University of Nottingham

School of Civil Engineering

Accuracy in Mechanistic Pavement Design Consequent upon Unbound Material Testing

Appendices

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Thesis submitted to the University of Nottingham
for the degree of Doctor of Philosophy

May 2001

Table of Contents

Appendix A Description and Classification of Materials used in this Study

Appendix B A European Approach to Road Pavement Design

Appendix C Results of the Instrumentation COMPARISON Experiment Conducted at LRSB (Phase 4)

Appendix D The Test Procedures for Phases 1,2 and 5

APPENDIX D.1 THE FIRST TEST PROCEDURE FOR TESTING SUBGRADE SOILS AND UNBOUND GRANULAR MATERIALS (TEST PROGRAMME I; PHASE 1)

APPENDIX D.2 THE SECOND TEST PROCEDURES FOR TESTING SUBGRADE SOILS AND UNBOUND GRANULAR MATERIALS (TEST PROGRAMME II; PHASE 2)

APPENDIX D.3 THE THIRD TEST PROCEDURES FOR TESTING SUBGRADE SOILS AND UNBOUND GRANULAR MATERIALS (TEST PROGRAMME III; PHASE 5)

Appendix E Results of the Apparatus Comparison using Artificial Specimen 'Round Robin' Experiment (Phase 3)

Appendix F The Repeated Load Triaxial Test Results for Phase 1, 2 and 5

APPENDIX F.1 RESULTS OF TEST PROGRAMME I FOR SUBGRADE SOILS AND UNBOUND GRANULAR MATERIALS (PHASE I)

APPENDIX F.2 RESULTS OF TEST PROGRAMME II FOR SUBGRADE SOILS AND UNBOUND GRANULAR MATERIALS (PHASE II)

APPENDIX F.3 RESULTS OF TEST PROGRAMME III FOR SUBGRADE SOILS AND UNBOUND GRANULAR MATERIALS (PHASE 5)

Appendix G The Analysis and Analytical Modelling of the Test Results

APPENDIX G.1 RESULTS OF TEST PROGRAMME I FOR SUBGRADE SOILS AND UNBOUND GRANULAR MATERIALS (PHASE 1)

APPENDIX G.2 RESULTS OF TEST PROGRAMME II FOR SUBGRADE SOILS AND UNBOUND GRANULAR MATERIALS (PHASE 2)

APPENDIX G.3 RESULTS OF TEST PROGRAMME III FOR SUBGRADE SOILS AND UNBOUND GRANULAR MATERIALS (PHASE 5)

APPENDIX G.4 SUMMARY OF THE CORRELATION COEFFICIENTS FOR TEST PROGRAMME I

APPENDIX G.5 INTRODUCTION OF A RANDOM ERROR OF DIFFERING VARIATION TO DATA

APPENDIX G.6 SUMMARY OF THE ANALYSIS PARAMETERS AND COEFFICIENTS FOR ALL THREE TEST PROGRAMMES

Appendix H Mechanistic Pavement Design

APPENDIX H.1 MECHANISTIC PAVEMENT DESIGN ANALYSES

APPENDIX H.2 PAVEMENT LIFE ESTIMATIONS

APPENDIX A DESCRIPTION AND CLASSIFICATION OF MATERIALS USED IN THIS STUDY

Appendix C. 1 Classification of European Road Construction Materials

Material Name	Code	Origin	Description	Atterberg limits						PSD	Compaction		Failure Strength				Suction	
				SG (t/m^3)	LL (%)	LP (%)	IP (%)	LS (%)	%Clay (%)		OMC (%)	ODD (kg/m^3)	Failure Equation (kPa)	p* (kPa)	ω (%)	dd (kg/m^3)	ω (%)	S (kPa)
London Clay	LOC	UK	Clay	2.76	71 76	23 25	48 51		54	✓			q_f=0.001p+86		36		26 36	25 40
Keuper Marl	KML	UK	Silty clay	2.69	37 34	18 18	19	16	33	✓								
Gault Clay	GLT	UK		2.69	61	25	36		39	✓								
Bothkenner Clay	BKC	UK			54	25	29			✓								
Seine et Marne Silt	LIM	F	Silt	2.69	36 37	24 21	12 16	1516		✓	17.0	1762	q_f=0.547p+109		20	2053	20	80
Gravely Silt	GRL	F																
Seine Maritime Silt	LIR	F	Silt															
Fountainebleau Sand	SFB	F	Sand	2.64						✓	5.5	1600	q_f=1.710p+26	15	0	1600	0	3
Barreiro Clayey Sand	BCS	P		2.70		27	17			✓								

Cont….

Material Name	Code	Origin	Description	Atterberg limits						PSD	Compaction		Failure Strength				Suction	
				SG (t/m^3)	LL (%)	LP (%)	IP (%)	LS (%)	%Clay (%)		OMC (%)	ODD (kg/m^3)	Failure Equation (kPa)	p* (kPa)	ω (%)	dd (kg/m^3)	ω (%)	S (kPa)
La Ennerie Sand	SEN	F	Sand	2.62	38	28				✓	7.1	2002						
Eastern Scheldt Sand	ESS	NL	Sand										q_f=1.680p+30	7.5				12.6
Hard Limestone	CCD	F	Crushed rock		---	---	---	---		✓	5.3 5.5	2430 2400	q_f=1.600p+30	19	3.3	2370		
Soft Limestone	CCT	F	Crushed rock		---	---	---	---		✓	5.1 5.5	2280 2260	q_f=1.700p+136	80	3.5	2250		
Microgranite	MIG	F	Crushed rock		---	---	---	---		✓	5.5 6.0	2150 2180	q_f=2.280p+61	27	3.3	2150		

Notes: Those materials in blue were used in this work

SG – Specific Gravity
LL – Liquid limit
LP – Plastic Limit
IP – Plasticity Index
LS – Linear Shrinkage
PSD – Particle Size Distribution (Grading)

OMC – Optimum Mositure Content
ODD – Optimum Dry Density
p* - Paramter related to the filure line of the material
ω – Moisture content
dd – Dry Density
S - Suction

APPENDIX B A EUROPEAN APPROACH TO ROAD PAVEMENT DESIGN

A1 A EUROPEAN APPROACH TO ROAD PAVEMENT DESIGN

European Community funded project DGXII - Contract No. SCI 0130-C(SMA).

Except from the Proceedings of the European Symposium Euroflex 1993, held in Lisbon, Portugal, 20-22 September 1993.

(A.A.Balkema, Rotterdam, Brookfield, 1996)

Flexible Pavements, Gomes Correia (ed.) © 1996 Balkema, Rotterdam. ISBN 90 5410 523 2

Preface

The 'Laboratório Nacional de Engenharia Civil – LNEC' (Portugal), the 'University of Nottingham – UNott' (United Kingdom), the 'Laboratoire Central des Ponts et Chaussées – LCPC' (France) and the 'Delft University of Technology – TUD' (Netherlands) were awarded a laboratory twinning project under the 'SCIENCE' program of the European Community – DG XII, entitled 'A European Approach to Road Pavement Design', contract no. SCI 0130-C(SMA). The purpose of this Symposium will be the presentation of both the results obtained during this project (papers of the Science program), and other selected relevant research that contributes to a European approach to road pavement design (papers outside the Science program).

AIMS OF THE SCIENCE PROJECT

The enormous increase of heavy traffic on roads, the need to economically use local materials and the availability of new road construction techniques all require the development of more effective pavement design methods than are available using current empirical techniques. Such methods require a rational study of the mechanical behaviour of the constituent materials and soil, more rigorous structural analysis, and appropriate analysis to match the actual pavement behaviour.

The construction and maintenance of flexible pavements of light and moderately trafficked roads in Europe and in developing countries are often uneconomical owing to defective understanding of the mechanical properties of pavement materials and foundation soils. This may lead to either overdesign, or underdesign and hence to early failure of the pavement. As the European Community member countries are the largest importers of bitumen in the world, improved knowledge about unbound granular materials and soil subgrade will provide a marked reduction in the construction and maintenance cost of bituminous pavements.

In Europe there is a need for cooperation between different laboratories in this work. This Science project aims to coordinate and harmonize the activities of the different laboratories working in this field.

The reliability of a structural method of road design depends on a mathematical model and on the quality of data with respect to the mechanical properties of the pavement materials and subgrade. Such properties (resilient and plastic) need to be determined by laboratory means and this has traditionally been through cyclic loading triaxial tests that can closely simulate structure. The suitability and/or limitations of the testing approach require investigation as the reliability of the pavement design depends upon it.

THE SYMPOSIUM

The Symposium embraced a wide scope of experimental and analytical research with respect to foundation and pavement design. For this purpose the Symposium has been divided into five

sessions: Sessions 1 and 2 have been devoted to the experimental determination and mathematical modelling of stress-strain behaviour of subgrade soils and unbound granular materials; Sessions 3 and 4 covered the non-linear pavement analysis and the pavement design. An emphasis is done to the harmonization of experimental methods. In addition to these sessions related with the Science program a Session 5 about monitoring and performance of flexible pavements was included, which contains only papers outside the Science program.

These contributions will greatly assist with the worldwide improvement in standards for testing subgrade soils and unbound granular materials and for flexible pavement design.

The future challenge will be implementing this experience to a larger cooperation between European research organizations.

The Coordinator of the Science Program and the President of the Symposium

A.Gomes Correia (Portugal)

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FINANCIAL ASSISTANCE
The Symposium is formally supported by
the Science Program of the European Community – DG XII
the 'Laboratório Nacional de Engenharia Civil'
the 'Instituto Superior Técnico' – Technical University of Lisbon.

APPENDIX C RESULTS OF THE INSTRUMENTATION COMPARISON EXPERIMENT CONDUCTED AT LRSB (PHASE 4)

Static Radial Test 1					
Time	Cell	Deviator	Strain		
	Pressure	Stress	SOW	Hoop	3-LVDT(R)
(sec)	(kPa)	(kPa)	(με)	(με)	(με)
0	0	0	-671	-128	-91
69	249	299	5949	7067	6488
82	249	299	5986	7151	6541
94	249	299	6013	7216	6582
107	249	299	6033	7260	6756
120	249	299	6049	7294	6785
132	249	299	6062	7327	6805
195	249	299	6110	7419	6873
258	249	299	6142	7475	6905
320	249	299	6165	7519	6938
383	249	299	6183	7546	6962
446	249	299	6197	7567	6981
508	249	299	6209	7586	6996
571	249	299	6220	7605	7009
634	249	299	6229	7623	7020
696	249	299	6238	7630	7029
999	249	299	6269	7672	6911
1302	249	299	6428	7706	6942
1604	249	299	6440	7728	6959
1907	249	299	6451	7750	6972
2210	249	299	6459	7758	6982
2512	249	299	6467	7777	6992
2815	249	299	6473	7782	7002
3118	249	299	6479	7797	7008
3420	249	299	6484	7813	7016
3723	249	299	6489	7813	7023
3757	0	0	533	801	716
3820	0	0	311	510	278
3883	0	0	236	404	215
3945	0	0	206	336	177
4008	0	0	140	287	149
4071	0	0	126	249	131
4134	0	0	116	220	190
4197	0	0	107	195	218
4260	0	0	96	176	86
4323	0	0	89	158	75
4626	0	0	64	104	39
4929	0	0	48	68	16
5232	0	0	35	46	-3
5535	0	0	26	25	-16
5837	0	0	21	11	78
6140	0	0	13	-7	-37
6443	0	0	8	-17	-42
6746	0	0	-50	-25	-56
7049	0	0	-54	-33	75
7352	0	0	-57	-41	73

Static Radial Test 2					
Time	Cell	Deviator	Strain		
	Pressure	Stress	SOW	Hoop	3-LVDT(R)
(sec)	(kPa)	(kPa)	(με)	(με)	(με)
0	0	0	-202	-216	-99
69	249	373	7635	8823	8166
82	249	373	7705	8941	8256
95	249	373	7752	9029	8314
108	249	373	7789	9098	8355
121	249	373	7823	9152	8388
134	249	373	7851	9176	8416
197	249	374	7932	9311	8504
260	249	374	7978	9380	8558
323	249	374	8044	9432	8601
385	249	374	8064	9478	8632
448	249	374	8080	9504	8656
511	249	374	8094	9528	8677
574	249	374	8109	9553	8696
637	249	374	8123	9576	8712
700	249	374	8149	9591	8726
1003	249	374	8224	9656	8781
1306	249	374	8251	9706	8818
1609	249	374	8276	9752	8846
1912	249	374	8293	9777	8869
2215	249	374	8308	9803	8888
2518	249	374	8320	9821	8904
2820	249	374	8332	9844	8918
3123	249	374	8388	9860	8933
3426	249	374	8396	9868	8943
3729	249	374	8403	9884	8954
3769	0	0	572	850	554
3832	0	0	365	575	408
3895	0	0	286	462	301
3958	0	0	235	387	254
4021	0	0	190	333	221
4084	0	0	173	292	198
4147	0	0	160	257	230
4211	0	0	147	231	158
4274	0	0	136	208	143
4337	0	0	104	183	130
4640	0	0	75	116	86
4943	0	0	55	69	62
5246	0	0	42	47	38
5549	0	0	8	29	20
5852	0	0	1	10	6
6156	0	0	-5	-2	-3
6459	0	0	-11	-20	-13
6762	0	0	-15	-28	-21
7065	0	0	-19	-35	-27
7368	0	0	-23	-43	-36

Static Radial Test 3					
Time	Cell	Deviator	Strain		
	Pressure	Stress	SOW	Hoop	3-LVDT(R)
(sec)	(kPa)	(kPa)	(με)	(με)	(με)
0	0	0	10	-39	-25
52	100	200	3857	4625	4187
65	100	200	3902	4709	4244
78	100	200	3932	4763	4279
91	100	200	3951	4794	4301
104	100	200	3966	4823	4321
117	100	200	3979	4844	4334
180	100	200	4018	4915	4382
243	100	200	4037	4955	4409
306	100	200	4051	4983	4429
369	100	200	4061	5005	4471
432	100	200	4070	5018	4456
495	100	200	4077	5030	4464
557	100	200	4084	5049	4475
620	100	200	4144	5055	4483
683	100	200	4148	5062	4490
986	100	200	4163	5087	4514
1289	100	200	4172	5102	4530
1592	100	200	4180	5116	4540
1895	100	200	4187	5127	4548
2198	100	200	4191	5132	4554
2501	100	200	4196	5140	4561
2804	100	200	4200	5143	4566
3107	100	200	4203	5151	4574
3410	100	200	4206	5156	4576
3713	100	200	4209	5158	4581
3733	0	0	339	530	361
3796	0	0	204	331	220
3859	0	0	165	264	177
3922	0	0	144	220	150
3985	0	0	112	190	131
4048	0	0	102	166	116
4111	0	0	94	147	105
4174	0	0	88	133	94
4237	0	0	82	122	86
4301	0	0	78	111	79
4604	0	0	61	70	57
4907	0	0	20	45	34
5210	0	0	13	32	21
5513	0	0	7	15	12
5816	0	0	2	8	5
6119	0	0	-1	1	-3
6422	0	0	-4	-14	-9
6725	0	0	-7	-19	-8
7029	0	0	-10	-22	-19
7332	0	0	-12	-26	-22

Static Axial Test					
Time	Cell	Deviator	Strain		
	Pressure	Stress	2-LVDT(A)	3-LVDT(A)	Top
(sec)	(kPa)	(kPa)	(με)	(με)	(με)
0	0	0	-104	-610	-214
46	100	150	7336	6163	7926
58	100	150	7422	6139	7989
71	100	150	7474	6141	8029
84	100	150	7512	6128	8060
97	100	150	7541	6202	8085
110	100	150	7565	6178	8105
173	100	150	7641	6230	8173
235	100	150	7688	6251	8216
298	100	150	7722	6253	8248
361	100	150	7748	6301	8271
424	100	151	7770	6291	8291
487	100	151	7788	6309	8308
549	100	151	7805	6297	8323
612	100	151	7834	6337	8339
675	100	151	7839	6348	8349
978	100	151	7879	6411	8389
1281	100	151	7912	6482	8420
1583	100	151	7936	6445	8442
1886	100	151	7956	6383	8461
2189	100	151	7971	6410	8475
2492	100	151	7985	6390	8488
2794	100	150	7997	6417	8499
3097	100	150	8011	6414	8510
3400	100	150	8018	6425	8518
3703	100	150	8027	6445	8526
3785	0	0	496	316	542
3848	0	0	279	197	334
3910	0	0	213	138	268
3973	0	0	174	133	227
4036	0	0	147	73	197
4099	0	0	126	67	172
4161	0	0	109	79	154
4224	0	0	95	67	138
4287	0	0	83	57	127
4350	0	0	73	30	116
4653	0	0	37	25	79
4955	0	0	13	29	53
5258	0	0	-3	-15	34
5561	0	0	-16	24	19
5864	0	0	-26	-16	6
6167	0	0	-34	12	-4
6469	0	0	-42	25	-12
6772	0	0	-47	-4	-19
7075	0	0	-53	-26	-25
7378	0	0	-58	21	-31

Dynamic Radial Test						
Cycle		Cell Pressure (sec)	Deviator Stress (kPa)	Strain		
				SOW (με)	Hoop (με)	3-LVDT(R) (με)
50	min	0	0	0	0	0
	max	99	249	4689	5430	5036
80	min	0	0	0	0	0
	max	99	249	4683	5448	5066
100	min	0	0	0	0	0
	max	99	249	4679	5443	5079
50	min	0	0	0	0	0
	max	99	198	3608	4297	4003
80	min	0	0	0	0	0
	max	99	198	3599	4294	4016
100	min	0	0	0	0	0
	max	99	198	3607	4272	4022
50	min	0	0	0	0	0
	max	100	149	2550	3156	2992
80	min	0	0	0	0	0
	max	100	149	2542	3136	3004
100	min	0	0	0	0	0
	max	100	149	2542	3128	3007
50	min	0	0	0	0	0
	max	100	98	1505	2020	1948
80	min	0	0	0	0	0
	max	100	98	1500	1999	1950
100	min	0	0	0	0	0
	max	100	98	1499	2046	1953
50	min	0	0	0	0	0
	max	100	49	568	918	960
80	min	0	0	0	0	0
	max	100	48	566	968	953
100	min	0	0	0	0	0
	max	100	48	565	889	963
50	min	0	0	0	0	0
	max	100	23	226	374	483
80	min	0	0	0	0	0
	max	100	23	225	378	485
100	min	0	0	0	0	0
	max	100	23	225	422	489
50	min	0	0	0	0	0
	max	100	4	-12	62	1
80	min	0	0	0	0	0
	max	100	1	-13	78	6
100	min	0	0	0	0	0
	max	100	5	-13	15	7

APPENDIX D THE TEST PROCEDURES FOR PHASES 1,2 AND 5

Appendix D.1 THE FIRST TEST PROCEDURE FOR TESTING SUBGRADE SOILS AND UNBOUND GRANULAR MATERIALS (TEST PROGRAMME I; PHASE 1)

Appendix D The Test Procedures for Phases 1,2 and 5

Appendix D. 1 The First Test Programme for Subgrade Soils and Unbound Granular Materials

The aim of these tests was to compare the test methods and equipment of the four participating laboratories and to observe the behaviour of various materials under loads typical of a pavement structure.

Three different soils were to be tested:

- Fontainebleau Sand (SFB);
- Seine et Marne Silt (LIM);
- London Clay (LOC).

Three different unbound granular materials were to be tested:

- Microgranite (MIG);
- Hard Limestone (CCD);
- Soft Limestone (CCT).

Test Procedure for Subgrade Soils

Specimen Preparation

Where possible use a specimen with a 76 mm diameter and a height of 140 mm or as close as possible. Prepare the correct quantity of soil to the correct moisture content.

Compact the SFB dry to 100% of the maximum density as stipulated by the normal proctor compaction test, The LIM and LOC are to be compacted to 95% of the maximum density as stipulated by the normal proctor compaction test. Where possible use a vibrating table to compact the SFB sand and proctor hammer for LIM and LOC. For both compaction methods the material should be placed in the mould in five layers, and the moisture content determined from 200 g of remaining material. Before removing the SFB from the mould apply an internal vacuum to the specimen of 15 kPa to prevent the specimen collapsing. Determine the weight and measure each specimen accurately and calculate the dry density. If the dry density differs by more than 16 kg/m^3 from that specified prepare another specimen adjusting the number of tamps or vibration time as required.

Once the specimen is mounted in the triaxial apparatus apply an external confining pressure of p = 15 kPa, and monitor the strain (both radial and axial) until stabilisation is reached, (see definition page). The drainage inlets will be open to the atmosphere, use some method to prevent loss of moisture, (a disk of unwoven geotextile [100 g/m^2] compressed and sprayed with a water-resistant silicone emulsion aerosol placed between the specimen and the porous plate).

Conditioning.

Apply 200 repeated vertical stress pulses (pre-loading) such that $q_{Max} = 0.5\, q_{failure}$, (see the definition of a stress path and failure on the definition page). Use haversine wave form with 1 sec rest period and 1 sec loading. After loading monitor strain until stabilisation is reached.

Resilient Deformation Test.

Apply 50 cycles of vertical stress and confining pressure (in phase) for:

q_{Max} (=q_r) = 5, 15, 30, 45, 60, 75, 90 kPa.

Use these qr values for each of the following stress ratios q/p_r = 3.0, 2.5, 1.5, 1.0, 0.5. Always begin with qr/pr = 3.0. Never exceed $q_{Max} = 0.5\, q_{failure}$, see the stress path diagram attached.

Isotropic Loading

For each of the following confining pressures conduct the following stress paths:

For $q_r/p_r = 0$ (isotropic loading) use:

Consolidation at σ_3 = 15 kPa,

$$p_{Max} = \sigma_3 + pr = 20, 30 \text{ kPa.}$$

Consolidation at σ_3 = 30 kPa,

$$p_{Max} = \sigma_3 + pr = 35, 45, 60 \text{ kPa.}$$

Consolidation at σ_3 = 60 kPa,

$$p_{Max} = \sigma_3 + pr = 65, 75, 90, 120 \text{ kPa.}$$

Raise confining pressure to σ_3 = 30 kPa and wait for strain stabilisation.

Repeat isotropic loading

Raise confining pressure to σ_3 = 60 kPa and wait for strain stabilisation.

Repeat isotropic loading

Once complete record the results in the format as show ... isotropic and resilient.

Permanent Deformation Test.

After strain stabilisation, Apply a repeated vertical stress such that $q_{Max} = 0.5\, q_{failure}$ for 100000 cycles. Use a simple sine wave at 5 Hz, if possible. Record stress and strains at the following number of cycles: 20, 50, 100, 200, 400, 1000, 2500, 5000, 10000, 25000, 50000, 100000.

Once complete record the results in the format as shown in table....

Specimen Failure.

If possible record the failure strength for the specimen (at a constant confining pressure of σ_3 = 60 kPa).

Note: If equipment allows, monitor suctions before the repeated loading is applied on the specimen and after stabilisation for each confining pressure.

Test Procedure for Unbound Granular Materials

Introduction.

The aim of these tests is to compare the test methods and equipment of the four participating laboratories and to observe the behaviour of various unbound granular materials under loads typical of a pavement structure.

Three different unbound granular materials are to be tested:

- Microgranite (MIG)
- Hard Limestone (CCD)
- Soft Limestone (CCT)

Specimen Preparation.

Prepare the aggregate to optimum moisture content less 2% as defined by the modified Proctor test.

Compact the specimen to 98% of the maximum density at the chosen moisture content as stipulated by the modified proctor compaction test. If possible use a vibratory compaction technique. Determine the weight and measure the specimen accurately then calculate the dry density. If the dry density differs by more than 16 kg/m^3 from that specified prepare another specimen adjusting the vibration time or other as required.

Once mounted in the apparatus apply an external confining pressure of p= 30 kPa, or its "equivalent internal vacuum", and monitor the strain (both radial and axial) until stabilisation is reached. The drainage inlets are to be open to the atmosphere, use some method to prevent loss of moisture, (a disk of unwoven geotextile [100 g/m^2] compressed and sprayed with a water-resistant silicone emulsion aerosol placed between the specimen and the porous plate).

Permanent Deformation Test.

Apply a repeated vertical stress such that $q_{Max} = 0.5\ q_{failure}$, see the stress path diagram attached, for 100000 cycles. Use a simple sine wave at 5 Hz, if possible. Record stress and strains at the following number of cycles: 20, 50, 100, 200, 400, 1000, 2500, 5000, 10000, 25000, 50000, 100000.

Resilient Deformation Test.

Once the permanent deformation test is complete leave the specimen under a confining pressure of p = 15 kPa and monitor strains until stabilisation.

Apply 100 cycles, record the last 10, of vertical stress and confining pressure (in phase) for q_{Max} (=q_r) = 15, 30, 45, 60, 75, 100, 150, 200, 300, 400 kPa. Use these q values for each of the following stress ratios q/p_r = 3.0, 2.5, 1.5, 1.0, 0.5. Begin always with q_r/p_r = 3.0. Never exceed $q_{Max} = 0.5\ q_{failure}$ (for $p+p_r$), see the stress path diagram attached.

Isotropic Loading

For each of the following confining pressures conduct the following stress paths:

For q_r/p_r = 0 (isotropic loading) use:

Consolidation at σ_3 = 15 kPa,

$p_{Max} = \sigma_3 + pr = 30, 45, 60$ kPa.

Consolidation at $\sigma_3 = 30$ kPa,

$p_{Max} = \sigma_3 + pr = 45, 60, 90, 120$ kPa.

Consolidation at $\sigma_3 = 60$ kPa,

$p_{Max} = \sigma_3 + pr = 75, 90, 120, 150, 180, 240$ kPa.

Raise confining pressure to $\sigma_3 = 30$ kPa and wait for strain stabilisation.

Repeat Isotropic Loading

Raise confining pressure to $\sigma_3 = 60$ kPa and wait for strain stabilisation.

Repeat Isotropic Loading

Specimen Failure.

If possible record the failure strength for the specimen (at a constant confining pressure of $\sigma_3 = 60$ kPa).

Appendix D.2 THE SECOND TEST PROCEDURES FOR TESTING SUBGRADE SOILS AND UNBOUND GRANULAR MATERIALS (TEST PROGRAMME II; PHASE 2)

Appendix D. 2 The Second Test Programme for Subgrade Soils and Unbound Granular Materials

Introduction

Resulting from Test Programme I it was realised that there is a need to conduct a single test in conditions common to all the laboratories. Thus, the aim of these tests is to compare the measured deformations from different triaxial equipment with tests carried out on the same material under the same conditions using a standard procedure and also to investigate the repeatability of test results within a single laboratory.

Each laboratory will carry out tests on three specimens of:

- London Clay LOC
- MicroGranite MIG

Since DUT and LNEC test unbound granular material specimens of large diameters, 400 mm and 300 mm respectively, and thus do not contain the specimens in a cell a procedure was developed so that all the laboratories may follow it. This procedure is made up of two levels.

Level A applies to all of the laboratories since it consists of tests with a stress ratio of $q_r/p_r = 3$ only.

Level B and is to be carried out as a second stage of the procedure by UNOT and LRSB only since they contain the specimens in cells and are able to apply a stress ratio of $q_r/p_r = 1$.

Test Procedure for Subgrade Soils.

Sample preparation.

The natural water content of the material, as supplied, is about 36%. The specimens are to be compacted at this moisture content in five layers, the number of blows applied to each layer are to be calculated to achieve the specific energy of the Standard Proctor Compaction.

Specific energy of standard normal proctor = 6.048 kg.cm/cm^3, thus for a specimen of particular volume (V) the total number of blows (n) will be given by:

$$n = 7.953 \times 10^{-2} V$$

For example, a specimen of 76 mm diameter and 150 mm height will be compacted with a total number 54 blows, thus 5 layers of 10; 11; 11; 11; 11 blows. Note use always the lower number of blows in the first layers.

When mounting the specimen in the apparatus place a disk of waterproof geotextile (treated with silicone emulsion) between the specimen and the platens (top and bottom). The drainage system is dry and open to the atmosphere.

Once completed leave the specimen for two days (three nights) to allow for moisture content equilibrium before starting the test. During this period the drainage system is to be closed to the atmosphere.

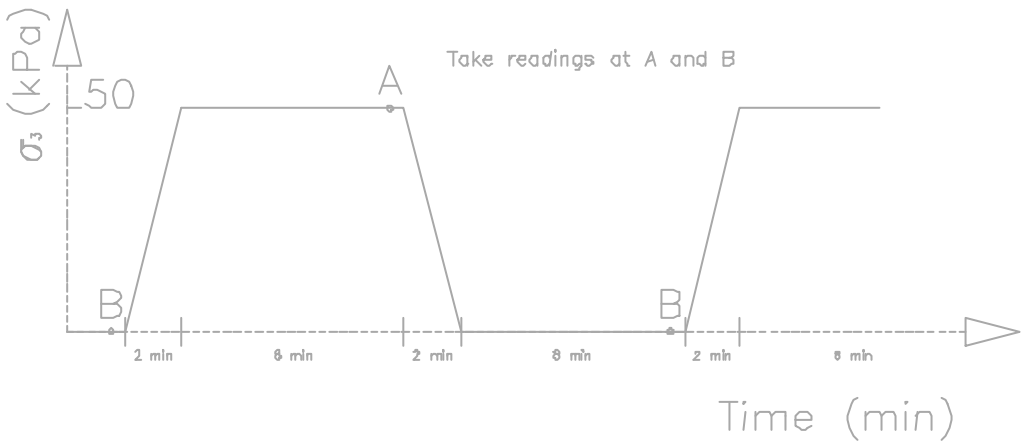
Once moisture content equilibrium has been attained open the drainage system is open to the atmosphere. Apply a cell pressure of 15 kPa and allow the specimen to reach strain stabilisation, as defined previously.

Isotropic Loading Test 1

Apply 10 cycles for each of the following cell pressures:

s3r = 15; 30; 45 kPa.

The measurements of stress and strains are recorded at each cycle at points A and B, as shown:



Between the different stress levels wait for strain stabilisation.

Resilient loading test.

The repeated deviator stress applied is to have a haversine wave form with a frequency of 1 second loading and 1 second rest period.

These tests are to be carried out with $q_r/p_r = 3$, and at a constant cell pressure. Apply 50 cycles, recording the last 10, of the following stress levels:

q_r = 15; 30 kPa.

Between the different stress levels wait for strain stabilisation.

Apply a cell pressure $\sigma_3 = 30$ kPa and allow time for strain stabilisation. Apply 50 cycles, recording the last 10, at the following stress levels:

qr = 15; 30; 45 kPa.

Between the different stress levels wait for strain stabilisation.

Apply a cell pressure s3 = 30 kPa and allow the time for strain stabilisation. Apply 50 cycles, recording the last 10, at the following stress levels:

qr = 15; 30; 45; 60 kPa.

Between the different stress levels wait for strain stabilisation.

Isotropic loading test 2.

Apply 10 cycles for each of the following cell pressures:

σ_3r = 15; 30; 45; 60 and 75 kPa.

Between the different stress levels wait for strain stabilisation.

Permanent deformation test.

Keeping the cell pressure at $\sigma_3 = 60$ kPa, wait for strain stabilisation. This test is carried out with qr/pr = 3, thus at a constant cell pressure. Apply a deviator stress of qr = 90 kPa for 100000 cycles. Use a simple sine wave at a frequency of 5 Hz, if possible. Record stress and strains at the following number of cycles:

N = 20, 50, 100, 200, 400, 1000, 2500, 5000, 10000, 25000, 50000, 75000, 100000.

Test Procedure for Unbound Granular Materials

Specimen preparation.

The tests will be carried out on three specimens of Microgranite (MIG), at a dry density of 2140 kg/m^3 and moisture content of 3.3 %.

The large diameter specimens (TUD, LNEC), the specimens are to be compacted in a number of layers, at the required water content (3.3 %) using a vibrating hammer with a compaction plate.

The smaller diameter specimens (UNott, LRSB), the specimens are to be compacted by vibration at the optimum moisture content (5.3%). At UNott the specimen should be compacted in a number of layers, then the water content is reduced to 3.3% by draining the specimen using a vacuum. At LRSB the specimen should be compacted in only one layer by vibrocompression at the optimum moisture content and then the water content is reduced to 3.3% by drying the specimen in an oven at 40°C.

The triaxial tests are to be conducted after conditioning of the specimen at 20°C ± 3°C for a minimum of 3 days but not exceeding a maximum of 7 days.

The repeated load triaxial tests are to be conducted at constant water content. For this, a waterproof geotextile disk (treated with silicone emulsion) is to be placed between the specimen and the drainage bases of the cell. During the test the drainage systems are to be open to the atmosphere.

Isotropic Loading 1

To take into consideration the differences and abilities of the different test equipment, a series of 5 isotropic loading/ unloading are to be applied manually under the following conditions:

σ_{3min} = 0 kPa; σ_{3max} = 50 kPa

Once complete reduce the cell pressure to 0 kPa and allow time for strain stabilisation.

Permanent/ conditioning deformation test.

The stress ratio q_r/p_r = 3 and the following cell pressure and deviator stresses are to be applied for 20000 cycles.

$\sigma_{3(constant)}$ = 50 kPa;

q_{min} = 0 kPa; q_{max} = 130 kPa.

The frequency of the loading is to be between 0.5 and 1 Hz depending on the capability of the equipment, 1 Hz if possible. Record stresses and strains at cycles:

N = 20, 50, 100, 200, 400, 1000, 2500, 5000, 7500, 10000, 12500, 15000, 20000.

Once complete reduce the cell pressure to 0 kPa and allow time for strain stabilisation.

Isotropic Loading 2

Repeat isotropic loading

Resilient Behaviour Test 1

The stress ratio is to be q/p_r = 3. Apply the chosen cell pressure and allow time for strain stabilisation. Apply 100 cycles under the chosen deviator stress and record the last 10 cycles, for the following stress conditions:

σ3 = 15 kPa;	qr = 15, 30, 45, 60 kPa
σ3 = 30 kPa;	qr = 25, 50, 75, 100 kPa
σ3 = 45 kPa;	qr = 30, 60, 90, 120 kPa

Report values at cycle number 100, or 90 and 100 if significant differences between the strains are found.

Reduce the deviator stress q = 0 kPa, and cell stress σ_3 = 0 kPa, wait for strain stabilisation.

Isotropic loading 3.

Repeat isotropic loading

Resilient Behaviour Test 2

The stress ratio is to be q_r/p_r = 1. This test series can only be conducted by UNOT and LRPC because it required a variable cell pressures. Apply 100 cycles, records as with the resilient test 1, for the stress conditions as shown below:

Stress Levels for Variable Confining Pressure Test

σ_3 (kPa)		q (kPa)		σ_3 (kPa)		q (kPa)		σ_3 (kPa)		q (kPa)	
Min	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
15	55	0	60	30	70	0	60	45	85	0	60
15	95	0	120	30	110	0	120	45	125	0	120
15	135	0	180	30	150	0	180	45	165	0	180

Once complete reduce the cell pressure to 0 kPa and wait for strain stabilisation.

Isotropic loading 4.

Repeat isotropic loading

Appendix D.3 THE THIRD TEST PROCEDURES FOR TESTING SUBGRADE SOILS AND UNBOUND GRANULAR MATERIALS (TEST PROGRAMME III; PHASE 5)

Appendix D. 3 The Third Test Programme for Subgrade Soils and Unbound Granular Materials

The aim of these tests is to characterise the resilient and permanent behaviour of different soils over which pavements in Europe may be constructed. The results of these tests were incorporated in the analysis of typical European Pavement structures in order to establish a European Pavement Design Method.

The soils to be tested are listed below. The moisture content and the density were chosen to match representative situations of soils under pavements in Europe.

Subgrade Soils Tested

Material	Laboratory	Test Moisture Content			Dry Density (% of MDD)
		w1	W2	W3	
LOC	LNEC	S = 70%	S = 80%	S =90%	90%
LIM	LNEC	S = 70%	S = 80%	S =90%	97%

The permanent behaviour tests are to be conducted on 2 specimens for each of the different stress paths specified below, but for only the moisture content W2.

For each stress path apply 80 000 cycles with a frequency of loading of 1 Hz. Strains, stresses and pore water (if measurement is possible), are to be recorded at the following cycles:

N = 10, 20, 50, 100, 200, 400, 1000, 2500, 5000, 7500, 10000, 12500, 15000, 20000, 40000, 60000, 80000.

Permanent Behaviour Stress Paths

Consolidation pressure σ_3 (kPa)	Cyclic deviator stress q_r (kPa)
10	0.65 q_{fail}
10	0.50 q_{fail}
10	0.35 q_{fail}
30	0.65 q_{fail}
30	0.50 q_{fail}
30	0.35 q_{fail}

The results are to be recorded in the standard format as described in the previous chapter.

The aim of the tests conducted on the unbound granular materials is to characterise the resilient and permanent behaviour of common unbound granular materials used in road construction in Europe. The experimental values obtained from this laboratory testing may be compared with previous values obtained in full-scale tests on the same materials. Thus material parameters may be used in the computer analysis of typical European pavement structures comprising of these materials, resulting from this new design criteria may be validated and analysed.

The unbound granular material to be tested are listed below, the moisture contents are chosen to match those found in the materials after the full scale tests conducted at LCPC - Nantes, except the DNG which was used in full scale tests at Dresden University of Technology.

Unbound Granular Materials Tested.

Material and code	Test Moisture Content		Test density (kg/m^3)
	W1 (%)	W2 (%)	
Soft Limestone (CCT)	3.5	4.5	2250
Hard Limestone (CCD)	2.0	4.3	2370
Microgranite (MIG)	3.3	4.3	2150

Test Procedure for Subgrade Soils

Specimen Preparation

The preparation of the specimens is be conducted by normal Proctor compaction. If possible, the specimen will be prepared at the above specified moisture content and compacted with the compaction energy to achieve the desired density. If this is not possible, the specimen will be compacted at a higher moisture content and then dried to the desired water content. The compaction is to be done in five layers.

After compaction, weigh the specimen to the nearest gram. Determine the average height and diameter to the nearest 0.25 mm, and calculate the dry density. If the dry density differs by more than 16 kg/m^3 from that specified, prepare another specimen.

The repeated load triaxial tests are to be conducted at a constant water content. For this during the test the water drainage system will be closed and the air system open to the atmosphere.

Two specimens are to be tested for each different characteristics listed, if the results of the two specimens do not agree then a third specimen is to be tested, thus three specimens should be made from a single batch of material to insure uniformity.

Conditioning Test

Apply a cell pressure σ_3 = 10 kPa, and allow time for strain stabilisation. Apply 80 000 cycles of a deviator stress $q_{max} = 0.6\, q_{failure}$. The frequency of loading is to be 1 Hz. Strains, stresses and pore water (if measurement is possible), are to be recorded at the following cycles:

N = 10, 20, 50, 100, 200, 400, 1000, 2500, 5000, 7500, 10000, 12500, 15000, 20000, 40000, 60000, 80000.

Keeping the cell pressure at 10 kPa allow time for strain stabilisation.

Resilient behaviour test.

Apply 50 cycles of vertical stress and cell pressure (in phase) for:

q_{max} = 20, 40, 60, 80 kPa.

Use these q values for each of the following repeated stress ratios q/p_r = 3 and 1.5. Never exceed $q_{max} = 0.5\, q_{failure}$. Begin always with q_r/p_r = 3 and the maximum q_r possible. Use haversine wave form with 1second rest period and 1 second loading. Record the values of strains, stresses and pore water (if possible) at cycles 49 and 50.

Apply a cell pressure of σ_3 = 30 kPa and allow time for strain stabilisation and repeat.

Apply a cell pressure of σ_3 = 45 kPa and allow time for strain stabilisation and repeat.

Test Procedure for Unbound Granular Materials

Specimen preparation.

To investigate the influence of moisture content on the behaviour of these materials two resilient tests should be conducted, one at each of the two different moisture contents,

T1 and T2. Four permanent tests on different specimens should be conducted, one for each of the different stress levels at the moisture content, T1.

Two specimens are to be tested for each different characteristic listed to insure uniformity, thus if the results of the two specimens do not agree then a third specimen is to be tested. The compaction methods for the specimens at moisture content, T1 is to to compact the specimens at the optimum moisture content in one layer by vibrocompression. The water content is reduced to the correct moisture content for testing by drying the specimen in an oven at 40°C.

The specimens at moisture content, T2 are to be compacted in one layer by vibrocompression at the correct moisture content for testing. Once compacted the specimens are to be conditioned at 20°C ± 3°C for a minimum of 3 days but not exceeding a maximum of 7 days.

Since the specimens are to be kept at a constant moisture content, a waterproof geotextile disk (treated with silicone emulsion) is to be placed between the specimen and the drainage bases of the cell. During the test the drainage systems are to be open to the atmosphere.

Specimen conditioning test.

The conditioning stress ratio is qr/pr = 2.5. 20000 cycles are to be applied for each stress path at a loading frequency of between 20 and 30 cycles a minute. The stress levels are as follows:

σ_{3min} = 0 kPa; σ_{3max} = 100 kPa

q_{min} = 0 kPa; q_{max} = 600 kPa

Record the stresses and strains at the following cycles:

N = 20, 50, 100, 200, 400, 1000, 2500, 5000, 7500, 10000, 12500, 15000, 20000.

Once conditioning is completed reduce the cell pressure to 0 kPa and allow time for strain stabilisation.

Resilient behaviour test.

The stress paths for the resilient testing of the materials are shown below. Apply the stipulated cell pressure and allow time for strain stabilisation. Apply 100 cycles under the stress level and record the values from cycle 90 to 100. The frequency of the loading is to be at between 20 and 30 cycles a minute.

Resilient Stress Paths

σ_3 (kPa)		q (kPa)		q_r/p_r	σ_3 (kPa)		q (kPa)		q_r/p_r
Min	**Max**	**Min**	**Max**		**Min**	**Max**	**Min**	**Max**	
0	50	0	30	0.5	15	65	0	30	0.5
0	100	0	60	0.5	15	115	0	60	0.5
0	175	0	105	0.5	15	190	0	105	0.5
0	250	0	150	0.5	15	265	0	150	0.5
0	50	0	150	1.5	15	65	0	150	1.5
0	100	0	300	1.5	15	115	0	300	1.5
0	150	0	450	1.5	15	165	0	450	1.5
0	200	0	600	1.5	15	215	0	600	1.5
0	30	0	180	2.0	15	45	0	180	2.0
0	60	0	360	2.0	15	75	0	360	2.0
0	100	0	600	2.0	15	115	0	600	2.0
0	10	0	150	2.5	15	25	0	150	2.5
0	15	0	225	2.5	15	30	0	225	2.5
0	20	0	300	2.5	15	35	0	300	2.5

Once complete reducer the cell pressure to 0 kPa and allow time for strain stabilisation.

Permanent behaviour test.

Apply 80000 cycles at a loading frequency of between 20 and 30 cycles a minute. The stress levels and the stress ratios q/p_r are shown below. Record the stresses and strains at the following cycles:

N = 20, 50, 100, 200, 400, 1000, 2500, 5000, 7500, 10000, 12500, 15000, 20000, 40000, 60000, 80000.

Permanent Stress Paths

Path Name	Cell Pressure [σ_3] (kPa)		Deviator stress [q] (kPa)		q_r/p_r
	min	max	min	max	
P1	0	20	0	300	2.5
P2	0	100	0	600	2.0
P3	0	200	0	600	1.5
P4	0	75	0	300	1.7

APPENDIX E RESULTS OF THE APPARATUS COMPARISON USING ARTIFICIAL SPECIMEN 'ROUND ROBIN' EXPERIMENT (PHASE 3)

Phase 3 - Artificial Specimen - LNEC
Polytetrafluoretylene (PTFE) Specimen

LNEC1	144 mm x 76 mm			
Date:	7 April 1992			
	Temperature =	19-22 °C		
Time	Confining	Deviator	Strain	
	Pressure	Stress	ε1	ε3
sec	kPa	kPa	με	με
0	0	0	0	0
2	4	0	0	4
4	12	0	0	13
6	19	0	0	27
8	32	0	0	62
10	68	0	0	137
12	174	0	0	296
14	235	0	0	371
16	245	0	0	393
18	247	0	25	407
120	250	0	0	473
240	251	0	-25	500
480	251	0	0	522
720	251	0	-25	535
960	251	0	-25	548
1200	251	0	0	557
1440	251	0	0	561
1680	251	0	0	566
1920	251	0	0	566
2160	251	0	-25	570
2400	251	0	0	579
2640	250	0	-25	584
2880	250	0	-50	588
3120	250	0	-25	588
3360	250	0	-25	588
3600	250	0	-50	597
3602	247	0	-50	597
3604	245	0	-25	597
3606	134	0	-50	539
3608	52	0	-50	473
3610	18	0	-50	429
3612	6	0	-50	389
3614	0	0	-50	371
3616	0	0	-76	358
3618	0	0	-76	349
3720	0	0	-76	217
3840	0	0	-76	172
4080	0	0	-101	159
4320	0	0	-76	141
4560	0	0	-76	124
4800	0	0	-76	115
5040	0	0	-101	93
5280	0	0	-76	84
5520	0	0	-76	80
5760	0	0	-76	71
6000	0	0	-76	62
6240	0	0	-101	53
6480	0	0	-101	49
6720	0	0	-101	44
6960	0	0	-126	40
7200	0	0	-101	-31

Phase 3 - Artificial Specimen - LNEC
Polytetrafluoretylene (PTFE) Specimen

LNEC2	144 mm x 76 mm			
Date:	8 April 1992			
	Temperature =	19-22 °C		
Time	Confining	Deviator	Strain	
	Pressure	Stress	ε1	ε3
sec	kPa	kPa	με	με
0	0	0	0	0
2	0	12	176	-75
4	123	154	1966	-880
6	248	248	3578	-1592
8	249	387	4788	-2339
10	249	384	4964	-2458
12	250	385	5141	-2542
14	249	390	5242	-2582
16	249	399	5368	-2670
18	249	393	5418	-2688
120	249	377	5821	-2913
240	249	396	6275	-3170
480	249	395	6527	-3320
720	249	407	6728	-3453
960	249	401	6804	-3484
1200	250	400	6804	-3515
1440	249	402	6854	-3555
1680	250	393	6829	-3563
1920	249	399	6905	-3608
2160	250	388	6804	-3550
2400	250	384	6703	-3519
2640	249	401	6955	-3656
2880	249	398	6930	-3643
3120	249	399	6955	-3683
3360	249	399	6980	-3687
3600	249	393	6930	-3656
3602	246	387	6905	-3634
3604	234	404	6930	-3683
3606	224	406	7006	-3718
3608	214	390	6930	-3705
3610	205	397	6955	-3727
3612	197	401	7106	-3767
3614	189	396	6930	-3705
3616	182	401	6980	-3749
3618	174	396	6905	-3723
3720	0	0	781	-535
3840	0	0	529	-407
4080	0	0	328	-332
4320	0	0	227	-296
4560	0	0	151	-283
4800	0	0	101	-270
5040	0	0	50	-270
5280	0	0	25	-261
5520	0	0	-25	-248
5760	0	0	-50	-243
6000	0	0	-76	-243
6240	0	0	-101	-239
6480	0	0	-151	-230
6720	0	0	-126	-230
6960	0	0	-151	-221
7200	0	0	-151	-225

Phase 3 - Artificial Specimen - LNEC
Polytetrafluoretylene (PTFE) Specimen

LNEC3	144 mm x 76 mm			
Date:	9 April 1992			
	Temperature =	19-22 °C		
Time	Confining	Deviator	Strain	
	Pressure	Stress	ε1	ε3
sec	kPa	kPa	με	με
0	0	0	0	0
2	0	4	252	-133
4	0	31	277	-190
6	0	67	1210	-588
8	2	447	5393	-2962
10	61	546	6577	-3647
12	95	570	7182	-3944
14	98	590	7434	-4094
16	98	579	7610	-4182
18	98	582	7736	-4262
120	99	597	8921	-4899
240	99	611	9450	-5181
480	99	603	9828	-5411
720	99	602	10030	-5531
960	99	610	10181	-5632
1200	99	613	10256	-5703
1440	99	613	10357	-5756
1680	99	626	10634	-5937
1920	99	604	10433	-5783
2160	98	615	10584	-5902
2400	98	616	10634	-5946
2640	99	617	10685	-5986
2880	98	615	10685	-6008
3120	98	601	10483	-5893
3360	98	612	10660	-5995
3600	98	612	10685	-6017
3602	77	606	10634	-6008
3604	74	608	10634	-6013
3606	72	605	10634	-6013
3608	70	609	10634	-6017
3610	66	538	9551	-5522
3612	1	267	5998	-3731
3614	0	49	3352	-2255
3616	0	7	2898	-1897
3618	0	0	2646	-1737
3720	0	0	1739	-1163
3840	0	0	1008	-752
4080	0	0	655	-561
4320	0	0	504	-473
4560	0	0	403	-420
4800	0	0	328	-385
5040	0	0	252	-354
5280	0	0	202	-332
5520	0	0	151	-318
5760	0	0	126	-305
6000	0	0	101	-292
6240	0	0	50	-283
6480	0	0	25	-279
6720	0	0	0	-270
6960	0	0	-25	-265
7200	0	0	-25	-261

Phase 3 - Artificial Specimen - U.Nottingham
Polytetrafluoretylene (PTFE) Specimen

UNOT11	320 mm x 160 mm			
Date:	17 february 1992			
	Temperature =	24 °C		
Time	Confining	Deviator	Strain	
	Pressure	Stress	ε1	ε3
sec	kPa	kPa	με	με
2	65	0	0	0
10	145	0	15	114
20	216	0	38	189
30	244	0	38	271
40	245	0	46	374
50	245	0	46	405
60	245	0	46	414
120	246	0	46	291
180	247	0	53	220
240	247	0	46	181
300	247	0	46	153
360	248	0	38	134
420	248	0	30	122
480	248	0	30	106
540	249	0	23	94
600	248	0	23	102
900	249	0	15	78
1200	249	0	15	78
1500	248	0	8	70
1800	248	0	8	74
2100	248	0	15	86
2400	248	0	8	78
2700	248	0	8	78
3000	248	0	8	66
3300	248	0	0	78
3600	248	0	0	78
3610	248	0	0	90
3620	240	0	8	90
3630	216	0	0	125
3640	127	0	-15	55
3650	61	0	-23	-163
3660	23	0	-38	-238
3720	2	0	-30	-206
3780	1	0	-30	-107
3840	1	0	-30	-64
3900	1	0	-23	-29
3960	1	0	-23	-1
4020	1	0	-15	15
4080	1	0	-8	26
4140	1	0	-8	38
4200	0	0	-8	54
4500	0	0	0	70
4800	0	0	-8	78
5100	0	0	0	74
5400	0	0	8	74
5700	0	0	0	78
6000	0	0	8	66
6300	0	0	8	74
6600	0	0	-8	66
6900	0	0	0	62
7200	0	0	0	46

Phase 3 - Artificial Specimen - U.Nottingham
Polytetrafluoretylene (PTFE) Specimen

UNOT12	320 mm x 160 mm			
Date:	18 february 1992			
	Temperature =	22 °C		
Time	Confining	Deviator	Strain	
	Pressure	Stress	ε1	ε3
sec	kPa	kPa	με	με
2	34	1	99	-310
10	119	80	709	-671
20	200	338	3620	-2306
30	239	377	4443	-2683
40	243	376	4595	-2703
50	244	377	4687	-2699
60	244	375	4732	-2727
120	245	372	4885	-2928
180	245	374	4976	-3071
240	245	374	5037	-3138
300	245	373	5083	-3201
360	246	373	5113	-3253
420	246	372	5144	-3288
480	246	374	5174	-3304
540	246	373	5197	-3340
600	246	374	5220	-3351
900	246	373	5296	-3399
1200	247	373	5350	-3426
1500	247	374	5388	-3462
1800	247	373	5410	-3482
2100	247	372	5449	-3510
2400	246	372	5464	-3530
2700	246	373	5487	-3545
3000	246	372	5502	-3553
3300	246	374	5510	-3557
3600	246	373	5525	-3581
3610	238	366	5449	-3526
3620	206	0	1364	-1008
3630	112	0	1128	-953
3640	55	0	998	-992
3650	22	0	914	-1091
3660	8	0	853	-1114
3720	2	0	663	-939
3780	1	0	556	-797
3840	1	0	579	-698
3900	1	0	541	-651
3960	1	0	503	-592
4020	1	0	472	-572
4080	1	0	457	-540
4140	0	0	442	-521
4200	0	0	427	-509
4500	0	0	366	-454
4800	0	0	320	-418
5100	0	0	290	-406
5400	0	0	259	-390
5700	0	0	244	-390
6000	0	0	221	-390
6300	0	0	206	-375
6600	0	0	190	-367
6900	0	0	183	-375
7200	0	0	168	-367

Phase 3 - Artificial Specimen - U.Nottingham
Polytetrafluoretylene (PTFE) Specimen

UNOT13 320 mm x 160 mm Date: 19 february 1992 Temperature = 22 °C				
Time	Confining	Deviator	Strain	
	Pressure	Stress	ε1	ε3
sec	kPa	kPa	με	με
2	12	3	0	0
10	54	59	366	-325
20	86	329	3124	-2014
30	96	501	5471	-3201
40	97	542	6287	-3585
50	97	551	6599	-3732
60	97	566	6935	-3926
120	99	598	7811	-4425
180	100	598	8055	-4592
240	100	598	8215	-4710
300	100	598	8314	-4785
360	100	599	8398	-4845
420	100	598	8474	-4900
480	100	598	8535	-4940
540	100	599	8588	-4968
600	100	598	8626	-5007
900	100	599	8802	-5114
1200	100	599	8931	-5209
1500	100	603	9076	-5289
1800	100	604	9160	-5344
2100	100	603	9190	-5372
2400	100	608	9327	-5459
2700	100	606	9373	-5495
3000	100	602	9297	-5459
3300	100	608	9419	-5534
3600	101	600	9335	-5503
3610	101	600	9335	-5507
3620	101	600	9335	-5507
3630	92	601	9350	-5499
3640	39	52	3002	-1994
3650	12	33	2286	-1594
3660	5	14	1890	-1419
3720	1	3	1235	-979
3780	0	0	1006	-808
3840	0	0	869	-698
3900	0	0	770	-622
3960	0	0	709	-563
4020	0	0	640	-527
4080	0	0	594	-484
4140	0	0	556	-456
4200	0	0	518	-436
4500	0	0	381	-349
4800	0	0	282	-306
5100	0	0	229	-274
5400	0	0	183	-262
5700	0	0	137	-238
6000	0	0	107	-230
6300	0	0	76	-223
6600	1	0	53	-227
6900	0	0	30	-211
7200	0	0	15	-207

Phase 3 - Artificial Specimen - U.Nottingham
Polytetrafluoretylene (PTFE) Specimen

UNOT21	144 mm x 70 mm			
Date:	8 July 1992			
	Temperature =	24 °C		
Time	Confining Pressure	Deviator Stress	Strain	
			ε1	ε3
sec	kPa	kPa	με	με
1	250	0	0	0
10	250	0	117	107
20	250	0	101	155
30	250	0	18	285
40	250	0	54	285
50	250	0	32	321
60	250	0	24	416
70	250	0	35	440
80	250	0	96	464
90	250	0	32	428
100	250	0	36	416
110	250	0	53	511
120	250	0	56	440
130	250	0	51	475
140	250	0	71	428
150	250	0	47	511
160	250	0	40	511
170	250	0	31	475
180	250	0	100	428
190	250	0	32	511
200	250	0	32	511
210	250	0	55	571
300	250	0	55	571
600	250	0	55	643
900	250	0	55	643
1200	250	0	55	643
1800	250	0	55	643
2700	250	0	55	715
3600	250	0	55	715
3601	0	0	27	618
3610	0	0	-17	523
3620	0	0	-176	333
3630	0	0	-101	285
3640	0	0	-75	333
3650	0	0	-134	392
3660	0	0	-96	440
3670	0	0	-124	285
3680	0	0	-109	333
3690	0	0	-136	333
3700	0	0	-120	511
3710	0	0	-88	333
3720	0	0	-113	333
3730	0	0	-116	238
3740	0	0	-132	333
3750	0	0	-109	321
3760	0	0	-81	333
3770	0	0	-112	238
3780	0	0	-128	333
3790	0	0	-116	321
3800	0	0	-96	321
3810	0	0	-81	333
3900	0	0	-81	333
4200	0	0	-213	333
4500	0	0	-213	260
7200	0	0	46	188

Phase 3 - Artificial Specimen - U.Nottingham
Polytetrafluoretylene (PTFE) Specimen

UNOT22	144 mm x 70 mm			
Date:	29 July 1992			
	Temperature =	27 °C		
Time	Confining Pressure	Deviator Stress	Strain	
			ε1	ε3
sec	kPa	kPa	με	με
1	250	375	885	-74
10	250	375	2664	-356
20	250	375	8276	-2624
30	250	375	9236	-2980
40	250	375	9421	-3039
50	250	375	9358	-3143
60	250	375	9377	-3039
70	250	375	9389	-3039
80	250	375	9780	-3321
90	250	375	9941	-3558
100	250	375	10023	-3558
110	250	375	10146	-3558
120	250	375	10162	-3558
130	250	375	10146	-3558
140	250	375	10245	-3558
150	250	375	10144	-3558
160	250	375	10204	-3558
170	250	375	10204	-3558
180	250	375	10220	-3558
200	250	375	10234	-3558
210	250	375	10264	-3558
300	250	375	10201	-3558
600	250	375	10321	-3573
900	250	375	10506	-3633
1200	250	375	10752	-3633
1800	250	375	10688	-3677
2400	250	375	10748	-3692
3000	250	375	10992	-3796
3600	250	375	10992	-3796
3601	0	0	10763	-3810
3610	0	0	10985	-3796
3620	0	0	9300	-3099
3630	0	0	7803	-2609
3640	0	0	5632	-1661
3650	0	0	3034	-845
3660	0	0	700	-712
3670	0	0	1714	-712
3680	0	0	840	-474
3690	0	0	853	-712
3700	0	0	855	-311
3710	0	0	732	-311
3720	0	0	670	-371
3730	0	0	735	-356
3740	0	0	735	-326
3750	0	0	723	-282
3760	0	0	668	-311
3770	0	0	624	-282
3780	0	0	569	-252
3790	0	0	585	-311
3800	0	0	555	-237
3810	0	0	564	-252
3900	0	0	159	-119
4200	0	0	136	0
4500	0	0	138	-15
4800	0	0	15	0
5400	0	0	-224	0
6000	0	0	-228	0
6600	0	0	-228	0
7200	0	0	-352	-15

Phase 3 - Artificial Specimen - U.Nottingham
Polytetrafluoretylene (PTFE) Specimen

UNOT23	144 mm x 70 mm			
Date:	30 July 1992			
	Temperature =	27 °C		
Time	Confining Pressure	Deviator Stress	Strain	
			ε1	ε3
sec	kPa	kPa	με	με
1	100	600	4195	-104
10	100	600	4923	-979
20	100	600	6367	-1779
30	100	600	7772	-2609
40	100	600	9287	-3440
50	100	600	11189	-4270
60	100	600	12721	-5115
70	100	600	13401	-5441
80	100	600	13555	-5590
90	100	600	13791	-5575
100	100	600	13882	-5634
110	100	600	13858	-5634
120	100	600	14001	-5649
130	100	600	14060	-5708
140	100	600	14173	-5708
150	100	600	14150	-5753
160	100	600	14147	-5768
170	100	600	14146	-5812
180	100	600	14027	-5782
190	100	600	14073	-5768
200	100	600	14103	-5827
210	100	600	14103	-5753
300	100	600	14469	-5871
600	100	600	14583	-6049
900	100	600	14858	-6064
1200	100	600	15011	-6123
1500	100	600	15068	-6123
1800	100	600	15221	-6183
2400	100	600	15343	-6242
3000	100	600	15431	-6287
3600	100	600	15369	-6301
3601	0	0	14235	-6049
3610	0	0	2415	-1320
3620	0	0	2165	-949
3630	0	0	1906	-756
3640	0	0	1796	-608
3650	0	0	1533	-712
3660	0	0	1463	-638
3670	0	0	1443	-608
3680	0	0	1351	-578
3690	0	0	1324	-430
3700	0	0	1328	-400
3710	0	0	1188	-489
3720	0	0	1183	-326
3730	0	0	1091	-400
3740	0	0	1137	-474
3750	0	0	1143	-400
3760	0	0	984	-400
3770	0	0	961	-356
3780	0	0	961	-371
3790	0	0	961	-252
3800	0	0	1029	-430
3810	0	0	1023	-371
3900	0	0	788	-237
4200	0	0	485	-193
4500	0	0	489	-119
4800	0	0	401	-74
5400	0	0	122	-74
6000	0	0	0	0
6600	0	0	190	0
7200	0	0	190	0

Phase 3 - Artificial Specimen - St.Brieuc
Polytetrafluoretylene (PTFE) Specimen

LRSB1 320 mm x 160 mm Date: Temperature = °C				
Time	Confining Pressure	Deviator Stress	Strain	
			ε1	ε3
sec	kPa	kPa	με	με
0	250	0	0	0
49	250	0	20	88
58	250	0	0	88
67	250	0	20	88
76	250	0	-10	88
85	250	0	10	88
388	250	0	0	88
691	250	0	-10	88
993	250	0	10	88
1296	250	0	40	88
1599	250	0	70	100
1902	250	0	-40	100
2205	250	0	-30	100
2508	250	0	20	100
2810	250	0	10	100
3114	250	0	0	100
3417	250	0	-50	100
3720	250	0	-70	100
3746	0	0	-10	13
3755	0	0	-20	13
3764	0	0	50	13
3774	0	0	10	13
3783	0	0	10	13
4086	0	0	-20	13
4389	0	0	-70	13
4692	0	0	0	13
4995	0	0	-20	13
5298	0	0	10	13
5601	0	0	-20	13
5904	0	0	-20	13
6206	0	0	-20	13
6509	0	0	-30	13
5812	0	0	-30	13
7115	0	0	20	13
7418	0	0	-10	13

Phase 3 - Artificial Specimen - St.Brieuc
Polytetrafluoretylene (PTFE) Specimen

LRSB2	320 mm x 160 mm			
Date:				
	Temperature =	°C		
Time	Confining	Deviator	Strain	
	Pressure	Stress	ε1	ε3
sec	kPa	kPa	με	με
0	250	375	0	0
49	250	375	5850	-2763
58	250	375	5960	-2838
67	250	375	6090	-2900
76	250	375	6170	-2938
85	250	375	6200	-2963
388	250	375	6750	-3238
691	250	375	6890	-3325
993	250	375	7050	-3363
1296	250	375	7070	-3400
1599	250	375	7160	-3425
1902	250	375	7110	-3450
2205	250	375	7150	-3463
2508	250	375	7220	-3475
2810	250	375	7160	-3488
3114	250	375	7200	-3500
3417	250	375	7190	-3513
3720	250	375	7230	-3525
3746	0	0	1280	-650
3755	0	0	1190	-600
3764	0	0	1100	-563
3774	0	0	1050	-538
3783	0	0	1010	-513
4086	0	0	540	-275
4389	0	0	450	-213
4692	0	0	390	-175
4995	0	0	320	-150
5298	0	0	250	-125
5601	0	0	240	-113
5904	0	0	260	-100
6206	0	0	200	-88
6509	0	0	150	-88
5812	0	0	170	-75
7115	0	0	110	-75
7418	0	0	100	-63

Phase 3 - Artificial Specimen - St.Brieuc
Polytetrafluoretylene (PTFE) Specimen

LRSB3	320 mm x 160 mm			
Date:				
	Temperature =	°C		
Time	Confining	Deviator	Strain	
	Pressure	Stress	ε1	ε3
sec	kPa	kPa	με	με
0	100	600	0	0
49	100	600	9500	-4663
58	100	600	9680	-4763
67	100	600	9820	-4838
76	100	600	9950	-4888
85	100	600	10070	-4938
388	100	600	10950	-5363
691	100	600	11260	-5500
993	100	600	11360	-5575
1296	100	600	11440	-5625
1599	100	600	11530	-5675
1902	100	600	11580	-5700
2205	100	600	11620	-5738
2508	100	600	11690	-5763
2810	100	600	11740	-5775
3114	100	600	11800	-5800
3417	100	600	11780	-5813
3720	100	600	11780	-5838
3746	0	0	2230	-1125
3755	0	0	2060	-1025
3764	0	0	1910	-950
3774	0	0	1780	-900
3783	0	0	1680	-863
4086	0	0	880	-450
4389	0	0	660	-338
4692	0	0	530	-275
4995	0	0	440	-238
5298	0	0	390	-213
5601	0	0	330	-188
5904	0	0	330	-163
6206	0	0	260	-150
6509	0	0	250	-138
5812	0	0	250	-138
7115	0	0	200	-125
7418	0	0	140	-113

Phase 3 - Artificial Specimen - Clermont Ferrand
Polytetrafluoretylene (PTFE) Specimen

LRCF1	140 mm x 70 mm			
Date:	23 June 1992			
	Temperature =	18 °C		
Time	Confining Pressure	Deviator Stress	Strain	
			ε1	ε3
sec	kPa	kPa	με	με
0	237	0	67	11.8
183	236	0	61	22.8
482	236	0	56	28.3
782	236	0	56	31
1082	236	0	52	33.2
1382	236	0	52	35
1682	236	0	50	36.3
1982	236	0	46	36.8
2282	236	0	45	37.7
2582	236	0	42	38.6
2882	236	0	40	39
3182	236	0	40	38.8
3482	237	0	38	38.8
4049	0	0	-21	21.1
4053	0	0	-21	21.1
4357	0	0	-23	17.4
4657	0	0	-23	15.9
4957	0	0	-25	15.7
5257	0	0	-25	14.3
5557	0	0	-27	12.9
5857	0	0	-29	12.5
6157	0	0	-31	11.8
6457	0	0	-33	10.9
6757	0	0	-34	8.78
7057	0	0	-39	9.35
7244	0	0	-39	4.68

Phase 3 - Artificial Specimen - Clermont Ferrand
Polytetrafluoretylene (PTFE) Specimen

LRCF2	140 mm x 70 mm			
Date:	23 June 1992			
	Temperature =	18 °C		
Time	Confining	Deviator	Strain	
	Pressure	Stress	ε1	ε3
sec	kPa	kPa	με	με
0	237	89	4350	-959
231	237	89	4890	-1030
531	237	89	5030	-1050
832	237	89	5100	-1060
1131	237	89	5150	-1070
1431	237	89	5180	-1070
1732	237	89	5210	-1070
2031	237	89	5230	-1080
2332	237	89	5240	-1080
2631	237	89	5260	-1080
2931	237	89	5270	-1080
3231	237	89	5280	-1090
3531	237	89	5290	-1090
3832	237	89	5300	-1090
3871	0	0	928	-371
4131	0	0	400	-321
4431	0	0	278	-307
4731	0	0	212	-300
5031	0	0	168	-296
5331	0	0	136	-293
5631	0	0	109	-291
5931	0	0	80	-290
6231	0	0	71	-289
6531	0	0	54	-288
6831	0	0	40	-288
7131	0	0	28	-287

Phase 3 - Artificial Specimen - Clermont Ferrand
Polytetrafluoretylene (PTFE) Specimen

LRCF3	140 mm x 70 mm			
Date:	23 June 1992			
	Temperature =	18 °C		
Time	Confining	Deviator	Strain	
	Pressure	Stress	ε1	ε3
sec	kPa	kPa	με	με
0	87	89	435	-103
160	87	89	2220	-1110
460	87	89	5030	-1130
761	87	89	5100	-1150
1061	87	89	5150	-1150
1361	87	89	5190	-1160
1661	87	89	5210	-1160
1960	87	89	5230	-1170
2261	87	89	5250	-1170
2561	87	89	5260	-1180
2860	87	89	5270	-1180
3161	87	89	5280	-1180
3461	87	89	5280	-1180
3761	0	0	228	-354
4060	0	0	228	-338
4360	0	0	162	-330
4660	0	0	119	-326
4960	0	0	86	-322
5260	0	0	86	-320
5560	0	0	38	-319
5860	0	0	2	-317
6160	0	0	2	-317
6460	0	0	2	-317
6760	0	0	2	-316
7060	0	0	2	-316

Phase 3 - Artificial Specimen - TU.Delft
Polytetrafluoretylene (PTFE) Specimen

DUT1	210 mm x 102 mm			
Date:				
	Temperature =	21 °C		
Time	Confining	Deviator	Strain	
	Pressure	Stress	ε1	ε3
sec	kPa	kPa	με	με
0	250	6	0	0
300	250	6	123	42
600	250	6	128	46
1200	250	6	129	47
1800	250	6	128	47
2400	250	6	128	48
3000	250	6	128	48
3600	250	6	128	48
3900	0	6	2	2
4200	0	6	-3	2
4800	0	6	-11	1
5400	0	6	-18	1
6000	0	6	-25	1
6600	0	6	-37	1
7200	0	6	-43	1

Phase 3 - Artificial Specimen - TU.Delft
Polytetrafluoretylene (PTFE) Specimen

DUT2	210 mm x 102 mm			
Date:				
	Temperature =	22 °C		
Time	Confining	Deviator	Strain	
	Pressure	Stress	ε1	ε3
sec	kPa	kPa	με	με
0	250	382	0	0
300	250	382	6415	-3186
600	250	382	6646	-3258
1200	250	382	6860	-3336
1800	250	382	6932	-3370
2400	250	382	7021	-3404
3000	250	382	7056	-3436
3600	250	382	7074	-3520
3900	0	6	677	-318
4200	0	6	463	-246
4800	0	6	285	-144
5400	0	6	178	-122
6000	0	6	143	-96
6600	0	6	107	-86
7200	0	6	0	-80

Phase 3 - Artificial Specimen - TU.Delft
Polytetrafluoretylene (PTFE) Specimen

DUT3	210 mm x 102 mm			
Date:				
	Temperature =	23 °C		
Time	Confining	Deviator	Strain	
	Pressure	Stress	ε1	ε3
sec	kPa	kPa	με	με
0	100	592	0	0
300	100	592	10029	-5416
600	100	592	10386	-5600
1200	100	592	10689	-5822
1800	100	592	10867	-5902
2400	100	592	10974	-5982
3000	100	592	11063	-6022
3600	100	592	11135	-6068
3900	0	6	1034	-588
4200	0	6	713	-414
4800	0	6	446	-318
5400	0	6	339	-270
6000	0	6	232	-238
6600	0	6	178	-222
7200	0	6	143	-160

APPENDIX F THE REPEATED LOAD TRIAXIAL TEST RESULTS FOR PHASE 1, 2 AND 5

Appendix F.1 RESULTS OF TEST PROGRAMME I FOR SUBGRADE SOILS AND UNBOUND GRANULAR MATERIALS (PHASE I)

Repeated Load Triaxial Test Results **Test Programme 1**

Laboratory: LNEC
Material: London Clay (LOC)
Specimen: L_LOC_01

Specimen details

	Moisture content	Dry density
Aimed:	36.0%	1752 kg/m^3
Start of test:		kg/m^3
End of test:		

Specimen size: 144 mm x 76 mm Static load included (y/n) n

Resilient Deformation Test 1

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s_{31} kPa	s_{32} kPa	p_1 kPa	p_2 kPa	q_1 kPa	q_2 kPa	q_r/p_r	E_{1r} με	E_{3r} με	E_{1p} x10^{-4}	E_{3p} x10^{-4}	PP_r kPa	PP_p kPa
15.8	15.8	15.8	21.4	0.0	16.8	3.0	464	-287			-31.9	-31.7
15.8	15.8	16.0	25.5	0.7	29.1	3.0	1192	-736			-31.9	-31.3
15.8	15.8	15.6	30.1	-0.7	43.0	3.0	2583	-1677			-31.9	-30.6
15.8	15.8	15.6	20.4	-0.7	13.8	3.0	424	-327			-32.1	-31.7
15.8	19.2	15.6	23.8	-0.7	13.8	1.8	371	-223			-32.1	-31.7
15.8	26.3	16.0	36.3	0.7	29.9	1.4	1490	-556			-31.9	-30.4
15.8	31.4	15.6	45.7	-0.7	43.0	1.4	2715	-1595			-31.7	-29.6
16.2	31.0	16.0	45.3	-0.7	43.0	1.5	2847	-1555			-31.7	-29.6
15.4	25.9	15.1	31.0	-0.7	15.3	1.0	635	-327			-31.9	-30.8
15.0	34.8	15.0	45.7	0.0	32.8	1.1	1986	-982			-31.4	-29.6
14.1	42.0	14.4	56.0	0.7	42.3	1.0	2715	-1309			-31.2	-28.5
15.0	51.2	14.7	69.9	-0.7	56.0	1.0	4838	-2535			-30.6	-27.0
14.5	37.7	14.8	43.3	0.7	16.8	0.6	795	-286			-31.0	-29.4
14.5	61.4	13.8	71.1	-2.2	29.1	0.5	2120	-859			-30.6	-27.2
14.5	82.9	14.3	97.2	-0.7	43.0	0.5	3579	-1431			-29.5	-24.7
12.8	106.5	12.6	126.1	-0.7	58.8	0.5	5644	-2737			-28.7	-21.3

Resilient Deformation Test 2

Date

Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain		Pore Pressure	
s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
29.2	29.2	30.9	35.3	5.1	18.3	3.0	372	-205			-21.2	-20.8
29.2	29.2	29.2	39.7	0.0	31.4	3.0	1163	-590			-21.0	-19.9
28.4	28.4	28.4	42.9	0.0	43.7	3.0	2197	-1191			-20.8	-19.1
24.1	28.4	23.7	37.8	-1.5	28.4	2.1	1798	-602			-20.8	-19.5
22.9	27.5	22.1	31.6	-2.2	12.4	1.5	266	-131			-20.6	-20.1
24.1	31.7	24.1	42.7	0.0	32.8	1.8	1332	-628			-20.6	-18.9
24.1	36.0	23.9	50.8	-0.7	44.4	1.7	4398	-1126			-20.1	-17.4
24.1	40.6	24.4	59.2	0.7	55.8	1.6	3743	-1854			-19.7	-16.1
24.1	30.9	24.1	36.5	0.0	16.7	1.4	267	-136			-19.9	-18.9
23.3	39.3	22.6	48.8	-2.2	28.3	1.2	1095	-555			-19.7	-17.0
23.3	46.9	24.0	63.1	2.2	48.5	1.2	2340	-1200			-18.9	-14.8
23.3	54.5	23.1	75.4	-0.7	62.7	1.2	8059	-2421			-18.0	-12.5
23.7	42.7	26.4	50.6	7.9	23.8	0.7	403	-141			-18.4	-16.3
23.3	63.0	25.5	76.2	6.5	39.7	0.7	1746	-755			-17.8	-12.9
23.7	78.6	25.9	94.2	6.5	46.9	0.6	5645	-443			-17.6	-12.3
23.3	97.5	25.7	119.1	7.2	64.7	0.6	10235	-806			-15.9	-5.3
23.3	32.6	25.5	34.7	6.5	6.5	0.0	-81	65			-17.4	-16.7
22.5	37.6	24.6	39.8	6.5	6.5	0.0	-148	117			-17.2	-15.9
22.5	50.3	24.6	52.5	6.5	6.5	0.0	-242	203			-17.2	-15.0
22.5	52.8	24.6	55.0	6.5	6.5	0.0	-269	219			-17.2	-14.6

Resilient Deformation Test 3

Date

Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain		Pore Pressure	
s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
60.0	60.0	60.0	64.9	0.0	14.7	3.0	107	-61			4.6	4.8
60.0	60.0	59.8	70.1	-0.7	30.2	3.0	670	-395			5.1	6.8
60.0	60.0	60.2	75.4	0.7	46.3	3.0	1665	-966			5.9	9.1
60.0	61.7	59.8	66.1	-0.7	13.2	2.2	94	-53			5.9	6.8
60.0	64.6	60.0	74.9	0.0	30.9	2.1	685	-381			6.3	9.3
60.0	67.2	59.8	81.9	-0.7	44.1	2.0	1504	-841			6.8	11.4
60.0	65.5	59.8	69.9	-0.7	13.2	1.4	94	-37			6.8	8.0
60.0	69.3	59.8	78.3	-0.7	27.2	1.5	591	-315			6.8	11.0
60.0	74.8	59.5	88.7	-1.5	41.9	1.5	1558	-670			7.6	14.2
60.0	79.0	59.8	98.5	-0.7	58.6	1.5	2690	-1444			8.9	18.2
60.0	65.1	59.5	65.6	-1.5	1.5	0.5	-47	34			7.4	8.5
60.0	69.3	60.0	74.2	0.0	14.7	1.0	134	-59			7.8	10.6
60.0	84.9	59.5	89.3	-1.5	13.2	0.5	699	-299			8.7	16.7
60.0	96.7	59.8	111.1	-0.7	43.2	0.9	1613	-761			9.3	22.1
60.0	109.4	59.8	127.7	-0.7	54.9	0.8	2489	-1208			10.4	28.2
60.0	69.3	59.3	68.3	-2.2	-2.9	-0.1	-108	89			8.2	9.9
60.0	72.2	59.3	71.0	-2.2	-3.7	-0.1	-161	121			8.5	10.8
60.4	74.8	59.7	73.5	-2.2	-3.7	-0.1	-161	76			8.7	11.4

Permanent Deformation Test

Date

Cycle	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
N	*s31* *kPa*	*s32* *kPa*	*p1* *kPa*	*p2* *kPa*	*q1* *kPa*	*q2* *kPa*	*qr/pr*	*E1r* *με*	*E3r* *με*	*E1p* *x10 $^{-4}$*	*E3p* *x10 $^{-4}$*	*PPr* *kPa*	*PPp* *kPa*

Repeated Load Triaxial Test Results **Test Programme 1**

Laboratory: UNOT
Material: London Clay (LOC)
Specimen: LOC - Test 2

Specimen details

	Moisture content	Dry density
Aimed:	36.0%	1752 kg/m^3
Start of test:		1202 kg/m^3
End of test:		

Specimen size: 144 mm x 76 mm Static load included (y/n) n

Resilient Deformation Test 1

Date *23/7/91*

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	E_{1r} *με*	E_{3r} *με*	E_{1p} *x10^{-4}*	E_{3p} *x10^{-4}*	PP_r *kPa*	PP_p *kPa*
15.0	15.0	15.7	17.3	2.0	7.0	3.0	0					
15.0	15.0	15.7	20.7	2.0	17.0	3.0	189	-369				
15.0	15.0	15.7	25.7	2.0	32.0	3.0	2485	-1868				
15.0	16.0	15.7	21.7	2.0	17.0	2.5	286	-350				
15.0	17.0	15.7	27.7	2.0	32.0	2.5	2498	-1884				
15.0	20.0	15.7	25.7	2.0	17.0	1.5	454	-299				
15.0	25.0	15.7	35.7	2.0	32.0	1.5	2589	-1782				
15.0	18.3	15.7	20.7	2.0	7.0	1.0	233					
15.0	25.0	15.7	30.7	2.0	17.0	1.0	598	-264				
15.0	35.0	15.7	45.7	2.0	32.0	1.0	2972	-1723				
15.0	40.0	15.7	45.7	2.0	17.0	0.5	398	-213				
15.0	65.0	15.7	75.7	2.0	32.0	0.5	2745	-1534				
15.0	20.0	15.7	20.7	2.0	2.0	0.0	0	70				
15.0	30.0	15.7	30.7	2.0	2.0	0.0	162	145				

Resilient Deformation Test 2

Date

Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain		Pore Pressure	
s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
30.0	30.0	30.7	35.7	2.0	17.0	3.0	0	-323				
30.0	30.0	30.7	40.7	2.0	32.0	3.0	1787	-1511				
30.0	31.0	30.7	36.7	2.0	17.0	2.5	437	-283				
30.0	32.0	30.7	42.7	2.0	32.0	2.5	1889	-1544				
30.0	35.0	30.7	40.7	2.0	17.0	1.5	824	-283				
30.0	40.0	30.7	50.7	2.0	32.0	1.5	1984	-1541				
30.0	33.7	30.7	36.0	2.0	7.0	0.9	275	-54				
30.0	40.0	30.7	45.7	2.0	17.0	1.0	865	-255				
30.0	50.0	30.7	60.7	2.0	32.0	1.0	2074	-1452				
30.0	38.3	30.7	40.7	2.0	7.0	0.5	97	-24				
30.0	55.0	30.7	60.7	2.0	17.0	0.5	540	-229				
30.0	80.0	30.7	90.7	2.0	32.0	0.5	2010	-1349				
30.0	45.0	30.7	45.7	2.0	2.0	0.0		73				
30.0	60.0	30.7	60.7	2.0	2.0	0.0		207				

Resilient Deformation Test 3

Date

Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain		Pore Pressure	
s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
60.0	60.0	60.7	62.3	2.0	7.0	3.0	180	-5	0.2	0.1		
60.0	60.0	60.7	65.7	2.0	17.0	3.0	330	-296	0.0	0.1		
60.0	60.0	60.7	70.7	2.0	32.0	3.0	1469	-264	0.1	0.1		
60.0	61.0	60.7	66.7	2.0	17.0	2.5	329	-299	0.1	0.2		
60.0	62.0	60.7	72.7	2.0	32.0	2.5	1645	-1367	0.2	0.3		
60.0	65.0	60.7	70.7	2.0	17.0	1.5	442	-283	0.2	0.5		
60.0	70.0	60.7	80.7	2.0	32.0	1.5	1763	-1324	0.4	0.6		
60.0	80.0	60.7	85.7	2.0	17.0	0.6	662	-148	0.4	0.9		
60.0	80.0	60.7	90.7	2.0	32.0	1.0	1927	-1265	0.7	1.2		
60.0	110.0	60.7	120.7	2.0	32.0	0.5	1767	-1168	0.8	1.4		
60.0	75.0	60.7	75.7	2.0	2.0	0.0	0	87	0.8	1.6		
60.0	90.0	60.7	90.7	2.0	2.0	0.0	0	215				
60.0	120.0	60.7	120.7	2.0	2.0	0.0	244	339				

Permanent Deformation Test

Date

Cycle	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
N	*s31*	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
	kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*με*	*με*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
20	60.0	60.0	60.0	72.7	0.0	38.0	3.0		-48				
50	60.0	60.0	60.0	72.7	0.0	38.0	3.0		-60	0.2	0.1		
100	60.0	60.0	60.0	72.7	0.0	38.0	3.0		-69	0.0	0.1		
200	60.0	60.0	60.0	72.7	0.0	38.0	3.0	145	-66	0.1	0.1		
400	60.0	60.0	60.0	72.7	0.0	38.0	3.0	175	-63	0.1	0.2		
1000	60.0	60.0	60.0	72.7	0.0	38.0	3.0	175	-59	0.2	0.3		
2500	60.0	60.0	60.0	72.7	0.0	38.0	3.0	0	-76	0.2	0.5		
5000	60.0	60.0	60.0	73.0	0.0	39.0	3.0	94	-63	0.4	0.6		
10000	60.0	60.0	60.0	73.0	0.0	39.0	3.0	197	-74	0.4	0.9		
25000	60.0	60.0	60.0	73.0	0.0	39.0	3.0	77	-60	0.7	1.2		
50000	60.0	60.0	60.0	73.0	0.0	39.0	3.0	74	-58	0.8	1.4		
100000	60.0	60.0	60.0	73.0	0.0	39.0	3.0	87	-53	0.8	1.6		

Repeated Load Triaxial Test Results **Test Programme 1**

Laboratory: LRCF
Material: London Clay (LOC)
Specimen: LCD101-6

Specimen details

	Moisture content	Dry density
Aimed:	36.0%	1752 kg/m^3
Start of test:		kg/m^3
End of test:		

Specimen size: 140 mm x 70 mm Static load included (y/n) n

Resilient Deformation Test 1

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s_{31} kPa	s_{32} kPa	p_1 kPa	p_2 kPa	q_1 kPa	q_2 kPa	q_r/p_r	E_{1r} με	E_{3r} με	E_{1p} x10^{-4}	E_{3p} x10^{-4}	PP_r kPa	PP_p kPa
16.2	16.2	16.2	17.6	0.0	4.3	3.1	64	-44				
16.4	16.4	16.4	21.0	0.0	13.8	3.0	250	-158				
16.3	16.3	16.3	26.1	0.0	29.3	3.0	734	-493				
16.2	16.4	16.2	18.0	0.0	4.7	2.6	96	-53				
16.3	16.6	16.3	21.7	0.0	15.2	2.8	300	-194				
16.4	17.3	16.4	27.8	0.0	31.5	2.8	836	-553				
16.4	17.1	16.4	19.1	0.0	6.0	2.2	112	-65				
16.6	19.6	16.6	25.8	0.0	18.6	2.0	423	-275				
16.6	23.7	16.6	36.5	0.0	38.5	1.9	1272	-814				
16.5	18.4	16.5	20.9	0.0	7.4	1.7	143	-85				
16.6	23.8	16.6	31.6	0.0	23.4	1.6	638	-419				
16.6	34.2	16.6	50.0	0.0	47.3	1.4	2328	-1289				
16.6	22.3	16.6	26.1	0.0	11.5	1.2	269	-172				
16.6	38.9	16.6	51.3	0.0	37.3	1.1	1720	-978				
16.3	71.4	16.3	94.7	0.0	69.9	0.9	9397	-4442				
15.4	18.6	15.4	18.6	0.0	0.0	0.0	31	-4				
15.5	27.7	15.5	27.7	0.0	0.0	0.0	0	0				

Resilient Deformation Test 2

Date

Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain		Pore Pressure	
s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
30.3	30.3	30.3	31.7	0.0	4.1	2.9	111	-44				
30.3	30.3	30.3	34.9	0.0	13.9	3.0	287	-156				
30.2	30.2	30.2	40.0	0.0	29.4	3.0	772	-469				
30.2	30.4	30.2	31.8	0.0	4.3	2.7	99	-44				
30.2	30.6	30.2	35.7	0.0	15.2	2.8	326	-180				
30.3	31.3	30.3	41.7	0.0	31.1	2.7	844	-526				
30.4	31.2	30.4	33.1	0.0	5.8	2.1	126	-64				
30.4	33.5	30.4	39.7	0.0	18.7	2.0	438	-262				
30.6	38.1	30.6	50.9	0.0	38.3	1.9	1503	-879				
30.4	32.3	30.4	34.7	0.0	7.2	1.7	163	-81				
30.5	38.0	30.5	45.7	0.0	23.2	1.5	705	-428				
30.4	48.1	30.4	63.8	0.0	47.0	1.4	2845	-1475				
30.5	36.4	30.5	40.3	0.0	11.7	1.2	303	-165				
30.4	53.0	30.4	65.2	0.0	36.5	1.0	2033	-1102				
30.3	78.0	30.3	101.9	0.0	71.7	1.0	8747	-4211				
30.2	33.6	30.2	33.6	0.0	0.0	0.0	0	0				
30.3	42.9	30.3	42.9	0.0	0.0	0.0	-35	0				
30.4	58.2	30.4	58.2	0.0	0.0	0.0	-46	13				

Resilient Deformation Test 3

Date

Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain		Pore Pressure	
s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
58.9	58.9	58.9	60.5	0.0	4.7	2.9	107	-46				
59.1	59.1	59.1	63.7	0.0	13.9	3.0	308	-155				
59.1	59.1	59.1	68.8	0.0	29.1	3.0	927	-544				
58.9	59.2	58.9	60.7	0.0	4.6	2.6	99	-47				
59.1	59.5	59.1	64.5	0.0	14.9	2.8	356	-194				
59.1	60.2	59.1	70.5	0.0	30.9	2.7	1056	-604				
59.0	59.8	59.0	61.7	0.0	5.8	2.1	144	-61				
59.0	62.7	59.0	68.9	0.0	18.7	1.9	518	-280				
59.2	67.2	59.2	80.1	0.0	38.7	1.9	1867	-1029				
59.0	61.1	59.0	63.5	0.0	7.1	1.6	160	-84				
59.3	67.1	59.3	74.7	0.0	22.9	1.5	830	-450				
59.2	77.5	59.2	93.1	0.0	46.7	1.4	3233	-1660				
59.2	65.5	59.2	69.2	0.0	11.1	1.1	315	-160				
59.3	82.5	59.3	94.6	0.0	36.4	1.0	2295	-1207				
59.3	107.5	59.3	131.2	0.0	71.1	1.0	8409	-4124				
60.4	63.6	60.4	63.6	0.0	0.0	0.0	-51	0				
60.5	73.0	60.5	73.0	0.0	0.0	0.0	-34	6				
60.4	88.6	60.4	88.6	0.0	0.0	0.0	0	13				
60.4	118.0	60.4	118.0	0.0	0.0	0.0	98	53				

Permanent Deformation Test

Date

Cycle	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
N	*s31*	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
	kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*με*	*με*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
50	59.1	59.1	59.1	72.9	0.0	41.5	3.0	1440	-824	3.3	-1.6		
100	58.9	58.9	58.9	72.9	0.0	42.0	3.0	1456	-847	4.2	-1.8		
200	59.1	59.1	59.1	72.9	0.0	41.4	3.0	1529	-879	4.8	-2.0		
400	59.1	59.1	59.1	72.9	0.0	41.5	3.0	1547	-903	5.9	-2.3		
1000	59.1	59.1	59.1	72.9	0.0	41.3	3.0	1578	-913	7.6	-2.9		
2500	59.0	59.0	59.0	72.9	0.0	41.6	3.0	1546	-900	9.8	-3.7		
5000	59.1	59.1	59.1	72.9	0.0	41.3	3.0	1525	-873	11.4	-4.3		
10000	59.0	59.0	59.0	73.1	0.0	42.2	3.0	1424	-845	13.4	-4.8		
25000	59.1	59.1	59.1	73.1	0.0	41.9	3.0	1328	-771	15.5	-5.8		
50000	59.1	59.1	59.1	73.0	0.0	41.6	3.0	1234	-713	16.7	-6.8		
100000	59.1	59.1	59.1	73.0	0.0	41.6	3.0	1087	-628	19.9	-7.0		

Repeated Load Triaxial Test Results **Test Programme 1**

Laboratory: UNOT
Material: Fountainebleau Sand (SFB)
Specimen: UN_SFB01

Specimen details

	Moisture content	Dry density
Aimed:	0.0%	1600 kg/m^3
Start of test:	0.0%	1610 kg/m^3
End of test:	0.0%	

Specimen size: 300 mm x 150 mm Static load included (y/n) n

Resilient Deformation Test 1

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10^{-4}*	*x10^{-4}*	*kPa*	*kPa*
15.0	15.0	16.5	18.1	4.4	9.4	3.0	44	-32				
15.0	15.0	16.5	18.3	4.4	9.9	3.0	32	-31				
15.0	15.0	16.5	21.6	4.4	19.7	3.0	110	-74				
15.0	15.0	16.5	20.8	4.4	17.5	3.0	102	-62				
15.0	16.7	16.5	20.3	4.4	11.0	1.7	41	-41				
15.0	20.0	16.5	27.1	4.4	21.3	1.6	147	-95				
15.0	25.0	16.5	37.6	4.4	37.7	1.6	243	-135				
15.0	18.3	16.5	22.0	4.4	11.0	1.2	37	-41				
15.0	25.0	16.5	31.8	4.4	20.4	1.0	166	84				
15.0	35.0	16.5	47.2	4.4	36.6	1.0	201	-79				
15.0	45.0	16.5	62.5	4.4	52.5	1.0	405	177				
15.0	55.0	16.5	76.9	4.4	65.6	1.0	503	194				
15.0	65.0	16.5	92.3	4.4	82.0	1.0	629	239				
15.0	75.0	16.5	106.7	4.4	95.1	1.0	734	291				
15.0	23.3	16.5	26.8	4.4	10.4	0.6	64	124				
15.0	40.0	16.5	48.0	4.4	24.1	0.6	255	230				
15.0	65.0	16.5	77.4	4.4	37.2	0.5	399	305				
15.0	90.0	16.5	108.0	4.4	54.1	0.5	524	362				
15.0	115.0	16.5	137.4	4.4	67.2	0.5	670	478				
15.0	165.0	16.5	196.5	4.4	94.6	0.5	878	593				
15.0	20.0	16.5	22.9	4.4	8.8	0.7	22	90				
15.0	30.0	16.5	34.6	4.4	13.7	0.5	22	226				
15.0	60.0	16.5	64.0	4.4	11.9	0.2	198	441				
15.0	120.0	16.5	129.8	4.4	29.5		176	247				

Resilient Deformation Test 2

Date

Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain		Pore Pressure	
s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
30.0	30.0	31.5	33.8	4.4	11.5	3.0	44	-26				
30.0	30.0	31.5	32.9	4.4	8.8	3.0	36	-32				
30.0	30.0	31.5	36.7	4.4	20.2	3.0	110	-75				
30.0	30.0	31.5	41.1	4.4	33.4	3.0	198	-86				
30.0	30.0	31.5	45.9	4.4	47.6	3.0	286	-129				
30.0	31.7	31.5	35.1	4.4	10.4	1.6	36	21				
30.0	35.0	31.5	41.6	4.4	19.7	1.5	106	52				
30.0	40.0	31.5	51.8	4.4	35.5	1.5	227	52				
30.0	45.0	31.5	61.8	4.4	50.3	1.5	312	52				
30.0	50.0	31.5	71.7	4.4	65.1	1.5	397	57				
30.0	55.0	31.5	82.0	4.4	80.9	1.5	464	73				
30.0	33.7	31.5	37.1	4.4	10.4	1.1	36	32				
30.0	40.0	31.5	46.7	4.4	20.2	1.0	135	73				
30.0	50.0	31.5	62.6	4.4	37.7	1.1	273	84				
30.0	60.0	31.5	77.5	4.4	52.5	1.0	355	115				
30.0	70.0	31.5	92.0	4.4	66.1	1.0	445	171				
30.0	80.0	31.5	107.0	4.4	80.9	1.0	482	167				
30.0	90.0	31.5	121.5	4.4	94.6	1.0	582	178				
30.0	38.3	31.5	41.8	4.4	10.4	0.6	64	52				
30.0	55.0	31.5	62.3	4.4	21.9	0.6	209	136				
30.0	80.0	31.5	92.6	4.4	37.7	0.5	355	230				
30.0	105.0	31.5	122.7	4.4	53.0	0.5	473	314				
30.0	130.0	31.5	152.6	4.4	67.7	0.5	573	377				
30.0	155.0	31.5	182.2	4.4	81.5	0.5	646	429				
30.0	35.0	31.5	37.9	4.4	8.7	0.7	22	43				
30.0	45.0	31.5	49.9	4.4	14.8	0.6	66	118				

Resilient Deformation Test 3

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
60.0	60.0	61.5	64.6	4.4	13.7	3.0	132	204				
60.0	90.0	61.5	93.8	4.4	11.5	0.2	220	345				
60.0	60.0	61.5	62.4	4.4	7.1	3.0	34	-24				
60.0	60.0	61.5	66.4	4.4	19.2	3.0	88	-32				
60.0	60.0	61.5	70.8	4.4	32.3	3.0	154	-54				
60.0	60.0	61.5	75.9	4.4	47.6	3.0	220	-75				
60.0	60.0	61.5	74.9	4.4	44.8	3.0	170	-74				
60.0	60.0	61.5	80.8	4.4	62.3	3.0	286	-97				
60.0	60.0	61.5	85.9	4.4	77.6	3.0	352	-118				
60.0	60.0	61.5	86.6	4.4	79.8	3.0	360	-104				
60.0	60.0	61.5	94.8	4.4	104.4	3.0	434	-177				
60.0	60.0	61.5	103.4	4.4	130.1	3.0	544	-177				
60.0	60.0	61.5	111.5	4.4	154.4	3.0	612	-287				
60.0	65.0	61.5	71.0	4.4	18.0	1.4	81	24				
60.0	70.0	61.5	82.0	4.4	36.1	1.5	171	53				
60.0	75.0	61.5	91.2	4.4	48.7	1.5	251	42				
60.0	80.0	61.5	100.8	4.4	62.3	1.5	350	64				
60.0	85.0	61.5	112.0	4.4	80.9	1.5	403	64				
60.0	80.0	61.5	87.5	4.4	22.4	0.7	135	74				
60.0	80.0	61.5	92.2	4.4	36.6	1.0	206	64				
60.0	90.0	61.5	106.5	4.4	49.4	1.0	301	96				
60.0	100.0	61.5	120.8	4.4	62.4	1.0	378	116				
60.0	100.0	61.5	126.6	4.4	79.8	1.2	421	95				
60.0	68.7	61.5	72.5	4.4	11.5	0.6	13	53				
60.0	85.0	61.5	92.8	4.4	23.5	0.6	161	85				
60.0	110.0	61.5	122.2	4.4	36.6	0.5	278	170				
60.0	135.0	61.5	153.0	4.4	54.1	0.5	422	244				
60.0	160.0	61.5	181.7	4.4	65.1	0.5	510	307				
60.0	65.0	61.5	67.9	4.4	8.8	0.7	21	43				
60.0	75.0	61.5	79.9	4.4	14.8	0.6	22	75				
60.0	90.0	61.5	97.1	4.4	21.3	0.5	31	150				

Permanent Deformation Test

Date

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
N	*s31*	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
	kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*με*	*με*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
0	60.0	60.0	60.0	110.0	0.0	150.0	3.0			0.0	0.0		
20	60.0	60.0	60.0	110.0	0.0	150.0	3.0			-3.1	6.9		
50	60.0	60.0	60.0	110.0	0.0	150.0	3.0			-3.0	5.9		
100	60.0	60.0	60.0	110.0	0.0	150.0	3.0			-3.0	5.9		
200	60.0	60.0	60.0	110.0	0.0	150.0	3.0			-2.3	4.8		
500	60.0	60.0	60.0	110.0	0.0	150.0	3.0			-2.8	5.7		
1000	60.0	60.0	60.0	110.0	0.0	150.0	3.0			-3.4	5.7		
2500	60.0	60.0	60.0	110.0	0.0	150.0	3.0			-2.5	5.2		
5000	60.0	60.0	60.0	110.0	0.0	150.0	3.0			-2.0	4.6		
10000	60.0	60.0	60.0	110.0	0.0	150.0	3.0			-2.0	4.6		
25000	60.0	60.0	60.0	110.0	0.0	150.0	3.0			-2.4	6.0		
50000	60.0	60.0	60.0	110.0	0.0	150.0	3.0			-2.3	5.9		

Repeated Load Triaxial Test Results **Test Programme 1**

Laboratory: LRSB
Material: Fountainebleau Sand (SFB)
Specimen: 1_176_1A

Specimen details

	Moisture content	Dry density
Aimed:	0.0%	1600 kg/m^3
Start of test:	0.0%	1600 kg/m^3
End of test:	0.0%	

Specimen size: 320 mm x 160 mm Static load included (y/n) n

Resilient Deformation Test 1

Date 25/06/91

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s_{31} kPa	s_{32} kPa	p_1 kPa	p_2 kPa	q_1 kPa	q_2 kPa	q_r/p_r	E_{1r} με	E_{3r} με	E_{1p} x10^{-4}	E_{3p} x10^{-4}	PP_r kPa	PP_p kPa
15.2	15.2	15.4	17.0	0.6	5.5	3.0	40	-7	0.9	-1.0		
15.2	15.2	15.5	20.0	1.0	14.7	3.0	116	-24	0.9	-1.0		
15.2	15.2	15.5	24.9	1.2	29.2	3.0	227	-57	0.9	-1.0		
15.2	15.2	15.6	29.7	1.3	43.6	3.0	326	-96	0.9	-1.0		
15.2	15.1	15.6	34.5	1.5	58.1	3.0	423	-153	0.9	-1.0		
14.7	19.2	15.2	38.6	1.4	58.2	2.4	420	-97	1.0	-1.0		
15.5	20.3	16.0	44.5	1.5	72.7	2.5	510	-138	1.0	-1.1		
15.6	20.3	16.0	25.2	1.3	14.7	1.5	131	0	1.0	-1.1		
15.1	25.4	15.5	35.1	1.3	29.1	1.4	247	6	1.0	-1.1		
15.1	30.3	15.6	44.9	1.3	43.9	1.4	340	5	1.0	-1.1		
15.2	35.3	15.6	54.8	1.4	58.4	1.5	416	6	1.0	-1.1		
15.0	40.5	15.6	64.7	1.7	72.6	1.4	481	12	1.0	-1.1		
14.9	45.3	15.8	75.8	2.7	91.6	1.5	546	11	1.0	-1.1		
15.1	25.4	15.5	30.4	1.3	15.0	0.9	168	27	1.0	-1.0		
14.6	35.1	15.0	44.9	1.2	29.3	0.9	284	51	1.0	-1.0		
15.0	45.0	15.4	59.6	1.3	44.0	1.0	368	72	1.0	-1.0		
14.7	54.8	15.1	74.3	1.3	58.5	1.0	472	91	1.0	-1.0		
14.4	64.9	14.9	89.1	1.4	72.6	1.0	538	110	1.0	-1.0		
14.4	75.6	15.0	104.6	1.7	86.9	1.0	599	127	1.0	-1.0		
14.9	23.7	15.4	30.6	1.4	20.7	1.3	207	15	1.0	-1.0		
14.8	40.2	15.2	45.2	1.2	14.9	0.5	217	92	1.0	-1.0		
18.2	65.0	18.8	74.9	1.8	29.6	0.5	297	128	1.0	-1.0		
15.5	90.6	16.2	105.4	2.2	44.5	0.5	425	203	1.0	-1.0		
14.2	115.6	14.8	135.1	1.9	58.5		540	264				
17.2	141.1	18.4	165.8	3.6	74.0	0.5	579	268	1.0	-0.9		
19.9	165.5	21.9	194.7	5.9	87.8	0.5	609	279	1.0	-0.9		
15.3	20.5	15.2	20.5	-0.1	0.0	0.0	38	23	1.0	-0.9		
15.4	30.1	15.3	30.1	-0.2	0.1	0.0	93	66	1.0	-0.9		

Resilient Deformation Test 2

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
30.4	30.4	30.6	32.2	0.6	5.2	3.0	28	-4	1.3	1.0		
30.4	30.4	30.7	35.5	0.8	15.1	3.0	91	-14	1.4	0.9		
30.4	30.4	30.8	40.3	1.0	29.7	3.0	175	-30	1.6	0.8		
30.5	30.4	30.8	45.3	1.1	44.7	3.0	253	-49	1.9	0.6		
30.5	30.4	30.8	50.2	1.2	59.2	3.0	324	-69	2.3	0.3		
30.5	30.5	30.9	55.1	1.3	74.0	3.0	391	-92	3.1	-0.3		
30.5	30.5	30.9	59.9	1.4	88.3	3.0	457	-121	4.4	-1.6		
30.3	34.2	30.7	54.1	1.2	59.6	2.5	326	-53	4.5	-1.7		
29.9	35.3	30.3	59.9	1.3	74.0	2.5	393	-68				
30.0	36.3	30.4	65.8	1.4	88.4	2.5	458	-89	4.6	-1.7		
29.9	35.1	30.3	39.9	1.1	14.6	1.4	103	0	4.5	-1.7		
30.0	40.3	30.3	50.3	1.1	30.0	1.4	201	1	4.5	-1.6		
30.1	45.1	30.4	60.0	1.0	44.7	1.5	280	1	4.6	-1.6		
30.0	50.3	30.4	70.1	1.1	59.6	1.5	351	2	4.6	-1.6		
30.1	55.2	30.5	79.9	1.3	74.1	1.5	411	1	4.7	-1.6		
29.9	60.2	30.3	89.7	1.3	88.6	1.5	481	1	4.7	-1.6		
30.1	40.4	30.4	45.4	1.1	14.9	0.9	128	14	4.6	-1.5		
30.0	50.3	30.3	60.4	1.0	30.1	1.0	229	29	4.6	-1.5		
30.0	60.2	30.3	75.3	1.0	45.2	1.0	315	45	4.6	-1.5		
30.2	70.2	30.6	90.2	1.2	59.9	1.0	380	54	4.8	-1.4		
30.3	80.8	30.9	105.5	2.0	74.2	1.0	436	69	5.0	-1.4		
30.9	90.4	32.1	120.1	3.6	89.1	1.0	476	79	5.3	-1.4		
30.0	38.5	30.4	40.2	1.1	5.1	0.4	63	19	4.6	-1.2		
30.0	55.1	30.3	60.1	1.0	15.1	0.5	173	57	4.6	-1.1		
30.1	80.5	30.5	90.6	1.3	30.3	0.5	287	107	4.7	-1.0		
32.8	104.4	33.9	119.5	3.5	45.3	0.5	341	132	5.1	-0.7		
29.8	131.3	30.5	151.3	2.0	60.0	0.5	473	191	4.7	-0.5		
30.2	154.8	31.4	179.9	3.6	75.2	0.5	536	220	5.0	-0.2		
32.7	178.0	35.6	207.8	8.8	89.3	0.5	539	245	5.8	0.5		
30.1	35.4	30.0	35.5	0.0	0.1	0.0	25	13	3.8	1.0		
30.1	45.2	30.0	45.2	-0.2	0.1	0.0	71	44	3.7	1.1		
30.1	60.3	30.0	60.3	-0.4	0.2	0.0	129	86	3.6	1.2		

Resilient Deformation Test 3

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
60.2	60.2	60.1	61.9	0.0	5.1	3.0	20	-3	2.4	2.3		
60.2	60.2	60.2	65.1	0.1	14.8	3.0	63	-9	2.4	2.3		
60.2	60.2	60.3	69.9	0.4	29.4	3.0	123	-18	2.6	2.2		
60.2	60.2	60.3	75.0	0.4	44.5	3.0	182	-28	2.7	2.2		
60.2	60.2	60.3	80.0	0.5	59.4	3.0	237	-39	2.8	2.2		
60.2	60.2	60.3	84.8	0.6	73.9	3.0	286	-49	3.0	2.1		
60.2	60.2	60.4	89.6	0.7	88.3	3.0	338	-60	3.1	2.0		
60.1	64.2	60.2	84.0	0.5	59.2	2.5	242	-31	3.1	2.0		
60.1	65.4	60.3	90.2	0.6	74.3	2.5	297	-39	3.1	2.0		
60.1	66.3	60.3	95.8	0.6	88.5	2.5	345	-48	3.2	2.0		
60.0	65.1	60.2	70.0	0.5	14.8	1.5	75	-2	3.1	2.0		
60.1	70.0	60.2	80.0	0.5	29.9	1.5	148	-2	3.1	2.0		
60.0	75.2	60.2	90.0	0.5	44.5	1.5	212	-1	3.1	2.0		
60.1	80.3	60.3	100.1	0.6	59.5	1.5	269	0	3.2	2.0		
60.2	85.3	60.3	110.0	0.5	74.0	1.5	328	1	3.2	2.0		
60.3	90.2	60.4	119.8	0.6	88.8	1.5	380	-1	3.3	2.0		
60.0	70.1	60.2	75.2	0.5	15.3	1.0	93	6	3.2	2.1		
60.1	80.3	60.2	90.3	0.4	30.2	1.0	172	17	3.2	2.1		
60.2	90.2	60.4	105.2	0.4	45.1	1.0	243	26	3.2	2.1		
60.1	100.3	60.2	120.3	0.4	59.8	1.0	312	37	3.3	2.1		
60.1	110.1	60.3	134.9	0.5	74.4	1.0	369	44	3.4	2.1		
60.3	120.2	60.6	149.9	1.0	89.3	1.0	418	51	3.5	2.1		
60.0	68.0	60.1	69.8	0.5	5.2	0.5	46	8	3.3	2.1		
60.0	84.9	60.1	90.0	0.4	15.3	0.5	131	34	3.3	2.2		
60.2	110.2	60.3	120.3	0.3	30.3	0.5	236	71	3.3	2.2		
60.4	135.4	60.7	150.6	0.9	45.6	0.5	320	102	3.5	2.2		
62.0	161.5	62.6	181.6	1.8	60.4	0.5	383	125	3.7	2.4		
70.1	186.3	72.2	211.3	6.0	74.9	0.5	392	134	4.4	2.8		
60.5	208.6	60.5	238.5	-0.1	89.8	0.5	561	175	3.7	2.8		
59.9	65.3	59.9	65.3	-0.1	0.0	0.0	16	7	3.4	3.1		
60.0	75.2	59.9	75.2	-0.2	0.1	0.0	48	26	3.3	3.2		
60.0	90.1	59.9	90.2	-0.4	0.2	0.0	91	55	3.2	3.2		
60.2	120.5	59.9	120.6	-0.7	0.5	0.0	165	109	3.2	3.3		

Permanent Deformation Test

Date

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
N	*s31*	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
	kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
20	60.2	60.2	60.4	108.8	0.7	145.8	3.0			4.6	1.0		
50	60.2	60.2	60.5	108.8	0.7	145.7	3.0			4.8	0.9		
100	60.2	60.2	60.5	108.7	0.8	145.6	3.0			4.9	0.9		
150	60.2	60.2	60.5	108.7	0.8	145.6	3.0			4.9	0.9		
200	60.2	60.2	60.5	108.7	0.8	145.5	3.0			4.9	0.9		
400	60.3	60.2	60.6	108.7	0.9	145.5	3.0			5.0	1.0		
600	60.3	60.3	60.6	108.7	0.9	145.4	3.0			5.1	1.0		
1000	60.3	60.3	60.6	108.8	1.0	145.4	3.0			5.1	1.1		
2500	60.4	60.4	60.7	108.7	1.1	145.2	3.0			5.2	1.2		
5000	60.4	60.4	60.8	108.8	1.1	145.2	3.0			5.3	1.4		
10000	60.2	60.2	60.6	108.6	1.2	145.2	3.0			5.6	1.5		
15000	60.2	60.1	60.6	108.5	1.2	145.2	3.0			6.0	1.6		
25000	60.3	60.3	60.7	108.6	1.3	145.2	3.0			6.5	1.9		
30000	60.4	60.4	60.8	108.7	1.3	145.2	3.0			6.8	2.1		
40000	60.2	60.2	60.7	108.6	1.4	145.0	3.0			7.0	2.2		
50000	60.1	60.1	60.6	108.5	1.4	145.1	3.0			7.2	2.3		
60000	60.6	60.6	61.0	108.9	1.4	145.1	3.0			7.5	2.7		
70000	60.4	60.4	60.9	108.7	1.5	145.1	3.0			7.8	2.8		
80000	60.4	60.4	60.9	108.7	1.4	145.1	3.0			8.0	2.9		
90000	60.7	60.7	61.2	109.0	1.5	145.0	3.0			8.1	3.3		
100000	60.5	60.5	61.0	108.9	1.5	145.1	3.0			8.4	3.4		

Repeated Load Triaxial Test Results **Test Programme 1**

Laboratory: LRSB
Material: Fountainbleau Sand (SFB)
Specimen: 1_182_1A

Specimen details

	Moisture content	Dry density
Aimed:	0.0%	1600 kg/m^3
Start of test:	0.0%	kg/m^3
End of test:	0.0% %	

Specimen size: 320 mm x 160 mm Static load included (y/n) n

Resilient Deformation Test 1

Date *01/07/91*

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	E_{1r} *με*	E_{3r} *με*	E_{1p} *x10^{-4}*	E_{3p} *x10^{-4}*	PP_r *kPa*	PP_p *kPa*
14.9	35.1	14.8	35.1	-0.3	0.1	0.0	80	51	-0.3	0.6		
15.0	55.0	14.8	55.1	-0.6	0.3	0.0	153	92	-0.7	1.5		
14.1	75.2	13.8	75.4	-0.8	0.5	0.0	225	132	-1.4	2.4		
14.4	48.1	14.8	55.0	1.2	20.6	0.5	247	58	-0.9	2.2		
15.2	81.8	15.7	95.4	1.5	40.8	0.5	410	89	1.2	1.9		
15.9	98.8	16.7	115.8	2.4	51.1	0.5	465	105	2.8	1.7		
16.2	146.2	18.4	173.2	6.6	81.0	0.5	581	171	7.3	0.5		
14.8	28.5	15.3	35.1	1.4	19.9	0.9	210	11	5.8	0.6		
14.6	41.7	15.0	55.3	1.5	40.6	1.0	365	17	5.8	0.6		
15.2	48.1	15.7	64.8	1.5	50.4	1.0	426	14	6.0	0.6		
15.3	68.2	15.9	95.1	1.7	80.8	1.0	576	19	7.6	-0.2		
14.8	22.1	15.3	28.6	1.4	19.5	1.4	182	-10	7.2	-0.2		
15.1	28.4	15.7	41.8	1.6	40.2	1.5	328	-28	7.3	-0.2		
15.1	31.7	15.7	48.5	1.7	50.4	1.5	385	-35	7.6	-0.4		
14.0	41.8	14.9	68.4	2.7	80.0	1.4	509	-40	11.9	-3.8		
15.2	18.5	15.7	25.1	1.4	19.8	1.9	162	-25	11.7	-3.9		
15.1	21.7	15.7	35.1	1.5	40.4	2.0	307	-59	11.8	-3.9		
15.5	25.1	16.0	45.2	1.7	60.2	2.0	411	-87	12.9	-4.9		
15.2	28.3	15.8	55.0	2.0	80.0	2.0	502	-105	27.9	-20.2		
15.0	19.1	15.6	39.0	1.7	59.7	2.5	409	-127	29.8	-22.4		

Resilient Deformation Test 2

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
29.8	50.2	29.6	50.2	-0.5	-0.1	0.0	66	45	-0.9	4.8		
30.2	70.0	30.0	70.0	-0.8	0.0	0.0	124	84	-1.9	6.8		
30.0	90.2	29.7	90.3	-1.0	0.3	0.0	180	120	-3.0	8.7		
29.7	63.3	29.9	70.2	0.7	20.6	0.5	194	48	-2.9	8.8		
30.1	96.9	30.5	110.5	1.3	40.9	0.5	332	90	-2.4	8.8		
30.1	113.9	30.5	130.8	1.4	50.7	0.5	397	109	-2.1	8.9		
35.4	163.5	36.7	190.5	3.9	81.0	0.5	519	137	-1.0	10.0		
29.8	43.5	30.1	50.2	0.8	20.2	1.0	159	7	-2.2	10.0		
29.8	56.8	30.2	70.1	1.0	39.8	1.0	279	14				
30.1	63.7	30.6	80.6	1.5	50.6	1.0	329	17	-2.2	10.1		
32.3	82.8	34.0	109.5	5.0	80.0	1.0	417	21	-1.4	10.0		
29.8	36.9	30.1	43.6	0.9	19.9	1.4	141	-10	-2.3	10.1		
29.8	43.3	30.0	56.6	0.9	39.8	1.5	260	-21	-2.3	10.0		
29.7	46.7	30.0	63.3	1.0	49.9	1.5	312	-26	-2.3	10.0		
29.8	56.7	30.2	83.4	1.1	80.1	1.5	446	-40	-1.9	9.8		
29.8	36.8	30.1	50.0	0.9	39.4	1.9	245	-40	-2.2	9.8		
29.8	40.1	30.2	60.2	1.0	60.3	2.0	348	-63	-2.1	9.8		
30.5	43.3	30.9	69.9	1.1	79.9	2.0	429	-84	-1.7	9.5		
29.9	35.4	30.2	62.0	1.2	79.6	2.5	421	-115	-1.1	8.9		
29.8	34.2	30.2	54.0	1.1	59.5	2.5	328	-83	-1.0	8.9		

Resilient Deformation Test 3

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
60.1	80.3	60.0	80.3	-0.4	0.0	0.0	50	22	2.0	2.1		
60.0	100.2	59.8	100.3	-0.6	0.2	0.0	96	48	2.0	2.3		
60.2	120.3	59.9	120.4	-0.8	0.4	0.0	139	72	1.9	2.6		
60.0	93.5	60.1	100.3	0.2	20.3	0.5	150	24	1.7	2.9		
60.3	127.1	60.4	140.7	0.3	40.7	0.5	274	50	1.9	2.9		
60.4	144.1	60.5	161.1	0.4	51.1	0.5	329	65	2.1	2.9		
62.7	193.6	63.7	220.5	3.0	80.7	0.5	452	95	2.7	3.2		
60.1	73.5	60.2	80.2	0.5	20.0	1.0	113	0	2.0	3.3		
60.1	86.7	60.2	100.1	0.4	40.4	1.0	214	2	1.8	3.4		
60.1	93.2	60.3	110.0	0.4	50.4	1.0	261	3	1.8	3.4		
60.3	113.5	60.5	140.3	0.6	80.4	1.0	382	8	2.0	3.4		
59.9	66.9	60.1	73.7	0.5	20.4	1.5	98	-10	1.8	3.4		
60.2	73.4	60.4	86.8	0.5	40.1	1.5	186	-18	1.8	3.5		
60.0	76.9	60.2	93.5	0.5	50.0	1.5	229	-22	1.8	3.5		
60.3	86.9	60.6	113.5	1.0	80.0	1.5	335	-31	1.8	3.4		
59.9	66.8	60.0	80.1	0.6	39.8	2.0	174	-28	1.8	3.4		
59.8	70.1	60.0	90.1	0.6	60.1	2.0	254	-41	1.7	3.4		
59.9	73.3	60.1	99.9	0.7	79.8	2.0	326	-54	1.8	3.4		
59.8	64.3	60.1	84.2	0.6	59.7	2.5	243	-51	1.8	3.4		
59.9	65.6	60.1	92.1	0.7	79.8	2.5	314	-69	1.9	3.3		

Permanent Deformation Test

Date

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
N	*s31*	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
	kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*

Repeated Load Triaxial Test Results **Test Programme 1**

Laboratory: LRCF
Material: Fountainebleau Sand (SFB)
Specimen: SFD101-6

Specimen details

	Moisture content	Dry density
Aimed:	0.0%	1600 kg/m^3
Start of test:	0.0%	kg/m^3
End of test:	0.0%	

Specimen size: 140 mm x 70 mm Static load included (y/n) n

Resilient Deformation Test 1

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s_{31} kPa	s_{32} kPa	p_1 kPa	p_2 kPa	q_1 kPa	q_2 kPa	q_r/p_r	E_{1r} με	E_{3r} με	E_{1p} x10^{-4}	E_{3p} x10^{-4}	PP_r kPa	PP_p kPa
15.9	15.9	15.9	17.6	0.0	5.0	2.9	0	-17				
15.9	15.9	15.9	20.6	0.0	14.2	3.0	102	-51				
15.9	15.9	15.9	25.6	0.0	29.0	3.0	145	-105				
16.0	16.0	16.0	30.4	0.0	43.1	3.0	217	-164				
15.9	15.9	15.9	35.4	0.0	58.5	3.0	290	-293				
16.3	17.6	16.3	19.1	0.0	4.5	1.6	45	-13				
15.9	16.3	15.9	21.1	0.0	14.5	2.8	108	-51				
16.0	16.8	16.0	26.4	0.0	28.8	2.8	163	-104				
16.1	17.2	16.1	31.6	0.0	43.3	2.8	219	-162				
16.1	17.8	16.1	37.1	0.0	58.0	2.8	272	-222				
16.0	18.9	16.0	42.7	0.0	71.5	2.7	514	-556				
16.3	16.7	16.3	18.0	0.0	4.0	2.4	-54	-15				
16.3	18.3	16.3	23.0	0.0	14.0	2.1	108	-48				
15.8	22.2	15.8	31.4	0.0	27.6	1.8	162	-100				
15.4	28.3	15.4	42.1	0.0	41.3	1.5	237	-137				
15.0	33.0	15.0	51.4	0.0	55.2	1.5	286	-163				
14.8	38.9	14.8	61.8	0.0	68.8	1.5	352	-189				
14.5	44.1	14.5	71.6	0.0	82.6	1.4	414	-209				
16.4	17.6	16.4	19.0	0.0	4.3	1.7	0	-14				
16.4	21.9	16.4	26.3	0.0	13.3	1.3	91	-43				
15.4	33.3	15.4	42.0	0.0	26.1	1.0	146	-76				
14.8	43.9	14.8	57.0	0.0	39.4	0.9	237	-95				
14.5	54.2	14.5	71.6	0.0	52.2	0.9	275	-111				
14.1	65.5	14.1	87.4	0.0	65.8		345	-119				
13.8	75.6	13.8	101.5	0.0	77.7	0.9	382	-138				
16.1	16.3	16.1	17.8	0.0	4.5	2.6	0	-17				
15.0	38.6	15.0	42.4	0.0	11.3	0.4	129	50				
14.2	65.4	14.2	72.7	0.0	22.0	0.4	183	86				
13.5	89.2	13.5	100.5	0.0	33.8	0.4	257	108				
12.6	116.8	12.6	131.8	0.0	45.0	0.4	318	133				
12.2	140.5	12.2	159.4	0.0	56.8	0.4	387	151				
11.8	168.6	11.8	190.9	0.0	66.9	0.4	429	160				
15.1	17.7	15.1	17.7	0.0	0.0	0.0	18	8				
14.4	28.4	14.4	28.4	0.0	0.0	0.0	55	39				

Resilient Deformation Test 2

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
30.7	30.7	30.7	32.2	0.0	4.5	3.0	54	-9				
30.7	30.7	30.7	35.4	0.0	14.2	3.0	76	-28				
30.8	30.8	30.8	40.3	0.0	28.6	3.0	145	-59				
30.7	30.7	30.7	45.0	0.0	43.0	3.0	182	-87				
30.8	30.8	30.8	49.9	0.0	57.4	3.0	214	-124				
30.7	30.7	30.7	54.8	0.0	72.2	3.0	267	-152				
30.7	30.7	30.7	59.6	0.0	86.7	3.0	318	-185				
30.7	31.0	30.7	32.5	0.0	4.6	2.6	54	-11				
30.7	31.2	30.7	35.8	0.0	13.9	2.6	85	-28				
30.6	31.9	30.6	41.4	0.0	28.6	2.6	128	-56				
30.5	32.5	30.5	46.9	0.0	43.1	2.6	182	-84				
30.5	33.2	30.5	52.3	0.0	57.3	2.6	214	-112				
30.4	34.2	30.4	58.1	0.0	71.8	2.6	291	-141				
30.4	35.2	30.4	63.9	0.0	86.2	2.6	323	-172				
30.7	31.4	30.7	33.0	0.0	4.7	2.0	68	-11				
30.8	33.8	30.8	38.4	0.0	13.9	1.8	87	-27				
30.7	38.3	30.7	47.5	0.0	27.6	1.6	135	-52				
30.3	44.3	30.3	57.8	0.0	40.5	1.5	182	-72				
30.2	49.7	30.2	68.1	0.0	55.3	1.5	255	-81				
30.1	55.3	30.1	78.4	0.0	69.2	1.4	304	-92				
29.7	60.7	29.7	88.4	0.0	83.0	1.4	318	-104				
30.7	32.6	30.7	34.0	0.0	4.2	1.3	48	-10				
30.5	39.1	30.5	43.6	0.0	13.4	1.0	109	-26				
30.2	50.0	30.2	58.8	0.0	26.3	0.9	169	-44				
29.7	60.6	29.7	73.6	0.0	39.0	0.9	197	-53				
29.5	70.5	29.5	88.0	0.0	52.5	0.9	263	-61				
29.2	80.6	29.2	102.6	0.0	66.0	0.9	291	-61				
28.9	90.8	28.9	117.1	0.0	78.8	0.9	363	-68				
30.6	37.2	30.6	38.4	0.0	3.7	0.5	0	-11				
30.0	55.2	30.0	58.9	0.0	11.2	0.4	110	32				
29.1	90.7	29.1	97.6	0.0	20.8	0.3	181	64				
28.4	106.4	28.4	117.4	0.0	33.1	0.4	238	73				
27.9	130.9	27.9	145.7	0.0	44.5	0.4	290	84				
27.3	157.0	27.3	175.8	0.0	56.3	0.4	343	106				
26.8	183.1	26.8	205.5	0.0	67.3	0.4	431	123				
30.3	33.5	30.3	33.5	0.0	0.0		36	6				
29.9	44.5	29.9	44.5	0.0	0.0	0.0	72	28				
29.5	60.1	29.5	60.1	0.0	0.0	0.0	89	53				

Resilient Deformation Test 3

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
59.2	59.2	59.2	60.7	0.0	4.5	3.0	18	-7				
59.3	59.3	59.3	64.1	0.0	14.4	3.0	67	-18				
59.3	59.3	59.3	69.0	0.0	29.1	3.0	109	-36				
59.2	59.2	59.2	73.6	0.0	43.1	3.0	158	-57				
59.3	59.3	59.3	78.6	0.0	57.9	3.0	182	-77				
59.3	59.3	59.3	83.5	0.0	72.5	3.0	236	-98				
59.3	59.3	59.3	88.3	0.0	86.9	3.0	285	-118				
59.2	59.4	59.2	60.8	0.0	4.2	2.6	-48	-6				
59.1	59.8	59.1	64.6	0.0	14.3	2.6	90	-19				
59.1	60.8	59.1	70.3	0.0	28.5	2.5	121	-39				
59.0	61.4	59.0	75.6	0.0	42.6	2.6	163	-58				
59.1	62.2	59.1	81.3	0.0	57.4	2.6	200	-76				
59.0	62.7	59.0	86.7	0.0	71.9	2.6	229	-94				
58.9	64.0	58.9	92.6	0.0	85.8	2.5	273	-112				
59.3	60.1	59.3	61.5	0.0	4.2	1.9	0	-6				
59.2	62.6	59.2	67.2	0.0	13.8	1.7	74	-21				
59.2	67.2	59.2	76.5	0.0	27.8	1.6	111	-34				
58.9	72.6	58.9	86.4	0.0	41.4	1.5	181	-48				
58.8	78.2	58.8	96.6	0.0	55.3	1.5	212	-59				
58.6	84.2	58.6	107.3	0.0	69.4	1.4	247	-70				
58.5	89.6	58.5	117.1	0.0	82.5	1.4	291	-75				
59.3	61.5	59.3	62.9	0.0	4.1	1.1	0	-6				
59.0	68.1	59.0	72.5	0.0	13.3	1.0	90	-15				
58.8	79.1	58.8	87.7	0.0	25.8	0.9	145	-27				
58.6	89.7	58.6	102.6	0.0	38.7	0.9	194	-33				
58.2	99.5	58.2	116.9	0.0	52.2	0.9	236	-40				
58.0	109.6	58.0	131.5	0.0	65.8	0.9	291	-44				
57.8	119.6	57.8	145.8	0.0	78.7	0.9	320	-47				
59.2	66.3	59.2	67.4	0.0	3.4	0.4	46	8				
58.7	84.5	58.7	88.1	0.0	10.9	0.4	94	22				
57.9	109.1	57.9	116.6	0.0	22.5	0.4	176	40				
57.5	134.9	57.5	146.0	0.0	33.4	0.4	248	53				
56.7	159.5	56.7	174.3	0.0	44.3	0.4	309	69				
56.3	185.3	56.3	204.1	0.0	56.3	0.4	356	82				
55.7	211.6	55.7	233.9	0.0	66.9	0.4	400	96				
60.1	63.6	60.1	63.6	0.0	0.0	0.0	36	4				
59.7	74.3	59.7	74.3	0.0	0.0	0.0	0	21				
59.2	90.2	59.2	90.2	0.0	0.0	0.0	90	43				
58.6	120.1	58.6	120.1	0.0	0.0	0.0	111	74				

Permanent Deformation Test

Date

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
N	*s31*	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
	kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
10	59.2	59.2	59.2	107.3	0.0	144.4	3.0	403	-210	1.1	-0.9		
50	59.0	59.0	59.0	107.0	0.0	144.0	3.0	401	-208	1.4	-1.0		
100	59.2	59.2	59.2	107.0	0.0	143.3	3.0	422	-212	1.5	-1.0		
200	59.5	59.5	59.5	107.1	0.0	142.8	3.0	403	-214	1.8	-1.0		
400	59.1	59.1	59.1	107.0	0.0	143.6	3.0	401	-215	1.8	-0.9		
1000	59.6	59.6	59.6	106.9	0.0	141.8	3.0	426	-218	2.4	-1.1		
2500	60.6	60.6	60.6	105.9	0.0	136.0	3.0	412	-220	3.0	-1.0		
5000	58.5	58.5	58.5	106.6	0.0	144.3	3.0	413	-239	3.5	-0.9		
10000	59.7	59.7	59.7	106.5	0.0	140.4	3.0	419	-236	4.7	-1.2		
25000	59.7	59.7	59.7	106.7	0.0	141.0	3.0	390	-237	5.9	-0.9		
50000	59.4	59.4	59.4	106.8	0.0	142.3	3.0	346	-210	7.3	-0.2		
100000	59.7	59.7	59.7	105.8	0.0	138.2	3.0	326	-188	7.3	1.4		

Repeated Load Triaxial Test Results **Test Programme 1**

Laboratory: LRCF
Material: Fountainebleau Sand (SFB)
Specimen: SFD201-6

Specimen details

	Moisture content	Dry density
Aimed:	0.0%	1600 kg/m^3
Start of test:	0.0%	kg/m^3
End of test:	0.0%	

Specimen size: 140 mm x 70 mm Static load included (y/n) n

Resilient Deformation Test 1

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s_{31} kPa	s_{32} kPa	p_1 kPa	p_2 kPa	q_1 kPa	q_2 kPa	q_r/p_r	E_{1r} με	E_{3r} με	E_{1p} x10^{-4}	E_{3p} x10^{-4}	PP_r kPa	PP_p kPa
20.9	20.9	20.9	22.3	0.0	4.3	3.1	51	-17				
21.0	21.0	21.0	25.6	0.0	13.8	3.0	103	-73				
21.0	21.0	21.0	30.6	0.0	28.7	3.0	181	-164				
20.9	20.9	20.9	35.7	0.0	44.5	3.0	285	-252				
21.0	21.0	21.0	40.6	0.0	58.8	3.0	371	-354				
20.6	20.9	20.6	22.6	0.0	5.0	2.5	53	-21				
20.7	21.6	20.7	26.5	0.0	14.8	2.6	120	-78				
20.6	22.3	20.6	32.7	0.0	31.2	2.6	232	-177				
20.7	23.2	20.7	38.9	0.0	47.2	2.6	321	-260				
20.5	23.9	20.5	44.8	0.0	62.6	2.6	383	-334				
20.6	24.8	20.6	50.7	0.0	77.6	2.6	451	-438				
20.5	21.5	20.5	23.5	0.0	5.9	2.0	70	-25				
20.7	24.9	20.7	31.0	0.0	18.4	1.8	152	-81				
20.7	29.5	20.7	42.2	0.0	38.1	1.8	287	-165				
20.6	35.0	20.6	54.0	0.0	57.1	1.7	372	-236				
20.6	40.4	20.6	65.6	0.0	75.5	1.7	444	-296				
21.0	46.0	21.0	77.0	0.0	92.9	1.7	563	-374				
20.8	51.0	20.8	88.7	0.0	113.1	1.7	645	-441				
20.7	23.4	20.7	25.7	0.0	7.0	1.4	85	-31				
20.6	30.1	20.6	37.7	0.0	22.7	1.3	215	-95				
20.5	40.4	20.5	56.2	0.0	47.3	1.3	365	-178				
20.2	51.2	20.2	74.2	0.0	69.1	1.3	490	-243				
24.6	62.2	24.6	93.3	0.0	93.3	1.4	575	-302				
24.9	71.9	24.9	110.2	0.0	114.9		657	-356				
24.2	81.5	24.2	128.0	0.0	139.5	1.3	818	-432				
27.2	33.7	27.2	37.4	0.0	11.2	1.1	136	-43				
26.6	49.6	26.6	61.6	0.0	36.0	1.0	316	-113				
24.9	72.0	24.9	96.2	0.0	72.6	1.0	540	-194				
25.1	97.0	25.1	132.2	0.0	105.5	1.0	699	-252				
25.4	121.5	25.4	167.9	0.0	139.1	1.0	857	-317				
25.6	145.6	25.6	203.8	0.0	174.6	1.0	967	-355				
27.1	172.6	27.1	244.5	0.0	215.8	1.0	1130	-387				
27.1	30.4	27.1	30.4	0.0	0.0	0.0	51	0				
27.4	40.1	27.4	40.1	0.0	0.0	0.0	102	21				

Resilient Deformation Test 2

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
30.3	30.3	30.3	31.6	0.0	3.8	2.9	36	-17				
30.4	30.4	30.4	34.9	0.0	13.6	3.0	119	-55				
30.9	30.9	30.9	40.6	0.0	29.2	3.0	217	-122				
30.9	30.9	30.9	45.5	0.0	43.9	3.0	298	-182				
30.6	30.6	30.6	50.3	0.0	59.0	3.0	337	-253				
30.8	30.8	30.8	55.2	0.0	73.1	3.0	422	-315				
30.7	31.2	30.7	32.9	0.0	5.1	2.3	49	-18				
30.8	31.6	30.8	36.8	0.0	15.5	2.6	119	-61				
30.8	32.1	30.8	42.5	0.0	31.2	2.6	220	-126				
30.8	33.0	30.8	48.5	0.0	46.4	2.6	305	-189				
30.6	33.5	30.6	54.3	0.0	62.3	2.6	372	-260				
30.9	34.6	30.9	60.6	0.0	78.1	2.6	438	-329				
31.1	35.7	31.1	66.8	0.0	93.2	2.6	513	-395				
33.0	33.8	33.0	35.8	0.0	6.0	2.1	60	-22				
33.4	36.7	33.4	42.7	0.0	18.0	1.9	148	-64				
33.4	40.6	33.4	53.4	0.0	38.3	1.9	283	-134				
33.2	45.7	33.2	64.7	0.0	57.1	1.8	386	-193				
33.5	50.9	33.5	76.4	0.0	76.4	1.8	464	-252				
32.7	54.8	32.7	86.5	0.0	95.0	1.8	554	-310				
32.7	60.4	32.7	98.0	0.0	112.7	1.7	637	-356				
32.9	35.0	32.9	37.4	0.0	7.1	1.6	85	-26				
33.4	40.7	33.4	48.5	0.0	23.3	1.5	198	-81				
32.6	50.3	32.6	66.0	0.0	47.0	1.4	351	-140				
32.3	60.3	32.3	83.6	0.0	70.0	1.4	457	-203				
32.8	70.2	32.8	101.3	0.0	93.4	1.4	570	-258				
33.2	80.0	33.2	117.6	0.0	112.8	1.3	640	-287				
33.6	90.7	33.6	135.1	0.0	133.3	1.3	791	-326				
32.8	39.0	32.8	42.8	0.0	11.3	1.1	119	-39				
32.9	55.9	32.9	68.0	0.0	36.4	1.0	312	-95				
33.0	79.8	33.0	104.1	0.0	73.0	1.0	506	-158				
33.3	104.6	33.3	139.9	0.0	106.0	1.0	671	-203				
32.9	128.6	32.9	175.2	0.0	139.8	1.0	813	-259				
32.9	152.4	32.9	210.4	0.0	173.9	1.0	924	-305				
33.4	178.7	33.4	248.9	0.0	210.7	1.0	1009	-348				
32.0	35.4	32.0	35.4	0.0	0.0	0.0	51	0				
31.9	44.8	31.9	44.8	0.0	0.0		70	17				
31.9	59.6	31.9	59.6	0.0	0.0	0.0	134	42				

Resilient Deformation Test 3

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 -4*	*x10 -4*	*kPa*	*kPa*
62.0	62.0	62.0	63.7	0.0	5.0	2.9	53	-13				
62.0	62.0	62.0	66.4	0.0	13.1	3.0	85	-35				
61.9	61.9	61.9	71.6	0.0	29.0	3.0	149	-72				
61.5	61.5	61.5	76.2	0.0	44.2	3.0	220	-114				
62.2	62.2	62.2	81.6	0.0	58.2	3.0	283	-154				
61.8	61.8	61.8	86.3	0.0	73.4	3.0	351	-195				
62.2	62.2	62.2	91.4	0.0	87.6	3.0	407	-232				
61.2	61.6	61.2	63.2	0.0	4.7	2.4	0	-13				
60.3	60.8	60.3	65.8	0.0	15.0	2.7	85	-38				
60.4	61.8	60.4	72.0	0.0	30.6	2.6	187	-80				
59.7	61.7	59.7	77.3	0.0	46.8	2.7	254	-124				
60.1	62.9	60.1	83.7	0.0	62.3	2.6	339	-165				
60.3	63.8	60.3	89.9	0.0	78.3	2.6	388	-207				
60.1	64.4	60.1	95.4	0.0	93.1	2.6	485	-245				
60.4	61.2	60.4	63.2	0.0	6.0	2.1	51	-14				
60.9	64.1	60.9	70.2	0.0	18.3	2.0	119	-47				
61.2	68.6	61.2	81.3	0.0	38.1	1.9	220	-97				
61.0	73.3	61.0	92.4	0.0	57.4	1.8	337	-138				
61.3	78.6	61.3	103.9	0.0	76.0	1.8	424	-176				
61.2	83.3	61.2	114.4	0.0	93.2	1.8	490	-210				
61.6	89.4	61.6	126.7	0.0	111.9	1.7	525	-246				
60.6	62.7	60.6	65.0	0.0	6.9	1.6	63	-17				
60.4	68.1	60.4	75.5	0.0	22.1	1.5	178	-55				
61.4	79.1	61.4	94.6	0.0	46.5	1.4	303	-102				
61.6	89.1	61.6	112.5	0.0	70.1	1.4	434	-147				
61.8	99.1	61.8	129.4	0.0	90.9	1.3	479	-184				
61.8	108.4	61.8	145.9	0.0	112.6	1.3	557	-211				
61.9	118.2	61.9	162.6	0.0	133.2	1.3	605	-245				
61.6	67.8	61.6	71.6	0.0	11.4	1.1	87	-26				
58.1	80.9	58.1	93.1	0.0	36.6	1.0	278	-75				
62.4	108.0	62.4	131.3	0.0	69.9	1.0	469	-135				
63.9	133.6	63.9	167.9	0.0	102.9	1.0	571	-168				
65.3	158.1	65.3	203.8	0.0	137.1	1.0	683	-205				
67.5	184.4	67.5	241.4	0.0	170.9	1.0	768	-248				
67.8	209.1	67.8	279.8	0.0	212.0	1.0	896	-298				
69.1	71.9	69.1	71.9	0.0	0.0	0.0	-17	4				
70.0	81.3	70.0	81.3	0.0	0.0	0.0	0	13				
70.5	97.0	70.5	97.0	0.0	0.0	0.0	104	29				
70.9	125.7	70.9	125.7	0.0	0.0	0.0	153	59				

Permanent Deformation Test

Date

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
N	*s31*	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
	kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
20	91.1	91.1	91.1	139.0	0.0	143.7	3.0	576	-243	1.9	-0.5		
50	91.7	91.7	91.7	138.6	0.0	140.6	3.0	557	-238	1.8	-0.5		
100	91.3	91.3	91.3	138.9	0.0	142.7	3.0	566	-241	1.4	-0.5		
200	90.8	90.8	90.8	139.0	0.0	144.7	3.0	571	-244	1.3	-0.4		
400	90.7	90.7	90.7	138.7	0.0	143.9	3.0	556	-243	1.4	-0.4		
1000	91.2	91.2	91.2	138.5	0.0	142.0	3.0	557	-243	1.3	-0.4		
2500	91.9	91.9	91.9	138.6	0.0	140.0	3.0	585	-235	0.8	-0.5		
5000	91.4	91.4	91.4	138.7	0.0	142.0	3.0	605	-246	0.7	-0.4		
10000	91.8	91.8	91.8	138.5	0.0	140.1	3.0	583	-248	1.1	-0.5		
25000	92.0	92.0	92.0	138.7	0.0	140.1	3.0	571	-244	1.1	-0.6		
50000	91.6	91.6	91.6	138.3	0.0	140.1	3.0	554	-251	1.4	0.1		
100000	91.6	91.6	91.6	138.7	0.0	141.3	3.0	561	-236	1.5	0.2		

Repeated Load Triaxial Test Results **Test Programme 1**

Laboratory: LNEC
Material: Hard Limestone (CCD)
Specimen: Sample 2

Specimen details

	Moisture content	Dry density
Aimed:	3.3%	2380 kg/m^3
Start of test:	3.4%	2427 kg/m^3
End of test:		

Specimen size: 560 mm x 300 mm Static load included (y/n) n

Permanent Deformation Test

Date 23 August 1991

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
N	*s31*	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
	kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*με*	*με*	*x10^{-4}*	*x10^{-4}*	*kPa*	*kPa*
0	30.0	29.8	30.0	56.0	0.0	78.7	3.0			0.0	0.0		
20	30.0	29.8	30.0	56.0	0.0	78.7	3.0			24.8	-9.4		
50	30.0	29.8	30.0	56.0	0.0	78.7	3.0			26.0	-9.4		
100	30.0	29.8	30.0	56.0	0.0	78.7	3.0			27.4	-9.5		
200	30.0	29.8	30.0	56.0	0.0	78.7	3.0			29.0	-9.5		
400	30.0	29.8	30.0	56.0	0.0	78.7	3.0			30.4	-9.7		
1000	30.0	29.8	30.0	56.0	0.0	78.7	3.0			33.0	-10.1		
2500	30.0	29.8	30.0	56.0	0.0	78.7	3.0			35.1	-10.3		
5000	30.0	29.8	30.0	56.0	0.0	78.7	3.0			36.2	-10.3		
10000	30.0	29.8	30.0	56.0	0.0	78.7	3.0			38.4	-10.6		
25000	30.0	29.8	30.0	56.0	0.0	78.7	3.0			39.6	-10.2		
50000	30.0	29.8	30.0	56.0	0.0	78.7	3.0			42.1	-10.7		
100000	30.0	29.8	30.0	56.0	0.0	78.7	3.0			44.3	0.0		

Resilient Deformation Test 1

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
16.0	16.0	16.0	21.0	0.0	15.0	3.0	62	-21				
16.0	16.0	16.0	26.0	0.0	30.0	3.0	92	-95				
16.0	16.0	16.0	31.0	0.0	45.0	3.0	139	-177				

Resilient Deformation Test 2

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
29.3	29.3	29.3	35.6	0.0	18.7	3.0	46	-9				
29.3	29.3	29.3	39.3	0.0	30.0	3.0	62	-38				
29.3	29.3	29.3	44.3	0.0	45.0	3.0	100	-70				
29.3	29.3	29.3	51.8	0.0	67.5	3.0	138	-115				
29.3	29.3	29.3	55.0	0.0	76.9	3.0	155	-146				

Resilient Deformation Test 3

Date

Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain		Pore Pressure	
s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
61.3	61.3	61.3	67.6	0.0	18.7	3.0	28	-2				
61.3	61.3	61.3	71.3	0.0	30.0	3.0	39	-10				
61.3	61.3	61.3	75.7	0.0	43.1	3.0	57	-22				
61.3	61.3	61.3	82.6	0.0	63.7	3.0	88	-36				
61.3	61.3	61.3	87.6	0.0	78.7	3.0	107	-50				
61.3	61.3	61.3	93.8	0.0	97.5	3.0	128	-72				

Repeated Load Triaxial Test Results **Test Programme 1**

Laboratory: UNOT
Material: Hard Limestone (CCD)
Specimen: UNOT-1

Specimen details

	Moisture content	Dry density
Aimed:	3.3%	2381 kg/m^3
Start of test:	3.6%	2417 kg/m^3
End of test:		

Specimen size: 300 mm x 150 mm Static load included (y/n) n

Permanent Deformation Test

Date

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
N	*s31*	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
	kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*με*	*με*	*x10^{-4}*	*x10^{-4}*	*kPa*	*kPa*
0													
50													
100													
200	30.0	30.0	30.0	61.0	0.0	93.0	3.0	145	-120	0.0	0.0		
400	30.0	30.0	30.0	61.0	0.0	93.0	3.0	118	-71	0.4	-0.1		
1000	30.0	30.0	30.0	61.0	0.0	93.0	3.0	92	-39	0.5	-0.1		
2500	30.0	30.0	30.0	57.0	0.0	81.0	3.0	125	-54	0.6	-0.2		
5000	30.0	30.0	30.0	57.0	0.0	81.0	3.0	184	-112	0.6	0.4		
10000	30.0	30.0	30.0	57.0	0.0	81.0	3.0	191	-136	0.9	0.6		
25000	30.0	30.0	30.0	57.0	0.0	81.0	3.0	178	-273	1.1	3.9		
50000	30.0	30.0	30.0	57.0	0.0	81.0	3.0	165	-303	0.5	4.0		
100000	30.0	30.0	30.0	57.0	0.0	81.0	3.0	178	-303	0.6	4.1		

Resilient Deformation Test 1

Date

Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain		Pore Pressure	
s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
15.0	15.0	16.5	19.2	4.4	12.5	3.0	18	-20				
15.0	15.0	16.5	26.5	4.4	34.4	3.0	80	-40				
15.0	25.0	16.5	32.5	4.4	22.4	1.1	186	-143				
15.0	30.0	16.5	42.6	4.4	37.7	1.3	97	-51				
15.0	35.0	16.5	40.7	4.4	17.0	0.5	106	-112				
15.0	45.0	16.5	55.9	4.4	32.8	0.7	133	91				
15.0	55.0	16.5	77.0	4.4	65.9	1.0	292	143				
15.0	65.0	16.5	90.1	4.4	75.4	1.0	327	183				
15.0	81.7	16.5	120.7	4.4	117.0	1.1	490	203				
15.0	81.7	16.5	120.6	4.4	116.9	1.1	469	163				
15.0	65.0	16.5	74.3	4.4	27.9	0.4	230	234				
15.0	90.0	16.5	100.9	4.4	32.8	0.3	230	275				
15.0	115.0	16.5	137.1	4.4	66.2	0.5	363	264				
15.0	140.0	16.5	166.6	4.4	79.8	0.5	451	366				
15.0	181.6	16.5	215.9	4.4	103.0	0.5	548	478				
15.0	30.0	16.5	35.1	4.4	15.3	0.6	80	173				
15.0	45.0	16.5	49.4	4.4	13.1	0.3	186	234				
15.0	60.0	16.5	67.5	4.4	22.4	0.4	248	316				

Resilient Deformation Test 2

Date

Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain		Pore Pressure	
s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
30.0	30.0	31.5	35.7	4.4	17.0	3.0	35	-20				
30.0	30.0	31.5	40.7	4.4	32.2	3.0	79	-30				
30.0	30.0	31.5	45.5	4.4	46.4	3.0	106	-51				
30.0	35.0	31.5	40.9	4.4	17.6	1.4	35	-20				
30.0	40.0	31.5	50.4	4.4	31.2	1.4	79	-40				
30.0	45.0	31.5	60.1	4.4	45.4	1.4	117	-51				
30.0	50.0	31.5	70.1	4.4	60.4	1.4	168	-51				
30.0	55.0	31.5	80.5	4.4	76.4	1.5	221	-41				
30.0	40.0	31.5	45.8	4.4	17.5	0.9	53	-40				
30.0	50.0	31.5	60.6	4.4	31.9	0.9	110	41				
30.0	60.0	31.5	75.3	4.4	45.9	0.9	168	61				
30.0	70.0	31.5	91.1	4.4	63.4	1.0	212	81				
30.0	80.0	31.5	105.3	4.4	75.9	1.0	248	91				
30.0	96.7	31.5	130.9	4.4	102.8	1.0	327	122				
30.0	130.0	31.5	179.9	4.4	149.8	1.0	462	1123				
30.0	55.0	31.5	62.5	4.4	22.4	0.6	26	71				
30.0	80.0	31.5	91.5	4.4	34.4	0.5	168	97				
30.0	105.0	31.5	121.4	4.4	49.2	0.5	224	132				
30.0	130.0	31.5	151.5	4.4	64.4	0.5	274	162				
30.0	155.0	31.5	181.5	4.4	79.4	0.5	407	260				
30.0	196.6	31.5	230.1	4.4	100.4	0.5	690	1747				
30.0	45.0	31.5	48.8	4.4	11.4	0.4	53	244				
30.0	60.0	31.5	64.1	4.4	12.4	0.2	71	406				
30.0	90.0	31.5	93.1	4.4	9.4	0.1	194	557				
30.0	120.0	31.5	123.1	4.4	9.4	0.1	230	769				

Resilient Deformation Test 3

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
60.0	60.0	61.5	65.8	4.4	17.4	3.0	27	-30				
60.0	60.0	61.5	70.4	4.4	31.1	3.0	62	-39				
60.0	60.0	61.5	80.6	4.4	61.8	3.0	141	-81				
60.0	60.0	61.5	81.0	4.4	62.9	3.0	168	-91				
60.0	60.0	61.5	85.5	4.4	76.4	3.0	212	-133				
60.0	65.0	61.5	70.8	4.4	17.4	1.4	35	-20				
60.0	70.0	61.5	80.6	4.4	31.7	1.4	71	-31				
60.0	75.0	61.5	89.8	4.4	44.4	1.4	115	-40				
60.0	80.0	61.5	100.8	4.4	62.3	1.5	177	-71				
60.0	85.0	61.5	110.8	4.4	77.4	1.5	239	-71				
60.0	93.3	61.5	126.8	4.4	100.4	1.5	318	81				
60.0	80.0	61.5	86.1	4.4	18.4	0.6	53	-51				
60.0	80.0	61.5	90.2	4.4	30.6	0.9	80	31				
60.0	90.0	61.5	105.7	4.4	47.0	1.0	133	41				
60.0	100.0	61.5	120.8	4.4	62.4	1.0	195	61				
60.0	100.0	61.5	125.7	4.4	77.0	1.1	256	71				
60.0	126.6	61.5	160.3	4.4	101.1	1.0	354	182				
60.0	85.0	61.5	90.8	4.4	17.5	0.4	18	65				
60.0	110.0	61.5	120.4	4.4	31.2	0.5	88	101				
60.0	135.0	61.5	151.8	4.4	50.3	0.5	209	132				
60.0	160.0	61.5	181.1	4.4	63.4	0.5	292	232				
60.0	185.0	61.5	210.1	4.4	75.4	0.5	310	394				
60.0	75.0	61.5	78.8	4.4	11.4	0.4	18	81				
60.0	90.0	61.5	92.7	4.4	8.2	0.1	71	121				
60.0	120.0	61.5	125.3	4.4	15.9	0.2	106	233				
60.0	150.0	61.5	153.8	4.4	11.4	0.1	177	314				
60.0	180.0	61.5	182.5	4.4	7.4	0.0	177	505				

Repeated Load Triaxial Test Results **Test Programme 1**

Laboratory: LRSB
Material: Hard Limestone (CCD)
Specimen: 1_186_1A

Specimen details

	Moisture content	Dry density
Aimed:	3.3%	2380 kg/m^3
Start of test:	3.1%	2370 kg/m^3
End of test:		

Specimen size: 320 mm x 160 mm Static load included (y/n) n

Permanent Deformation Test

Date 08/07/91

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
N	*s31*	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
	kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*με*	*με*	*x10^{-4}*	*x10^{-4}*	*kPa*	*kPa*
20	30.3	30.2	31.2	56.8	2.7	79.9	3.0			19.3	0.3		
50	30.3	30.2	31.3	56.9	2.8	79.9	3.0			22.4	0.3		
100	30.3	30.2	31.2	56.9	2.6	79.9	3.0			26.0	0.5		
150	30.3	30.2	31.2	56.9	2.7	80.0	3.0			28.0	0.6		
200	30.3	30.2	31.2	56.8	2.7	79.9	3.0			29.9	0.6		
400	30.3	30.2	31.2	56.9	2.6	80.0	3.0			33.6	0.7		
600	30.3	30.2	31.1	56.8	2.4	80.1	3.0			36.2	0.8		
1000	30.3	30.2	31.1	57.0	2.4	80.2	3.0			39.0	0.8		
2500	30.2	30.2	30.9	56.8	1.9	80.0	3.0			44.0	0.9		
5000	30.2	30.1	30.9	56.7	1.9	80.0	3.0			46.9	1.0		
10000	30.1	30.0	30.7	56.7	1.9	80.1	3.0			48.2	1.2		
15000	29.9	29.8	30.4	56.5	1.6	80.0	3.0			49.8	1.3		
25000	29.1	28.9	29.5	55.6	1.3	80.0	3.0			50.5	1.6		
30000	29.7	29.5	30.0	56.1	1.1	79.8	3.0			49.7	2.4		
40000	29.1	28.9	29.6	55.5	1.4	79.8	3.0			49.8	2.2		
50000	29.0	28.9	29.5	55.6	1.5	80.1	3.0			49.3	2.2		
60000	29.6	29.5	29.9	56.1	0.8	79.8	3.0			50.2	3.1		
70000	29.9	29.7	30.3	56.4	1.3	80.0	3.0			49.1	2.7		
80000	29.9	29.8	30.2	56.5	0.8	79.9	3.0			49.1	2.5		
90000	30.1	29.9	30.5	56.6	1.3	80.0	3.0			49.4	2.6		
100000	30.0	29.8	30.4	56.6	1.3	80.2	3.0			49.3	2.5		

Resilient Deformation Test 1

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
15.2	15.2	15.6	20.6	1.1	16.4	3.0	91	-29	47.8	1.6		
15.2	15.1	15.6	25.2	1.3	30.4	3.0	174	-59	48.6	1.6		
15.2	15.2	15.8	30.4	1.6	45.7	3.0	220	-86	48.3	1.5		
15.9	19.1	16.5	39.7	1.8	62.0	2.6	209	-90	48.9	1.2		
15.2	20.0	15.9	45.0	2.3	75.3	2.5	257	-105	48.8	1.2		
15.3	21.6	16.2	55.2	2.8	100.7	2.5	347	-164	48.9	0.8		
15.5	20.2	16.3	25.3	2.4	15.2	1.4	66	-9	49.0	1.0		
15.3	24.9	16.1	35.2	2.4	30.9	1.5	166	-20	49.0	1.0		
15.2	30.2	16.0	45.4	2.6	45.7	1.5	178	-24	49.0	1.0		
15.2	35.0	16.1	55.3	2.6	60.8	1.5	232	-29	49.6	1.0		
15.3	39.7	16.3	64.9	2.9	75.6	1.5	260	-31	48.9	0.9		
15.7	47.8	16.6	81.3	2.9	100.4	1.5	303	-28	49.5	0.9		
15.3	25.2	16.2	30.4	2.8	15.7	0.9	48	5	49.3	1.3		
15.2	35.3	16.2	45.3	2.8	30.2	0.9	131	10	49.1	1.3		
15.2	44.7	16.1	60.0	2.8	45.7	1.0	200	18	49.4	1.2		
15.8	54.7	16.8	75.1	3.1	61.3	1.0	245	24	49.3	1.2		
14.8	64.5	15.8	89.7	3.3	75.4	1.0	270	45	49.4	1.2		
14.9	81.2	16.0	114.8	3.3	100.5	1.0	325	83	50.1	1.3		
15.4	114.9	16.8	164.8	4.3	149.6	1.0	457	156	53.1	1.5		
14.4	147.7	16.7	213.9	6.8	198.6	1.0	460	562	65.5	-4.0		
14.7	215.1	19.6	313.6	14.8	295.4	1.0	528	1916	101.4	-31.9		
15.3	39.9	16.5	44.9	3.6	15.0	0.4	111	184	101.9	-14.6		
15.3	65.0	16.6	75.0	3.9	29.9	0.4	192	385	102.1	-14.6		
15.1	90.1	16.5	105.3	4.2	45.5	0.5	210	776	103.4	-18.4		
15.3	114.7	16.6	134.5	3.7	59.2	0.5	283	1159	105.0	-23.1		
15.5	139.8	16.9	164.6	4.2	74.4	0.5	334	1627	110.7	-32.3		
14.9	181.8	16.5	215.1	4.9	99.9	0.5	357	2023	119.9	-38.7		
15.4	30.3	15.9	30.7	1.4	1.3	0.0	41	183	118.2	-21.5		
15.6	45.3	16.0	45.8	1.4	1.4	0.0	58	460	118.3	-21.3		
14.9	60.3	15.3	60.8	1.3	1.4	0.0	56	830	118.8	-24.1		

Resilient Deformation Test 2

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 -4*	*x10 -4*	*kPa*	*kPa*
30.4	30.3	30.8	35.8	1.2	16.4	3.0	11	-5	0.2	2.2		
30.4	30.2	30.7	40.2	1.1	29.8	3.1	30	-11	0.6	2.4		
30.4	30.3	30.8	45.4	1.2	45.2	3.0	39	-21	1.3	2.6		
30.4	30.2	30.8	50.2	1.2	59.9	3.0	86	-36	1.4	2.8		
30.4	30.2	30.9	55.1	1.6	74.6	3.0	131	-47	1.7	2.9		
29.9	34.0	30.4	54.0	1.4	59.9	2.5	106	-34	1.8	3.1		
29.5	35.0	30.2	60.3	2.2	75.9	2.4	137	-42	2.2	3.1		
30.3	35.0	30.9	40.1	1.9	15.3	1.5	34	-4	1.9	3.3		
31.0	40.4	31.7	50.4	2.1	30.0	1.5	54	-9	1.5	3.3		
30.1	45.3	30.7	60.3	2.1	45.2	1.5	43	-12	2.8	3.4		
30.3	50.1	31.0	70.1	2.2	60.2	1.5	104	-14	1.5	3.5		
30.2	55.2	31.1	80.2	2.6	75.1	1.5	136	-16	1.8	3.6		
30.4	63.3	31.2	96.6	2.6	99.7	1.5	149	-26	2.8	3.8		
30.5	79.9	31.8	129.3	3.9	148.3	1.5	239	-32	3.0	4.0		
30.0	40.2	31.0	45.2	3.2	14.8	0.8	13	1	3.2	4.3		
30.3	50.0	31.4	59.9	3.2	29.8	0.9	40	1	3.4	4.3		
35.6	60.6	36.7	75.7	3.2	45.5	1.1	92	-4	3.3	4.5		
30.0	69.8	31.1	89.6	3.4	59.6	1.0	114	0	3.1	4.4		
30.0	79.7	31.1	104.7	3.4	74.9	1.0	125	7	2.9	4.5		
29.8	96.5	31.0	129.7	3.6	99.6	1.0	165	6	3.3	4.7		
30.2	129.9	31.8	179.5	4.9	148.7	1.0	227	14	3.6	5.1		
29.9	163.9	31.9	229.9	6.0	198.1	1.0	261	20	4.5	5.7		
28.4	222.7	34.8	317.1	19.4	283.1	0.9	273	59	8.2	6.4		
30.0	55.0	31.1	59.7	3.4	14.0	0.4	62	26	6.6	7.2		
29.7	79.6	31.1	89.6	4.1	30.0	0.4	99	42	6.4	7.2		
30.5	105.3	31.8	120.3	3.9	45.2	0.5	138	50	6.9	7.3		
30.1	129.3	31.5	149.2	4.4	59.9	0.5	161	64	6.5	7.3		
29.7	155.0	30.7	180.1	2.9	75.3	0.5	214	67	7.1	7.4		
30.4	195.3	32.1	228.6	5.2	99.6	0.5	236	80	8.0	7.7		
30.5	45.1	30.8	45.5	1.1	1.1	0.0	20	14	6.0	7.0		
29.8	59.7	30.2	60.0	1.1	1.1	0.0	21	30	5.9	7.2		
30.1	89.7	30.3	90.0	0.6	0.7	0.0	55	52	5.7	7.4		
30.5	119.7	30.5	120.0	0.1	0.7	0.0	81	65	5.8	7.6		

Resilient Deformation Test 3

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*			*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*		*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*με*	*με*	*x10 $^{-4}$*	*x10 $^{-4}$*		*kPa*	*kPa*
60.4	60.4	60.7	65.3	0.9	14.5	3.0	4	-3	1.6	3.3			
60.5	60.4	60.9	70.4	1.3	30.1	3.0	57	-8	1.5	3.3			
60.2	60.0	60.7	75.0	1.6	45.1	3.0	61	-15	1.0	3.3			
60.2	60.0	60.8	80.0	1.8	60.0	3.0	85	-23	1.7	3.3			
60.2	60.0	60.9	84.9	2.1	74.7	3.0	94	-33	2.1	3.3			
60.3	60.2	61.0	93.4	2.1	99.7	3.0	144	-48	2.1	3.3			
61.5	64.5	62.1	84.4	1.9	59.7	2.6	85	-20	2.0	3.3			
60.4	65.2	61.1	90.1	2.1	74.7	2.5	105	-30	2.3	3.3			
60.3	67.1	61.1	100.6	2.4	100.5	2.5	136	-38	2.6	3.3			
60.3	65.2	61.0	70.2	2.1	15.2	1.4	23	-3	2.1	3.3			
60.4	70.3	60.8	79.8	1.1	28.6	1.4	57	-9	0.4	3.5			
60.3	74.9	60.6	90.0	1.1	45.1	1.5	75	-13	1.2	3.5			
60.1	79.9	60.5	99.9	1.1	60.0	1.5	94	-17	0.9	3.4			
59.8	85.4	60.3	110.4	1.4	74.9	1.5	129	-20	1.6	3.4			
59.6	93.6	60.1	127.3	1.6	100.9	1.5	153	-22	1.4	3.4			
58.9	109.9	59.6	159.6	2.3	149.2	1.5	180	-38	2.3	3.5			
59.7	126.5	60.6	193.0	2.8	199.5	1.5	223	-49	2.5	3.5			
60.1	70.5	60.7	75.5	1.9	15.0	0.9	26	-7	1.9	3.8			
59.9	79.8	60.6	89.8	2.1	29.9	1.0	51	-4	2.3	3.8			
60.3	90.6	61.1	105.6	2.3	45.1	1.0	62	-6	2.0	3.8			
60.5	100.0	61.3	120.1	2.3	60.2	1.0	94	-7	2.2	3.7			
59.8	109.8	60.6	134.8	2.4	75.1	1.0	129	-7	2.3	3.7			
60.1	126.4	60.8	160.1	2.3	101.4	1.0	126	-11	2.6	3.8			
60.1	159.2	61.1	208.9	2.9	148.9	1.0	181	-12	2.5	3.8			
60.1	193.4	61.6	259.6	4.4	198.8	1.0	238	-11	3.0	4.0			
60.3	84.7	61.2	89.5	2.6	14.2	0.4	13	5	3.0	4.3			
60.3	110.0	61.2	120.0	2.8	30.1	0.5	62	11	2.7	4.3			
59.8	135.3	60.6	150.2	2.4	44.8	0.5	83	16	3.2	4.2			
59.9	159.2	60.7	178.9	2.3	59.3	0.5	123	18	3.2	4.3			
59.9	184.4	61.0	209.5	3.2	75.4	0.5	141	22	2.9	4.4			
59.9	226.8	60.7	259.5	2.4	97.9	0.5	198	29	2.8	4.7			
60.3	75.1	60.8	75.5	1.3	1.1	0.0	8	3	3.0	5.0			
60.3	90.1	60.8	90.7	1.6	1.6	0.0	34	12	2.7	5.0			
60.3	119.3	60.7	119.8	1.3	1.3	0.0	21	24	3.3	5.0			
60.2	149.7	60.3	149.9	0.4	0.6	0.0	55	35	3.1	5.0			

Repeated Load Triaxial Test Results **Test Programme 1**

Laboratory: UNOT
Material: Soft Limestone CCT
Specimen: Permanent Test

Specimen details

	Moisture content	Dry density
Aimed:	3.1%	2230 kg/m^3
Start of test:	3.4%	2358 kg/m^3
End of test:		

Specimen size: 300 mm x 150 mm Static load included (y/n) n

Permanent Deformation Test

Date

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
N	*s31*	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
	kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*με*	*με*	*x10^{-4}*	*x10^{-4}*	*kPa*	*kPa*
20	30.0	30.0	30.0	84.3	0.0	163.0	3.0	434	-214	0.0	1.1		
50	30.0	30.0	30.0	84.3	0.0	163.0	3.0	428	-218	0.7	0.6		
100	30.0	30.0	30.0	84.3	0.0	163.0	3.0	441	-227	3.4	0.9		
200	30.0	30.0	30.0	84.3	0.0	163.0	3.0	447	-224	1.8	1.2		
400	30.0	30.0	30.0	84.3	0.0	163.0	3.0	454	-234	2.6	1.4		
1000	30.0	30.0	30.0	84.3	0.0	163.0	3.0	454	-240	3.6	1.8		
2500	30.0	30.0	30.0	84.3	0.0	163.0	3.0	461	-244	4.5	2.1		
5000	30.0	30.0	30.0	84.3	0.0	163.0	3.0	467	-229	5.3	2.4		
10000	30.0	30.0	30.0	84.3	0.0	163.0	3.0	441	-227	6.3	2.5		
25000	30.0	30.0	30.0	84.3	0.0	163.0	3.0	428	-221	7.6	3.0		
50000	30.0	30.0	30.0	84.3	0.0	163.0	3.0	428	-224	8.7	3.2		
100000	30.0	30.0	30.0	84.3	0.0	163.0	3.0	329	-192	13.0	4.1		

Resilient Deformation Test 1

Date

Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain		Pore Pressure	
s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
15.0	15.0	16.5	20.7	4.4	17.0	3.0	38	-21				
15.0	15.0	16.5	25.8	4.4	32.3	3.0	109	-51				
15.0	15.0	16.5	31.0	4.4	48.1	3.0	265	-162				
15.0	15.0	16.5	37.1	4.4	66.2	3.0	399	-263				
15.0	15.0	16.5	41.6	4.4	79.8	3.0	492	-364				
15.0	25.0	16.5	35.6	4.4	31.7	1.4	113	-20				
15.0	35.0	16.5	56.1	4.4	63.4	1.5	328	-81				
15.0	48.3	16.5	83.1	4.4	104.4	1.5	538	-203				
15.0	35.0	16.5	45.4	4.4	31.2	0.9	118	-20				
15.0	55.0	16.5	76.1	4.4	63.4	1.0	307	-51				
15.0	81.7	16.5	116.5	4.4	104.4	1.0	488	-81				
15.0	148.3	16.5	215.2	4.4	200.6	1.0	731	172				
15.0	65.0	16.5	80.0	4.4	44.9	0.6	38	293				
15.0	115.0	16.5	137.2	4.4	66.7	0.5	273	374				
15.0	181.6	16.5	215.1	4.4	100.6	0.5	445	395				
15.0	30.0	16.5	33.5	4.4	10.4	0.4	25	101				
15.0	45.0	16.5	50.5	4.4	16.4	0.4	42	162				
15.0	60.0	16.5	66.4	4.4	19.2	0.3	67	233				

Resilient Deformation Test 2

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*με*	*με*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
30.0	30.0	31.5	35.7	4.4	17.0	3.0	51	-40				
30.0	30.0	31.5	40.6	4.4	31.7	3.0	127	-71				
30.0	30.0	31.5	46.1	4.4	48.4	3.0	245	-142				
30.0	30.0	31.5	51.3	4.4	64.0	3.0	337	-212				
30.0	30.0	31.5	56.1	4.4	78.4	3.0	439	-314				
30.0	40.0	31.5	50.8	4.4	32.4	1.4	143	-40				
30.0	45.0	31.5	61.1	4.4	48.4	1.5	211	-61				
30.0	50.0	31.5	71.5	4.4	64.4	1.5	287	-81				
30.0	63.3	31.5	97.6	4.4	102.8	1.5	438	-40				
30.0	80.0	31.5	130.8	4.4	152.4	1.5	624	-162				
30.0	50.0	31.5	60.6	4.4	31.7	0.9	127	-30				
30.0	60.0	31.5	76.0	4.4	48.1	1.0	186	-30				
30.0	70.0	31.5	90.2	4.4	60.7	1.0	236	-51				
30.0	96.7	31.5	130.9	4.4	102.8	1.0	438	-41				
30.0	130.0	31.5	180.1	4.4	150.3	1.0	574	-51				
30.0	80.0	31.5	89.8	4.4	29.5	0.4	110	121				
30.0	105.0	31.5	121.5	4.4	49.4	0.5	202	172				
30.0	130.0	31.5	148.2	4.4	54.7	0.4	211	212				
30.0	45.0	31.5	48.8	4.4	11.4	0.4	17	61				
30.0	60.0	31.5	64.8	4.4	14.4	0.3	8	91				
30.0	90.0	31.5	95.1	4.4	15.4	0.2	101	132				
30.0	120.0	31.5	126.1	4.4	18.4	0.1	143	192				

Resilient Deformation Test 3

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
60.0	60.0	61.5	65.8	4.4	17.5	3.0	34	-20				
60.0	60.0	61.5	70.4	4.4	31.2	3.0	84	-51				
60.0	60.0	61.5	75.7	4.4	47.0	3.0	127	-61				
60.0	60.0	61.5	79.8	4.4	59.4	3.0	186	-81				
60.0	60.0	61.5	85.7	4.4	77.0	3.0	262	-132				
60.0	60.0	61.5	94.3	4.4	102.8	3.0	354	-1314				
60.0	70.0	61.5	80.7	4.4	32.2	1.4	84	-30				
60.0	80.0	61.5	100.8	4.4	62.4	1.5	186	-41				
60.0	93.3	61.5	127.8	4.4	103.4	1.5	320	-81				
60.0	80.0	61.5	90.2	4.4	30.7	0.9	93	-20				
60.0	100.0	61.5	121.1	4.4	63.4	1.0	202	-20				
60.0	126.6	61.5	161.1	4.4	103.4	1.0	329	-31				
60.0	110.0	61.5	120.4	4.4	31.2	0.5	84	71				
60.0	160.0	61.5	181.3	4.4	64.0	0.5	219	111				
60.0	226.6	61.5	255.0	4.4	85.3	0.4	236	325				
60.0	75.0	61.5	78.5	4.4	10.4	0.4	8	20				
60.0	90.0	61.5	94.6	4.4	13.7	0.3	17	51				
60.0	120.0	61.5	126.6	4.4	19.7	0.2	51	81				
60.0	150.0	61.5	154.2	4.4	12.6	0.1	110	11				
60.0	180.0	61.5	186.5	4.4	19.4	0.1	143	132				
60.0	240.0	61.5	247.1	4.4	21.4	0.1	168	172				

Repeated Load Triaxial Test Results **Test Programme 1**

Laboratory: LRSB
Material: Sort Limestone (CCT)
Specimen: 1_189_1A

Specimen details

	Moisture content	Dry density
Aimed:	3.1%	2230 kg/m^3
Start of test:	3.3% %	2230 kg/m^3
End of test:	%	

Specimen size: 320 mm x 160 mm Static load included (y/n) n

Permanent Deformation Test

Date 25/07/91

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
N	*s31*	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
	kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*με*	*με*	*x10^{-4}*	*x10^{-4}*	*kPa*	*kPa*
20	30.2	30.0	31.3	102.2	3.0	216.5	3.0			13.8	-2.2		
50	30.2	29.9	31.3	102.0	3.3	216.3	3.0			15.2	-2.1		
100	30.2	30.0	31.5	101.8	3.9	215.5	3.0			16.1	-2.0		
150	30.2	30.0	31.8	101.7	4.5	215.0	3.0			16.4	-1.9		
200	30.2	30.0	31.8	101.5	4.8	214.4	3.0			16.8	-1.9		
400	30.2	30.0	31.8	101.4	4.5	214.3	3.0			17.3	-1.8		
600	30.3	30.0	31.9	101.5	4.7	214.5	3.0			18.1	-1.7		
1000	30.3	30.0	31.9	101.6	4.7	214.6	3.0			18.7	-1.5		
2500	30.3	30.1	31.8	101.7	4.4	214.7	3.0			19.7	-1.2		
5000	30.2	30.0	31.5	101.4	3.8	214.3	3.0			21.2	-1.0		
10000	30.3	30.1	31.5	101.4	3.6	214.0	3.0			21.8	-0.8		
15000	30.3	30.0	31.5	101.4	3.5	214.1	3.0			21.7	-0.7		
25000	30.6	30.3	31.8	101.7	3.4	214.1	3.0			22.7	-0.1		
30000	30.7	30.5	31.8	101.8	3.3	214.0	3.0			22.9	0.2		
40000	30.7	30.4	31.7	101.7	3.1	213.8	3.0			23.3	0.3		
50000	30.5	30.2	31.4	101.5	2.8	213.7	3.0			23.5	0.3		
60000	30.7	30.4	31.5	101.6	2.5	213.4	3.0			23.8	1.0		
70000	30.4	30.1	31.3	101.3	2.6	213.6	3.0			24.6	0.9		
80000	30.1	29.8	30.9	101.0	2.4	213.5	3.0			24.9	0.9		
90000	30.2	29.9	30.9	101.0	2.4	213.3	3.0			25.1	1.7		
100000	29.7	29.4	30.4	100.5	2.1	213.1	3.0			24.5	1.5		

Resilient Deformation Test 1

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
15.1	15.1	16.1	20.3	2.9	15.6	3.0	6	-1	24.0	1.4		
15.1	15.0	16.1	24.9	3.1	29.8	3.0	17	-3	23.9	1.4		
15.2	15.1	16.1	30.2	2.9	45.4	3.0	22	-5	24.3	1.4		
15.1	15.0	16.1	35.0	2.9	60.1	3.0	17	-7	23.8	1.4		
15.1	15.0	16.1	40.1	2.9	75.3	3.0	30	-9	24.2	1.4		
15.2	15.1	16.1	48.7	2.9	100.9	3.0	38	-14	24.5	1.4		
15.2	15.0	16.1	65.0	2.9	150.1	3.0	72	-25	24.3	1.3		
15.4	19.1	16.5	38.6	3.1	58.6	2.5	7	-10	24.3	1.4		
15.2	19.9	16.1	44.9	2.9	75.1	2.5	64	-12	24.2	1.4		
15.0	21.8	16.0	55.1	3.1	99.9	2.5	55	-16	24.0	1.4		
14.4	24.9	15.4	74.9	3.1	150.1	2.5	89	-27	24.1	1.3		
14.9	28.3	15.9	94.6	2.9	198.9	2.5	122	-41	24.4	1.4		
15.0	20.2	16.1	25.3	3.3	15.3	1.3	12	-7	24.4	1.4		
15.4	25.0	16.6	35.0	3.6	30.3	1.4	-1	-10	24.4	1.4		
15.0	30.2	16.3	45.4	3.9	45.4	1.4	7	-11	24.4	1.4		
15.4	34.6	16.7	54.3	3.9	59.1	1.5	-8	-12	24.5	1.4		
15.2	39.8	16.5	64.9	3.9	75.4	1.5	60	-14	24.7	1.4		
15.3	48.1	16.7	81.6	4.1	100.6	1.5	41	-18	24.3	1.4		
15.6	65.0	17.1	114.9	4.4	149.6	1.5	91	-28	24.8	1.5		
15.6	81.3	17.2	148.3	4.9	200.9	1.5	107	-35	24.9	1.5		
14.8	115.1	17.0	215.5	6.8	301.1	1.5	169	-42	25.4	1.7		
14.0	24.9	15.8	31.1	5.4	18.6	0.9	-3	-9	24.8	1.9		
15.8	35.4	17.6	45.0	5.4	28.9	0.9	38	-11	24.3	2.3		
15.4	45.0	17.3	59.7	5.8	44.1	0.9	33	-11	24.3	2.3		
14.9	54.6	16.8	74.7	5.9	60.3	0.9	-7	-11	24.7	2.3		
14.9	64.9	16.9	89.8	5.9	74.8	0.9	37	-14	24.6	2.3		
15.1	81.5	17.2	115.2	6.3	101.3	1.0	71	-16	24.3	2.4		
14.7	115.2	16.7	165.3	5.9	150.3	1.0	81	-17	24.9	2.5		
14.8	148.7	16.9	214.9	6.4	198.5	1.0	97	-13	25.6	2.8		
15.4	206.7	19.7	305.6	12.9	296.7	1.0	127	-3	25.5	3.9		
15.0	40.1	15.8	45.0	2.3	14.6	0.4	1	-7	24.6	4.4		
14.9	64.7	15.7	74.7	2.4	29.9	0.5	14	-1	24.4	4.4		
14.8	90.5	15.5	105.6	2.3	45.3	0.5	10	2	24.1	4.4		
14.8	115.1	15.6	135.1	2.4	60.1	0.5	58	5	24.6	4.4		
14.6	140.4	15.4	165.2	2.3	74.5	0.5	35	8	24.4	4.5		
14.5	179.3	15.9	212.8	4.1	100.5	0.5	79	13	24.5	4.7		
15.3	30.2	15.5	30.4	0.6	0.8	0.0	-8	-7	23.5	4.5		
15.3	44.8	15.5	45.1	0.8	1.1	0.0	-24	-7	23.6	4.4		
15.3	59.8	15.5	60.2	0.8	1.3	0.0	-23	-4	23.6	4.4		

Resilient Deformation Test 2

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
30.1	30.0	30.6	35.2	1.3	15.6	3.1	8	-2	0.1	0.9		
30.1	30.0	30.8	39.9	2.1	29.6	3.0	10	-3	0.2	0.9		
30.1	30.0	30.9	45.2	2.5	45.5	3.0	9	-5	0.1	0.9		
30.1	30.1	31.0	50.2	2.6	60.3	3.0	15	-8	0.0	0.9		
30.1	30.1	31.0	55.1	2.6	75.0	3.0	19	-11	0.0	0.9		
30.1	30.1	31.0	63.4	2.6	99.9	3.0	44	-16	0.0	0.9		
30.1	30.0	31.2	80.0	3.1	150.0	3.0	39	-31	0.2	0.9		
30.1	30.1	31.4	96.8	4.0	200.2	3.0	59	-48	0.4	0.8		
29.2	34.4	30.5	54.5	4.0	60.3	2.3	17	-12	0.4	0.8		
29.8	35.2	31.0	60.1	3.5	75.0	2.4	17	-14	0.3	0.9		
29.7	37.0	30.8	70.5	3.3	100.6	2.5	31	-18	0.2	0.9		
30.0	40.4	31.1	90.2	3.5	149.5	2.5	41	-30	0.2	0.9		
30.3	43.5	31.7	110.0	4.1	199.5	2.5	58	-46	0.1	0.9		
30.0	35.3	31.3	40.3	4.0	14.9	1.2	-3	-6	0.2	0.9		
30.5	40.4	31.9	50.4	4.3	30.2	1.4	21	-10	0.2	0.9		
30.1	45.0	31.6	60.1	4.5	45.2	1.4	8	-12	0.3	0.9		
30.2	49.9	31.6	70.1	4.3	60.3	1.5	29	-15	0.2	1.0		
31.0	55.1	32.5	80.2	4.5	75.3	1.5	8	-17	0.5	1.0		
30.6	63.3	32.0	96.7	4.3	100.1	1.5	15	-21	0.3	1.0		
30.1	79.5	31.7	129.2	4.6	149.0	1.5	17	-27	0.6	1.0		
30.2	96.4	32.0	162.7	5.3	198.8	1.5	55	-33	0.6	1.0		
30.0	130.1	31.7	230.1	5.1	300.1	1.5	91	-47	0.7	1.1		
30.0	162.6	32.0	295.6	6.1	399.1	1.5	135	-62	0.8	1.2		
29.7	40.4	31.2	45.3	4.3	14.8	0.7	-2	-8	0.8	1.4		
30.1	50.2	31.7	60.3	4.6	30.2	0.9	9	-11	0.8	1.5		
30.3	59.7	31.8	74.8	4.6	45.4	0.9	8	-14	0.6	1.5		
30.5	69.8	32.0	89.7	4.6	59.7	1.0	16	-16	0.7	1.5		
30.3	80.0	31.8	104.5	4.6	73.6	0.9	20	-14	0.7	1.5		
30.2	97.3	31.8	130.7	4.6	100.2	1.0	36	-19	0.7	1.5		
30.2	130.0	31.7	179.8	4.5	149.6	1.0	43	-24	0.8	1.5		
29.8	155.5	31.7	221.9	5.6	199.2	1.0	61	-26	1.0	1.6		
29.7	220.8	33.4	319.5	11.1	296.3	1.0	83	-21	1.3	1.9		
29.2	54.7	30.5	59.8	4.0	15.1	0.4	-11	-9	0.9	2.3		
30.5	80.2	31.8	90.1	4.1	29.7	0.4	6	-9	0.7	2.4		
29.7	105.7	31.0	120.5	4.0	44.5	0.5	12	-5	0.7	2.4		
29.7	130.8	31.0	151.1	4.0	61.0	0.5	27	-1	0.7	2.4		
30.3	153.6	31.6	178.5	4.0	74.7	0.5	43	2	0.7	2.4		
30.2	184.5	31.7	217.7	4.5	99.6	0.5	39	-6	0.8	2.6		
29.2	45.0	28.7	44.7	-1.4	-0.9	0.0	-2	-8	0.7	2.7		
30.3	59.9	29.9	59.8	-1.0	-0.2	0.0	3	-9	0.7	2.8		
29.7	89.9	29.4	89.8	-0.9	-0.2	0.0	5	-3	0.6	2.7		
30.2	120.7	29.7	120.5	-1.5	-0.5	0.0	9	3	0.5	2.7		

Resilient Deformation Test 3

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
60.2	60.2	60.4	65.0	0.6	14.6	3.0	17	-1	-0.7	0.7		
60.2	60.2	60.5	70.1	1.1	29.6	3.0	24	-1	-0.2	0.7		
60.2	60.2	60.4	75.2	0.7	45.1	3.0	11	-3	-0.3	0.7		
60.2	60.2	60.5	80.2	0.9	60.1	3.0	15	-5	-0.3	0.7		
60.2	60.2	60.4	85.1	0.7	74.6	3.0	21	-8	-0.2	0.7		
60.3	60.2	60.6	93.5	1.1	100.0	3.0	38	-12	-0.4	0.7		
60.2	60.2	60.8	110.1	1.7	149.8	3.0	82	-22	0.0	0.7		
60.3	60.2	61.2	126.6	2.9	199.2	3.0	108	-35	-0.1	0.7		
60.3	60.1	61.9	193.0	4.9	398.7	3.0	244	-106	0.3	0.5		
60.0	64.3	61.4	84.2	4.1	59.6	2.4	35	-11	0.2	0.6		
60.3	65.2	61.5	90.1	3.7	74.9	2.5	24	-13	0.1	0.6		
60.0	67.0	61.2	100.4	3.4	100.1	2.5	57	-19	0.1	0.7		
59.9	70.3	61.1	120.2	3.6	149.8	2.5	60	-30	0.5	0.7		
60.0	73.4	61.4	139.9	4.1	199.5	2.5	118	-40	0.0	0.6		
60.4	80.2	62.2	180.3	5.4	300.2	2.5	153	-64	0.5	0.6		
59.7	65.4	61.2	70.3	4.6	14.7	1.1	-2	-7	0.3	0.7		
59.0	70.2	60.6	80.1	4.9	29.8	1.3	17	-11	0.1	0.7		
60.0	75.3	61.6	90.3	5.1	45.1	1.4	5	-14	0.3	0.7		
60.2	80.1	61.8	100.0	4.9	59.8	1.4	7	-18	0.4	0.7		
60.1	85.3	61.8	110.2	5.1	74.6	1.4	41	-21	0.1	0.7		
60.6	93.3	62.2	126.8	4.9	100.5	1.5	56	-24	0.5	0.8		
61.6	110.7	63.0	160.6	4.2	149.8	1.5	63	-30	0.0	0.8		
60.2	126.1	61.8	192.8	4.7	200.0	1.5	110	-37	0.3	0.8		
60.4	160.8	62.3	260.3	5.9	298.4	1.5	141	-53	1.2	0.9		
59.1	191.4	62.9	324.0	11.6	397.8	1.5	189	-63	2.0	1.0		
60.6	70.4	62.2	75.3	4.9	14.7	0.8	18	-9	0.7	1.2		
60.6	80.0	62.5	89.8	5.6	29.4	0.9	23	-13	0.9	1.2		
60.4	89.9	62.2	104.8	5.4	44.6	0.9	-4	-17	0.9	1.2		
60.0	99.9	61.9	120.1	5.6	60.4	0.9	30	-20	0.7	1.3		
60.5	110.9	62.3	136.0	5.2	75.1	0.9	67	-20	0.7	1.3		
59.8	127.5	61.4	160.7	4.7	99.6	1.0	37	-19	1.4	1.3		
59.8	159.5	61.1	209.1	3.9	148.7	1.0	98	-31	1.2	1.4		
59.9	184.0	62.0	249.9	6.2	197.9	1.0	117	-31	1.2	1.4		
59.9	85.1	61.4	90.3	4.6	15.6	0.4	-8	-13	0.7	1.6		
60.1	109.9	61.7	119.9	4.9	29.9	0.4	-6	-16	1.2	1.6		
60.2	135.7	61.8	150.9	4.7	45.4	0.5	58	-15	0.6	1.6		
60.3	159.5	61.5	179.3	3.6	59.6	0.5	18	-20	1.0	1.7		
60.1	180.3	61.6	205.9	4.6	76.6	0.5	51	-23	1.0	1.7		
59.8	201.7	61.6	234.8	5.6	99.1	0.5	53	-24	0.9	1.9		
60.3	75.4	60.7	75.8	1.2	1.2	0.0	-7	-10	0.6	2.1		
60.5	90.3	61.0	90.8	1.4	1.7	0.0	4	-13	0.3	2.1		
60.0	120.4	60.3	120.8	0.7	1.4	0.0	-27	-14	0.6	2.1		
60.2	151.1	60.3	151.5	0.4	1.2	0.0	8	-12	0.4	2.0		
60.5	90.3	61.0	90.8	1.4	1.7	0.0	4	-13	0.3	2.1		
60.0	120.4	60.3	120.8	0.7	1.4	0.0	-27	-14	0.6	2.1		
60.2	151.1	60.3	151.5	0.4	1.2	0.0	8	-12	0.4	2.0		
60.5	90.3	61.0	90.8	1.4	1.7	0.0	4	-13	0.3	2.1		
60.0	120.4	60.3	120.8	0.7	1.4	0.0	-27	-14	0.6	2.1		
60.2	151.1	60.3	151.5	0.4	1.2	0.0	8	-12	0.4	2.0		

Repeated Load Triaxial Test Results **Test Programme 1**

Laboratory: LRSB
Material: Microgranite (MIG)
Specimen: 1_187_1A

Specimen details

	Moisture content	Dry density
Aimed:	3.3%	2140 kg/m^3
Start of test:	3.4%	2140 kg/m^3
End of test:		

Specimen size: 320 mm x 160 mm Static load included (y/n) n

Permanent Deformation Test

Date 18/07/91

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
N	*s31*	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
	kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*με*	*με*	*x10^{-4}*	*x10^{-4}*	*kPa*	*kPa*
20	30.4	30.3	31.4	133.7	2.9	310.3	3.0			63.2	-22.0		
50	30.4	30.3	31.6	133.5	3.7	309.7	3.0			75.4	-25.0		
100	30.4	30.3	31.9	133.5	4.5	309.5	3.0			84.5	-27.6		
150	30.4	30.3	32.2	133.1	5.4	308.5	3.0			90.2	-29.2		
200	30.4	30.4	32.4	133.0	6.1	307.9	3.0			93.9	-30.3		
400	30.4	30.4	32.6	132.5	6.5	306.5	3.0			102.3	-32.6		
600	30.4	30.4	32.5	132.3	6.3	305.9	3.0			106.8	-33.6		
1000	30.4	30.4	32.4	132.1	6.0	305.3	3.0			111.7	-34.8		
2500	30.5	30.4	32.3	131.8	5.4	304.4	3.0			119.4	-36.2		
5000	30.5	30.4	32.0	131.7	4.6	303.9	3.0			124.7	-36.7		
10000	30.5	30.5	32.1	131.8	4.6	304.1	3.0			128.7	-36.9		
15000	30.4	30.4	32.0	131.7	4.6	303.8	3.0			131.6	-37.0		
25000	30.5	30.5	32.1	131.3	4.7	302.6	3.0			135.2	-36.9		
30000	30.6	30.5	32.1	131.4	4.4	302.7	3.0			135.6	-36.8		
40000	30.7	30.6	32.0	131.5	3.8	302.7	3.0			138.4	-36.9		
50000	30.7	30.6	32.0	131.5	3.8	302.7	3.0			139.4	-37.0		
60000	31.0	31.0	32.3	131.9	3.8	302.8	3.0			141.4	-36.6		
70000	31.2	31.1	32.3	131.9	3.5	302.5	3.0			141.8	-36.7		
80000	31.1	31.0	32.2	131.9	3.3	302.6	3.0			142.3	-36.8		
90000	31.4	31.4	32.5	132.2	3.2	302.6	3.0			143.2	-36.1		
100000	31.2	31.1	32.2	131.9	3.2	302.4	3.0			144.1	-36.3		

Resilient Deformation Test 1

Date

Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain		Pore Pressure	
s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
15.3	15.3	15.8	20.3	1.6	15.0	3.0	119	-42	141.5	-36.8		
15.6	15.6	16.3	25.6	2.1	30.1	3.0	271	-81	144.4	-36.4		
15.1	15.1	16.0	30.2	2.5	45.4	3.0	416	-155	143.9	-36.3		
15.4	15.2	16.2	35.3	2.5	60.3	3.0	508	-215	144.5	-36.2		
15.2	15.1	16.2	40.1	2.8	75.3	3.0	606	-271	144.2	-36.1		
15.4	15.2	16.4	48.4	3.0	99.6	3.0	704	-343	144.7	-36.0		
15.1	14.9	16.2	64.0	3.5	147.4	3.0	818	-447	144.9	-36.2		
15.1	14.8	16.5	80.2	4.3	196.0	3.0	890	-509	145.0	-36.3		
14.8	19.4	16.1	39.7	3.8	60.8	2.4	483	-151	144.9	-35.8		
15.3	20.3	16.5	45.1	3.6	74.6	2.5	556	-191	144.9	-35.6		
15.1	21.7	16.3	55.6	3.5	101.4	2.5	651	-240	145.1	-35.6		
15.0	24.8	16.2	74.3	3.6	148.2	2.5	753	-297	145.3	-35.6		
16.1	28.2	17.6	94.1	4.3	197.9	2.5	827	-342	145.9	-35.6		
15.1	34.9	17.1	133.6	5.8	296.0	2.5	945	-375	145.9	-35.9		
14.9	20.1	16.4	24.9	4.5	14.4	1.2	91	10	145.6	-35.6		
15.3	25.3	16.7	35.1	4.1	29.6	1.4	257	-2	145.5	-35.6		
15.5	30.2	16.7	45.0	3.6	44.4	1.4	347	-11	145.5	-35.7		
15.4	34.8	16.3	54.6	2.6	59.5	1.5	399	-21	144.9	-35.9		
15.5	40.0	16.5	65.0	3.0	75.1	1.5	504	-28	144.8	-35.9		
15.1	47.7	16.2	81.0	3.5	99.9	1.5	551	-36	145.0	-36.0		
14.8	64.6	16.5	114.2	5.0	148.9	1.5	669	-31	145.0	-36.0		
15.1	81.5	17.1	146.8	6.2	195.9	1.5	719	-16	145.6	-35.9		
15.0	114.7	17.9	213.3	8.7	295.9	1.5	765	-4	146.5	-35.8		
15.2	148.7	19.2	280.3	12.0	394.9	1.5	825	41	148.1	-35.5		
15.0	25.1	17.5	30.2	7.7	15.2	0.6	83	38	146.0	-34.9		
14.8	34.9	17.4	44.8	7.8	29.8	0.8	201	52	145.9	-34.9		
15.1	44.5	17.6	59.3	7.7	44.6	0.9	317	57	145.7	-34.9		
15.3	55.3	17.7	75.2	7.3	59.7	0.9	373	63	145.5	-34.8		
15.6	64.8	17.9	89.6	7.2	74.4	0.9	427	64	145.3	-34.8		
15.8	81.8	18.2	115.1	7.3	99.9	1.0	487	74	146.0	-34.8		
15.1	114.7	17.6	163.7	7.5	147.1	1.0	610	104	146.3	-34.7		
15.4	147.9	18.2	213.6	8.5	197.1	1.0	661	130	146.3	-34.5		
14.8	215.1	19.2	313.5	13.2	295.3	1.0	693	202	148.2	-33.7		
14.9	40.2	16.7	45.6	5.5	16.1	0.4	205	84	144.9	-32.8		
15.3	64.9	17.4	74.8	6.2	30.0	0.4	292	119	145.4	-32.7		
15.1	90.1	17.2	105.1	6.3	44.9	0.4	362	149	145.3	-32.6		
15.3	115.0	17.5	134.9	6.5	59.5	0.5	460	176	145.6	-32.5		
15.1	140.0	17.3	164.9	6.5	74.8	0.5	492	205	145.3	-32.4		
15.1	181.7	17.4	215.0	6.7	100.0	0.5	548	241	145.2	-32.0		
15.2	29.9	16.2	30.9	3.0	3.0	0.0	94	65	143.8	-31.5		
14.8	45.0	15.8	46.0	3.0	3.1	0.0	148	111	143.0	-31.5		
14.9	60.0	15.9	61.1	3.1	3.3	0.0	194	137	143.8	-31.4		

Resilient Deformation Test 2

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
30.1	30.1	30.6	35.3	1.7	15.7	3.0	44	-7	2.6	3.2		
30.1	30.1	30.9	40.2	2.3	30.3	3.0	155	-25	2.7	3.2		
30.2	30.2	31.0	45.1	2.5	44.8	3.0	202	-53	3.4	3.2		
30.1	30.1	31.0	50.1	2.8	60.1	3.0	289	-80	3.1	3.1		
30.1	30.1	31.1	55.0	3.2	74.8	3.0	320	-108	3.2	3.0		
30.2	30.1	31.4	63.9	3.7	101.6	3.0	429	-159	3.8	2.8		
30.1	30.1	31.5	79.7	4.3	148.7	3.0	517	-238	4.4	2.4		
30.1	30.1	31.7	96.2	4.8	198.3	3.0	616	-312	4.7	2.1		
30.2	30.1	32.1	129.1	5.8	297.0	3.0	755	-435	5.5	1.5		
30.2	34.1	31.7	54.0	4.5	59.9	2.5	243	-53	4.7	2.1		
29.9	35.1	31.4	60.4	4.3	76.0	2.5	369	-76	3.8	2.2		
30.2	36.7	31.6	69.9	4.2	99.7	2.5	420	-108	4.3	2.3		
28.9	40.1	30.4	89.6	4.5	148.4	2.4	525	-157	5.0	2.2		
30.1	43.2	31.8	109.2	5.2	198.1	2.5	623	-207	4.8	2.2		
30.4	49.7	32.5	148.5	6.3	296.3	2.5	755	-273	5.1	2.0		
30.5	56.6	32.9	188.9	7.2	396.7	2.5	835	-322	5.5	1.9		
29.9	34.8	31.6	39.8	5.0	14.9	1.2	48	2	4.9	2.2		
30.7	40.6	32.4	50.4	5.0	29.4	1.4	101	0	5.3	2.3		
30.0	45.0	31.7	60.0	5.0	45.2	1.4	202	-10	5.1	2.4		
29.9	50.0	31.5	69.9	4.8	59.7	1.4	266	-10	5.0	2.5		
30.6	54.8	32.2	79.5	4.8	74.3	1.5	294	-17	4.9	2.6		
30.5	63.2	32.1	96.3	5.0	99.6	1.5	391	-22	4.6	2.7		
29.8	80.5	31.6	130.7	5.3	150.6	1.5	497	-29	4.8	3.3		
30.4	96.8	32.2	162.7	5.5	197.6	1.5	564	-30	5.3	3.4		
29.8	129.5	32.7	228.6	8.5	297.4	1.5	676	-18	5.8	3.4		
30.6	163.8	33.9	297.2	10.0	400.2	1.5	736	-13	6.6	3.6		
29.9	40.3	31.6	45.2	5.0	14.9	0.7	86	15	5.3	4.1		
30.5	49.8	32.1	59.7	5.0	29.8	0.9	172	21	4.9	4.1		
29.7	60.1	31.3	75.2	4.8	45.2	0.9	277	27	4.5	4.1		
29.9	70.2	31.5	90.5	4.8	61.1	1.0	292	29	4.6	4.0		
29.8	80.2	31.4	105.2	4.8	75.0	1.0	361	34	5.4	4.1		
29.7	96.7	31.3	130.2	4.8	100.4	1.0	419	41	5.1	4.1		
29.5	129.6	31.1	179.4	4.8	149.3	1.0	516	56	5.0	4.1		
29.5	163.7	31.7	229.4	6.7	197.0	1.0	558	81	5.3	4.2		
29.8	230.2	33.9	328.7	12.5	295.5	1.0	620	131	6.2	4.6		
29.7	55.0	31.6	59.9	5.7	14.7	0.3	119	53	4.7	5.2		
29.7	79.8	31.6	89.8	5.7	30.0	0.4	217	80	4.9	5.3		
30.0	104.6	31.8	119.7	5.5	45.2	0.5	283	101	4.9	5.3		
29.8	130.0	31.6	150.2	5.5	60.8	0.5	347	119	5.2	5.3		
29.8	155.5	31.6	180.3	5.5	74.7	0.5	358	138	5.0	5.4		
29.9	197.0	31.9	230.4	5.8	100.1	0.5	429	169	5.6	5.7		
30.0	45.2	30.0	45.3	0.0	0.2	0.0	77	36	4.1	6.1		
29.8	59.7	29.9	59.8	0.2	0.2	0.0	107	66	3.2	6.2		
30.2	89.8	30.3	89.9	0.3	0.3	0.0	156	108	3.6	6.2		
30.2	120.4	30.0	120.4	-0.4	0.0	0.0	226	135	3.7	6.3		

Resilient Deformation Test 3

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*		*Pore Pressure*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
60.1	60.1	60.5	64.9	1.0	14.7	3.1	24	-4	3.3	5.6		
60.1	60.1	60.4	70.1	1.1	30.2	3.0	100	-14	3.4	5.7		
60.1	60.1	60.5	75.1	1.5	45.0	3.0	169	-28	3.6	5.7		
60.1	60.1	60.7	79.9	1.8	59.6	3.0	198	-41	3.8	5.6		
60.1	60.0	60.7	84.8	2.0	74.4	3.0	261	-61	3.9	5.6		
60.1	60.0	60.9	93.6	2.5	100.8	3.0	265	-90	4.8	5.6		
60.1	60.0	61.1	109.5	3.1	148.7	3.0	453	-143	4.4	5.4		
60.1	60.0	61.3	126.1	3.6	198.5	3.0	487	-195	5.0	5.2		
60.1	59.9	61.7	159.1	4.9	297.6	3.0	644	-296	5.4	4.9		
60.1	59.9	62.0	192.2	5.9	396.9	3.0	763	-388	6.2	4.6		
59.6	64.2	60.2	84.2	1.8	60.0	2.4	187	-37	4.2	4.5		
60.4	65.1	61.0	89.9	2.0	74.6	2.5	221	-49	4.4	4.6		
59.2	66.8	60.0	100.0	2.3	99.6	2.4	297	-70	4.2	4.6		
60.0	70.2	61.0	119.6	3.1	148.1	2.5	414	-112	4.5	4.6		
60.1	73.2	61.3	139.4	3.6	198.6	2.5	500	-152	4.3	4.5		
60.6	80.3	62.3	179.5	4.9	297.6	2.5	634	-215	4.7	4.4		
60.0	86.9	61.9	219.9	5.8	399.0	2.5	729	-267	5.0	4.3		
59.8	65.4	61.3	70.3	4.6	14.5	1.1	47	-1	5.0	4.4		
59.9	70.2	61.3	80.1	4.1	29.5	1.4	104	-3	5.0	4.4		
60.1	75.3	61.5	90.2	4.1	44.5	1.4	145	-6	5.1	4.4		
60.0	80.4	61.3	100.3	4.1	59.9	1.4	180	-12	5.5	4.5		
59.9	85.3	61.5	110.2	4.8	74.9	1.4	226	-16	5.2	4.5		
60.0	93.4	61.6	126.7	4.8	100.0	1.5	315	-22	5.5	4.5		
59.9	110.3	61.4	160.0	4.4	149.0	1.5	389	-37	5.3	4.6		
60.3	125.9	62.1	192.2	5.4	198.8	1.5	490	-46	5.6	4.7		
60.3	160.1	62.4	259.4	6.4	297.8	1.5	595	-55	5.6	4.7		
59.9	193.1	63.1	324.6	9.6	394.5	1.5	663	-49	6.0	4.8		
60.2	70.3	62.1	75.3	5.8	15.0	0.7	64	8	5.4	5.1		
58.8	80.4	60.8	90.3	5.8	29.7	0.8	113	13	5.1	5.1		
59.6	90.1	61.5	105.0	5.8	44.9	0.9	181	9	5.2	5.2		
60.0	100.2	61.9	120.1	5.8	59.7	0.9	198	8	5.6	5.2		
60.3	110.7	62.2	135.7	5.6	75.2	0.9	266	10	5.0	5.3		
59.6	127.0	61.5	160.4	5.6	100.3	1.0	333	11	5.2	5.3		
59.6	159.4	61.8	208.5	6.6	147.3	1.0	395	21	5.4	5.3		
60.2	188.0	63.1	252.0	8.6	192.1	1.0	427	27	6.1	5.6		
60.5	85.4	62.2	90.5	5.1	15.3	0.4	104	24	4.8	6.0		
59.9	109.8	61.6	119.6	5.3	29.7	0.4	169	36	5.1	6.1		
59.8	134.9	61.7	150.7	5.6	47.5	0.5	230	48	4.6	6.1		
59.6	160.5	61.4	180.5	5.6	60.1	0.5	259	60	5.2	6.2		
60.0	180.8	61.9	205.6	5.8	74.6	0.5	296	69	5.4	6.3		
60.5	229.3	62.4	266.9	5.6	113.0	0.5	374	91	5.5	6.6		
59.8	75.0	60.4	75.6	1.8	1.8	0.0	25	17	4.7	6.8		
60.1	90.0	60.8	90.6	2.0	2.0	0.0	65	36	4.1	6.8		
59.8	120.1	60.5	120.8	2.1	2.3	0.0	137	61	4.3	6.9		
59.9	150.8	60.5	151.5	2.0	2.3	0.0	135	86	5.0	7.0		

Appendix F.2 RESULTS OF TEST PROGRAMME II FOR SUBGRADE SOILS AND UNBOUND GRANULAR MATERIALS (PHASE II)

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory: LNEC
Material: London Clay (LOC)
Specimen: FILE LOC11

Specimen details **Moisture content** **Dry density**

Aimed: 36.0% kg/m^3
Start of test: 36.0% 1380 kg/m^3
End of test: 36.0%

Specimen size: 144 mm x 76 mm Static load included (y/n) n

Resilient Deformation Test

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
15.0	15.0	15.0	20.0	0.0	15.0	3.0	504	-257	4.3	-1.8
15.0	15.0	15.0	25.0	0.0	30.0	3.0	1795	-953	31.2	-12.1
30.0	30.0	30.0	35.0	0.0	15.0	3.0	632	-345	9.4	-2.0
30.0	30.0	30.0	40.0	0.0	30.0	3.0	1980	-1081	46.5	-19.4
30.0	30.0	30.0	45.0	0.0	45.0	3.0	4253	-2333	194.6	-92.5
60.0	60.0	60.0	65.0	0.0	15.0	3.0	463	-244	0.1	-0.3
60.0	60.0	60.0	70.0	0.0	30.0	3.0	1622	-914	6.0	-3.1
60.0	60.0	60.0	75.0	0.0	45.0	3.0	3771	-2125	37.7	-19.2
60.0	60.0	60.0	80.0	0.0	60.0	3.0	5437	-3384	155.5	-79.9

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory:	LNEC
Material:	London Clay (LOC)
Specimen:	FILE LOC13

Specimen details

	Moisture content	Dry density
Aimed:	36.0%	kg/m^3
Start of test:	36.5%	1370 kg/m^3
End of test:	36.5%	

Specimen size: 144 mm x 76 mm

Static load included (y/n): n

Resilient Deformation Test

Date *25/01/92*

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *µE*	e_{3r} *µE*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
15.0	15.0	15.0	20.0	0.0	15.0	3.0	480	-294	4.3	0.0
15.0	15.0	15.0	25.0	0.0	30.0	3.0	1415	-922	18.2	-7.2
30.0	30.0	30.0	35.0	0.0	15.0	3.0	505	-346	2.5	0.0
30.0	30.0	30.0	40.0	0.0	30.0	3.0	1441	-980	10.6	-5.3
30.0	30.0	30.0	45.0	0.0	45.0	3.0	2993	-2003	40.7	-21.3
60.0	60.0	60.0	65.0	0.0	15.0	3.0	532	-356	2.8	-1.2
60.0	60.0	60.0	70.0	0.0	30.0	3.0	1522	-1088	11.4	-7.1
60.0	60.0	60.0	75.0	0.0	45.0	3.0	2873	-2048	33.4	-23.2
60.0	60.0	60.0	80.0	0.0	60.0	3.0	4679	-3309	90.2	-63.1

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory: LNEC
Material: London Clay (LOC)
Specimen: FILE LOC21

Specimen details **Moisture content** **Dry density**

Aimed: 36.0%
Start of test: 35.7% 1380 kg/m^3
End of test: 35.7%

Specimen size: 144 mm x 76 mm Static load included (y/n) n

Resilient Deformation Test

Date *06/01/96*

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
15.0	15.0	15.0	20.0	0.0	15.0	3.0	126	-84	1.3	-1.0
15.0	15.0	15.0	25.0	0.0	30.0	3.0	278	-204	1.5	-0.8
30.0	30.0	30.0	35.0	0.0	15.0	3.0	278	-209	2.0	-2.2
30.0	30.0	30.0	40.0	0.0	30.0	3.0	962	-754	6.1	-4.2
30.0	30.0	30.0	45.0	0.0	45.0	3.0	2541	-1848	45.0	-27.5
60.0	60.0	60.0	65.0	0.0	15.0	3.0	254	-193	1.8	-10.9
60.0	60.0	60.0	70.0	0.0	30.0	3.0	1042	-810	4.6	-12.8
60.0	60.0	60.0	75.0	0.0	45.0	3.0	2495	-1862	25.1	-26.9
60.0	60.0	60.0	80.0	0.0	60.0	3.0	4812	-3290	132.8	-96.4

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory: LNEC
Material: London Clay (LOC)
Specimen: FILE LOC23

Specimen details **Moisture content** **Dry density**

Aimed:	36.0%	kg/m^3
Start of test:	35.6%	1370 kg/m^3
End of test:	35.6%	

Specimen size: 144 mm x 76 mm Static load included (y/n) n

Resilient Deformation Test

Date *05/01/92*

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *µE*	e_{3r} *µE*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
15.0	15.0	15.0	20.0	0.0	15.0	3.0	480	-278	3.0	-0.2
15.0	15.0	15.0	25.0	0.0	30.0	3.0	1264	-846	4.6	-2.5
30.0	30.0	30.0	35.0	0.0	15.0	3.0	455	-263	1.5	-1.1
30.0	30.0	30.0	40.0	0.0	30.0	3.0	1289	-804	1.8	-3.0
30.0	30.0	30.0	45.0	0.0	45.0	3.0	2402	-1722	9.6	-8.0
60.0	60.0	60.0	65.0	0.0	15.0	3.0	405	-247	1.5	-0.6
60.0	60.0	60.0	70.0	0.0	30.0	3.0	1113	-783	2.5	-2.9
60.0	60.0	60.0	75.0	0.0	45.0	3.0	2176	-1660	8.8	-8.1
60.0	60.0	60.0	80.0	0.0	60.0	3.0	4234	-3277	28.3	-23.7

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory: LNEC
Material: London Clay (LOC)
Specimen: FILE LOC24

Specimen details **Moisture content** **Dry density**

Aimed:	36.0%	kg/m^3
Start of test:	35.5%	1370 kg/m^3
End of test:	35.5%	

Specimen size: 144 mm x 76 mm Static load included (y/n) n

Resilient Deformation Test

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
15.0	15.0	15.0	20.0	0.0	15.0	3.0	404	-446	2.5	-1.6
15.0	15.0	15.0	25.0	0.0	30.0	3.0	1240	-1365	9.9	-7.4
30.0	30.0	30.0	35.0	0.0	15.0	3.0	405	-483	2.5	-1.2
30.0	30.0	30.0	40.0	0.0	30.0	3.0	1114	-1376	7.3	-4.3
30.0	30.0	30.0	45.0	0.0	45.0	3.0	2941	-3189	25.5	-20.3
60.0	60.0	60.0	65.0	0.0	15.0	3.0	355	-468	1.5	-0.8
60.0	60.0	60.0	70.0	0.0	30.0	3.0	1141	-1455	5.6	-3.6
60.0	60.0	60.0	75.0	0.0	45.0	3.0	2742	-3239	16.5	-12.5
60.0	60.0	60.0	80.0	0.0	60.0	3.0	6302	-6204	63.9	-55.6

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory:	LNEC
Material:	London Clay (LOC)
Specimen:	FILE LOC2

Specimen details **Moisture content** **Dry density**

Aimed:	36.0%	kg/m^3
Start of test:	36.8%	1370 kg/m^3
End of test:	36.8%	

Specimen size: 144 mm x 76 mm Static load included (y/n) n

Resilient Deformation Test

Date *15/01/92*

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
15.0	15.0	15.0	20.0	0.0	15.0	3.0	76	-482	28.2	-13.7
15.0	15.0	15.0	25.0	0.0	30.0	3.0	507	-1490	53.7	-25.8
30.0	30.0	30.0	35.0	0.0	15.0	3.0	152	-492	51.2	-2.0
30.0	30.0	30.0	40.0	0.0	30.0	3.0	939	-1500	69.2	-9.5
30.0	30.0	30.0	45.0	0.0	45.0	3.0	3684	-3282	148.7	-60.6
60.0	60.0	60.0	65.0	0.0	15.0	3.0	128	-438	1.5	-1.3
60.0	60.0	60.0	70.0	0.0	30.0	3.0	409	-1265	12.3	-4.2
60.0	60.0	60.0	75.0	0.0	45.0	3.0	3180	-2901	43.7	-21.9
60.0	60.0	60.0	80.0	0.0	60.0	3.0	6302	-6204	63.9	-55.6

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory: UNOT
Material: London Clay (LOC)
Specimen: Test Series 1 - Test1

Specimen details **Moisture content** **Dry density**

Aimed: 36.0% kg/m^3
Start of test: kg/m^3
End of test:

Specimen size: 144 mm x 76 mm Static load included (y/n) n

Resilient Deformation Test

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
15.0	15.0	15.0	20.0	0.0	15.0	3.0	466	-705	20.0	-3.1
15.0	15.0	15.0	25.0	0.0	30.0	3.0	4725	-2886	186.7	-26.1
30.0	30.0	30.0	34.7	0.0	14.2	3.0	1433	-806	13.4	-1.5
30.0	30.0	30.7	39.3	2.0	28.0	3.0	4564	-2819	456.7	-116.7
30.0	30.0	30.2	44.1	0.5	42.4	3.0	9433	-6402	457.6	-65.7
60.0	60.0	60.3	65.0	0.8	15.0	3.0	1255	-870	10.7	-0.6
60.0	60.0	60.3	69.7	1.0	29.0	3.0	4466	-3278	41.3	-4.5
60.0	60.0	60.2	73.8	0.5	41.5	3.0	9378	-6069	162.5	-24.6
60.0	60.0	60.2	78.3	0.5	55.0	3.0	15807	-10354	1278.6	-134.2

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory: UNOT
Material: London Clay (LOC)
Specimen: Test Series 1 - Test2

Specimen details **Moisture content** **Dry density**

Aimed: 36.0% kg/m^3
Start of test: kg/m^3
End of test:

Specimen size: 144 mm x 76 mm Static load included (y/n) n

Resilient Deformation Test

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
15.0	15.0	15.0	19.7	0.0	14.0	3.0	512	-258	3.5	-0.2
15.0	15.0	15.2	24.8	0.5	29.5	3.0	1679	-881	20.1	-4.1
30.0	30.0	30.2	34.7	0.5	14.0	3.0	351	-253	6.4	-0.6
30.0	30.0	30.2	39.9	0.5	29.6	3.0	1674	-863	12.2	-1.7
30.0	30.0	30.0	44.9	0.0	44.6	3.0	3966	-2125	37.2	-14.3
60.0	60.0	60.0	64.7	0.0	14.2	3.0	486	-289	53.0	-0.7
60.0	60.0	60.2	69.8	0.5	29.5	3.0	1701	-981	58.6	-1.4
60.0	60.0	60.2	74.8	0.5	44.5	3.0	3948	-2070	73.8	-7.0
60.0	60.0	60.2	79.3	0.5	58.0	3.0	6885	-4067	226.6	-29.6

Permanent Deformation Test:

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
20	62.0	62.0	65.0	86.0	9.0	72.0	3.0	8575	-4107	30	-27.2
50	62.0	62.0	65.0	86.0	9.0	72.0	3.0	9143	-4646	245	-48.4
100	62.0	62.0	65.0	86.0	9.0	72.0	3.0	9730	-4957	415	-73.2
200	62.0	62.0	64.3	85.7	7.0	71.0	3.0	10629	-5094	615	-95.1
400	62.0	62.0	64.3	85.7	7.0	71.0	3.0	10560	-5157	811	-119.2
1000	62.0	62.0	64.0	85.3	6.0	70.0	3.0	11201	-5320	1040	-152.9
2500	62.0	62.0	64.0	85.3	6.0	70.0	3.0	11368	-5277	1334	-184.6
5000	62.0	62.0	64.0	85.3	6.0	70.0	3.0	11667	-5252	1621	-208.5
10000	62.0	62.0	64.0	85.3	6.0	70.0	3.0	11827	-5093	1896	-241.9

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory: UNOT
Material: London Clay (LOC)
Specimen: Test Series 1 - Test3

Specimen details **Moisture content** **Dry density**

Aimed: 36.0% kg/m^3
Start of test: kg/m^3
End of test:

Specimen size: 144 mm x 76 mm Static load included (y/n) n

Resilient Deformation Test

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
15.0	15.0	15.0	20.0	0.0	15.0	3.0	350	-282	-1.5	-1.9
15.0	15.0	15.0	26.0	0.0	33.0	3.0	1367	-1077	3.6	-2.8
30.0	30.0	30.0	40.9	0.0	32.6	3.0	1282	-1021	4.0	-2.3
30.0	30.0	30.7	41.1	2.0	33.4	3.0	1256	-1032	-16.5	-2.2
30.0	30.0	30.2	46.2	0.5	48.5	3.0	2873	-2448	13.4	-10.2
60.0	60.0	60.3	70.8	0.8	32.5	3.0	1264	-1092	3.5	-2.1
60.0	60.0	60.3	71.4	1.0	34.3	3.0	1324	-1097	0.8	-1.5
60.0	60.0	60.2	76.2	0.5	48.7	3.0	2689	-2243	6.4	-5.2
60.0	60.0	60.2	81.2	0.5	63.6	3.0	4818	-4261	23.7	-19.5

Permanent Deformation Test:

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
20	60.0	60.0	63.3	90.0	10.0	80.0	2.6	4605	-4202	73.8	-24.6
50	60.0	60.0	63.0	89.7	9.0	80.0	2.7	5195	-4626	81.2	-31.7
100	60.0	60.0	62.7	89.5	8.0	80.5	2.7	5633	-4967	89.0	-41.9
200	60.0	60.0	61.7	88.6	5.0	80.8	2.8	6025	-5512	101.9	-50.5
400	60.0	60.0	61.0	87.9	3.0	80.8	2.9	6554	-6121	113.9	-59.7
1000	60.0	60.0	61.0	87.9	3.0	80.7	2.9	6860	-6306	132.4	-76.3
2500	60.0	60.0	61.0	87.9	3.0	80.7	2.9	6798	-6327	150.2	-92.4

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory:	UNOT
Material:	London Clay (LOC)
Specimen:	Test Series 2 - Sample 1

Specimen details **Moisture content** **Dry density**

Aimed:	36.0%	kg/m^3
Start of test:	35.9%	1220 kg/m^3
End of test:		

Specimen size: 144 mm x 76 mm Static load included (y/n) n

Resilient Deformation Test

Date *30/06/92*

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
15.0	15.0	15.0	20.0	0.0	15.0	3.0	676	-192	3.4	-1.9
15.0	15.0	15.0	25.0	0.0	30.0	3.0	1964	-661	9.7	-4.1
30.0	30.0	30.0	35.0	0.0	15.0	3.0	654	-320	3.5	-1.5
30.0	30.0	30.0	40.0	0.0	30.0	3.0	1802	-709	10.6	-3.4
30.0	30.0	30.0	45.0	0.0	45.0	3.0	4126	-1576	33.8	-12.8
60.0	60.0	60.0	65.0	0.0	15.0	3.0	532	-216	5.1	-2.1
60.0	60.0	60.0	70.0	0.0	30.0	3.0	1620	-648	8.7	-2.9
60.0	60.0	60.0	75.0	0.0	45.0	3.0	3396	-1405	18.3	-7.1
60.0	60.0	60.0	80.0	0.0	60.0	3.0	6610	-2488	68.1	-21.5

Permanent Deformation Test:

Cycles *N*	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
	s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
20	60.0	60.0	60.7	85.3	2.0	74.0	2.9	2998	-992	32.7	-11.0
50	60.0	60.0	60.7	85.3	2.0	74.0	2.9	3112	-1005	43.3	-14.2
100	60.0	60.0	60.7	85.3	2.0	74.0	2.9	3160	-1056	53.3	-17.5
200	60.0	60.0	60.7	85.3	2.0	74.0	2.9	3178	-1032	64.8	-20.0
400	60.0	60.0	60.7	85.3	2.0	74.0	2.9	3346	-984	79.1	-24.5
1000	60.0	60.0	60.7	85.3	2.0	74.0	2.9				
2500	60.0	60.0	60.7	85.3	2.0	74.0	2.9	3402	-584	125.3	-33.8
5000	60.0	60.0	60.7	85.3	2.0	74.0	2.9	3420	-435	144.5	-35.3
10000	60.0	60.0	60.7	85.3	2.0	74.0	2.9	3290	-432	166.2	-35.3
25000	60.0	60.0	60.7	85.3	2.0	74.0	2.9	3140	-354	188.7	-32.5
50000	60.0	60.0	60.7	85.3	2.0	74.0	2.9	6730	-368	147.7	-31.5
75000	60.0	60.0	60.7	85.3	2.0	74.0	2.9				

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory:	UNOT
Material:	London Clay (LOC)
Specimen:	Test Series 2 - Sample 2

Specimen details **Moisture content** **Dry density**

Aimed:	36.0%	kg/m^3
Start of test:	35.2%	1240 kg/m^3
End of test:		

Specimen size: 144 mm x 76 mm Static load included (y/n) n

Resilient Deformation Test

Date *25/06/92*

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
15.0	15.0	15.0	20.0	0.0	15.0	3.0	336	-203	2.5	-0.5
15.0	15.0	15.0	25.0	0.0	30.0	3.0	1088	-357	4.8	-0.6
30.0	30.0	30.0	35.0	0.0	15.0	3.0	392	-170	2.1	-0.7
30.0	30.0	30.0	40.0	0.0	30.0	3.0	1134	-403	4.9	-0.3
30.0	30.0	30.0	45.0	0.0	45.0	3.0	2502	-851	12.9	-2.7
60.0	60.0	60.0	65.0	0.0	15.0	3.0	456	-232	1.2	0.9
60.0	60.0	60.0	70.0	0.0	30.0	3.0	1262	-435	6.6	0.9
60.0	60.0	60.0	75.0	0.0	45.0	3.0	2564	-864	13.6	-1.3
60.0	60.0	60.0	80.0	0.0	60.0	3.0	4754	-1704	40.0	-6.6

Permanent Deformation Test:

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
20	60.0	60.0	60.3	86.0	1.0	77.0	3.0	2464	-960	37.3	-11.7
50	60.0	60.0	60.3	86.0	1.0	77.0	3.0	2532	-1000	47.4	-15.0
100	60.0	60.0	60.3	86.0	1.0	77.0	3.0	2600	-1019	58.4	-18.3
200	60.0	60.0	60.3	86.0	1.0	77.0	3.0	2536	-1040	72.9	-22.9
400	60.0	60.0	60.3	86.0	1.0	77.0	3.0	3453	-1043	82.6	-25.9
1000	60.0	60.0	60.3	86.0	1.0	77.0	3.0	2774	-1083	146.9	-49.6
2500	60.0	60.0	60.3	86.0	1.0	77.0	3.0	2922	-1240	183.8	-65.7
5000	60.0	60.0	60.3	86.0	1.0	77.0	3.0	2946	-1296	211.0	-76.6
10000	60.0	60.0	60.3	86.0	1.0	77.0	3.0	2918	-1341	235.1	-87.0
25000	60.0	60.0	60.3	86.0	1.0	77.0	3.0	2810	-1000	256.2	-98.6
50000	60.0	60.0	60.3	86.0	1.0	77.0	3.0	5470	-1333	231.2	-104.7
75000	60.0	60.0	60.3	86.0	1.0	77.0	3.0				

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory:	UNOT
Material:	London Clay (LOC)
Specimen:	Test Series 2 - Sample 3

Specimen details **Moisture content** **Dry density**

Aimed:	36.0%	kg/m^3
Start of test:	36.3%	1220 kg/m^3
End of test:		

Specimen size: 144 mm x 76 mm Static load included (y/n) n

Resilient Deformation Test

Date *02/07/92*

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
15.0	15.0	15.0	20.0	0.0	15.0	3.0	600	-635	8.5	
15.0	15.0	15.0	25.0	0.0	30.0	3.0	1780	-1333	8.6	1.9
30.0	30.0	30.0	35.0	0.0	15.0	3.0	580	-773		
30.0	30.0	30.0	40.0	0.0	30.0	3.0	1720	-1600		
30.0	30.0	30.0	45.0	0.0	45.0	3.0	3860	-3733	25.6	-0.2
60.0	60.0	60.0	65.0	0.0	15.0	3.0	500	-720	4.0	
60.0	60.0	60.0	70.0	0.0	30.0	3.0	1610	-1333	7.8	
60.0	60.0	60.0	75.0	0.0	45.0	3.0	3380	-4426	17.4	3.6
60.0	60.0	60.0	80.0	0.0	60.0	3.0	6400	-5786	59.0	-4.6

Permanent Deformation Test:

Cycles *N*	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
	s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
20	60.0	60.0	60.3	86.0	1.0	77.0	3.0				
50	60.0	60.0	60.3	86.0	1.0	77.0	3.0	3340	-1360	46.6	-18.4
100	60.0	60.0	60.3	86.0	1.0	77.0	3.0	3420	-1413	57.6	-22.7
200	60.0	60.0	60.3	86.0	1.0	77.0	3.0	3480	-1333	71.6	-28.5
400	60.0	60.0	60.3	86.0	1.0	77.0	3.0	3540	-1480	87.6	-33.7
1000	60.0	60.0	60.3	86.0	1.0	77.0	3.0	3680	-1493	112.6	-44.5
2500	60.0	60.0	60.3	86.0	1.0	77.0	3.0	3700	-1600	158.6	-64.0
5000	60.0	60.0	60.3	86.0	1.0	77.0	3.0	3620	-1520	180.4	-72.8
10000	60.0	60.0	60.3	86.0	1.0	77.0	3.0	3600	-1600	180.6	-72.0
25000	60.0	60.0	60.3	86.0	1.0	77.0	3.0	3340	-1467	217.4	-84.0
50000	60.0	60.0	60.3	86.0	1.0	77.0	3.0	3320	-1413	224.6	-85.3
75000	60.0	60.0	60.3	86.0	1.0	77.0	3.0				

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory: LRCF
Material: London Clay (LOC)
Specimen: LCD20

Specimen details **Moisture content** **Dry density**

Aimed: 36.0%
Start of test: 36.0% 1861 kg/m^3
End of test: 36.0%

Specimen size: 140 mm x 70 mm Static load included (y/n) n

Resilient Deformation Test

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
14.7	15.2	15.4	20.5	2.0	16.0	2.7	233	-217	0.0	0.0
14.2	15.3	14.8	25.7	1.7	31.2	2.7	578	-425	0.0	0.0
29.9	30.3	29.9	34.7	0.1	13.2	2.7	193	-191	0.0	0.0
29.7	30.3	29.7	40.2	-0.1	29.8	2.8	549	-425	0.0	0.0
29.3	30.5	29.3	45.4	0.0	44.8	2.8	1260	-896	0.1	0.0
59.9	60.2	58.6	63.5	-3.9	9.9	2.8	215	-153	0.0	0.0
59.9	60.2	58.6	68.7	-3.8	25.6	2.9	632	-482	0.0	0.0
59.5	60.2	58.3	73.8	-3.7	40.8	2.9	1337	-900	0.1	0.0
59.7	60.4	58.4	79.0	-3.8	55.9	2.9	2868	-1559	0.3	-0.1

Permanent Deformation Test:

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
20	58.3	61.7	58.1	86.5	-0.6	74.4	2.6	6072	-2677	0.6	-0.2
50	57.7	62.1	57.2	86.7	-1.4	73.9	2.6	6086	-2729	0.9	-0.3
100	57.4	62.5	57.3	87.2	-0.2	74.1	2.5	6252	-2806	1.2	-0.4
200	56.8	63.0	56.3	87.6	-1.5	73.8	2.4	6410	-2899	1.5	-0.5
400	56.4	63.2	56.2	87.8	-0.6	73.7	2.4	6640	-2985	1.8	-0.6
1000	55.9	63.6	55.8	88.0	-0.3	73.2	2.3	6917	-3137	2.2	-0.7
2500	55.5	63.7	55.1	88.1	-1.3	73.2	2.3	6979	-3186	2.6	-0.9
5000	55.4	63.8	55.1	88.2	-0.9	73.1	2.2	6888	-3188	2.9	-1.0
10000	55.3	64.0	55.1	88.3	-0.5	73.0	2.2	6740	-3153	3.1	-1.1
25000	55.5	63.9	54.8	88.4	-2.0	73.6	2.3	6268	-2980	3.4	-1.2
50000	59.7	63.6	58.8	88.2	-2.6	73.8	2.6	5858	-2778	3.5	-1.2
75000	55.8	63.4	54.9	88.0	-2.6	73.7	2.3	5587	-2663	3.6	-1.2
100000	56.0	63.3	55.2	87.9	-2.5	73.7	2.3	5366	-2568	3.6	-1.3

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory: LRCF
Material: London Clay (LOC)
Specimen: LCD30

Specimen details **Moisture content** **Dry density**

Aimed: 36.0%
Start of test: 36.0% 1860 kg/m^3
End of test: 36.0%

Specimen size: 140 mm x 70 mm Static load included (y/n) n

Resilient Deformation Test

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
14.7	15.1	15.2	20.3	1.5	15.5	2.7	208	-212	0.0	0.0
14.4	15.3	15.2	25.9	2.4	31.9	2.8	583	-678	0.0	0.0
30.0	30.1	30.1	34.9	0.3	14.3	2.9	221	-183	0.0	0.0
29.5	30.6	29.6	40.4	0.3	29.5	2.7	611	-590	0.0	0.0
29.3	30.7	29.4	45.5	0.4	44.5	2.7	1748	-1448	0.1	0.0
59.9	60.2	58.7	63.6	-3.7	10.3	2.9	226	-193	0.0	0.0
59.8	60.3	58.6	69.3	-3.6	27.1	2.9	698	-557	0.0	0.0
59.7	60.2	58.4	73.8	-3.8	40.7	2.9	1667	-1278	0.1	0.0
59.3	60.9	58.1	79.4	-3.6	55.4	2.8	3798	-2416	0.3	-0.1

Permanent Deformation Test:

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
20	57.5	62.1	57.5	86.9	0.1	74.4	2.5	7191	-4045	0.9	-0.5
50	57.2	62.5	57.5	87.1	0.8	73.7	2.5	7098	-3926	1.2	-0.7
100	57.0	62.6	57.5	87.2	1.5	73.9	2.4	7033	-3902	1.5	-0.8
200	56.9	62.8	57.4	87.3	1.4	73.6	2.4	6941	-3836	1.8	-1.0
400	56.8	63.0	57.1	87.5	0.8	73.6	2.4	6858	-3826	2.1	-1.2
1000	56.7	63.1	57.0	87.4	1.0	73.0	2.4	6843	-3814	2.5	-1.4
2500	56.8	63.2	56.6	87.7	-0.6	73.4	2.4	6636	-3719	2.8	-1.6
5000	56.8	63.1	56.5	87.5	-0.8	73.3	2.4	6514	-3641	3.0	-1.7
10000	56.6	63.3	56.4	87.7	-0.7	73.2	2.4	6180	-3494	3.2	-1.8
25000	56.8	63.2	56.3	87.6	-1.4	73.2	2.4	5815	-3254	3.4	-1.9
50000	56.9	63.1	56.5	87.4	-1.2	73.0	2.4	5369	-2972	3.5	-1.9
75000	57.0	62.9	57.0	87.2	0.0	72.8	2.4	5116	-2803	3.5	-1.9
100000	57.1	62.9	56.7	87.3	-1.2	73.3	2.4	4901	-2682	3.5	-1.9

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory: LRCF
Material: London Clay (LOC)
Specimen: LCD40

Specimen details **Moisture content** **Dry density**

Aimed: 36.0% kg/m^3
Start of test: 34.4% 1865 kg/m^3
End of test: 34.4%

Specimen size: 140 mm x 70 mm Static load included (y/n) n

Resilient Deformation Test

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
14.8	15.2	15.7	20.2	2.8	15.1	2.7	234	-180	0.0	0.0
14.4	15.3	15.4	25.9	2.9	31.7	2.7	854	-481	0.0	0.0
29.7	30.1	30.0	34.4	0.8	13.0	2.8	192	-139	0.0	0.0
29.6	30.2	29.9	39.7	1.0	28.5	2.8	620	-353	0.0	0.0
29.1	30.6	29.4	45.2	1.0	43.8	2.7	1535	-804	0.1	0.0
59.9	60.2	58.6	63.0	-4.0	8.3	2.8	209	-120	0.0	0.0
59.8	60.2	58.4	68.3	-4.1	24.2	2.9	659	-360	0.0	0.0
59.8	60.4	58.4	73.5	-4.2	39.4	2.9	1512	-850	0.1	0.0
59.8	60.2	58.4	78.5	-4.2	54.8	2.9	3314	-1722	0.3	0.0

Permanent Deformation Test:

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
20	58.7	61.4	59.1	85.8	1.3	73.3	2.7	7042	-3138	0.5	-0.2
50	58.2	61.8	58.6	86.3	1.1	73.5	2.6	6707	-3071	1.0	-0.3
100	58.1	61.9	58.0	86.5	-0.2	73.7	2.6	6836	-3102	1.3	-0.4
200	57.9	62.2	57.9	86.7	0.0	73.5	2.6	6796	-3132	1.6	-0.6
400	57.5	62.3	57.9	86.7	1.1	73.2	2.5	7122	-3223	1.9	-0.7
1000	57.4	63.1	57.3	87.7	-0.4	73.7	2.4	7232	-3244	2.4	-0.8
2500	57.0	62.7	57.3	87.0	0.9	72.9	2.4	7245	-3262	2.7	-1.0
5000	57.0	63.0	57.0	87.4	-0.1	73.1	2.4	7094	-3180	3.0	-1.1
10000	57.0	63.0	56.7	87.4	-0.9	73.2	2.4	6807	-3060	3.2	-1.2
25000	57.0	62.9	56.5	87.3	-1.4	73.1	2.4	6196	-2794	3.5	-1.2
50000	57.0	63.0	56.7	87.3	-0.9	72.8	2.4	5569	-2522	3.6	-1.3
75000	56.8	63.3	56.4	87.6	-1.2	72.8	2.4	5308	-2380	3.7	-1.3
100000	56.7	63.3	56.0	87.7	-2.2	73.2	2.4	5093	-2295	3.7	-1.3

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory: DUT
Material: London Clay (LOC)
Specimen: Specimen 1

Specimen details **Moisture content** **Dry den** Dry density:

Aimed: 36.0% kg/m^3 kg/m^3
Start of test: 36.7% kg/m^3 kg/m^3
End of test: 36.1%

Specimen size: 207 mm x 102 mm Static load included (y/n) n

Resilient Deformation Test

Date *20-3-1992*

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
15.0	15.0	17.1	22.0	6.2	21.0	3.0	599	-187	3.5	-0.8
15.0	15.0	17.1	27.3	6.2	37.0	3.0	2930	-1165	20.9	-8.7
30.0	30.0	32.1	37.0	6.2	21.0	3.0	718	-251	1.6	-0.2
30.0	30.0	32.1	42.3	6.2	37.0	3.0	2695	-1026	4.8	-0.5
30.0	30.0	32.1	47.5	6.2	52.5	3.0	6149	-3174	57.0	-27.0
60.0	60.0	62.1	67.0	6.2	21.0	3.0	585	-231	0.9	-0.1
60.0	60.0	62.1	72.3	6.2	37.0	3.0	2695	-1225	4.1	-0.4
60.0	60.0	62.1	77.5	6.2	52.5	3.0	6113	-3094	12.4	-8.0
60.0	60.0	62.1	82.1	6.2	66.3	3.0	9932	-5878	106.6	-72.4

Permanent Deformation Test:

Cycles *N*	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
	s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
20	60.0	60.0	62.1	82.1	6.2	66.3	3.0	4326	-3174	12.6	-7.6
50	60.0	60.0	62.1	82.1	6.2	66.3	3.0	7943	-4764	58.2	-33.0
100	60.0	60.0	62.1	82.1	6.2	66.3	3.0	8485	-5083	91.8	-54.5
200	60.0	60.0	62.1	82.1	6.2	66.3	3.0	3241	-1742	70.5	-35.4
400	60.0	60.0	62.1	82.1	6.2	66.3	3.0	4326	-2458	83.5	-43.3
1000	60.0	60.0	62.1	82.1	6.2	66.3	3.0	7039	-4128	121.1	-68.0
2500	60.0	60.0	62.1	82.1	6.2	66.3	3.0	7220	-4208	185.1	-103.0
5000	60.0	60.0	62.1	82.1	6.2	66.3	3.0	7039	-4287	217.7	-128.9
10000	60.0	60.0	62.1	82.1	6.2	66.3	3.0	7672	-4566	257.5	-156.7
25000	60.0	60.0	62.1	82.1	6.2	66.3	3.0	7581	-4526	305.2	-190.5
50000	60.0	60.0	62.1	82.1	6.2	66.3	3.0	7039	-4446	335.2	-212.4
75000	60.0	60.0	62.1	82.1	6.2	66.3	3.0				
100000	60.0	60.0	62.1	82.1	6.2	66.3	3.0				

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory: DUT
Material: London Clay (LOC)
Specimen: Specimen 2

Specimen details **Moisture content** **Dry den** Dry density:

Aimed: 36.0% kg/m^3 kg/m^3
Start of test: 36.2% kg/m^3 kg/m^3
End of test: 35.3%

Specimen size: 213 mm x 102 mm Static load included (y/n) n

Resilient Deformation Test

Date *27-3-1992*

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
15.0	15.0	17.1	22.1	6.2	21.3	3.0	499	-167	1.6	-0.4
15.0	15.0	17.1	27.3	6.2	37.0	3.0	1947	-768	13.8	-4.2
30.0	30.0	32.1	37.1	6.2	21.3	3.0	495	-191	0.9	-0.1
30.0	30.0	32.1	42.3	6.2	37.0	3.0	1876	-787	6.8	-1.4
30.0	30.0	32.1	47.0	6.2	50.9	3.0	4439	-2080	27.6	-12.8
60.0	60.0	62.1	67.1	6.2	21.3	3.0	495	-223	0.5	0.2
60.0	60.0	62.1	72.3	6.2	37.0	3.0	1955	-923	1.8	-0.6
60.0	60.0	62.1	77.0	6.2	50.9	3.0	4140	-1662	9.1	-4.4
60.0	60.0	62.1	82.1	6.2	66.3	3.0	8090	-4963	83.8	-49.7

Permanent Deformation Test:

Cycles *N*	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
	s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
20	60.0	60.0	62.1	82.1	6.2	66.3	3.0	2100	-986	7.7	-15.9
50	60.0	60.0	62.1	82.1	6.2	66.3	3.0	4038	-1981	35.9	-21.9
100	60.0	60.0	62.1	82.1	6.2	66.3	3.0	4390	-2378	37.3	-26.6
200	60.0	60.0	62.1	82.1	6.2	66.3	3.0	4919	-2537	63.4	-34.2
400	60.0	60.0	62.1	82.1	6.2	66.3	3.0	5271	-2816	72.9	-39.0
1000	60.0	60.0	62.1	82.1	6.2	66.3	3.0	5659	-3154	92.2	-50.5
2500	60.0	60.0	62.1	82.1	6.2	66.3	3.0	5799	-3372	113.4	-62.8
5000	60.0	60.0	62.1	82.1	6.2	66.3	3.0	5870	-3382	130.3	-72.4
10000	60.0	60.0	62.1	82.1	6.2	66.3	3.0	5905	-3452	148.6	-82.7
25000	60.0	60.0	62.1	82.1	6.2	66.3	3.0	5729	-3333	169.8	-95.4
50000	60.0	60.0	62.1	82.1	6.2	66.3	3.0	5162	-2975	183.1	-103.4
75000	60.0	60.0	62.1	82.1	6.2	66.3	3.0	4954	-2935	190.2	-107.0
100000	60.0	60.0	62.1	82.1	6.2	66.3	3.0	4742	-2776	193.7	-109.0

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory: DUT
Material: London Clay (LOC)
Specimen: Specimen 3

Specimen details **Moisture content** **Dry den** Dry density:

Aimed: 36.0% kg/m^3 kg/m^3
Start of test: 36.7% kg/m^3 kg/m^3
End of test: 36.1%

Specimen size: 211 mm x 102 mm Static load included (y/n) n

Resilient Deformation Test

Date *07-4-1992*

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
15.0	15.0	17.1	22.1	6.2	21.3	3.0	488	-207	0.9	-0.4
15.0	15.0	17.1	27.3	6.2	37.0	3.0	2023	-986	8.8	-4.5
30.0	30.0	32.1	37.1	6.2	21.3	3.0	435	-237	0.4	-0.2
30.0	30.0	32.1	42.3	6.2	37.0	3.0	1969	-950	5.4	-2.3
30.0	30.0	32.1	47.0	6.2	50.9	3.0	4932	-3114	31.5	-18.8
60.0	60.0	62.1	67.1	6.2	21.3	3.0	510	-260	0.4	-0.2
60.0	60.0	62.1	72.3	6.2	37.0	3.0	2218	-1233	2.0	-1.3
60.0	60.0	62.1	77.0	6.2	50.9	3.0	4684	-2895	8.7	-5.6
60.0	60.0	62.1	82.1	6.2	66.3	3.0	9318	-6435	107.3	-72.6

Permanent Deformation Test:

Cycles *N*	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
	s_{31} *kPa*	s_{32} *kPa*	p_1 *kPa*	p_2 *kPa*	q_1 *kPa*	q_2 *kPa*	q_r/p_r	e_{1r} *με*	e_{3r} *με*	e_{1p} *x 10^{-4}*	e_{3p} *x 10^{-4}*
20	60.0	60.0	62.1	82.1	6.2	66.3	3.0	3357	-1881	0.7	-4.0
50	60.0	60.0	62.1	82.1	6.2	66.3	3.0	5663	-3870	18.4	-25.9
100	60.0	60.0	62.1	82.1	6.2	66.3	3.0	5912	-4208	56.7	-37.8
200	60.0	60.0	62.1	82.1	6.2	66.3	3.0	6018	-4307	74.4	-48.5
400	60.0	60.0	62.1	82.1	6.2	66.3	3.0	6302	-4406	82.3	-53.3
1000	60.0	60.0	62.1	82.1	6.2	66.3	3.0	6515	-4566	94.7	-61.2
2500	60.0	60.0	62.1	82.1	6.2	66.3	3.0	6533	-4585	116.0	-75.6
5000	60.0	60.0	62.1	82.1	6.2	66.3	3.0	6550	-4605	133.0	-87.5
10000	60.0	60.0	62.1	82.1	6.2	66.3	3.0	6692	-4566	151.4	-100.6
25000	60.0	60.0	62.1	82.1	6.2	66.3	3.0	6373	-4526	179.8	-119.3
50000	60.0	60.0	62.1	82.1	6.2	66.3	3.0	5770	-4208	197.6	-129.3
75000	60.0	60.0	62.1	82.1	6.2	66.3	3.0	5486	-4088	205.7	-134.4
100000	60.0	60.0	62.1	82.1	6.2	66.3	3.0	5415	-4029	210.7	-137.6

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory: LNEC
Material: Microgranite MIG
Specimen: L_MIG_01

Specimen details

	Moisture content	Dry density
Aimed:	3.3%	2140 kg/m^3
Start of test:	3.3%	2135 kg/m^3
End of test:	3.3%	

Specimen size: 607 mm x 308 mm Static load included (y/n) n

Isotropic Loading Test 1

Date 27 Sept 1991

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*	*kPa*	*kPa*
1	61	210	1.2	0.9	0.0	50.3
2	48	192	1.3	1.2	0.0	50.3
3	56	212	1.3	1.3	0.0	50.3
4	54	195	1.3	1.3	0.0	50.3
5	44	184	1.3	1.4	0.0	50.3

Permanent Deformation Test

Date 28 Sept 1991

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*
20	50.3	50.3	50.3	137.3	0.0	261.0	3.0	723	-233	2.0	-1.1
50	50.3	50.3	50.3	137.3	0.0	261.0	3.0	629	-244	2.1	-1.1
100	50.3	50.3	50.3	137.3	0.0	261.0	3.0	691	-244	2.1	-1.1
200	50.3	50.3	50.3	137.3	0.0	261.0	3.0	717	-255	2.1	-1.1
400	50.3	50.3	50.3	137.3	0.0	261.0	3.0	733	-233	2.1	-1.2
1000	50.3	50.3	50.3	137.3	0.0	261.0	3.0	676	-158	2.1	-0.9
2500	50.3	50.3	50.3	137.3	0.0	261.0	3.0	733	-210	2.2	-1.1
5000	50.3	50.3	50.3	137.3	0.0	261.0	3.0	758	-203	2.2	-1.2
7500	50.3	50.3	50.3	137.3	0.0	261.0	3.0	790	-222	2.2	-1.2
10000	50.3	50.3	50.3	137.3	0.0	261.0	3.0	782	-225	2.2	-1.1
12500	50.3	50.3	50.3	137.3	0.0	261.0	3.0	766	-218	2.2	-1.2
15000	50.3	50.3	50.3	137.3	0.0	261.0	3.0	782	-218	2.2	-1.1
20000	50.3	50.3	50.3	137.3	0.0	261.0	3.0	782	-229	2.2	-1.1

Isotropic Loading Test 2

Date *30 Sept 1991*

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*	*kPa*	*kPa*
1	228	516	0.0	0.4	0.0	50.3
2	195	502	0.0	0.4	0.0	49.7
3	332	565	0.4	0.2	0.0	49.7
4	335	535	0.4	0.3	0.0	50.8
5	335	544	0.4	0.3	0.0	49.7

Resilient Deformation Test 1 (CCP)

Date *30 Sept 1991*

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*
16.2	16.2	16.2	27.1	0.0	32.6	3.0	264	-113	0.4	-0.1
16.4	16.4	16.4	38.1	0.0	65.3	3.0	426	-227	0.7	-0.3
16.4	16.4	16.4	45.4	0.0	87.0	3.0	545	-305	1.0	-0.6
16.2	16.2	16.2	57.3	0.0	123.3	3.0	662	-366	1.1	-0.8
30.5	30.5	30.5	47.4	0.0	50.8	3.0	281	-66	-0.1	0.6
30.5	30.5	30.5	63.1	0.0	97.9	3.0	486	-225	-0.1	0.5
30.5	30.5	30.5	92.1	0.0	184.9	3.0	690	-347	0.0	0.4
30.5	30.5	30.5	101.8	0.0	213.9	3.0	732	-375	0.4	0.3
45.6	45.6	45.6	65.0	0.0	58.0	3.0	260	-66	-0.1	0.3
45.6	45.6	45.6	87.9	0.0	126.9	3.0	472	-178	0.0	0.2
45.6	45.6	45.6	103.7	0.0	174.0	3.0	590	-244	0.0	0.1
45.6	45.6	45.6	124.2	0.0	235.7	3.0	696	-310	0.1	0.1

Isotropic Loading Test 3

Date *30 Sept 1991*

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*	*kPa*	*kPa*
1	220	568	0.0	0.1	0.0	49.7
2	267	554	-0.1	0.2	0.0	49.7
3	266	565	0.0	0.2	0.0	49.7
4	268	575	0.0	0.2	0.0	49.7
5	274	547	0.0	0.3	0.0	49.7

Resilient Deformation Test 2 (VCP)

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r µE*	*E3r µE*	*E1p x10 $^{-4}$*	*E3p x10 $^{-4}$*

Isotropic Loading Test 4

Date

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10 $^{-4}$*	*E3p x10 $^{-4}$*	*kPa*	*kPa*

Resilient Deformation Test (Extra)

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r µE*	*E3r µE*	*E1p x10 $^{-4}$*	*E3p x10 $^{-4}$*
16.2	16.2	16.2	25.8	0.0	29.0	3.0	241	-6	0.1	0.0
16.4	16.4	16.4	35.7	0.0	58.0	3.0	397	-81	0.3	-0.1
16.4	16.4	16.4	45.4	0.0	87.0	3.0	506	-134	0.5	-0.1
16.2	16.2	16.2	57.3	0.0	123.3	3.0	611	-178	0.9	-0.2
30.5	30.5	30.5	47.4	0.0	50.8	3.0	277	-4	0.0	0.2
30.5	30.5	30.5	64.3	0.0	101.5	3.0	463	-81	0.3	0.2
30.5	30.5	30.5	81.2	0.0	152.3	3.0	592	-133	0.6	0.2
30.5	30.5	30.5	124.7	0.0	282.8	3.0	714	-205	0.8	0.2
45.6	45.6	45.6	65.0	0.0	58.0	3.0	257	0	0.4	0.0
45.6	45.6	45.6	86.7	0.0	123.3	3.0	444	-30	0.9	0.1
45.6	45.6	45.6	108.5	0.0	188.5	3.0	585	-54	1.4	0.0
45.6	45.6	45.6	127.8	0.0	246.5	3.0	627	-106	1.7	0.1
16.2	16.2	16.2	25.8	0.0	29.0	3.0	244	-3	-0.3	0.0
16.2	16.2	16.2	35.5	0.0	58.0	3.0	400	-32	-0.3	-0.3
16.2	16.2	16.2	45.2	0.0	87.0	3.0	506	-76	-0.4	-0.3
16.2	16.2	16.2	54.9	0.0	116.0	3.0	603	-123	-0.3	-0.5

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory: LNEC
Material: Microgranite MIG
Specimen: L_MIG_02

Specimen details

	Moisture content	Dry density
Aimed:	3.3%	2140 kg/m^3
Start of test:	3.3%	2138 kg/m^3
End of test:	3.2%	

Specimen size: 608 mm x 308 mm Static load included (y/n) n

Isotropic Loading Test 1

Date 2 Oct 1991

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*	*kPa*	*kPa*
1	255	0	0.4	3.9	0.0	50.3
2	282	0	0.7	3.9	0.0	50.3
3	292	0	0.8	3.9	0.0	50.3
4	299	0	1.0	3.9	0.0	51.4
5	285	0	1.2	3.9	0.0	50.3

Permanent Deformation Test

Date 3 Oct 1991

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*
20	50.3	50.3	50.3	138.5	0.0	264.7	3.0	350	-132	2.1	-2.4
50	50.3	50.3	50.3	138.5	0.0	264.7	3.0	442	-165	3.0	-3.0
100	50.3	50.3	50.3	138.5	0.0	264.7	3.0	450	-150	3.3	-3.2
200	50.3	50.3	50.3	138.5	0.0	264.7	3.0	450	-143	3.7	-3.2
400	50.3	50.3	50.3	138.5	0.0	264.7	3.0	476	-143	3.9	-3.4
1000	50.3	50.3	50.3	132.5	0.0	246.5	3.0	434	-139	4.7	-3.5
2500	50.3	50.3	50.3	139.7	0.0	268.3	3.0	515	-150	4.8	-4.2
5000	50.3	50.3	50.3	149.4	0.0	297.3	3.0	528	-156	5.3	-3.0
7500	50.3	50.3	50.3	149.4	0.0	297.3	3.0	534	-145	5.4	-3.0
10000	50.3	50.3	50.3	139.7	0.0	268.3	3.0	513	-267	5.5	-2.9
12500	50.3	50.3	50.3	137.3	0.0	261.0	3.0	495	-241	5.6	-2.8
15000	50.8	50.8	50.8	139.0	0.0	264.7	3.0	515	-259	6.1	-2.7
20000	50.8	50.8	50.8	139.0	0.0	264.7	3.0	515	-267	6.0	-2.6

Isotropic Loading Test 2

Date *4 Oct 1991*

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r*	*E3r*	*E1p*	*E3p*		
	µE	*µE*	*x10 -4*	*x10 -4*	*kPa*	*kPa*
1	167	188	-40.2	178.5	0.0	50.3
2	286	193	-53.5	178.5	0.0	50.3
3	242	357	-6.9	84.6	0.0	50.3
4	269	188	-3.6	126.8	0.0	50.3
5	262	164	-3.6	159.7	0.0	50.3

Resilient Deformation Test 1 (CCP)

Date *4 Oct 1991*

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 -4*	*x10 -4*
16.3	16.3	16.3	27.2	0.0	32.6	3.0	220	-90	0.3	-0.1
16.3	16.3	16.3	38.1	0.0	65.3	3.0	397	-220	0.5	-0.2
16.3	16.3	16.3	45.3	0.0	87.0	3.0	524	-349	0.8	-0.2
16.3	16.3	16.3	57.4	0.0	123.3	3.0	625	-432	1.2	-0.4
30.5	30.5	30.5	47.4	0.0	50.8	3.0	279	-101	0.2	-0.5
30.5	30.5	30.5	63.1	0.0	97.9	3.0	464	-229	0.3	-0.6
30.5	30.5	30.5	92.1	0.0	184.9	3.0	584	-327	0.5	-0.4
30.5	30.5	30.5	101.8	0.0	213.9	3.0	694	-425	0.5	-0.4
45.0	45.0	45.0	64.4	0.0	58.0	3.0	247	-79	0.2	-0.4
45.0	45.0	45.0	87.3	0.0	126.9	3.0	425	-192	0.2	-0.5
45.0	45.0	45.0	103.0	0.0	174.0	3.0	597	-308	0.3	-0.4
45.0	45.0	45.0	123.6	0.0	235.7	3.0	661	-365	0.3	-0.5

Isotropic Loading Test 3

Date *4 Oct 1991*

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r*	*E3r*	*E1p*	*E3p*		
	µE	*µE*	*x10 -4*	*x10 -4*	*kPa*	*kPa*
1	251	364	-0.1	0.4	0.0	50.3
2	249	383	0.0	0.5	0.0	50.3
3	244	383	0.1	0.7	0.0	50.3
4	248	395	0.1	0.9	0.0	50.3
5	248	417	0.1	0.9	0.0	50.3

Resilient Deformation Test 2 (VCP)

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r µE*	*E3r µE*	*E1p x10 $^{-4}$*	*E3p x10 $^{-4}$*

Isotropic Loading Test 4

Date

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10 $^{-4}$*	*E3p x10 $^{-4}$*	*kPa*	*kPa*

Resilient Deformation Test (Extra)

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*
15.9	15.9	15.9	21.3	0.0	16.3	3.0	105	-21	0.2	0.4
15.9	15.9	15.9	25.5	0.0	29.0	3.0	220	-86	0.3	0.5
15.9	15.9	15.9	30.4	0.0	43.5	3.0	289	-126	0.3	0.6
15.9	15.9	15.9	36.4	0.0	61.6	3.0	347	-203	0.4	0.7
30.8	30.8	30.8	39.2	0.0	25.4	3.0	115	-19	0.3	0.4
30.8	30.8	30.8	47.7	0.0	50.8	3.0	215	-83	0.3	0.6
30.8	30.8	30.8	56.1	0.0	76.1	3.0	334	-165	0.4	0.7
30.8	30.8	30.8	65.8	0.0	105.1	3.0	419	-199	0.3	0.7
45.8	45.8	45.8	55.4	0.0	29.0	3.0	110	-15	0.3	0.4
45.8	45.8	45.8	65.7	0.0	59.8	3.0	237	-71	0.2	0.5
45.8	45.8	45.8	74.8	0.0	87.0	3.0	292	-113	0.3	0.7
45.8	45.8	45.8	89.3	0.0	130.5	3.0	377	-165	0.2	0.8
16.2	16.2	16.2	25.9	0.0	29.0	3.0	207	-75	0.0	0.1
16.2	16.2	16.2	35.6	0.0	58.0	3.0	332	-186	0.1	0.0
16.2	16.2	16.2	45.2	0.0	87.0	3.0	476	-276	0.2	-0.1
16.2	16.2	16.2	58.5	0.0	126.9	3.0	564	-348	0.4	-0.2
30.7	30.7	30.7	47.7	0.0	50.8	3.0	244	-79	0.2	0.5
30.7	30.7	30.7	64.6	0.0	101.5	3.0	412	-188	0.2	0.6
30.7	30.7	30.7	80.3	0.0	148.7	3.0	541	-286	0.3	0.6
30.7	30.7	30.7	98.4	0.0	203.0	3.0	604	-364	0.3	0.5
45.6	45.6	45.6	64.9	0.0	58.0	3.0	204	-56	0.0	0.4
45.6	45.6	45.6	84.3	0.0	116.0	3.0	364	-154	0.0	0.5
45.6	45.6	45.6	106.0	0.0	181.3	3.0	464	-248	-0.1	0.5
45.6	45.6	45.6	122.9	0.0	232.0	3.0	577	-316	-0.1	0.5
16.3	16.3	16.3	25.9	0.0	29.0	3.0	103	0	0.0	0.0
16.3	16.3	16.3	35.6	0.0	58.0	3.0	222	-162	-0.1	0.2
16.3	16.3	16.3	44.1	0.0	83.4	3.0	310	-255	0.0	0.2
16.3	16.3	16.3	55.0	0.0	116.0	3.0	400	-406	0.0	0.2

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory: LNEC
Material: Microgranite MIG
Specimen: L_MIG_03

Specimen details

	Moisture content	Dry density
Aimed:	3.3%	2140 kg/m^3
Start of test:	2.9%	2145 kg/m^3
End of test:	2.6%	

Specimen size: 605 mm x 308 mm Static load included (y/n) n

Isotropic Loading Test 1

Date 15 Oct 1991

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*	*kPa*	*kPa*
1	-2	24	0.0	0.2	0.0	49.7
2	348	99	0.2	1.4	0.0	49.7
3	376	94	0.2	1.4	0.0	49.7
4	384	80	0.2	1.7	0.0	49.7
5	389	104	0.3	1.6	0.0	49.7

Permanent Deformation Test

Date 17 Oct 1991

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*
20	49.7	49.7	49.7	86.0	0.0	108.8	3.0	261	-72	1.3	-0.2
50	49.7	49.7	49.7	93.2	0.0	130.5	3.0	284	-72	1.5	-0.2
100	49.7	49.7	49.7	92.0	0.0	126.9	3.0	286	-75	1.9	-0.1
200	49.7	49.7	49.7	92.0	0.0	126.9	3.0	297	-92	2.0	0.0
400	49.7	49.7	49.7	90.8	0.0	123.3	3.0	304	-72	2.1	0.1
1000	49.7	49.7	49.7	92.0	0.0	126.9	3.0	314	-77	2.1	0.2
2500	49.7	49.7	49.7	92.0	0.0	126.9	3.0	318	-75	2.4	0.3
5000	49.7	49.7	49.7	92.0	0.0	126.9	3.0	328	-73	2.8	0.5
7500	49.7	49.7	49.7	92.6	0.0	128.7	3.0	348	-78	3.5	0.6
10000	49.7	49.7	49.7	93.2	0.0	130.5	3.0	351	-81	3.8	0.8
12500	49.7	49.7	49.7	93.2	0.0	130.5	3.0	347	-75	4.0	0.9
15000	50.2	50.2	50.2	93.7	0.0	130.5	3.0	349	-79	4.1	1.0
20000	50.2	50.2	50.2	93.7	0.0	130.5	3.0	351	-77	4.1	1.0

Isotropic Loading Test 2

Date *17 Oct 1991*

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*	*kPa*	*kPa*
1	281	134	-0.5	0.7	7.4	49.7
2	260	137	-0.4	0.7	7.4	49.7
3	265	139	-0.5	0.7	7.4	49.7
4	277	137	-0.6	0.7	7.4	49.7
5	276	143	-0.6	0.7	7.4	49.7

Resilient Deformation Test 1 (CCP)

Date *18 Oct 1991*

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*
17.9	17.9	17.9	22.7	0.0	14.5	3.0	78	0	0.4	0.0
17.9	17.9	17.9	28.8	0.0	32.6	3.0	185	-32	0.4	0.0
17.9	17.9	17.9	32.4	0.0	43.5	3.0	240	-47	0.4	0.0
17.9	17.9	17.9	40.9	0.0	68.9	3.0	352	-77	0.5	0.1
30.6	30.6	30.6	38.5	0.0	23.6	3.0	98	0	0.1	0.0
30.6	30.6	30.6	49.9	0.0	58.0	3.0	216	-38	0.1	0.0
30.6	30.6	30.6	57.2	0.0	79.8	3.0	295	-62	0.1	-0.2
30.6	30.6	30.6	66.9	0.0	108.8	3.0	386	-86	0.1	-0.2
44.7	44.7	44.7	53.2	0.0	25.4	3.0	99	0	0.0	-0.1
44.7	44.7	44.7	67.7	0.0	68.9	3.0	219	-32	0.0	-0.2
44.7	44.7	44.7	81.0	0.0	108.8	3.0	285	-52	0.0	-0.3
44.7	44.7	44.7	85.2	0.0	121.5	3.0	369	-67	0.0	-0.3

Isotropic Loading Test 3

Date *18 Oct 1991*

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*	*kPa*	*kPa*
1	259	137	-0.2	-0.2	7.4	49.7
2	245	121	0.0	0.2	7.4	49.7
3	260	124	-0.2	0.0	7.4	49.7
4	261	121	-0.3	0.1	7.4	49.7
5	256	121	-0.1	0.1	7.4	49.7

Resilient Deformation Test 2 (VCP)

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10 $^{-4}$*	*E3p x10 $^{-4}$*

Isotropic Loading Test 4

Date

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r με*	*E3r με*	*E1p x10 $^{-4}$*	*E3p x10 $^{-4}$*	*kPa*	*kPa*

Resilient Deformation Test (Extra)

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10 $^{-4}$*	*E3p x10 $^{-4}$*
17.6	17.6	17.6	22.4	0.0	14.5	3.0	82	-1	0.1	0.4
17.6	17.6	17.6	27.3	0.0	29.0	3.0	157	-27	0.0	0.3
17.6	17.6	17.6	32.1	0.0	43.5	3.0	235	-46	0.0	0.4
17.6	17.6	17.6	39.3	0.0	65.3	3.0	308	-70	0.0	0.5

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory: LNEC
Material: Microgranite MIG
Specimen: L_MIG_04

Specimen details

	Moisture content	Dry density
Aimed:	3.3%	2140 kg/m^3
Start of test:	3.3%	2145 kg/m^3
End of test:	3.0%	

Specimen size: 610 mm x 308 mm Static load included (y/n) n

Isotropic Loading Test 1

Date 21 Oct 1991

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*	*kPa*	*kPa*
1	1	45	-0.3	0.1	7.4	50.3
2	11	45	-0.5	0.1	7.4	50.3
3	-21	47	-0.3	0.1	7.4	50.3
4	-11	44	-0.3	0.2	7.4	50.3
5	-21	46	-0.3	0.2	7.4	50.3

Permanent Deformation Test

Date 22 Oct 1991

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*
20	50.3	50.3	50.3	95.0	0.0	134.1	3.0	234	-20	1.0	0.0
50	50.3	50.3	50.3	93.8	0.0	130.5	3.0	234	-26	1.0	0.1
100	50.3	50.3	50.3	93.8	0.0	130.5	3.0	247	-26	1.0	0.1
200	50.3	50.3	50.3	93.8	0.0	130.5	3.0	258	-28	1.0	0.1
400	50.3	50.3	50.3	93.8	0.0	130.5	3.0	258	-29	1.0	0.2
1000	50.3	50.3	50.3	95.0	0.0	134.1	3.0	271	-29	1.1	0.2
2500	50.3	50.3	50.3	92.6	0.0	126.9	3.0	266	-29	1.0	0.4
5000	50.3	50.3	50.3	95.0	0.0	134.1	3.0	288	-32	1.1	0.5
7500	50.3	50.3	50.3	95.0	0.0	134.1	3.0	288	-33	1.1	0.5
10000	50.3	50.3	50.3	96.2	0.0	137.8	3.0	301	-35	1.2	0.6
12500	50.3	50.3	50.3	95.0	0.0	134.1	3.0	293	-34	1.2	0.6
15000	50.3	50.3	50.3	95.0	0.0	134.1	3.0	304	-35	1.2	0.7
20000	50.3	50.3	50.3	96.2	0.0	137.8	3.0	309	-37	1.3	0.7

Isotropic Loading Test 2

Date *22 Oct 1991*

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10 -4*	*E3p x10 -4*	*kPa*	*kPa*
1	-184	64	0.0	0.1	7.4	50.3
2	-195	63	-0.3	0.1	7.4	50.3
3	-199	64	-0.3	0.1	7.4	50.3
4	-204	63	-0.4	0.1	7.4	50.3
5	-204	62	-0.4	0.1	7.4	50.3

Resilient Deformation Test 1 (CCP)

Date *23 Oct 1991*

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r µE*	*E3r µE*	*E1p x10 -4*	*E3p x10 -4*
17.3	17.3	17.3	22.8	0.0	16.3	3.0	92	-15	0.1	0.0
17.3	17.3	17.3	27.0	0.0	29.0	3.0	174	-47	0.2	0.0
17.3	17.3	17.3	31.8	0.0	43.5	3.0	247	-69	0.2	0.0
17.8	17.8	17.8	39.5	0.0	65.3	3.0	339	-101	0.3	-0.1
31.3	31.3	31.3	39.8	0.0	25.4	3.0	122	-21	0.1	0.0
31.3	31.3	31.3	50.7	0.0	58.0	3.0	280	-60	0.2	0.1
31.3	31.3	31.3	58.5	0.0	81.6	3.0	322	-84	0.3	0.1
31.4	31.4	31.4	64.1	0.0	97.9	3.0	380	-103	0.3	0.1
45.3	45.3	45.3	55.0	0.0	29.0	3.0	105	-14	0.1	0.0
45.3	45.3	45.3	66.5	0.0	63.4	3.0	224	-47	0.2	0.1
45.3	45.3	45.3	75.6	0.0	90.6	3.0	295	-68	0.2	0.1
45.3	45.3	45.3	85.8	0.0	121.5	3.0	358	-88	0.3	0.1

Isotropic Loading Test 3

Date *23 Oct 1991*

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10 -4*	*E3p x10 -4*	*kPa*	*kPa*
1	-209	60	0.0	0.0	7.4	50.3
2	-211	59	0.0	0.0	7.4	50.3
3	-208	59	0.0	0.1	7.4	50.3
4	-219	60	-0.1	0.1	7.4	50.3
5	-199	59	-0.1	0.1	7.4	50.3

Resilient Deformation Test 2 (VCP)

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10 $^{-4}$*	*E3p x10 $^{-4}$*

Isotropic Loading Test 4

Date

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r με*	*E3r με*	*E1p x10 $^{-4}$*	*E3p x10 $^{-4}$*	*kPa*	*kPa*

Resilient Deformation Test (Extra)

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10 $^{-4}$*	*E3p x10 $^{-4}$*
17.3	17.3	17.3	22.1	0.0	14.5	3.0	82	-15	0.2	-0.2
17.3	17.3	17.3	27.0	0.0	29.0	3.0	184	-47	0.2	-0.2
17.3	17.3	17.3	31.2	0.0	41.7	3.0	247	-68	0.2	-0.2
17.3	17.3	17.3	37.8	0.0	61.6	3.0	309	-94	0.2	-0.2
17.6	17.6	17.6	22.4	0.0	14.5	3.0	65	-4	0.5	0.0
17.6	17.6	17.6	26.7	0.0	27.2	3.0	143	-17	0.7	0.0
17.6	17.6	17.6	31.5	0.0	41.7	3.0	218	-51	0.7	0.0
17.5	17.5	17.5	37.4	0.0	59.8	3.0	291	-75	0.9	0.0
31.6	31.6	31.6	40.6	0.0	27.2	3.0	107	-9	0.3	-0.1
31.6	31.6	31.6	47.3	0.0	47.1	3.0	192	-34	0.3	-0.1
31.6	31.6	31.6	57.5	0.0	78.0	3.0	287	-60	0.5	-0.1
31.6	31.6	31.6	65.4	0.0	101.5	3.0	352	-79	0.6	-0.1
45.3	45.3	45.3	55.6	0.0	30.8	3.0	99	-7	0.2	-0.1
45.3	45.3	45.3	65.9	0.0	61.6	3.0	205	-28	0.2	-0.1
45.3	45.3	45.3	75.6	0.0	90.6	3.0	260	-49	0.3	-0.1
45.3	45.3	45.3	85.2	0.0	119.6	3.0	324	-67	0.4	-0.1
17.3	17.3	17.3	22.1	0.0	14.5	3.0	83	-7	0.0	0.3
17.3	17.3	17.3	27.0	0.0	29.0	3.0	181	-34	0.1	0.3
17.3	17.3	17.3	33.0	0.0	47.1	3.0	252	-56	0.1	0.3
17.3	17.3	17.3	37.8	0.0	61.6	3.0	313	-77	0.2	0.3

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory:	LNEC
Material:	Microgranite MIG
Specimen:	L_MIG_05

Specimen details

	Moisture content	Dry density
Aimed:	3.3%	3140 kg/m^3
Start of test:	3.4%	2138 kg/m^3
End of test:	3.3%	

Specimen size: 607 mm x 308 mm Static load included (y/n) n

Isotropic Loading Test 1

Date 27 Oct 1991

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*	*kPa*	*kPa*
1	96	51	0.7	0.1	7.4	50.3
2	117	64	0.9	0.2	7.4	50.3
3	126	73	1.1	0.2	7.4	50.3
4	124	82	1.2	0.2	7.4	50.3
5	122	90	1.3	0.3	7.4	50.3

Permanent Deformation Test

Date 28 Oct 1991

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*
20	50.3	50.3	50.3	93.8	0.0	130.5	3.0	242	-25	1.3	0.0
50	50.3	50.3	50.3	93.8	0.0	130.5	3.0	242	-26	1.5	0.0
100	50.3	50.3	50.3	93.8	0.0	130.5	3.0	286	-27	1.9	0.0
200	50.3	50.3	50.3	93.8	0.0	130.5	3.0	289	-30	2.0	0.0
400	50.3	50.3	50.3	93.8	0.0	130.5	3.0	305	-30	2.2	0.0
1000	50.3	50.3	50.3	93.8	0.0	130.5	3.0	325	-32	2.4	0.1
2500	50.3	50.3	50.3	94.4	0.0	132.3	3.0	348	-33	2.9	0.2
5000	50.3	50.3	50.3	94.4	0.0	132.3	3.0	361	-36	3.8	0.2
7500	50.3	50.3	50.3	95.6	0.0	136.0	3.0	374	-37	4.1	0.3
10000	50.3	50.3	50.3	95.6	0.0	136.0	3.0	384	-38	4.6	0.4
12500	50.3	50.3	50.3	93.8	0.0	130.5	3.0	372	-37	4.8	0.4
15000	51.4	51.4	51.4	94.9	0.0	130.5	3.0	371	-37	5.2	0.5
20000	52.2	52.2	52.2	95.7	0.0	130.5	3.0	315	-38	5.5	0.5

Isotropic Loading Test 2

Date *29 Oct 1991*

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10 -4*	*E3p x10 -4*	*kPa*	*kPa*
1	-489	36	-0.4	0.0	7.7	50.3
2	-490	36	-0.6	0.1	7.7	50.3
3	-486	37	-0.7	0.1	7.7	50.3
4	-507	37	-0.6	0.1	7.7	50.3
5	-469	36	-0.9	0.1	7.7	50.3

Resilient Deformation Test 1 (CCP)

Date *30 Oct 1991*

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r µE*	*E3r µE*	*E1p x10 -4*	*E3p x10 -4*
17.3	17.3	17.3	22.1	0.0	14.5	3.0	89	-17	0.4	0.2
17.3	17.3	17.3	27.6	0.0	30.8	3.0	181	-42	0.5	0.2
17.3	17.3	17.3	31.8	0.0	43.5	3.0	227	-61	0.7	0.2
17.3	17.3	17.3	37.2	0.0	59.8	3.0	302	-86	0.9	0.3
31.3	31.3	31.3	40.4	0.0	27.2	3.0	120	-15	0.1	0.0
31.3	31.3	31.3	48.2	0.0	50.8	3.0	207	-44	0.1	-0.1
31.3	31.3	31.3	56.7	0.0	76.1	3.0	287	-73	0.2	-0.1
31.4	31.4	31.4	64.1	0.0	97.9	3.0	348	-94	0.3	-0.1
45.3	45.3	45.3	55.0	0.0	29.0	3.0	105	-15	0.1	-0.1
45.3	45.3	45.3	65.9	0.0	61.6	3.0	211	-41	0.1	-0.1
45.3	45.3	45.3	75.6	0.0	90.6	3.0	276	-62	0.2	-0.1
45.3	45.3	45.3	85.2	0.0	119.6	3.0	335	-82	0.2	-0.1

Isotropic Loading Test 3

Date *30 Oct 1991*

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10 -4*	*E3p x10 -4*	*kPa*	*kPa*
1	57	36	0.2	0.0	7.4	50.3
2	62	38	0.3	0.0	7.4	50.3
3	83	35	0.5	0.1	7.4	50.3
4	56	35	0.4	0.1	7.4	50.3
5	73	36	0.4	0.1	7.4	50.3

Resilient Deformation Test 2 (VCP)

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10 $^{-4}$*	*E3p x10 $^{-4}$*

Isotropic Loading Test 4

Date

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r με*	*E3r με*	*E1p x10 $^{-4}$*	*E3p x10 $^{-4}$*	*kPa*	*kPa*

Resilient Deformation Test (Extra)

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10 $^{-4}$*	*E3p x10 $^{-4}$*
17.3	17.3	17.3	22.1	0.0	14.5	3.0	92	-3	0.2	0.2
17.3	17.3	17.3	27.0	0.0	29.0	3.0	167	-38	0.3	0.2
17.3	17.3	17.3	30.6	0.0	39.9	3.0	227	-60	0.3	0.2
17.3	17.3	17.3	37.8	0.0	61.6	3.0	292	-86	0.4	0.3

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory: LNEC
Material: Microgranite MIG
Specimen: L_MIG_06

Specimen details

	Moisture content	Dry density
Aimed:	3.3%	2140 kg/m^3
Start of test:	3.4%	2128 kg/m^3
End of test:	3.0%	

Specimen size: 607 mm x 308 mm Static load included (y/n) n

Isotropic Loading Test 1

Date 25 Nov 1991

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*	*kPa*	*kPa*
1	38	68	-0.1	0.0	7.5	50.3
2	51	69	-0.1	0.1	7.5	50.3
3	46	66	-0.2	0.1	7.5	50.3
4	52	71	-0.1	0.1	7.5	50.3
5	47	65	-0.1	0.2	7.5	50.3

Permanent Deformation Test

Date 26 Nov 1991

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*
20	50.0	50.0	50.0	86.3	0.0	108.8	3.0	242	-42	1.0	-0.1
50	50.0	50.0	50.0	92.3	0.0	126.9	3.0	258	-46	1.3	0.0
100	50.0	50.0	50.0	92.9	0.0	128.7	3.0	290	-49	1.3	0.0
200	50.0	50.0	50.0	93.5	0.0	130.5	3.0	299	-51	1.4	0.0
400	50.0	50.0	50.0	93.5	0.0	130.5	3.0	300	-53	1.5	0.0
1000	50.0	50.0	50.0	95.3	0.0	136.0	3.0	327	-59	1.6	0.1
2500	50.0	50.0	50.0	94.1	0.0	132.3	3.0	337	-62	2.1	0.3
5000	50.0	50.0	50.0	93.5	0.0	130.5	3.0	358	-65	2.5	0.4
7500	50.0	50.0	50.0	94.1	0.0	132.3	3.0	371	-70	2.7	0.4
10000	50.0	50.0	50.0	92.9	0.0	128.7	3.0	376	-65	2.7	0.5
12500	50.0	50.0	50.0	92.9	0.0	128.7	3.0	374	-69	3.0	0.6
15000	50.0	50.0	50.0	94.7	0.0	134.1	3.0	387	-72	3.2	0.7
20000	50.0	50.0	50.0	93.5	0.0	130.5	3.0	392	-72	3.5	0.7

Isotropic Loading Test 2

Date *27 Nov 1991*

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r με*	*E3r με*	*E1p x10 -4*	*E3p x10 -4*	*kPa*	*kPa*
1	105	67	-0.4	0.4	7.6	49.7
2	105	69	-0.6	0.5	7.6	49.7
3	97	62	-0.6	0.5	7.6	49.7
4	95	67	-0.7	0.5	7.6	49.7
5	72	61	-0.6	0.6	7.6	49.7

Resilient Deformation Test 1 (CCP)

Date *28 Sept 1991*

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10 -4*	*E3p x10 -4*
17.2	17.2	17.2	22.1	0.0	14.5	3.0	75	-4	0.7	0.1
17.2	17.2	17.2	28.1	0.0	32.6	3.0	224	-37	0.6	0.1
17.2	17.2	17.2	31.7	0.0	43.5	3.0	266	-49	0.7	0.1
17.2	17.2	17.2	39.0	0.0	65.3	3.0	358	-72	0.9	0.2
31.7	31.7	31.7	40.2	0.0	25.4	3.0	103	-5	0.1	-0.1
31.7	31.7	31.7	47.4	0.0	47.1	3.0	230	-30	0.0	-0.1
31.7	31.7	31.7	55.9	0.0	72.5	3.0	305	-51	0.1	-0.1
31.7	31.7	31.7	63.2	0.0	94.3	3.0	371	-65	0.1	-0.1
45.0	45.0	45.0	54.7	0.0	29.0	3.0	113	-5	0.2	-0.1
45.0	45.0	45.0	65.6	0.0	61.6	3.0	221	-27	0.2	-0.1
45.0	45.0	45.0	74.6	0.0	88.8	3.0	298	-44	0.2	-0.1
45.0	45.0	45.0	83.7	0.0	116.0	3.0	359	-60	0.1	-0.1

Isotropic Loading Test 3

Date *27 Nov 1991*

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r με*	*E3r με*	*E1p x10 -4*	*E3p x10 -4*	*kPa*	*kPa*
1	116	61	-0.2	0.1	7.6	49.7
2	115	64	-0.3	0.1	7.6	49.7
3	100	59	-0.2	0.1	7.6	49.7
4	105	61	-0.3	0.2	7.6	49.7
5	101	59	-0.3	0.2	7.6	49.7

Resilient Deformation Test 2 (VCP)

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10 $^{-4}$*	*E3p x10 $^{-4}$*

Isotropic Loading Test 4

Date

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r με*	*E3r με*	*E1p x10 $^{-4}$*	*E3p x10 $^{-4}$*	*kPa*	*kPa*

Resilient Deformation Test (Extra)

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r µE*	*E3r µE*	*E1p x10 $^{-4}$*	*E3p x10 $^{-4}$*
17.1	17.1	17.1	21.9	0.0	14.5	3.0	70	-1	0.3	0.2
17.1	17.1	17.1	26.7	0.0	29.0	3.0	201	-29	0.3	0.3
17.1	17.1	17.1	31.6	0.0	43.5	3.0	260	-46	0.4	0.3
17.1	17.1	17.1	37.6	0.0	61.6	3.0	339	-67	0.5	0.3
17.3	17.3	17.3	22.1	0.0	14.5	3.0	91	-4	0.3	0.0
17.3	17.3	17.3	27.0	0.0	29.0	3.0	186	-24	0.3	0.0
17.3	17.3	17.3	31.8	0.0	43.5	3.0	246	-42	0.3	0.0
17.3	17.3	17.3	40.3	0.0	68.9	3.0	335	-67	0.4	0.1

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory:	UNott
Material:	Microgranite (MIG)
Specimen:	Sample No. 1

Specimen details

	Moisture content	Dry density
Aimed:	3.3%	2140 kg/m^3
Start of test:	3.5%	2080 kg/m^3
End of test:		

Specimen size: 150 mm x 75 mm Static load included (y/n) n

Isotropic Loading Test 1

Date 25 October 1991

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*	*kPa*	*kPa*
1	-3149	2364	-6.4	3.7	0.0	50.0
2	-2635	2120	-1.0	1.2	0.0	50.0
3	-2555	2103	0.1	-0.3	0.0	50.0
4	-2274	1987	0.1	0.2	0.0	50.0
5	-2527	2297	3.2	-3.3	0.0	50.0

Permanent Deformation Test

Date

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*
20	47.5	50.0	50.0	93.6	7.5	130.9	2.8	593	-182	0.7	-0.1
50	48.7	50.0	50.0	93.4	3.9	130.2	2.9	630	-205	1.1	-0.2
100	48.7	50.0	50.0	92.6	3.9	127.7	2.9	627	-193	2.0	-0.2
200	48.2	50.0	50.0	93.0	5.5	129.0	2.9	627	-199	2.8	-0.2
400	48.8	50.0	50.0	93.0	3.5	129.0	2.9	634	-189	3.6	-0.2
1000	48.8	50.0	50.0	93.0	3.5	129.0	2.9	634	-190	4.8	-0.3
2500	48.8	50.0	50.0	93.1	3.5	129.4	2.9	630	-203	6.0	-0.6
5000	49.3	50.0	50.0	93.8	2.2	131.4	2.9	616	-204	7.2	-0.8
7500	49.0	50.0	50.0	93.1	3.0	129.4	2.9	620	-202	7.7	-0.7
10000	49.4	50.0	50.0	92.4	1.8	127.3	3.0	641	-181	7.8	-0.6
12500	49.3	50.0	50.0	92.6	2.2	127.7	2.9	657	-197	8.4	-0.6
15000	49.1	50.0	50.0	92.6	2.6	127.7	2.9	654	-193	8.4	-0.5
20000	48.7	50.0	50.0	93.0	3.9	129.0	2.9	661	-198	8.9	-0.7

Isotropic Loading Test 2

Cycles	Resilient Strain		Permanent Strain		s31 =p1	s32 =p2
N	E1r µE	E3r µE	E1p x10 $^{-4}$	E3p x10 $^{-4}$	kPa	kPa
1	-1930	2002	0.7	0.0	0.0	50.0
2	-1901	1938	0.0	-0.2	0.0	50.0
3	-1853	1898	0.4	0.2	0.0	50.0
4	-1477	1808	-3.8	0.0	0.0	50.0
5	-1875	1906	0.2	0.2	0.0	50.0

Resilient Deformation Test 1 (CCP)

Date

Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain	
s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r µE	E3r µE	E1p x10 $^{-4}$	E3p x10 $^{-4}$
16.4	16.0	16.0	20.6	-1.1	13.8	3.2	87	-47	-1.0	-0.3
16.5	16.0	16.0	24.7	-1.5	26.2	3.2	260	-73	0.7	0.5
15.8	16.0	16.0	30.1	0.6	42.3	3.0	347	-120	0.7	0.2
14.8	16.0	16.0	34.3	3.5	55.0	2.8	360	-133	0.9	0.7
29.7	31.0	31.0	40.5	4.0	28.6	2.6	173	-40	-0.3	-0.2
29.7	31.0	31.0	48.8	4.0	53.4	2.8	327	-90	-0.1	-0.1
30.7	31.0	31.0	56.0	1.0	74.9	3.0	453	-127	-0.3	0.0
30.0	31.0	31.0	65.0	3.0	102.0	2.9	560	-170	0.1	-0.2
44.7	46.0	46.0	56.3	4.0	31.0	2.6	147	-30	0.0	0.1
44.7	46.0	46.0	65.7	4.0	59.0	2.8	293	-67	-0.2	-0.1
46.0	46.0	46.0	74.0	0.0	84.0	3.0	440	-123	-0.7	-0.3
46.0	46.0	46.0	82.3	0.0	109.0	3.0	527	-123	-0.3	-0.1

Isotropic Loading Test 3

Cycles	Resilient Strain		Permanent Strain		s31 =p1	s32 =p2
N	E1r µE	E3r µE	E1p x10 $^{-4}$	E3p x10 $^{-4}$	kPa	kPa
1	-2010	1939	-0.8	3.8	0.0	50.0
2	-1930	1830	-0.2	0.5	0.0	50.0
3	-1683	1823	1.9	0.1	0.0	50.0
4	-1598	1788	0.2	0.0	0.0	50.0
5	-1606	1787	0.1	0.0	0.0	50.0

Resilient Deformation Test 2 (VCP)

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 -4*	*x10 -4*
14.3	34.0	17.0	54.0	8.0	60.0	1.4	253	147	-2.6	-1.2
17.3	54.3	17.0	93.0	-1.0	116.0	1.5	550	213	-1.3	-1.4
15.0	70.0	17.0	131.0	6.0	183.0	1.6	547	330	-0.2	-1.3
30.7	47.0	32.0	68.0	4.0	63.0	1.6	360	73	-0.9	-0.4
30.0	64.3	31.0	104.0	3.0	119.0	1.6	627	123	-0.2	-0.3
29.0	83.3	30.0	143.0	3.0	179.0	1.6	773	197	-0.5	-0.7
47.0	64.3	47.0	83.0	0.0	56.0	1.6	287	67	0.3	-0.5
44.7	82.7	46.0	122.0	4.0	118.0	1.5	533	103	-0.6	-0.1
44.2	100.7	46.0	160.0	5.5	178.0	1.5	673	158	-1.4	-0.8

Isotropic Loading Test 4

Date

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r*	*E3r*	*E1p*	*E3p*		
	µE	*µE*	*x10 -4*	*x10 -4*	*kPa*	*kPa*
1	-1626	1502	0.5	0.0	0.0	50.0
2	-1892	1953	3.5	-0.2	0.0	50.0
3	-1679	1727	-1.8	0.2	0.0	50.0
4	-2012	2229	3.2	0.0	0.0	50.0
5	-2062	2003	0.5	0.2	0.0	50.0

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory:	UNott
Material:	Microgranite (MIG)
Specimen:	Sample No. 2

Specimen details

	Moisture content	Dry density
Aimed:	3.3%	2140 kg/m^3
Start of test:	3.5%	1997 kg/m^3
End of test:		

Specimen size: 150 mm x 75 mm Static load included (y/n) n

Isotropic Loading Test 1

Date 14 November 1991

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*	*kPa*	*kPa*
1	-54	98	0.0	0.0	0.0	50.0
2	-204	2677	0.8	0.3	0.0	50.0
3	-286	2579	0.2	-0.1	0.0	50.0
4	-252	2561	0.3	-0.2	0.0	50.0
5	-299	2577	0.0	0.0	0.0	50.0

Permanent Deformation Test

Date

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*
20	48.3	49.6	49.6	92.8	4.0	129.5	2.9	443	-211	11.2	-3.1
50	48.1	49.4	49.4	93.9	4.0	133.6	2.9	481	-220	14.2	-3.2
100	47.9	49.2	49.2	94.2	4.0	134.9	2.9	490	-224	16.5	-3.5
200	47.9	49.2	49.2	94.3	4.0	135.3	2.9	490	-220	18.8	-3.9
400	48.5	49.8	49.8	94.5	4.0	134.0	2.9	498	-224	20.8	-4.3
1000	48.1	49.4	49.4	93.8	4.0	133.2	2.9	490	-224	23.4	-4.8
2500	49.1	50.4	50.4	93.6	4.0	129.5	2.9	466	-203	25.9	-5.3
5000	49.3	50.6	50.6	93.6	4.0	129.1	2.9	490	-203	27.4	-5.7
7500	49.3	50.6	50.6	95.7	4.0	135.3	2.9	521	-216	28.1	-5.8
10000	50.1	51.4	51.4	95.5	4.0	132.4	2.9	567	-245	27.7	-4.9
12500	49.3	50.6	50.6	95.1	4.0	133.6	2.9	544	-233	28.7	-5.1
15000	49.5	50.8	50.8	94.7	4.0	131.6	2.9	544	-233	29.1	-5.0
20000	49.1	50.4	50.4	94.9	4.0	133.6	2.9	568	-254	29.9	-4.9

Isotropic Loading Test 2

Cycles N	Resilient Strain		Permanent Strain		s31 =p1	s32 =p2
	E1r µE	E3r µE	E1p x10^{-4}	E3p x10^{-4}	kPa	kPa
1	19	2443	0.8	-1.7	0.0	50.0
2	-7	2471	-0.2	0.0	0.0	50.0
3	-4	2455	0.0	-0.2	0.0	50.0
4	-3	2438	0.6	-0.9	0.0	50.0
5	-73	2540	0.1	-0.3	0.0	50.0

Resilient Deformation Test 1 (CCP)

Date

Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain	
s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r µE	E3r µE	E1p x10^{-4}	E3p x10^{-4}
13.7	15.0	15.0	21.6	4.0	19.7	2.4	54	-30	6.6	-4.0
13.7	15.0	15.0	25.0	4.0	30.0	2.6	93	-55	7.7	-4.9
13.5	14.8	14.8	29.8	4.0	44.9	2.7	158	-80	8.0	-5.2
13.5	14.8	14.8	32.2	4.0	52.3	2.8	196	-110	8.4	-5.6
29.7	31.0	31.0	39.9	4.0	26.7	2.6	69	-17	0.4	0.2
29.1	30.4	30.4	46.7	4.0	49.0	2.8	154	-63	0.1	1.2
29.1	30.4	30.4	54.8	4.0	73.3	2.8	251	-119	-0.1	2.0
28.9	30.2	30.2	63.6	4.0	100.2	2.9	339	-165	0.4	2.5
43.8	45.1	45.1	56.6	4.0	34.5	2.7	96	-34	0.7	0.2
44.0	45.3	45.3	64.7	4.0	58.1	2.8	197	-72	0.7	0.2
43.8	45.1	45.1	74.5	4.0	88.2	2.9	289	-118	1.5	1.3
43.8	45.1	45.1	84.0	4.0	116.7	2.9	366	-152	3.2	1.7

Isotropic Loading Test 3

Cycles N	Resilient Strain		Permanent Strain		s31 =p1	s32 =p2
	E1r µE	E3r µE	E1p x10^{-4}	E3p x10^{-4}	kPa	kPa
1	-2010	1939	-0.8	3.8	0.0	50.0
2	-1930	1830	-0.2	0.5	0.0	50.0
3	-1683	1823	1.9	0.1	0.0	50.0
4	-1598	1788	0.2	0.0	0.0	50.0
5	-1606	1787	0.1	0.0	0.0	50.0

Resilient Deformation Test 2 (VCP)

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10 $^{-4}$*	*E3p x10 $^{-4}$*
14.3	34.0	17.0	54.0	8.0	60.0	1.4	253	147	-2.6	-1.2
17.3	54.3	17.0	93.0	-1.0	116.0	1.5	550	213	-1.3	-1.4
15.0	70.0	17.0	131.0	6.0	183.0	1.6	547	330	-0.2	-1.3
30.7	47.0	32.0	68.0	4.0	63.0	1.6	360	73	-0.9	-0.4
30.0	64.3	31.0	104.0	3.0	119.0	1.6	627	123	-0.2	-0.3
29.0	83.3	30.0	143.0	3.0	179.0	1.6	773	197	-0.5	-0.7
47.0	64.3	47.0	83.0	0.0	56.0	1.6	287	67	0.3	-0.5
44.7	82.7	46.0	122.0	4.0	118.0	1.5	533	103	-0.6	-0.1
44.2	100.7	46.0	160.0	5.5	178.0	1.5	673	158	-1.4	-0.8

Isotropic Loading Test 4

Date

Cycles N	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
	E1r με	*E3r με*	*E1p x10 $^{-4}$*	*E3p x10 $^{-4}$*	*kPa*	*kPa*
1	#####	#####	0.5	0.0	0.0	50.0
2	#####	#####	3.5	-0.2	0.0	50.0
3	#####	#####	-1.8	0.2	0.0	50.0
4	#####	#####	3.2	0.0	0.0	50.0
5	#####	#####	0.5	0.2	0.0	50.0

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory: UNott
Material: Microgranite (MIG)
Specimen: Sample No. 3

Specimen details

	Moisture content	Dry density
Aimed:	3.3%	2140 kg/m^3
Start of test:	3.5%	2020 kg/m^3
End of test:		

Specimen size: 150 mm x 75 mm Static load included (y/n) n

Isotropic Loading Test 1

Date *Sample No. 3*

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*	*kPa*	*kPa*
1	206	1818	-0.1	-0.9	0.0	50.0
2	187	1851	-0.1	-0.1	0.0	50.0
3	160	1842	-0.1	-0.1	0.0	50.0
4	147	1838	-0.3	0.0	0.0	50.0
5	147	1822	-0.1	0.0	0.0	50.0

Permanent Deformation Test

Date

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*
20	48.7	50.0	50.0	91.1	4.0	123.3	2.9	434	-218	5.7	-1.5
50	48.7	50.0	50.0	92.3	4.0	127.0	2.9	457	-224	7.7	-1.8
100	48.7	50.0	50.0	93.2	4.0	129.5	2.9	480	-229	9.0	-2.1
200	48.7	50.0	50.0	93.2	4.0	129.5	2.9	480	-246	10.6	-2.4
400	48.7	50.0	50.0	93.9	4.0	131.6	2.9	495	-243	12.2	-2.8
1000	48.7	50.0	50.0	93.4	4.0	130.3	2.9	488	-243	14.7	-3.2
2500	48.7	50.0	50.0	93.0	4.0	129.1	2.9	465	-229	17.0	-3.5
5000	48.7	50.0	50.0	93.7	4.0	131.1	2.9	465	-224	18.5	-3.5
7500	48.7	50.0	50.0	93.4	4.0	130.3	2.9	465	-218	19.4	-3.8
10000	48.7	50.0	50.0	93.6	4.0	130.7	2.9	457	-218	20.1	-3.6
12500	48.7	50.0	50.0	93.3	4.0	129.9	2.9	450	-222	20.6	-3.6
15000	48.7	50.0	50.0	93.0	4.0	129.1	2.9	450	-216	20.9	-3.6
20000	48.7	50.0	50.0	93.2	4.0	129.5	2.9	450	-218	21.5	-3.4

Isotropic Loading Test 2

Cycles N	Resilient Strain		Permanent Strain		s31 =p1	s32 =p2
	E1r µE	E3r µE	E1p x10^{-4}	E3p x10^{-4}	kPa	kPa
1	220	1722	-0.1	0.3	0.0	50.0
2	220	1735	-0.1	-0.2	0.0	50.0
3	233	1722	0.1	0.0	0.0	50.0
4	220	1730	-0.1	-0.1	0.0	50.0
5	227	1717	-0.1	0.1	0.0	50.0

Resilient Deformation Test 1 (CCP)

Date

Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain	
s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r µE	E3r µE	E1p x10^{-4}	E3p x10^{-4}
14.0	15.3	15.3	22.4	4.0	21.3	2.4	98	-47	5.1	-2.5
14.1	15.4	15.4	26.4	4.0	32.9	2.6	163	-72	5.8	-3.0
14.1	15.4	15.4	30.8	4.0	46.1	2.7	234	-119	6.4	-3.4
14.1	15.4	15.4	36.0	4.0	61.8	2.8	306	-174	7.1	-3.9
28.9	30.2	30.2	39.9	4.0	29.1	2.6	117	-55	2.0	-0.5
29.1	30.4	30.4	48.0	4.0	52.7	2.8	219	-102	2.2	-0.6
28.5	29.8	29.8	55.6	4.0	77.5	2.8	348	-165	1.9	-0.4
28.3	29.6	29.6	62.9	4.0	99.8	2.9	484	-237	1.5	0.0
44.6	45.9	45.9	56.9	4.0	32.9	2.6	110	-34	3.3	-1.0
44.2	45.5	45.5	66.2	4.0	62.2	2.8	231	-93	3.5	-1.1
44.8	46.1	46.1	76.6	4.0	91.5	2.9	352	-144	3.3	-0.8
44.8	46.1	46.1	84.6	4.0	115.4	2.9	404	-186	4.0	-0.1

Isotropic Loading Test 3

Cycles N	Resilient Strain		Permanent Strain		s31 =p1	s32 =p2
	E1r µE	E3r µE	E1p x10^{-4}	E3p x10^{-4}	kPa	kPa
1	160	1598	-0.1	-0.6	0.0	50.0
2	173	1648	0.0	0.0	0.0	50.0
3	153	1650	0.0	0.0	0.0	50.0
4	167	1641	0.0	0.0	0.0	50.0
5	153	1644	0.0	0.0	0.0	50.0

Resilient Deformation Test 2 (VCP)

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r µE*	*E3r µE*	*E1p x10 $^{-4}$*	*E3p x10 $^{-4}$*

Isotropic Loading Test 4

Date

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10 $^{-4}$*	*E3p x10 $^{-4}$*	*kPa*	*kPa*

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory:	LRSB
Material:	Microgranite (MIG)
Specimen:	1-304-1A

Specimen details

	Moisture content	Dry density
Aimed:	3.3%	2140 kg/m^3
Start of test:	3.4%	2142 kg/m^3
End of test:		

Specimen size: 320 mm x 160 mm Static load included (y/n) n

Isotropic Loading Test 1

Date 8 November 1991

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r μE*	*E3r μE*	*E1p x10^{-4}*	*E3p x10^{-4}*	*kPa*	*kPa*
1	150	805	1.5	1.5	0.0	50.0
2	178	701	1.5	1.4	0.0	50.0
3	130	651	0.8	2.4	0.0	50.0
4	190	565	2.1	1.8	0.0	50.0
5	150	528	1.6	1.6	0.0	50.0

Permanent Deformation Test

Date

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r μE*	*E3r μE*	*E1p x10^{-4}*	*E3p x10^{-4}*
20	49.7	50.0	50.0	93.5	1.0	130.6	3.0	448	-151	17.4	-6.4
50	49.7	50.0	50.0	93.0	1.0	129.0	3.0	428	-142	19.7	-6.6
100	49.7	50.0	50.0	93.0	1.0	129.0	3.0	405	-136	21.1	-6.9
200	49.3	50.0	50.0	93.0	2.0	129.0	3.0	386	-127	23.2	-7.2
400	49.4	50.1	50.1	93.1	2.0	129.0	3.0	360	-120	24.7	-7.6
1000	49.4	50.1	50.1	93.1	2.0	129.0	3.0	362	-113	26.8	-8.2
2500	49.5	50.2	50.2	93.2	2.0	129.0	3.0	372	-107	28.8	-9.0
5000	49.6	50.3	50.3	93.3	2.0	129.0	3.0	360	-103	30.2	-9.7
7500	49.7	50.4	50.4	93.4	2.0	129.0	3.0	363	-99	30.6	-10.1
10000	49.8	50.5	50.5	93.5	2.0	129.0	3.0	355	-98	31.3	-10.2
12500	49.8	50.5	50.5	93.5	2.0	129.0	3.0	349	-98	31.9	-10.4
20000	49.9	50.9	50.9	94.2	3.0	130.0	2.9	345	-97	32.6	-10.2

Isotropic Loading Test 2

Cycles N	Resilient Strain		Permanent Strain		s31 =p1	s32 =p2
	E1r µE	E3r µE	E1p x10^{-4}	E3p x10^{-4}	kPa	kPa
1	361	400	2.5	3.9	0.0	50.0
2	341	400	3.7	4.0	0.0	50.0
3	403	400	3.9	4.1	0.0	50.0
4	361	400	4.1	4.0	0.0	50.0
5	333	400	3.7	4.1	0.0	50.0

Resilient Deformation Test 1 (CCP)

Date

Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain	
s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r µE	E3r µE	E1p x10^{-4}	E3p x10^{-4}
14.8	15.2	15.2	20.4	1.1	15.6	2.8	79	-20	1.8	-2.8
14.8	15.3	15.3	25.6	1.4	31.0	2.9	213	-46	2.3	-2.8
14.6	15.2	15.2	30.2	1.8	45.0	2.9	276	-71	2.6	-2.7
14.5	15.3	15.3	35.3	2.1	60.0	2.9	306	-91	3.3	-2.6
30.4	30.9	30.9	39.2	1.3	25.0	2.8	83	-23	3.6	-3.6
29.6	30.0	30.0	46.6	1.0	50.0	2.9	190	-52	3.7	-3.7
29.2	29.9	29.9	54.9	2.0	75.0	2.9	294	-77	4.2	-3.7
29.3	30.0	30.0	63.6	2.0	101.0	2.9	364	-99	4.3	-3.8
44.7	45.1	45.1	55.1	1.0	30.0	2.9	88	-21	5.6	-4.4
44.5	45.1	45.1	65.1	1.6	60.0	2.9	214	-45	5.1	-4.4
44.4	45.1	45.1	75.1	2.1	90.0	2.9	257	-65	5.6	-4.5
44.3	45.2	45.2	85.5	2.4	121.0	2.9	316	-87	5.0	-4.6

Isotropic Loading Test 3

Cycles N	Resilient Strain		Permanent Strain		s31 =p1	s32 =p2
	E1r µE	E3r µE	E1p x10^{-4}	E3p x10^{-4}	kPa	kPa
1	321	426	4.1	4.8	0.0	50.0
2	391	413	2.9	4.3	0.0	50.0
3	333	400	3.4	4.1	0.0	50.0
4	333	400	3.2	4.1	0.0	50.0
5	343	400	3.4	4.1	0.0	50.0

Resilient Deformation Test 2 (VCP)

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*
15.3	25.0	16.0	45.0	2.0	60.0	2.0	343	-38	3.3	-2.6
15.0	95.0	16.0	135.0	3.0	120.0	1.0	503	-94	5.3	-3.6
15.7	135.7	17.0	196.0	4.0	181.0	1.0	662	-135	7.9	-4.9
29.3	69.7	30.0	90.0	2.0	61.0	1.0	290	-29	8.3	-6.3
30.3	109.7	31.0	150.0	2.0	121.0	1.0	421	-54	8.7	-6.5
30.7	151.0	32.0	211.0	4.0	180.0	1.0	558	-86	9.5	-7.0
44.3	84.7	45.0	105.0	2.0	61.0	1.0	219	-19	10.3	-7.8
45.0	124.7	46.0	165.0	3.0	121.0	1.0	383	-37	10.2	-8.0
45.7	166.0	47.0	226.0	4.0	180.0	1.0	494	-62	11.5	-8.3

Isotropic Loading Test 4

Date

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r*	*E3r*	*E1p*	*E3p*		
	µE	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
1	374.0	439.0	3.7	5.4	0.0	50.0
2	387.0	439.0	3.4	4.5	0.0	50.0
3	387.0	426.0	3.3	4.5	0.0	50.0
4	408.0	426.0	3.6	4.4	0.0	50.0
5	389.0	414.0	4.0	4.1	0.0	50.0

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory:	LRSB
Material:	Microgranite (MIG)
Specimen:	1-312-1A

Specimen details

	Moisture content	Dry density
Aimed:	3.3%	2140 kg/m^3
Start of test:	3.4%	2139 kg/m^3
End of test:		

Specimen size: 320 mm x 160 mm Static load included (y/n) n

Isotropic Loading Test 1

Date 18 November 1991

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*	*kPa*	*kPa*
1	97	540	5.7	17.4	0.0	50.0
2	78	463	1.5	6.3	0.0	50.0
3	125	425	0.8	5.1	0.0	50.0
4	140	400	2.1	4.8	0.0	50.0
5	164	400	1.6	4.4	0.0	50.0

Permanent Deformation Test

Date

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*
20	49.2	50.0	50.0	93.5	2.5	130.6	2.9	336	-165	23.3	-4.2
50	49.4	50.0	50.0	93.7	1.7	131.0	3.0	395	-178	25.4	-4.7
100	49.3	50.0	50.0	93.7	2.0	131.0	3.0	368	-173	28.0	-5.0
200	49.2	50.0	50.0	93.6	2.4	130.7	2.9	373	-164	29.4	-5.4
400	49.0	50.1	50.1	93.7	3.2	130.7	2.9	324	-156	31.7	-5.8
1000	49.0	50.1	50.1	93.6	3.4	130.6	2.9	347	-149	34.0	-6.3
2500	49.1	50.2	50.2	93.8	3.4	130.8	2.9	353	-143	36.1	-7.0
5000	49.1	50.3	50.3	94.0	3.5	131.0	2.9	379	-141	37.3	-7.5
7500	49.2	50.4	50.4	94.0	3.6	130.9	2.9	390	-138	37.2	-7.9
10000	49.4	50.5	50.5	94.1	3.4	130.7	2.9	372	-137	37.6	-8.2
12500	49.3	50.5	50.5	94.2	3.7	131.1	2.9	380	-136	37.7	-8.4
20000	49.7	50.9	50.9	94.6	3.6	131.2	2.9	378	-135	38.6	-8.8

Isotropic Loading Test 2

Cycles N	Resilient Strain		Permanent Strain		s31 =p1	s32 =p2
	E1r µE	E3r µE	E1p x10^{-4}	E3p x10^{-4}	kPa	kPa
1	181	439	1.8	4.6	0.0	50.0
2	227	426	1.5	4.4	0.0	50.0
3	156	426	1.9	4.3	0.0	50.0
4	223	414	2.0	4.3	0.0	50.0
5	151	414	1.9	4.1	0.0	50.0

Resilient Deformation Test 1 (CCP)

Date

Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain	
s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r µE	E3r µE	E1p x10^{-4}	E3p x10^{-4}
14.8	15.2	15.2	20.4	1.1	15.6	2.8	59	-25	1.8	-2.9
14.8	15.3	15.3	25.2	1.4	29.8	2.9	161	-60	2.0	-3.1
14.6	15.2	15.2	30.4	1.8	45.6	2.9	258	-94	2.4	-3.1
14.5	15.3	15.3	35.4	2.1	60.5	2.9	297	-118	3.2	-3.1
30.4	30.9	30.9	39.2	1.3	25.0	2.8	76	-31	3.8	-4.2
29.4	30.0	30.0	46.5	1.6	49.6	2.9	207	-72	4.2	-4.3
29.3	29.9	29.9	55.0	1.8	75.3	2.9	287	-106	4.5	-4.4
29.1	30.0	30.0	63.5	2.6	100.7	2.9	355	-132	4.9	-4.4
44.6	45.1	45.1	55.0	1.4	29.7	2.9	104	-27	5.1	-5.1
44.5	45.1	45.1	65.0	1.6	59.9	2.9	204	-64	4.8	-5.2
44.4	45.1	45.1	75.2	2.1	90.4	2.9	252	-93	5.0	-5.3
44.3	45.2	45.2	85.3	2.4	120.3	2.9	329	-116	5.7	-5.4

Isotropic Loading Test 3

Cycles N	Resilient Strain		Permanent Strain		s31 =p1	s32 =p2
	E1r µE	E3r µE	E1p x10^{-4}	E3p x10^{-4}	kPa	kPa
1	229	413	1.8	4.3	0.0	50.0
2	201	401	1.9	4.1	0.0	50.0
3	165	414	1.6	4.1	0.0	50.0
4	256	414	2.1	4.1	0.0	50.0
5	186	414	2.4	4.1	0.0	50.0

Resilient Deformation Test 2 (VCP)

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*
kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*
15.5	55.3	16.3	75.4	2.4	60.4	1.0	347	-29	2.7	-4.4
15.4	94.8	16.2	118.4	2.2	70.8	0.7	407	-108	3.9	-5.1
15.2	134.8	17.8	194.7	7.8	179.7	1.0	547	-146	7.9	-6.2
29.2	69.5	30.3	89.4	3.4	59.7	1.0	257	-22	7.5	-7.8
31.0	100.3	32.6	140.8	4.8	121.5	1.1	400	-32	8.0	-7.9
30.3	149.7	32.5	210.3	6.4	181.8	1.0	564	-77	8.9	-8.3
44.9	85.4	45.7	105.8	2.4	61.3	1.0	220	1	8.9	-9.5
46.0	124.5	47.6	165.0	4.8	121.3	1.0	389	-17	9.4	-9.7
45.4	165.0	47.5	225.4	6.3	181.1	1.0	530	-47	10.3	-10.2

Isotropic Loading Test 4

Date

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r*	*E3r*	*E1p*	*E3p*		
	µE	*µE*	*x10 $^{-4}$*	*x10 $^{-4}$*	*kPa*	*kPa*
1	362.0	439.0	3.4	5.0	0.0	50.0
2	372.0	439.0	3.5	4.6	0.0	50.0
3	255.0	439.0	2.5	4.5	0.0	50.0
4	332.0	439.0	2.6	4.4	0.0	50.0
5	327.0	427.0	3.3	4.4	0.0	50.0

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory:	LRSB
Material:	Microgranite (MIG)
Specimen:	Sample No. 1-323-1A

Specimen details

	Moisture content	Dry density
Aimed:	3.3%	2130 kg/m^3
Start of test:	3.4%	2141 kg/m^3
End of test:		

Specimen size: 320 mm x 160 mm Static load included (y/n) n

Isotropic Loading Test 1

Date 25 November 1991

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*	*kPa*	*kPa*
1	195	953	4.1	22.3	0.0	50.0
2	140	777	2.6	10.7	0.0	50.0
3	100	677	1.9	8.8	0.0	50.0
4	164	614	1.8	7.3	0.0	50.0
5	153	589	1.7	6.6	0.0	50.0

Permanent Deformation Test

Date

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*
20	49.5	50.0	50.0	93.8	1.5	131.3	3.0	572	-283	22.0	-6.6
50	49.4	50.0	50.0	93.8	1.8	131.3	3.0	560	-279	24.3	-7.4
100	49.3	50.0	50.0	93.8	2.0	131.3	3.0	531	-269	26.8	-7.9
200	49.3	50.1	50.1	93.8	2.5	131.1	2.9	516	-256	29.0	-8.5
400	48.9	50.0	50.0	93.6	3.4	130.7	2.9	498	-241	31.5	-9.2
1000	48.9	50.1	50.1	93.8	3.6	131.0	2.9	482	-224	34.0	-10.2
2500	48.9	50.1	50.1	93.8	3.5	131.2	2.9	461	-207	36.2	-11.4
5000	48.8	50.1	50.1	93.9	3.8	131.5	2.9	462	-196	37.2	-12.3
7500	48.8	50.2	50.2	94.1	4.2	131.7	2.9	467	-189	38.0	-12.7
10000	48.9	50.3	50.3	94.2	4.2	131.8	2.9	461	-185	38.6	-13.0
12500	48.9	50.3	50.3	94.2	4.1	131.7	2.9	458	-180	39.1	-13.2
20000	49.3	50.6	50.6	94.5	4.0	131.7	2.9	452	-176	40.2	-13.9

Isotropic Loading Test 2

Cycles N	Resilient Strain		Permanent Strain		s31 =p1	s32 =p2
	E1r µE	E3r µE	E1p x10^{-4}	E3p x10^{-4}	kPa	kPa
1	438	527	3.9	5.9	0.0	50.0
2	311	514	3.7	5.3	0.0	50.0
3	405	514	3.8	5.3	0.0	50.0
4	303	502	3.9	5.2	0.0	50.0
5	379	502	3.0	5.2	0.0	50.0

Resilient Deformation Test 1 (CCP)

Date

Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain	
s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r µE	E3r µE	E1p x10^{-4}	E3p x10^{-4}
14.7	15.1	15.1	19.8	1.3	14.2	2.7	68	-31	2.8	-3.4
14.6	15.1	15.1	25.3	1.6	30.4	2.8	242	-88	2.8	-3.4
14.5	15.1	15.1	30.3	2.0	45.5	2.9	334	-133	3.3	-3.3
14.4	15.1	15.1	35.3	2.3	60.6	2.9	386	-166	4.3	-3.1
29.6	30.1	30.1	38.5	1.6	25.2	2.8	121	-40	4.7	-4.2
29.5	30.2	30.2	46.9	2.0	50.2	2.9	242	-95	4.9	-4.4
29.4	30.1	30.1	55.1	2.1	75.0	2.9	352	-141	5.3	-4.4
29.2	30.0	30.0	63.6	2.6	100.6	2.9	402	-180	5.5	-4.4
44.5	45.1	45.1	55.1	1.8	29.9	2.8	121	-35	5.9	-5.1
44.4	45.0	45.0	65.0	1.8	60.1	2.9	228	-80	5.9	-5.2
14.4	15.1	15.1	45.2	2.1	90.3	2.9	320	-121	6.1	-5.3
44.1	45.0	45.0	85.3	2.6	120.9	2.9	379	-158	6.5	-5.3

Isotropic Loading Test 3

Cycles N	Resilient Strain		Permanent Strain		s31 =p1	s32 =p2
	E1r µE	E3r µE	E1p x10^{-4}	E3p x10^{-4}	kPa	kPa
1	389	540	3.6	6.3	0.0	50.0
2	322	515	2.8	5.4	0.0	50.0
3	338	515	4.2	5.3	0.0	50.0
4	382	502	3.3	5.2	0.0	50.0
5	282	490	3.7	5.0	0.0	50.0

Resilient Deformation Test 2 (VCP)

Date

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 *kPa*	*s32* *kPa*	*p1* *kPa*	*p2* *kPa*	*q1* *kPa*	*q2* *kPa*	*qr/pr*	*E1r* *µE*	*E3r* *µE*	*E1p* *x10 -4*	*E3p* *x10 -4*
15.3	54.8	16.1	74.8	2.3	60.0	1.0	393	-22	3.4	-4.8
15.4	95.1	16.5	135.5	3.3	121.2	1.0	539	-68	5.1	-5.3
15.4	135.3	17.5	195.8	6.5	181.5	1.0	643	-119	8.1	-5.9
29.6	69.4	31.0	89.5	4.3	60.4	1.0	328	-13	7.8	-7.5
30.2	109.7	31.7	150.2	4.5	121.2	1.0	491	-28	8.4	-7.7
30.2	150.6	32.2	211.2	5.8	181.9	1.0	607	-54	9.6	-8.0
44.5	85.5	45.8	105.6	3.8	60.4	0.9	245	-4	10.1	-9.1
45.8	124.7	47.2	165.1	4.1	121.1	1.0	419	-12	9.8	-9.2
45.0	165.4	47.0	226.0	6.0	182.0	1.0	530	-30	10.9	-9.5

Isotropic Loading Test 4

Date

Cycles *N*	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
	E1r *µE*	*E3r* *µE*	*E1p* *x10 -4*	*E3p* *x10 -4*	*kPa*	*kPa*
1	432.0	515.0	3.6	5.5	0.0	50.0
2	382.0	515.0	4.1	5.3	0.0	50.0
3	320.0	503.0	3.3	5.2	0.0	50.0
4	322.0	490.0	4.0	5.0	0.0	50.0
5	337.0	490.0	3.5	4.9	0.0	50.0

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory:	DUT
Material:	Microgranite (MIG)
Specimen:	Specimen 1

Specimen details

	Moisture content	Dry density
Aimed:	3.3%	2140 kg/m^3
Start of test:	3.6%	2070 kg/m^3
End of test:	1.9%	

Specimen size: 800 mm x 400 mm Static load included (y/n) n

Isotropic Loading Test 1

Date 8-7-1992

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r*	*E3r*	*E1p*	*E3p*		
	µE	*µE*	*x10^{-4}*	*x10^{-4}*	*kPa*	*kPa*
1	260	203	-0.2	0.1	3.0	50.0
2	250	216	0.1	-0.1	3.0	50.0
3	236	194	0.0	0.0	3.0	50.0
4	211	189	0.2	0.2	3.0	50.0
5	224	181	-0.2	-0.1	3.0	50.0

Permanent Deformation Test

Date 10-7-1992

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31*	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*
	kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*µE*	*µE*	*x10^{-4}*	*x10^{-4}*
20	50.0	50.0	53.8	97.2	11.5	141.5	3.0	417	-113	2.2	-0.8
50	50.0	50.0	53.8	97.2	11.5	141.5	3.0	426	-113	0.4	-0.1
100	50.0	50.0	53.8	97.2	11.5	141.5	3.0	407	-116	0.3	-0.1
200	50.0	50.0	53.8	97.2	11.5	141.5	3.0	417	-116	0.2	0.0
400	50.0	50.0	53.8	97.2	11.5	141.5	3.0	398	-116	0.1	0.0
1000	50.0	50.0	53.8	97.2	11.5	141.5	3.0	440	-131	0.0	0.3
2500	50.0	50.0	53.8	97.2	11.5	141.5	3.0	417	-125	0.1	0.2
5000	50.0	50.0	53.8	97.2	11.5	141.5	3.0	394	-131	0.3	0.1
7500	50.0	50.0	53.8	97.2	11.5	141.5	3.0	407	-125	0.1	0.0
10000	50.0	50.0	53.8	97.2	11.5	141.5	3.0	421	-156	0.1	0.3
12500	50.0	50.0	53.8	97.2	11.5	141.5	3.0	407	-128	0.3	0.2
15000	50.0	50.0	53.8	97.2	11.5	141.5	3.0	405	-119	0.1	0.0
20000	50.0	50.0	53.8	97.2	11.5	141.5	3.0	426	-131	0.1	-0.1

Isotropic Loading Test 2

Date *13-7-1992*

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10 -4*	*E3p x10 -4*	*kPa*	*kPa*
1	223	172	-0.4	0.2	3.0	50.0
2	235	181	0.0	0.0	3.0	50.0
3	246	173	0.0	0.1	3.0	50.0
4	211	179	0.0	-0.1	3.0	50.0
5	177	174	0.0	0.1	3.0	50.0

Resilient Deformation Test 1 (CCP)

Date *14-7-1992*

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r µE*	*E3r µE*	*E1p x10 -4*	*E3p x10 -4*
15.0	15.0	18.8	23.0	11.5	24.1	3.0	82	-19	0.0	0.0
15.0	15.0	18.8	28.6	11.5	40.7	3.0	135	-34	0.4	-0.1
15.0	15.0	18.8	33.8	11.5	56.3	3.0	242	-55	0.1	-0.1
15.0	15.0	18.8	38.3	11.5	69.9	3.0	239	-64	0.3	-0.1
30.0	30.0	33.8	42.0	11.5	36.0	3.0	85	-18	0.7	1.2
30.0	30.0	33.8	49.8	11.5	59.4	3.0	165	-36	0.3	-0.1
30.0	30.0	33.8	58.3	11.5	84.8	3.0	268	-57	0.3	0.0
30.0	30.0	33.8	66.6	11.5	109.8	3.0	350	-88	-0.2	-0.2
45.0	45.0	48.8	58.5	11.5	40.4	3.0	84	-26	0.1	-0.1
45.0	45.0	48.8	68.6	11.5	70.9	3.0	171	-30	0.1	0.1
45.0	45.0	48.8	78.8	11.5	101.3	3.0	268	-53	0.0	0.0
45.0	45.0	48.8	88.8	11.5	131.5	3.0	360	-81	0.1	-0.1

Isotropic Loading Test 3

Date *14-7-1992*

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10 -4*	*E3p x10 -4*	*kPa*	*kPa*
1	206	177	0.0	0.2	3.0	50.0
2	210	191	-0.2	-0.1	3.0	50.0
3	177	178	0.2	0.2	3.0	50.0
4	184	179	-0.1	0.0	3.0	50.0
5	192	175	-0.1	0.1	3.0	50.0

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory: DUT
Material: Microgranite (MIG)
Specimen: Specimen 2

Specimen details

	Moisture content	Dry density
Aimed:	3.3%	2140 kg/m^3
Start of test:	4.2%	2197 kg/m^3
End of test:	3.3%	

Specimen size: 800 mm x 400 mm Static load included (y/n) n

Isotropic Loading Test 1

Date 19-8-1992

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*	*kPa*	*kPa*
1	422	206	-0.5	0.2	3.0	50.0
2	343	182	0.3	0.4	3.0	50.0
3	392	199	-0.5	0.3	3.0	50.0
4	391	200	-0.2	0.1	3.0	50.0
5	395	208	0.0	0.1	3.0	50.0

Permanent Deformation Test

Date 20-8-1992

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*
20	50.0	50.0	53.8	84.8	11.5	104.5	3.0	295	-148	0.9	-0.8
50	50.0	50.0	53.8	94.2	11.5	132.5	3.0	396	-206	1.0	-0.6
100	50.0	50.0	53.8	94.2	11.5	132.5	3.0	425	-205	0.2	0.2
200	50.0	50.0	53.8	94.2	11.5	132.5	3.0	417	-204	0.2	-0.1
400	50.0	50.0	53.8	94.2	11.5	132.5	3.0	400	-205	0.3	0.0
1000	50.0	50.0	53.8	94.2	11.5	132.5	3.0	341	-219	0.3	0.1
2500	50.0	50.0	53.8	94.2	11.5	132.5	3.0	356	-209	0.2	0.4
5000	50.0	50.0	53.8	94.2	11.5	132.5	3.0	353	-200	0.1	0.3
7500	50.0	50.0	53.8	94.2	11.5	132.5	3.0	360	-188	0.3	0.2
10000	50.0	50.0	53.8	94.2	11.5	132.5	3.0	341	-188	0.1	0.1
12500	50.0	50.0	53.8	94.2	11.5	132.5	3.0	353	-193	0.1	0.1
15000	50.0	50.0	53.8	94.2	11.5	132.5	3.0	340	-200	0.1	0.4
20000	50.0	50.0	53.8	94.2	11.5	132.5	3.0	350	-169	0.1	0.0

Isotropic Loading Test 2

Date *21-8-1992*

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10 -4*	*E3p x10 -4*	*kPa*	*kPa*
1	219	209	0.0	0.4	3.0	50.0
2	205	209	0.0	0.1	3.0	50.0
3	186	201	0.1	0.2	3.0	50.0
4	196	213	-0.2	0.1	3.0	50.0
5	176	207	0.2	0.1	3.0	50.0

Resilient Deformation Test 1 (CCP)

Date *26-8-1992*

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r µE*	*E3r µE*	*E1p x10 -4*	*E3p x10 -4*
15.0	15.0	19.3	24.2	13.0	27.7	3.0	112	-28	0.0	0.0
15.0	15.0	19.3	29.4	13.0	43.1	3.0	149	-48	0.0	-0.2
15.0	15.0	19.3	35.0	13.0	59.9	3.0	243	-75	0.0	-0.2
15.0	15.0	19.3	39.2	13.0	72.5	3.0	313	-105	-0.5	-0.6
30.0	30.0	34.3	42.7	13.0	38.0	3.0	128	-28	0.0	0.0
30.0	30.0	34.3	50.9	13.0	62.7	3.0	242	-52	0.0	0.1
30.0	30.0	34.3	59.2	13.0	87.7	3.0	324	-76	0.1	0.1
30.0	30.0	34.3	67.4	13.0	112.1	3.0	388	-110	0.1	-0.1
45.0	45.0	49.3	59.4	13.0	43.1	3.0	108	-32	0.0	0.0
45.0	45.0	49.3	68.9	13.0	71.8	3.0	249	-57	-1.4	0.5
45.0	45.0	49.3	79.3	13.0	102.9	3.0	357	-81	0.2	-0.1
45.0	45.0	49.3	89.5	13.0	133.5	3.0	441	-120	0.3	-0.1

Isotropic Loading Test 3

Date *26-8-1992*

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10 -4*	*E3p x10 -4*	*kPa*	*kPa*
1	272	203	-0.1	0.2	3.0	50.0
2	286	214	-0.1	-0.1	3.0	50.0
3	282	218	0.1	0.0	3.0	50.0
4	273	213	-0.1	0.0	3.0	50.0
5	277	208	-0.1	0.0	3.0	50.0

Repeated Load Triaxial Test Results **Test Programme 2**

Laboratory: DUT
Material: Microgranite (MIG)
Specimen: Specimen 3

Specimen details

	Moisture content	Dry density
Aimed:	3.3%	2140 kg/m^3
Start of test:	4.1%	2170 kg/m^3
End of test:	3.6%	

Specimen size: 800 mm x 400 mm Static load included (y/n) n

Isotropic Loading Test 1

Date 4-9-1992

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*	*kPa*	*kPa*
1	180	281	-2.4	1.8	3.0	50.0
2	188	321	0.0	-0.1	3.0	50.0
3	173	293	0.0	0.3	3.0	50.0
4	168	294	0.0	0.2	3.0	50.0
5	170	308	0.0	0.0	3.0	50.0

Permanent Deformation Test

Date 8-9-1992

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*
20	50.0	50.0	54.2	91.6	12.6	124.8	3.0	407	-113	1.3	-0.6
50	50.0	50.0	54.2	96.6	12.6	139.9	3.0	444	-131	0.2	-0.2
100	50.0	50.0	54.2	96.6	12.6	139.9	3.0	458	-138	0.2	0.0
200	50.0	50.0	54.2	96.9	12.6	140.7	3.0	457	-138	0.2	0.0
400	50.0	50.0	54.2	96.9	12.6	140.7	3.0	463	-131	0.4	0.0
1000	50.0	50.0	54.2	97.2	12.6	141.5	3.0	477	-138	0.6	-0.1
2500	50.0	50.0	54.2	96.9	12.6	140.7	3.0	485	-144	0.4	0.1
5000	50.0	50.0	54.2	97.2	12.6	141.5	3.0	470	-163	0.3	0.3
7500	50.0	50.0	54.2	96.9	12.6	140.7	3.0	457	-156	0.3	0.2
10000	50.0	50.0	54.2	97.2	12.6	141.5	3.0	448	-159	0.3	0.2
12500	50.0	50.0	54.2	97.2	12.6	141.5	3.0	489	-144	0.0	0.1
15000	50.0	50.0	54.2	97.7	12.6	143.1	3.0	428	-150	0.4	0.2
20000	50.0	50.0	54.2	97.2	12.6	141.5	3.0	448	-138	0.3	0.0

Isotropic Loading Test 2

Date *9-9-1992*

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*	*kPa*	*kPa*
1	274	258	0.8	0.5	3.0	50.0
2	262	235	0.1	0.3	3.0	50.0
3	267	233	0.0	0.3	3.0	50.0
4	268	249	0.0	-0.1	3.0	50.0
5	271	246	0.0	-0.1	3.0	50.0

Resilient Deformation Test 1 (CCP)

Date *9-9-1992*

Confining Pressure		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
s31 kPa	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*
15.0	15.0	18.8	24.0	11.5	26.9	3.0	120	-34	0.2	-0.2
15.0	15.0	18.8	29.0	11.5	42.1	3.0	249	-69	0.4	-0.1
15.0	15.0	18.8	34.0	11.5	56.9	3.0	320	-77	0.2	-0.1
15.0	15.0	18.8	38.9	11.5	71.7	3.0	399	-102	0.5	-0.2
30.0	30.0	33.8	42.3	11.5	37.0	3.0	157	-35	0.2	0.2
30.0	30.0	33.8	51.3	11.5	64.0	3.0	308	-57	0.1	0.1
30.0	30.0	33.8	59.1	11.5	87.3	3.0	387	-84	0.4	-0.1
30.0	30.0	33.8	67.6	11.5	112.9	3.0	455	-121	0.2	-0.1
45.0	45.0	48.8	59.2	11.5	42.5	3.0	146	-30	0.0	-0.1
45.0	45.0	48.8	69.5	11.5	73.4	3.0	286	-54	0.4	-0.1
45.0	45.0	48.8	79.7	11.5	104.0	3.0	388	-90	0.4	0.0
45.0	45.0	48.8	89.6	11.5	133.9	3.0	488	-103	0.1	-0.1

Isotropic Loading Test 3

Date *9-9-1992*

Cycles	*Resilient Strain*		*Permanent Strain*		*s31 =p1*	*s32 =p2*
N	*E1r µE*	*E3r µE*	*E1p x10^{-4}*	*E3p x10^{-4}*	*kPa*	*kPa*
1	298	247	0.0	0.1	3.0	50.0
2	284	242	0.0	0.0	3.0	50.0
3	283	241	0.0	0.3	3.0	50.0
4	286	237	0.0	0.2	3.0	50.0
5	289	255	-0.1	-0.1	3.0	50.0

Appendix F.3 RESULTS OF TEST PROGRAMME III FOR SUBGRADE SOILS AND UNBOUND GRANULAR MATERIALS (PHASE 5)

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC
Material: Seine et Marne Silt (LIM)
Specimen: LIM01

Date: 30/05/92
Cell No.: 1

Specimen details

	Moisture content	Dry density
Aimed:	14.9%	1712 kg/m^3
Start of Test:	14.5%	1691 kg/m^3
End of Test:	14.3%	

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
LIM01C01s3=10 kP	N	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
30 May 1992		kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	20	13	9	17	90	14	242	3.1	2111	-791	-2	-3	0	-362
	50	13	9	17	90	12	242	3.1	2114	-841	3	-4	0	-360
	100	13	10	18	90	16	240	3.1	2012	-820	8	-5	0	-358
	200	12	9	18	90	18	242	3.1	2013	-843	11	-6	0	-356
	400	12	9	18	90	17	243	3.1	2031	-864	13	-7	0	-355
	1000	13	10	18	90	18	242	3.1	2055	-906	18	-9	0	-353
	2500	12	9	17	90	12	240	3.1	2183	-960	18	-10	0	-350
	5000	12	10	23	97	31	262	3.1	2100	-1006	27	-14	0	-345
	7500	12	10	25	101	39	274	3.1	2079	-1035	39	-20	0	-335
	10000	12	10	27	103	43	279	3.1	2034	-1052	52	-26	0	-326
	20000	12	10	28	105	48	285	3.1	2017	-1080	68	-33	0	-313
	30000	12	10	27	104	45	282	3.1	2034	-1104	76	-37	0	-307
	40000	12	10	25	102	38	275	3.1	2123	-1134	79	-38	0	-306
	50000	12	10	23	98	31	266	3.1	2212	-1182	80	-39	0	-305
	60000	12	10	26	102	40	277	3.1	2150	-1168	85	-41	0	-301
	70000	12	10	26	103	43	281	3.1	2146	-1177	89	-42	0	-299
	80000	12	10	25	101	37	274	3.1	2222	-1207	90	-43	0	-298

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
LIM01R01s3=10 kPa													
2 Jun 1992 13:05:49	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	11	10	13	38	6	84	3.2	457	-151	-2	-1	0	-308
	11	10	13	32	7	66	3.2	313	-105	0	0	0	-308
	11	10	12	25	4	44	3.2	213	-63	0	0	0	-308
	11	10	12	18	2	22	3.2	112	-29	0	0	0	-308
	13	37	13	65	1	83	1.6	564	-54	0	1	1	-310
	12	30	13	50	1	59	1.6	368	-39	0	0	1	-310
	12	23	13	37	3	42	1.6	246	-28	0	0	1	-309
	11	17	12	24	2	21	1.7	112	-14	0	0	0	-309

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
LIM01R02s3=30 kPa													
3 Jun 1992 14:23:59	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	29	27	30	53	2	78	3.3	391	-116	1	0	0	-313
	26	25	27	44	2	58	3.2	259	-78	0	0	0	-313
	29	28	30	41	4	41	3.3	170	-49	0	0	0	-313
	29	29	31	36	5	24	3.2	99	-23	0	0	0	-313
	29	54	31	80	5	78	1.5	427	-85	0	1	1	-315
	29	48	31	68	5	60	1.5	320	-54	0	0	0	-315
	30	42	32	56	6	42	1.5	208	-32	0	0	0	-315
	28	34	30	42	6	24	1.6	104	-17	0	0	0	-314

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
LIM01R03s3=30 kPa													
3 Jun 1992 15:05:30	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	30	28	30	54	2	80	3.2	396	-117	-1	0	0	-314
	30	28	30	49	2	61	3.3	290	-86	0	0	0	-314
	30	29	31	43	3	43	3.2	191	-53	0	0	0	-314
	29	29	30	36	3	22	3.2	91	-22	0	0	0	-314
	29	56	30	83	4	82	1.5	501	-30	0	3	1	-318
	29	49	31	71	4	64	1.5	368	-28	0	0	1	-318
	29	42	31	57	5	43	1.5	239	-16	0	0	0	-318
	29	36	30	43	3	24	1.6	122	-9	0	0	0	-318

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
LIM01R04s3=30 kPa													
3 Jun 1992 15:23:27	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	30	28	31	55	3	81	3.3	384	-118	-1	0	0	-318
	29	27	30	48	2	61	3.3	297	-86	0	0	0	-318
	29	28	31	43	6	47	3.3	198	-54	0	0	0	-318
	29	28	28	34	-2	19	3.3	94	-25	0	0	0	-318
	29	56	31	83	6	83	1.5	488	-37	1	0	1	-319
	29	48	29	69	1	60	1.5	353	-28	0	0	1	-318
	29	41	29	55	2	41	1.5	249	-17	0	0	0	-318
	28	35	29	41	1	20	1.5	107	-9	0	0	0	-318

LIM01R05s3=45 kPa
4 Jun 1992 10:50:24

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
48	45	46	209	-6	492	3.0	363	-135	2	0	0	-321
48	46	49	70	5	73	3.2	259	-74	0	0	0	-321
47	46	48	75	3	87	3.1	178	-51	0	0	0	-321
47	47	49	55	5	27	3.3	91	-23	0	0	0	-321
47	75	50	103	9	82	1.4	452	-20	0	0	0	-321
47	68	49	89	6	64	1.5	335	-22	0	0	0	-321
47	61	49	78	4	52	1.6	219	-22	0	0	0	-321
48	54	49	64	5	29	1.7	130	-17	0	0	0	-321

LIM01R06s3=45 kPa
4 Jun 1992 11:12:08

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
48	46	51	76	8	89	3.3	351	-111	-1	0	0	-321
48	47	52	70	11	69	3.3	262	-77	0	0	0	-321
48	47	51	63	9	48	3.3	186	-49	0	0	0	-321
48	47	51	65	9	54	3.1	86	-25	0	0	0	-321
47	74	49	102	4	83	1.5	424	-21	0	0	0	-321
48	68	50	89	7	63	1.4	315	-18	0	0	0	-321
47	61	50	75	8	44	1.4	208	-12	0	0	0	-321
47	54	49	63	4	26	1.6	135	-10	0	0	0	-322

LIM01R07s3=45 kPa
4 Jun 1992 16:46:29

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
45	42	45	70	2	84	3.3	406	-123	1	-1	0	-321
44	42	45	63	1	62	3.3	290	-85	0	0	0	-321
44	43	45	60	3	52	3.3	185	-56	0	0	0	-321
44	43	46	51	5	25	3.3	109	-25	0	0	0	-321
44	72	46	103	6	93	1.5	528	-36	0	0	0	-322
44	64	45	85	4	64	1.5	361	-23	0	0	0	-322
43	57	44	71	3	42	1.5	239	-17	0	0	0	-322
44	50	44	58	1	24	1.6	109	-8	0	0	0	-322

LIM01R08s3=45 kPa
4 Jun 1992 17:03:14

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
45	42	47	72	7	87	3.3	386	-124	-1	0	0	-322
45	43	47	65	6	67	3.3	310	-89	0	0	0	-322
44	43	46	62	7	56	3.2	191	-59	0	0	0	-322
44	43	46	52	7	26	3.5	91	-23	0	0	0	-322
44	72	46	102	7	90	1.5	503	-39	0	0	0	-322
44	64	46	86	7	66	1.5	346	-28	0	0	0	-322
44	57	47	73	9	48	1.5	239	-18	0	0	0	-322
44	50	46	59	8	27	1.4	112	-10	0	0	0	-322

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC
Material: Seine et Marne Silt (LIM)
Specimen: LIM02

Date: 28/05/92
Cell No.: 2

Specimen details

	Moisture content	Dry density
Aimed:	14.9%	1712 kg/m^3
Start of Test:	14.4%	1694 kg/m^3
End of Test:	14.1%	

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
LIM02C01s3=10 kP	N	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
28 May 1992		kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	20	11	8	16	89	15	243	3.1	1259	-568	4	-2	1	-297
	50	11	8	16	90	15	246	3.1	1261	-599	6	-3	1	-296
	100	11	8	16	91	15	250	3.1	1299	-630	7	-3	1	-295
	200	11	8	15	91	14	250	3.1	1345	-654	8	-4	1	-294
	400	11	8	16	92	15	252	3.1	1360	-673	10	-5	1	-292
	1000	10	8	16	94	16	258	3.1	1484	-724	12	-6	1	-290
	2500	10	8	15	96	15	265	3.1	1594	-818	16	-8	1	-287
	5000	11	8	16	100	17	275	3.1	1796	-924	20	-11	1	-281
	7500	11	8	18	101	22	280	3.1	1835	-954	25	-14	1	-275
	10000	11	8	14	96	9	264	3.1	1909	-977	26	-14	1	-274
	20000	11	9	16	99	13	271	3.1	2049	-1034	31	-17	1	-270
	30000	11	8	15	98	11	268	3.1	2085	-1064	36	-18	1	-267
	40000	11	8	14	97	9	265	3.1	2147	-1074	40	-20	1	-265
	50000	11	9	14	97	9	264	3.1	2168	-1068	43	-20	1	-263
	60000	12	9	16	99	12	269	3.1	2173	-1080	46	-21	1	-262
	70000	11	11	9	9	-6	-6	7.8	35	-4	45	-19	0	-266
	80000	11	11	9	9	-6	-6	5.5	46	-4	45	-18	0	-267

LIM02R01s3=10 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
2 Jun 1992 19:24:32	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	10	9	15	43	15	102	3.1	375	-135	2	1	0	-273
	10	10	16	35	15	77	3.1	269	-91	-4	1	0	-273
	10	10	15	28	13	55	3.2	177	-62	-3	1	0	-273
	11	10	15	21	14	34	3.2	109	-23	-2	1	0	-273
	12	38	16	69	12	94	1.6	377	-66	-1	1	1	-274
	12	30	16	54	11	73	1.6	289	-49	-4	1	1	-274
	11	23	16	41	15	54	1.6	175	-27	-3	0	1	-273
	11	16	16	29	16	37	1.7	109	-14	-2	0	0	-273

LIM02R02s3=30 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
3 Jun 1992 10:18:35	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	31	30	34	60	8	91	3.2	332	-101	1	0	0	-276
	31	30	32	52	4	68	3.2	266	-77	-4	1	0	-276
	31	30	33	47	6	51	3.2	193	-52	-3	1	0	-276
	31	30	34	41	10	32	3.2	117	-25	-2	0	0	-276
	32	64	34	94	9	89	1.4	390	-53	-1	1	1	-277
	31	55	32	77	3	66	1.4	309	-40	-4	1	1	-277
	31	47	33	63	5	48	1.4	223	-27	-3	0	1	-277
	31	39	35	49	10	30	1.4	127	-15	-2	0	0	-277

LIM02R03s3=30 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
3 Jun 1992 10:52:38	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	32	30	36	61	11	93	3.2	365	-105	-1	0	0	-277
	32	30	35	54	11	73	3.2	286	-79	-4	1	0	-277
	31	30	34	47	9	51	3.2	213	-48	-3	1	0	-277
	31	31	33	40	5	30	3.2	129	-23	-2	0	0	-277
	31	64	34	94	7	89	1.4	393	-57	-1	0	1	-277
	32	55	35	79	9	71	1.4	324	-43	-4	1	1	-277
	31	47	34	63	6	48	1.4	215	-27	-3	0	1	-277
	31	39	34	48	8	28	1.4	144	-16	-2	0	0	-277

LIM02R04s3=30 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
3 Jun 1992 11:10:51	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	32	30	35	60	9	91	3.2	352	-107	-1	0	0	-276
	32	30	35	54	10	72	3.2	281	-80	-3	1	0	-276
	31	30	34	47	7	50	3.2	215	-51	-3	1	0	-276
	31	31	34	41	9	31	3.2	134	-25	-2	1	0	-276
	32	57	36	89	14	94	1.5	390	-55	-2	0	1	-277
	32	51	36	82	12	96	1.8	296	-44	-4	1	1	-277
	32	44	36	61	12	52	1.6	215	-29	-3	0	0	-277
	31	37	35	47	11	30	1.6	139	-14	-2	0	0	-276

LIM02R05s3=45 kPa
4 Jun 1992 12:06:58

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
49	46	52	80	9	100	3.3	334	-91	-1	0	0	-278
48	47	52	71	11	74	3.3	274	-69	-3	1	0	-278
48	47	51	65	10	55	3.2	193	-46	-2	1	0	-278
48	47	51	58	9	33	3.4	124	-24	-2	0	0	-278
48	75	52	106	12	93	1.5	372	-46	-1	0	1	-278
48	68	52	93	12	74	1.5	291	-35	-3	0	1	-278
48	61	51	80	10	56	1.6	225	-25	-3	0	0	-278
48	54	51	72	11	52	2.0	147	-11	-3	0	0	-278

LIM02R06s3=45 kPa
4 Jun 1992 12:25:14

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
49	46	53	79	13	98	3.3	350	-100	-2	0	0	-278
49	47	54	75	16	84	3.2	276	-73	-3	1	0	-278
48	47	53	67	16	59	3.3	195	-45	-3	1	0	-278
48	47	53	61	15	40	3.4	144	-23	-2	0	0	-278
48	75	54	109	17	102	1.5	388	-66	-1	0	1	-278
48	68	54	95	17	82	1.6	312	-51	-4	1	1	-278
48	61	52	81	13	59	1.6	213	-34	-3	0	0	-278
48	54	53	67	15	38	1.7	142	-18	-2	0	0	-277

LIM02R07s3=45 kPa
4 Jun 1992 15:36:11

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
45	43	48	74	10	95	3.3	377	-105	-1	0	0	-277
44	43	48	68	11	75	3.2	317	-77	-4	1	0	-277
44	43	49	62	14	56	3.2	225	-50	-3	1	0	-277
44	43	49	56	15	36	3.3	129	-22	-2	0	0	-277
44	73	49	107	16	104	1.5	436	-62	-1	0	1	-277
44	65	49	90	14	76	1.5	342	-40	-5	1	1	-277
44	58	49	76	15	55	1.5	213	-25	-3	0	0	-277
44	51	49	62	14	35	1.5	127	-11	-2	0	0	-277

LIM02R08s3=45 kPa
4 Jun 1992 15:55:27

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
45	43	45	71	2	87	3.3	377	-105	-1	0	0	-277
44	43	46	65	3	67	3.2	317	-77	-4	1	0	-277
44	43	46	59	6	47	3.2	225	-50	-3	1	0	-277
44	43	46	53	7	28	3.3	129	-22	-2	0	0	-277
44	73	47	104	8	96	1.5	436	-62	-1	0	1	-277
44	65	46	88	6	68	1.5	342	-40	-5	1	1	-277
44	58	46	73	7	47	1.5	213	-25	-3	0	0	-277
44	51	46	60	6	27	1.5	127	-11	-2	0	0	-277

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC
Material: Seine et Marne Silt (LIM)
Specimen: LIM03

Date: 6/6/92
Cell No.: 2

Specimen details

	Moisture content	Dry density
Aimed:	17.0%	1712 kg/m^3
Start of Test:	17.1%	1705 kg/m^3
End of Test:	16.5%	

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
LIM03C01 s3=10 k	N	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
6 Jun 1992		kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	20	11	8	10	71	7	180	2.9	2219	-1247	11	-6	0	-385
	50	11	9	11	66	7	165	2.9	1734	-940	20	-11	0	-378
	100	11	9	11	67	7	166	2.9	1717	-946	24	-13	0	-375
	200	11	9	11	67	7	167	2.9	1723	-972	28	-14	0	-372
	400	11	9	11	67	8	167	2.9	1721	-976	32	-16	0	-369
	1000	11	9	11	67	7	168	2.9	1785	-1005	36	-19	0	-365
	2500	11	8	11	68	9	171	2.9	1832	-1048	42	-23	0	-359
	5000	10	8	14	99	19	268	2.9	3024	-1779	175	-106	1	-224
	7500	10	8	10	65	8	164	2.9	2085	-1120	153	-92	0	-215
	10000	10	7	7	62	-1	156	2.9	2138	-1110	180	-111	1	-217
	20000	10	8	10	66	7	166	2.9	2026	-1064	184	-113	1	-214
	30000	10	7	9	64	4	163	2.9	2037	-1058	186	-114	1	-212
	40000	10	8	8	63	3	160	2.9	2095	-1098	185	-112	0	-215
	50000	9	6	4	59	-7	148	2.8	2170	-1118	184	-112	1	-216
	60000	9	8	22	79	42	210	2.9	1636	-908	200	-121	0	-200
	70000	10	8	19	76	33	199	2.9	1714	-983	204	-123	0	-198
	80000	10	7	5	60	-7	149	2.9	2139	-1119	196	-118	0	-206

LIM03R01 s3=10 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
15 Jun 1992 14:34:42	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	12	10	12	41	6	86	2.8	627	-134	0	32	0	-282
	12	11	13	35	8	69	2.8	455	-91	-6	1	0	-282
	12	11	12	26	4	44	2.8	285	-61	-5	1	0	-282
	12	11	13	20	5	25	2.8	87	-23	-3	1	0	-282
	13	39	13	66	2	80	1.5	661	-66	-1	1	1	-283
	12	31	12	51	1	60	1.5	507	-49	-6	1	1	-283
	11	24	12	37	1	41	1.5	391	-27	-5	0	1	-282
	12	18	11	25	-3	21	1.7	123	-14	-4	0	0	-282

LIM03R02 s3=10 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
15 Jun 1992 15:07:09	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	10	11	13	40	1	81	3.0	638	-159	-2	-33	0	-219
	11	12	13	34	3	64	2.8	499	-113	-5	2	0	-219
	11	12	12	27	3	43	2.8	303	-64	-5	1	0	-219
	12	12	12	19	2	22	2.7	64	-26	-4	1	0	-219
	13	14	39	67	5	82	2.8	679	-76	0	0	1	-220
	12	13	32	52	2	62	2.9	550	-59	-7	1	1	-220
	12	13	25	39	4	44	2.8	391	-35	-4	1	1	-220
	12	13	18	25	2	21	2.7	118	-15	-4	0	0	-220

LIM03R03 s3=30 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
16 Jun 1992 11:21:07	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	30	27	28	57	2	82	2.8	571	-157	-1	2	0	-223
	29	27	28	50	2	62	2.8	424	-111	-6	2	0	-223
	29	28	28	45	2	47	2.8	237	-67	-3	1	0	-223
	29	28	28	37	1	25	2.7	51	-31	-2	1	0	-223
	29	56	31	83	4	81	1.5	581	-65	-1	0	1	-223
	29	49	29	69	2	60	1.5	465	-51	-6	1	1	-223
	28	42	28	55	-2	40	1.6	319	-35	-4	1	1	-223
	28	35	29	42	1	21	1.5	75	-17	-3	0	0	-223

LIM03R04 s3=30 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
16 Jun 1992 11:40:41	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	29	27	28	57	3	81	2.8	597	-183	0	0	0	-223
	29	27	28	50	3	63	2.7	458	-130	-6	2	0	-223
	29	28	29	43	3	43	2.8	267	-78	-4	1	0	-223
	29	28	29	36	3	23	2.7	62	-32	-2	1	0	-223
	29	56	30	82	3	80	1.5	661	-78	-1	0	1	-223
	29	49	30	69	4	62	1.5	473	-67	-6	1	1	-223
	28	42	30	56	3	42	1.5	280	-39	-5	1	1	-223
	28	35	30	42	4	23	1.5	69	-17	-2	0	0	-223

LIM03R05 s3=45 kPa
17 Jun 1992 08:11:59

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
45	43	44	73	2	83	2.8	267	-146	0	0	0	-226
45	43	43	64	-1	59	2.8	147	-103	-3	2	0	-226
45	44	45	60	2	43	2.8	100	-64	-1	1	0	-226
46	45	44	55	-3	28	2.8	51	-30	-2	1	0	-226
46	73	45	99	-2	77	1.5	332	-60	0	1	1	-227
45	66	45	85	-2	56	1.5	172	-43	-3	1	1	-227
45	59	46	73	1	43	1.5	121	-29	-2	0	0	-227
45	52	45	58	0	19	1.5	69	-12	-1	0	0	-227

LIM03R06 s3=45 kPa
17 Jun 1992 08:30:11

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
46	44	42	71	-7	73	2.8	262	-147	-1	0	0	-227
46	44	42	63	-8	52	2.8	435	-101	-3	1	0	-226
46	44	42	57	-8	34	2.8	324	-64	-5	1	0	-226
45	45	43	51	-4	17	2.7	108	-29	-3	1	0	-226
45	73	44	98	-4	75	1.5	599	-62	-1	1	1	-227
45	66	45	87	0	65	1.6	465	-46	-5	0	1	-226
45	58	46	72	3	40	1.5	334	-27	-5	0	0	-226
45	52	47	63	6	34	1.7	141	-10	-3	0	0	-226

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC
Material: Seine et Marne Silt (LIM)
Specimen: LIM04

Date: 8/6/92
Cell No.: 1

Specimen details

	Moisture content	Dry density
Aimed:	17.0%	1712 kg/m^3
Start of Test:	16.5%	1704 kg/m^3
End of Test:	15.6%	

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
LIM04C01 s3=10 k	N	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
11 Jun 1992		kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	20	11	8	10	67	5	166	2.8	1748	-756	11	-3	0	-341
	50	11	8	10	68	6	170	2.8	1796	-812	14	-4	0	-339
	100	11	8	10	68	7	172	2.8	1835	-815	18	-5	0	-336
	200	11	8	11	69	10	176	2.9	1876	-878	22	-7	0	-334
	400	11	8	11	69	9	175	2.9	1925	-914	25	-9	0	-331
	1000	11	8	11	70	10	177	2.9	1961	-962	30	-10	0	-328
	2500	11	8	8	65	1	164	2.8	2088	-991	32	-11	0	-327
	5000	11	8	10	67	6	170	2.9	2129	-1044	36	-13	0	-325
	7500	11	8	7	63	-3	157	2.8	2217	-1060	36	-13	0	-325
	10000	11	8	9	66	2	164	2.8	2210	-1097	39	-14	0	-323
	20000	10	7	8	64	1	160	2.8	2300	-1121	45	-16	0	-319
	30000	11	7	5	61	-6	151	2.8	2392	-1156	46	-16	0	-319
	40000	10	7	9	67	6	168	2.8	2286	-1151	50	-18	0	-317
	50000	10	7	9	66	6	167	2.8	2381	-1180	52	-18	0	-316
	60000	10	7	10	67	11	172	2.8	2265	-1156	56	-19	0	-314
	70000	10	7	12	69	15	177	2.8	2291	-1158	60	-21	0	-312
	80000	9	6	11	69	15	179	2.8	2281	-1157	61	-21	0	-311

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
LIM04R01 s3=10 kPa													
15 Jun 1992 16:02:11	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	13	11	13	42	6	88	2.8	697	-197	0	-1	0	-318
	13	11	14	36	9	70	2.8	550	-142	-7	2	0	-318
	12	11	16	31	13	55	2.8	418	-93	-5	1	0	-318
	12	12	17	25	16	38	2.8	190	-42	-3	1	0	-317
	13	40	15	69	6	86	1.5	757	-67	-3	1	1	-319
	13	33	15	55	7	67	1.5	600	-55	-7	1	1	-318
	13	25	15	42	7	49	1.6	436	-47	-6	1	0	-318
	13	19	16	29	9	29	1.6	228	-25	-4	0	0	-318

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
LIM04R02 s3=10 kPa													
15 Jun 1992 16:26:47	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	13	11	15	44	10	93	2.8	712	-211	-2	0	0	-318
	13	12	15	37	10	73	2.8	560	-153	-7	2	0	-318
	13	12	15	31	9	54	2.8	408	-97	-5	2	0	-318
	13	12	16	23	11	32	2.8	198	-38	-4	1	0	-318
	13	40	17	72	13	94	1.5	788	-79	-2	1	1	-318
	13	33	17	57	12	73	1.5	621	-65	-8	1	1	-318
	13	26	16	44	10	56	1.6	451	-52	-6	1	0	-318
	13	19	17	30	13	34	1.6	233	-22	-5	0	0	-318

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
LIM04R03 s3=30 kPa													
16 Jun 1992 09:39:10	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	31	29	27	57	-4	76	2.8	590	-153	-2	4	0	-323
	30	29	26	49	-8	55	2.8	479	-128	-6	2	0	-324
	30	29	31	47	4	48	2.8	375	-75	-4	1	0	-323
	31	30	32	49	7	56	2.9	162	-34	-3	1	0	-323
	30	59	31	86	3	81	1.4	661	-36	-2	1	0	-324
	30	51	32	72	5	64	1.5	519	-36	-6	0	0	-324
	30	44	32	59	5	45	1.5	395	-30	-5	0	0	-324
	30	37	33	47	8	29	1.5	203	-13	-4	0	0	-324

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
LIM04R04 s3=30 kPa													
16 Jun 1992 10:09:51	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	32	30	32	61	6	87	2.8	616	-163	-2	0	0	-324
	32	30	32	55	7	70	2.8	492	-122	-6	2	0	-324
	31	30	33	49	9	52	2.8	357	-78	-5	1	0	-324
	31	31	34	43	10	34	2.8	190	-38	-3	1	0	-324
	31	59	33	87	5	84	1.5	669	-43	-2	1	0	-324
	31	52	33	75	8	69	1.5	547	-42	-7	0	0	-324
	31	44	33	61	7	49	1.5	400	-29	-6	0	0	-324
	31	37	34	48	9	30	1.5	213	-14	-4	0	0	-324

LIM04R05 s3=45 kPa
17 Jun 1992 09:27:36

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
46	44	45	74	2	84	2.8	562	-139	2	0	0	-327
46	45	44	67	0	63	2.8	446	-101	-6	1	0	-327
45	44	44	59	-1	42	2.8	337	-59	-5	1	0	-327
45	45	43	51	-4	18	2.8	152	-26	-3	1	0	-327
46	74	47	102	4	84	1.5	646	-54	-1	1	0	-328
45	66	46	86	0	61	1.5	514	-40	-6	0	0	-328
46	59	46	73	0	40	1.5	360	-25	-5	0	0	-328
46	52	46	60	1	21	1.5	172	-13	-4	0	0	-328

LIM04R05 s3=45 kPa
17 Jun 1992 09:50:01

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
46	45	45	76	1	88	2.8	565	-141	-2	0	0	-328
46	45	46	68	2	66	2.8	459	-107	-6	1	0	-328
46	45	46	61	3	46	2.9	327	-65	-5	1	0	-328
46	45	46	54	2	24	2.8	152	-26	-3	1	0	-328
46	74	47	101	2	84	1.5	644	-50	-1	1	0	-328
46	66	46	87	2	62	1.5	502	-40	-6	0	0	-328
46	59	46	73	2	42	1.5	367	-28	-5	0	0	-328
46	52	47	61	5	25	1.5	190	-10	-3	0	0	-328

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC
Material: Seine et Marne Silt (LIM)
Specimen: LIM05

Date: 23 Jun 1992
Cell No.: 2

Specimen details

	Moisture content	Dry density	
Aimed:	17.0%	1712 kg/m^3	kg/m^3
Start of Test:	17.0%	1698 kg/m^3	kg/m^3
End of Test:			

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
Conditioning S3=10	N	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
23 Jun 1992		kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	20	11	8	13	56	4	146	3.2	23	-659	1	-3	1	-342
	50	11	8	12	57	3	149	3.2	15	-679	1	-3	1	-341
	100	11	8	13	59	6	153	3.2	25	-681	1	-4	0	-340
	200	11	8	14	60	9	156	3.2	23	-674	1	-5	0	-338
	400	11	8	11	59	0	153	3.2	15	-715	1	-5	1	-338
	1000	11	7	10	57	-2	149	3.2	23	-736	1	-5	1	-338
	2500	11	7	10	57	-1	151	3.2	18	-755	1	-6	1	-336
	5000	11	8	12	61	4	160	3.2	25	-785	1	-8	0	-333
	7500	11	8	12	60	2	156	3.2	15	-802	1	-9	0	-331
	10000	11	8	13	61	5	160	3.2	23	-805	1	-10	0	-329
	20000	11	7	12	62	4	164	3.2	20	-873	0	-16	0	-318
	30000	12	8	9	56	-7	144	3.3	15	-923	1	-15	1	-319
	40000	12	9	11	59	-3	150	3.2	23	-899	1	-16	1	-317
	50000	13	9	13	61	-1	155	3.2	25	-893	1	-16	0	-316
	60000	11	7	12	61	5	161	3.2	25	-884	1	-16	0	-317
	70000	11	7	12	60	4	157	3.2	18	-864	1	-17	0	-315
	80000	11	8	14	63	10	164	3.2	23	-840	1	-19	0	-311

LIM05R01 s3=10 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
29 Jun 1992 09:44:20	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	11	9	11	37	0	83	3.2	438	-315	1	0	0	-322
	11	10	13	32	6	67	3.2	327	-241	-4	3	0	-321
	11	10	11	24	2	43	3.2	203	-160	-3	3	0	-322
	11	10	12	18	3	23	3.2	114	-71	-3	2	0	-322
	10	38	11	66	3	83	1.5	509	-217	-1	1	1	-322
	11	31	11	51	1	61	1.5	352	-195	-5	2	1	-322
	10	23	11	37	3	42	1.5	233	-133	-4	2	1	-322
	10	16	11	23	3	23	1.6	117	-64	-2	1	1	-322

LIM05R02 s3=10 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
29 Jun 1992 10:02:22	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	10	8	12	37	5	87	3.2	476	-319	-1	0	0	-321
	10	9	11	30	4	65	3.2	312	-252	-5	3	0	-321
	10	9	13	26	7	49	3.2	233	-163	-3	2	0	-321
	10	10	12	19	7	27	3.2	104	-73	-3	2	0	-321
	12	40	14	69	7	87	1.5	530	-215	0	1	1	-322
	11	32	13	53	6	65	1.5	380	-192	-5	2	1	-322
	11	24	13	39	7	46	1.5	248	-130	-5	2	1	-323
	10	16	13	26	9	27	1.5	124	-57	-3	1	0	-323

LIM05R03 s3=30 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
30 Jun 1992 10:41:34	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	31	29	33	56	3	83	3.4	603	-286	2	2	0	-336
	31	29	34	51	8	64	3.4	408	-231	-5	3	0	-335
	30	29	30	41	-1	37	3.4	233	-146	-5	3	0	-336
	30	29	29	35	-3	16	3.3	122	-65	-2	2	0	-336
	31	58	30	84	-2	77	1.5	626	-181	-1	1	0	-337
	31	51	32	72	3	62	1.5	464	-174	-6	2	0	-337
	31	44	33	59	6	45	1.5	291	-130	-4	2	0	-336
	31	37	32	45	5	24	1.5	144	-62	-3	1	0	-336

LIM05R04 s3=30 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
30 Jun 1992 11:00:11	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	31	28	32	56	2	84	3.4	644	-288	-1	1	0	-336
	32	29	34	52	7	70	3.4	466	-245	-6	3	0	-336
	30	29	30	42	-2	39	3.4	261	-164	-5	3	0	-336
	30	30	32	38	4	26	3.3	127	-80	-2	1	0	-336
	30	57	29	82	-3	74	1.5	654	-184	-2	1	0	-337
	30	50	30	70	-2	58	1.5	512	-166	-6	2	0	-337
	30	43	28	54	-5	34	1.5	289	-136	-5	2	0	-337
	31	37	33	46	8	28	1.5	170	-63	-2	1	0	-336

LIM05R05 s3=45 kPa
2 Jul 1992 18:05:49

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
47	43	47	69	0	80	3.5	1039	-405	1	1	0	-319
47	43	47	64	0	61	3.5	769	-320	-10	4	0	-319
46	44	46	58	0	41	3.5	473	-219	-8	3	0	-319
46	44	45	51	-1	20	3.6	223	-93	-5	2	0	-320
46	73	46	98	0	77	1.5	1226	-215	-1	20	0	-355
45	65	44	83	-4	54	1.5	928	-196	-13	3	0	-358
45	58	44	70	-4	35	1.5	592	-160	-9	2	0	-357
45	51	43	56	-4	16	1.5	271	-69	-6	1	0	-357

LIM05R06 s3=45 kPa
2 Jul 1992 18:24:32

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
46	42	45	68	-3	78	3.5	1080	-468	-2	0	0	-356
46	42	45	62	-3	58	3.6	804	-374	-11	5	0	-356
45	43	44	56	-3	38	3.6	493	-267	-8	4	0	-356
45	44	44	49	-4	17	3.6	230	-112	-5	3	0	-356
45	73	44	98	-3	75	1.5	1272	-232	-1	8	0	-370
45	65	44	84	-3	55	1.5	961	-222	-13	3	0	-370
45	58	43	69	-6	33	1.5	609	-172	-11	2	0	-370
45	52	44	57	-3	17	1.5	276	-86	-6	1	0	-369

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC
Material: Seine et Marne Silt (LIM)
Specimen: LIM06

Date: 26 Jun 1992
Cell No.: 1

Specimen details

	Moisture content	Dry density
Aimed:	17.0%	1712 kg/m^3
Start of Test:	16.6%	1699 kg/m^3
End of Test:		

LIM06C01 s3=10 k
26 Jun 1992

Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
N	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
20	11	7	13	56	7	147	3.3	1159	-522	6	-3	0	-288
50	11	7	14	57	9	148	3.3	1200	-556	9	-4	0	-287
100	11	7	14	58	7	152	3.3	1311	-605	10	-4	0	-286
200	11	7	13	56	5	148	3.3	1321	-619	10	-4	0	-285
400	11	7	14	58	8	154	3.3	1374	-652	12	-5	0	-284
1000	11	8	25	72	43	193	3.2	1219	-690	37	-19	0	-261
2500	11	8	25	73	43	196	3.2	1253	-718	46	-25	0	-253
5000	11	7	13	57	6	149	3.2	1528	-842	40	-22	0	-257
7500	10	7	11	55	3	146	3.2	1562	-853	36	-22	0	-257
10000	11	7	15	59	13	157	3.2	1545	-849	37	-23	0	-256
20000	19	2	13	29	-16	81	6.3	1069	-571	29	-19	0	-262
30000	19	1	14	29	-15	84	6.4	1071	-551	28	-19	0	-262
40000	22	-1	16	17	-17	52	181.5	586	-352	29	-18	0	-263
50000	19	0	16	27	-10	81	8.1	869	-472	27	-17	0	-265
60000	22	-2	19	9	-11	32	-4.5	275	-215	25	-17	0	-265
70000	10	9	-5	16	-45	20	3.1	35	-19	26	-19	0	-262
80000	9	9	-5	15	-43	21	3.1	40	-18	27	-19	0	-262

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC
Material: Seine et Marne Silt (LIM)
Specimen: LIM07

Date: 30 Jun 1992
Cell No.: 1

Specimen details

	Moisture content	Dry density
Aimed:	17.0%	1712 kg/m^3
Start of Test:	16.5%	1696 kg/m^3
End of Test:		

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
LIM07C01/02 s3=1	N	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
30 Jun 1992		kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	20	10	8	13	57	6	149	3.2	1513	-762	9	-2	0	-333
	50	10	8	13	59	9	154	3.2	1499	-816	14	-3	0	-331
	100	10	8	14	60	11	157	3.2	1499	-850	18	-4	0	-330
	200	11	8	11	57	1	147	3.2	1542	-867	17	-4	0	-330
	400	11	8	13	60	7	155	3.2	1533	-914	22	-6	0	-328
	1000	11	8	13	59	6	153	3.2	1533	-934	26	-8	0	-326
	2500	11	8	11	61	1	158	3.2	1676	-1054	29	-9	0	-324
	5000	12	7	9	46	-11	115	3.4	1578	-977	23	6	0	-341
	7500	11	9	11	57	1	147	3.1	1834	-1050	28	9	0	-344
	10000	10	8	12	58	5	149	3.1	1625	-983	28	6	0	-341
	20000	10	9	11	57	3	146	3.1	1728	-1058	-106	-3	0	-331
	30000	11	9	13	59	7	151	3.1	5007	-1118	481	1	0	-336
	40000	10	9	13	60	9	153	3.1	1767	-1070	864	8	0	-343
	50000	10	9	10	58	-1	149	3.1	1386	-586	1060	-8	0	-326
	60000	10	9	24	77	41	203	3.1	518	-811	1070	-15	0	-317
	70000	10	9	22	75	37	198	3.1	401	-795	1071	-20	0	-312
	80000	11	9	12	60	5	151	3.1	2007	-583	1061	-17	0	-316

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
LIM07R01 s3=10 kPa	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
2 Jul 1992 12:04:09	11	9	10	35	-1	76	3.1	1234	-157	3	1	0	-321
	11	9	10	28	-3	57	3.2	854	-63	-10	2	0	-321
	11	10	12	25	3	46	3.2	380	-41	-6	1	0	-321
	10	10	13	19	6	28	3.2	66	-21	-3	0	0	-321
	11	38	13	66	6	84	1.5	980	-239	2	4	0	-325
	10	30	13	52	7	66	1.5	766	-202	-8	2	0	-324
	10	22	11	37	5	44	1.6	363	-156	-7	1	0	-323
	10	16	13	25	8	29	1.6	89	-67	-3	1	0	-322

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
LIM07R02 s3=10 kPa	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
2 Jul 1992 12:24:34	10	9	13	39	9	90	3.1	1083	-245	1	0	0	-321
	10	10	14	34	11	72	3.1	792	-139	-8	2	0	-321
	10	10	14	27	11	53	3.2	340	-53	-6	1	0	-321
	10	10	14	20	12	31	3.2	66	-25	-3	1	0	-321
	10	37	11	65	3	81	1.5	1037	-268	-2	3	0	-325
	10	30	11	50	2	61	1.5	820	-238	-9	2	0	-325
	11	24	11	38	2	42	1.5	406	-168	-7	2	0	-324
	10	16	11	25	3	24	1.6	89	-74	-4	1	0	-323

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
LIM07R032 s3=3 kPa	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
2 Jul 1992 16:59:47	32	30	35	57	9	82	3.2	592	-152	2	7	0	-330
	32	30	34	51	5	61	3.3	320	-69	-5	2	0	-330
	32	31	33	45	4	43	3.3	103	-30	-3	1	0	-330
	31	31	33	39	4	24	3.3	80	-21	-1	0	0	-329
	32	57	33	83	2	77	1.5	597	-267	0	4	0	-333
	32	51	33	71	3	62	1.5	377	-190	-5	2	0	-333
	31	43	33	58	5	44	1.6	194	-145	-3	1	0	-332
	31	37	32	45	4	24	1.6	63	-79	-2	1	0	-331

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
LIM07R04 s3=30 kPa	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
2 Jul 1992 17:23:08	32	30	33	57	4	84	3.2	634	-135	0	0	0	-330
	32	30	33	52	5	66	3.3	397	-69	-5	1	0	-330
	31	30	33	45	5	46	3.3	163	-28	-3	1	0	-330
	31	30	33	39	6	26	3.3	71	-18	-1	0	0	-330
	31	59	34	87	7	86	1.5	600	-269	1	3	0	-333
	31	51	34	74	7	67	1.5	432	-211	-5	2	0	-333
	31	44	33	59	5	45	1.5	217	-165	-4	1	0	-332
	31	37	32	45	5	24	1.5	103	-79	-2	0	0	-331

LIM07R05 s3=45 kPa
3 Jul 1992 09:20:55

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
47	44	48	72	5	82	3.3	140	-64	4	1	0	-337
46	44	47	65	2	62	3.3	97	-56	-1	1	0	-337
46	45	47	59	3	43	3.3	95	-40	-1	1	0	-337
46	45	47	53	2	24	3.3	49	-30	-1	0	0	-337
46	73	47	99	3	78	1.4	132	-353	1	5	0	-342
46	66	48	88	6	64	1.5	109	-266	-1	3	0	-341
46	60	49	75	7	45	1.4	86	-184	-1	2	0	-340
46	53	49	62	8	27	1.5	75	-91	-1	1	0	-339

LIM07R06 s3=45 kPa
3 Jul 1992 09:40:11

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
47	45	48	71	2	79	3.3	175	-65	0	1	0	-339
47	45	48	66	2	62	3.4	86	-60	-2	1	0	-339
47	45	48	60	4	43	3.4	106	-38	-1	0	0	-338
46	46	48	54	4	24	3.3	54	-31	0	0	0	-338
46	73	47	100	4	80	1.4	166	-342	0	4	0	-342
46	66	46	86	0	58	1.5	123	-282	-1	3	0	-341
46	59	47	73	2	40	1.5	115	-191	-2	2	0	-340
46	53	47	60	2	21	1.5	95	-92	-1	1	0	-339

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC
Material: Seine et Marne Silt (LIM)
Specimen: LIM08

Date: 3/7/92
Cell No.: 1

Specimen details

	Moisture content	Dry density
Aimed:	19.1%	1712 kg/m^3
Start of Test:	19.0%	1717 kg/m^3
End of Test:		

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
LIM08C01 s3=10 k	N	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
7 Jul 1992		kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	20	11	8	14	52	7	130	3.2	1650	-976	10	-8	0	-311
	50	11	8	13	51	6	129	3.2	1729	-1043	18	-13	0	-304
	100	11	9	13	51	5	128	3.2	1786	-1082	23	-17	0	-297
	200	11	9	13	52	6	130	3.2	1817	-1110	29	-21	0	-291
	400	11	8	12	52	6	131	3.2	1871	-1153	34	-25	0	-285
	1000	11	8	11	50	1	126	3.2	1994	-1237	43	-32	0	-274
	2500	11	8	9	48	-5	120	3.2	2086	-1323	48	-34	0	-269
	5000	11	9	11	51	1	127	3.2	2092	-1338	52	-38	0	-264
	7500	11	8	11	51	1	127	3.2	2133	-1362	56	-40	0	-260
	10000	11	8	10	49	-3	121	3.2	2202	-1403	57	-41	0	-259
	20000	11	9	17	57	17	145	3.1	1873	-1212	70	-46	0	-250
	30000	11	9	19	61	24	156	3.1	1713	-1140	102	-67	0	-217
	40000	11	9	11	50	0	124	3.2	2086	-1344	94	-61	0	-227
	50000	11	8	11	50	-1	124	3.2	2147	-1380	93	-60	0	-228
	60000	12	8	7	44	-14	106	3.3	2296	-1421	91	-57	0	-233
	70000	17	3	8	24	-27	62	5.6	1823	-1148	87	-52	0	-242
	80000	11	9	13	53	4	134	3.2	2232	-1402	97	-56	0	-235

LIM08R01 s3=10 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
11 Jul 1992 12:42:45	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	11	9	12	36	3	81	3.2	829	-435	1	0	0	-240
	11	9	13	31	5	65	3.2	610	-311	-8	4	0	-240
	11	10	12	25	5	47	3.2	364	-178	-6	3	0	-240
	10	10	13	20	6	28	3.2	145	-66	-4	2	0	-240
	11	38	14	66	10	84	1.4	855	-267	0	1	0	-240
	10	30	13	52	8	65	1.5	649	-205	-9	3	0	-240
	10	24	13	39	7	46	1.5	397	-105	-6	2	0	-240
	10	17	13	27	8	29	1.5	176	-43	-4	1	0	-240

LIM08R02 s3=10 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
11 Jul 1992 13:01:26	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	11	9	12	36	5	82	3.2	895	-480	-2	0	0	-240
	11	9	13	31	7	66	3.2	656	-339	-9	5	0	-240
	10	9	12	24	4	44	3.2	371	-180	-7	3	0	-240
	10	10	12	19	6	27	3.2	170	-67	-4	2	0	-240
	12	43	14	68	7	76	1.3	852	-232	-1	1	0	-240
	11	30	13	51	5	62	1.5	677	-208	-9	2	0	-240
	11	24	13	39	7	45	1.5	389	-116	-7	2	0	-240
	11	17	13	26	7	28	1.6	170	-47	-4	1	0	-240

LIM08R03 s3=30 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
12 Jul 1992 10:35:21	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	31	29	33	57	6	84	3.3	667	-315	5	6	0	-249
	31	29	33	51	6	65	3.3	481	-216	-7	3	0	-249
	30	29	33	45	8	49	3.3	285	-131	-5	2	0	-249
	30	29	32	39	8	29	3.3	140	-52	-3	1	0	-249
	31	58	33	86	6	82	1.4	682	-172	-1	1	0	-249
	30	52	35	75	12	69	1.4	532	-124	-6	1	0	-249
	30	44	33	60	7	46	1.5	316	-79	-6	1	0	-249
	30	37	34	47	10	31	1.5	145	-37	-3	1	0	-249

LIM08R04 s3=30 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
12 Jul 1992 10:52:08	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	31	29	33	57	7	86	3.3	705	-334	-1	0	0	-249
	31	29	34	52	10	69	3.3	512	-236	-6	3	0	-249
	31	29	35	47	13	54	3.3	333	-142	-5	2	0	-249
	30	29	31	37	3	24	3.3	143	-52	-4	2	0	-249
	31	59	33	86	6	82	1.4	708	-178	-1	1	0	-249
	31	51	33	73	7	64	1.4	524	-129	-7	2	0	-249
	31	44	33	60	8	47	1.5	333	-80	-5	1	0	-249
	30	37	33	47	8	28	1.5	158	-34	-4	1	0	-249

LIM08R05 s3=45 kPa
13 Jul 1992 09:58:33

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
46	44	48	73	3	89	3.3	626	-270	3	-1	0	-254
47	45	47	66	-1	64	3.4	443	-185	-7	3	0	-254
46	45	46	59	0	44	3.4	272	-107	-4	2	0	-254
46	45	46	53	0	24	3.4	145	-45	-3	1	0	-254
46	74	46	100	-1	78	1.5	649	-140	-1	1	0	-255
46	67	46	88	1	63	1.5	496	-108	-6	1	0	-254
45	59	41	73	-11	40	1.6	369	-79	-6	1	0	-255
46	53	43	61	-7	25	1.8	191	-51	-3	1	0	-255

LIM08R06 s3=45 kPa
13 Jul 1992 10:25:08

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
47	45	50	72	10	81	3.3	547	-241	0	0	0	-254
47	45	49	66	5	65	3.4	438	-186	-6	3	0	-254
47	46	50	63	10	52	3.4	290	-114	-4	2	0	-254
47	44	37	52	-27	25	3.6	366	-154	-6	2	0	-256
46	73	44	95	-6	68	1.4	603	-130	-2	1	0	-255
45	66	45	78	-1	36	1.1	310	-71	-6	1	0	-255
45	59	46	70	0	33	1.3	257	-45	-3	0	0	-255
45	52	44	53	-2	2	0.5	38	-25	-2	0	0	-255

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC
Material: Seine et Marne Silt (LIM)
Specimen: LIM09

Date: 3/7/92
Cell No.: 2

Specimen details

	Moisture content	Dry density
Aimed:	19.1%	1712 kg/m^3
Start of Test:	18.9%	1721 kg/m^3
End of Test:		

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
LIM09C01 s3=10 k	N	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
9 Jul 1992		kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	20	11	9	14	55	10	139	3.2	1743	-757	31	-6	0	-282
	50	11	9	12	53	3	134	3.2	1793	-800	37	-8	0	-279
	100	11	9	12	54	4	135	3.2	1826	-816	42	-10	0	-276
	200	11	9	14	56	8	141	3.2	1843	-844	51	-12	0	-271
	400	11	9	12	54	2	135	3.2	1954	-893	59	-14	0	-268
	1000	11	9	12	54	4	136	3.2	1982	-922	74	-19	0	-258
	2500	10	8	14	58	11	149	3.1	1965	-945	91	-26	0	-245
	5000	9	7	10	52	2	135	3.2	2087	-999	99	-29	1	-239
	7500	9	7	10	52	1	134	3.2	2138	-1026	101	-30	0	-237
	10000	9	7	8	48	-5	124	3.2	2161	-1038	102	-30	1	-237
	20000	12	7	7	41	-15	103	3.5	2186	-1087	99	-26	1	-244
	30000	10	8	17	62	23	163	3.1	1743	-947	141	-43	0	-211
	40000	10	8	11	52	1	133	3.2	2009	-1059	143	-44	1	-210
	50000	10	7	10	51	-1	131	3.2	2002	-1069	145	-44	1	-210
	60000	10	8	10	52	-1	132	3.2	2015	-1079	145	-44	1	-211
	70000	11	8	9	50	-6	127	3.2	2038	-1058	147	-41	1	-216
	80000	10	8	15	58	13	151	3.2	1855	-991	154	-43	1	-212

LIM09R01 s3=10 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
11 Jul 1992 11:44:11	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	11	10	13	38	6	85	3.2	899	-587	1	0	0	-215
	11	10	12	31	4	64	3.2	453	-389	-9	6	0	-215
	11	10	13	26	5	47	3.2	51	-209	-4	4	0	-215
	11	10	13	20	7	28	3.2	49	-67	0	2	0	-215
	11	40	13	68	6	85	1.4	917	-359	0	1	1	-216
	11	31	13	53	7	65	1.5	469	-247	-9	4	1	-216
	11	23	13	38	7	46	1.5	33	-134	-5	2	1	-216
	11	17	13	25	7	26	1.6	36	-42	0	1	0	-216

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
11 Jul 1992 12:00:55	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	11	9	12	38	5	85	3.2	861	-557	-1	0	0	-216
	11	10	12	31	5	65	3.2	420	-374	-9	6	0	-215
	11	10	13	26	7	48	3.2	41	-202	-4	4	0	-215
	10	10	11	18	3	23	3.3	44	-60	-1	2	0	-216
	11	38	12	66	5	85	1.5	894	-373	1	1	1	-216
	11	31	12	52	3	62	1.5	466	-250	-9	4	1	-216
	11	23	12	38	3	42	1.5	51	-129	-5	3	1	-216
	11	17	12	25	4	25	1.6	38	-46	-1	1	0	-216

LIM09R03 s3=30 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
12 Jul 1992 11:24:22	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	31	29	32	56	3	82	3.3	338	-250	1	3	0	-222
	31	29	32	51	5	67	3.3	220	-186	-3	2	0	-222
	31	29	32	45	4	47	3.3	44	-103	-2	2	0	-222
	30	30	33	39	7	29	3.3	51	-40	0	1	0	-222
	30	58	34	87	10	89	1.5	436	-159	1	0	1	-222
	30	50	34	74	10	71	1.5	238	-119	-4	2	1	-222
	30	43	31	57	2	43	1.5	56	-65	-3	1	0	-222
	30	36	30	43	1	22	1.6	59	-25	-1	1	0	-222

LIM09R04 s3=30 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
12 Jul 1992 11:42:21	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	31	28	32	57	4	86	3.3	412	-292	0	0	0	-222
	30	29	32	51	4	66	3.3	246	-202	-4	3	0	-222
	30	29	32	45	5	47	3.3	49	-113	-3	2	0	-222
	30	29	29	36	-1	20	3.3	41	-41	-1	1	0	-222
	30	58	30	85	0	81	1.5	505	-176	0	0	1	-222
	30	50	29	70	-1	59	1.5	251	-120	-5	2	1	-222
	30	43	30	57	1	43	1.5	36	-71	-3	1	0	-222
	30	36	30	43	1	22	1.5	41	-26	0	1	0	-222

LIM09R05 s3=30 kPa
13 Jul 1992 09:11:57

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
47	44	48	72	2	84	3.3	266	-203	2	0	0	-226
47	44	48	66	3	65	3.4	38	-142	-3	2	0	-226
46	45	46	59	0	42	3.4	49	-80	0	1	0	-226
46	45	46	53	2	23	3.4	41	-33	0	1	0	-226
46	76	46	102	0	78	1.4	323	-100	0	1	0	-227
46	69	47	89	3	62	1.4	205	-75	-3	1	0	-227
46	59	45	72	-1	40	1.5	41	-50	-3	1	0	-227
46	53	46	60	0	21	1.5	59	-21	-1	0	0	-227

LIM09R06 s3=30 kPa
13 Jul 1992 09:28:06

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
47	44	47	71	0	81	3.3	284	-207	0	0	0	-227
47	45	47	65	0	61	3.4	36	-144	-3	2	0	-227
47	45	48	60	3	45	3.4	44	-87	-1	1	0	-227
46	45	45	52	-3	20	3.4	49	-35	0	1	0	-227
46	73	45	99	-2	77	1.5	318	-112	0	0	0	-227
46	66	46	86	0	59	1.5	200	-81	-3	1	0	-227
46	59	46	73	1	42	1.5	41	-55	-2	1	0	-227
46	52	46	60	1	21	1.5	61	-23	-1	1	0	-227

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC
Material: Seine et Marne Silt (LIM)
Specimen: LIM28C01

Date: 30 Oct 1992
Cell No.:

Specimen details

	Moisture content	Dry density
Aimed:	17.0%	kg/m^3
Start of Test:		kg/m^3
End of Test:		

LIM28C01 s3=10 k 30 Oct 1992	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient		Permanent		Pore Pressure	
									Axial	Radial	Axial	Radial	Axial	Radial
	N	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
		kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	20	11	7	11	60	1	160	3.3	1954	-998	17	-17	4	-27
	50	11	7	11	61	2	165	3.2	1973	-1053	22	-21	4	-27
	100	11	7	11	62	2	165	3.2	2002	-1080	27	-23	4	-27
	200	11	7	12	64	4	171	3.2	2024	-1118	34	-27	4	-26
	400	10	6	11	63	3	170	3.2	2050	-1146	38	-30	4	-26
	1000	11	7	12	63	3	170	3.2	2061	-1167	44	-34	4	-24
	2500	10	7	12	64	5	172	3.2	2050	-1198	64	-47	4	-20
	5000	11	7	14	67	10	181	3.2	2023	-1202	70	-50	4	-17
	7500	10	7	11	61	1	162	3.2	2072	-1195	73	-51	4	-16
	10000	11	7	12	62	3	164	3.2	2073	-1190	75	-52	3	-15
	20000	10	7	12	62	3	166	3.2	2110	-1208	84	-56	2	-13
	30000	11	7	14	65	8	173	3.2	2084	-1209	93	-59	2	-11
	40000	11	7	14	65	10	175	3.2	2109	-1241	102	-63	2	-11
	50000	11	7	15	66	12	176	3.2	2128	-1280	109	-67	2	-11
	60000	11	8	17	70	20	187	3.2	1918	-1242	126	-75	1	-11
	70000	11	8	17	69	17	184	3.2	1988	-1297	134	-80	1	-6
	80000	11	7	11	61	2	162	3.2	2333	-1453	133	-82	1	-5

LIM28C01 s3=10 kPa 30 Oct 1992	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	11	8	13	36	5	84	3.4	723	-255	1	-3	1	-9
	11	9	12	30	4	66	3.4	520	-171	1	-2	0	-9
	10	9	12	24	4	45	3.3	289	-83	1	-1	0	-9
	10	10	11	18	4	25	3.1	60	-7	1	0	0	-9
	10	37	12	65	5	83	1.5	843	-86	1	-1	1	-9
	10	31	11	52	4	64	1.5	643	-57	1	0	1	-9
	10	23	11	38	3	43	1.5	371	-21	1	0	0	-9
	10	17	11	25	5	25	1.5	83	-36	1	0	0	-9

LIM28C01 s3=30 kPa 30 Oct 1992	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	32	28	32	54	1	79	3.4	605	-209	1	-2	1	-8
	31	29	31	49	1	60	3.5	443	-135	1	-2	0	-8
	31	29	31	43	1	41	3.4	245	-65	1	-1	0	-8
	30	30	31	37	1	22	3.1	68	-6	1	0	0	-8
	30	57	31	82	2	76	1.5	704	-46	1	0	1	-8
	30	50	31	69	1	58	1.5	525	-29	1	0	1	-8
	30	43	30	56	0	38	1.5	333	-16	1	0	0	-8
	30	37	30	44	1	20	1.5	66	-39	1	0	0	-8

LIM28C01 s3=45 kPa 30 Oct 1992	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	47	43	47	71	1	82	3.5	563	-190	1	-2	1	-7
	47	44	47	64	1	61	3.5	398	-125	1	-2	0	-7
	46	44	46	58	1	42	3.5	242	-64	1	-1	0	-7
	46	45	46	53	0	22	3.1	71	-6	1	0	0	-7
	45	73	45	98	0	77	1.4	647	-29	1	0	1	-7
	45	66	45	85	0	57	1.5	476	-17	1	0	1	-7
	45	59	45	71	-1	38	1.5	307	-14	1	0	0	-7
	46	53	46	60	1	21	1.4	63	-40	1	0	0	-7

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC
Material: Seine et Marne Silt (LIM)
Specimen: LIM30C01

Date: 1 Nov 1992
Cell No.:

Specimen details

	Moisture content	Dry density
Aimed:	14.9%	kg/m^3
Start of Test:		kg/m^3
End of Test:		

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
LIM30C01 s3=10 k	N	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
1 Nov 1992		kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	20	12	9	13	64	1	164	3.2	1513	-509	5	-3	1	-13
	50	12	9	12	63	-1	160	3.2	1441	-526	11	-4	1	-13
	100	12	9	13	65	2	166	3.2	1388	-538	15	-5	1	-13
	200	12	10	13	66	2	168	3.2	1358	-557	19	-5	1	-14
	400	12	10	12	63	-3	160	3.2	1374	-560	21	-6	1	-14
	1000	12	9	12	64	1	165	3.2	1367	-583	24	-7	1	-14
	2500	12	9	12	65	2	166	3.1	1355	-615	29	-9	1	-16
	5000	11	9	12	64	3	168	3.1	1381	-634	33	-10	1	-17
	7500	11	9	12	64	2	166	3.1	1396	-654	36	-11	1	-18
	10000	11	9	12	65	4	168	3.1	1394	-663	39	-12	1	-19
	20000	12	10	16	70	13	180	3.1	1358	-695	52	-17	1	-21
	30000	12	10	16	69	12	178	3.1	1379	-720	58	-20	1	-20
	40000	12	9	11	62	-3	157	3.1	1488	-741	59	-20	1	-19
	50000	11	8	13	63	4	165	3.2	1501	-761	57	-21	1	-16
	60000	12	8	11	60	-3	156	3.2	1536	-776	58	-22	1	-15
	70000	12	8	10	60	-4	155	3.2	1557	-787	57	-23	1	-14
	80000	12	8	10	59	-6	153	3.2	1597	-791	56	-23	1	-13

LIM30C01 s3=10 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
1 Nov 1992	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	11	9	12	36	2	82	3.3	528	-210	1	-2	0	-7
	11	9	12	30	3	62	3.3	335	-132	1	-2	0	-7
	11	10	11	24	3	43	3.2	169	-65	1	-1	0	-7
	10	10	11	18	3	24	3.1	55	-12	1	-1	0	-7
	10	38	11	64	2	78	1.4	612	-45	1	0	1	-7
	10	30	11	50	1	58	1.5	409	-37	1	0	0	-7
	10	23	11	37	1	40	1.5	209	-31	1	0	0	-7
	10	16	10	23	2	21	1.5	90	-29	0	0	0	-7

LIM30C01 s3=30 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
1 Nov 1992	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	31	28	32	55	1	82	3.4	559	-199	1	-2	1	-5
	31	28	31	49	1	62	3.4	382	-131	1	-2	0	-5
	31	29	31	43	1	42	3.4	194	-72	1	-1	0	-5
	30	30	31	37	2	23	3.3	61	-27	1	-1	0	-5
	30	57	31	83	1	78	1.5	655	-40	1	1	1	-5
	30	50	30	70	1	59	1.5	489	-26	1	1	1	-5
	30	43	30	56	0	39	1.5	259	-16	1	1	0	-5
	30	36	30	43	0	20	1.5	91	-15	1	1	0	-5

LIM30C01 s3=45 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
1 Nov 1992	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	47	43	47	70	0	82	3.5	511	-174	1	-2	1	-3
	46	43	46	64	1	63	3.5	368	-120	1	-2	0	-3
	46	44	46	58	0	42	3.5	189	-65	1	-1	0	-3
	45	45	45	52	0	21	3.3	63	-24	2	-1	0	-3
	45	73	46	99	1	79	1.5	615	-28	1	0	1	-3
	45	66	46	86	2	61	1.5	453	-23	1	1	1	-3
	45	59	46	73	2	42	1.5	267	-15	1	1	0	-3
	45	52	46	59	2	22	1.5	85	-16	0	1	0	-3

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC
Material: Seine et Marne Silt (LIM)
Specimen: LIM31

Date: 15 Nov 1992
Cell No.:

Specimen details

	Moisture content	Dry density
Aimed:		kg/m^3
Start of Test:		kg/m^3
End of Test:		

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
LIM31 s3=10 kPa	*N*	*s31*	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
15 Nov 1992		*kPa*	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*me*	*me*	*x10^{-4}*	*x10^{-4}*	*kPa*	*kPa*
	20	12	6	15	104	9	294	3.2	2462	-748	42	-12	2	1
	50	12	6	14	102	4	288	3.2	2285	-764	54	-14	2	1
	100	12	6	13	105	3	298	3.2	2236	-799	62	-16	2	1
	200	12	6	12	102	0	286	3.2	2168	-792	65	-16	2	1
	400	12	6	11	102	-2	289	3.2	2204	-824	67	-17	2	0
	1000	12	6	12	103	0	292	3.2	2243	-876	70	-19	2	0
	2500	12	6	11	103	-3	293	3.2	2431	-972	72	-22	2	0
	5000	12	6	13	106	5	298	3.2	2389	-1016	77	-25	2	0
	7500	12	6	10	99	-5	280	3.2	2532	-1053	76	-26	2	0
	10000	12	6	11	100	-4	282	3.2	2529	-1065	78	-27	2	0
	20000	12	6	13	104	3	294	3.2	2519	-1125	86	-31	2	0
	30000	12	6	13	103	3	290	3.2	2543	-1167	91	-35	2	0
	40000	11	6	14	103	6	291	3.2	2560	-1211	96	-37	2	0
	50000	12	6	12	102	-2	287	3.2	2700	-1264	105	-35	2	-1
	60000	12	6	11	99	-4	276	3.2	2728	-1258	105	-36	2	-1
	70000	12	6	10	98	-8	275	3.2	2759	-1274	106	-37	2	0
	80000	12	6	10	99	-8	280	3.2	2866	-1335	107	-38	2	0

	s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
LIM31 s3=10 kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*me*	*me*	*x10^{-4}*	*x10^{-4}*	*kPa*	*kPa*
15 Nov 1992	11	9	12	37	2	84	3.3	543	-148	1	-2	1	0
	11	9	11	31	1	64	3.3	358	-90	1	-1	0	0
	11	10	11	24	1	43	3.2	186	-43	1	-1	0	0
	10	10	11	18	2	23	3.1	54	-6	1	-1	0	0
	10	38	12	65	4	82	1.4	641	-31	1	0	1	0
	10	31	11	51	1	60	1.5	432	-31	1	0	1	0
	10	24	11	38	2	41	1.5	236	-33	1	0	0	0
	10	17	11	24	2	22	1.5	71	-27	1	0	0	0

	s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
LIM31 s3=30 kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*me*	*me*	*x10^{-4}*	*x10^{-4}*	*kPa*	*kPa*
15 Nov 1992	31	29	31	55	-2	80	3.3	365	-86	1	-1	1	0
	31	29	31	50	1	62	3.3	250	-57	1	-1	0	0
	31	30	31	44	0	43	3.3	141	-30	1	-1	0	0
	30	30	30	37	-2	19	3.1	41	-5	1	0	0	0
	30	58	31	85	1	80	1.5	449	-43	1	0	1	0
	30	51	30	71	0	60	1.5	324	-34	1	0	1	0
	30	44	31	58	1	42	1.5	197	-28	1	0	0	0
	30	37	30	44	0	21	1.5	54	-30	1	0	0	0

	s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
LIM31 s3=45 kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*me*	*me*	*x10^{-4}*	*x10^{-4}*	*kPa*	*kPa*
15 Nov 1992	47	44	46	71	-4	81	3.4	346	-85	1	-1	1	1
	47	44	46	64	-3	61	3.4	249	-58	1	-1	0	1
	46	45	45	58	-4	39	3.3	148	-31	1	-1	0	1
	46	45	44	51	-5	18	3.1	52	-5	1	0	0	1
	45	73	44	99	-4	77	1.5	424	-33	2	0	1	1
	46	67	44	86	-4	56	1.5	305	-32	2	0	1	0
	45	59	44	71	-4	36	1.5	172	-26	1	0	0	1
	45	53	44	58	-3	17	1.5	54	-28	1	0	0	1

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC
Material: Seine et Marne Silt (LIM)
Specimen: LIM32

Date: 23 Nov 1992
Cell No.:

Specimen details

	Moisture content	Dry density
Aimed:		kg/m^3
Start of Test:		kg/m^3
End of Test:		

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
LIM32 s3=10 kPa	*N*	*s31*	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
23 Nov 1992		*kPa*	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*me*	*me*	*x10^{-4}*	*x10^{-4}*	*kPa*	*kPa*
	20	12	7	12	101	0	281	3.2	3096	-840	62	-17	2	1
	50	12	7	11	103	0	289	3.1	2978	-916	77	-20	2	1
	100	11	7	11	104	-1	290	3.1	2943	-958	84	-22	2	1
	200	11	7	12	103	0	289	3.1	2754	-963	90	-24	2	1
	400	11	7	11	102	0	285	3.1	2706	-993	93	-25	2	1
	1000	11	7	11	102	0	285	3.1	2732	-1016	95	-26	2	0
	2500	11	6	10	102	-2	287	3.1	2789	-1116	97	-29	2	0
	5000	10	6	9	100	-2	284	3.1	2805	-1181	100	-31	2	0
	7500	10	6	9	100	-3	283	3.1	2844	-1224	102	-33	2	0
	10000	10	6	10	100	-1	282	3.1	2824	-1238	104	-35	2	0
	20000	8	5	9	100	4	286	3.1	2782	-1304	109	-40	2	-1
	30000	-1	-1	1	94	6	285	3.0	4576	-1330	72	-56	2	-1
	40000	2	2	4	4	5	5	4.8	38	-5	-37	-50	0	-1
	50000	2	2	4	4	5	5	5.7	33	-4	-37	-49	0	-1
	60000	2	2	4	4	5	5	5.0	33	-5	-38	-50	0	-1
	70000	2	2	4	4	5	5	4.8	40	-5	-39	-50	0	-1
	80000	2	2	4	4	5	5	4.0	33	-4	-40	-50	0	-1

	s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
LIM32 s3=10 kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*me*	*me*	*x10^{-4}*	*x10^{-4}*	*kPa*	*kPa*
23 Nov 1992	11	9	12	37	2	84	3.2	779	-166	4	-3	0	-1
	11	10	11	30	1	62	3.2	520	-103	3	-2	0	-1
	11	10	11	24	1	42	3.1	261	-44	3	-2	0	-1
	10	10	11	18	2	24	3.0	44	-5	3	-1	0	-1
	10	38	11	65	3	81	1.5	1101	-213	2	0	1	-1
	10	31	11	51	2	60	1.5	771	-161	1	0	0	-1
	10	23	10	36	2	41	1.5	411	-110	3	0	0	-1
	10	17	11	25	2	22	1.5	61	-76	3	0	0	-1

	s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
LIM32 s3=30 kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*me*	*me*	*x10^{-4}*	*x10^{-4}*	*kPa*	*kPa*
23 Nov 1992	31	29	31	56	1	83	3.3	773	-136	0	-3	0	-1
	31	29	31	50	2	63	3.2	504	-80	3	-2	0	-1
	30	30	31	44	1	43	3.2	219	-32	3	-1	0	-1
	30	30	31	38	1	23	3.1	60	-4	2	-1	0	-1
	30	58	30	84	-1	78	1.5	898	-118	-6	0	1	-1
	30	51	30	70	-1	59	1.5	732	-95	-5	0	0	-1
	30	44	29	56	-2	38	1.5	385	-72	-5	0	0	-1
	30	37	30	44	-1	20	1.5	69	-52	-5	0	0	-1

	s31	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*	*PPr*	*PPp*
LIM32 s3=45 kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*me*	*me*	*x10^{-4}*	*x10^{-4}*	*kPa*	*kPa*
23 Nov 1992	47	44	47	71	0	82	3.4	802	-126	-6	-2	0	0
	46	44	46	64	-1	60	3.4	548	-77	-5	-2	0	0
	46	45	45	58	-2	40	3.3	289	-35	-2	-1	0	0
	45	45	45	52	-1	20	3.1	53	-5	-2	-1	0	0
	45	73	45	100	-1	78	1.5	1348	-85	-37	-1	1	-1
	45	66	45	86	-1	58	1.5	776	-70	-30	0	0	0
	45	59	44	72	-2	38	1.5	425	-52	-28	0	0	0
	45	52	45	59	-1	20	1.5	102	-41	-28	0	0	0

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC
Material: Seine et Marne Silt (LIM)
Specimen: LIM31R01

Date: 17 Nov 1992
Cell No.:

Specimen details

	Moisture content	Dry density
Aimed:		kg/m^3
Start of Test:		kg/m^3
End of Test:		

Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa

LIM31R01 s3=10 kPa
17 Nov 1992

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
11	9	12	38	2	86	3.3	561	-156	1	-2	1	0
11	9	12	31	2	65	3.3	368	-94	1	-2	0	0
11	10	11	24	1	43	3.2	191	-44	1	-1	0	0
11	10	11	18	2	24	3.1	71	-6	1	-1	0	0
11	38	13	66	6	85	1.5	656	-28	2	0	1	0
10	30	11	51	1	60	1.5	429	-30	1	0	1	0
10	24	10	38	1	40	1.4	235	-37	1	0	0	0
10	17	10	24	2	21	1.4	79	-27	1	0	0	0

LIM31R01 s3=10 kPa
17 Nov 1992

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
11	9	11	36	0	82	3.3	541	-147	1	-2	1	0
11	9	11	30	1	63	3.3	367	-91	1	-1	0	0
10	10	11	24	1	43	3.2	199	-44	1	-1	0	0
10	10	11	18	2	24	3.1	51	-6	1	-1	0	0
10	38	11	65	3	80	1.4	628	-29	1	0	1	0
10	31	11	50	1	59	1.5	436	-30	1	0	1	0
10	24	11	37	1	40	1.5	227	-30	1	0	0	0
10	16	10	23	0	20	1.5	64	-26	1	0	0	0

LIM31R01 s3=10 kPa
17 Nov 1992

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
11	9	12	37	3	84	3.3	526	-142	1	-2	1	0
11	9	12	31	1	63	3.3	339	-84	0	-1	0	0
11	10	11	24	1	41	3.3	168	-41	0	-1	0	0
10	10	11	17	1	22	3.1	38	-5	0	0	0	0
10	38	11	65	3	80	1.4	638	-35	1	0	1	0
10	31	11	51	2	60	1.4	431	-34	1	0	1	0
10	24	11	38	3	42	1.5	245	-32	0	0	0	0
10	17	12	25	5	25	1.5	69	-29	1	0	0	0

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC
Material: Seine et Marne Silt (LIM)
Specimen: LIM31R04

Date: 18 Nov 1992
Cell No.:

Specimen details

	Moisture content	Dry density
Aimed:		kg/m^3
Start of Test:		kg/m^3
End of Test:		

Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa

LIM31R04 s3=30 kPa
18 Nov 1992

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
31	29	30	54	-5	77	3.3	337	-81	1	-1	1	0
31	29	31	49	0	60	3.3	237	-53	1	-1	0	0
31	30	30	43	-2	40	3.3	133	-30	1	-1	0	0
30	30	30	37	-2	19	3.1	36	-6	1	0	0	0
30	57	29	84	-2	79	1.5	452	-42	2	0	1	0
30	51	30	70	-1	60	1.5	332	-34	2	0	1	0
30	44	31	58	0	42	1.5	194	-28	2	0	0	0
30	37	31	45	1	22	1.5	49	-29	2	0	0	0

LIM31R04 s3=30 kPa
18 Nov 1992

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
32	29	32	57	1	85	3.3	370	-87	1	-1	1	0
31	29	32	51	2	64	3.3	255	-59	1	-1	0	0
31	30	31	44	0	42	3.3	151	-31	1	-1	0	0
30	30	30	36	-2	19	3.1	49	-5	0	0	0	0
30	58	31	85	1	80	1.5	449	-42	1	0	1	0
30	51	30	71	0	59	1.5	317	-34	1	0	1	0
30	44	31	58	1	42	1.5	202	-27	0	0	0	0
30	37	31	45	2	22	1.5	61	-31	1	0	0	0

LIM31R04 s3=30 kPa
18 Nov 1992

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
31	28	30	55	-3	80	3.4	388	-90	1	-1	1	0
31	29	31	50	0	63	3.3	258	-58	2	-1	0	0
31	30	32	45	3	45	3.2	140	-30	1	-1	0	0
30	30	29	37	-2	20	3.1	38	-5	1	-1	0	0
31	58	32	86	3	82	1.5	447	-46	2	0	1	0
31	51	31	71	2	61	1.5	324	-35	1	0	1	0
30	44	30	57	0	41	1.5	194	-30	1	0	0	0
30	37	30	44	-1	19	1.5	54	-30	1	0	0	0

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC
Material: Seine et Marne Silt (LIM)
Specimen: LIM31R07

Date: 19 Nov 1992
Cell No.:

Specimen details

	Moisture content	Dry density
Aimed:		kg/m^3
Start of Test:		kg/m^3
End of Test:		

Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa

LIM31R07 s3=45 kPa
19 Nov 1992

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
47	44	46	70	-3	81	3.4	332	-79	2	-1	1	1
47	44	46	65	0	63	3.4	243	-57	2	-1	0	1
46	44	44	56	-7	36	3.3	123	-27	1	-1	0	1
45	45	44	51	-4	17	3.1	56	-4	1	0	0	1
45	74	44	99	-3	76	1.5	419	-35	2	0	1	1
45	66	44	85	-5	55	1.5	304	-31	2	0	1	0
45	59	43	70	-6	32	1.4	151	-29	1	0	0	1
45	53	44	58	-5	16	1.4	54	-28	1	0	0	1

LIM31R07 s3=45 kPa
19 Nov 1992

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
47	44	47	72	-1	84	3.4	347	-87	2	-1	1	1
47	44	45	63	-5	58	3.4	243	-56	2	-1	0	1
46	45	45	58	-4	39	3.3	163	-30	1	-1	0	1
46	45	44	51	-6	17	3.1	51	-6	1	-1	0	1
45	73	44	99	-4	79	1.5	429	-30	2	0	1	1
45	66	44	85	-3	58	1.5	299	-28	2	0	1	1
45	59	44	72	-2	38	1.5	184	-23	2	0	0	1
45	52	44	58	-3	18	1.5	54	-29	1	0	0	1

LIM31R07 s3=45 kPa
19 Nov 1992

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
47	43	45	69	-6	77	3.4	358	-88	1	-1	1	0
47	44	46	65	-3	61	3.4	263	-61	1	-1	0	1
46	45	46	59	-2	42	3.4	158	-35	1	-1	0	1
46	45	44	51	-5	18	3.1	49	-7	1	0	0	1
49	78	73	128	70	151	1.5	330	-54	8	-2	1	1
46	69	45	87	-4	56	1.4	312	-37	2	0	1	0
45	59	44	72	-3	37	1.5	181	-27	1	0	0	0
45	53	45	58	-2	18	1.4	56	-28	1	0	0	1

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC
Material: Seine et Marne Silt (LIM)
Specimen: LIM32R01

Date: 27 Nov 1992
Cell No.:

Specimen details

	Moisture content	Dry density
Aimed:		kg/m^3
Start of Test:		kg/m^3
End of Test:		

Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa

LIM32R01 s3=10 kPa
27 Nov 1992

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
11	9	12	38	3	84	3.2	741	-149	-23	-2	0	-1
11	10	12	31	2	63	3.2	475	-90	-24	-1	0	-1
11	10	11	24	2	42	3.1	229	-35	-23	-1	0	-1
11	10	11	18	1	23	3.0	47	-5	-24	-1	0	-1
10	38	11	65	2	81	1.4	1084	-224	-29	4	1	-1
11	31	12	52	3	62	1.5	741	-167	-26	4	0	-1
10	23	11	37	4	43	1.5	418	-113	-26	4	0	-1
10	17	12	26	4	25	1.5	62	-80	-26	3	0	-1

LIM32R01 s3=10 kPa
27 Nov 1992

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
11	9	12	38	3	85	3.2	793	-171	4	-3	0	-1
11	10	11	30	2	62	3.2	520	-105	3	-2	0	-1
10	10	11	24	2	42	3.1	244	-45	3	-2	0	-1
10	10	11	18	3	25	3.1	40	-5	3	-1	0	-1
10	38	11	65	3	81	1.4	1094	-213	1	0	1	-1
10	31	10	50	-1	57	1.4	763	-166	1	0	0	-1
10	23	9	35	-1	37	1.5	408	-110	1	0	0	-1
10	17	10	24	-1	19	1.5	60	-71	1	0	0	-1

LIM32R01 s3=10 kPa
27 Nov 1992

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
11	9	11	37	1	82	3.2	803	-177	3	-3	0	-1
11	10	11	30	0	60	3.2	565	-114	3	-2	0	-1
11	10	11	24	0	41	3.2	311	-52	3	-2	0	-1
14	10	7	18	-22	22	4.1	331	-110	0	-1	0	-1
10	38	11	65	2	82	1.5	1124	-203	2	0	1	-1
10	31	11	51	3	62	1.5	808	-149	2	0	0	-1
10	23	11	37	3	42	1.5	408	-107	5	0	0	-1
11	18	11	25	1	23	1.5	60	-75	5	0	0	-1

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC
Material: Seine et Marne Silt (LIM)
Specimen: LIM32R04

Date: 27 Nov 1992
Cell No.:

Specimen details

	Moisture content	Dry density
Aimed:		kg/m^3
Start of Test:		kg/m^3
End of Test:		

Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa

LIM32R04 s3=30 kPa
27 Nov 1992

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
31	29	31	57	1	83	3.3	759	-135	4	-2	0	-1
31	29	31	51	2	63	3.2	503	-81	5	-2	0	-1
31	30	31	44	1	42	3.2	216	-31	5	-1	0	-1
31	30	31	38	1	22	3.1	65	-4	4	-1	0	-1
30	58	30	84	-1	79	1.5	911	-122	-20	2	1	-1
30	51	30	70	-1	58	1.5	720	-98	-20	2	0	-1
30	44	29	56	-2	37	1.5	373	-74	-14	2	0	-1
30	37	30	44	-1	21	1.5	70	-53	-14	2	0	-1

LIM32R04 s3=30 kPa
27 Nov 1992

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
31	29	31	57	1	83	3.3	765	-136	1	-2	0	-1
31	29	31	50	0	62	3.2	502	-79	5	-2	0	-1
31	30	30	44	0	41	3.2	231	-31	5	-1	0	-1
31	30	30	37	0	21	3.1	72	-5	5	-1	0	-1
30	58	30	85	1	80	1.5	893	-118	-7	0	1	-1
30	51	31	71	2	61	1.5	727	-94	-6	0	0	-1
30	44	30	57	-1	39	1.5	390	-71	-6	0	0	-1
30	37	30	44	0	21	1.5	69	-51	-6	0	0	-1

LIM32R04 s3=30 kPa
27 Nov 1992

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
31	29	31	56	1	83	3.3	794	-138	0	-3	0	-1
31	29	32	51	3	64	3.2	509	-82	0	-2	0	-1
30	29	31	44	3	45	3.2	211	-33	1	-2	0	-1
30	30	31	38	3	24	3.1	45	-4	0	-1	0	-1
30	58	29	84	-3	76	1.5	890	-113	-6	-1	1	-1
30	51	29	70	-4	56	1.5	749	-94	-4	1	0	-1
30	44	29	56	-2	37	1.5	392	-70	-4	1	0	-1
30	37	29	43	-2	19	1.5	69	-53	-4	0	0	-1

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC
Material: Seine et Marne Silt (LIM)
Specimen: LIM32R07

Date: 3 Dec 1992
Cell No.:

Specimen details

	Moisture content	Dry density
Aimed:		kg/m^3
Start of Test:		kg/m^3
End of Test:		

Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa

LIM32R07 s3=45 kPa
3 Dec 1992

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
47	44	47	72	2	84	3.4	766	-122	-6	-2	0	0
46	44	46	65	0	61	3.3	536	-77	-7	-2	0	0
46	45	46	58	0	41	3.3	285	-37	-6	-1	0	0
45	45	45	52	-1	20	3.1	47	-6	-7	-1	0	0
45	73	45	99	-1	78	1.4	1099	-88	-56	1	1	-1
45	66	45	86	-1	58	1.4	741	-71	-52	2	0	0
45	59	44	72	-2	38	1.5	415	-54	-51	3	0	0
45	53	46	60	0	21	1.5	72	-46	-50	2	0	0

LIM32R07 s3=45 kPa
3 Dec 1992

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
47	44	46	70	-2	80	3.4	810	-130	-4	-2	0	0
46	44	46	64	-2	59	3.4	566	-78	-4	-2	0	0
46	45	45	58	-1	40	3.3	265	-32	6	-1	0	0
46	45	45	52	-2	20	3.1	64	-5	6	-1	0	0
45	73	44	99	-2	78	1.5	1368	-85	-26	0	1	-1
45	66	45	85	-2	57	1.5	750	-69	-16	0	0	-1
45	59	45	72	-2	38	1.5	417	-52	-16	0	0	0
45	52	44	59	-3	20	1.5	99	-44	-16	0	0	0

LIM32R07 s3=45 kPa
3 Dec 1992

s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
47	44	46	71	0	82	3.4	830	-127	-9	-2	0	0
46	44	46	64	-2	60	3.3	543	-77	-5	-2	0	0
46	45	45	57	-3	38	3.3	316	-36	-5	-1	0	0
45	45	45	52	0	21	3.1	47	-4	-4	-1	0	0
45	73	45	100	0	80	1.5	1577	-82	-30	-1	1	-1
45	66	45	86	0	59	1.5	836	-69	-22	-1	0	0
45	59	44	71	-3	36	1.5	444	-50	-18	-1	0	0
45	52	45	58	-2	19	1.5	136	-34	-18	-1	0	0

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC Date: 1992.0
Material: London Clay (LOC)
Specimen: LOC02

Specimen details

	Moisture content	Dry density
Aimed:	25.0%	1515 kg/m^3
Start of Test:	25.5%	1510 kg/m^3
End of Test:	25.1%	

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
LOC02 s3=10 kPa	N	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
		kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	20	11	7	12	65	3	176	3.2	3673	-1124	44	-13	0	12
	50	11	7	12	66	4	178	3.2	3728	-1176	53	-15	0	12
	100	11	7	12	67	3	179	3.2	3827	-1239	60	-18	0	12
	200	11	7	11	66	-1	178	3.2	3924	-1300	67	-20	0	12
	400	7	11	6	71	-2	178	2.8	4022	-1362	76	-23	0	12
	1000	7	11	8	306	3	885	3.0	4004	-1400	89	-28	0	12
	2500	7	11	7	71	0	181	2.8	4195	-1475	100	-32	0	13
	5000	7	11	7	72	1	183	2.8	4226	-1498	108	-36	0	14
	7500	11	7	12	69	4	187	3.2	4275	-1519	116	-39	0	15
	10000	11	7	12	70	5	189	3.2	4227	-1532	121	-42	0	17
	20000	11	7	14	72	8	195	3.2	4239	-1530	137	-49	0	21
	30000	7	11	9	76	6	193	2.8	4272	-1540	143	-53	1	26
	40000	7	12	7	70	-3	177	2.8	4200	-1472	142	-52	1	32
	50000	7	11	8	71	4	180	2.8	3991	-1404	143	-53	1	38
	60000	7	11	7	70	0	176	2.8	3992	-1398	141	-55	1	45
	70000	7	11	7	70	2	178	2.8	3956	-1389	141	-56	1	53
	80000	7	11	7	70	0	176	2.8	3982	-1397	140	-57	1	63

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
LOC02 s3=10 kPa	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	11	9	12	37	2	83	3.2	740	-212	4	-3	0	0
	11	10	12	31	4	65	3.1	466	-134	4	-2	0	-1
	10	10	12	25	4	46	3.1	223	-66	4	-1	0	-1
	10	10	12	19	4	26	3.0	56	-5	4	-1	0	-1
	11	38	12	64	5	80	1.4	864	-73	5	0	1	0
	10	31	12	51	4	61	1.4	534	-42	5	0	0	-1
	10	23	11	37	2	41	1.5	276	-20	4	0	0	-1
	10	17	11	25	2	24	1.6	58	-38	4	0	0	-1

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
LOC02 s3=10 kPa	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	11	9	12	38	4	85	3.2	755	-211	2	-3	0	-1
	11	10	12	32	5	67	3.1	471	-137	1	-2	0	-1
	11	10	12	26	4	47	3.1	238	-70	1	-1	0	-1
	11	10	12	19	3	26	3.0	43	-9	1	0	0	-1
	10	39	11	65	4	80	1.4	861	-62	2	0	1	-1
	11	31	12	52	3	62	1.5	583	-40	1	0	0	-1
	10	24	12	38	3	43	1.5	274	-22	1	0	0	-1
	10	17	11	25	3	26	1.6	41	-38	1	0	0	-1

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
LOC02 s3=10 kPa	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	11	10	12	38	3	84	3.2	729	-207	4	-3	0	-1
	11	10	12	31	2	64	3.1	469	-134	3	-2	0	-1
	11	10	11	25	1	44	3.1	228	-67	3	-1	0	-1
	11	11	11	18	0	23	3.0	48	-7	3	-1	0	-1
	10	38	11	64	2	78	1.4	859	-67	4	-1	1	-1
	10	30	11	50	2	60	1.5	550	-40	4	-1	0	-1
	11	23	11	37	2	42	1.5	271	-21	3	0	0	-1
	10	17	11	25	2	24	1.6	43	-38	3	-1	0	-1

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC Date: 1992.0
Material: London Clay (LOC)
Specimen: LOC04

Specimen details

	Moisture content	Dry density
Aimed:	25.0%	1515 kg/m^3
Start of Test:	25.5%	1492 kg/m^3
End of Test:	25.8%	

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
LOC04 s3=10 kPa	N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
	20	12	7	13	64	2	171	3.3	3674	-1122	45	-18	0	0
	50	12	8	13	65	4	173	3.2	3728	-1174	54	-20	0	0
	100	12	8	13	66	3	174	3.2	3827	-1237	61	-22	0	0
	200	12	8	12	65	-1	173	3.2	3924	-1298	68	-24	0	0
	400	8	12	7	70	-2	173	2.8	4022	-1360	77	-27	0	1
	1000	8	12	9	299	3	861	3.0	4004	-1398	91	-32	0	1
	2500	7	12	7	70	0	176	2.8	4195	-1472	101	-37	0	2
	5000	7	12	8	71	1	178	2.8	4226	-1496	109	-40	0	3
	7500	11	7	13	68	3	182	3.2	4276	-1517	117	-43	0	4
	10000	11	7	13	69	5	184	3.2	4227	-1529	123	-46	0	5
	20000	12	8	15	71	8	189	3.2	4239	-1528	138	-53	0	10
	30000	12	8	14	70	5	188	3.2	4273	-1537	144	-57	1	15
	40000	8	12	7	70	-3	172	2.8	4201	-1470	144	-57	1	20
	50000	7	11	8	70	3	175	2.8	3991	-1401	145	-58	1	27
	60000	7	12	7	69	0	171	2.8	3993	-1395	143	-59	1	33
	70000	7	12	8	69	2	173	2.8	3956	-1386	142	-61	1	41
	80000	8	12	8	69	0	171	2.8	3982	-1395	141	-62	1	51

LOC04 s3=10 kPa	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
	11	9	12	37	2	83	3.2	975	-321	6	-4	0	1
	11	10	12	31	2	63	3.2	529	-189	6	-3	0	1
	11	10	11	25	3	45	3.1	220	-94	6	-2	0	1
	10	10	11	18	2	23	3.1	72	-20	5	-1	0	1
	10	37	11	61	3	72	1.4	1054	-54	7	10	1	1
	10	30	11	50	2	61	1.5	709	-46	7	10	0	1
	10	24	11	38	1	42	1.5	312	-32	6	10	0	1
	10	17	11	25	1	22	1.5	74	-35	5	10	0	1

LOC04 s3=10 kPa	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
	11	9	11	37	2	82	3.2	946	-293	3	-3	0	0
	11	10	11	32	2	67	3.2	629	-198	2	-3	0	0
	10	10	11	24	3	43	3.1	215	-84	2	-1	0	1
	10	10	11	18	2	23	3.1	54	-13	1	-1	0	1
	10	37	11	63	2	78	1.5	1187	-83	3	-1	1	1
	10	30	11	51	1	63	1.5	762	-59	3	0	1	1
	10	24	11	37	1	42	1.5	310	-33	2	0	0	1
	10	17	11	25	2	22	1.5	84	-37	2	0	0	1

LOC04 s3=10 kPa	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
	11	9	11	37	2	82	3.2	946	-293	3	-3	0	0
	11	10	11	32	2	67	3.2	629	-198	2	-3	0	0
	10	10	11	24	3	43	3.1	215	-84	2	-1	0	1
	10	10	11	18	2	23	3.1	54	-13	1	-1	0	1
	10	37	11	63	2	78	1.5	1187	-83	3	-1	1	1
	10	30	11	51	1	63	1.5	762	-59	3	0	1	1
	10	24	11	37	1	42	1.5	310	-33	2	0	0	1
	10	17	11	25	2	22	1.5	84	-37	2	0	0	1

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC Date: 1992.0
Material: London Clay (LOC)
Specimen: LOC09

Specimen details

	Moisture content	Dry density
Aimed:	25.0%	1515 kg/m^3
Start of Test:	25.1%	1446 kg/m^3
End of Test:	26.5%	

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
LOC09 s3=10 kPa	N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
	20	12	7	14	71	5	192	3.3	5111	-1567	57	-25	1	0
	50	12	7	13	71	2	192	3.3	5328	-1722	78	-31	1	0
	100	12	7	13	72	3	194	3.3	5399	-1801	91	-35	1	0
	200	12	7	14	72	4	196	3.3	5455	-1874	104	-39	1	0
	400	7	12	8	77	4	195	2.8	5450	-1920	114	-43	1	0
	1000	7	12	8	76	3	193	2.8	5564	-1986	125	-47	1	0
	2500	6	12	7	76	2	192	2.8	5623	-2060	135	-52	1	0
	5000	6	12	6	75	0	190	2.8	5709	-2100	142	-56	1	0
	7500	11	6	11	69	-1	190	3.3	5701	-2128	146	-59	1	0
	10000	11	6	11	70	0	191	3.3	5733	-2146	149	-61	1	0
	20000	13	7	15	74	8	202	3.3	5680	-2221	171	-73	1	0
	30000	13	8	15	75	6	201	3.3	5707	-2237	181	-78	1	0
	40000	7	13	6	73	-4	183	2.8	5705	-2197	179	-78	1	0
	50000	6	11	4	72	-4	183	2.8	5768	-2217	176	-79	1	0
	60000	7	12	8	76	3	193	2.8	5758	-2254	181	-84	1	0
	70000	7	13	8	78	4	196	2.8	5782	-2269	182	-86	1	0
	80000	7	13	6	74	-5	182	2.8	5763	-2251	181	-86	1	0

	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
LOC09 s3=10 kPa	11	9	12	37	3	84	3.2	1521	-557	6	-7	0	0
	11	10	12	30	4	62	3.2	803	-286	6	-5	0	0
	11	10	12	24	3	42	3.2	336	-121	5	-3	0	0
	10	10	11	18	2	22	3.1	87	-25	5	-2	0	0
	11	38	12	64	4	78	1.4	1673	-294	7	-4	1	0
	10	30	11	50	2	61	1.5	1031	-164	7	-2	0	0
	11	24	11	38	2	42	1.5	480	-65	6	-1	0	0
	10	17	11	25	2	23	1.5	159	-15	5	-1	0	0

	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
LOC09 s3=10 kPa	11	9	12	37	3	84	3.2	1465	-528	5	-6	0	0
	11	9	11	30	2	63	3.2	813	-295	5	-4	0	0
	11	10	11	24	2	43	3.2	380	-136	4	-2	0	0
	10	10	11	18	2	23	3.1	123	-40	4	-1	0	0
	10	38	12	64	4	79	1.4	1652	-281	6	-3	1	0
	10	30	11	50	1	60	1.5	1006	-159	5	-1	1	0
	11	23	11	37	1	43	1.6	487	-77	5	0	0	0
	10	16	11	24	2	24	1.7	156	-18	4	0	0	0

	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
LOC09 s3=10 kPa	11	9	11	37	2	83	3.2	1419	-512	5	-6	0	0
	11	9	12	31	2	64	3.2	834	-293	4	-4	0	0
	11	10	11	24	1	43	3.2	380	-135	4	-3	0	0
	10	10	11	18	2	23	3.1	115	-39	3	-1	0	0
	10	38	11	64	4	79	1.4	1647	-269	6	-3	1	0
	10	30	11	50	2	61	1.5	990	-149	5	-2	0	0
	10	24	11	37	1	41	1.5	459	-65	4	-1	0	0
	11	18	11	25	1	21	1.5	154	-15	3	-1	0	0

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC Date: 1992.0
Material: London Clay (LOC)
Specimen: LOC10

Specimen details

	Moisture content	Dry density
Aimed:	25.0%	1515 kg/m^3
Start of Test:	25.1%	1456 kg/m^3
End of Test:	26.5%	

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
LOC10 s3=10 kPa	N	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
		kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	20	13	6	14	69	3	188	3.3	4685	-1029	43	-14	0	0
	50	13	6	14	70	4	192	3.3	4821	-1136	56	-16	0	0
	100	13	6	13	70	3	192	3.3	4904	-1205	65	-17	0	0
	200	13	6	14	71	3	193	3.3	5023	-1285	73	-19	0	0
	400	6	13	7	76	3	190	2.7	5070	-1334	80	-21	0	1
	1000	6	12	7	75	1	188	2.7	5194	-1403	88	-23	0	1
	2500	6	12	7	75	1	187	2.7	5268	-1465	94	-26	0	2
	5000	6	12	6	75	0	188	2.7	5386	-1542	100	-29	0	3
	7500	12	6	11	68	-3	186	3.3	5506	-1574	101	-31	0	4
	10000	12	6	12	69	-1	190	3.3	5566	-1611	103	-33	0	6
	20000	13	7	14	72	5	197	3.3	5533	-1726	122	-41	1	13
	30000	7	13	9	79	6	198	2.7	5586	-1760	130	-45	1	25
	40000	6	12	5	74	-3	185	2.7	5617	-1730	128	-46	1	48
	50000	6	12	6	74	-2	184	2.7	5601	-1721	124	-47	1	59
	60000	6	13	5	74	-3	185	2.7	5659	-1755	122	-50	1	59
	70000	6	13	5	74	-4	183	2.7	5635	-1756	121	-52	1	59
	80000	6	12	5	73	-4	182	2.7	5648	-1749	121	-53	1	59

LOC10 s3=10 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	11	9	12	36	2	82	3.3	1672	-442	2	-5	0	0
	11	9	11	31	2	64	3.3	1062	-281	2	-4	0	0
	11	9	11	23	2	42	3.3	498	-136	2	-2	0	0
	10	10	11	17	1	21	3.2	191	-55	1	-1	0	0
	10	37	11	63	3	78	1.5	1776	-164	4	6	1	0
	10	31	11	51	2	61	1.5	1172	-90	3	7	0	0
	10	24	11	37	1	41	1.5	559	-50	3	8	0	0
	10	16	11	24	3	21	1.5	197	-29	3	8	0	0

LOC10 s3=10 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	11	9	12	36	2	81	3.3	1560	-399	3	-5	0	0
	11	9	12	31	2	64	3.3	1018	-260	3	-3	0	0
	11	10	11	24	2	43	3.3	493	-130	2	-2	0	0
	10	10	11	17	2	22	3.2	189	-50	2	-1	0	0
	10	37	11	63	2	78	1.5	1766	-159	4	-1	1	0
	10	31	11	51	1	60	1.5	1146	-86	3	-1	0	0
	10	24	11	37	1	41	1.5	587	-52	3	0	0	0
	10	17	11	24	1	21	1.5	197	-31	2	0	0	0

LOC10 s3=10 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	11	9	12	36	2	82	3.3	1521	-384	3	-4	0	0
	11	9	11	31	1	64	3.3	988	-250	3	-3	0	0
	11	10	11	24	3	44	3.3	467	-125	2	-2	0	0
	10	10	11	17	2	22	3.2	181	-50	2	-1	0	0
	10	37	11	63	3	78	1.5	1725	-143	3	-1	1	0
	10	31	11	51	2	61	1.5	1133	-85	3	-1	0	0
	10	24	10	37	1	41	1.5	554	-53	3	0	0	0
	10	17	11	24	2	22	1.5	199	-34	2	0	0	0

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC Date: 1992.0
Material: London Clay (LOC)
Specimen: LOC12

Specimen details

	Moisture content	Dry density
Aimed:	25.0%	1515 kg/m^3
Start of Test:	25.4%	1478 kg/m^3
End of Test:	25.2%	

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
	N	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
		kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
LOC12 s3=10 kPa	20	12	8	12	52	1	134	3.3	1973	-484	12	-6	1	3
	50	12	8	12	53	2	136	3.3	2024	-505	14	-7	1	3
	100	12	8	12	53	2	137	3.3	2047	-522	16	-7	1	3
	200	12	8	12	53	2	136	3.3	2070	-536	16	-7	1	3
	400	8	12	9	57	3	135	2.8	2088	-541	18	-8	1	3
	1000	8	12	9	57	3	137	2.8	2106	-557	20	-9	1	3
	2500	8	12	9	57	3	137	2.8	2094	-561	22	-10	1	3
	5000	7	11	8	56	3	137	2.8	2087	-570	26	-11	1	3
	7500	10	6	11	52	2	137	3.3	2127	-580	26	-12	1	3
	10000	10	6	11	53	4	140	3.3	2128	-589	27	-13	1	3
	20000	11	7	14	57	10	150	3.3	2263	-639	33	-17	1	3
	30000	11	7	15	58	10	151	3.3	2259	-643	36	-20	1	2
	40000	8	12	8	57	1	135	2.8	2190	-604	33	-20	1	2
	50000	6	10	6	55	-1	133	2.8	2191	-601	29	-21	1	2
	60000	7	11	9	58	7	143	2.8	2181	-617	30	-24	1	2
	70000	8	12	9	59	4	141	2.8	2194	-614	30	-25	1	2
	80000	8	12	9	57	2	134	2.8	2130	-591	28	-26	1	2

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
LOC12 s3=10 kPa	11	9	12	36	1	82	3.3	1071	-294	5	-4	1	0
	11	9	11	30	1	61	3.3	664	-187	5	-3	0	0
	11	10	11	24	2	42	3.2	336	-94	4	-2	0	0
	10	10	11	17	1	21	3.2	114	-29	4	-1	0	0
	11	37	12	64	3	80	1.5	1266	-95	6	2	1	0
	10	31	11	50	3	59	1.4	763	-41	6	3	1	0
	10	23	11	37	3	42	1.5	404	-34	5	3	0	0
	10	17	11	23	1	20	1.5	129	-24	4	3	0	0

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
LOC12 s3=10 kPa	11	9	12	37	3	84	3.3	1069	-279	3	-14	1	0
	11	9	12	30	3	63	3.3	647	-177	3	-13	0	0
	11	10	12	24	2	42	3.2	316	-89	2	-12	0	0
	11	10	11	18	3	22	3.1	101	-27	1	-11	0	0
	10	37	11	63	1	77	1.5	1205	-96	3	-10	1	0
	10	28	10	48	0	58	1.5	778	-58	2	-10	1	0
	10	24	11	37	2	39	1.4	397	-31	2	-9	0	0
	10	17	11	24	2	21	1.5	141	-24	1	-10	0	0

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
LOC12 s3=10 kPa	11	9	12	36	2	83	3.3	1081	-278	4	-4	1	0
	11	9	11	30	2	63	3.3	669	-177	4	-3	0	0
	11	10	11	23	1	41	3.2	316	-90	4	-2	0	0
	10	10	11	17	1	21	3.1	99	-26	3	-1	0	0
	10	37	11	63	3	78	1.4	1215	-96	5	-1	1	0
	10	31	10	50	1	58	1.5	786	-53	4	0	1	0
	10	22	9	35	-4	37	1.6	528	-67	2	0	0	0
	10	16	11	23	2	21	1.5	134	-22	3	0	0	0

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC Date: 1992.0
Material: London Clay (LOC)
Specimen: LOC13

Specimen details

	Moisture content	Dry density
Aimed:	25.0%	1515 kg/m^3
Start of Test:	25.3%	1472 kg/m^3
End of Test:	25.4%	

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
LOC13 s3=10 kPa	N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
	20	11	7	13	52	4	135	3.3	2093	-690	21	-10	1	0
	50	11	7	12	52	3	134	3.3	2122	-706	25	-11	1	0
	100	11	7	13	52	3	135	3.3	2183	-722	29	-11	1	0
	200	11	7	13	53	4	136	3.3	2196	-738	31	-12	1	0
	400	7	12	8	56	2	133	2.7	2252	-753	33	-12	1	0
	1000	7	11	9	57	5	137	2.7	2230	-753	37	-14	1	0
	2500	7	12	9	57	4	136	2.7	2243	-759	39	-15	1	0
	5000	7	12	7	55	-1	131	2.7	2243	-754	39	-16	1	0
	7500	11	7	12	52	2	134	3.3	2254	-761	40	-16	1	0
	10000	11	7	13	53	4	138	3.3	2277	-769	41	-17	1	0
	20000	11	7	15	56	11	146	3.3	2299	-801	49	-22	1	0
	30000	7	12	11	60	10	145	2.7	2312	-794	51	-24	1	0
	40000	7	12	8	56	1	134	2.7	2301	-780	49	-25	1	0
	50000	7	12	8	57	1	137	2.7	2469	-804	60	-26	61	-60
	60000	7	12	10	60	8	144	2.7	2412	-827	49	-28	1	0
	70000	7	12	9	60	7	144	2.7	2400	-831	49	-30	1	0
	80000	7	12	6	56	-2	132	2.7	2407	-823	47	-30	1	0

LOC13 s3=10 kPa	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
	11	9	12	36	3	83	3.3	1259	-417	4	-5	0	0
	11	9	11	30	1	64	3.3	864	-287	3	-4	0	0
	11	10	11	24	1	43	3.3	460	-151	3	-2	0	0
	11	10	11	18	2	23	3.2	167	-57	3	-1	0	0
	10	38	11	63	2	78	1.4	1448	-210	4	-1	1	0
	10	30	11	51	2	61	1.5	1006	-141	3	0	0	0
	10	24	11	38	2	43	1.5	564	-77	3	1	0	0
	10	17	11	25	2	23	1.6	222	-35	2	1	0	0

LOC13 s3=10 kPa	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
	11	9	12	36	2	83	3.3	1249	-408	2	-5	0	0
	11	9	12	30	2	64	3.3	826	-274	2	-3	0	0
	11	10	12	25	2	45	3.3	475	-155	2	-2	0	0
	11	10	11	18	1	23	3.2	184	-60	2	-1	0	0
	10	38	11	64	2	78	1.4	1433	-206	3	-1	1	0
	10	31	11	52	2	62	1.5	1016	-141	2	-1	1	0
	10	23	11	38	2	43	1.5	559	-81	2	0	0	0
	10	17	11	25	2	23	1.5	227	-33	1	0	0	0

LOC13 s3=10 kPa	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
	10	8	11	36	2	83	3.3	1213	-399	3	-5	0	0
	10	8	11	30	2	64	3.3	814	-269	2	-3	0	0
	10	9	11	24	2	44	3.3	440	-149	2	-2	0	0
	10	9	10	17	2	23	3.2	179	-57	2	-1	0	0
	10	38	11	64	2	78	1.4	1382	-201	4	-2	1	0
	10	31	11	52	2	62	1.5	1016	-138	3	-1	1	0
	10	24	11	38	2	44	1.5	579	-80	3	-1	0	0
	10	17	11	25	3	24	1.5	222	-34	2	0	0	0

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC Date: 1992.0
Material: London Clay (LOC)
Specimen: LOC15

Specimen details

	Moisture content	Dry density
Aimed:	25.0%	1515 kg/m^3
Start of Test:	24.8%	1453 kg/m^3
End of Test:	25.2%	

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
LOC15 s3=30 kPa	N	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
		kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	20	34	23	34	103	-1	242	3.5	5890	-1722	93	-23	2	1
	50	34	23	33	104	-2	244	3.5	5818	-1822	112	-23	2	0
	100	34	23	33	105	-2	246	3.5	5809	-1897	127	-25	2	0
	200	34	23	34	106	-1	248	3.4	5798	-1962	143	-27	2	0
	400	23	34	23	115	-2	242	2.7	5682	-1950	155	-27	2	0
	1000	23	34	22	115	-3	244	2.7	5851	-2054	171	-30	2	0
	2500	22	33	22	115	-2	244	2.6	5820	-2076	190	-34	2	0
	5000	22	33	21	114	-2	243	2.6	5732	-2143	207	-38	2	0
	7500	33	22	33	104	1	248	3.5	5579	-2173	222	-41	2	0
	10000	33	21	33	103	0	245	3.5	5486	-2129	230	-41	2	0
	20000	34	22	35	105	4	251	3.5	4626	-2039	267	-39	2	-1
	30000	34	22	36	106	5	252	3.5	3970	-2910	283	-21	2	0
	40000	21	34	20	113	-3	239	2.6	3660	-3108	288	-21	2	-1
	50000	20	33	19	113	-2	240	2.6	3600	-3206	288	-19	2	0
	60000	20	33	20	113	-2	241	2.6	3527	-3233	287	-17	2	0
	70000	20	33	19	113	-3	240	2.6	3476	-3336	288	-17	2	-1
	80000	19	33	19	113	-1	241	2.6	3424	-3457	288	-19	2	-1

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
LOC15 s3=30 kPa	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	32	28	31	56	-1	83	3.5	820	-455	2	-5	1	0
	31	28	32	50	0	64	3.5	480	-273	2	-4	0	0
	31	29	31	43	-1	41	3.5	218	-124	2	-2	0	0
	31	30	31	37	0	21	3.4	75	-54	2	-1	0	0
	30	58	30	85	0	80	1.5	839	-241	4	-2	1	1
	30	51	30	72	-1	63	1.5	566	-152	3	-1	1	1
	30	44	30	58	1	43	1.5	241	-55	3	0	0	1
	30	37	30	45	1	22	1.5	88	-19	2	0	0	1

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
LOC15 s3=30 kPa	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	32	28	32	56	-1	85	3.5	800	-440	2	-5	1	0
	32	29	31	50	-1	63	3.5	465	-262	1	-3	0	0
	31	29	31	44	-1	44	3.5	231	-138	1	-2	0	0
	31	30	31	37	-1	22	3.4	88	-55	1	-1	0	0
	30	58	30	85	0	80	1.5	813	-212	2	-2	1	1
	30	51	30	73	0	64	1.5	537	-134	2	-1	1	1
	30	44	30	58	0	42	1.5	239	-54	1	-1	0	0
	30	37	31	45	0	22	1.5	83	-22	1	0	0	0

	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
LOC15 s3=30 kPa	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	32	28	32	57	0	86	3.5	763	-417	2	-5	1	0
	32	29	32	50	0	64	3.5	459	-245	1	-3	0	0
	31	29	31	44	0	44	3.5	223	-128	2	-2	0	0
	31	30	31	37	0	23	3.4	75	-50	1	-1	0	0
	30	58	31	85	0	82	1.5	815	-236	3	-3	1	1
	30	51	30	71	-1	60	1.5	480	-114	2	-1	1	1
	30	44	30	58	-1	42	1.5	241	-49	2	-1	0	0
	30	37	30	44	-1	21	1.5	91	-23	2	0	0	0

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC Date: 1992.0
Material: London Clay (LOC)
Specimen: LOC16

Specimen details

	Moisture content	Dry density
Aimed:	25.0%	1515 kg/m^3
Start of Test:	24.8%	1461 kg/m^3
End of Test:	25.2%	

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
LOC16 s3=30 kPa	N	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
		kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	20	34	22	35	105	2	247	3.5	6275	-2113	90	-29	2	0
	50	34	23	35	107	1	253	3.5	6387	-2402	128	-36	2	0
	100	34	23	34	106	0	247	3.5	6245	-2469	148	-40	2	0
	200	34	23	34	106	0	249	3.5	6301	-2563	164	-44	2	0
	400	23	34	25	118	4	253	2.7	6203	-2680	186	-50	2	0
	1000	23	34	26	119	6	257	2.7	6108	-2742	222	-60	2	0
	2500	24	33	24	98	0	193	2.6	5655	-1364	127	-11	1	0
	5000	23	33	24	98	1	194	2.6	5495	-1349	134	-11	1	0
	7500	33	23	33	89	0	196	3.5	5505	-1350	137	-12	1	0
	10000	33	23	32	87	-2	191	3.5	5413	-1315	139	-12	1	0
	20000	33	24	34	90	3	200	3.5	5429	-1195	148	-12	1	0
	30000	24	33	25	101	5	202	2.6	5435	-1149	153	-12	1	0
	40000	24	33	23	97	0	192	2.6	5255	-899	152	-6	1	0
	50000	23	33	22	96	-3	189	2.6	5260	-496	147	4	1	0
	60000	23	33	25	99	5	198	2.6	5286	-382	149	5	1	0
	70000	23	34	25	99	3	198	2.6	5251	-383	150	4	1	0
	80000	24	34	24	97	2	191	2.6	5132	-368	148	4	1	0

LOC16 s3=30 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	32	29	32	57	0	85	3.4	1121	-622	4	-8	1	0
	31	29	32	50	1	63	3.4	601	-338	4	-5	0	0
	31	30	31	44	1	43	3.4	282	-168	3	-3	0	0
	31	30	31	38	1	22	3.3	119	-58	3	-2	0	0
	30	59	30	84	-1	77	1.4	1123	-412	4	-5	1	0
	30	51	30	72	-1	61	1.5	696	-259	4	-4	1	0
	30	44	30	59	0	43	1.5	339	-127	3	-2	0	0
	30	37	31	45	0	22	1.5	119	-37	3	-1	0	0

LOC16 s3=30 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	32	28	32	57	0	85	3.4	1064	-576	3	-7	0	0
	31	29	31	50	0	62	3.4	572	-331	3	-5	0	0
	31	30	31	44	0	42	3.3	285	-165	3	-3	0	0
	31	30	31	38	1	22	3.2	109	-56	3	-2	0	0
	30	58	31	85	0	80	1.5	1108	-416	4	-5	1	0
	30	52	30	73	0	63	1.5	707	-255	3	-4	1	0
	30	45	31	59	1	42	1.5	336	-118	3	-2	0	0
	30	38	31	45	1	21	1.5	111	-31	3	-1	0	0

LOC16 s3=30 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	32	29	32	57	0	84	3.4	991	-529	1	-6	0	0
	31	29	31	50	0	62	3.3	554	-308	1	-4	0	0
	31	30	31	43	0	42	3.4	303	-166	1	-2	0	0
	31	30	31	37	0	21	3.3	119	-51	1	-1	0	0
	30	58	31	85	0	79	1.5	1025	-384	2	-4	1	0
	30	52	30	72	-1	60	1.5	650	-229	1	-3	1	0
	30	44	30	58	-1	41	1.5	342	-112	1	-1	0	0
	31	38	30	45	0	21	1.5	124	-37	1	-1	0	0

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC Date: 1992.0
Material: London Clay (LOC)
Specimen: LOC18

Specimen details

	Moisture content	Dry density
Aimed:	25.0%	1515 kg/m^3
Start of Test:	24.7%	1511 kg/m^3
End of Test:	25.2%	

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
LOC18 s3=30 kPa	N	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
		kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	20	33	23	33	88	-2	197	3.6	4067	-1345	68	-16	1	0
	50	33	23	33	88	-1	195	3.5	3935	-1348	74	-17	1	0
	100	33	23	33	89	-1	198	3.5	4044	-1403	79	-18	1	0
	200	33	23	33	90	-1	202	3.5	4197	-1507	87	-20	2	0
	400	23	33	24	101	2	205	2.6	4288	-1597	98	-23	2	0
	1000	23	33	23	99	0	197	2.6	4170	-1565	106	-24	1	0
	2500	23	32	23	97	1	194	2.6	3989	-1529	114	-26	1	0
	5000	22	32	22	97	0	193	2.6	3964	-1551	120	-28	2	0
	7500	32	22	32	87	0	196	3.5	3996	-1575	125	-30	2	0
	10000	32	22	31	85	-3	191	3.6	3992	-1574	127	-32	2	0
	20000	33	23	35	91	7	203	3.5	3937	-1594	142	-38	2	0
	30000	33	23	35	91	6	205	3.6	3938	-1599	151	-42	2	0
	40000	22	33	21	96	-4	188	2.6	3795	-1566	150	-42	1	0
	50000	21	32	20	95	-4	189	2.6	3835	-1573	149	-43	1	0
	60000	21	32	23	99	5	201	2.6	3811	-1573	153	-45	2	0
	70000	21	32	23	99	4	199	2.6	3868	-1583	153	-47	2	0
	80000	22	33	23	99	3	199	2.6	3868	-1583	154	-49	2	0

LOC18 s3=30 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	31	29	32	56	0	81	3.3	494	-297	8	-4	1	0
	31	29	31	50	0	63	3.3	207	-180	7	-3	0	0
	31	30	31	44	-1	43	3.2	125	-87	7	-2	0	0
	31	30	31	37	0	21	3.2	51	-10	8	-1	0	0
	30	58	30	83	1	77	1.4	714	-170	7	-2	1	0
	30	50	30	71	1	61	1.5	343	-95	7	-1	1	0
	30	44	30	57	1	41	1.5	171	-39	3	-1	0	0
	30	37	30	44	-1	20	1.5	61	-34	1	0	0	0

LOC18 s3=30 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	32	29	31	56	-1	82	3.3	496	-286	5	-4	1	0
	31	29	31	50	0	63	3.3	200	-171	5	-2	0	0
	31	30	31	43	0	41	3.2	115	-75	5	-1	0	0
	31	30	31	37	1	21	3.2	36	-7	6	-1	0	0
	30	58	30	84	0	79	1.5	765	-172	6	-2	1	0
	30	51	30	71	1	60	1.4	330	-84	5	-1	1	0
	30	44	30	58	0	39	1.5	167	-33	25	-1	0	0
	30	37	30	44	-1	20	1.5	46	-31	26	-1	0	0

LOC18 s3=30 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	31	29	32	56	1	83	3.3	418	-293	8	-5	1	0
	31	29	31	50	0	62	3.3	169	-159	8	-3	0	0
	31	30	30	44	-1	42	3.2	118	-75	8	-2	0	0
	31	30	31	37	0	21	3.2	28	-9	9	-2	0	0
	30	58	30	84	0	78	1.4	671	-160	8	-3	1	0
	30	51	30	71	0	60	1.5	318	-88	8	-2	1	0
	30	44	30	58	1	40	1.5	161	-37	8	-1	0	0
	30	38	30	45	0	21	1.5	46	-30	1	-1	0	0

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC Date: 1992.0
Material: London Clay (LOC)
Specimen: LOC20

Specimen details

	Moisture content	Dry density
Aimed:	25.0%	1515 kg/m^3
Start of Test:	24.7%	1504 kg/m^3
End of Test:	25.6%	

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
LOC20 s3=30 kPa	N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
	20	34	23	34	87	0	193	3.6	4922	-1054	45	-12	1	0
	50	34	23	34	88	0	194	3.6	5118	-1122	61	-13	1	0
	100	34	23	34	89	1	195	3.6	5244	-1184	73	-14	1	0
	200	33	24	34	88	1	195	3.5	5273	-1230	85	-15	1	0
	400	24	34	24	98	2	195	2.6	5417	-1312	96	-17	1	0
	1000	23	33	23	98	0	194	2.6	5538	-1368	109	-18	1	0
	2500	22	30	22	76	-2	139	2.6	1651	-405	28	5	1	-1
	5000	22	30	21	76	-2	137	2.6	1630	-408	29	4	1	-1
	7500	30	22	29	68	-4	137	3.6	1648	-417	30	3	1	-1
	10000	30	22	30	69	-1	139	3.6	1635	-420	30	3	1	-1
	20000	31	23	32	71	2	143	3.6	1651	-444	34	0	1	-1
	30000	23	31	24	79	3	144	2.6	1679	-447	36	-1	1	-1
	40000	22	31	21	76	-3	137	2.5	1687	-453	36	-2	1	-1
	50000	21	30	23	77	3	143	2.6	1691	-463	34	-3	1	-1
	60000	22	31	22	76	-3	136	2.5	1696	-462	32	-4	1	-1
	70000	23	32	22	77	-4	135	2.5	1709	-463	32	-5	1	-1
	80000	23	32	21	76	-5	134	2.5	1693	-455	31	-5	1	-1

	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
LOC20 s3=30 kPa	32	29	32	57	2	85	3.4	1395	-40	135	206	1	-1
	31	29	32	51	2	65	3.4	856	-18	135	206	0	-1
	31	30	31	44	0	42	3.3	393	-6	134	206	0	-1
	31	30	36	38	17	22	3.7	41	-7	134	206	0	-1
	30	57	38	64	22	21	0.0	102	-140	137	207	0	0
	30	30	35	38	16	23	2.9	23	-6	137	207	0	0
	30	30	37	38	22	23	2.3	46	-6	136	207	0	0
	30	30	37	38	22	22	2.1	36	-7	136	207	0	0

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC Date: 1992.0
Material: London Clay (LOC)
Specimen: LOC21

Specimen details

	Moisture content	Dry density
Aimed:	25.0%	1515 kg/m^3
Start of Test:	24.7%	1482 kg/m^3
End of Test:	24.9%	

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
LOC21 s3=30 kPa	N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
	20	33	24	32	70	-2	136	3.7	1556	-352	10	-6	1	0
	50	33	24	32	70	-2	137	3.7	1525	-367	4	-6	1	0
	100	33	24	32	70	-2	137	3.7	1563	-377	6	-6	1	0
	200	33	24	32	71	-2	139	3.7	1599	-388	8	-6	1	0
	400	24	33	24	80	0	142	2.5	1687	-415	10	-7	1	0
	1000	24	33	24	77	-2	135	2.5	1609	-398	11	-7	1	0
	2500	24	33	23	78	-2	136	2.5	1635	-407	12	-8	1	0
	5000	24	32	23	77	-2	134	2.5	1630	-408	13	-9	1	0
	7500	32	24	31	68	-4	133	3.7	1648	-417	14	-9	1	0
	10000	33	24	32	69	-2	136	3.7	1635	-420	14	-10	1	0
	20000	34	25	34	71	2	140	3.7	1651	-444	19	-12	1	0
	30000	34	25	34	72	2	142	3.7	1679	-448	20	-13	1	0
	40000	24	33	23	78	-3	133	2.5	1687	-454	20	-14	1	0
	50000	23	32	24	79	3	140	2.5	1691	-463	18	-15	1	0
	60000	24	34	23	78	-3	133	2.5	1696	-463	16	-16	1	0
	70000	25	35	24	79	-4	132	2.5	1709	-464	16	-17	1	0
	80000	25	34	23	78	-5	131	2.5	1693	-456	16	-17	1	0

	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
LOC21 s3=30 kPa	32	28	32	55	0	81	3.4	824	-203	5	-3	0	0
	31	29	31	50	0	62	3.4	503	-126	4	-3	0	0
	31	30	31	43	0	41	3.3	250	-67	5	-2	0	0
	31	30	31	37	0	22	3.2	66	-13	4	-1	0	0
	30	57	30	83	-1	77	1.5	973	-75	5	0	1	0
	30	50	30	70	-1	59	1.5	609	-46	4	0	0	0
	30	44	30	57	0	40	1.5	303	-24	4	0	0	0
	30	37	30	43	-1	19	1.5	96	-26	4	0	0	0

	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
LOC21 s3=30 kPa	31	28	31	55	0	82	3.4	814	-200	3	-3	0	0
	31	29	31	50	0	63	3.4	505	-132	3	-2	0	0
	31	29	31	43	0	42	3.3	255	-63	3	-1	0	0
	30	30	30	37	0	22	3.2	66	-13	2	-1	0	0
	30	57	30	83	1	79	1.5	948	-74	4	-1	1	0
	30	50	30	70	0	58	1.5	591	-41	3	-1	1	0
	30	44	30	57	-1	39	1.5	301	-23	3	0	0	0
	30	37	30	44	-1	20	1.5	78	-25	2	0	0	0

	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r me	E3r me	E1p x10^{-4}	E3p x10^{-4}	PPr kPa	PPp kPa
LOC21 s3=30 kPa	31	28	32	56	0	83	3.4	806	-195	2	-2	0	0
	31	29	31	50	0	63	3.4	500	-128	2	-2	0	0
	31	29	31	43	0	42	3.3	233	-61	1	-1	0	0
	30	30	31	37	1	22	3.2	51	-8	2	0	0	0
	30	58	30	84	0	78	1.4	953	-58	2	0	1	0
	30	51	30	70	0	59	1.5	591	-32	2	0	0	0
	30	44	30	57	-1	39	1.5	291	-14	1	0	0	0
	30	37	29	43	-1	19	1.5	73	-26	1	0	0	0

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LNEC Date: 1992.0
Material: London Clay (LOC)
Specimen: LOC22

Specimen details

	Moisture content	Dry density
Aimed:	25.0%	1515 kg/m^3
Start of Test:	24.7%	1504 kg/m^3
End of Test:	24.7%	

	Cycle	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Axial	Resilient Radial	Permanent Axial	Permanent Radial	Pore Pressure Axial	Pore Pressure Radial
LOC22 s3=30 kPa	N	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
		kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	20	31	25	31	72	1	140	3.4	1549	-299	11	-3	1	0
	50	31	25	31	71	1	138	3.4	1522	-300	13	-3	1	0
	100	31	25	32	72	2	139	3.4	1555	-304	15	-3	1	0
	200	31	25	32	73	3	141	3.4	1613	-321	17	-4	1	0
	400	25	31	26	79	3	144	2.7	1689	-337	18	-4	1	0
	1000	26	31	26	76	0	135	2.7	1631	-323	19	-4	1	0
	2500	26	31	26	76	2	134	2.7	1548	-314	20	-4	1	0
	5000	26	31	26	75	0	131	2.7	1510	-308	20	-5	1	0
	7500	31	26	31	69	0	131	3.5	1518	-311	18	-6	1	0
	10000	31	25	31	68	-2	130	3.5	1520	-313	18	-7	1	0
	20000	31	25	32	70	3	135	3.5	1500	-326	19	-9	1	0
	30000	25	31	25	76	2	133	2.6	1485	-324	19	-10	1	0
	40000	25	32	24	75	-1	130	2.6	1492	-326	18	-12	1	0
	50000	24	31	24	74	0	129	2.6	1462	-326	17	-13	1	0
	60000	24	31	25	76	3	133	2.6	1477	-332	17	-15	1	0
	70000	24	32	26	76	4	135	2.6	1470	-338	16	-16	1	0
	80000	24	32	25	76	2	131	2.6	1442	-341	18	-17	1	0

LOC22 s3=30 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	32	28	32	56	1	83	3.4	819	-171	1	-2	0	0
	31	29	31	50	1	63	3.4	534	-112	1	-2	0	0
	31	29	31	44	0	43	3.3	338	-65	0	-1	0	0
	30	30	30	37	0	22	3.2	144	-25	0	-1	0	0
	30	58	30	84	1	77	1.4	892	-46	1	-1	1	0
	30	51	30	71	0	61	1.5	623	-34	1	-1	1	0
	30	43	30	57	0	40	1.5	355	-18	0	0	0	0
	30	37	30	44	0	21	1.5	139	-9	-1	0	0	0

LOC22 s3=30 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	31	28	31	56	0	82	3.4	776	-162	2	-2	0	0
	31	29	31	50	0	62	3.4	496	-108	2	-2	0	0
	31	29	31	43	0	42	3.3	290	-62	2	-1	0	0
	30	30	30	37	0	22	3.2	118	-24	1	-1	0	0
	30	58	30	84	1	80	1.5	864	-46	3	-1	1	0
	30	51	30	71	0	60	1.5	577	-29	2	-1	0	0
	30	44	30	58	0	41	1.5	328	-14	2	0	0	0
	30	37	30	44	-1	20	1.5	123	-9	2	0	0	0

LOC22 s3=30 kPa	s31	s32	p1	p2	q1	q2	qr/pr	E1r	E3r	E1p	E3p	PPr	PPp
	kPa	kPa	kPa	kPa	kPa	kPa		me	me	x10^{-4}	x10^{-4}	kPa	kPa
	31	28	32	56	1	82	3.4	733	-156	2	-2	0	0
	31	29	31	49	0	62	3.4	494	-107	1	-1	0	0
	31	29	31	44	1	43	3.3	282	-61	1	-1	0	0
	30	30	31	37	1	22	3.2	121	-22	1	-1	0	0
	30	58	30	84	1	79	1.4	844	-42	2	-1	1	0
	30	51	29	70	-1	57	1.4	738	-43	-1	0	1	0
	30	44	30	58	1	41	1.5	290	-14	1	0	0	0
	30	37	30	44	-1	20	1.5	126	-10	1	0	0	0

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LRPC
Material: Soft Limestone (CCT)
Specimen: 2_066_1A

Specimen details **Moisture content** **Dry density**

Aimed: 4.5% kg/m^3
Start of test: kg/m^3
End of test: 4.3%

Specimen size: 160 mm x 320 mm Static load included (y/n) n

Specimen Conditioning

Date 12/03/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*
20	1	100	7	204	16	312	1.5	1237	623	59	-17
50	1	100	7	203	16	310	1.5	1189	692	68	-19
100	1	100	7	203	18	309	1.5	1042	704	75	-21
200	1	100	8	203	19	309	1.5	938	637	83	-21
400	1	100	8	203	19	309	1.5	840	518	89	-21
1000	1	100	7	202	18	307	1.5	715	254	95	-18
2500	1	100	7	202	17	307	1.5	663	160	100	-16
5000	1	100	7	202	16	306	1.5	589	138	104	-16
7500	1	100	6	202	15	306	1.5	548	122	108	-15
10000	1	99	6	202	15	306	1.5	562	111	109	-15
12500	1	100	6	202	15	306	1.5	562	98	111	-15
20000	0	99	6	202	15	306	1.5	522	80	114	-15

Resilient 1

Date: 13/03/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*
1.1	0	50	4	65	9	43	0.6	188	144	111	-14
1.2	0	100	4	124	9	72	0.5	306	196	112	-13
1.3	0	175	4	215	12	117	0.5	318	324	113	-12
1.4	2	242	8	295	15	158	0.5	374	387	114	-10
2.1	1	50	6	103	14	160	1.5	402	109	114	-12
2.2	1	100	7	203	17	309	1.5	553	167	115	-12
2.3	1	150	8	303	21	458	1.5	687	208	118	-13
2.4	3	200	15	400	34	599	1.5	655	208	124	-13
3.1	1	30	6	93	17	190	2.0	538	-62	123	-15
3.2	1	60	7	183	18	367	2.0	771	-106	125	-16
3.3	1	100	8	302	20	605	2.0	1014	-230	137	-24
4.1	1	10	6	64	16	159	2.5	549	-338	138	-26
4.2	1	15	6	93	16	234	2.5	674	-453	139	-28
4.3	1	20	6	123	17	309	2.5	795	-582	142	-32

Resilient 2
Date: 13/03/92

Cycles	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain	
N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p $x10^{-4}$	E3p $x10^{-4}$
1.1	16	65	20	80	12	44	0.5	134	66	-3	11
1.2	16	114	21	138	14	71	0.5	276	132	-3	13
1.3	16	190	22	229	15	116	0.5	336	177	-3	15
1.4	16	246	22	297	17	152	0.5	389	226	-2	17
2.1	16	65	22	119	16	161	1.5	448	-83	-2	16
2.2	16	114	23	218	20	311	1.5	687	-128	-1	16
2.3	16	165	24	319	23	461	1.5	773	-74	2	15
2.4	17	212	29	413	36	602	1.5	685	43	7	14
3.1	16	45	23	109	19	191	2.0	570	-248	4	15
3.2	17	75	24	199	21	371	2.0	823	-326	4	14
3.3	16	115	24	318	23	608	2.0	1037	-420	8	12
4.1	15	25	21	79	18	160	2.5	624	-470	7	13
4.2	16	30	23	109	18	236	2.5	812	-634	8	12
4.3	16	35	22	139	19	311	2.5	902	-772	9	10

Resilient 3
Date: 17/03/92

Cycles	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain	
N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p $x10^{-4}$	E3p $x10^{-4}$
1.1	1	49	5	64	12	43	0.5	180	176	0	3
1.2	1	99	6	123	13	72	0.5	269	283	1	3
1.3	1	174	6	212	14	113	0.5	352	376	2	4
1.4	4	233	10	284	19	150	0.5	329	407	3	6
2.1	1	50	6	104	15	161	1.5	561	32	3	3
2.2	1	99	7	203	18	310	1.5	659	109	6	1
2.3	1	151	8	304	21	459	1.5	713	209	8	0
2.4	9	197	24	394	45	587	1.5	597	168	13	1
3.1	1	30	7	94	17	190	2.0	563	-103	9	-1
3.2	1	60	8	184	19	371	2.0	757	-115	10	-2
3.3	1	99	9	302	22	607	2.0	1002	-200	14	-5
4.1	1	10	7	64	17	160	2.5	563	-394	14	-6
4.2	1	15	7	93	18	234	2.5	674	-486	14	-8
4.3											

Resilient 4
Date: 17/03/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31*	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*
	kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*με*	*με*	*x10^{-4}*	*x10^{-4}*
1.1	1	50	5	64	13	43	0.5	197	315	-3	6
1.2	1	99	5	124	13	72	0.5	319	371	-2	8
1.3	1	175	6	212	14	112	0.5	383	438	-2	9
1.4	4	234	10	284	17	150	0.5	350	439	0	11
2.1	1	50	6	104	14	160	1.5	476	72	1	7
2.2	1	99	7	203	18	311	1.5	656	136	2	6
2.3	1	150	8	303	22	458	1.5	715	186	4	5
2.4	7	198	21	396	41	594	1.5	619	162	8	6
3.1	1	30	7	94	18	190	2.0	548	-118	4	4
3.2	1	60	8	184	20	369	2.0	770	-124	6	3
3.3	1	100	8	303	21	609	2.0	956	-218	9	0
4.1	1	10	7	64	17	160	2.5	541	-391	8	-2
4.2	1	15	7	93	17	235	2.5	673	-490	8	-3
4.3	1	20	7	123	18	309	2.5	763	-563	10	-5

Resilient 5
Date: 17/03/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31*	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*
	kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*με*	*με*	*x10^{-4}*	*x10^{-4}*
1.1	1	49	5	64	12	43	0.5	201	284	-2	6
1.2	1	100	5	124	13	71	0.5	301	399	-1	8
1.3	1	175	6	213	14	113	0.5	407	450	0	9
1.4	3	234	9	285	17	152	0.5	362	440	1	11
2.1	1	50	6	104	14	160	1.5	521	47	1	7
2.2	1	100	7	204	18	310	1.5	655	126	3	6
2.3	1	151	8	304	21	459	1.5	751	166	4	5
2.4	1	198	13	399	35	602	1.5	659	326	8	4
3.1	1	30	7	93	17	190	2.0	577	-115	5	4
3.2	1	60	8	184	20	371	2.0	762	-98	7	2
3.3	1	99	9	302	22	607	2.0	928	-147	9	0
4.1	1	11	7	64	17	160	2.5	572	-411	10	-3
4.2	1	15	7	93	17	235	2.5	722	-502	11	-4
4.3	1	20	7	123	18	307	2.5	758	-584	12	-7

Resilient 6
Date: 17/03/92

Cycles	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain	
N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p x10^{-4}	E3p x10^{-4}
1.1	16	64	21	79	12	43	0.5	138	65	-1	10
1.2	16	114	21	138	13	71	0.5	255	121	-1	11
1.3	16	190	21	228	14	113	0.5	303	184	0	13
1.4	15	246	21	297	16	151	0.5	376	239	0	14
2.1	16	65	21	119	14	161	1.5	455	-92	0	13
2.2	16	114	22	218	18	310	1.5	613	-97	2	13
2.3	16	165	24	318	22	458	1.5	726	-78	3	12
2.4	21	213	37	411	45	594	1.5	557	-12	7	12
3.1	16	45	22	109	17	191	2.0	542	-291	2	12
3.2	15	76	22	200	19	371	2.0	762	-389	3	12
3.3	16	114	23	318	22	610	2.0	995	-484	5	10
4.1	16	25	22	79	17	161	2.5	608	-530	4	11
4.2	16	30	22	109	17	235	2.5	758	-687	4	10
4.3	16	35	22	139	18	310	2.5	817	-806	4	9

Resilient 7
Date: 19/03/92

Cycles	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain	
N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p x10^{-4}	E3p x10^{-4}
1.1	16	64	20	79	12	42	0.5	179	60	0	5
1.2	16	114	20	138	13	71	0.5	252	102	1	6
1.3	16	190	21	227	14	112	0.5	335	151	2	7
1.4	17	246	24	297	18	151	0.5	339	159	3	8
2.1	16	66	21	119	14	161	1.5	486	-108	2	7
2.2	16	114	23	218	18	309	1.5	671	-118	3	7
2.3	15	165	22	318	22	458	1.5	719	-92	5	6
2.4	23	213	37	411	42	594	1.5	584	-52	9	6
3.1	16	45	22	109	18	190	2.0	579	-298	5	6
3.2	16	75	22	198	19	368	2.0	783	-396	5	5
3.3	16	115	24	318	21	607	2.0	949	-477	6	4
4.1	15	25	21	79	17	159	2.4	578	-505	5	4
4.2	16	30	22	109	18	235	2.5	714	-654	6	4
4.3	16	35	22	139	18	311	2.5	821	-756	5	3

Resilient 8
Date: 19/03/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*
1.1	16	64	20	79	12	43	0.5	156	69	0	6
1.2	16	114	20	138	12	70	0.5	296	106	0	6
1.3	16	190	20	227	13	110	0.5	335	148	1	7
1.4	24	246	32	295	22	145	0.5	294	137	3	8
2.1	16	65	21	119	13	160	1.5	524	-118	1	7
2.2	15	114	22	217	17	310	1.5	669	-139	2	6
2.3	16	166	23	319	20	459	1.5	748	-135	3	6
2.4	15	213	30	411	45	592	1.4	550	72	7	4
3.1	16	46	22	110	17	191	2.0	577	-306	3	6
3.2	16	75	23	199	19	370	2.0	782	-413	3	5
3.3	15	114	23	317	21	608	2.0	969	-472	4	4
4.1	15	26	21	80	17	161	2.5	609	-505	3	4
4.2	16	30	22	108	17	234	2.5	739	-644	3	4
4.3	16	35	22	139	18	310	2.5	803	-741	3	3

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LRPC
Material: Soft Limestone (CCT)
Specimen: 2_071_2A

Specimen details	**Moisture content**	**Dry density**
Aimed:	3.5%	2250 kg/m^3
Start of test:		kg/m^3
End of test:	3.5%	

Specimen size: 160 mm x 320 mm Static load included (y/n) n

Specimen Conditioning

Date 23/03/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31* *kPa*	*s32* *kPa*	*p1* *kPa*	*p2* *kPa*	*q1* *kPa*	*q2* *kPa*	*qr/pr*	*E1r* *με*	*E3r* *με*	*E1p* *x10^{-4}*	*E3p* *x10^{-4}*
20	1	99	2	300	4	602	2.0	706	-77	31	-2
50	1	99	3	299	5	601	2.0	688	-44	33	-2
100	1	99	4	299	8	600	2.0	613	-25	36	-2
200	1	99	4	299	9	599	2.0	603	-8	37	-1
400	1	99	4	298	10	598	2.0	555	11	38	-1
1000	1	99	5	298	11	597	2.0	496	32	40	1
2500	1	99	5	298	11	596	2.0	457	50	40	2
5000	1	99	5	297	11	595	2.0	421	59	41	3
7500	1	99	5	298	11	595	2.0	413	58	41	4
10000	1	99	6	298	13	595	2.0	379	58	42	5
12500	1	99	5	298	12	595	2.0	378	58	42	5
20000	1	99	5	298	11	596	2.0	361	51	42	6

Resilient 1

Date: 24/03/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31* *kPa*	*s32* *kPa*	*p1* *kPa*	*p2* *kPa*	*q1* *kPa*	*q2* *kPa*	*qr/pr*	*E1r* *με*	*E3r* *με*	*E1p* *x10^{-4}*	*E3p* *x10^{-4}*
1.1	2	50	4	60	8	31	0.4	13	104	41	6
1.2	2	100	5	120	9	60	0.4	55	122	42	7
1.3	1	176	5	211	10	106	0.5	103	167	42	8
1.4	13	239	20	285	22	139	0.4	95	89	42	11
2.1	2	50	5	100	10	150	1.5	79	127	41	10
2.2	2	100	5	200	11	302	1.5	253	131	41	10
2.3	2	150	6	301	13	451	1.5	316	143	42	10
2.4	8	200	16	398	23	595	1.5	329	31	42	11
3.1	2	30	5	90	9	179	2.0	165	111	42	10
3.2	2	60	6	180	11	361	2.0	303	98	42	10
3.3	2	100	6	301	13	602	2.0	403	81	42	10
4.1	2	10	5	60	9	150	2.6	130	57	42	9
4.2	2	15	5	90	9	225	2.5	214	68	42	9
4.3	2	20	5	120	10	301	2.5	249	58	41	9

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LRPC
Material: Soft Limestone (CCT)
Specimen: 2_087_1A

Specimen details **Moisture content** **Dry density**

Aimed: 4.5% kg/m^3
Start of test: kg/m^3
End of test: 3.5%

Specimen size: 160 mm x 320 mm Static load included (y/n) n

Specimen Conditioning

Date 01/04/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*
20	1	100	7	304	16	612	2.0	776	-166	28	0
50	1	100	7	304	17	611	2.0	715	-143	31	-1
100	1	100	8	303	19	610	2.0	668	-135	32	-1
200	1	99	9	303	21	609	2.0	622	-128	34	-1
400	1	100	9	303	22	608	2.0	612	-123	36	0
1000	1	100	9	302	22	607	2.0	574	-118	37	0
2500	2	100	9	302	21	605	2.0	510	-108	40	0
5000	2	100	9	302	20	604	2.0	469	-105	41	1
7500	2	100	9	301	20	603	2.0	457	-103	43	1
10000	2	100	9	301	20	603	2.0	443	-100	43	1
12500	2	100	9	301	20	603	2.0	431	-100	43	1
20000	2	100	9	301	20	603	2.0	414	-101	44	1

Resilient 1

Date: 02/04/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*
1.1	2	50	7	64	16	42	0.4	31	-18	44	1
1.2	2	100	7	124	16	71	0.5	86	-18	44	1
1.3	1	175	8	215	19	118	0.5	142	-8	44	2
1.4	5	240	12	293	21	158	0.5	141	-13	44	3
2.1	2	50	8	104	19	161	1.5	174	-29	44	3
2.2	2	100	8	205	19	312	1.5	272	-49	44	2
2.3	2	149	9	303	22	462	1.5	348	-61	45	2
2.4	3	201	12	405	26	611	1.5	350	-75	45	3
3.1	2	30	8	93	19	189	2.0	192	-41	44	3
3.2	2	60	9	184	20	371	2.0	327	-71	44	2
3.3	2	100	9	304	22	611	2.0	407	-103	45	2
4.1	2	10	8	63	18	159	2.5	125	-40	44	2
4.2	2	14	8	93	19	236	2.6	247	-65	44	1
4.3	2	20	8	123	19	311	2.5	269	-83	44	1

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LRPC
Material: Hard Limestone (CCD)2
Specimen: 2_063_1A

Specimen details **Moisture content** **Dry density**

Aimed: kg/m^3
Start of test: 2370 kg/m^3
End of test: 2.0%

Specimen size: 160 mm x 320 mm Static load included (y/n) n

Specimen Conditioning

Date 10/03/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*
20	1	99	6	303	16	610	2.0	790	-85	67	-26
50	1	99	7	302	17	608	2.0	738	-40	75	-28
100	1	100	8	302	21	605	2.0	603	-2	90	-34
400	1	99	8	301	21	604	2.0	567	2	94	-35
1000	1	100	9	300	23	600	2.0	508	17	100	-37
2500	1	100	9	299	22	596	2.0	458	24	104	-38
5000	2	100	9	299	21	596	2.0	439	26	106	-38
7500	2	100	9	300	20	597	2.0	416	25	108	-38
10000	2	101	9	300	21	597	2.0	410	25	108	-38
12500	2	100	9	300	20	596	2.0	402	22	109	-38
15000	2	100	9	300	20	596	2.0	386	21	109	-38
20000	2	100	9	299	20	596	2.0	385	22	109	-38

Resilient 1

Date: 11/03/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*
1.1	2	50	5	64	10	42	0.5	110	79	107	-37
1.2	2	100	6	124	11	72	0.5	129	119	109	-36
1.3	1	176	6	215	12	116	0.5	184	181	108	-34
1.4	3	238	9	290	17	155	0.5	173	213	108	-31
2.1	2	50	7	103	15	159	1.5	236	78	108	-32
2.2	2	100	8	203	16	308	1.5	307	106	109	-32
2.3	2	150	9	302	22	455	1.5	358	126	109	-32
2.4	2	199	11	399	27	598	1.5	351	133	111	-32
3.1	2	31	8	94	18	188	2.0	276	33	108	-32
3.2	2	60	9	183	19	367	2.0	380	40	109	-32
3.3	2	100	9	301	21	601	2.0	430	35	109	-33
4.1	2	10	8	63	18	158	2.6	219	-30	110	-33
4.2	2	14	8	93	18	234	2.6	289	-37	109	-34
4.3	2	20	8	122	18	307	2.5	309	-39	109	-34

Resilient 2
Date: 11/03/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*
1.1	15	65	20	79	12	42	0.5	53	27	-1	4
1.2	15	114	19	139	13	72	0.5	107	54	0	5
1.3	16	191	21	229	13	115	0.5	156	84	0	6
1.4	14	243	20	296	16	156	0.5	205	110	0	7
2.1	15	65	20	119	15	160	1.5	237	-3	-1	7
2.2	15	114	21	218	18	309	1.5	349	-8	-1	7
2.3	14	165	21	317	20	455	1.5	345	2	1	6
2.4	16	213	29	412	39	596	1.5	332	32	2	6
3.1	15	45	22	108	18	189	2.0	241	-42	0	7
3.2	15	75	22	198	19	368	2.0	388	-67	0	7
3.3	15	114	23	316	22	605	2.0	468	-87	0	6
4.1	15	25	22	79	19	159	2.5	210	-74	0	6
4.2	15	30	22	108	19	234	2.5	295	-107	0	6
4.3	15	35	22	138	19	308	2.5	345	-124	0	6

Resilient 2
Date: 02/04/92

Cycles	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain	
N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p $x10^{-4}$	E3p $x10^{-4}$
1.1	16	64	20	78	13	43	0.5	24	-27	0	1
1.2	15	115	20	139	13	72	0.5	80	-32	0	1
1.3	16	189	21	229	14	118	0.5	140	-32	0	2
1.4	16	261	21	315	15	160	0.5	161	-36	0	2
2.1	15	64	20	119	14	161	1.5	137	-48	0	2
2.2	15	115	20	219	16	311	1.5	248	-74	0	2
2.3	15	164	22	318	19	461	1.5	338	-88	1	2
2.4	15	216	25	418	27	606	1.5	344	-93	1	2
3.1	15	45	21	108	17	190	2.0	169	-57	0	2
3.2	15	75	22	199	19	371	2.0	298	-93	0	2
3.3	15	115	22	319	21	610	2.0	402	-131	0	2
4.1	15	25	21	79	17	160	2.5	135	-52	0	2
4.2	16	30	22	109	17	237	2.5	206	-76	0	2
4.3	16	35	22	139	18	311	2.5	268	-97	0	2

Resilient 3
Date: 03/04/92

Cycles	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain	
N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p $x10^{-4}$	E3p $x10^{-4}$
1.1	1	49	4	64	11	43	0.5	34	-6	1	0
1.2	1	100	5	124	11	72	0.5	99	-3	1	0
1.3	0	175	4	215	11	117	0.5	156	-3	2	0
1.4	8	243	15	295	18	154	0.5	124	-28	2	1
2.1	1	50	5	104	12	162	1.5	99	-24	108	1
2.2	1	100	6	204	15	310	1.5	180	-43	112	1
2.3	1	150	7	304	17	461	1.5	231	-62	112	1
2.4	3	200	11	403	22	609	1.5	265	-81	111	1
3.1	1	38	6	101	15	190	1.8	116	-36	107	1
3.2	1	60	7	183	17	370	2.0	187	-68	107	1
3.3	1	100	7	303	18	609	2.0	264	-101	107	1
4.1	1	10	6	64	15	160	2.5	98	-41	107	1
4.2	1	14	6	93	15	236	2.5	207	-65	100	0
4.3	1	20	6	98	15	236	2.4	151	-60	106	0

Resilient 4
Date: 04/04/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*
1.1	1	49	4	64	11	43	0.5	34	-6	1	0
1.2	1	100	5	124	11	72	0.5	99	-3	1	0
1.3	0	175	4	215	11	117	0.5	156	-3	2	0
1.4	8	243	15	295	18	154	0.5	124	-28	2	1
2.1	1	50	5	104	12	162	1.5	99	-24	108	1
2.2	1	100	6	204	15	310	1.5	180	-43	112	1
2.3	1	150	7	304	17	461	1.5	231	-62	112	1
2.4	3	200	11	403	22	609	1.5	265	-81	111	1
3.1	1	38	6	101	15	190	1.8	116	-36	107	1
3.2	1	60	7	183	17	370	2.0	187	-68	107	1
3.3	1	100	7	303	18	609	2.0	264	-101	107	1
4.1	1	10	6	64	15	160	2.5	98	-41	107	1
4.2	1	14	6	93	15	236	2.5	207	-65	100	0
4.3	1	20	6	98	15	236	2.4	151	-60	106	0

Resilient 5
Date: 04/04/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*
1.1	16	65	20	80	12	43	0.5	22	-27	0	1
1.2	16	115	20	139	13	72	0.5	64	-32	0	1
1.3	16	189	21	229	13	117	0.5	112	-35	1	1
1.4	16	258	23	310	19	154	0.5	75	-36	1	2
2.1	16	65	21	119	14	162	1.5	115	-41	0	2
2.2	16	115	22	219	17	310	1.5	185	-62	1	2
2.3	16	165	22	319	19	461	1.5	302	-91	0	2
2.4	15	216	23	419	21	608	1.5	356	-107	2	2
3.1	16	45	22	109	16	190	2.0	152	-56	0	2
3.2	16	75	22	199	18	371	2.0	291	-96	1	2
3.3	16	115	23	318	20	609	2.0	423	-131	1	2
4.1	16	26	22	80	16	161	2.5	103	-41	1	2
4.2	16	30	22	109	17	236	2.5	191	-74	1	1
4.3	16	35	22	139	18	311	2.5	222	-96	1	1

Resilient 6
Date: 04/04/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*
1.1	16	65	20	79	12	42	0.5	36	-24	0	0
1.2	16	115	20	139	13	72	0.5	79	-34	0	1
1.3	16	190	21	228	15	114	0.5	84	-34	0	1
1.4	25	259	33	310	22	153	0.5	137	-50	1	1
2.1	16	65	21	119	14	161	1.5	149	-45	0	1
2.2	16	115	22	219	17	311	1.5	204	-69	0	1
2.3	16	165	23	318	20	459	1.5	263	-74	0	1
2.4	15	216	24	420	24	612	1.5	344	-104	1	1
3.1	16	45	22	109	16	190	2.0	136	-55	1	1
3.2	16	75	22	199	18	371	2.0	293	-84	0	1
3.3	16	115	23	318	19	610	2.0	345	-127	1	1
4.1	15	25	21	79	16	160	2.5	127	-48	0	1
4.2	16	30	22	109	16	237	2.5	141	-71	0	1
4.3	16	35	22	139	17	310	2.5	237	-97	-1	1

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LRPC
Material: Hard Limestone (CCD)
Specimen: 2_063_1A

Specimen details	**Moisture content**	**Dry density**
Aimed:	2.0	2370 kg/m^3
Start of test:	2.3	2370 kg/m^3
End of test:	2.3	

Specimen size: 160 mm x 320 mm Static load included (y/n) n

Specimen Conditioning

Date 25/02/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*
20	1	99	6	303	15	610	2.0	771	-67	66	-26
50	1	99	6	303	16	609	2.0	717	-45	75	-30
100	1	99	7	302	18	607	2.0	657	-27	83	-33
200	1	99	8	301	21	604	2.0	578	-4	90	-37
400	1	99	8	300	22	601	2.0	496	8	97	-40
1000	1	99	8	299	22	598	2.0	429	22	105	-43
2500	1	100	8	298	21	596	2.0	400	32	110	-45
5000	1	100	8	298	21	595	2.0	400	22	113	-45
7500	1	100	8	298	21	594	2.0	395	13	114	-45
10000	1	100	8	298	21	593	2.0	388	0	114	-44
12500	1	100	8	298	21	594	2.0	386	1	115	-44
20000	1	100	8	298	20	593	2.0	391	-4	115	-44

Resilient 1 (CCD11)

Date: 26/02/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*
1.1	1	49	6	63	13	42	0.5	63	78	-1	2
1.2	1	100	6	124	14	72	0.5	105	120	-1	3
1.3	2	170	9	210	18	118	0.5	133	160	0	5
1.4	4	242	11	293	20	155	0.5	71	217	2	4
2.1	1	50	7	103	17	160	1.5	74	116	2	2
2.2	1	100	8	203	19	307	1.5	100	117	2	2
2.3	1	150	9	303	22	457	1.5	111	137	3	2
2.4	4	200	17	397	38	591	1.5	120	107	5	3
3.1	1	30	8	93	19	188	2.0	77	48	3	2
3.2	1	60	8	183	21	368	2.0	150	71	4	1
3.3	1	100	9	301	21	604	2.0	208	64	4	1
4.1	1	10	7	63	18	159	2.5	58	-52	4	0
4.2	1	15	8	93	18	234	2.5	124	-61	4	0
4.3	1	20	8	123	19	308	2.5	139	-62	5	-1

Resilient 2 (CCD12)
Date: 27/02/92

Cycles	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain	
N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p $x10^{-4}$	E3p $x10^{-4}$
1.1	1	50	5	64	13	42	0.5	24	107	-1	2
1.2	1	100	5	124	13	71	0.5	43	176	0	3
1.3	0	176	5	214	14	115	0.5	85	199	-1	4
1.4	2	241	8	294	15	159	0.5	111	200	0	6
2.1	1	50	6	103	16	158	1.5	50	152	0	4
2.2	1	100	7	203	18	309	1.5	149	159	1	3
2.3	1	150	8	303	20	458	1.5	201	168	1	3
2.4	1	201	9	402	25	604	1.5	182	171	2	3
3.1	1	30	7	94	16	189	2.0	145	33	1	3
3.2	1	61	8	184	18	368	2.0	185	48	1	3
3.3	1	100	8	302	19	604	2.0	239	42	2	3
4.1	1	10	7	64	16	159	2.5	81	-50	2	2
4.2	1	15	7	93	16	234	2.5	143	-65	2	2
4.3	1	20	7	123	17	309	2.5	163	-73	1	2

Resilient 3 (CCD13)
Date: 27/02/92

Cycles	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain	
N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p $x10^{-4}$	E3p $x10^{-4}$
1.1	15	65	20	79	12	42	0.5	22	24	-1	4
1.2	15	115	19	139	12	71	0.5	44	55	-1	5
1.3	15	190	20	228	14	114	0.5	42	96	-1	5
1.4	16	256	22	308	16	156	0.5	103	121	-1	6
2.1	15	65	21	119	16	161	1.5	96	-11	-1	6
2.2	15	115	22	218	19	309	1.5	177	-13	0	6
2.3	15	165	22	317	20	456	1.5	219	-13	0	6
2.4	20	215	34	411	41	586	1.4	168	3	1	6
3.1	15	45	22	108	18	188	2.0	123	-38	-1	6
3.2	15	75	22	198	19	368	2.0	201	-75	0	5
3.3	16	115	23	317	20	605	2.0	246	-101	1	5
4.1	16	26	22	79	17	159	2.5	120	-83	0	5
4.2	16	30	22	108	17	234	2.5	148	-118	0	5
4.3	15	35	22	138	18	309	2.5	181	-141	0	5

Resilient 4 (CCD14)
Date: 28/02/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*
1.1	1	50	6	64	13	42	0.5	36	126	1	0
1.2	1	99	6	125	13	74	0.5	77	144	1	1
1.3	1	175	6	214	14	117	0.5	143	178	1	2
1.4	2	241	8	295	16	160	0.5	128	178	2	2
2.1	1	50	6	104	15	160	1.5	96	110	2	1
2.2	1	99	7	202	18	308	1.5	191	133	2	0
2.3	1	150	8	302	20	455	1.5	220	149	3	0
2.4	1	200	11	400	27	598	1.5	164	119	4	1
3.1	1	30	7	93	17	189	2.0	138	67	3	0
3.2	1	60	8	183	19	366	2.0	184	101	3	-1
3.3	1	100	8	301	20	603	2.0	231	78	3	-1
4.1	1	10	7	64	16	159	2.5	143	-40	3	-1
4.2	1	14	7	93	16	233	2.5	164	-61	3	-2
4.3	1	19	7	122	18	308	2.5	179	-65	3	-2

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LRPC
Material: Hard Limestone (CCD)
Specimen: 2_056_1A

Specimen details **Moisture content** **Dry density**

Aimed:
Start of test: kg/m^3
End of test: kg/m^3

Specimen size: 160 mm x 320 mm Static load included (y/n) n

Specimen Conditioning

Date 02/03/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31* *kPa*	*s32* *kPa*	*p1* *kPa*	*p2* *kPa*	*q1* *kPa*	*q2* *kPa*	*qr/pr*	*E1r* *με*	*E3r* *με*	*E1p* *x10^{-4}*	*E3p* *x10^{-4}*
20	1	100	10	305	25	613	2.0	1024	-161	164	-90
50	1	100	10	304	26	610	2.0	1031	-118	199	-110
100	1	100	11	303	28	606	2.0	930	-50	230	-129
200	1	100	12	301	30	601	2.0	746	17	269	-150
400	1	100	12	299	30	596	2.0	642	51	309	-175
1000	1	100	12	297	32	589	2.0	507	69	370	-213
2500	1	100	12	295	32	583	1.9	449	56	424	-247
5000	1	100	12	294	32	579	1.9	412	57	459	-269
7500	1	100	12	293	32	578	1.9	394	84	476	-280
10000	1	100	12	293	30	578	1.9	393	59	487	-288
12500	1	100	12	293	32	576	1.9	368	73	496	-295
20000	1	101	11	293	27	576	1.9	455	-7	512	-308

Resilient 1 03/03/92

Date: 03/03/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31* *kPa*	*s32* *kPa*	*p1* *kPa*	*p2* *kPa*	*q1* *kPa*	*q2* *kPa*	*qr/pr*	*E1r* *με*	*E3r* *με*	*E1p* *x10^{-4}*	*E3p* *x10^{-4}*
1.1	1	49	9	67	23	51	0.5	49	179	0	3
1.2	1	100	9	127	24	80	0.5	128	241	-1	5
1.3	1	175	10	217	26	123	0.5	150	305	-1	8
1.4	3	240	13	294	28	160	0.5	198	302	-1	13
2.1	1	50	11	105	27	163	1.4	248	45	0	10
2.2	1	100	11	202	29	304	1.4	337	74	1	9
2.3	1	150	12	299	32	445	1.4	342	149	2	8
2.4	1	199	16	394	43	582	1.4	326	302	5	7
3.1	1	30	11	94	29	190	1.9	245	4	4	7
3.2	1	60	12	181	30	360	1.9	390	3	4	6
3.3	1	100	12	296	32	585	2.0	492	21	6	4
4.1	1	10	10	65	25	163	2.5	317	-394	3	-5
4.2	1	15	10	93	26	234	2.5	336	-424	4	-8
4.3	1	20	10	122	27	304	2.5	396	-471	5	-11

Resilient 2
Date: 03/03/92

Cycles	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain	
N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p $x10^{-4}$	E3p $x10^{-4}$
1.1	15	65	23	83	23	52	0.5	42	67	0	4
1.2	15	115	23	142	23	79	0.5	112	100	0	5
1.3	14	191	23	230	24	116	0.4	148	156	0	7
1.4	15	252	25	303	27	151	0.4	158	196	0	11
2.1	15	65	24	121	25	164	1.4	244	-51	0	10
2.2	15	115	25	217	27	304	1.4	332	-55	0	10
2.3	14	165	25	314	30	446	1.4	390	-37	2	9
2.4	16	214	29	410	38	586	1.4	393	15	3	8
3.1	15	45	25	109	26	191	1.9	311	-204	2	10
3.2	15	75	25	196	27	362	1.9	447	-303	3	9
3.3	15	115	25	311	29	586	1.9	569	-360	5	8
4.1	12	25	21	80	26	163	2.3	312	-384	4	7
4.2	15	30	25	108	26	234	2.5	412	-527	4	8
4.3	15	35	25	137	27	304	2.5	459	-628	5	7

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LRPC
Material: Hard Limestone (CCD)
Specimen: 2_062_2A

Specimen details **Moisture content** **Dry density**

Aimed: 4.3% 2270 kg/m^3
Start of test: kg/m^3
End of test:

Specimen size: 160 mm x 320 mm Static load included (y/n) n

Specimen Conditioning

Date 04/03/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31* *kPa*	*s32* *kPa*	*p1* *kPa*	*p2* *kPa*	*q1* *kPa*	*q2* *kPa*	*qr/pr*	*E1r* *με*	*E3r* *με*	*E1p* *x10^{-4}*	*E3p* *x10^{-4}*
20	1	100	6	299	14	599	2.0	902	-164	182	-112
50	1	100	6	298	15	594	2.0	826	-115	217	-130
100	1	100	7	297	17	591	2.0	734	-51	250	-148
200	1	100	7	296	18	587	2.0	634	-12	288	-169
400	1	100	7	294	18	582	2.0	572	3	332	-193
1000	1	100	7	292	18	575	2.0	534	-37	390	-223
2500	1	100	8	290	19	570	2.0	449	-18	444	-250
5000	1	100	7	289	16	568	2.0	432	-25	478	-267
7500	1	100	7	289	18	566	1.9	390	4	493	-274
10000	1	100	7	289	17	566	1.9	379	-2	502	-278
12500	1	99	7	288	17	565	1.9	393	7	508	-282
20000	1	99	7	288	18	565	1.9	370	34	518	-287

Resilient 1

Date: 05/03/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31* *kPa*	*s32* *kPa*	*p1* *kPa*	*p2* *kPa*	*q1* *kPa*	*q2* *kPa*	*qr/pr*	*E1r* *με*	*E3r* *με*	*E1p* *x10^{-4}*	*E3p* *x10^{-4}*
1.1	0	50	5	63	14	38	0.4	61	242	517	-285
1.2	0	100	5	122	14	65	0.4	96	303	545	-276
1.3	0	175	6	212	18	108	0.4	113	414	545	-273
1.4	2	245	9	292	23	140	0.4	137	467	545	-268
2.1	1	50	7	98	18	145	1.4	199	148	544	-268
2.2	1	100	7	194	19	280	1.4	322	160	545	-268
2.3	1	150	8	288	21	414	1.4	377	188	547	-269
2.4	0	201	9	383	26	546	1.4	351	249	550	-269
3.1	1	30	7	87	19	171	1.9	217	59	549	-269
3.2	1	60	7	171	19	332	1.9	358	12	549	-269
3.3	1	101	8	283	21	546	1.9	469	-1	551	-271
4.1											
4.2											
4.3											

Resilient 2
Date: 05/03/92

Cycles	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain	
N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p $x10^{-4}$	E3p $x10^{-4}$
1.1	15	65	20	79	12	41	0.5	91	95	-1	5
1.2	15	114	19	137	12	68	0.5	126	133	-1	6
1.3	15	190	20	228	12	111	0.5	174	168	0	7
1.4	15	253	20	302	15	145	0.5	200	215	-1	9
2.1	15	65	20	116	13	153	1.5	273	-43	-1	9
2.2	15	115	20	213	15	294	1.5	372	-72	0	8
2.3	15	165	22	310	20	433	1.4	397	-21	1	8
2.4	15	215	28	405	35	571	1.4	333	81	4	7
3.1	15	47	21	106	17	178	1.9	268	-142	2	8
3.2	15	75	22	192	19	350	1.9	361	-202	3	7
3.3	15	115	22	307	20	575	2.0	486	-284	4	6
4.1	15	25	21	76	17	152	2.5	292	-325	3	6
4.2	15	30	21	104	17	223	2.5	350	-411	3	6
4.3	15	35	21	132	18	292	2.5	402	-500	3	6

Resilient 3
Date: 05/03/92

Cycles	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain	
N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p $x10^{-4}$	E3p $x10^{-4}$
1.1	1	10	6	61	13	153	2.5	307	-332	2	-5
1.2	1	14	6	89	14	222	2.5	334	-356	3	-7
1.3	1	20	6	118	15	292	2.5	357	-385	4	-10
1.4	15	253	20	302	15	145	0.5	200	215	-1	9
2.1	15	65	20	116	13	153	1.5	273	-43	-1	9
2.2	15	115	20	213	15	294	1.5	372	-72	0	8
2.3	15	165	22	310	20	433	1.4	397	-21	1	8
2.4	15	215	28	405	35	571	1.4	333	81	4	7
3.1	15	47	21	106	17	178	1.9	268	-142	2	8
3.2	15	75	22	192	19	350	1.9	361	-202	3	7
3.3	15	115	22	307	20	575	2.0	486	-284	4	6
4.1	15	25	21	76	17	152	2.5	292	-325	3	6
4.2	15	30	21	104	17	223	2.5	350	-411	3	6
4.3	15	35	21	132	18	292	2.5	402	-500	3	6

Resilient 4
Date: 05/03/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31 kPa*	*s32 kPa*	*p1 kPa*	*p2 kPa*	*q1 kPa*	*q2 kPa*	*qr/pr*	*E1r με*	*E3r με*	*E1p x10^{-4}*	*E3p x10^{-4}*
1.1	15	65	20	79	12	41	0.5	72	87	0	6
1.2	15	114	20	137	12	68	0.5	128	109	-1	8
1.3	15	190	21	227	15	108	0.5	161	169	0	10
1.4	15	254	21	303	17	146	0.5	183	218	0	12
2.1	15	65	21	116	15	153	1.4	210	-11	0	12
2.2	15	115	21	212	16	292	1.4	313	-32	0	11
2.3	15	165	22	309	20	433	1.4	370	-24	1	11
2.4	16	215	28	404	36	567	1.4	279	92	4	10
3.1	15	45	21	105	17	180	1.9	249	-133	3	11
3.2	15	75	22	192	18	350	2.0	385	-217	3	11
3.3	16	114	22	306	19	573	2.0	505	-280	4	9
4.1	15	25	21	76	17	151	2.5	293	-346	4	10
4.2	15	30	21	104	16	222	2.5	364	-454	4	9
4.3	15	35	21	133	17	294	2.5	417	-558	4	9

Resilient 2
Date: 24/03/92

Cycles	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain	
N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p $x10^{-4}$	E3p $x10^{-4}$
1.1	15	65	16	76	2	32	0.5	40	11	0	3
1.2	15	114	16	135	2	61	0.5	78	29	0	4
1.3	15	190	16	224	3	103	0.5	142	59	0	4
1.4	19	247	22	294	7	143	0.5	133	62	1	5
2.1	15	65	16	115	3	151	1.5	149	-4	-1	5
2.2	16	114	17	215	6	301	1.5	247	-6	0	5
2.3	16	166	21	313	15	441	1.5	276	-5	1	5
2.4	30	213	45	401	45	563	1.5	231	-16	2	6
3.1	16	45	18	104	7	179	2.0	150	-20	0	5
3.2	15	75	18	196	9	361	2.0	256	-41	1	5
3.3	16	114	20	314	12	599	2.0	372	-53	1	5
4.1	15	25	17	75	7	148	2.5	126	-27	1	5
4.2	15	30	18	105	7	225	2.5	171	-49	1	5
4.3	16	35	18	135	8	300	2.5	225	-68	0	5

Repeated Load Triaxial Test Results **Test Programme 3**

Laboratory: LRPC
Material: Soft Limestone (CCT)
Specimen: 2_071_1A

Specimen details **Moisture content** **Dry density**

Aimed: 4.5% 2250 kg/m^3
Start of test: kg/m^3
End of test: 4.5%

Specimen size: 160 mm x 320 mm Static load included (y/n) n

Specimen Conditioning

Date 25/03/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31*	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*
	kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*με*	*με*	*x10^{-4}*	*x10^{-4}*
20	1	99	6	303	15	609	2.0	1801	-473	71	-20
50	1	99	7	302	17	606	2.0	1621	-370	86	-29
100	1	99	8	301	20	604	2.0	1397	-291	97	-36
200	1	99	9	300	23	601	2.0	1246	-228	107	-43
400	1	99	9	299	23	599	2.0	1156	-209	115	-49
1000	1	99	9	297	23	593	2.0	1071	-154	125	-58
2500	1	99	10	297	24	592	2.0	921	-95	132	-65
5000	1	99	9	297	21	593	2.0	911	-121	137	-68
7500	1	99	9	297	22	592	2.0	869	-113	140	-70
10000	0	98	8	296	22	592	2.0	817	-120	142	-70
12500	0	98	7	296	22	592	2.0	803	-124	143	-71
20000	-1	97	7	295	21	592	2.0	729	-114	145	-71

Resilient 1

Date: 26/03/92

Cycles	*Confining Pressure*		*Mean Normal Stress*		*Deviator Stress*		*Stress Ratio*	*Resilient Strain*		*Permanent Strain*	
N	*s31*	*s32*	*p1*	*p2*	*q1*	*q2*	*qr/pr*	*E1r*	*E3r*	*E1p*	*E3p*
	kPa	*kPa*	*kPa*	*kPa*	*kPa*	*kPa*		*με*	*με*	*x10^{-4}*	*x10^{-4}*
1.1	-1	50	4	64	13	41	0.5	161	179	139	-63
1.2	-1	100	4	124	14	72	0.5	289	292	140	-60
1.3	-1	175	4	214	16	116	0.5	396	482	140	-56
1.4	1	246	7	298	17	155	0.5	461	480	140	-51
2.1	-1	50	5	102	16	157	1.4	528	90	140	-56
2.2	-1	100	6	202	19	305	1.5	704	139	142	-57
2.3	-1	150	7	300	22	448	1.5	784	210	144	-58
2.4	3	200	13	399	29	595	1.5	730	146	147	-57
3.1	-1	30	6	92	21	186	1.9	589	-93	144	-59
3.2	-1	60	6	122	20	185	1.4	570	162	143	-58
3.3	-1	100	8	298	24	594	2.0	941	-141	146	-62
4.1	-1	10	6	63	20	156	2.4	552	-337	145	-63
4.2	-1	14	6	91	20	230	2.5	678	-434	145	-64
4.3	-1	20	6	121	21	302	2.5	780	-513	145	-66

Resilient 2
Date: 26/03/92

Cycles	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain	
N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p x10^{-4}	E3p x10^{-4}
1.1	16	65	20	79	12	42	0.5	189	75	-2	12
1.2	16	115	20	138	12	70	0.5	300	137	-1	13
1.3	15	190	19	228	13	112	0.5	382	203	-1	15
1.4	15	254	21	304	17	149	0.5	401	241	0	17
2.1	16	65	21	118	14	160	1.5	523	-147	0	16
2.2	16	115	21	217	17	306	1.5	691	-165	1	15
2.3	15	165	22	317	19	454	1.5	809	-152	2	14
2.4	16	215	27	413	31	594	1.5	713	14	5	13
3.1	16	45	22	108	17	189	2.0	641	-379	1	14
3.2	16	75	22	197	18	367	2.0	843	-523	2	13
3.3	16	115	23	316	20	602	2.0	1063	-636	4	11
4.1	15	25	21	79	17	160	2.5	639	-685	3	12
4.2	16	30	22	108	17	233	2.5	775	-868	2	11
4.3	16	35	22	138	17	307	2.5	860	######	3	10

Resilient 3
Date: 27/03/92

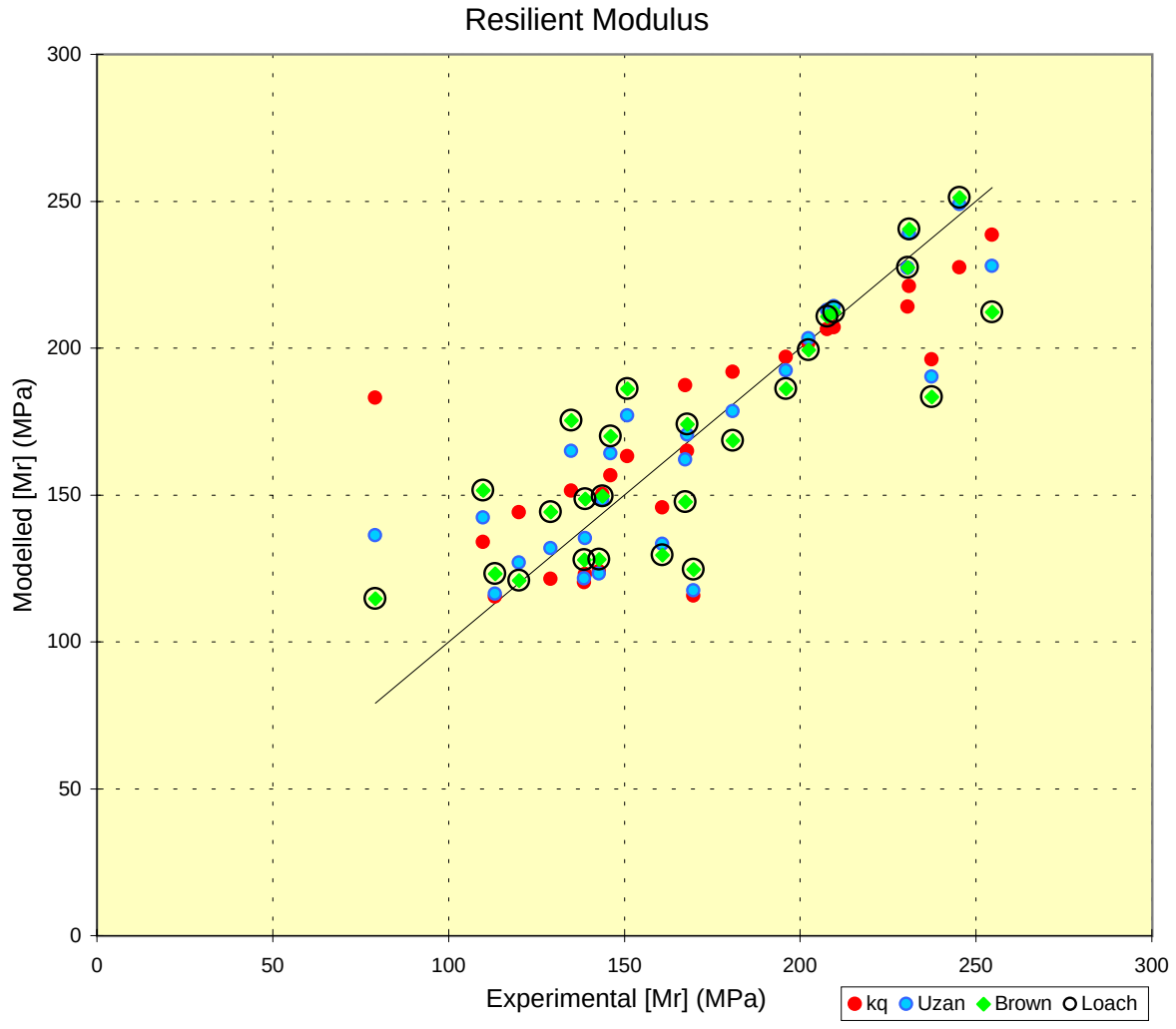
Cycles	Confining Pressure		Mean Normal Stress		Deviator Stress		Stress Ratio	Resilient Strain		Permanent Strain	
N	s31 kPa	s32 kPa	p1 kPa	p2 kPa	q1 kPa	q2 kPa	qr/pr	E1r με	E3r με	E1p x10^{-4}	E3p x10^{-4}
1.1	1	50	5	64	12	42	0.5	249	190	-1	4
1.2	1	100	5	123	12	70	0.5	375	297	0	5
1.3	1	175	6	213	13	113	0.5	480	385	1	7
1.4	15	237	24	284	28	142	0.4	287	311	3	10
2.1	1	50	7	104	16	160	1.5	588	-26	2	4
2.2	1	100	7	202	18	307	1.5	747	16	3	3
2.3	2	150	9	302	21	454	1.5	818	20	5	3
2.4	7	200	16	400	25	599	1.5	833	-25	8	3
3.1	1	30	8	93	17	189	2.0	633	-263	5	0
3.2	1	60	8	183	18	367	2.0	839	-325	6	-1
3.3	2	100	8	300	20	601	2.0	1046	-413	8	-4
4.1	2	10	8	63	17	158	2.5	618	-527	7	-6
4.2	1	14	7	92	17	233	2.5	716	-647	8	-7
4.3	2	20	8	122	17	306	2.5	819	-748	8	-9

APPENDIX G THE ANALYSIS AND ANALYTICAL MODELLING OF THE TEST RESULTS

Appendix G.1 RESULTS OF TEST PROGRAMME I FOR SUBGRADE SOILS AND UNBOUND GRANULAR MATERIALS (PHASE 1)

TP-I : UNOT ***Fountainebleau Sand (SFB)*** ***100% Percentile Data***

Experimental Data	Sample Size: 15 Suction (s) = 3 kPa @ ω= 0%			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 152 MPa	υ_e = 0.58
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 144,790	k_3 = 227,609	A = 92,013	C = 3,067,105
	k_2 = 0.3741	k_4 = 0.1647	B = -0.2548	D = 0.7452
		k_5 = 0.1651		
	r^2= 0.635	r^2= 0.750	r^2= 0.710	r^2= 0.710
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 97 MPa	Mr_c= 127 MPa	Mr_c= 159 MPa	Mr_c= 159 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	6990	0.06	8579	0.09	0.06	8750	0.03	291652	0.03
t=	20.71	6.39	26.53	1.87	2.85	10.52	-7.58	10.52	22.17
Prob(t)=	0%	0%	0%	7%	1%	0%	0%	0%	0%

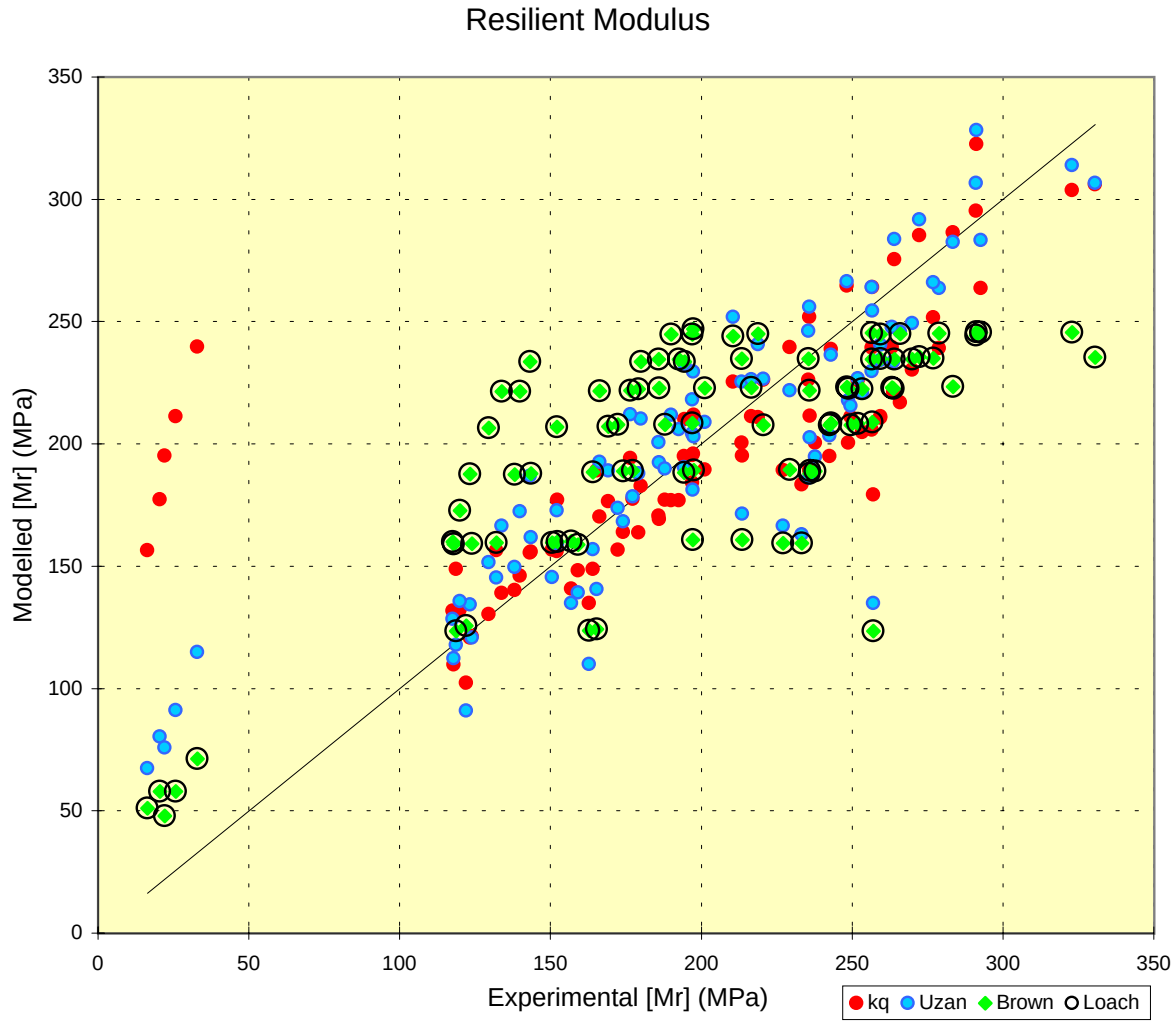
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : LRSB(1) ***Fountainebleau Sand (SFB)*** ***100% Percentile Data***

Experimental Data	Sample Size: 60 Suction (s) = 3 kPa @ ω= 0%			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 164 MPa	υ_e = 0.24
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 137,015	k_3 = 254,003	A = 108,597	C = 3,619,889
	k_2 = 0.4351	k_4 = 0.3147	B = -0.2404	D = 0.7596
		k_5 = 0.1621		
	r^2= 0.488	r^2= 0.786	r^2= 0.555	r^2= 0.555
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 86 MPa	Mr_c= 103 MPa	Mr_c= 182 MPa	Mr_c= 182 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	7624	0.05	5507	0.03	0.02	10362	0.03	345408	0.03
t=	17.97	8.94	46.13	9.24	7.32	10.48	-7.27	10.48	22.98
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

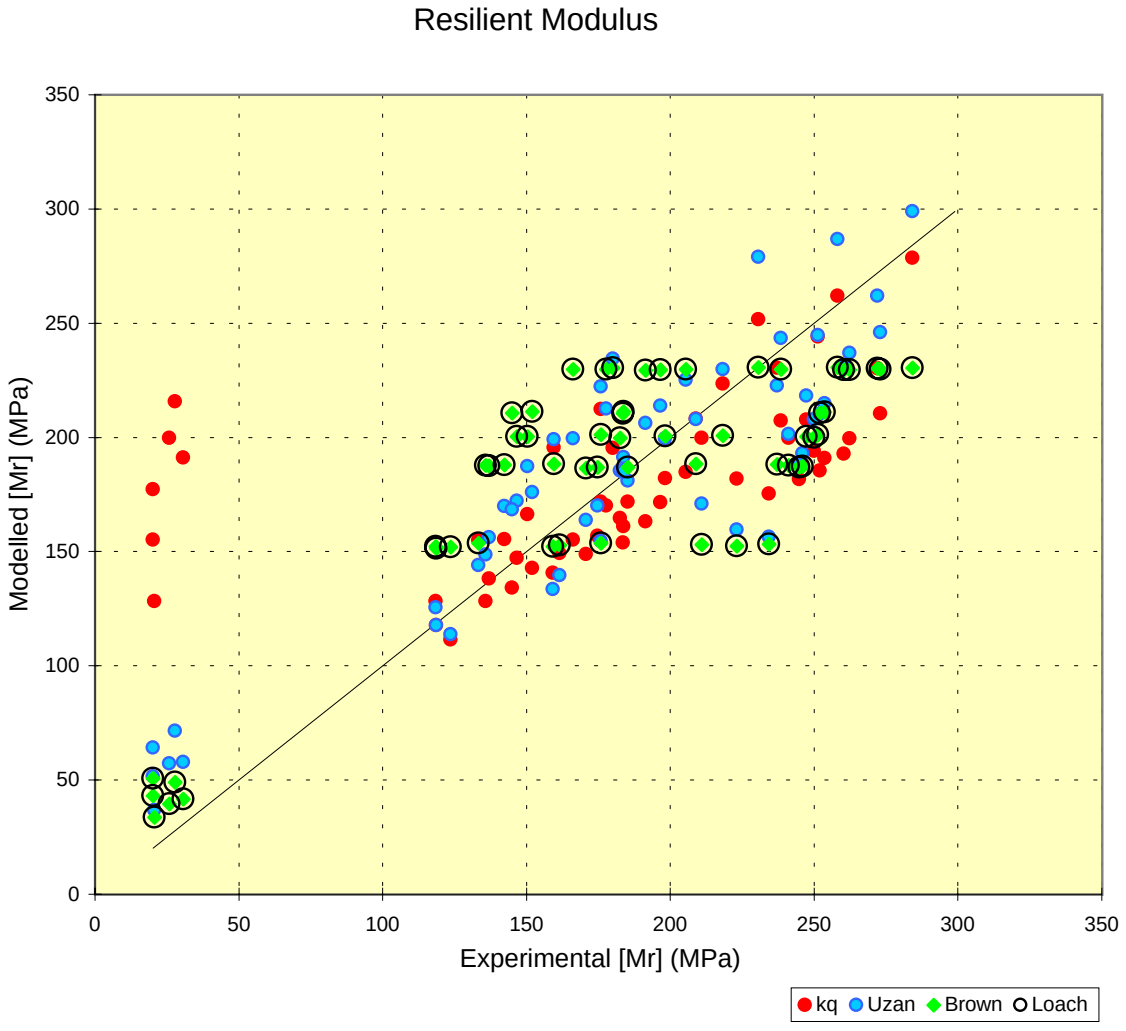
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : LRSB(2) ***Fountainbleau Sand (SFB)*** ***100% Percentile Data***

Experimental Data	Sample Size: 40 Suction (s) = 3 kPa @ ω= 0%			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 142 MPa	υ_e = 0.33
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 125,519	k_3 = 250,215	A = 86,958	C = 2,898,583
	k_2 = 0.4218	k_4 = 0.2898	B = -0.2959	D = 0.7041
		k_5 = 0.2398		
	r^2= 0.272	r^2= 0.801	r^2= 0.667	r^2= 0.667
Characteristic Values	At: p_2 = 12 kPa & q_2= 26 kPa			
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 80 MPa	Mr_c= 97 MPa	Mr_c= 164 MPa	Mr_c= 164 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	13019	0.09	7856	0.05	0.04	12373	0.05	412447	0.05
t=	9.64	4.45	31.85	5.82	6.82	7.03	-6.01	7.03	14.31
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

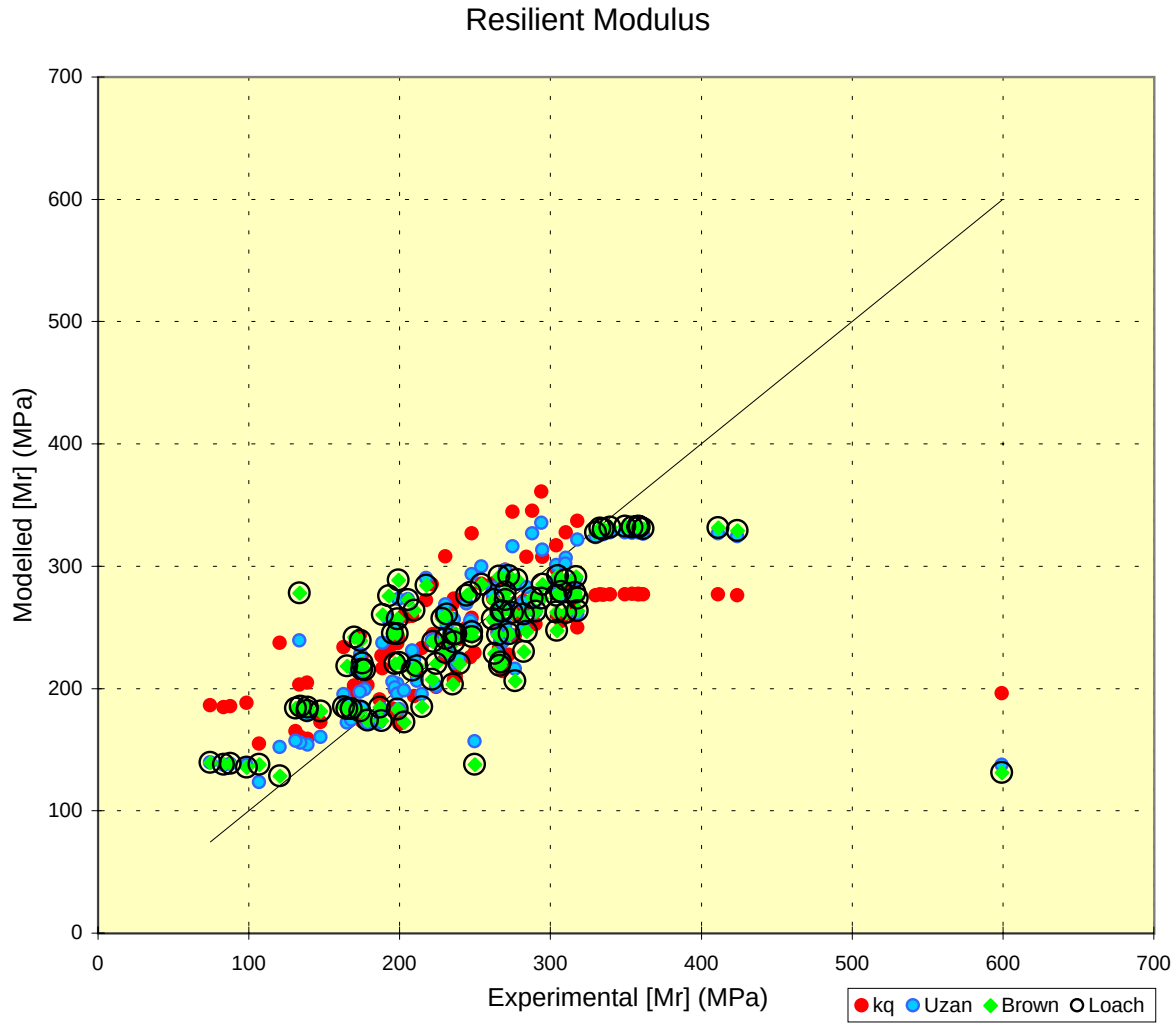
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : LRCF(1) ***Fountainebleau Sand (SFB)*** ***100% Percentile Data***

Experimental Data	Sample Size: 65 Suction (s) = 3 kPa @ ω= 0%			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 207 MPa	υ_e = 0.40
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 186,822	k_3 = 302,574	A = 124,188	C = 4,139,588
	k_2 = 0.3376	k_4 = 0.2056	B = -0.2542	D = 0.7458
		k_5 = 0.1794		
	r^2= 0.344	r^2= 0.484	r^2= 0.402	r^2= 0.402
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 130 MPa	Mr_c= 152 MPa	Mr_c= 215 MPa	Mr_c= 215 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	9737	0.05	8748	0.05	0.03	11806	0.03	393539	0.03
t=	19	6.93	35	3.97	5.31	11	-8.02	11	23.52
Prob(t)=	0	0.00	0	0.00	0.00	0	0.00	0	0.00

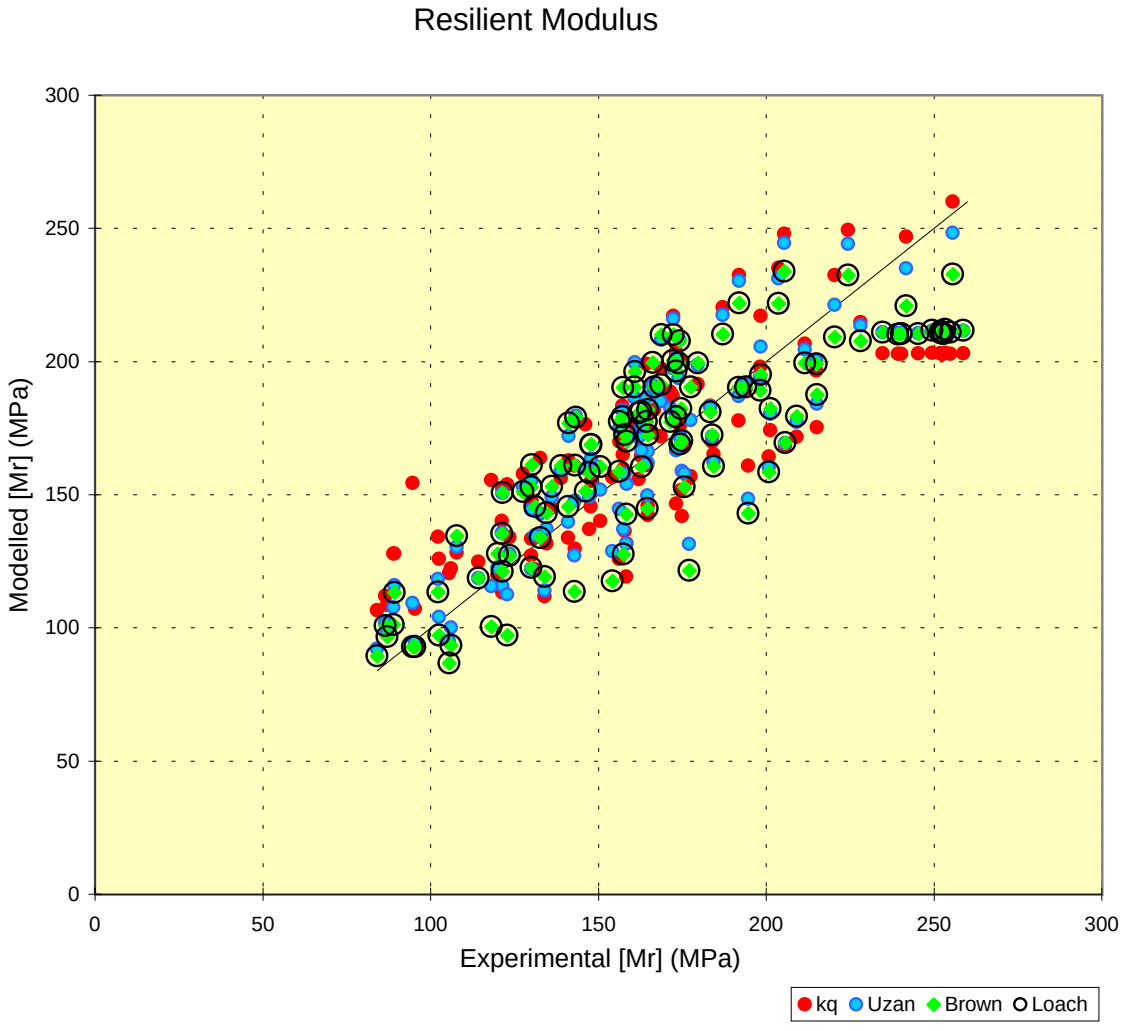
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : LRCF(2) ***Fountainebleau Sand (SFB)*** ***100% Percentile Data***

Experimental Data	Sample Size: 69 Suction (s) = 3 kPa @ ω= 0%			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 135 MPa	υ_e = 0.51
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 122,753	k_3 = 190,386	A = 81,915	C = 2,730,501
	k_2 = 0.3526	k_4 = 0.1380	B = -0.2453	D = 0.7547
		k_5 = 0.1646		
	r^2= 0.641	r^2= 0.736	r^2= 0.709	r^2= 0.709
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 84 MPa	Mr_c= 113 MPa	Mr_c= 139 MPa	Mr_c= 139 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	3879	0.03	2775	0.04	0.03	4523	0.02	150754	0.02
t=	32	13.55	69	3.39	5.99	18	-14.73	18	45.32
Prob(t)=	0	0.00	0	0.00	0.00	0	0.00	0	0.00

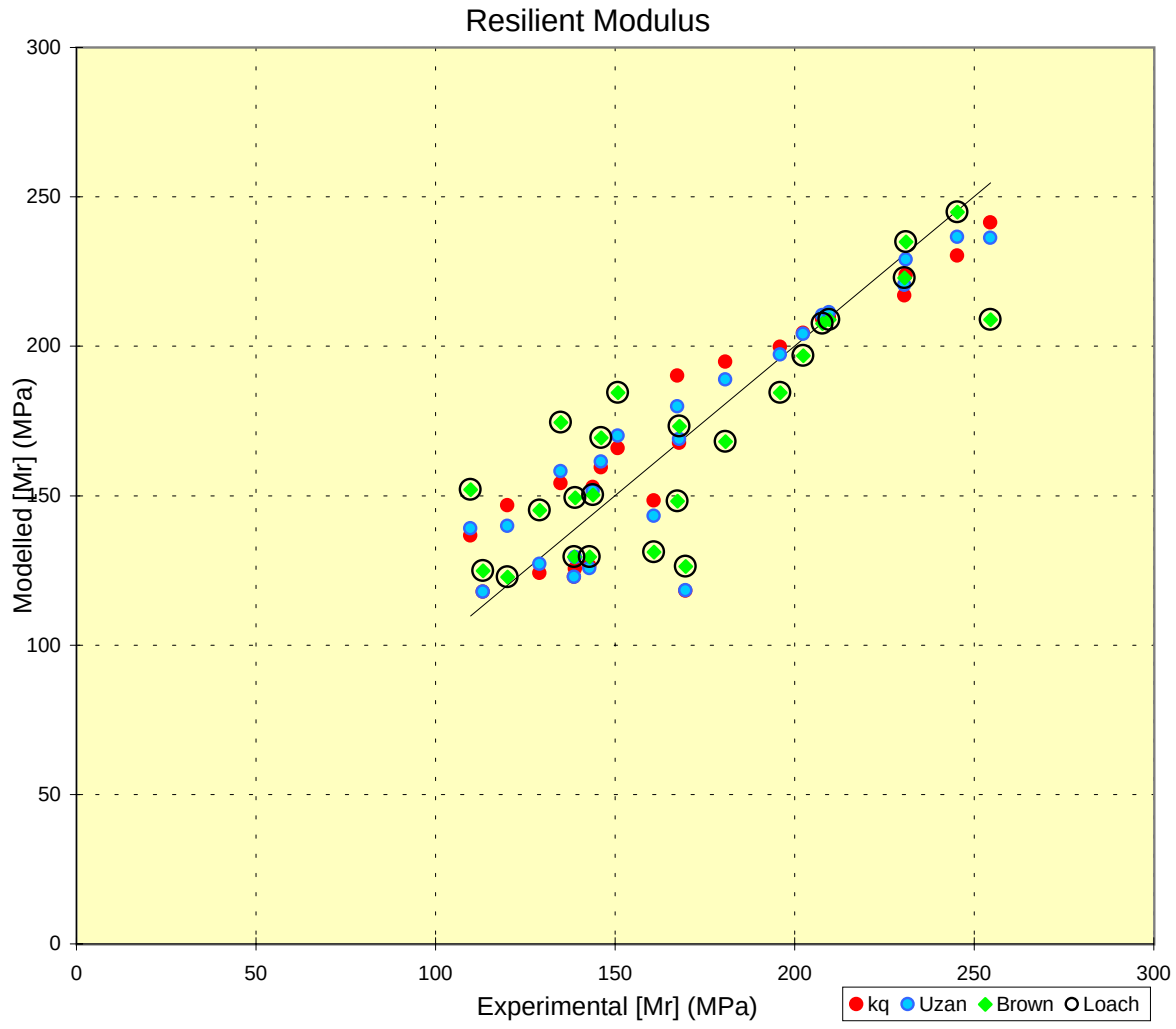
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : UNOT ***Fountainebleau Sand (SFB)*** *0.95* ***100% Percentile Data***

Experimental Data	Sample Size: 14	Suction (s) =	3 kPa @ ω=	0%
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 153 MPa	υ_e = 0.57
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 147,453	k_3 = 223,342	A = 94,894	C = 3,163,118
	k_2 = 0.3691	k_4 = 0.2943	B = -0.2406	D = 0.7594
		k_5 = 0.0583		
	r^2= 0.827	r^2= 0.837	r^2= 0.725	r^2= 0.725
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 100 MPa	Mr_c= 109 MPa	Mr_c= 159 MPa	Mr_c= 159 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	4456	0.04	6455	0.08	0.05	8415	0.03	280493	0.03
t=	33.09	10.16	34.60	3.83	1.10	11.28	-7.70	11.28	24.30
Prob(t)=	0%	0%	0%	0%	28%	0%	0%	0%	0%

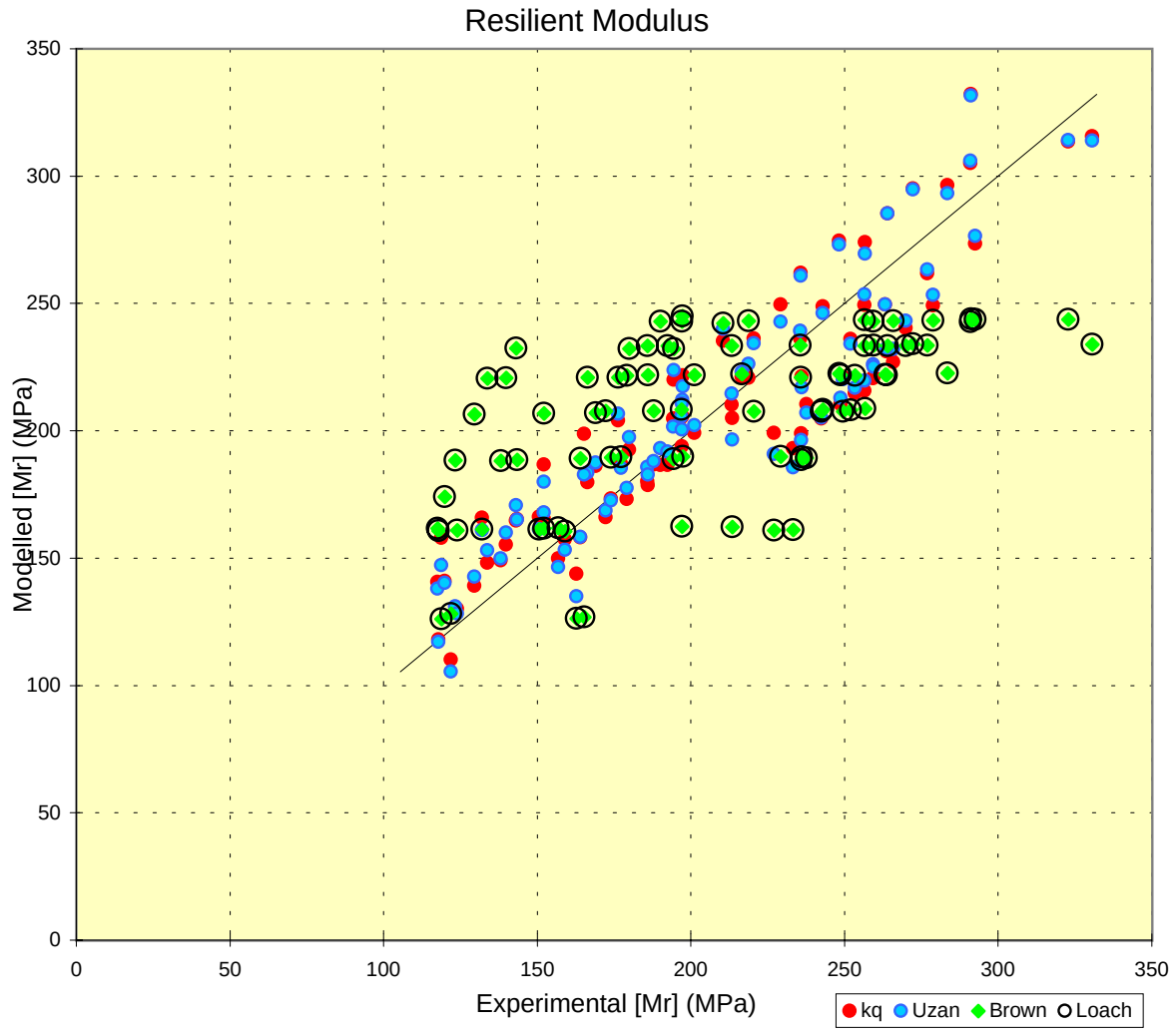
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : LRSB ***Fountainebleau Sand (SFB)*** ***95% Percentile Data***

Experimental Data	Sample Size: 57 Suction (s) = 3 kPa @ ω= 0%			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 177 MPa	υ_e = 0.21
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 145,952	k_3 = 237,135	A = 111,492	C = 3,716,387
	k_2 = 0.4177	k_4 = 0.3903	B = -0.2303	D = 0.7697
		k_5 = 0.0408		
	r^2= 0.836	r^2= 0.843	r^2= 0.350	r^2= 0.350
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 94 MPa	Mr_c= 97 MPa	Mr_c= 183 MPa	Mr_c= 183 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	3569	0.02	4181	0.03	0.02	12193	0.04	406449	0.04
t=	40.89	19.63	56.71	15.36	1.90	9.14	-6.08	9.14	20.31
Prob(t)=	0%	0%	0%	0%	6%	0%	0%	0%	0%

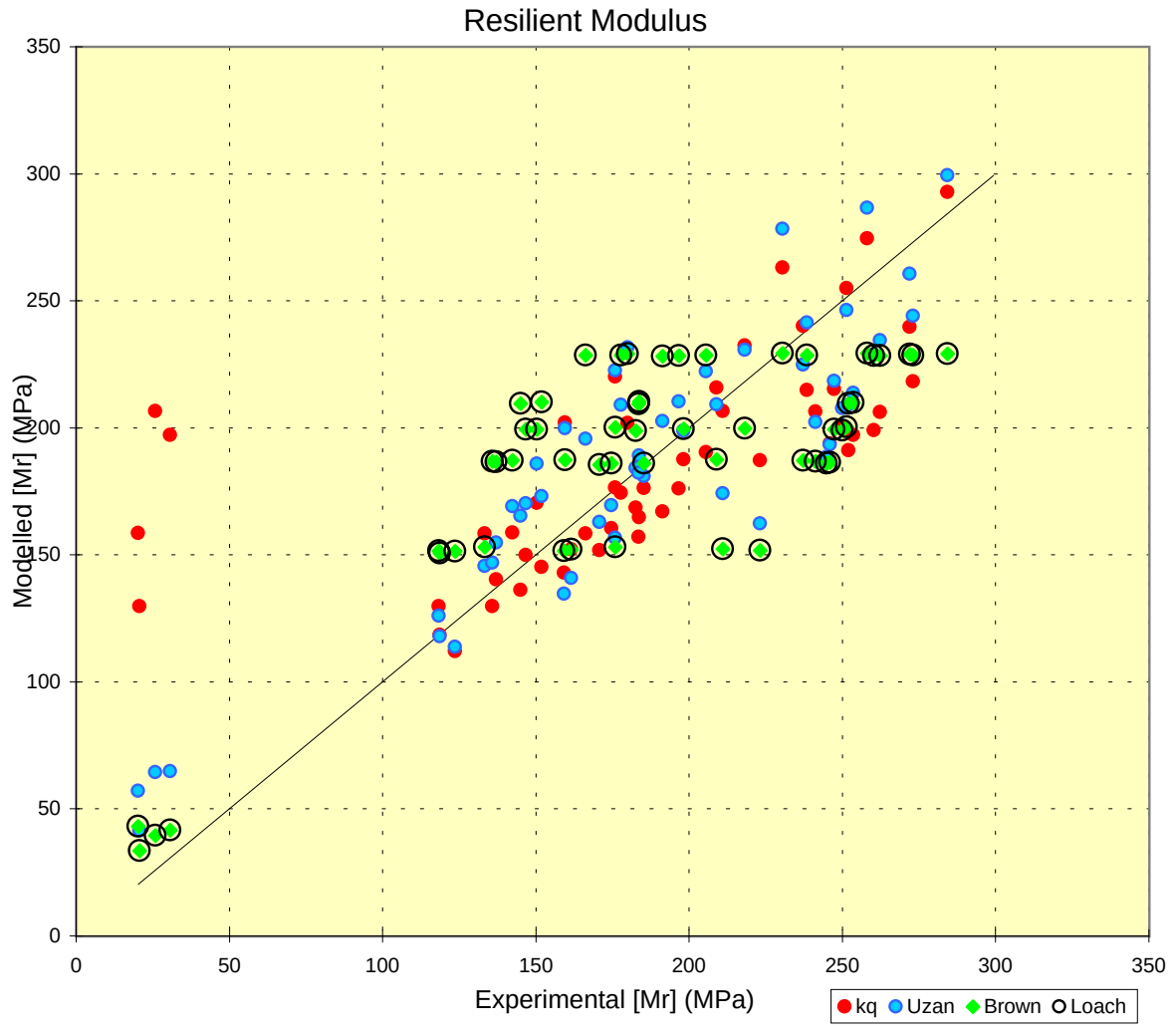
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : LRSB ***Fountainbleau Sand (SFB)*** ***95% Percentile Data***

Experimental Data	Sample Size: 38 Suction (s) = 3 kPa @ ω= 0%			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 145 MPa	υ_e = 0.32
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 126,858	k_3 = 246,393	A = 86,696	C = 2,889,857
	k_2 = 0.4427	k_4 = 0.3050	B = -0.2952	D = 0.7048
		k_5 = 0.2179		
	r^2= 0.394	r^2= 0.799	r^2= 0.623	r^2= 0.623
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 79 MPa	Mr_c= 95 MPa	Mr_c= 164 MPa	Mr_c= 164 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	10950	0.08	7456	0.05	0.04	13576	0.05	452522	0.05
t=	11.59	5.67	33.05	6.50	6.03	6.39	-5.47	6.39	13.07
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

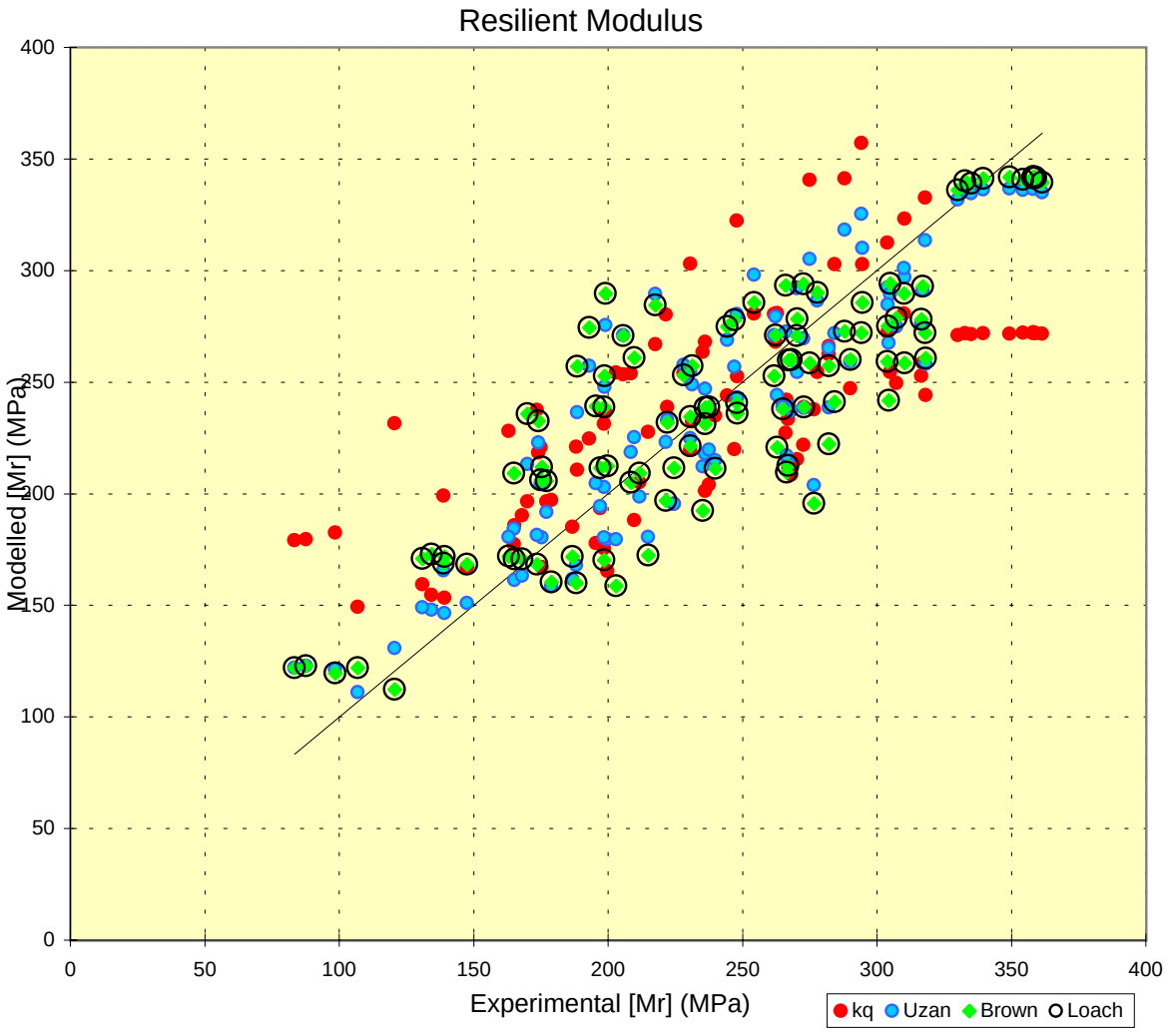
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : LRCF ***Fountainebleau Sand (SFB)*** ***95% Percentile Data***

Experimental Data	Sample Size: 61 Suction (s) = 3 kPa @ ω= 0%			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 201 MPa	υ_e = 0.39
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 181,176	k_3 = 305,821	A = 108,211	C = 3,607,044
	k_2 = 0.3481	k_4 = 0.1817	B = -0.2970	D = 0.7030
		k_5 = 0.2301		
	r^2= 0.510	r^2= 0.813	r^2= 0.726	r^2= 0.726
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 125 MPa	Mr_c= 151 MPa	Mr_c= 205 MPa	Mr_c= 205 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	7246	0.04	4689	0.03	0.02	6571	0.02	219044	0.02
t=	25	9.44	65	6.68	12.04	16	-14.74	16	34.89
Prob(t)=	0	0.00	0	0.00	0.00	0	0.00	0	0.00

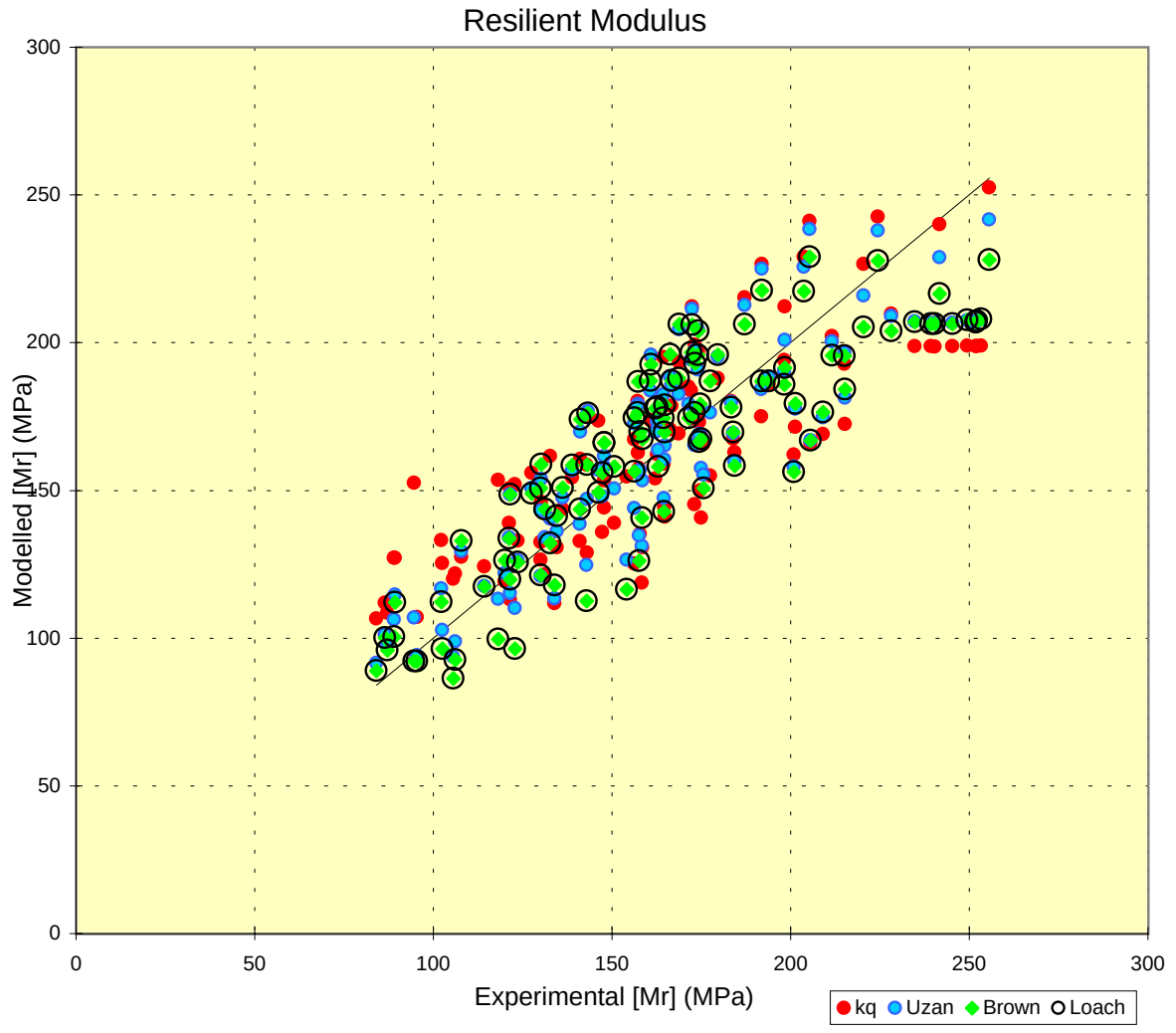
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TP-I : LRCF ***Fountainebleau Sand (SFB)*** ***95% Percentile Data***

Experimental Data	Sample Size: 68 Suction (s) = 3 kPa @ ω= 0%			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 133 MPa	υ_e = 0.51
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 122,251	k_3 = 187,456	A = 81,509	C = 2,716,962
	k_2 = 0.3408	k_4 = 0.1236	B = -0.2417	D = 0.7583
		k_5 = 0.1688		
	r^2= 0.650	r^2= 0.759	r^2= 0.734	r^2= 0.734
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 85 MPa	Mr_c= 114 MPa	Mr_c= 137 MPa	Mr_c= 137 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	3689	0.03	2614	0.04	0.03	4238	0.02	141262	0.02
t=	33	13.58	72	3.27	6.48	19	-15.29	19	47.98
Prob(t)=	0	0.00	0	0.00	0.00	0	0.00	0	0.00

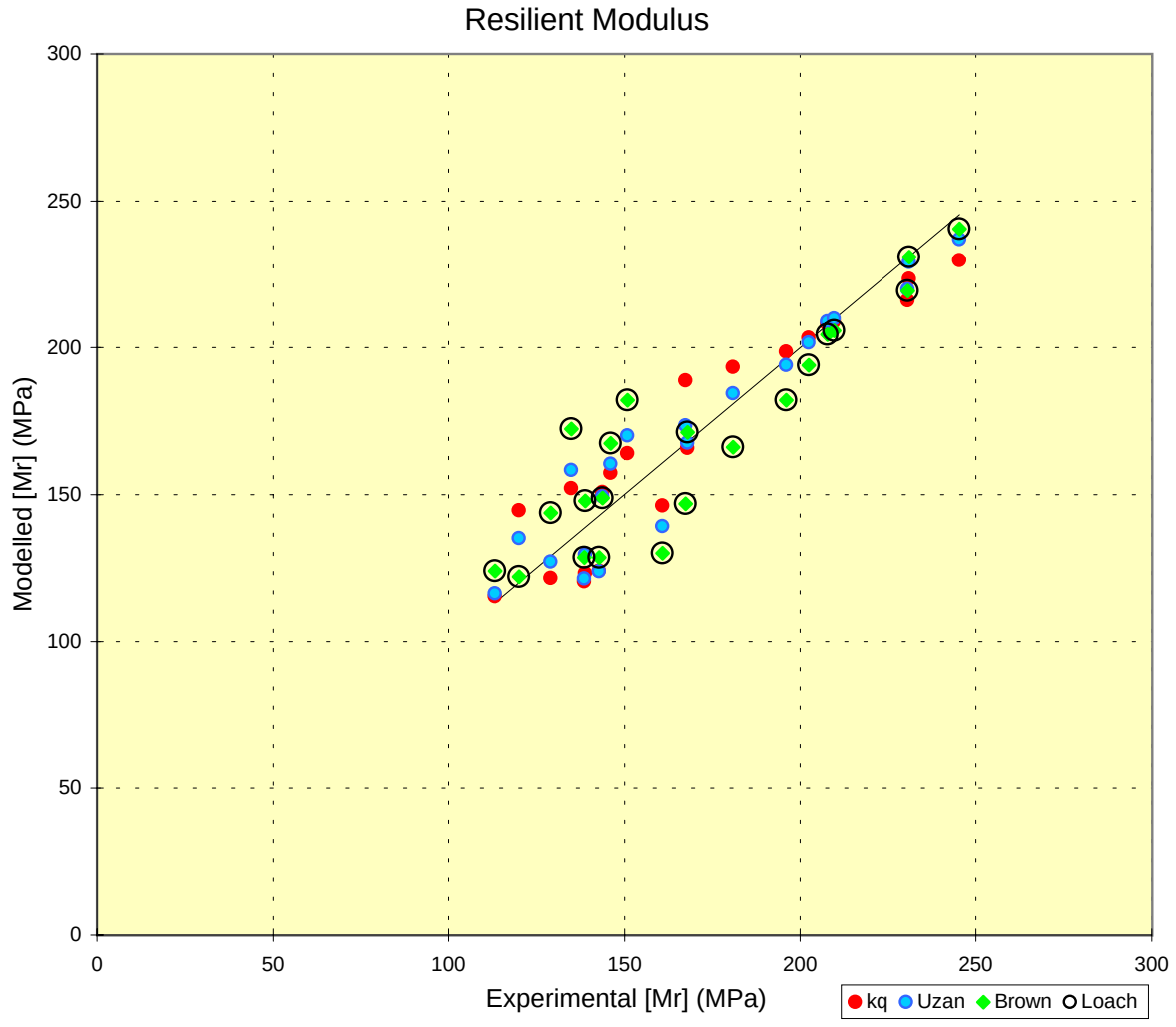
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TP-I : UNOT ***Fountainebleau Sand (SFB)*** ***90% Percentile Data***

Experimental Data	Sample Size: 12 Suction (s) = 3 kPa @ ω= 0%			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 152 MPa	υ_e = 0.56
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 145,264	k_3 = 221,998	A = 94,661	C = 3,155,350
	k_2 = 0.3797	k_4 = 0.2618	B = -0.2366	D = 0.7634
		k_5 = 0.0845		
	r^2= 0.884	r^2= 0.908	r^2= 0.819	r^2= 0.819
Characteristic Values	At: p_2 = 12 kPa & q_2= 26 kPa			
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 97 MPa	Mr_c= 112 MPa	Mr_c= 157 MPa	Mr_c= 157 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	3725	0.03	4896	0.06	0.04	6859	0.03	228626	0.03
t=	39.00	11.69	45.34	4.17	2.12	13.80	-9.32	13.80	30.09
Prob(t)=	0%	0%	0%	0%	5%	0%	0%	0%	0%

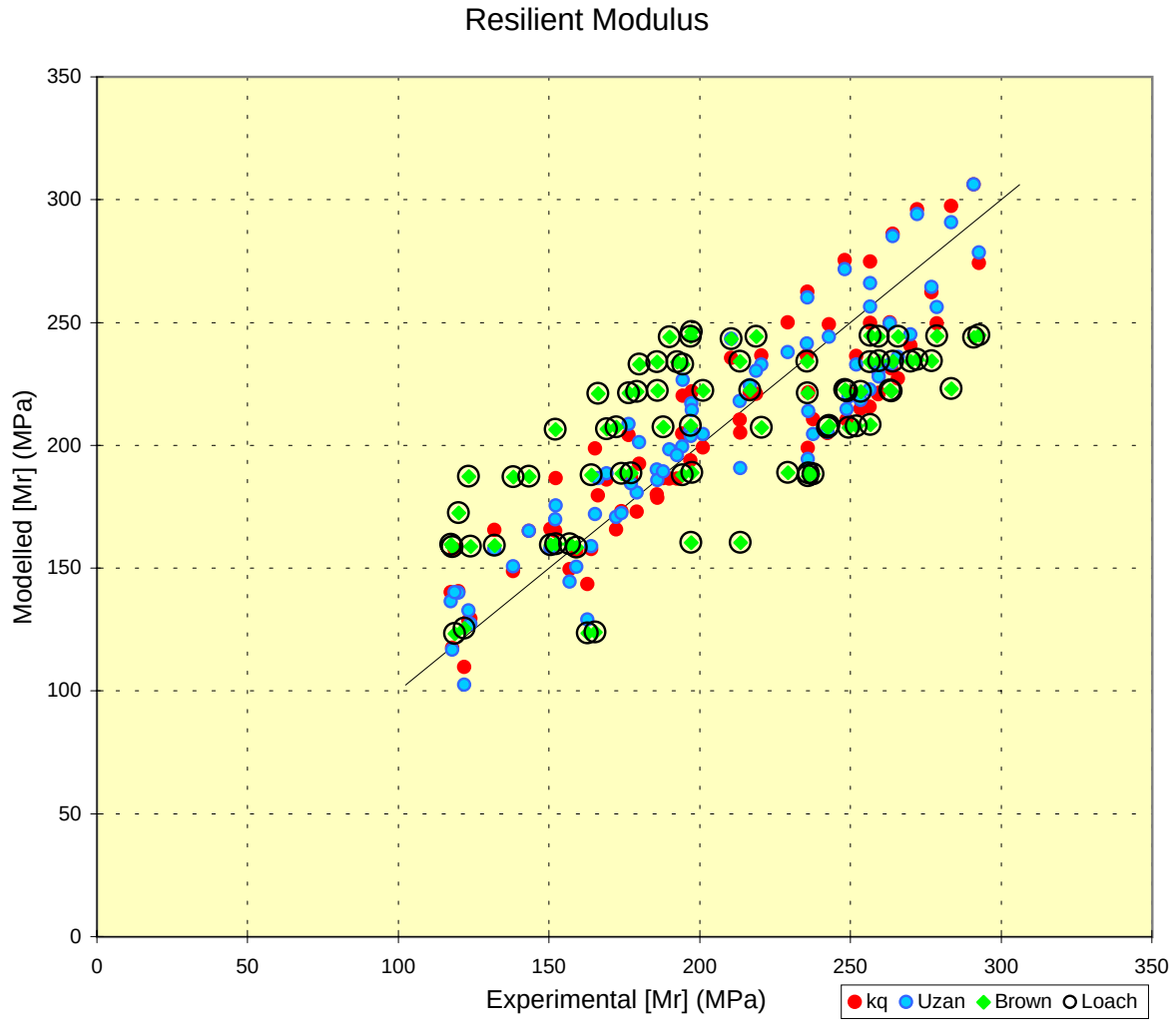
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

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TP-I : LRSB ***Fountainebleau Sand (SFB)*** ***90% Percentile Data***

Experimental Data	Sample Size: 51 Suction (s) = 3 kPa @ ω= 0%			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 176 MPa	υ_e = 0.21
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 145,532	k_3 = 241,683	A = 108,437	C = 3,614,558
	k_2 = 0.4212	k_4 = 0.3685	B = -0.2400	D = 0.7600
		k_5 = 0.0706		
	r^2= 0.814	r^2= 0.838	r^2= 0.453	r^2= 0.453
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 93 MPa	Mr_c= 99 MPa	Mr_c= 182 MPa	Mr_c= 182 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	3963	0.03	4266	0.03	0.02	10680	0.03	355996	0.03
t=	36.73	16.72	56.65	12.77	3.20	10.15	-7.01	10.15	22.20
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

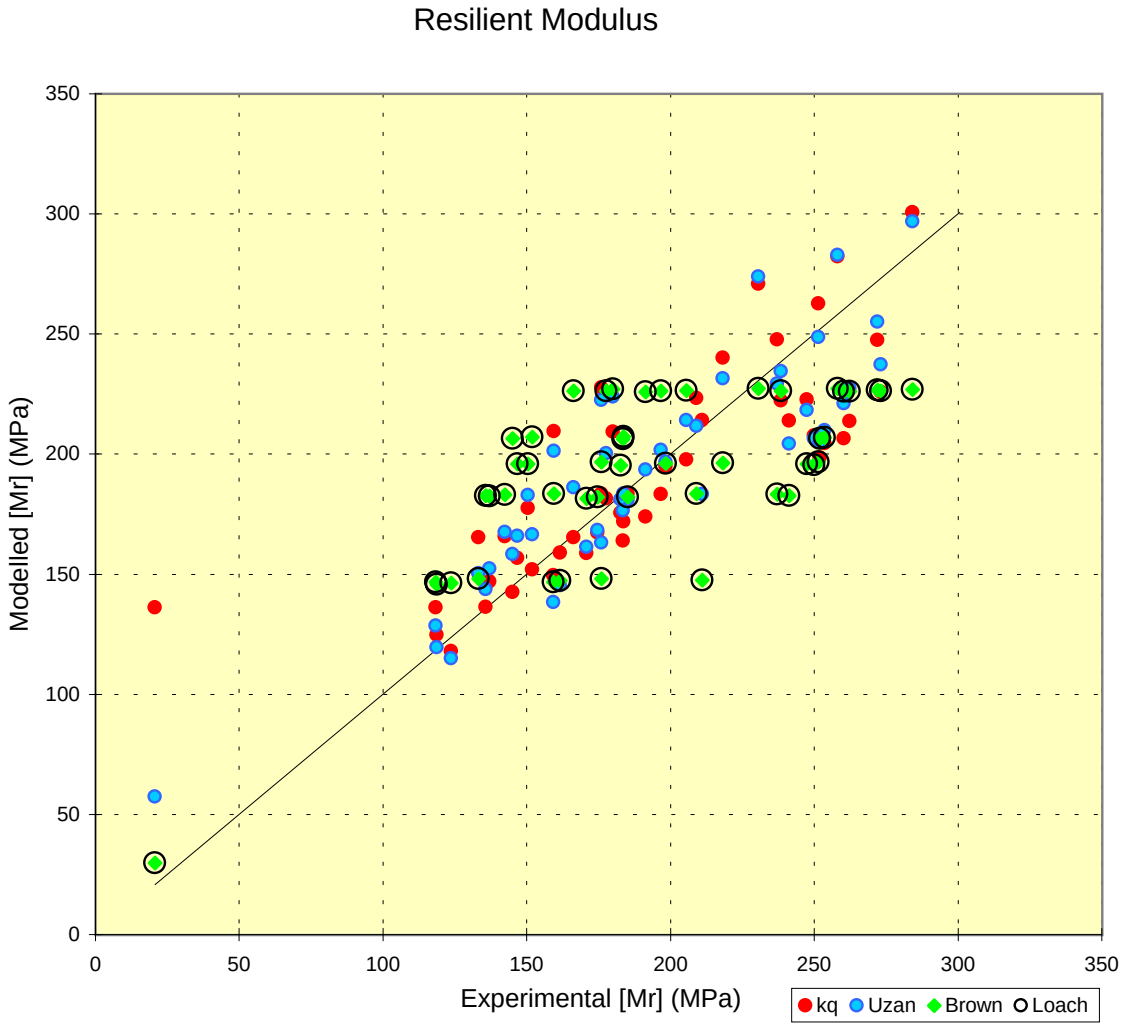
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

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TP-I : LRSB ***Fountainbleau Sand (SFB)*** ***90% Percentile Data***

Experimental Data	Sample Size: 35 Suction (s) = 3 kPa @ ω= 0%			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 152 MPa	υ_e = 0.29
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 133,226	k_3 = 235,553	A = 81,208	C = 2,706,926
	k_2 = 0.4306	k_4 = 0.3353	B = -0.3121	D = 0.6879
		k_5 = 0.1577		
	r^2= 0.669	r^2= 0.784	r^2= 0.478	r^2= 0.478
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 84 MPa	Mr_c= 92 MPa	Mr_c= 159 MPa	Mr_c= 159 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	6919	0.05	7164	0.04	0.04	15709	0.07	523636	0.07
t=	19.26	9.30	32.88	7.87	3.72	5.17	-4.73	5.17	10.42
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

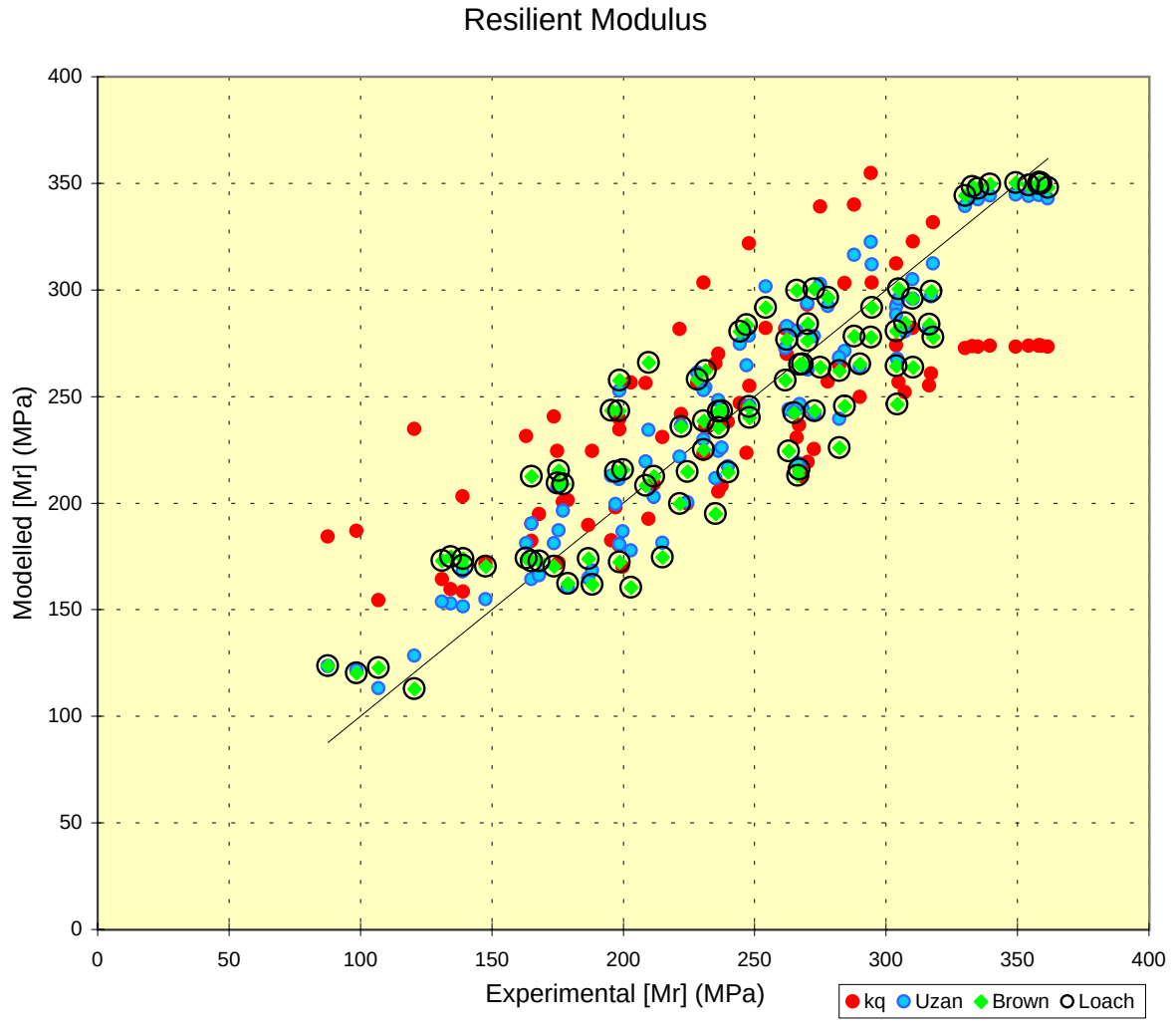
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TP-I : LRCF ***Fountainebleau Sand (SFB)*** ***90% Percentile Data***

Experimental Data	Sample Size: 52 Suction (s) = 3 kPa @ ω= 0%			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 204 MPa	υ_e = 0.39
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 185,725	k_3 = 311,928	A = 108,595	C = 3,619,845
	k_2 = 0.3322	k_4 = 0.1545	B = -0.3024	D = 0.6976
		k_5 = 0.2449		
	r^2= 0.516	r^2= 0.888	r^2= 0.819	r^2= 0.819
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 130 MPa	Mr_c= 160 MPa	Mr_c= 208 MPa	Mr_c= 208 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	7557	0.04	3757	0.02	0.01	5419	0.02	180649	0.02
t=	25	9.01	83	7.28	16.38	20	-18.34	20	42.31
Prob(t)=	0	0.00	0	0.00	0.00	0	0.00	0	0.00

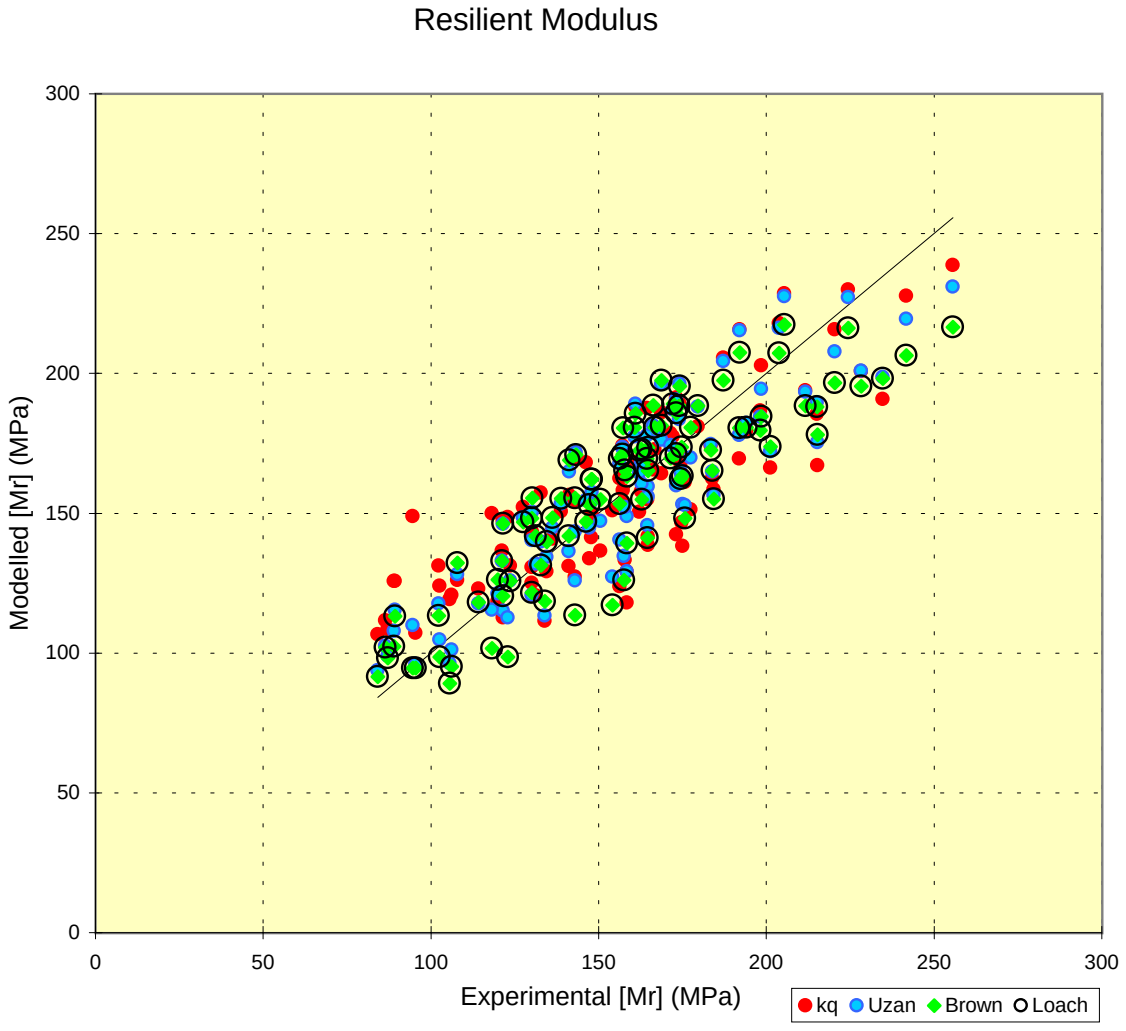
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TP-I : LRCF ***Fountainebleau Sand (SFB)*** ***90% Percentile Data***

Experimental Data	Sample Size: 67 Suction (s) = 3 kPa @ ω= 0%			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 132 MPa	υ_e = 0.51
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 121,213	k_3 = 180,914	A = 84,584	C = 2,819,454
	k_2 = 0.3184	k_4 = 0.1298	B = -0.2208	D = 0.7792
		k_5 = 0.1470		
	r^2= 0.691	r^2= 0.804	r^2= 0.768	r^2= 0.768
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 86 MPa	Mr_c= 112 MPa	Mr_c= 136 MPa	Mr_c= 136 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	3106	0.02	2263	0.03	0.02	3706	0.01	123547	0.01
t=	39	14.44	80	4.22	7.01	23	-16.09	23	56.79
Prob(t)=	0	0.00	0	0.00	0.00	0	0.00	0	0.00

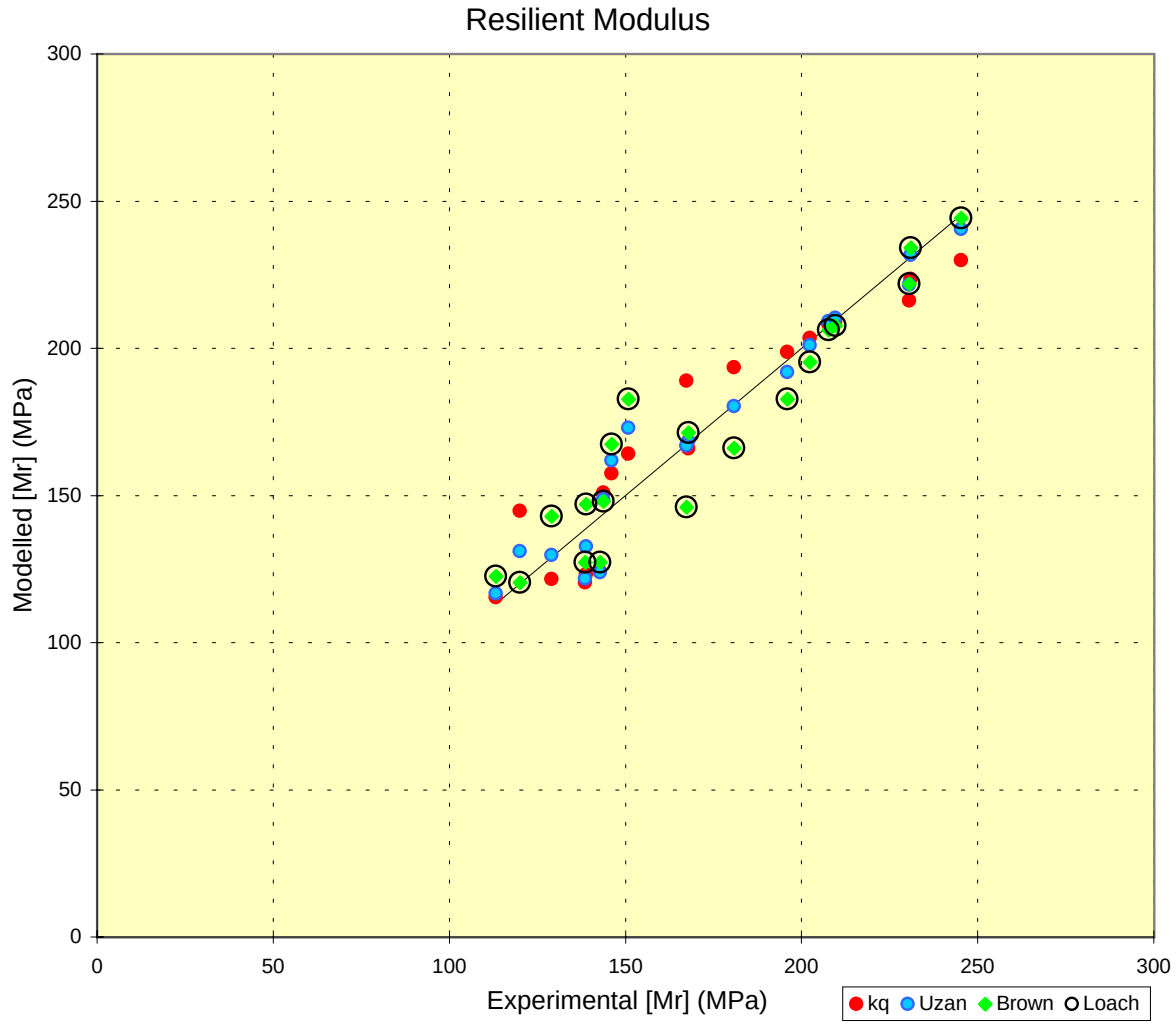
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TP-I : UNOT ***Fountainebleau Sand (SFB)*** ***85% Percentile Data***

Experimental Data	Sample Size: 10	Suction (s) =	3 kPa @ ω=	0%
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 152 MPa	υ_e = 0.56
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 145,371	k_3 = 222,787	A = 92,475	C = 3,082,516
	k_2 = 0.3798	k_4 = 0.2076	B = -0.2465	D = 0.7535
		k_5 = 0.1235		
	r^2= 0.896	r^2= 0.943	r^2= 0.892	r^2= 0.892
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 97 MPa	Mr_c= 120 MPa	Mr_c= 157 MPa	Mr_c= 157 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	3920	0.03	4010	0.05	0.04	5687	0.02	189583	0.02
t=	37.08	11.53	55.55	3.79	3.49	16.26	-11.69	16.26	35.73
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

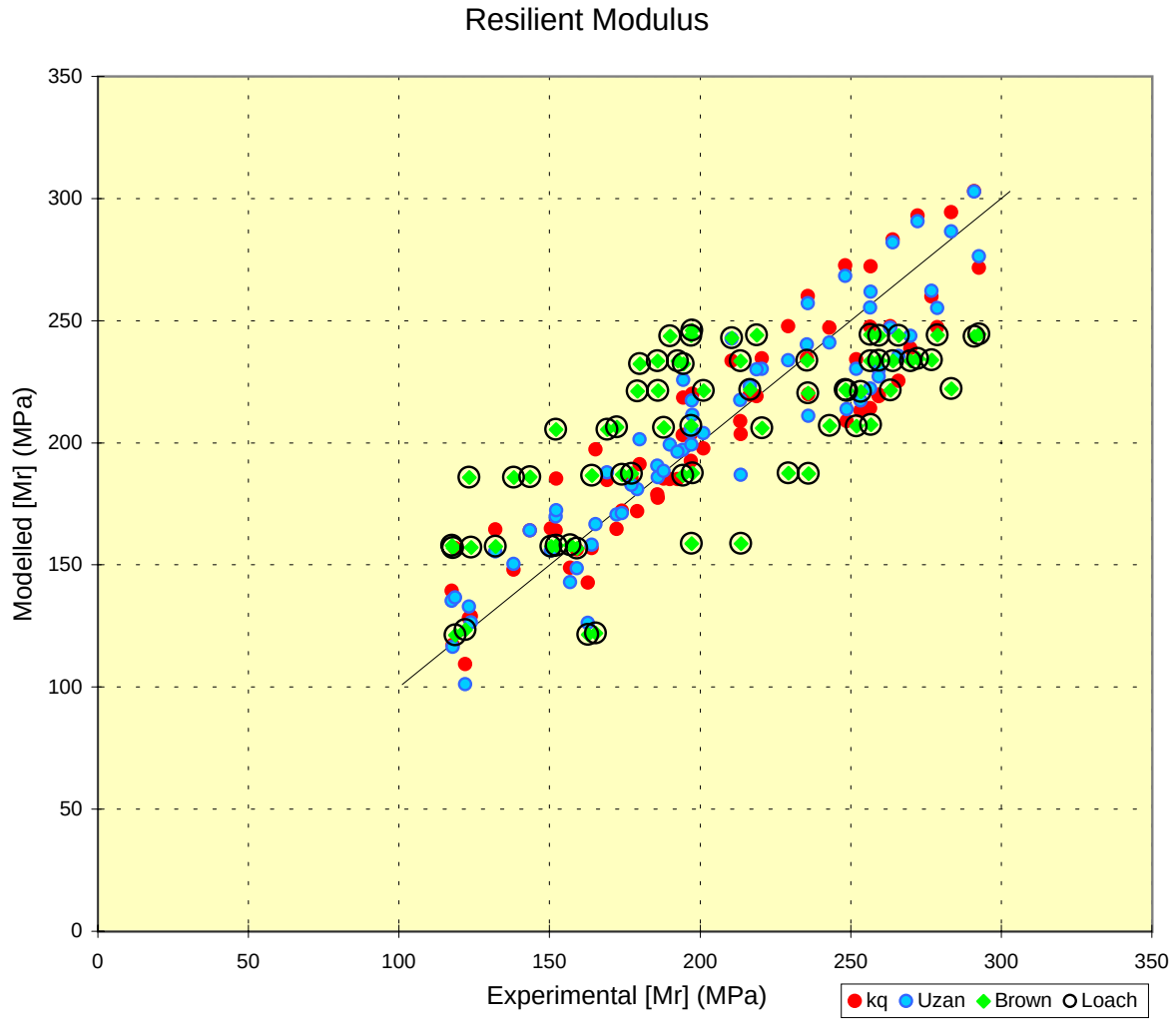
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TP-I : LRSB ***Fountainebleau Sand (SFB)*** ***85% Percentile Data***

Experimental Data	Sample Size: 47 Suction (s) = 3 kPa @ ω= 0%			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 173 MPa	υ_e = 0.22
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 144,805	k_3 = 241,431	A = 106,385	C = 3,546,176
	k_2 = 0.4181	k_4 = 0.3559	B = -0.2452	D = 0.7548
		k_5 = 0.0826		
	r^2= 0.836	r^2= 0.871	r^2= 0.498	r^2= 0.498
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 93 MPa	Mr_c= 100 MPa	Mr_c= 180 MPa	Mr_c= 180 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	3920	0.02	3953	0.03	0.02	10482	0.03	349392	0.03
t=	36.94	17.03	61.08	13.28	4.04	10.15	-7.22	10.15	22.23
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

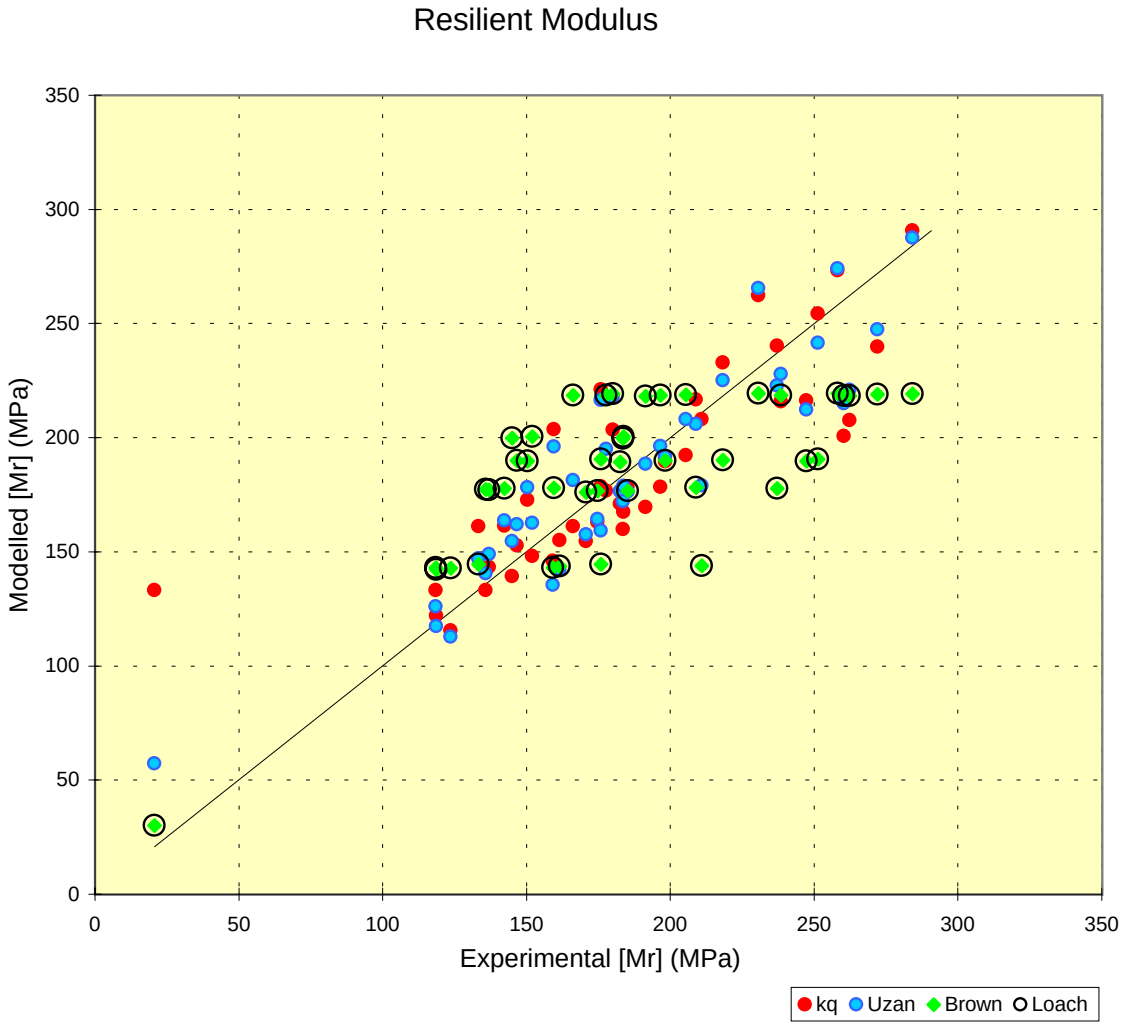
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TP-I : LRSB ***Fountainbleau Sand (SFB)*** ***85% Percentile Data***

Experimental Data	Sample Size: 35 Suction (s) = 3 kPa @ ω= 0%			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 147 MPa	υ_e = 0.29
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 130,164	k_3 = 228,717	A = 80,272	C = 2,675,745
	k_2 = 0.4252	k_4 = 0.3310	B = -0.3051	D = 0.6949
		k_5 = 0.1546		
	r^2= 0.705	r^2= 0.830	r^2= 0.504	r^2= 0.504
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 83 MPa	Mr_c= 91 MPa	Mr_c= 155 MPa	Mr_c= 155 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	6388	0.04	6366	0.04	0.04	15218	0.06	507260	0.06
t=	20.38	9.75	35.93	8.77	4.11	5.27	-4.70	5.27	10.71
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

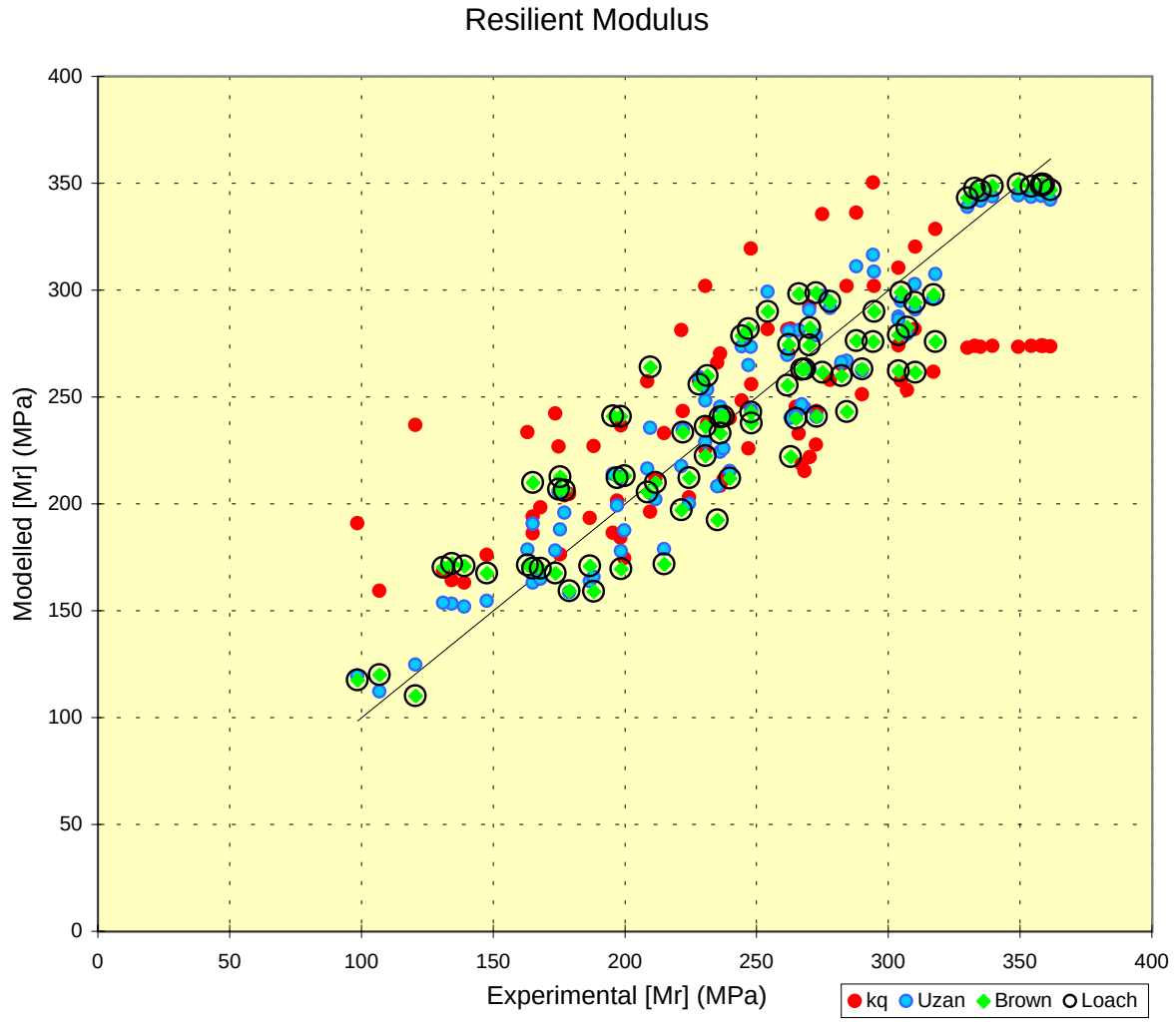
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TP-I : LRCF ***Fountainebleau Sand (SFB)*** ***85% Percentile Data***

Experimental Data	Sample Size: 46 Suction (s) = 3 kPa @ ω= 0%			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 203 MPa	υ_e = 0.40
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 189,596	k_3 = 310,841	A = 105,816	C = 3,527,213
	k_2 = 0.3149	k_4 = 0.1406	B = -0.3084	D = 0.6916
		k_5 = 0.2536		
	r^2= 0.515	r^2= 0.917	r^2= 0.854	r^2= 0.854
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 136 MPa	Mr_c= 163 MPa	Mr_c= 205 MPa	Mr_c= 205 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	7784	0.04	3249	0.02	0.01	5046	0.02	168198	0.02
t=	24	8.53	96	7.60	18.64	21	-19.85	21	44.51
Prob(t)=	0	0.00	0	0.00	0.00	0	0.00	0	0.00

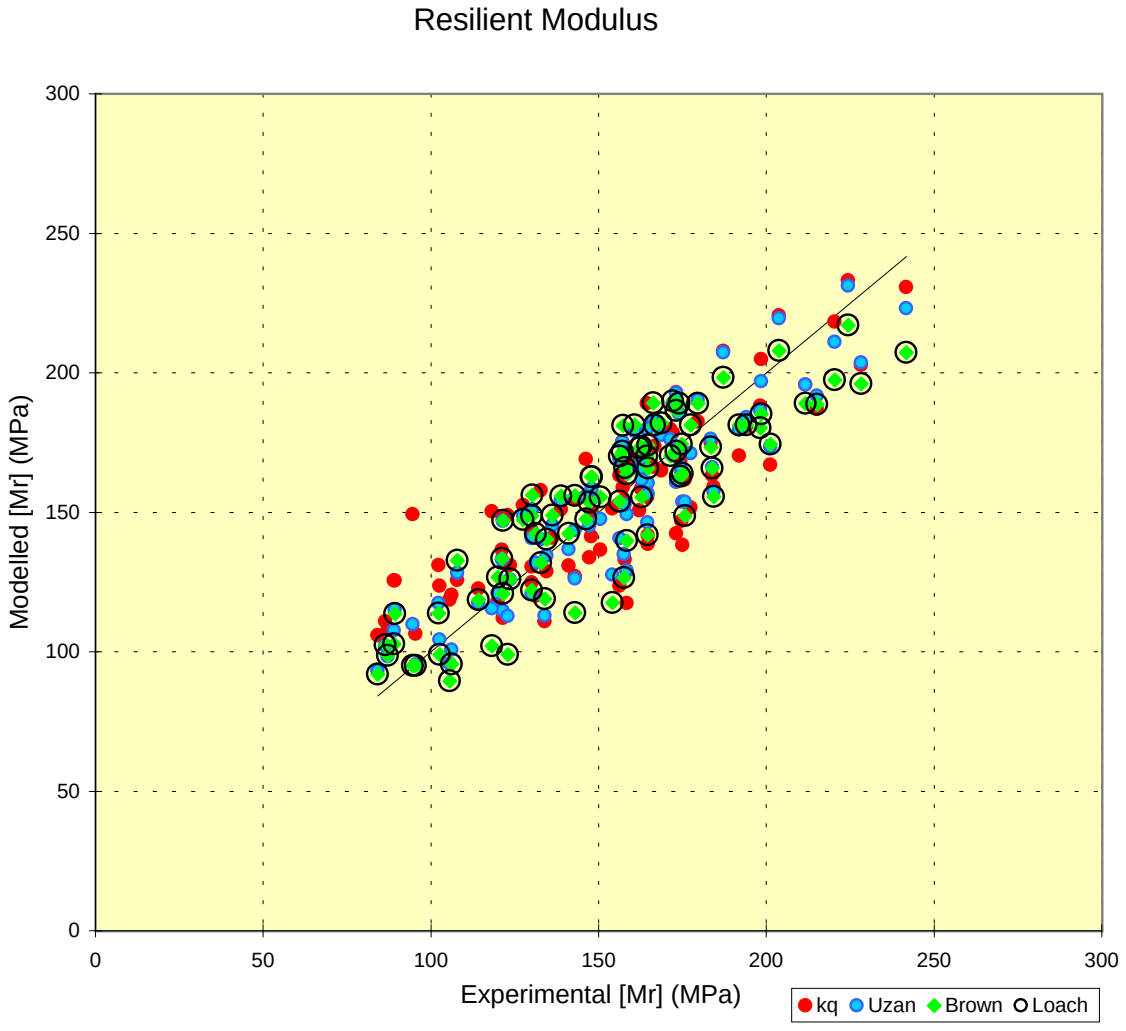
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The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : LRCF ***Fountainebleau Sand (SFB)*** ***85% Percentile Data***

Experimental Data	Sample Size: 60 Suction (s) = 3 kPa @ ω= 0%			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 131 MPa	υ_e = 0.51
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 120,763	k_3 = 182,644	A = 84,900	C = 2,829,993
	k_2 = 0.3269	k_4 = 0.1360	B = -0.2207	D = 0.7793
		k_5 = 0.1495		
	r^2= 0.692	r^2= 0.834	r^2= 0.789	r^2= 0.789
Characteristic Values	At: p_2 = 12 kPa & q_2= 26 kPa			
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 85 MPa	Mr_c= 111 MPa	Mr_c= 136 MPa	Mr_c= 136 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	3056	0.02	2247	0.03	0.02	3537	0.01	117891	0.01
t=	40	13.79	81	4.81	8.03	24	-16.24	24	57.34
Prob(t)=	0	0.00	0	0.00	0.00	0	0.00	0	0.00

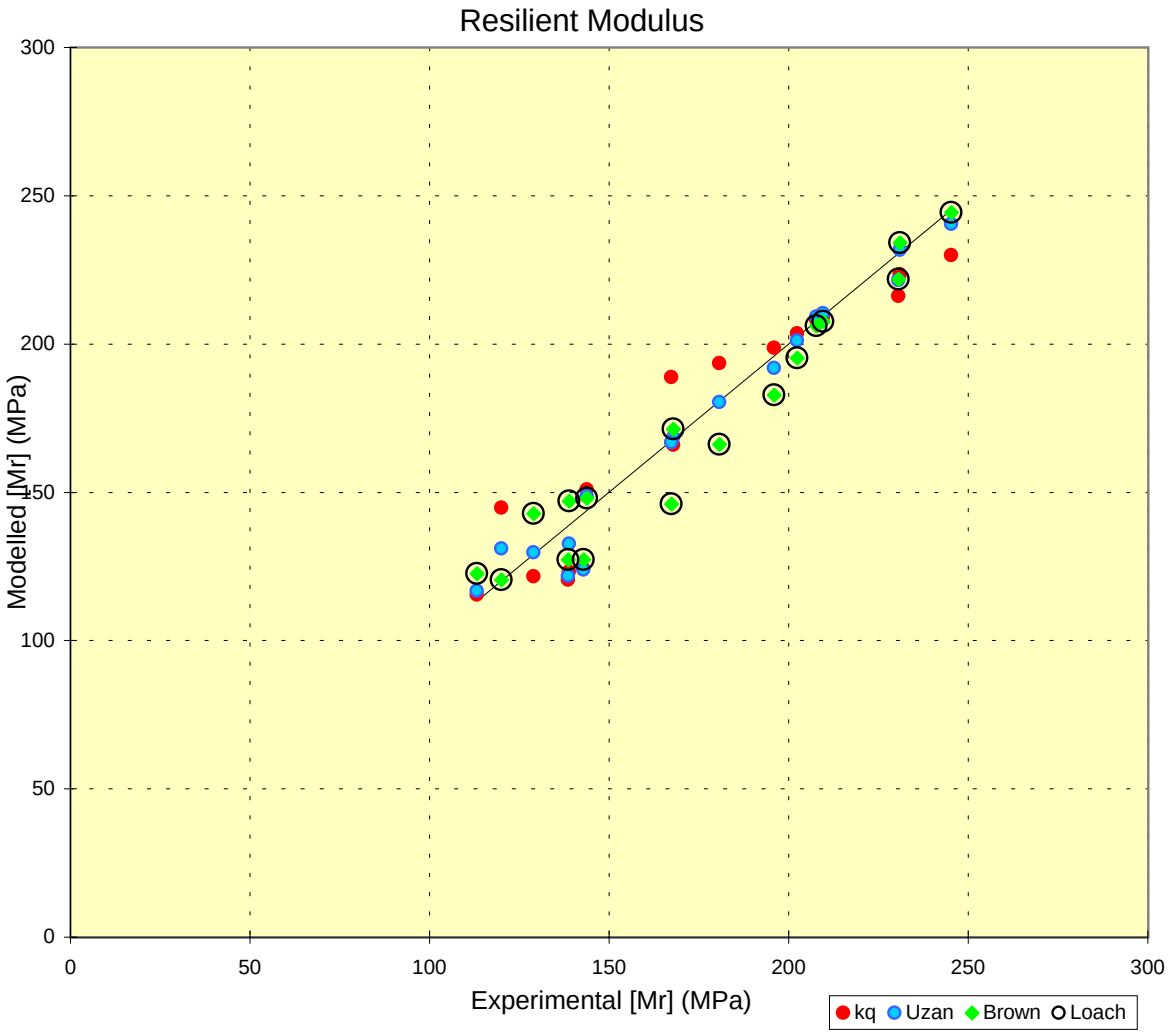
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TP-I : UNOT ***Fountainebleau Sand (SFB)*** ***80% Percentile Data***

Experimental Data	Sample Size: 8	Suction (s) =	3 kPa @ ω=	0%
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 154 MPa	υ_e = 0.57
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 145,371	k_3 = 222,787	A = 92,475	C = 3,082,516
	k_2 = 0.3798	k_4 = 0.2076	B = -0.2465	D = 0.7535
		k_5 = 0.1235		
	r^2= 0.896	r^2= 0.943	r^2= 0.892	r^2= 0.892
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 97 MPa	Mr_c= 120 MPa	Mr_c= 157 MPa	Mr_c= 157 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	3920	0.03	4010	0.05	0.04	5687	0.02	189583	0.02
t=	37.08	11.53	55.55	3.79	3.49	16.26	-11.69	16.26	35.73
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

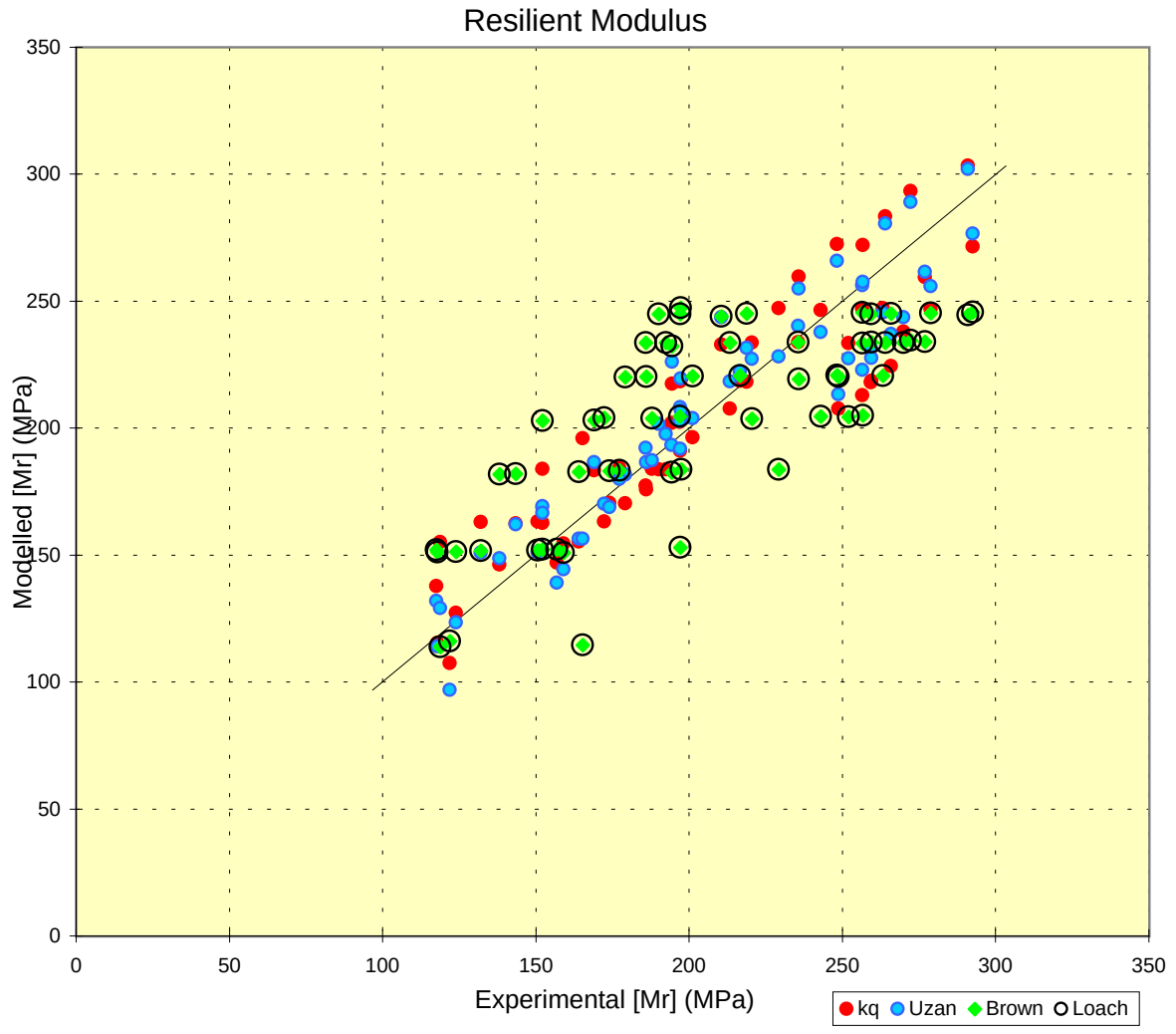
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : LRSB ***Fountainebleau Sand (SFB)*** ***80% Percentile Data***

Experimental Data	Sample Size: 44	Suction (s) =	3 kPa @ ω=	0%
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 169 MPa	υ_e = 0.22
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 143,087	k_3 = 243,599	A = 98,594	C = 3,286,458
	k_2 = 0.4257	k_4 = 0.3437	B = -0.2690	D = 0.7310
		k_5 = 0.1083		
	r^2= 0.833	r^2= 0.890	r^2= 0.568	r^2= 0.568
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 91 MPa	Mr_c= 100 MPa	Mr_c= 176 MPa	Mr_c= 176 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	4217	0.03	3849	0.03	0.02	10075	0.03	335836	0.03
t=	33.93	15.91	63.29	12.72	5.16	9.79	-7.73	9.79	21.02
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

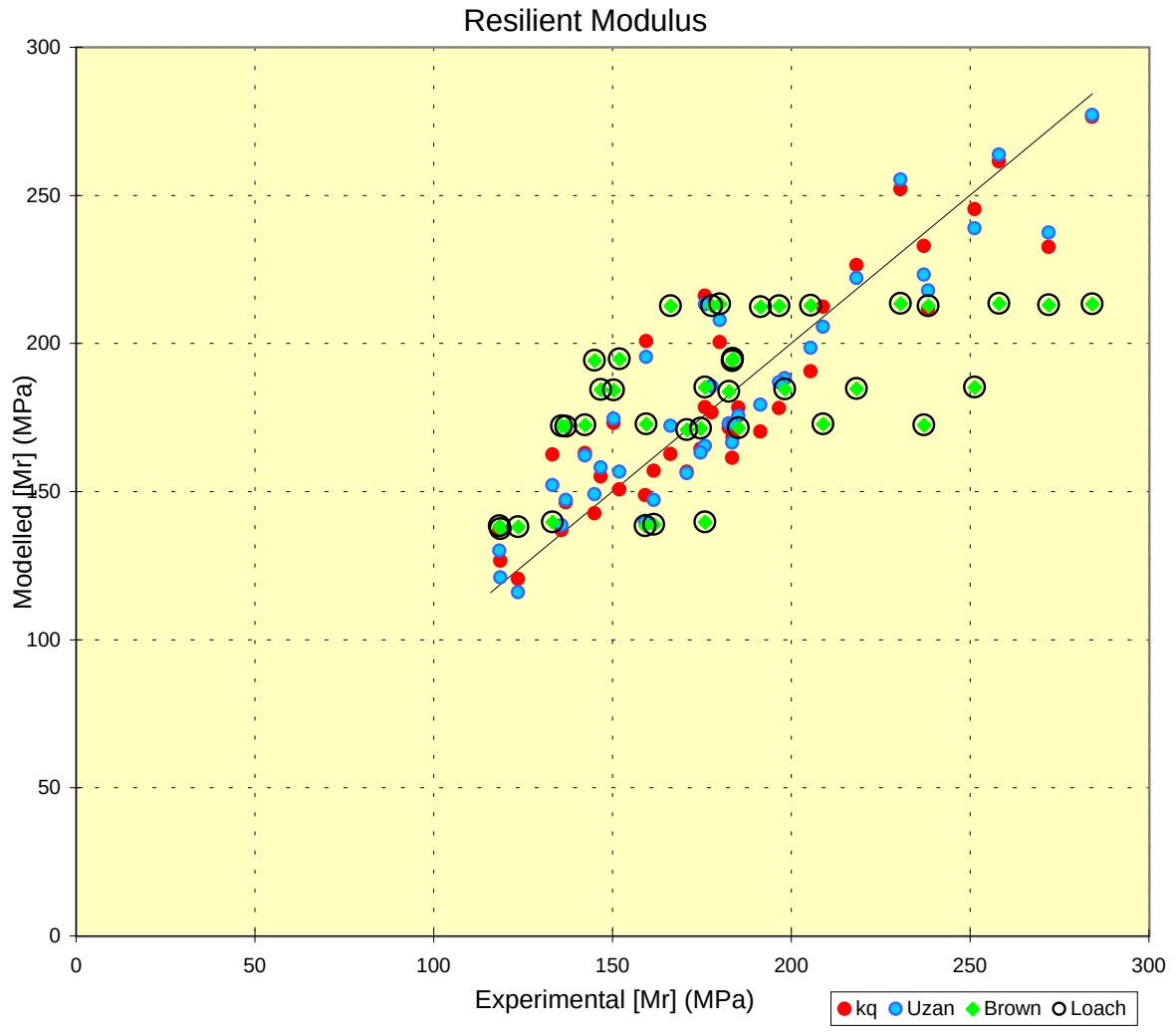
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : LRSB ***Fountainbleau Sand (SFB)*** ***80% Percentile Data***

Experimental Data	Sample Size: 34 Suction (s) = 3 kPa @ ω= 0%			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 151 MPa	υ_e = 0.28
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 134,197	k_3 = 215,530	A = 76,987	C = 2,566,237
	k_2 = 0.3825	k_4 = 0.3428	B = -0.3095	D = 0.6905
		k_5 = 0.0912		
	r^2= 0.828	r^2= 0.850	r^2= 0.371	r^2= 0.371
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 89 MPa	Mr_c= 91 MPa	Mr_c= 150 MPa	Mr_c= 150 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	4271	0.03	5986	0.03	0.04	15786	0.07	526211	0.07
t=	31.42	13.38	36.01	10.64	2.24	4.88	-4.40	4.88	9.81
Prob(t)=	0%	0%	0%	0%	3%	0%	0%	0%	0%

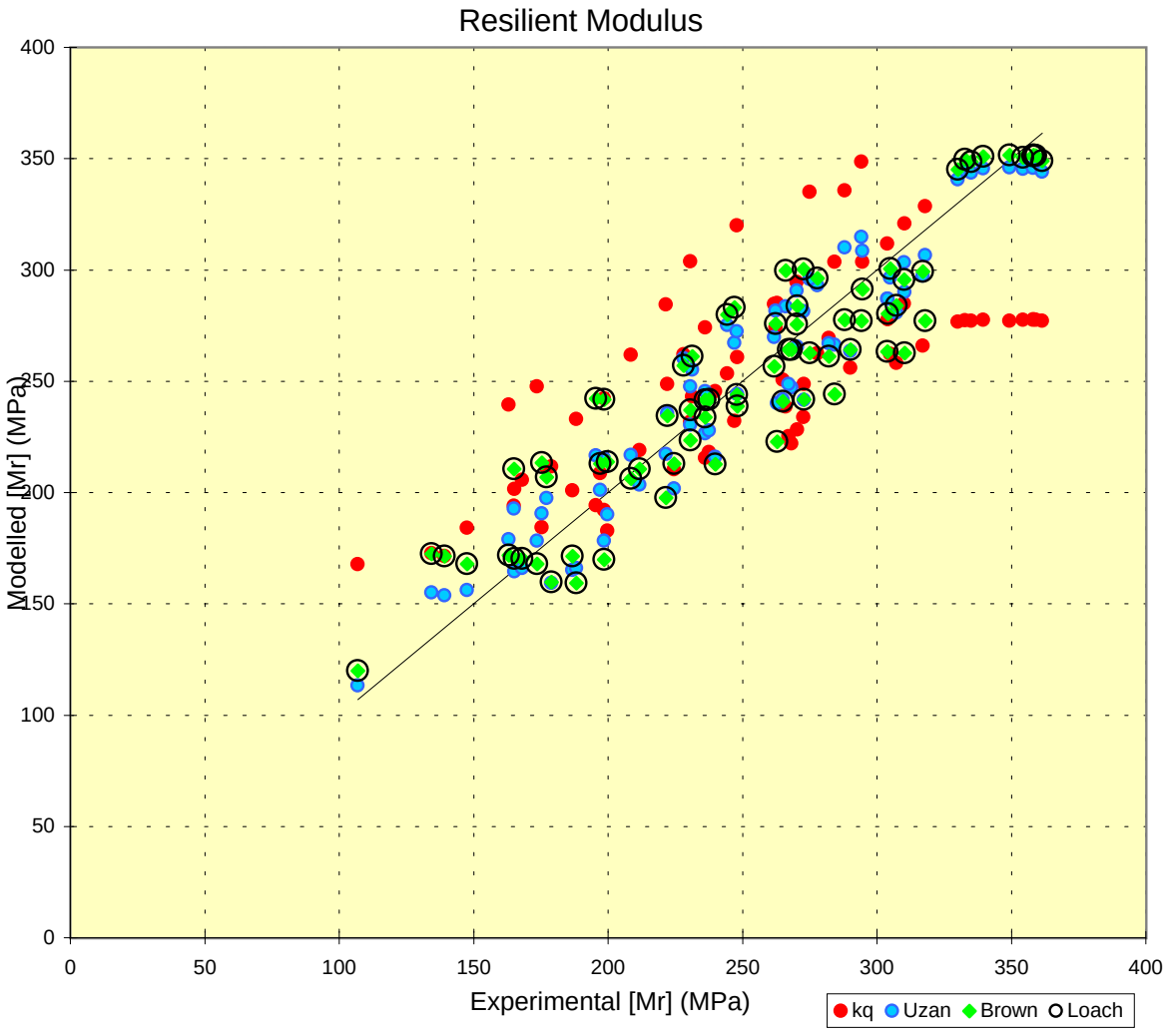
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : LRCF ***Fountainebleau Sand (SFB)*** ***80% Percentile Data***

Experimental Data	Sample Size: 39 Suction (s) = 3 kPa @ ω= 0%			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 207 MPa	υ_e = 0.40
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 197,344	k_3 = 312,307	A = 105,845	C = 3,528,164
	k_2 = 0.2920	k_4 = 0.1308	B = -0.3099	D = 0.6901
		k_5 = 0.2571		
	r^2= 0.519	r^2= 0.923	r^2= 0.862	r^2= 0.862
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 145 MPa	Mr_c= 166 MPa	Mr_c= 206 MPa	Mr_c= 206 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	7984	0.04	3055	0.02	0.01	5138	0.02	171265	0.02
t=	25	8.11	102	7.42	18.89	21	-19.82	21	44.13
Prob(t)=	0	0.00	0	0.00	0.00	0	0.00	0	0.00

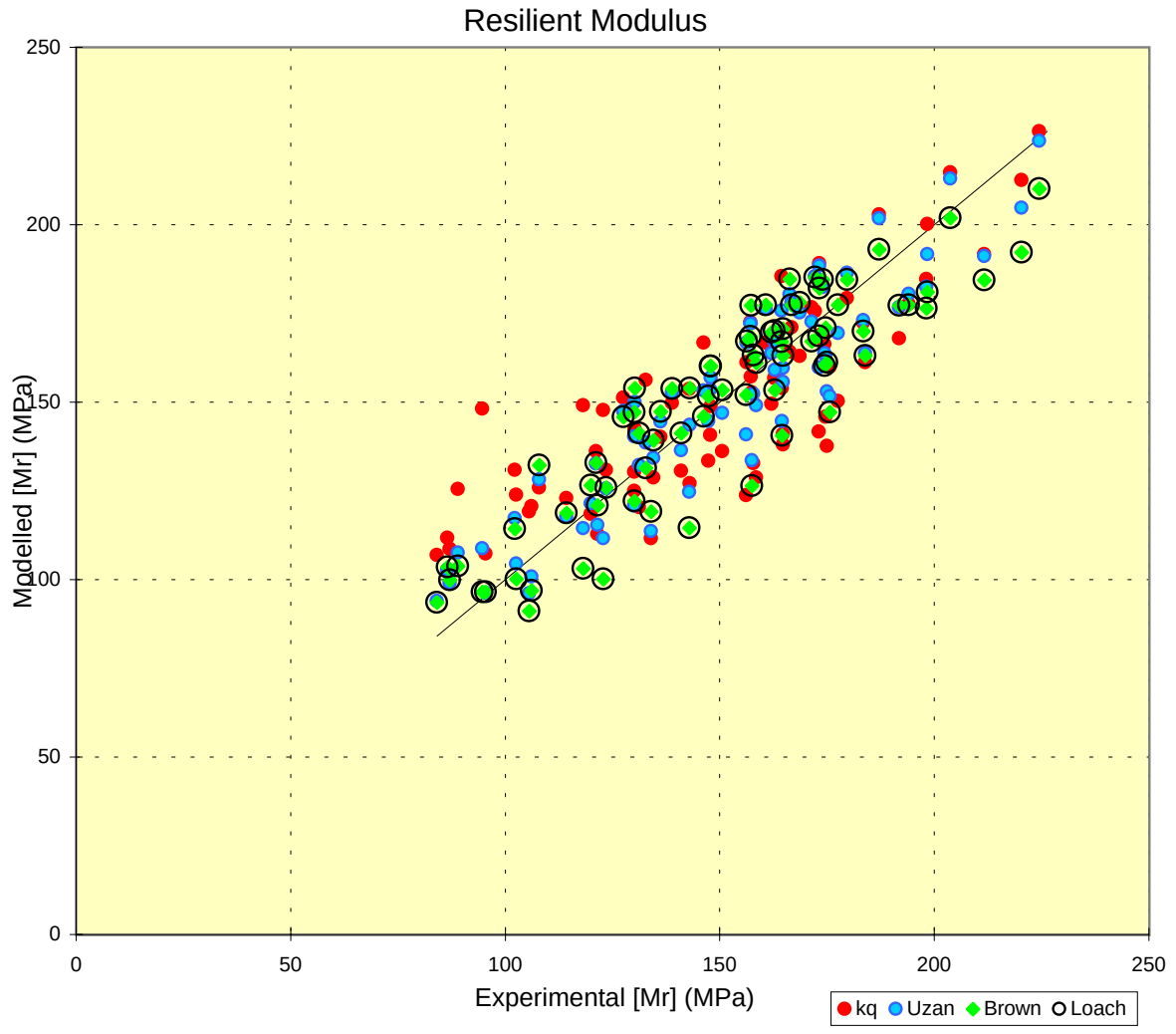
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

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TP-I : LRCF ***Fountainebleau Sand (SFB)*** ***80% Percentile Data***

Experimental Data	Sample Size: 56 Suction (s) = 3 kPa @ ω= 0%			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 130 MPa	υ_e = 0.50
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 121,113	k_3 = 179,546	A = 86,728	C = 2,890,928
	k_2 = 0.3108	k_4 = 0.1180	B = -0.2081	D = 0.7919
		k_5 = 0.1497		
	r^2= 0.684	r^2= 0.859	r^2= 0.819	r^2= 0.819
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 87 MPa	Mr_c= 114 MPa	Mr_c= 136 MPa	Mr_c= 136 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	3022	0.02	2042	0.03	0.02	3245	0.01	108165	0.01
t=	40	12.70	88	4.58	9.09	27	-16.84	27	64.08
Prob(t)=	0	0.00	0	0.00	0.00	0	0.00	0	0.00

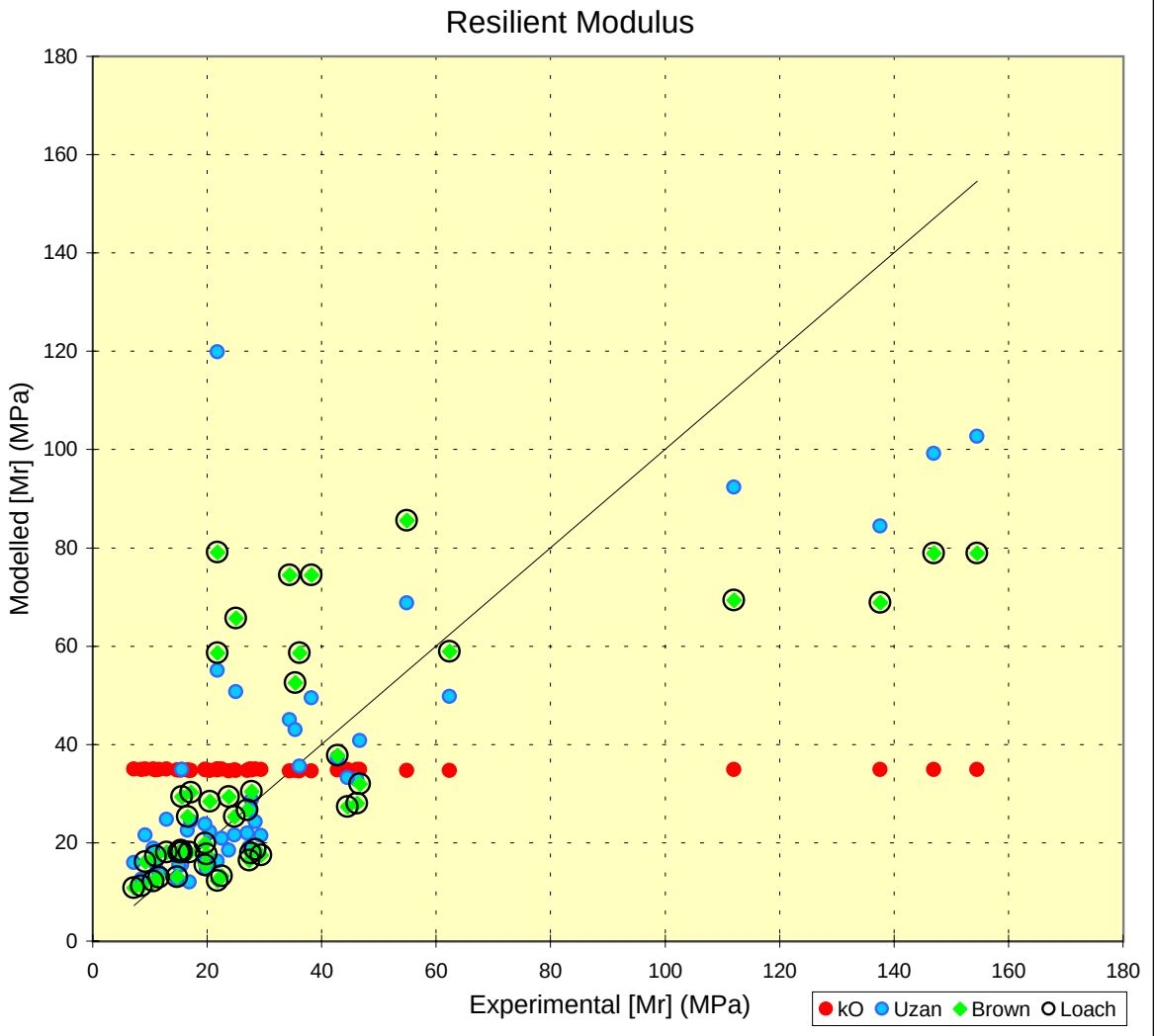
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

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TP-I : LNEC ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 46	Suction (s) = 40 kPa @ ω= 36%		
	Chara'tic Values at q_2 = 26 kPa	Mr_e= 46 MPa	υ_e = 0.52	
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 34,663	k_3 = 7,833	A = 19,723	C = 49,307
	k_2 = 0.0073	k_4 = 0.6192	B = 1.2526	D = 2.2526
		k_5 = -1.3816		
	r^2= 0.000	r^2= 0.599	r^2= 0.447	r^2= 0.447
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 34 MPa	Mr_c= 13 MPa	Mr_c= 34 MPa	Mr_c= 34 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	7702	0.32	2795	0.18	0.19	4577	0.25	11443	0.25
t=	4.50	0.02	2.80	3.44	-7.14	4.31	5.06	4.31	9.09
Prob(t)=	0%	98%	1%	0%	0%	0%	0%	0%	0%

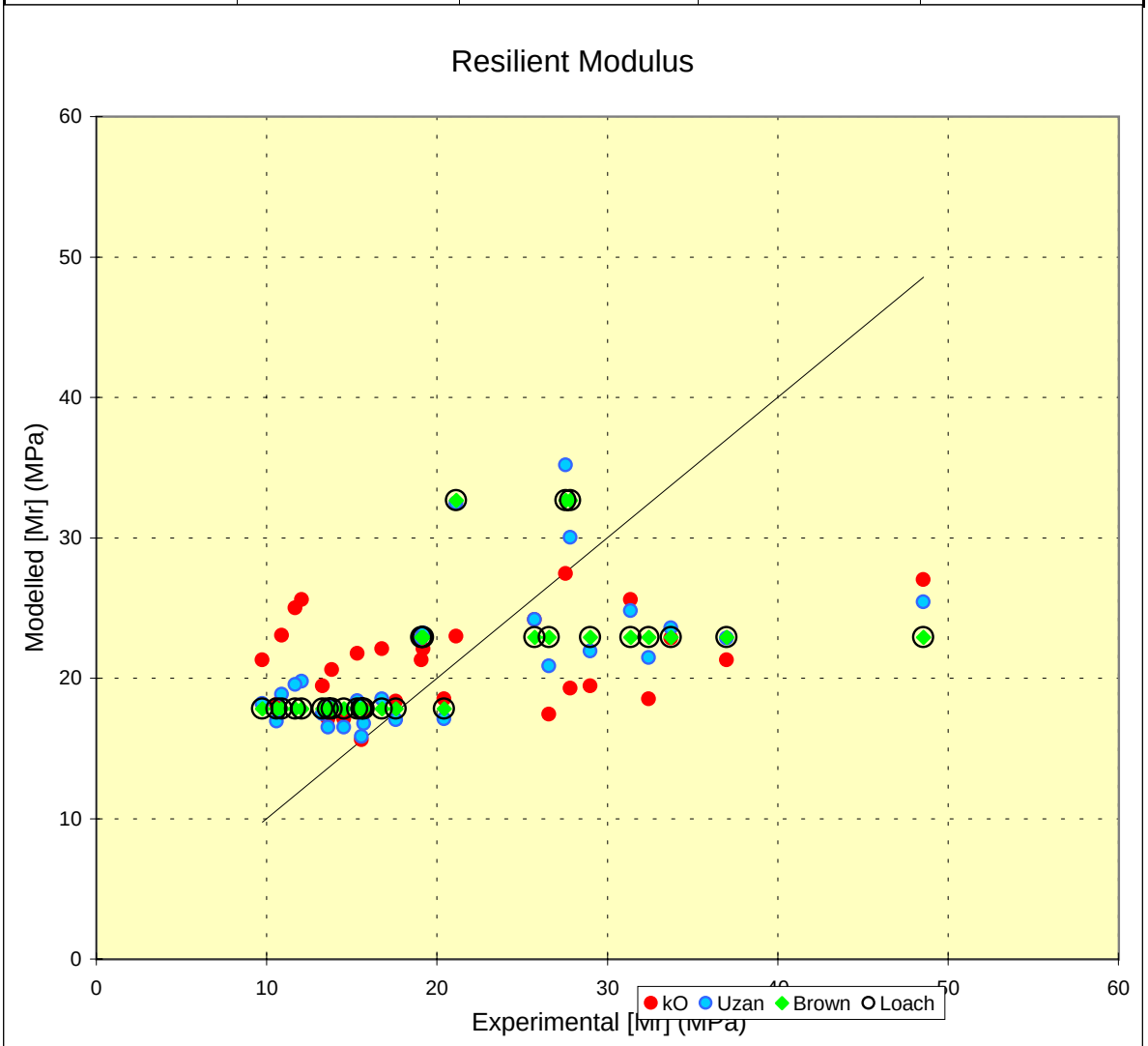
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : UNOT ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 28	Suction (s) =	40 kPa @ ω=	36%
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 20 MPa	υ_e = 0.56
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 23,541	k_3 = 10,804	A = 16,284	C = 40,709
	k_2 = -0.3195	k_4 = -0.1434	B = 0.3994	D = 1.3994
		k_5 = -0.3588		
	r^2= 0.105	r^2= 0.318	r^2= 0.298	r^2= 0.298
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 33 MPa	Mr_c= 24 MPa	Mr_c= 19 MPa	Mr_c= 19 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	2167	0.18	2538	0.16	0.13	2041	0.12	5103	0.12
t=	10.87	-1.80	4.26	-0.88	-2.70	7.98	3.26	7.98	11.42
Prob(t)=	0%	8%	0%	39%	1%	0%	0%	0%	0%

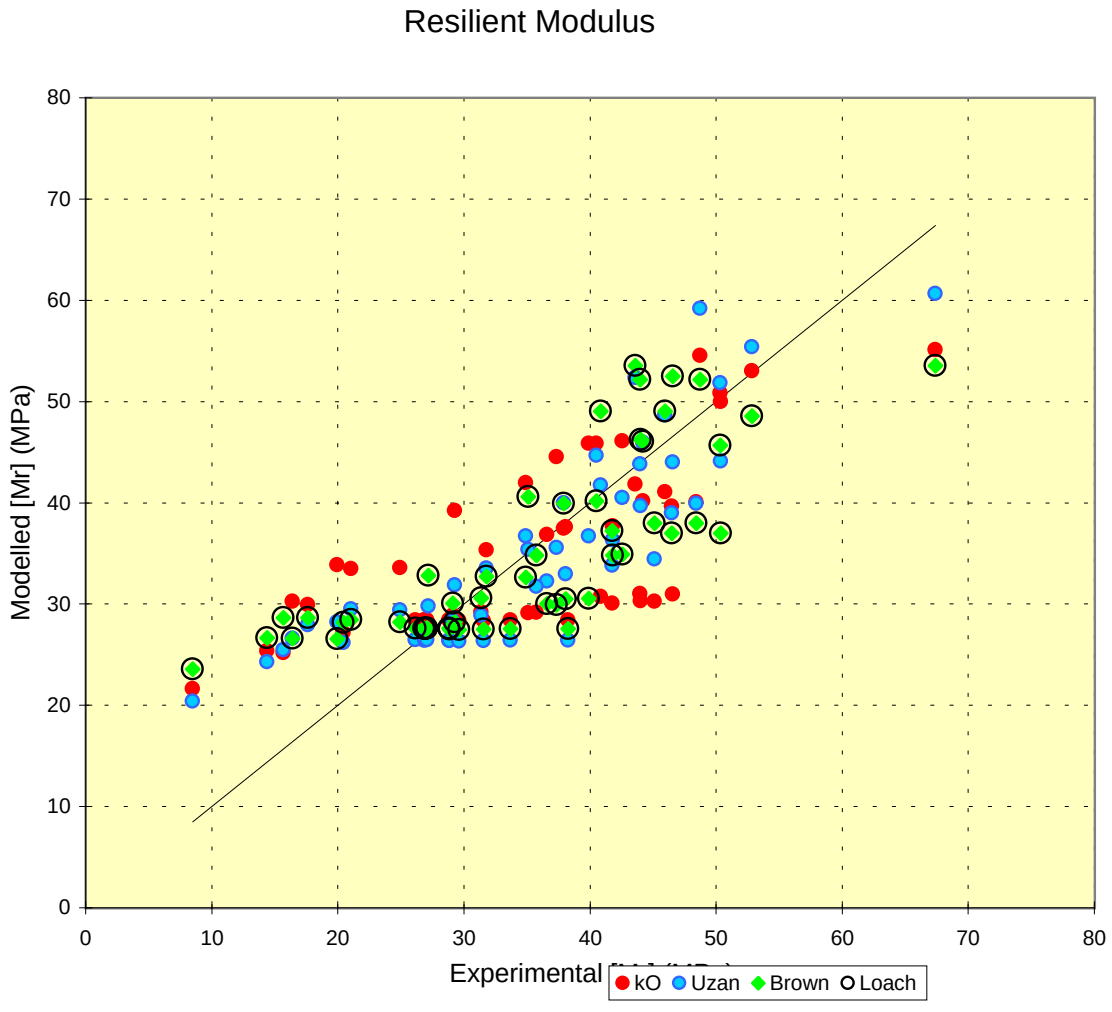
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : LRCF ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 52	Suction (s) =	40 kPa @ ω=	36%
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 35 MPa	υ_e = 0.55
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 40,915	k_3 = 20,295	A = 27,882	C = 69,706
	k_2 = -0.4659	k_4 = -0.2478	B = 0.2926	D = 1.2926
		k_5 = -0.2110		
	r^2= 0.537	r^2= 0.740	r^2= 0.628	r^2= 0.628
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 67 MPa	Mr_c= 46 MPa	Mr_c= 32 MPa	Mr_c= 32 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	1316	0.06	1224	0.05	0.03	1232	0.03	3079	0.03
t=	31.09	-7.77	16.58	-4.62	-6.45	22.64	9.19	22.64	40.59
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

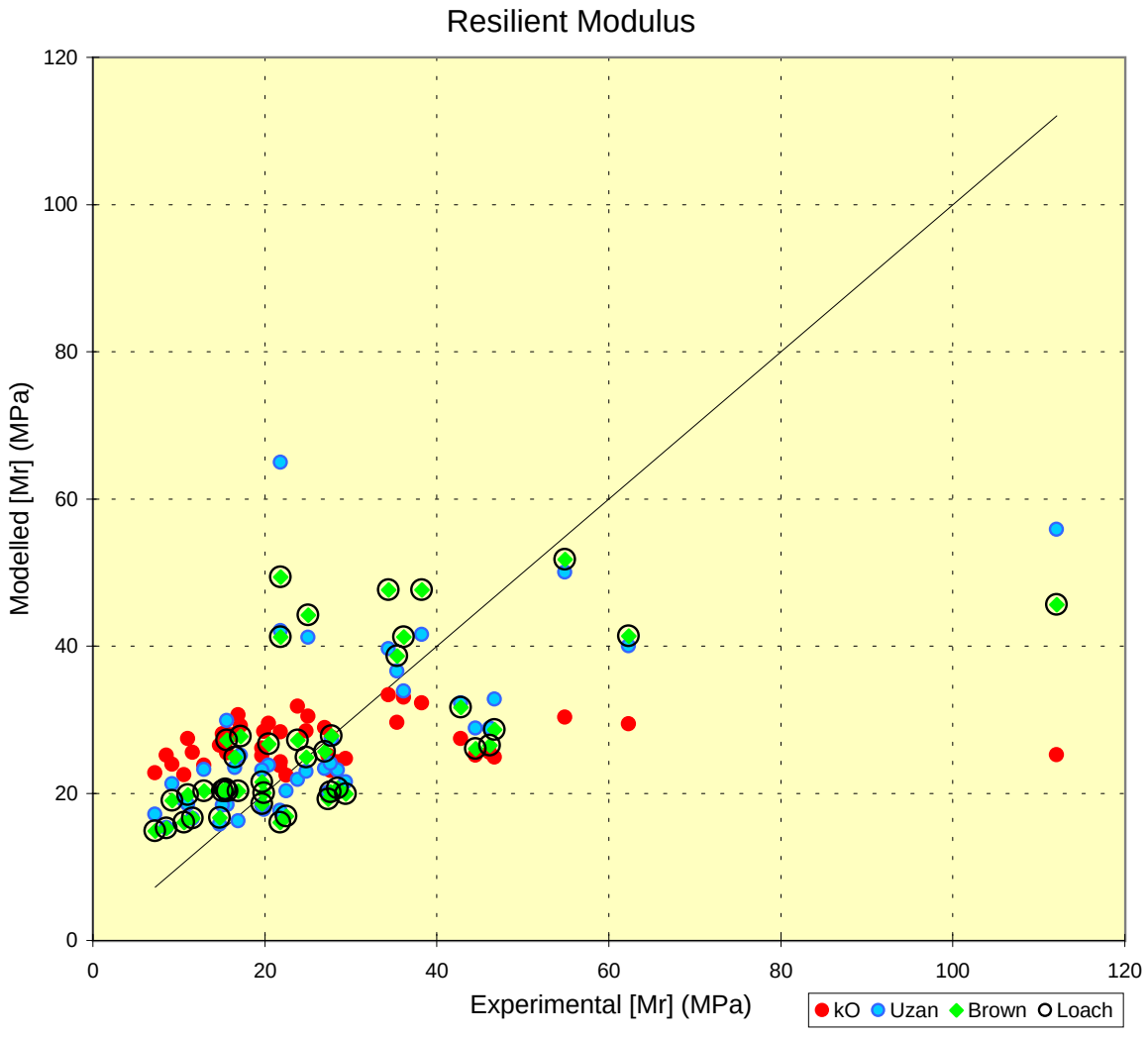
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : LNEC ***London Clay (LOC)*** ***95% Percentile Data***

Experimental Data	Sample Size: 43	Suction (s) =	40 kPa @ ω=	36%
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 34 MPa	υ_e = 0.52
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 29,987	k_3 = 11,008	A = 21,408	C = 53,521
	k_2 = -0.2173	k_4 = 0.3061	B = 0.7541	D = 1.7541
		k_5 = -0.8938		
	r^2= 0.026	r^2= 0.421	r^2= 0.365	r^2= 0.365
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 38 MPa	Mr_c= 19 MPa	Mr_c= 30 MPa	Mr_c= 30 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	4005	0.21	2621	0.16	0.16	2638	0.16	6596	0.16
t=	7.49	-1.03	4.20	1.91	-5.47	8.11	4.72	8.11	10.99
Prob(t)=	0%	31%	0%	6%	0%	0%	0%	0%	0%

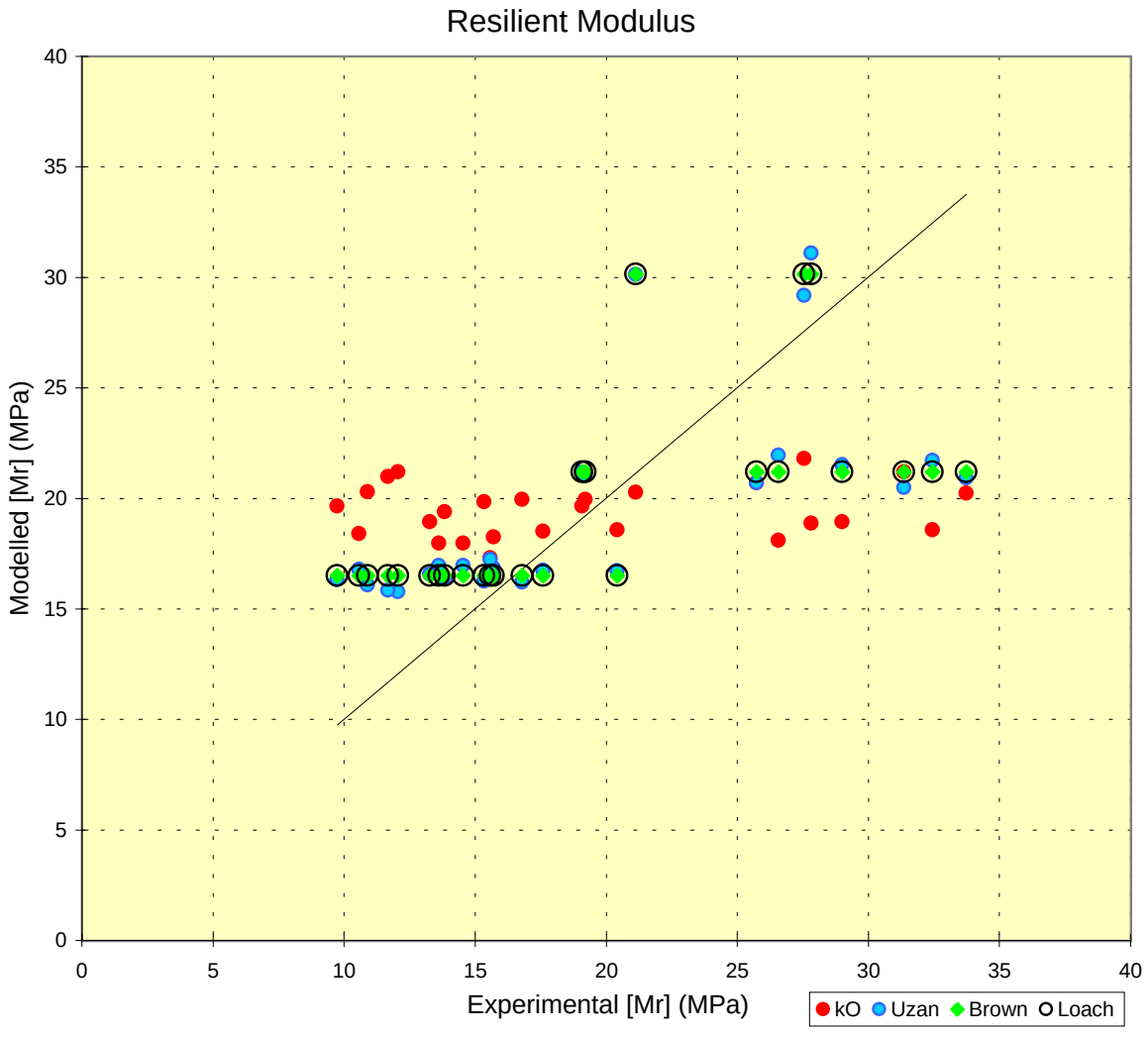
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : UNOT ***London Clay (LOC)*** ***95% Percentile Data***

Experimental Data	Sample Size: 26	Suction (s) =	40 kPa @ ω=	36%
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 19 MPa	υ_e = 0.54
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 20,481	k_3 = 10,654	A = 15,098	C = 37,744
	k_2 = -0.1310	k_4 = 0.0578	B = 0.3968	D = 1.3968
		k_5 = -0.4131		
	r^2= 0.025	r^2= 0.423	r^2= 0.419	r^2= 0.419
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 24 MPa	Mr_c= 16 MPa	Mr_c= 18 MPa	Mr_c= 18 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	1965	0.17	1919	0.14	0.10	1469	0.09	3673	0.09
t=	10.42	-0.79	5.55	0.43	-3.98	10.28	4.22	10.28	14.84
Prob(t)=	0%	44%	0%	67%	0%	0%	0%	0%	0%

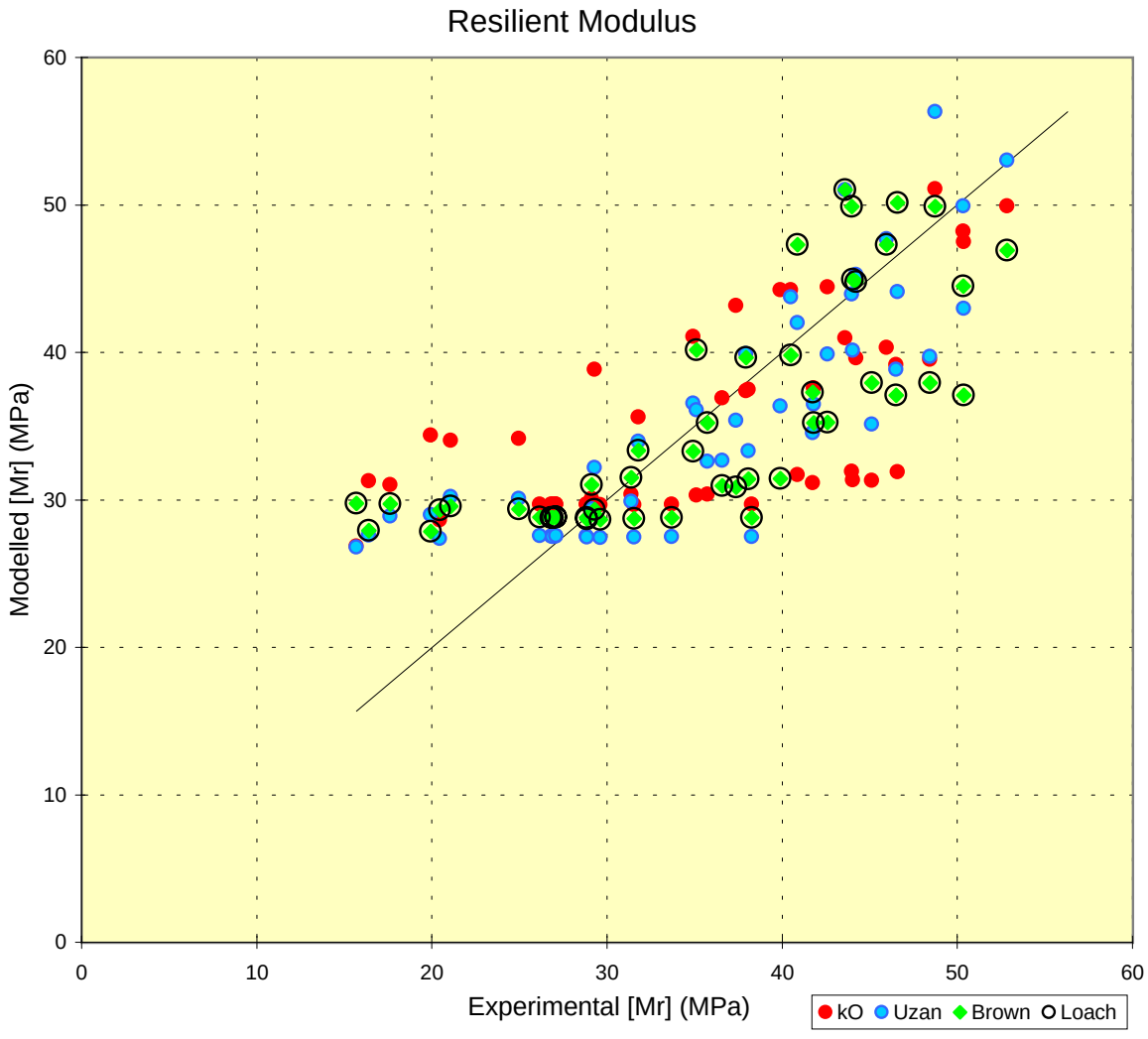
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : LRCF ***London Clay (LOC)*** ***95% Percentile Data***

Experimental Data	Sample Size: 49	Suction (s) =	40 kPa @ ω=	36%
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 35 MPa	υ_e = 0.55
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 40,227	k_3 = 21,689	A = 29,060	C = 72,649
	k_2 = -0.3876	k_4 = -0.2043	B = 0.2524	D = 1.2524
		k_5 = -0.1974		
	r^2= 0.433	r^2= 0.691	r^2= 0.591	r^2= 0.591
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 61 MPa	Mr_c= 44 MPa	Mr_c= 32 MPa	Mr_c= 32 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	1320	0.06	1284	0.05	0.03	1154	0.03	2885	0.03
t=	30.48	-6.19	16.90	-3.90	-6.43	25.18	8.30	25.18	41.19
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

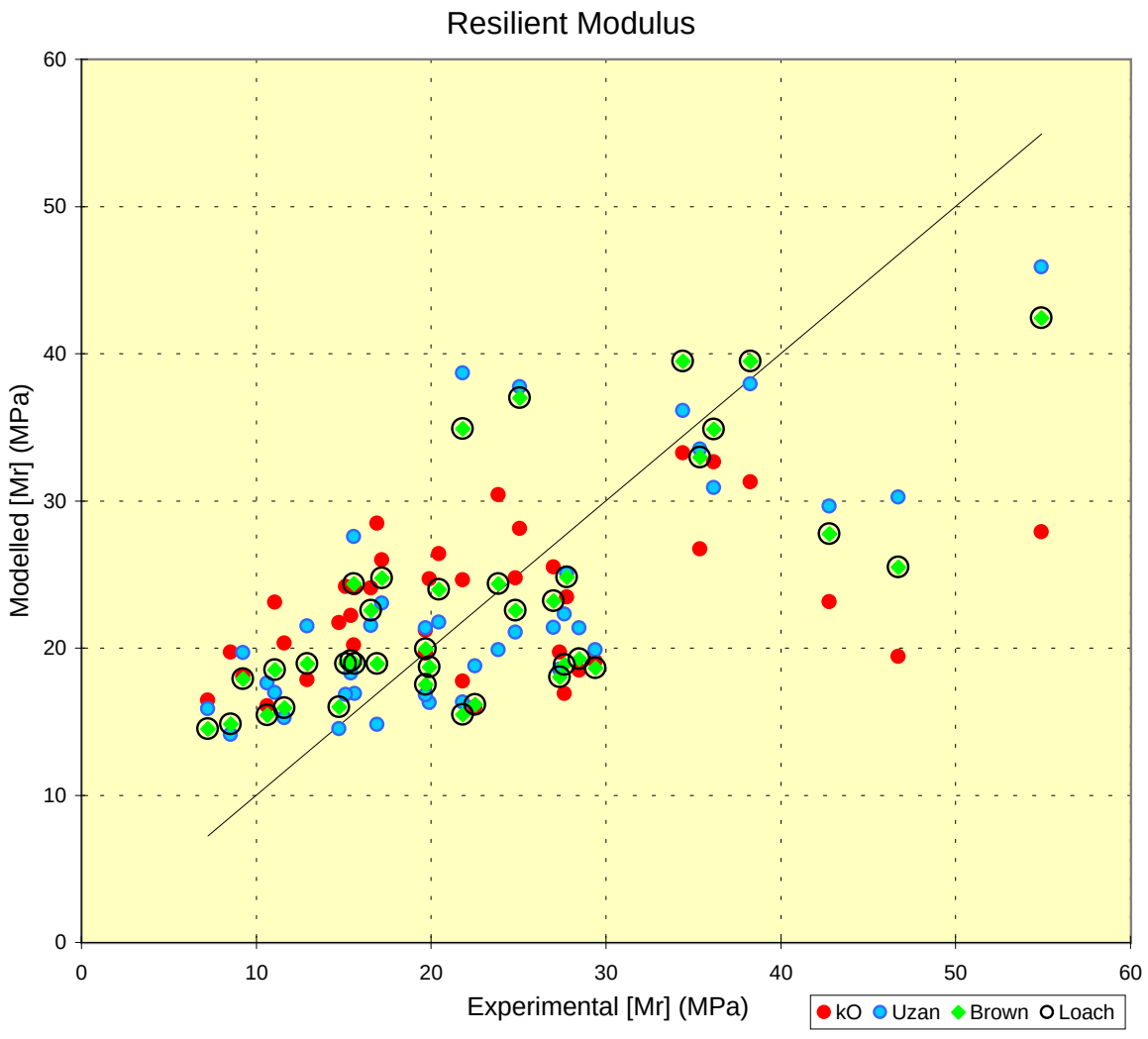
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

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TP-I : LNEC ***London Clay (LOC)*** ***90% Percentile Data***

Experimental Data	Sample Size: 38	Suction (s) =	40 kPa @ ω=	36%
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 29 MPa	υ_e = 0.53
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 27,325	k_3 = 10,151	A = 19,836	C = 49,590
	k_2 = -0.3994	k_4 = 0.3182	B = 0.6488	D = 1.6488
		k_5 = -0.8979		
	r^2= 0.173	r^2= 0.551	r^2= 0.507	r^2= 0.507
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 42 MPa	Mr_c= 17 MPa	Mr_c= 26 MPa	Mr_c= 26 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	2210	0.14	1575	0.17	0.17	1417	0.10	3542	0.10
t=	12.36	-2.80	6.45	1.90	-5.35	14.00	6.30	14.00	16.00
Prob(t)=	0%	1%	0%	7%	0%	0%	0%	0%	0%

The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : UNOT ***London Clay (LOC)*** ***90% Percentile Data***

Experimental Data	Sample Size: 23	Suction (s) = 40 kPa @ ω= 36%		
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 18 MPa	υ_e = 0.53
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 18,139	k_3 = 10,058	A = 13,937	C = 34,843
	k_2 = -0.0520	k_4 = 0.1446	B = 0.3933	D = 1.3933
		k_5 = -0.4337		
	r^2= 0.005	r^2= 0.587	r^2= 0.551	r^2= 0.551
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 19 MPa	Mr_c= 13 MPa	Mr_c= 17 MPa	Mr_c= 17 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	1787	0.16	1361	0.11	0.08	1075	0.07	2688	0.07
t=	10.15	-0.33	7.39	1.31	-5.49	12.96	5.38	12.96	19.06
Prob(t)=	0%	75%	0%	20%	0%	0%	0%	0%	0%

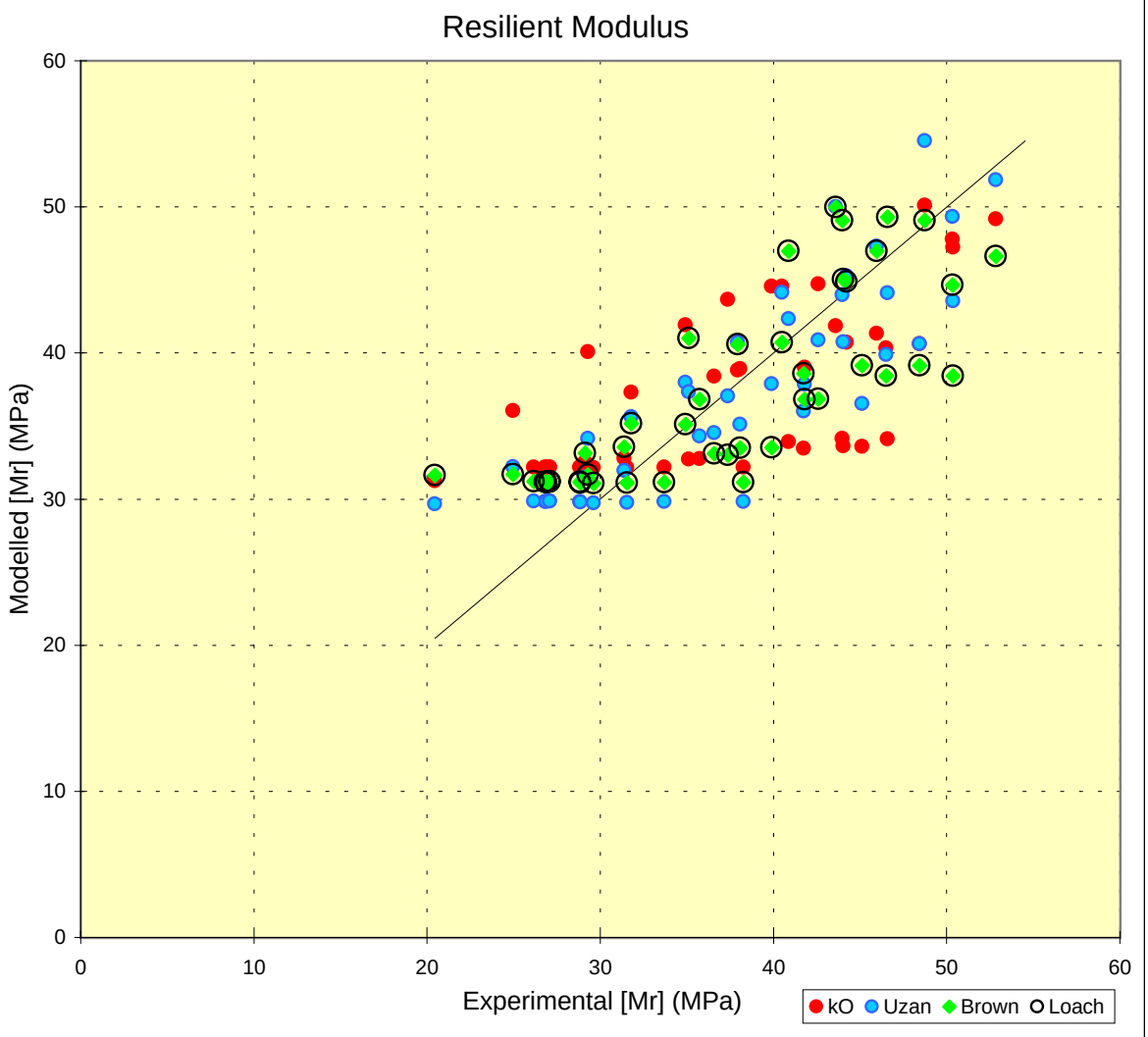
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : LRCF ***London Clay (LOC)*** ***90% Percentile Data***

Experimental Data	Sample Size: 43	Suction (s) =	40 kPa @ ω=	36%
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 36 MPa	υ_e = 0.56
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 41,227	k_3 = 24,440	A = 31,415	C = 78,538
	k_2 = -0.3164	k_4 = -0.1776	B = 0.2082	D = 1.2082
		k_5 = -0.1629		
	r^2= 0.459	r^2= 0.739	r^2= 0.619	r^2= 0.619
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 58 MPa	Mr_c= 45 MPa	Mr_c= 34 MPa	Mr_c= 34 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	1119	0.05	1178	0.04	0.02	1057	0.03	2643	0.03
t=	36.83	-6.03	20.75	-4.33	-6.72	29.71	8.14	29.71	47.24
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

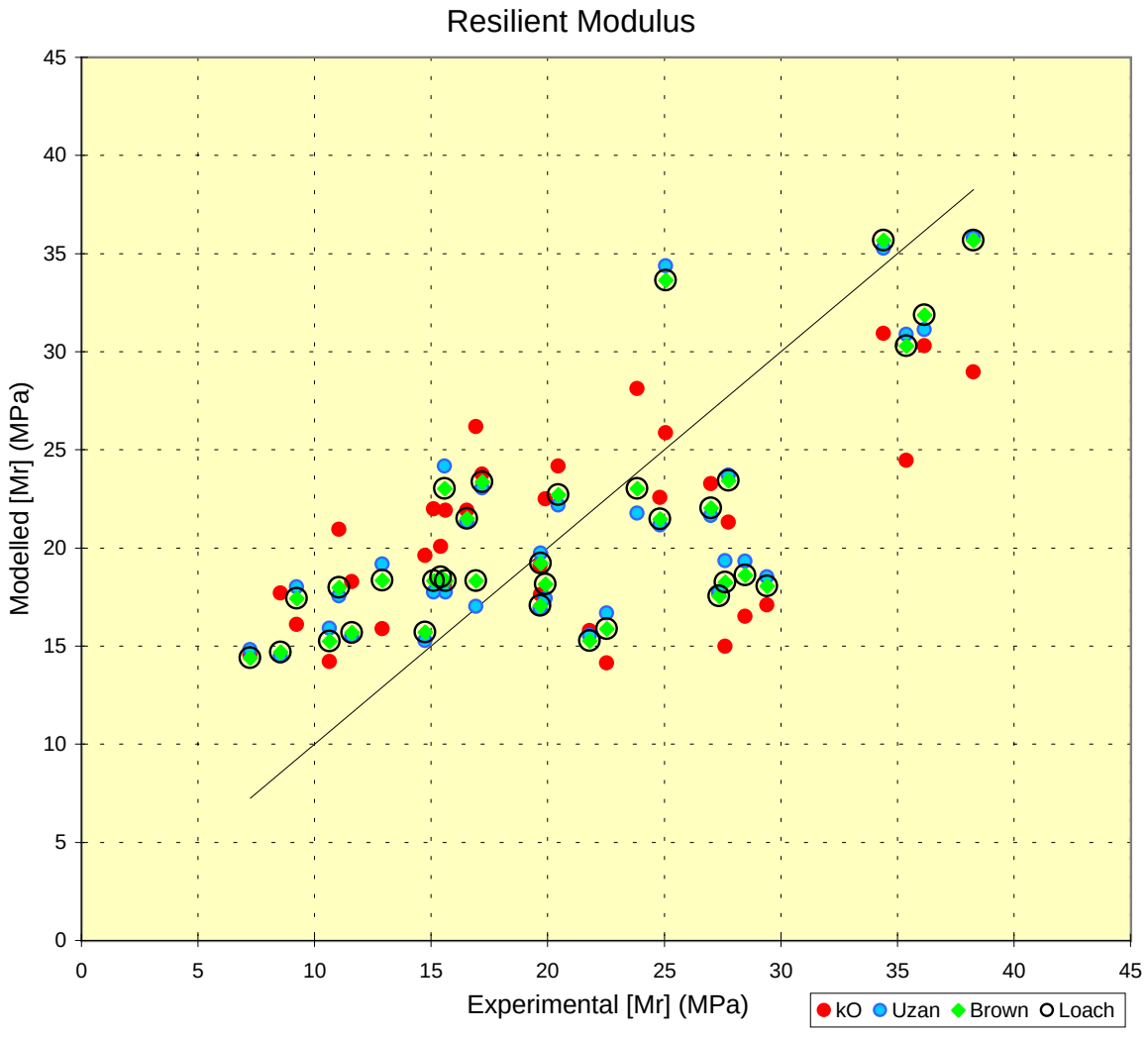
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : LNEC ***London Clay (LOC)*** ***85% Percentile Data***

Experimental Data	Sample Size: 34	Suction (s) =	40 kPa @ ω=	36%
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 27 MPa	υ_e = 0.54
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 25,067	k_3 = 10,838	A = 19,117	C = 47,792
	k_2 = -0.4275	k_4 = 0.1015	B = 0.5881	D = 1.5881
		k_5 = -0.6781		
	r^2= 0.283	r^2= 0.524	r^2= 0.518	r^2= 0.518
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 39 MPa	Mr_c= 22 MPa	Mr_c= 25 MPa	Mr_c= 25 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	1647	0.11	1521	0.17	0.18	1089	0.09	2723	0.09
t=	15.22	-3.74	7.13	0.61	-3.75	17.55	6.28	17.55	16.95
Prob(t)=	0%	0%	0%	55%	0%	0%	0%	0%	0%

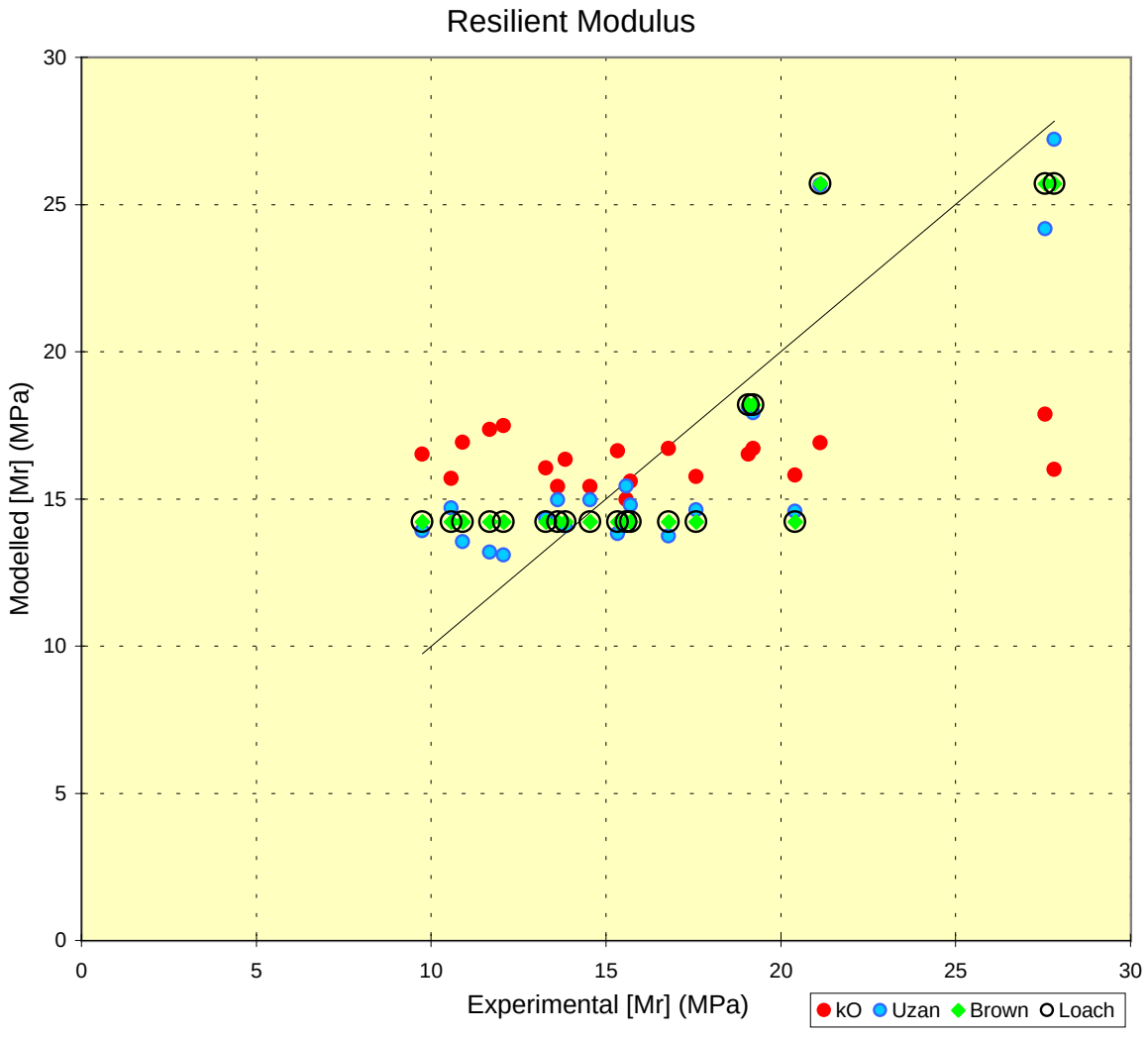
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : UNOT ***London Clay (LOC)*** ***85% Percentile Data***

Experimental Data	Sample Size: 20	Suction (s) =	40 kPa @ ω=	36%
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 17 MPa	υ_e = 0.52
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 17,034	k_3 = 9,378	A = 13,027	C = 32,568
	k_2 = -0.1003	k_4 = 0.1069	B = 0.3897	D = 1.3897
		k_5 = -0.4194		
	r^2= 0.022	r^2= 0.718	r^2= 0.695	r^2= 0.695
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 19 MPa	Mr_c= 13 MPa	Mr_c= 15 MPa	Mr_c= 15 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	1584	0.15	967	0.09	0.06	772	0.05	1930	0.05
	10.76	-0.65	9.70	1.18	-6.94	16.87	7.12	16.87	25.39
	0%	52%	0%	25%	0%	0%	0%	0%	0%

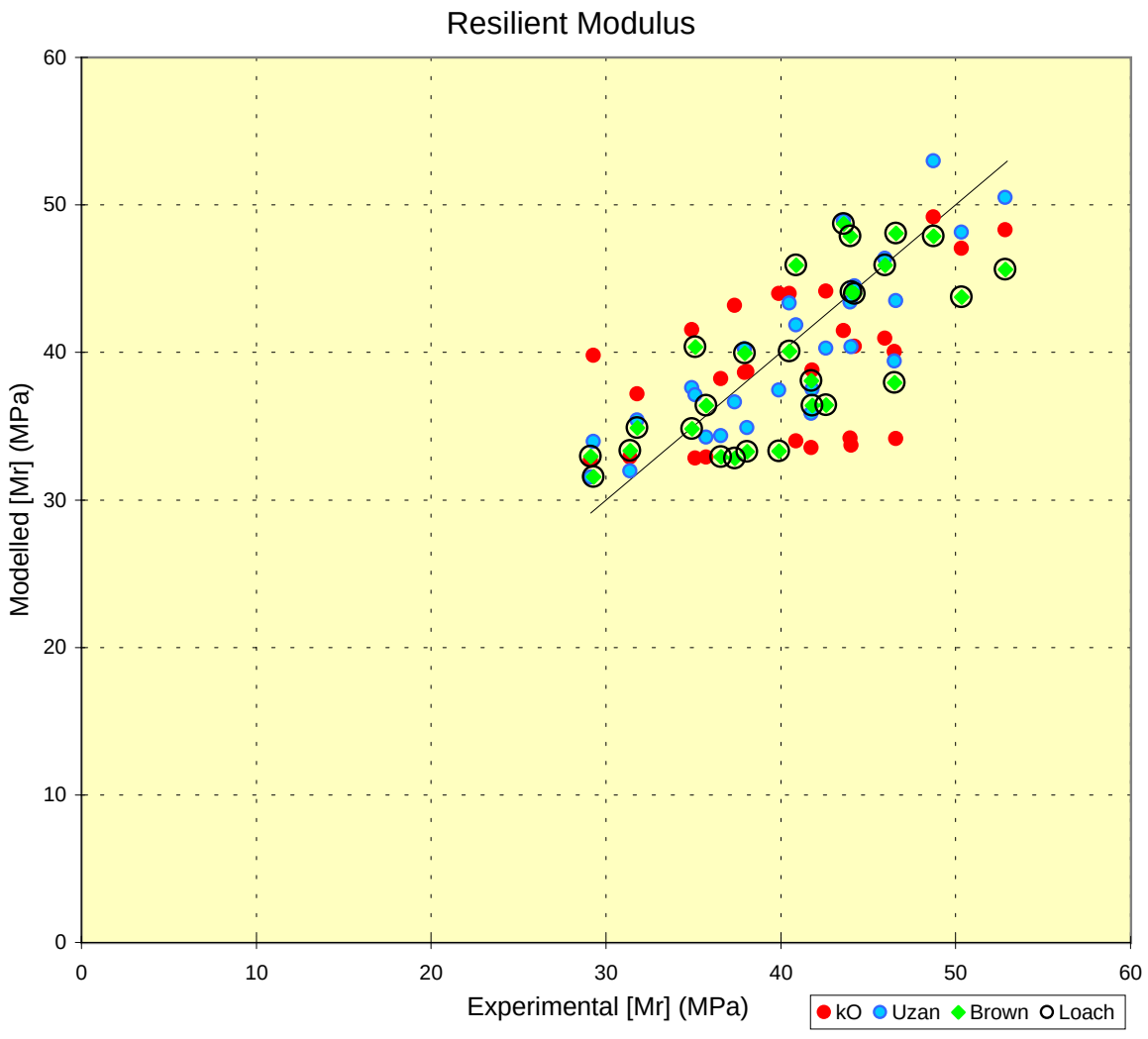
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : LRCF ***London Clay (LOC)*** ***85% Percentile Data***

Experimental Data	Sample Size: 39	Suction (s) =	40 kPa @ ω=	36%
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 36 MPa	υ_e = 0.56
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 40,875	k_3 = 24,788	A = 31,312	C = 78,280
	k_2 = -0.3002	k_4 = -0.1645	B = 0.1982	D = 1.1982
		k_5 = -0.1560		
	r^2= 0.483	r^2= 0.794	r^2= 0.674	r^2= 0.674
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 56 MPa	Mr_c= 44 MPa	Mr_c= 34 MPa	Mr_c= 34 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	1075	0.05	1010	0.04	0.02	941	0.02	2352	0.02
t=	38.03	-6.03	24.54	-4.62	-7.59	33.29	8.82	33.29	53.31
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

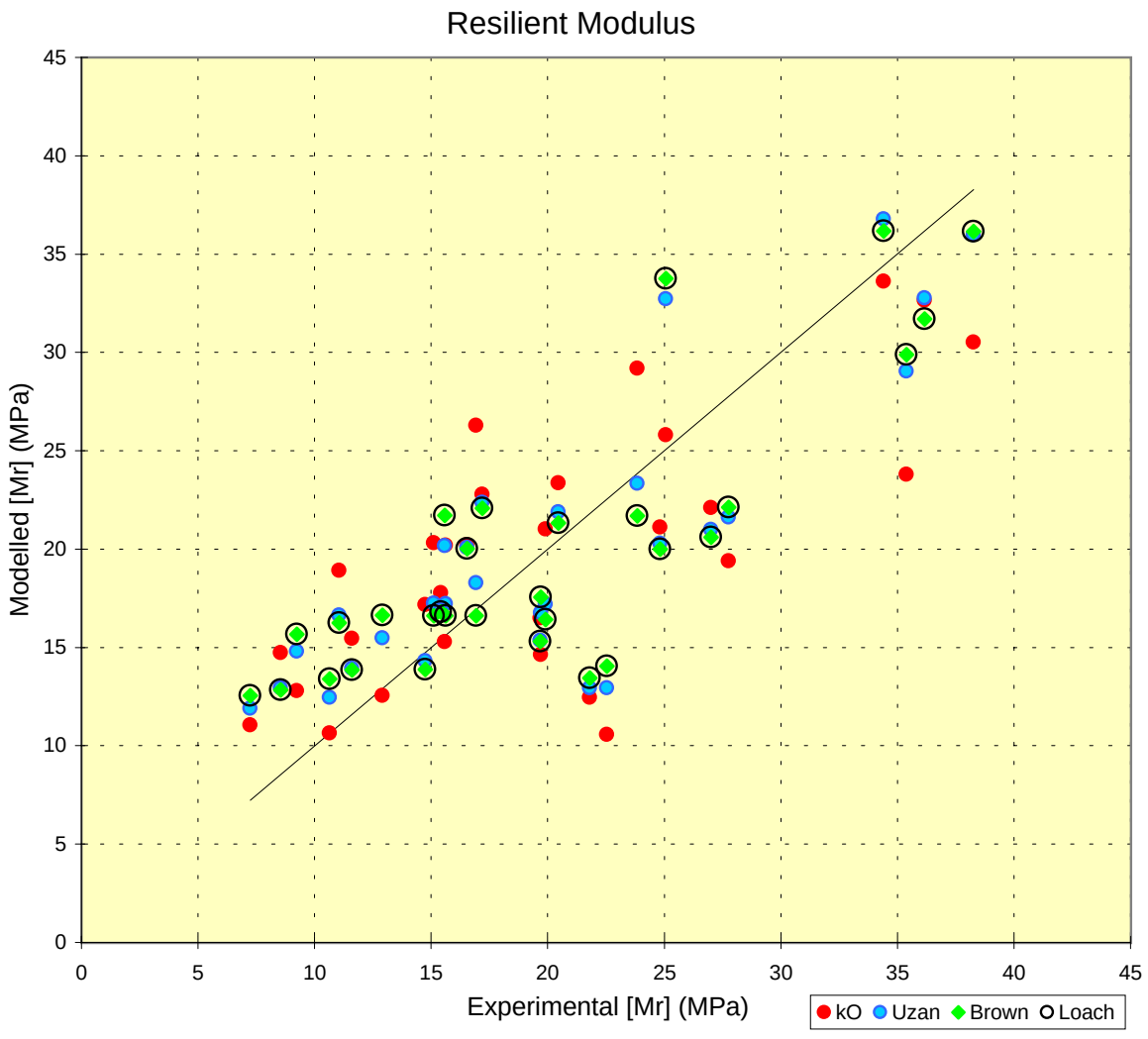
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : LNEC ***London Clay (LOC)*** ***80% Percentile Data***

Experimental Data	Sample Size: 30	Suction (s) =	40 kPa @ ω=	36%
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 26 MPa	υ_e = 0.54
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 24,663	k_3 = 9,531	A = 17,461	C = 43,654
	k_2 = -0.6312	k_4 = -0.1426	B = 0.6863	D = 1.6863
		k_5 = -0.5683		
	r^2= 0.536	r^2= 0.702	r^2= 0.693	r^2= 0.693
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 48 MPa	Mr_c= 28 MPa	Mr_c= 24 MPa	Mr_c= 24 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	1314	0.11	1164	0.16	0.15	958	0.08	2394	0.08
t=	18.77	-5.68	8.19	-0.92	-3.71	18.23	8.32	18.23	20.44
Prob(t)=	0%	0%	0%	37%	0%	0%	0%	0%	0%

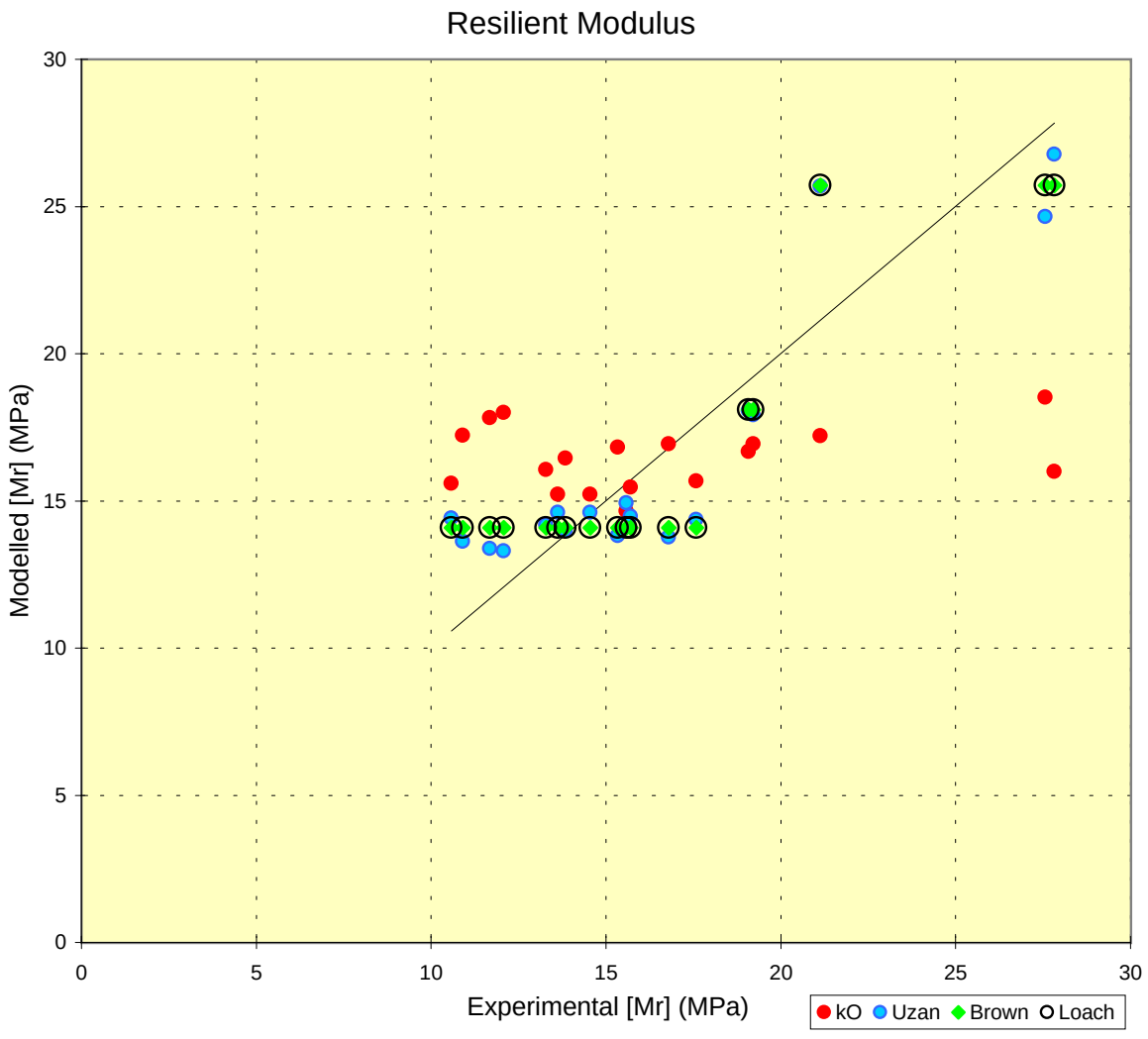
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-I : UNOT ***London Clay (LOC)*** ***80% Percentile Data***

Experimental Data	Sample Size: 18	Suction (s) =	40 kPa @ ω=	36%
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 17 MPa	υ_e = 0.54
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 17,380	k_3 = 9,150	A = 12,896	C = 32,240
	k_2 = -0.1330	k_4 = 0.0747	B = 0.3959	D = 1.3959
		k_5 = -0.4170		
	r^2= 0.044	r^2= 0.801	r^2= 0.789	r^2= 0.789
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 20 MPa	Mr_c= 14 MPa	Mr_c= 15 MPa	Mr_c= 15 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	1585	0.15	839	0.08	0.05	679	0.05	1699	0.05
t=	10.97	-0.87	10.91	0.97	-8.01	18.98	8.47	18.98	29.87
Prob(t)=	0%	40%	0%	35%	0%	0%	0%	0%	0%

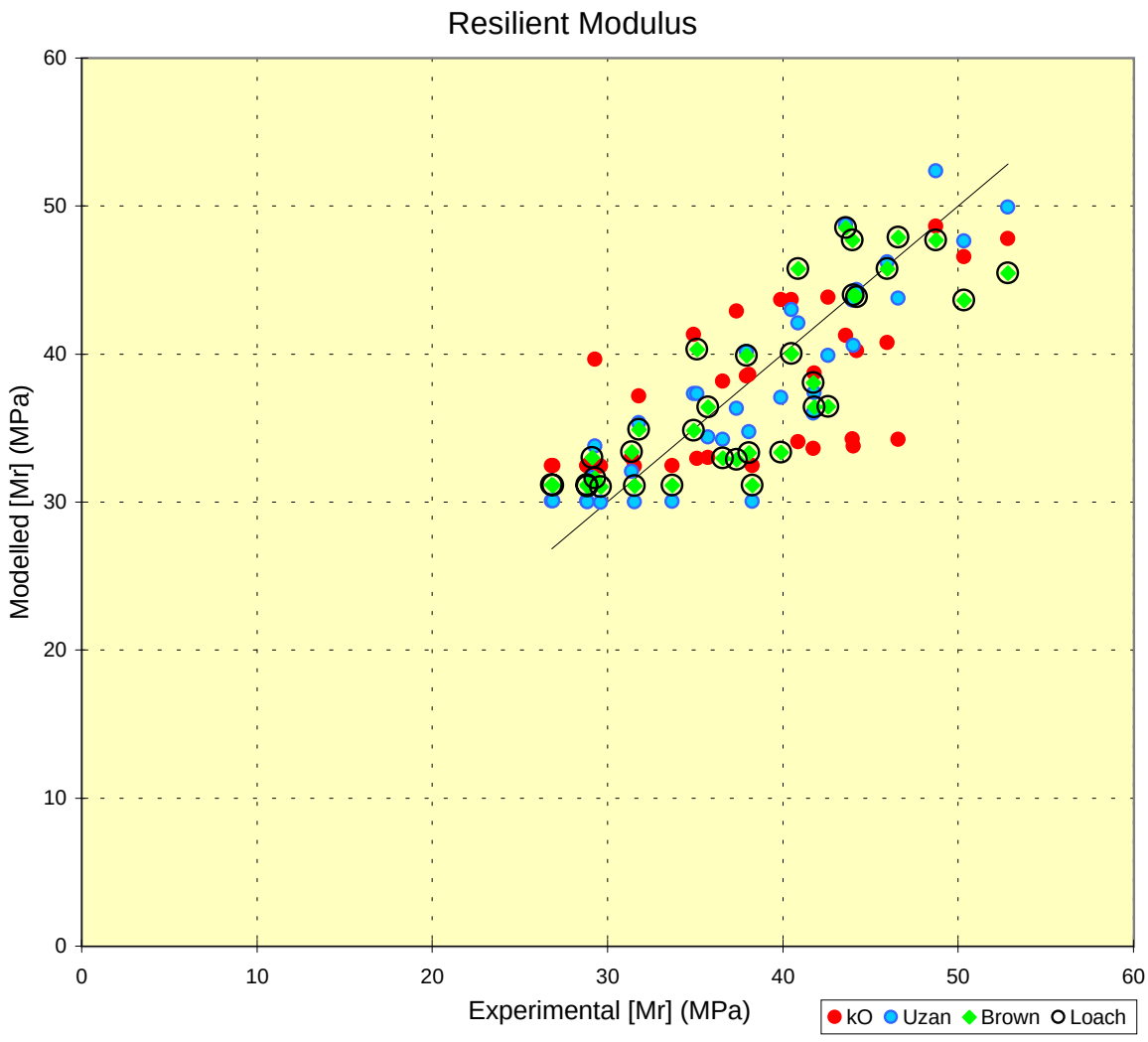
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TP-I : LRCF ***London Clay (LOC)*** ***80% Percentile Data***

Experimental Data	Sample Size: 37	Suction (s) =	40 kPa @ ω=	36%
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 36 MPa	υ_e = 0.56
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 40,692	k_3 = 24,947	A = 31,372	C = 78,430
	k_2 = -0.2890	k_4 = -0.1504	B = 0.1955	D = 1.1955
		k_5 = -0.1580		
	r^2= 0.468	r^2= 0.816	r^2= 0.711	r^2= 0.711
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 55 MPa	Mr_c= 43 MPa	Mr_c= 34 MPa	Mr_c= 34 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	1093	0.05	960	0.03	0.02	889	0.02	2223	0.02
t=	37.23	-5.71	26.00	-4.47	-8.26	35.28	9.35	35.28	57.16
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

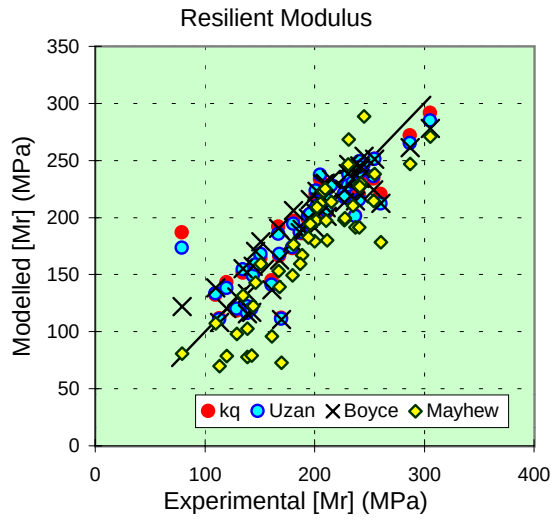
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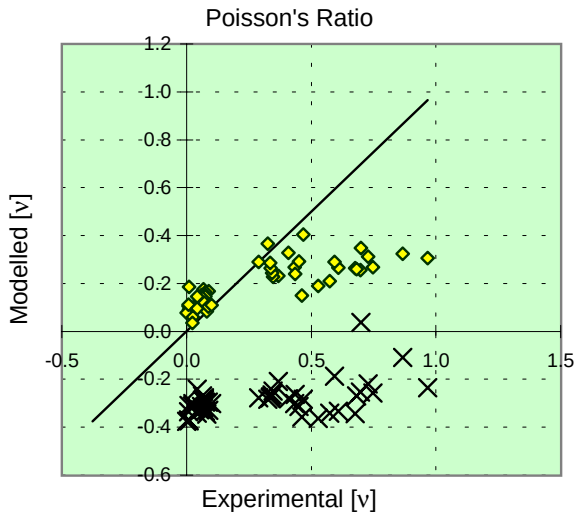
The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

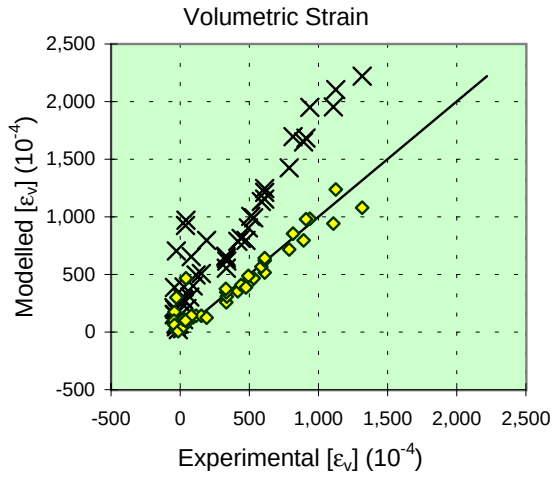
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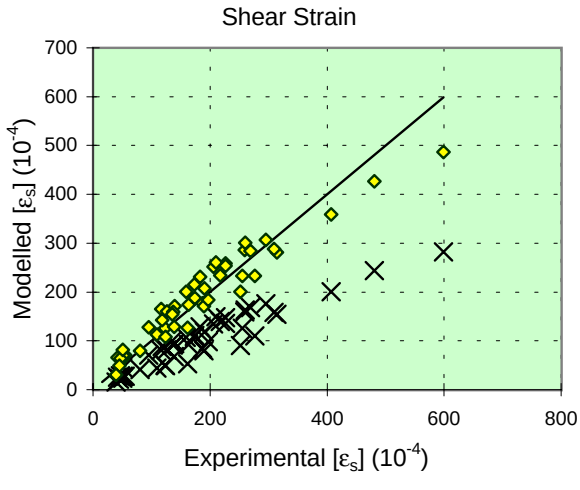
TP-I : UNOT ***Fountainebleau Sand (SFB)*** ***100% Percentile Data***

Experimental Data	Sample Size: 47	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 198 MPa		υ_e = 0.30
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 143,888 k_2 = 0.4168 r^2= 0.667	k_3 = 232,063 k_4 = 0.3738 k_5 = 0.0434 r^2= 0.673	Ga = 153,098 kPa Ka = 29,672 kPa n = 0.5530 r^2= 0.706	Ga = 86,707 kPa Ka = 57,039 kPa n = 0.3254 β = 0.1771 m = 0.6414 $r^2\varepsilon_v$= 0.786 $r^2\varepsilon_s$= 0.792
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 104 MPa	Mr_c= 112 MPa	ε_{vc}= 455 ε_{sc}= 138 Mr_c= 122 MPa υ_c= **-0.49**	ε_{vc}= -60 ε_{sc}= 374 Mr_c= 147 MPa υ_c= 0.66



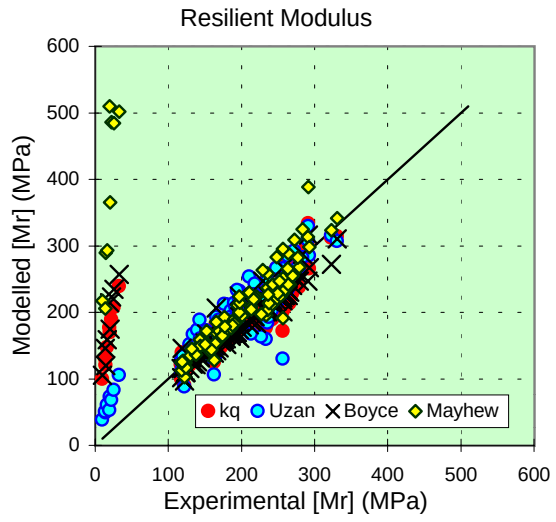


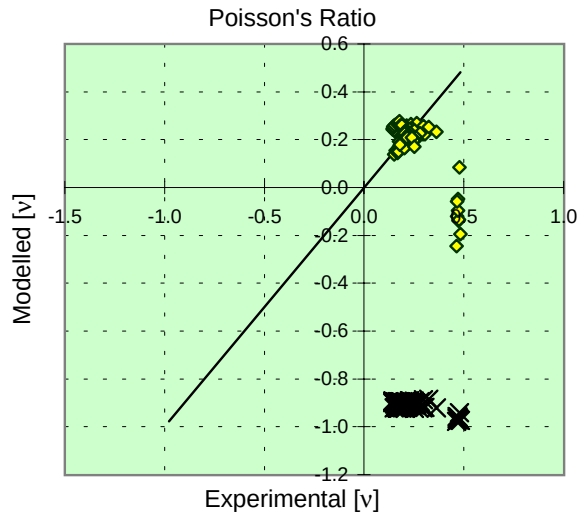


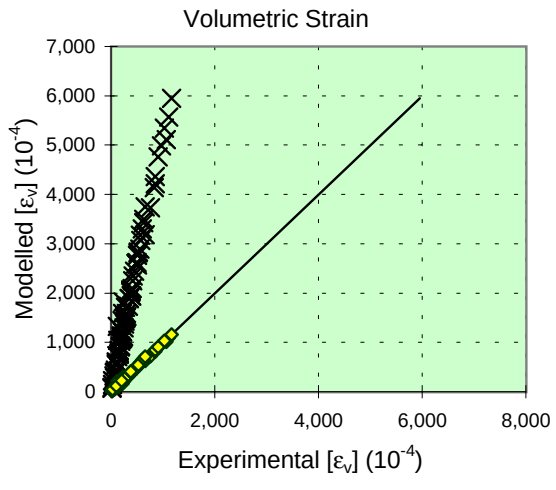


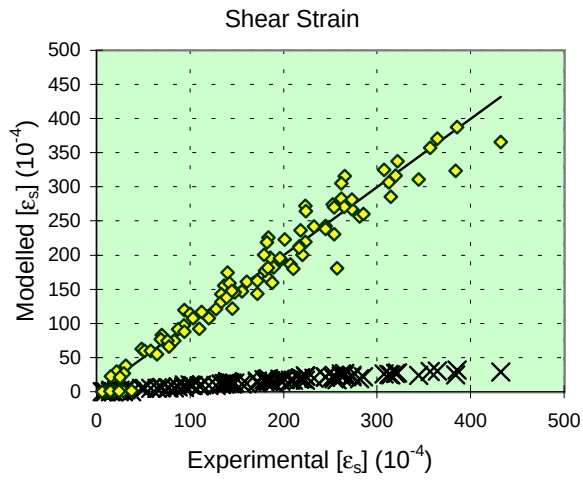
TP-I : LRSB(1) ***Fountainebleau Sand (SFB)*** ***100% Percentile Data***

Experimental Data	Sample Size: 93	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 205 MPa		υ_e = 0.22
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 126,933 k_2 = 0.4909 r^2= 0.497	k_3 = 256,430 k_4 = 0.3107 k_5 = 0.1795 r^2= 0.705	Ga = 1,000,000 kPa Ka = 13,802 kPa n = 0.4358 r^2= 0.460	Ga = 86,127 kPa Ka = 63,568 kPa n = 0.3178 β = 0.0460 m = 0.3910 $r^2\varepsilon_v$= 0.939 $r^2\varepsilon_s$= 0.848
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 87 MPa	Mr_c= 128 MPa	ε_{vc}= 1070 ε_{sc}= 26 Mr_c= 75 MPa υ_c= **-0.94**	ε_{vc}= 121 ε_{sc}= 382 Mr_c= 110 MPa υ_c= 0.26



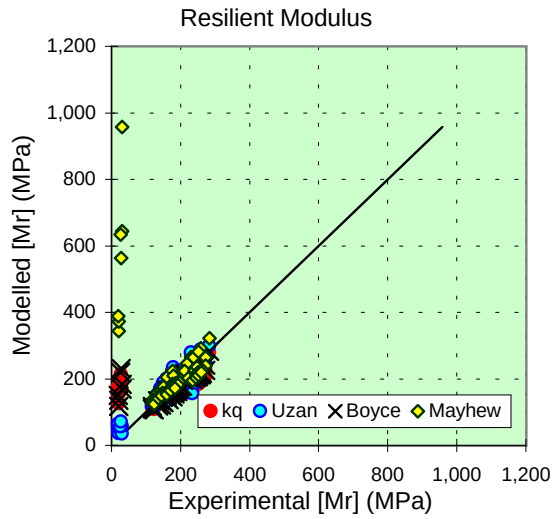


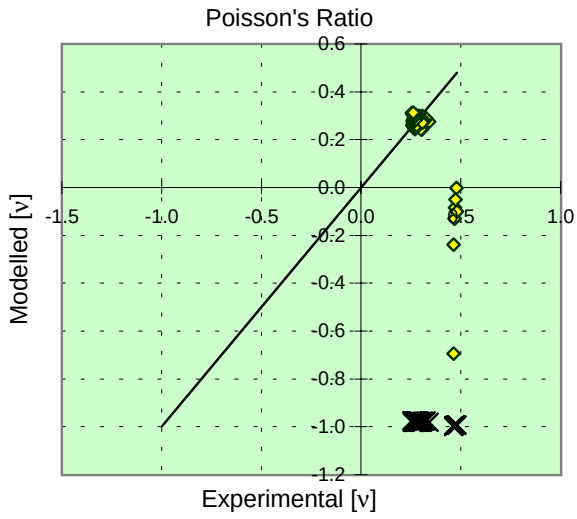


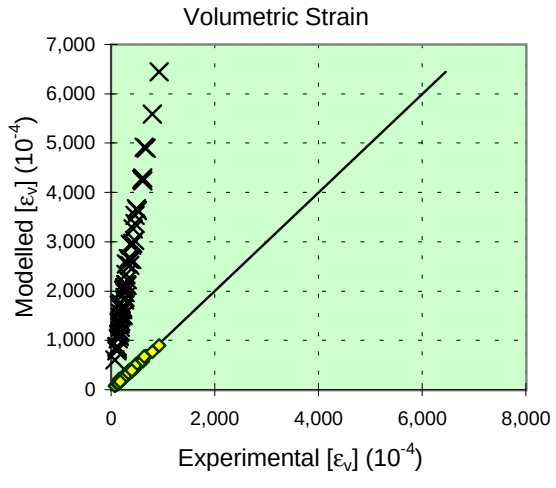


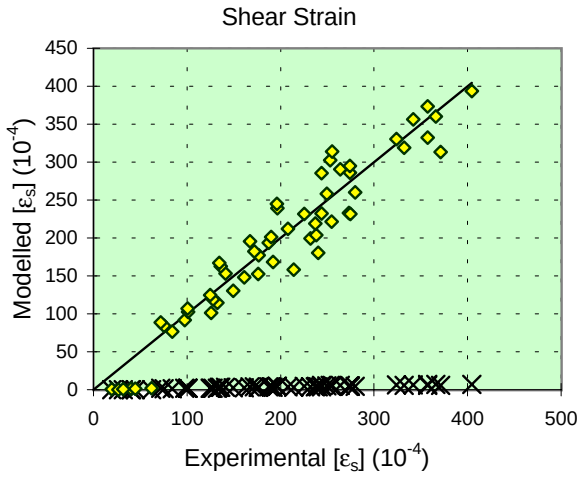
TP-I : LRSB(2) Fountainbleau Sand (SFB) ***100% Percentile Data***

Experimental Data	Sample Size: 58	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 196 MPa		υ_e = 0.29
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 122,142	k_3 = 250,300	Ga = 4,002,065 kPa	Ga = 76,463 kPa
	k_2 = 0.4368	k_4 = 0.2896	Ka = 13,203 kPa	Ka = 89,646 kPa
		k_5 = 0.2404	n = 0.4755	n = 0.3946
				β = 0.0378
				m = 0.4461
	r^2= 0.392	r^2= 0.696	r^2= 0.427	$r^2\varepsilon_v$= 0.916 $r^2\varepsilon_s$= 0.790
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 1119 ε_{sc}= 6	ε_{vc}= 107 ε_{sc}= 372
	Mr_c= 87 MPa	Mr_c= 125 MPa	Mr_c= 74 MPa	Mr_c= 114 MPa
			υ_c= **-0.99**	υ_c= 0.28



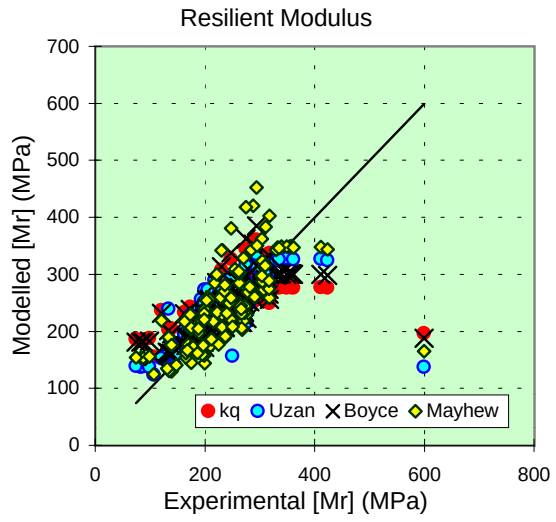


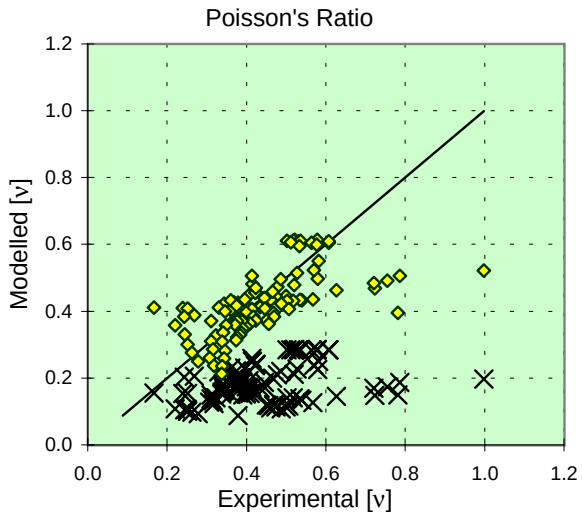


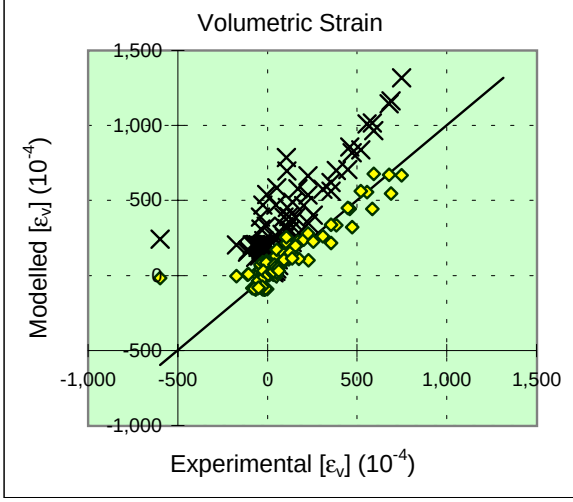


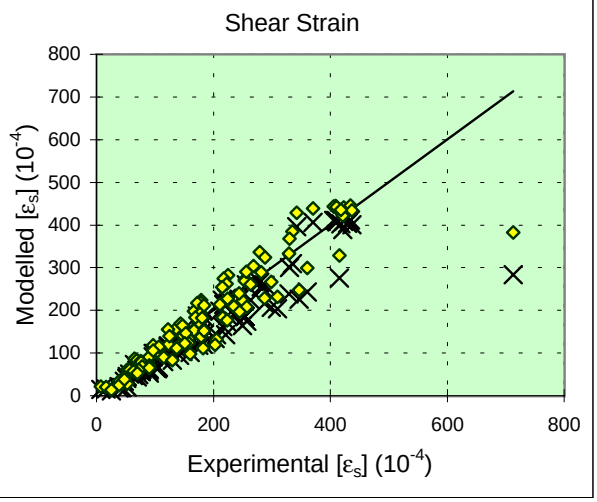
TP-I : LRCF(1) ***Fountainebleau Sand (SFB)*** ***100% Percentile Data***

Experimental Data	Sample Size: 106	p*= 15 kPa @ ω= 0.0%	p_a'= 100 kPa	
	Characteristic Values at q_2 = 54 kPa	Mr_e= 245 MPa	υ_e = 0.44	
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 186,822	k_3 = 302,574	Ga = 98,854 kPa	Ga = 89,968 kPa
	k_2 = 0.3376	k_4 = 0.2056	Ka = 72,623 kPa	Ka = 259,650 kPa
		k_5 = 0.1794	n = 0.4560	n = 0.2149
				β = 0.4903
				m = 1.0281
	r^2= 0.427	r^2= 0.492	r^2= 0.460	$r^2\varepsilon_v$= 0.701 $r^2\varepsilon_s$= 0.732
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 144 MPa	Mr_c= 184 MPa	ε_{vc}= 136 ε_{sc}= 257	ε_{vc}= -53 ε_{sc}= 443
			Mr_c= 148 MPa	Mr_c= 121 MPa
			υ_c= 0.14	υ_c= 0.62



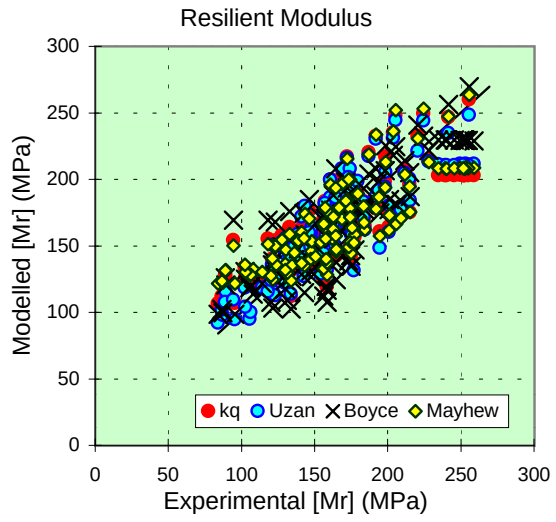


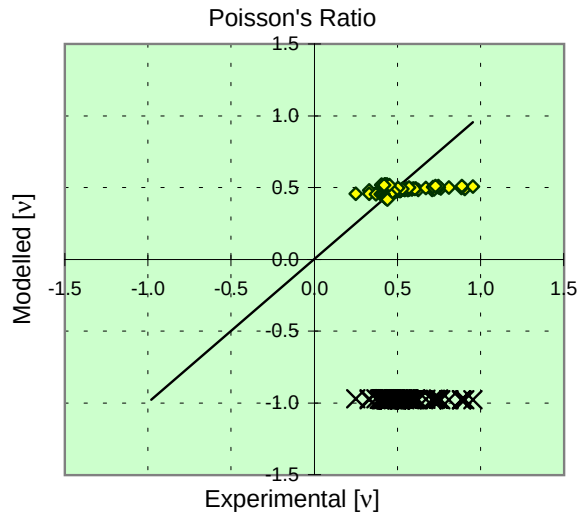


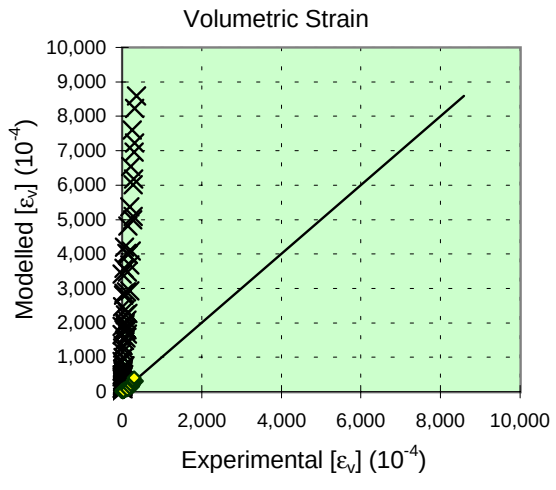


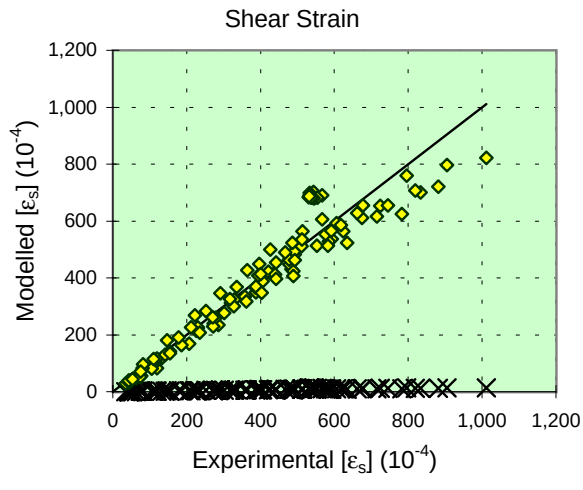
TP-I : LRCF(2) ***Fountainebleau Sand (SFB)*** ***100% Percentile Data***

Experimental Data	Sample Size: 112	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 155 MPa		υ_e = 0.51
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 122,753 k_2 = 0.3526 r^2= 0.576	k_3 = 190,386 k_4 = 0.1380 k_5 = 0.1646 r^2= 0.637	Ga = 3,058,585 kPa Ka = 11,908 kPa n = 0.4902 r^2= 0.639	Ga = 52,484 kPa Ka = 615,913 kPa n = 0.4948 β = 0.6551 m = 1.4807 $r^2\varepsilon_v$= 0.471 $r^2\varepsilon_s$= 0.787
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 93 MPa	Mr_c= 133 MPa	ε_{vc}= 1236 ε_{sc}= 8 Mr_c= 67 MPa υ_c= **-0.98**	ε_{vc}= -14 ε_{sc}= 450 Mr_c= 113 MPa υ_c= 0.53



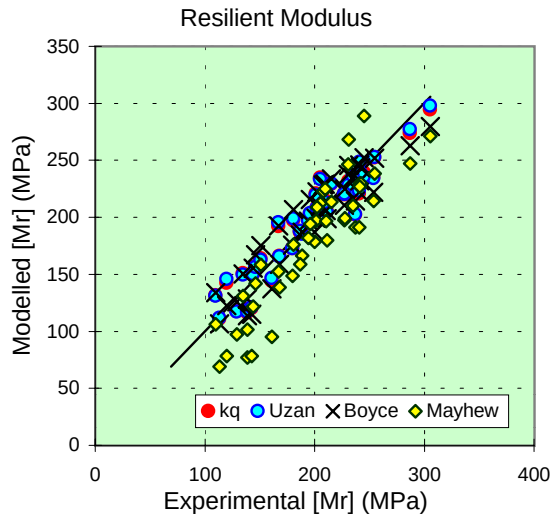


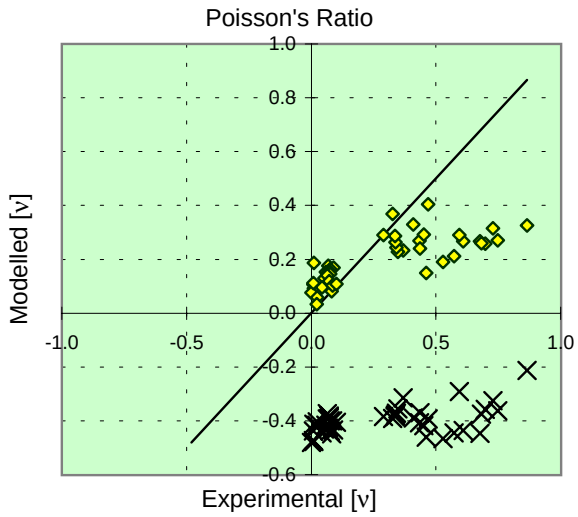


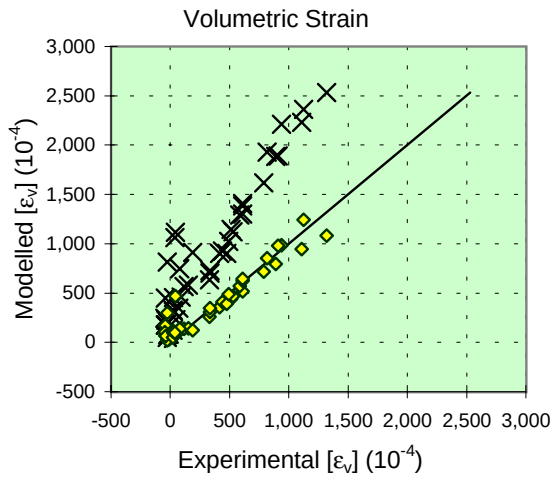


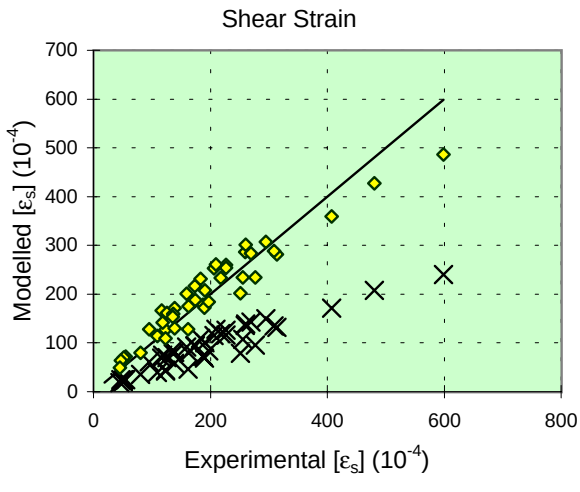
TP-I : UNOT ***Fountainebleau Sand (SFB)*** ***95% Percentile Data***

Experimental Data	Sample Size: 44	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 197 MPa		υ_e = 0.29
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 143,264	k_3 = 226,306	Ga = 179,631 kPa	Ga = 86,648 kPa
	k_2 = 0.4245	k_4 = 0.4446	Ka = 25,595 kPa	Ka = 56,914 kPa
		k_5 = -0.0217	n = 0.5355	n = 0.3184
				β = 0.1777
				m = 0.6415
	r^2= 0.787	r^2= 0.789	r^2= 0.752	$r^2\varepsilon_v$= 0.783 $r^2\varepsilon_s$= 0.784
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 103 MPa	Mr_c= 100 MPa	ε_{vc}= 539 ε_{sc}= 122	ε_{vc}= -62 ε_{sc}= 379
			Mr_c= 113 MPa	Mr_c= 145 MPa
			υ_c= **-0.59**	υ_c= 0.66



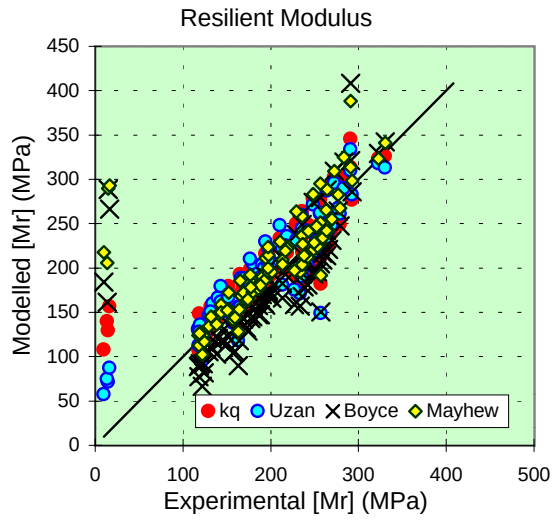


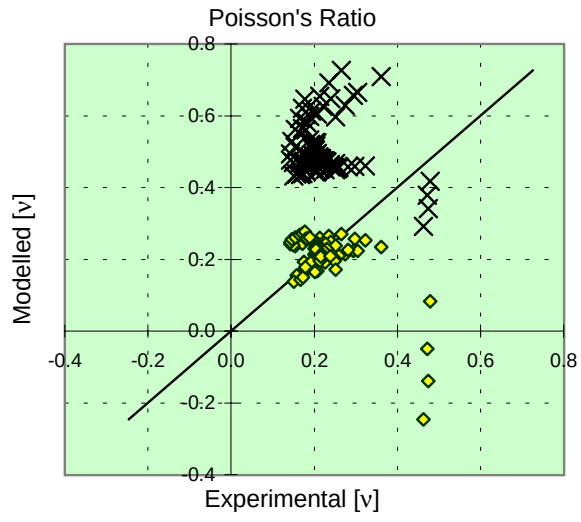


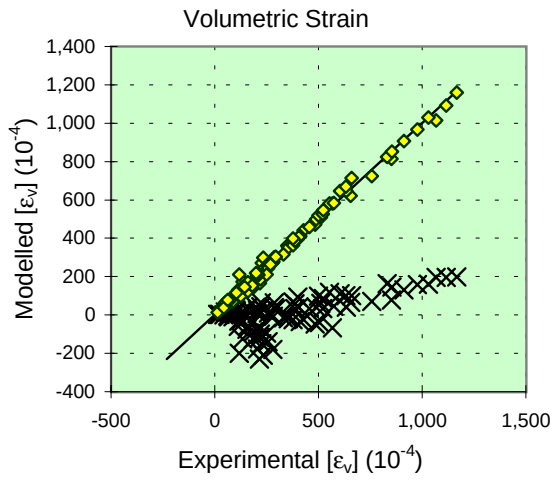


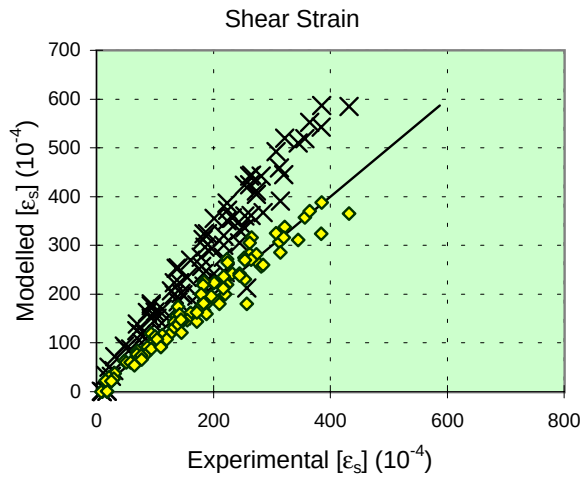
TP-I : LRSB(1) ***Fountainebleau Sand (SFB)*** ***95% Percentile Data***

Experimental Data	Sample Size: 88	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 208 MPa		υ_e = 0.22
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 135,557 k_2 = 0.4751 r^2= 0.626	k_3 = 248,089 k_4 = 0.3555 k_5 = 0.1145 r^2= 0.700	Ga = 62,422 kPa Ka = 116,042 kPa n = 0.1353 r^2= 0.349	Ga = 86,130 kPa Ka = 63,502 kPa n = 0.3178 β = 0.0467 m = 0.3913 $r^2\varepsilon_v$= 0.939 $r^2\varepsilon_s$= 0.844
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 94 MPa	Mr_c= 119 MPa	ε_{vc}= -232 ε_{sc}= 742 Mr_c= 82 MPa υ_c= 0.84	ε_{vc}= 120 ε_{sc}= 382 Mr_c= 110 MPa υ_c= 0.27



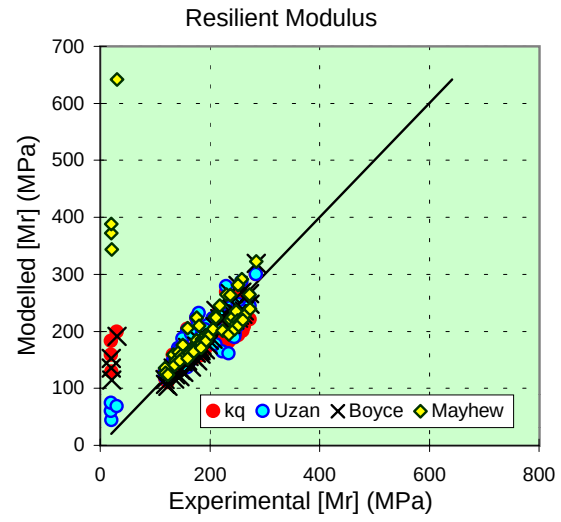


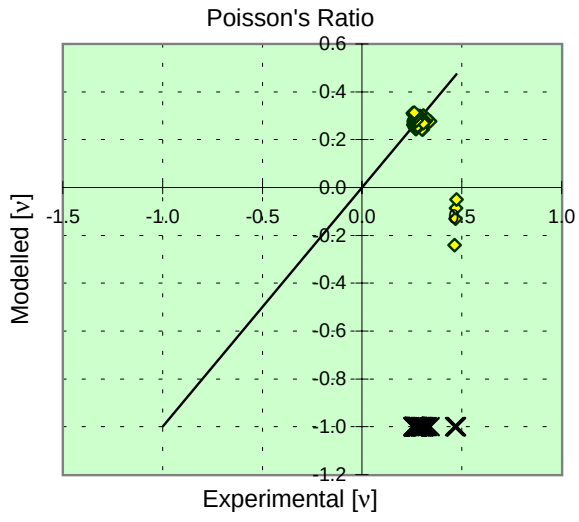


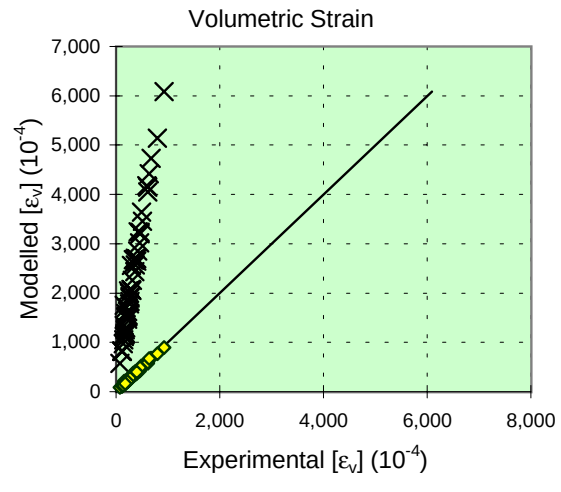


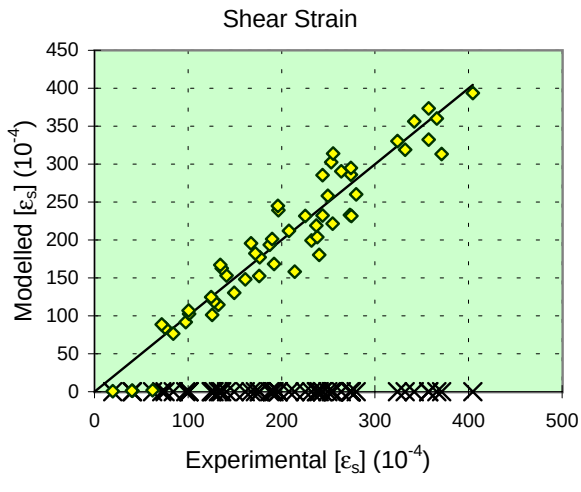
TP-I : LRSB(2) Fountainbleau Sand (SFB) 95% Percentile Data

Experimental Data	Sample Size: 55	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 197 MPa		υ_e = 0.28
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 125,936 k_2 = 0.4590 r^2= 0.462	k_3 = 246,300 k_4 = 0.3061 k_5 = 0.2089 r^2= 0.664	Ga = 728,384,849 kPa Ka = 11,983 kPa n = 0.3947 r^2= 0.569	Ga = 76,468 kPa Ka = 89,795 kPa n = 0.3945 β = 0.0405 m = 0.4502 $r^2\varepsilon_v$= 0.922 $r^2\varepsilon_s$= 0.781
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 88 MPa	Mr_c= 122 MPa	ε_{vc}= 1236 ε_{sc}= 0 Mr_c= 68 MPa υ_c= **-1.00**	ε_{vc}= 103 ε_{sc}= 372 Mr_c= 115 MPa υ_c= 0.29



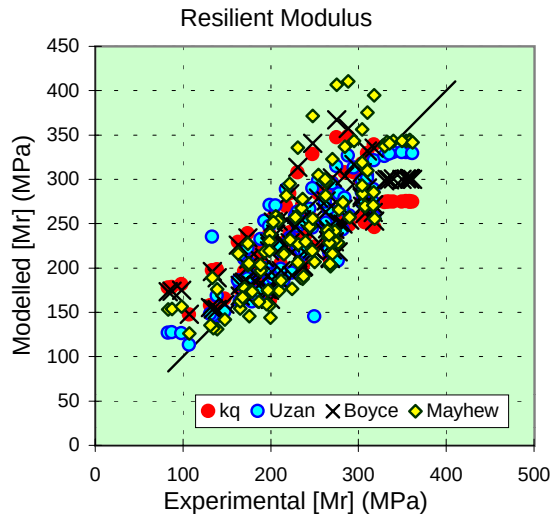


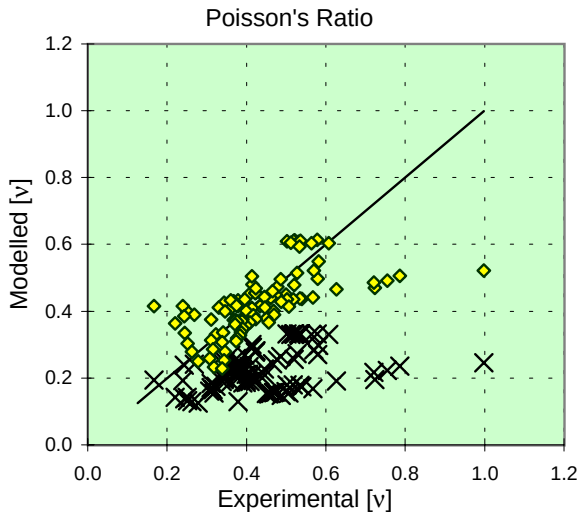


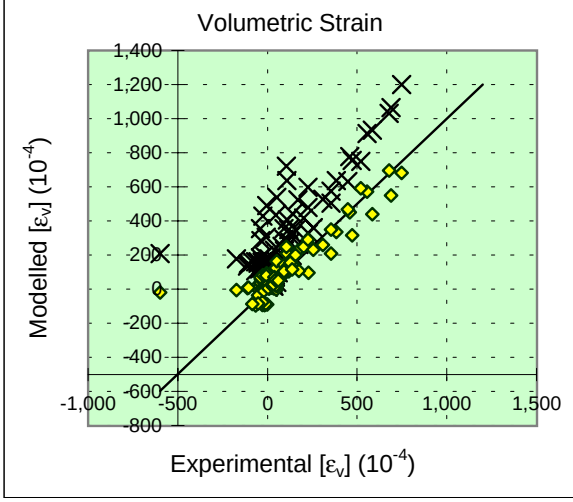


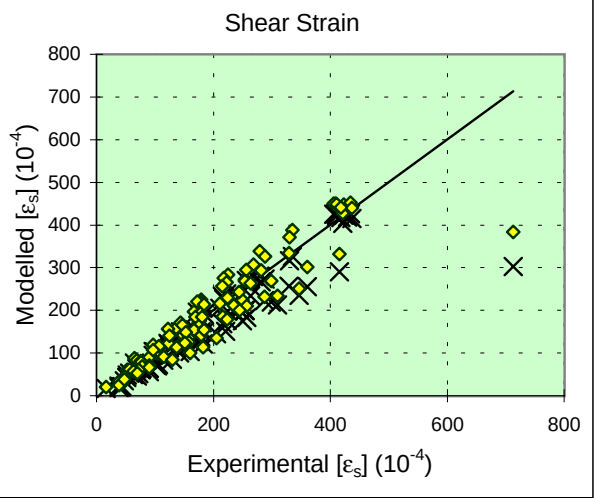
TP-I : LRCF(1) Fountainebleau Sand (SFB) 95% Percentile Data

Experimental Data	Sample Size: 100	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 241 MPa		υ_e = 0.43
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 180,004	k_3 = 302,660	Ga = 95,188 kPa	Ga = 88,753 kPa
	k_2 = 0.3628	k_4 = 0.2166	Ka = 75,087 kPa	Ka = 270,438 kPa
		k_5 = 0.2019	n = 0.4238	n = 0.2261
				β = 0.5150
				m = 1.1090
	r^2= 0.516	r^2= 0.654	r^2= 0.572	$r^2\varepsilon_v$= 0.692 $r^2\varepsilon_s$= 0.732
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 136 MPa	Mr_c= 178 MPa	ε_{vc}= 119 ε_{sc}= 283	ε_{vc}= -46 ε_{sc}= 440
			Mr_c= 141 MPa	Mr_c= 121 MPa
			υ_c= 0.20	υ_c= 0.60



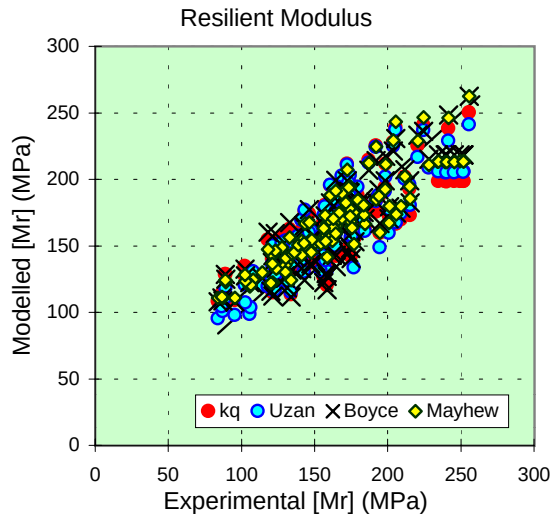


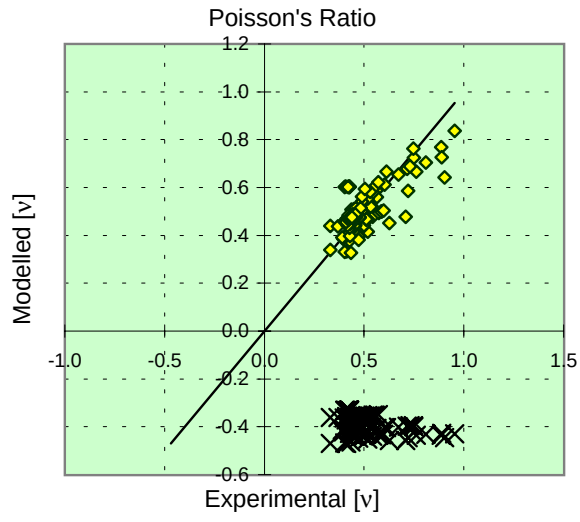


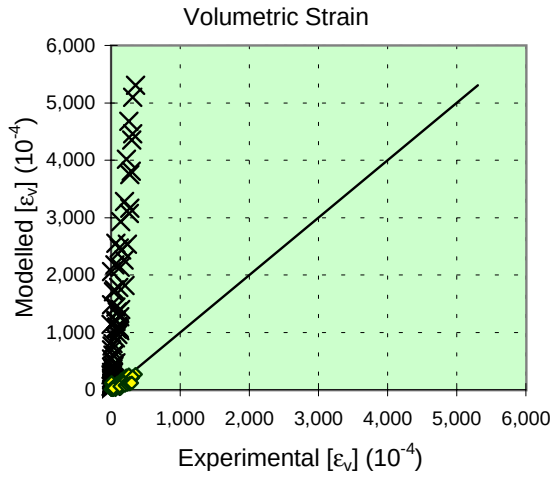


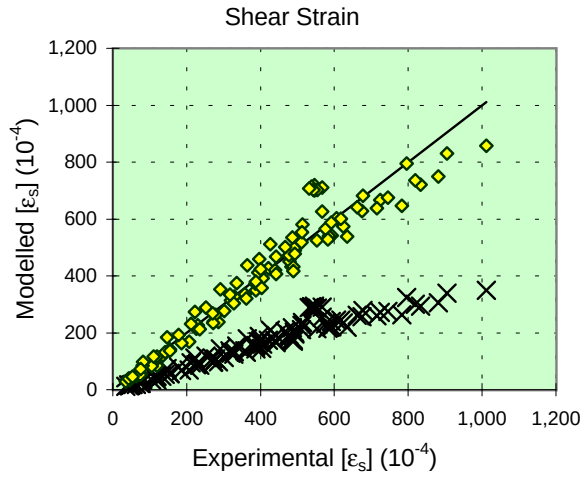
TP-I : LRCF(2) Fountainebleau Sand (SFB) 95% Percentile Data

Experimental Data	Sample Size: 106	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 154 MPa		υ_e = 0.51
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 123,836	k_3 = 186,392	Ga = 125,651 kPa	Ga = 51,264 kPa
	k_2 = 0.3308	k_4 = 0.1466	Ka = 20,006 kPa	Ka = -203,471 kPa
		k_5 = 0.1428	n = 0.5156	n = 0.5154
				β = -0.5424
				m = -0.3376
	r^2= 0.583	r^2= 0.634	r^2= 0.648	$r^2\varepsilon_v$= 0.522 $r^2\varepsilon_s$= 0.814
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 96 MPa	Mr_c= 130 MPa	ε_{vc}= 688 ε_{sc}= 181	ε_{vc}= -1265 ε_{sc}= 443
			Mr_c= 85 MPa	Mr_c= -162 MPa
			υ_c= **-0.54**	υ_c= **-3.16**



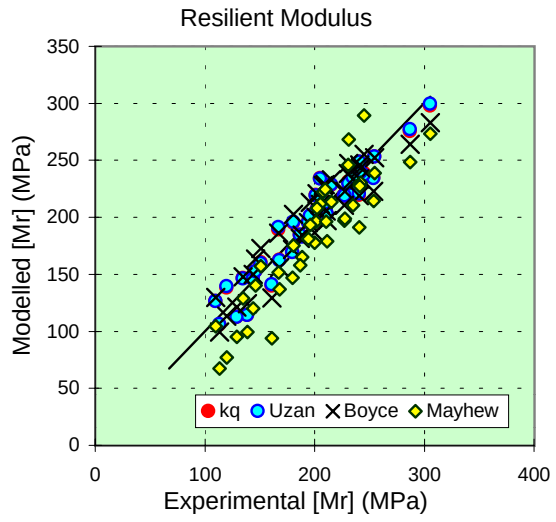


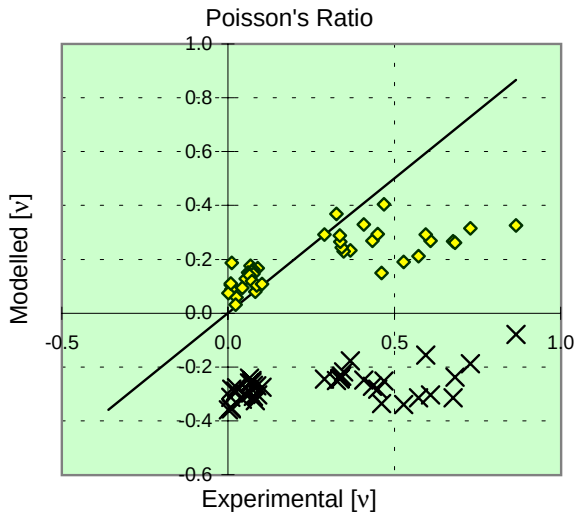


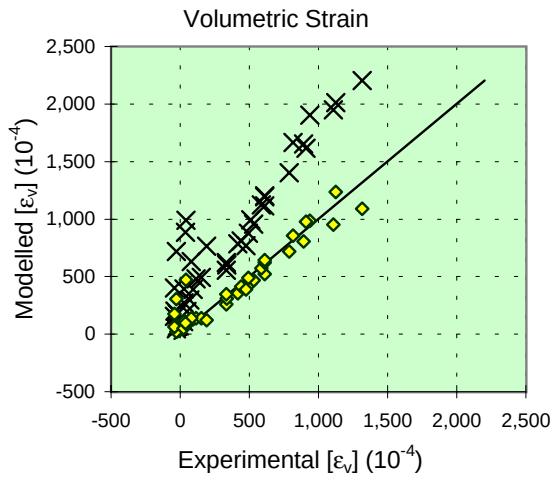


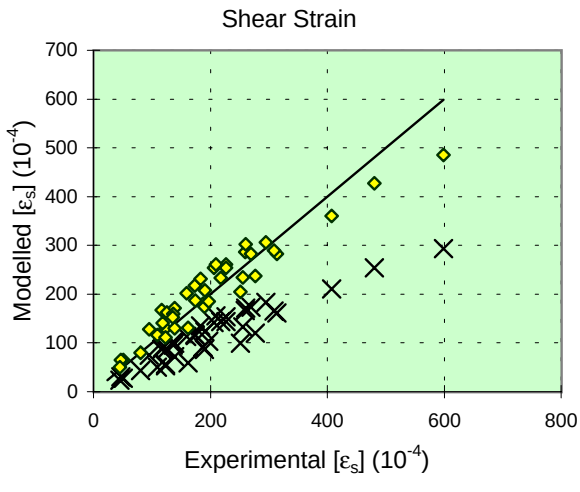
TP-I : UNOT ***Fountainebleau Sand (SFB)*** ***90% Percentile Data***

Experimental Data	Sample Size: 41	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 196 MPa		υ_e = 0.27
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 138,895 k_2 = 0.4496 r^2= 0.814	k_3 = 226,629 k_4 = 0.4586 k_5 = -0.0103 r^2= 0.814	Ga = 146,765 kPa Ka = 28,191 kPa n = 0.5048 r^2= 0.768	Ga = 86,637 kPa Ka = 55,865 kPa n = 0.3046 β = 0.1747 m = 0.6277 $r^2\varepsilon_v$= 0.783 $r^2\varepsilon_s$= 0.776
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 98 MPa	Mr_c= 96 MPa	ε_{vc}= 483 ε_{sc}= 158 Mr_c= 112 MPa υ_c= **-0.47**	ε_{vc}= -63 ε_{sc}= 389 Mr_c= 142 MPa υ_c= 0.66



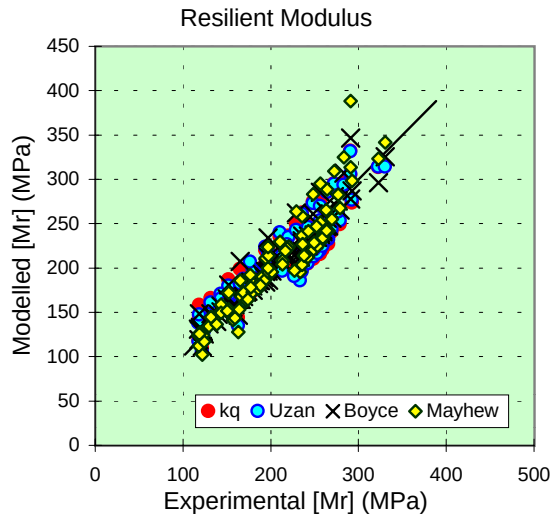


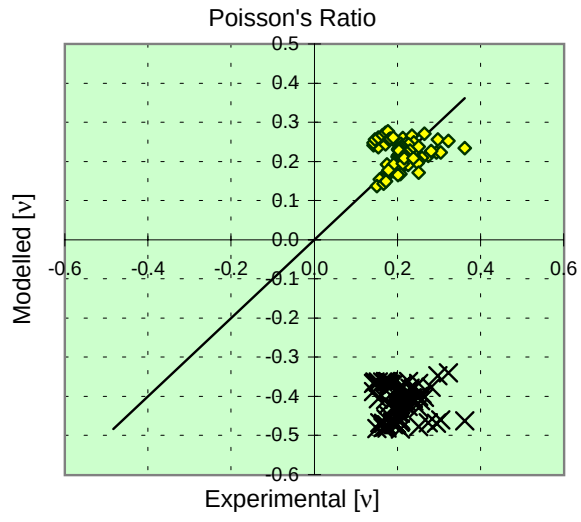


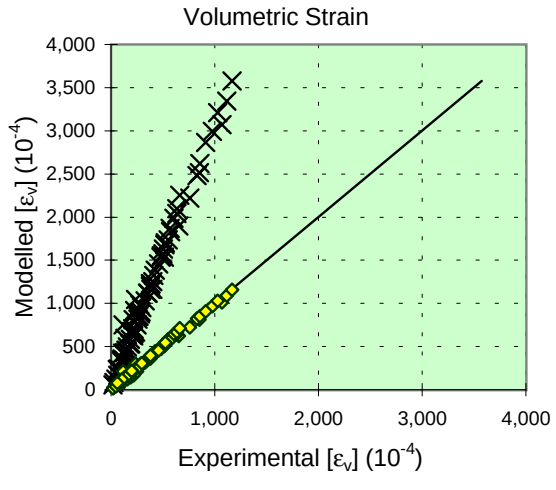


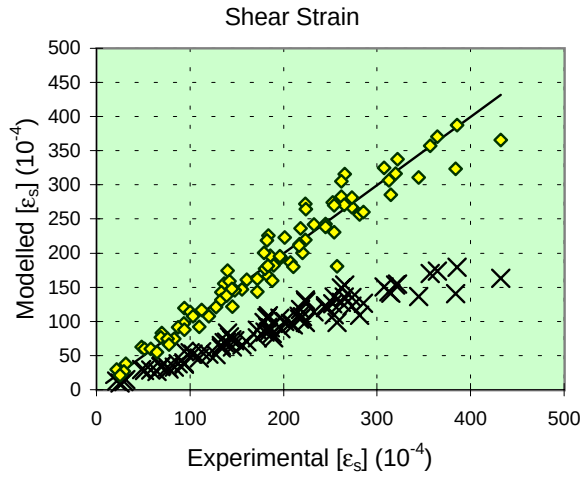
TP-I : LRSB(1) ***Fountainebleau Sand (SFB)*** ***90% Percentile Data***

Experimental Data	Sample Size: 83	p*= 15 kPa @ ω= 0.0%	p_a'= 100 kPa	
	Characteristic Values at q_2 = 54 kPa	Mr_e= 211 MPa	υ_e = 0.21	
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 145,952 k_2 = 0.4177 r^2= 0.713	k_3 = 237,142 k_4 = 0.3903 k_5 = 0.0408 r^2= 0.720	Ga = 175,013 kPa Ka = 22,948 kPa n = 0.4369 r^2= 0.801	Ga = 86,128 kPa Ka = 63,255 kPa n = 0.3178 β = 0.0470 m = 0.3897 $r^2\varepsilon_v$= 0.938 $r^2\varepsilon_s$= 0.831
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 105 MPa	Mr_c= 111 MPa	ε_{vc}= 606 ε_{sc}= 150 Mr_c= 98 MPa υ_c= **-0.56**	ε_{vc}= 119 ε_{sc}= 382 Mr_c= 110 MPa υ_c= 0.27



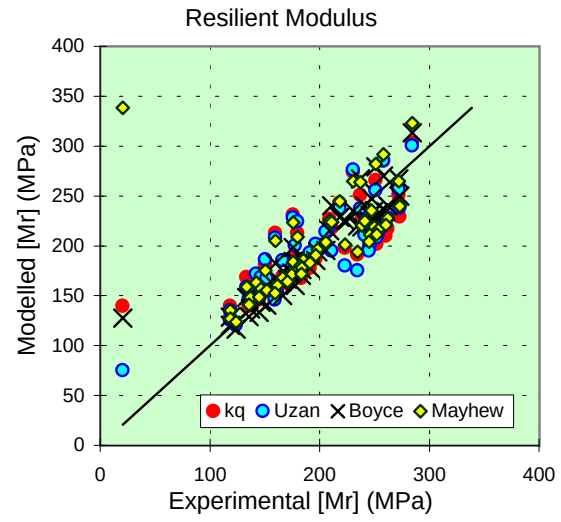


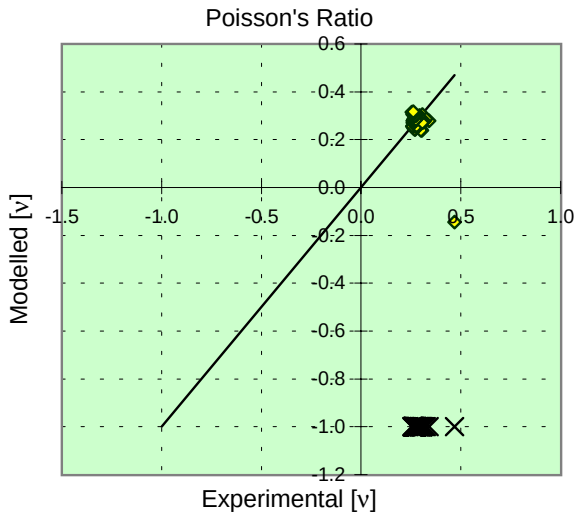


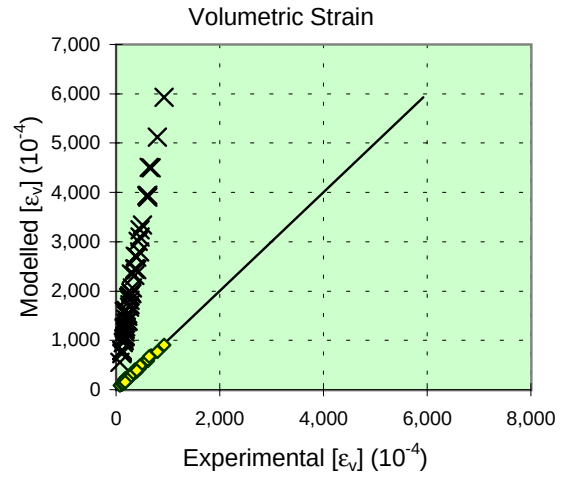


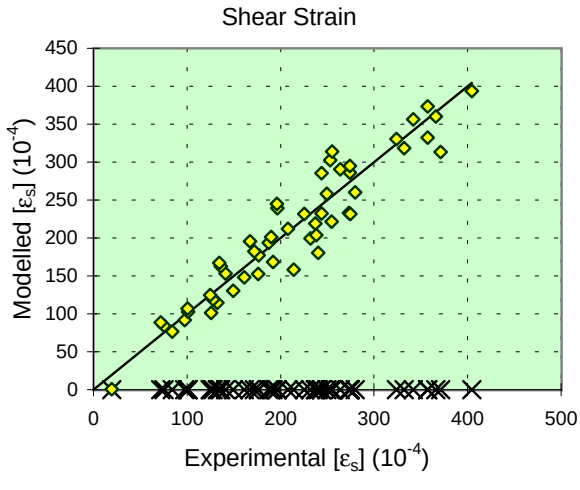
TP-I : LRSB(2) Fountainbleau Sand (SFB) 90% Percentile Data

Experimental Data	Sample Size: 52	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 200 MPa		υ_e = 0.28
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 136,552	k_3 = 234,155	Ga = 148,006,582 kPa	Ga = 76,474 kPa
	k_2 = 0.4223	k_4 = 0.3460	Ka = 14,240 kPa	Ka = 85,006 kPa
		k_5 = 0.1156	n = 0.4702	n = 0.3945
				β = 0.0482
				m = 0.4262
	r^2= 0.574	r^2= 0.622	r^2= 0.717	$r^2\varepsilon_v$= 0.928 $r^2\varepsilon_s$= 0.779
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 1040 ε_{sc}= 0	ε_{vc}= 93 ε_{sc}= 372
	Mr_c= 98 MPa	Mr_c= 114 MPa	Mr_c= 81 MPa	Mr_c= 117 MPa
			υ_c= **-1.00**	υ_c= 0.31



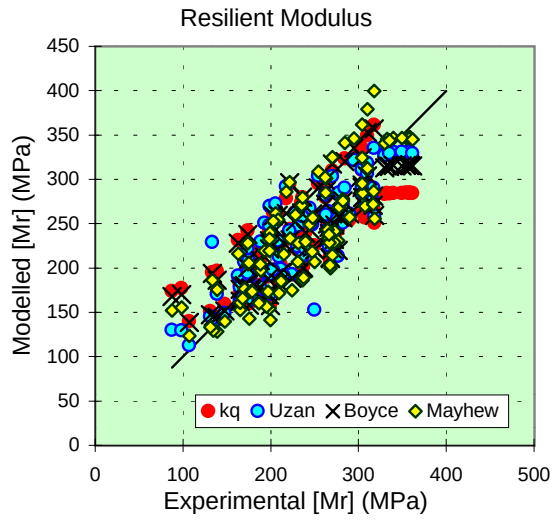


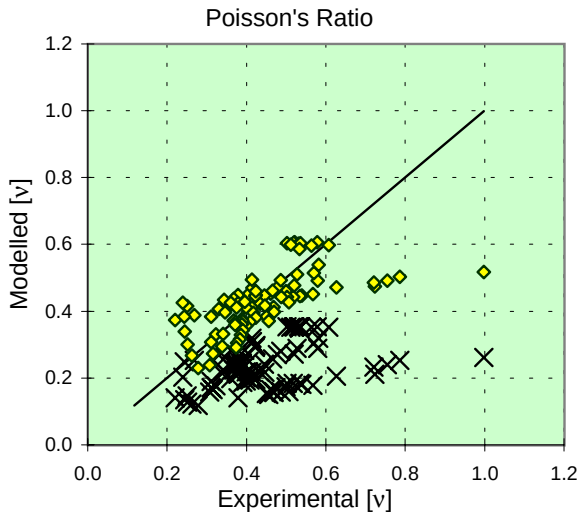


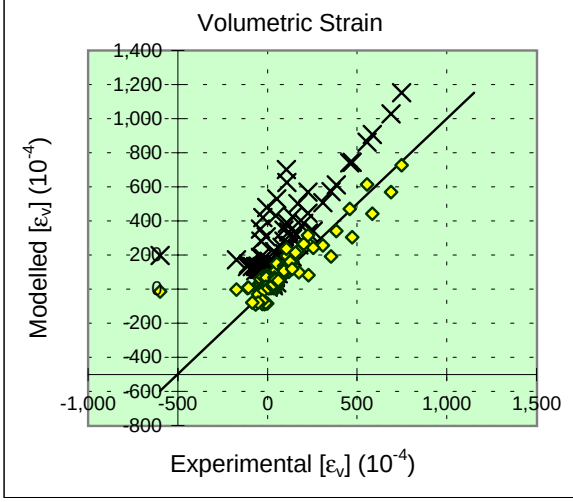


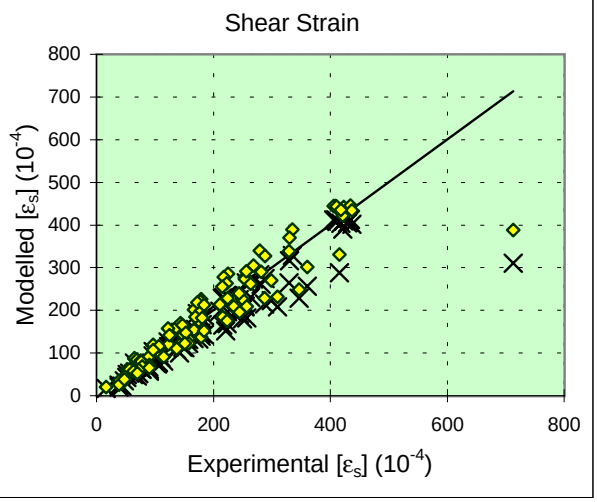
TP-I : LRCF(1) Fountainebleau Sand (SFB) 90% Percentile Data

Experimental Data	Sample Size: 95	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 241 MPa		υ_e = 0.44
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 175,826	k_3 = 304,417	Ga = 97,965 kPa	Ga = 89,820 kPa
	k_2 = 0.4127	k_4 = 0.2619	Ka = 68,684 kPa	Ka = 292,134 kPa
		k_5 = 0.1802	n = 0.3609	n = 0.2000
				β = 0.5546
				m = 1.3004
	r^2= 0.545	r^2= 0.660	r^2= 0.625	$r^2\varepsilon_v$= 0.659 $r^2\varepsilon_s$= 0.740
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 128 MPa	Mr_c= 167 MPa	ε_{vc}= 117 ε_{sc}= 310	ε_{vc}= -32 ε_{sc}= 457
			Mr_c= 131 MPa	Mr_c= 114 MPa
			υ_c= 0.23	υ_c= 0.56



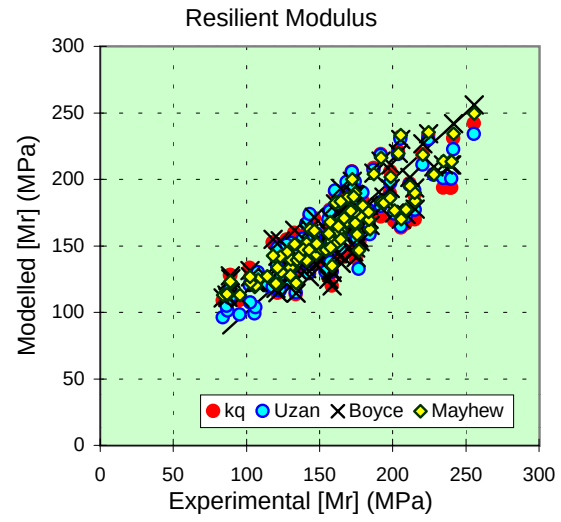


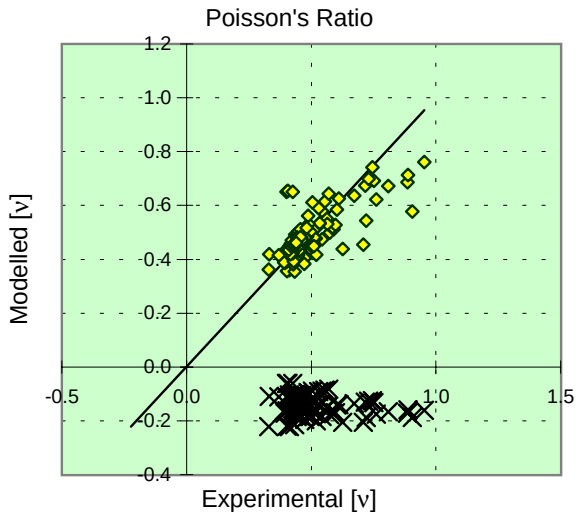


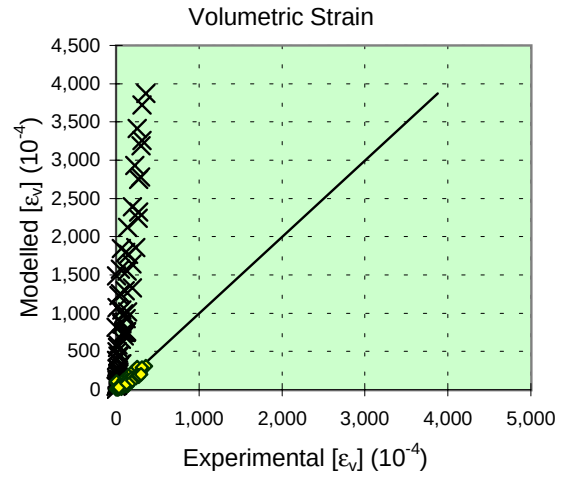


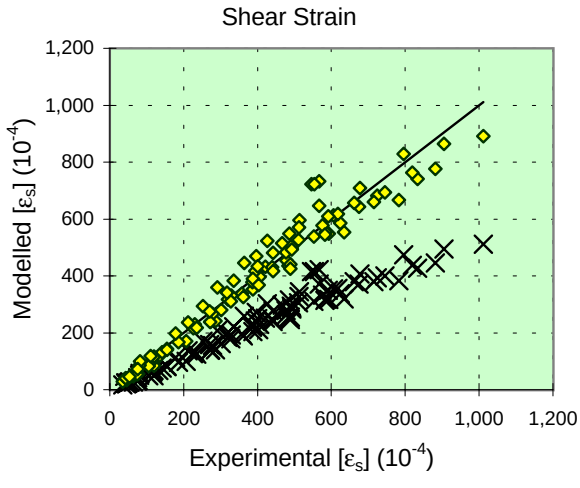
TP-I : LRCF(2) Fountainebleau Sand (SFB) 90% Percentile Data

Experimental Data	Sample Size: 100	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 152 MPa		υ_e = 0.51
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 123,236	k_3 = 182,590	Ga = 86,761 kPa	Ga = 50,053 kPa
	k_2 = 0.3168	k_4 = 0.1408	Ka = 27,511 kPa	Ka = 62,183 kPa
		k_5 = 0.1374	n = 0.5244	n = 0.5321
				β = 0.2230
				m = 0.1739
	r^2= 0.596	r^2= 0.653	r^2= 0.642	$r^2\varepsilon_v$= 0.589 $r^2\varepsilon_s$= 0.848
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 470 ε_{sc}= 257	ε_{vc}= -655 ε_{sc}= 439
	Mr_c= 96 MPa	Mr_c= 129 MPa	Mr_c= 93 MPa	Mr_c= 971 MPa
			υ_c= **-0.28**	υ_c= 11.85



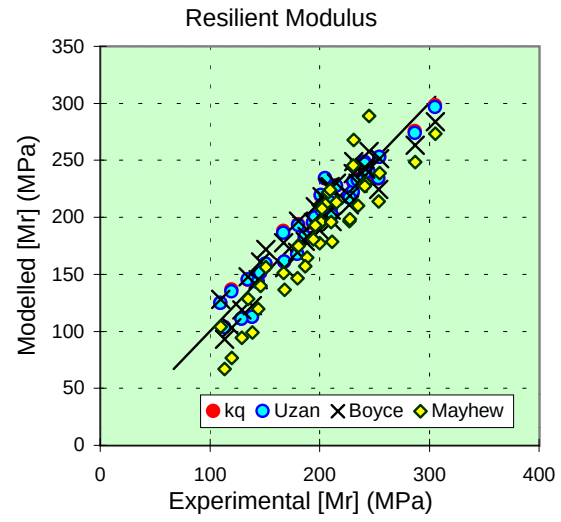


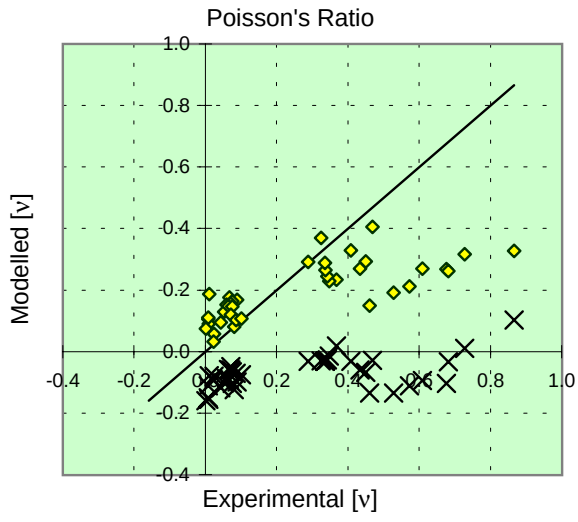


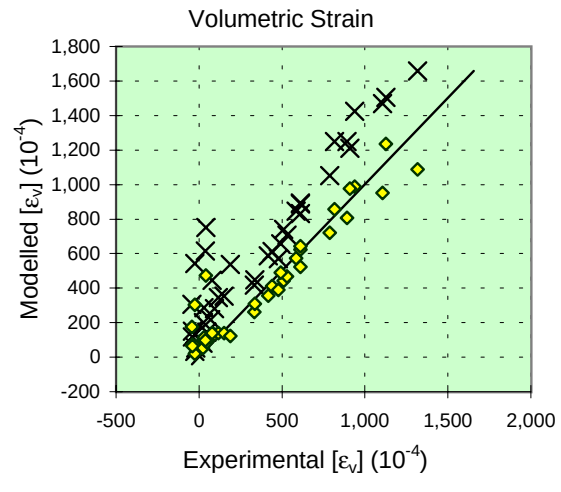


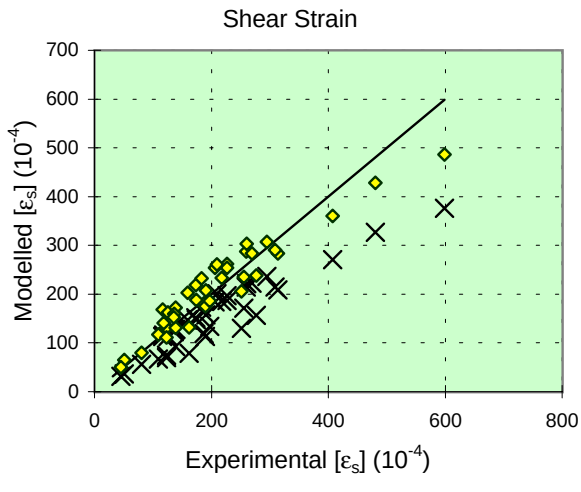
TP-I : UNOT ***Fountainebleau Sand (SFB)*** ***85% Percentile Data***

Experimental Data	Sample Size: 39	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 194 MPa		υ_e = 0.28
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 137,160	k_3 = 227,727	Ga = 113,967 kPa	Ga = 86,450 kPa
	k_2 = 0.4578	k_4 = 0.4492	Ka = 36,195 kPa	Ka = 55,833 kPa
		k_5 = 0.0102	n = 0.4872	n = 0.3017
				β = 0.1747
				m = 0.6278
	r^2= 0.826	r^2= 0.827	r^2= 0.788	$r^2\varepsilon_v$= 0.781 $r^2\varepsilon_s$= 0.771
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 355 ε_{sc}= 210	ε_{vc}= -63 ε_{sc}= 392
	Mr_c= 96 MPa	Mr_c= 97 MPa	Mr_c= 118 MPa	Mr_c= 140 MPa
			υ_c= **-0.25**	υ_c= 0.66



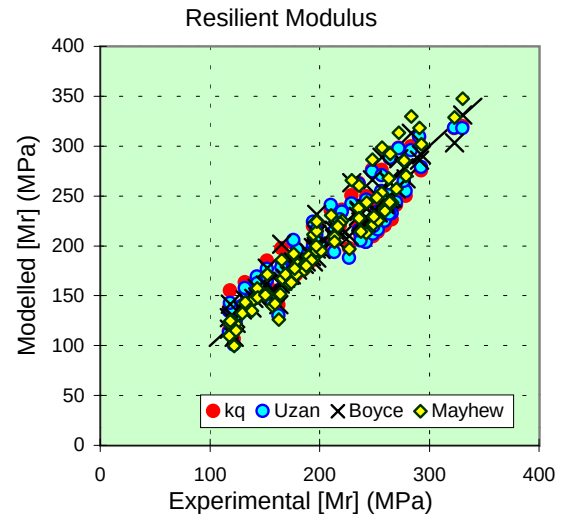


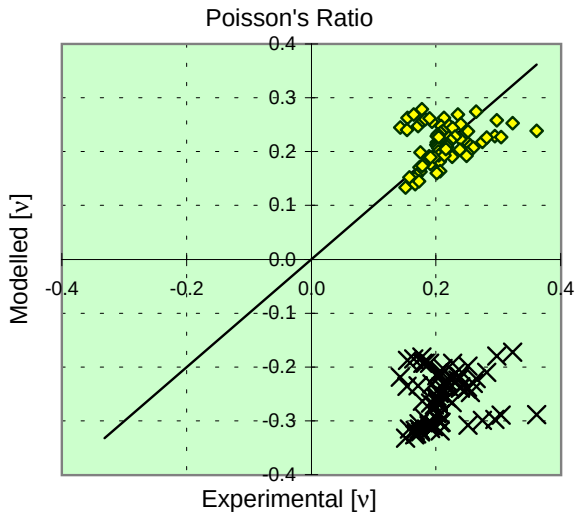


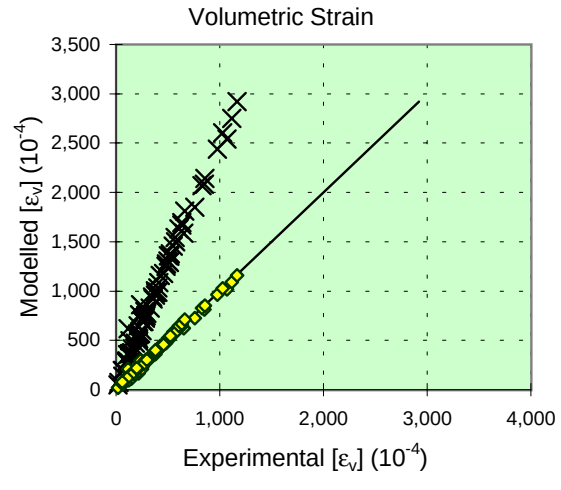


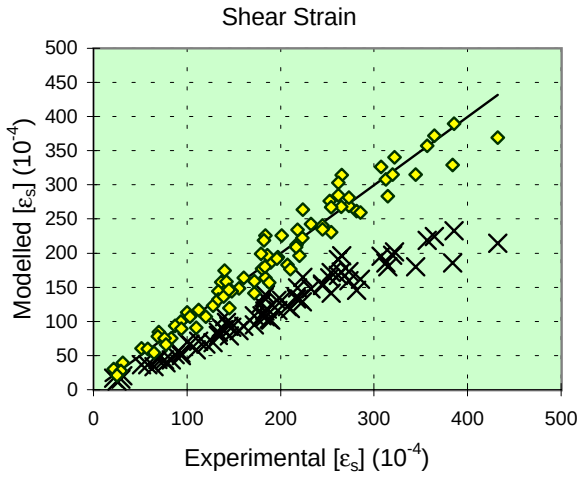
TP-I : LRSB(1) ***Fountainebleau Sand (SFB)*** ***85% Percentile Data***

Experimental Data	Sample Size: 79	p*= 15 kPa @ ω= 0.0%	p_a'= 100 kPa	
	Characteristic Values at q_2 = 54 kPa	Mr_e= 209 MPa	υ_e = 0.21	
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 142,806 k_2 = 0.4365 r^2= 0.733	k_3 = 238,039 k_4 = 0.4043 k_5 = 0.0490 r^2= 0.743	Ga = 137,310 kPa Ka = 25,932 kPa n = 0.4005 r^2= 0.825	Ga = 86,617 kPa Ka = 62,669 kPa n = 0.2971 β = 0.0484 m = 0.3856 $r^2\varepsilon_v$= 0.937 $r^2\varepsilon_s$= 0.847
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 102 MPa	Mr_c= 108 MPa	ε_{vc}= 512 ε_{sc}= 205 Mr_c= 98 MPa υ_c= **-0.39**	ε_{vc}= 116 ε_{sc}= 395 Mr_c= 108 MPa υ_c= 0.28



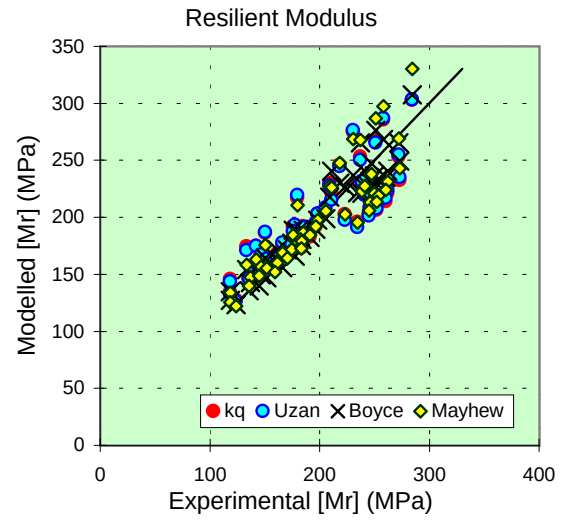


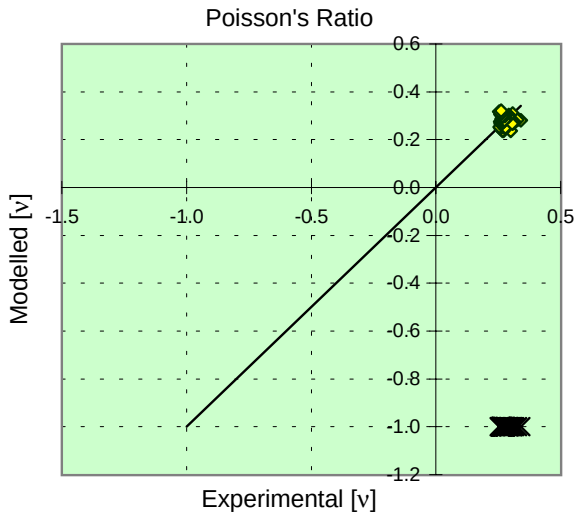


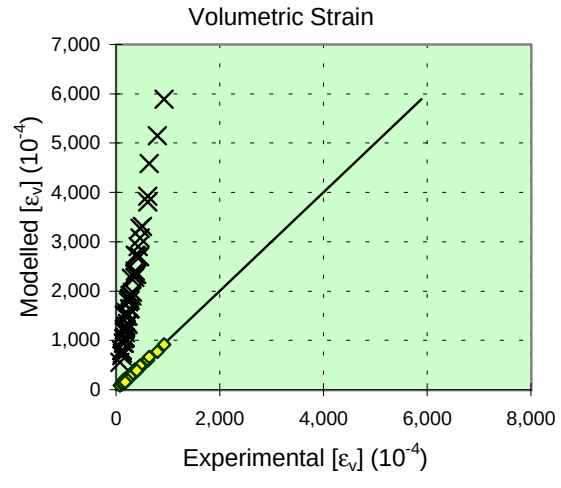


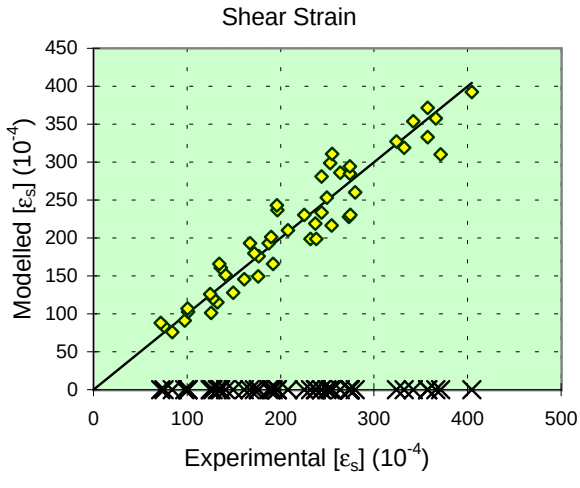
TP-I : LRSB(2) Fountainbleau Sand (SFB) 85% Percentile Data

Experimental Data	Sample Size: 49	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 203 MPa		υ_e = 0.28
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 142,831	k_3 = 225,244	Ga = 310,359,731 kPa	Ga = 77,430 kPa
	k_2 = 0.3978	k_4 = 0.3842	Ka = 15,348 kPa	Ka = 79,336 kPa
		k_5 = 0.0295	n = 0.5112	n = 0.3782
				β = 0.0561
				m = 0.3989
	r^2= 0.627	r^2= 0.629	r^2= 0.794	$r^2\varepsilon_v$= 0.933 $r^2\varepsilon_s$= 0.790
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 954 ε_{sc}= 0	ε_{vc}= 79 ε_{sc}= 379
	Mr_c= 105 MPa	Mr_c= 108 MPa	Mr_c= 88 MPa	Mr_c= 117 MPa
			υ_c= **-1.00**	υ_c= 0.33



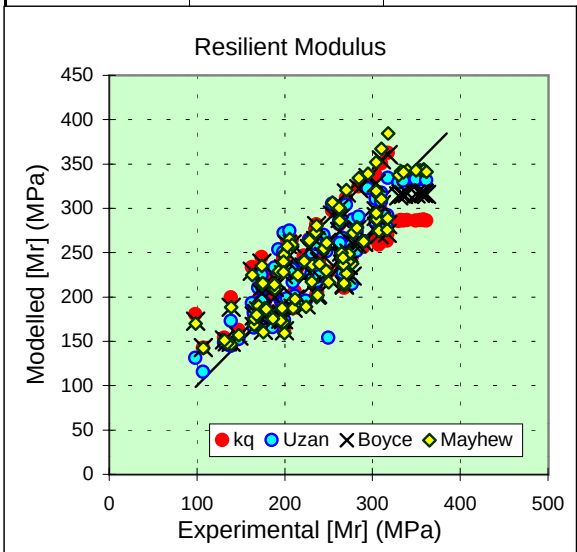


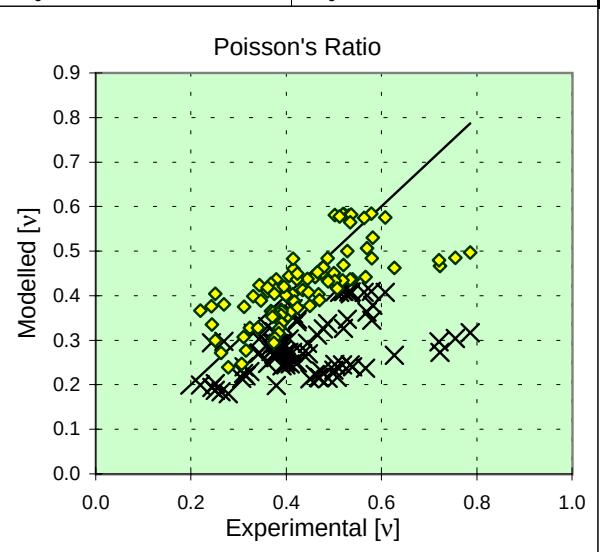


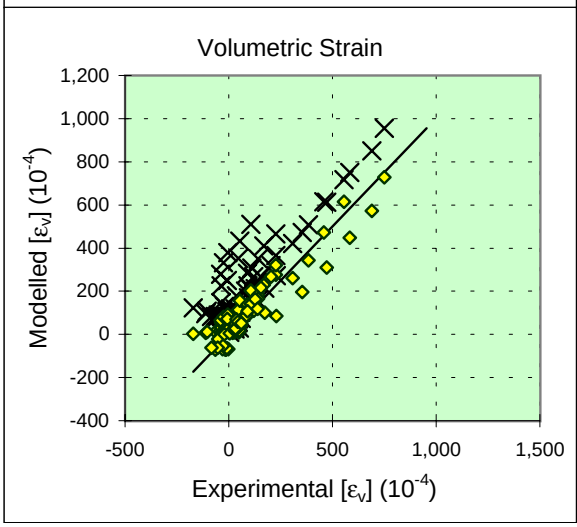


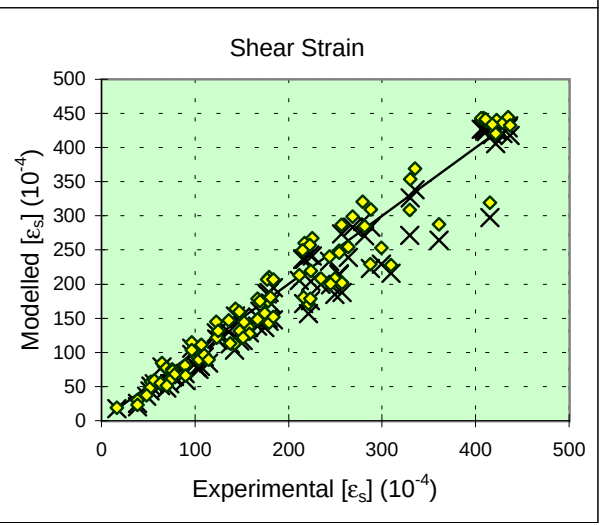
TP-I : LRCF(1) Fountainebleau Sand (SFB) 85% Percentile Data

Experimental Data	Sample Size: 90	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 243 MPa		υ_e = 0.44
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 178,681	k_3 = 306,170	Ga = 94,454 kPa	Ga = 90,604 kPa
	k_2 = 0.4047	k_4 = 0.2493	Ka = 84,600 kPa	Ka = 285,344 kPa
		k_5 = 0.1822	n = 0.3718	n = 0.2847
				β = 0.5104
				m = 1.2643
	r^2= 0.558	r^2= 0.684	r^2= 0.643	$r^2\varepsilon_v$= 0.744 $r^2\varepsilon_s$= 0.824
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 130 MPa	Mr_c= 172 MPa	ε_{vc}= 78 ε_{sc}= 315	ε_{vc}= -31 ε_{sc}= 386
			Mr_c= 138 MPa	Mr_c= 135 MPa
			υ_c= 0.31	υ_c= 0.57



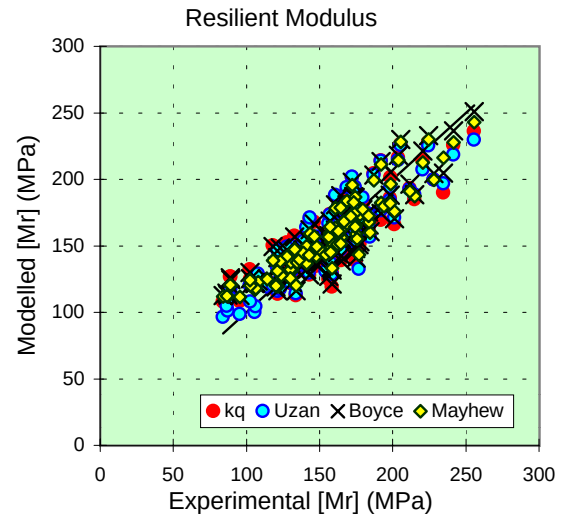


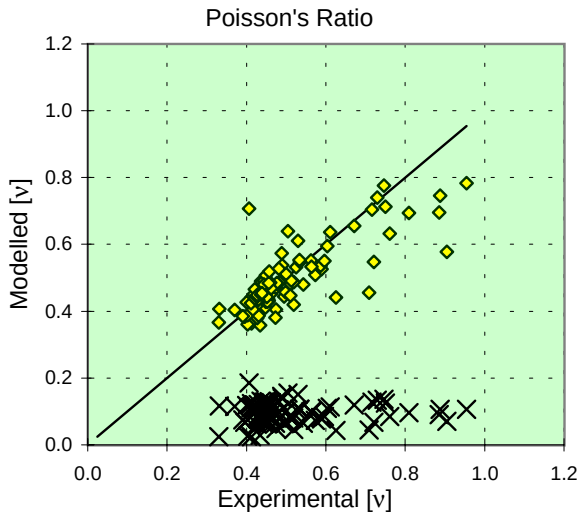


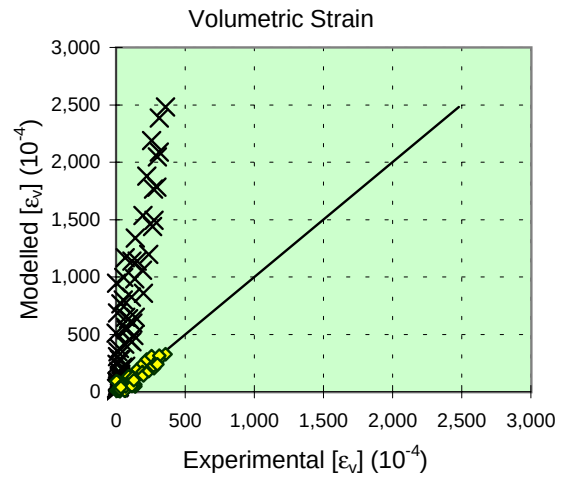


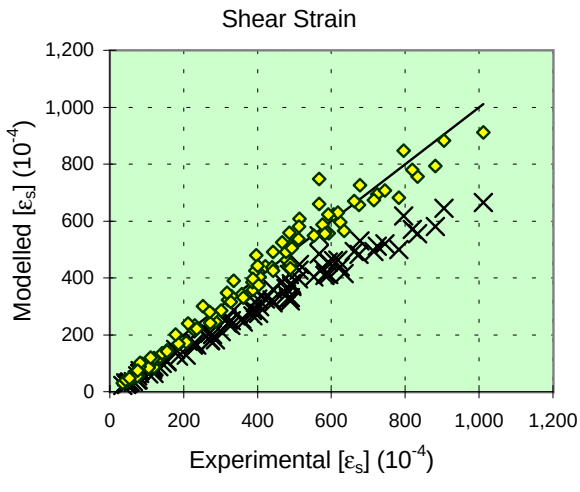
TP-I : LRCF(2) Fountainebleau Sand (SFB) 85% Percentile Data

Experimental Data	Sample Size: 95	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 150 MPa		υ_e = 0.51
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 122,155	k_3 = 179,279	Ga = 66,721 kPa	Ga = 49,118 kPa
	k_2 = 0.3098	k_4 = 0.1478	Ka = 42,083 kPa	Ka = 97,891 kPa
		k_5 = 0.1262	n = 0.5269	n = 0.5352
				β = 0.4365
				m = 0.3480
	r^2= 0.615	r^2= 0.672	r^2= 0.648	$r^2\varepsilon_v$= 0.661 $r^2\varepsilon_s$= 0.877
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 96 MPa	Mr_c= 126 MPa	ε_{vc}= 269 ε_{sc}= 333 Mr_c= 101 MPa υ_c= 0.01	ε_{vc}= -596 ε_{sc}= 445 Mr_c= 541 MPa υ_c= 6.26



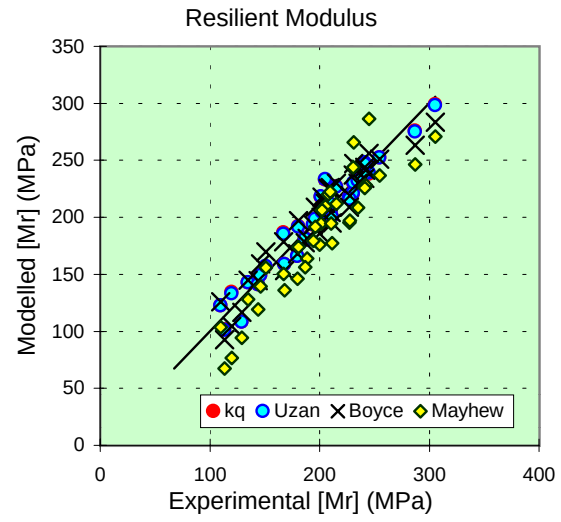


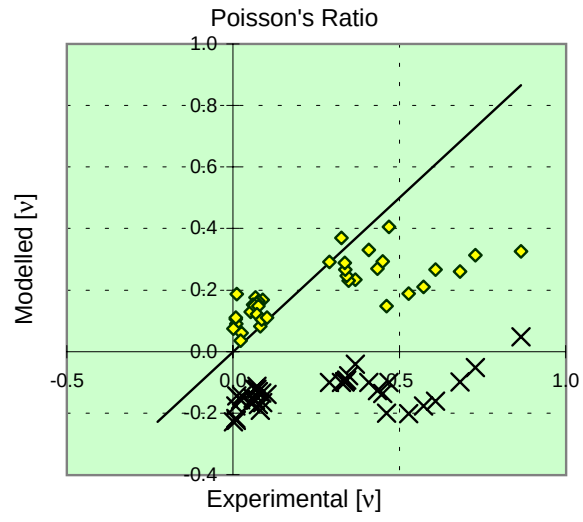


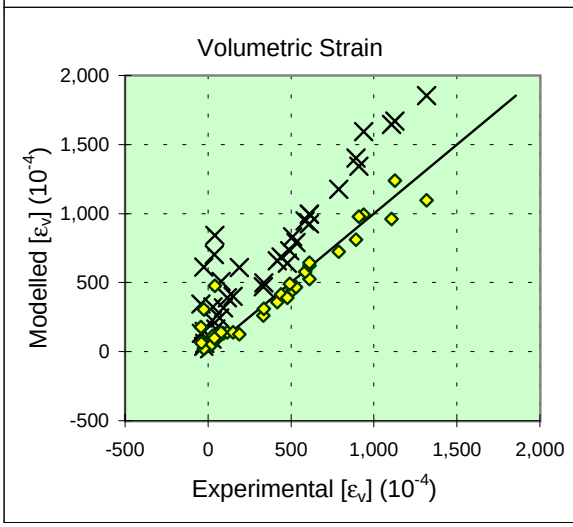


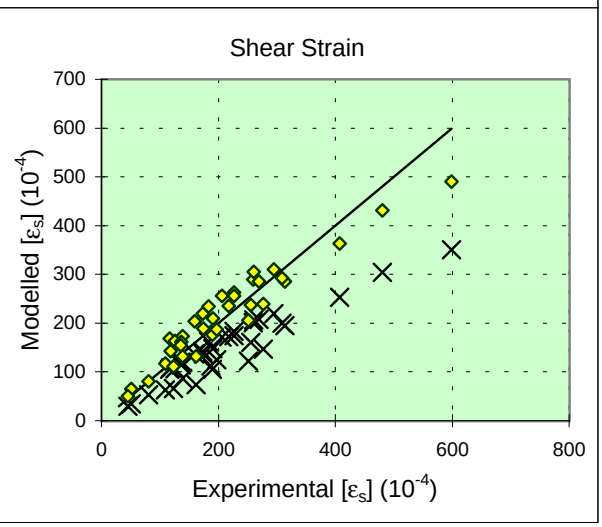
TP-I : UNOT ***Fountainebleau Sand (SFB)*** ***80% Percentile Data***

Experimental Data	Sample Size: 37	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 194 MPa		υ_e = 0.27
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 134,938 k_2 = 0.4695	k_3 = 226,651 k_4 = 0.4639 k_5 = 0.0068	Ga = 122,161 kPa Ka = 32,180 kPa n = 0.4805	Ga = 85,760 kPa Ka = 55,247 kPa n = 0.3078 β = 0.1731 m = 0.6221
	r^2= 0.841	r^2= 0.841	r^2= 0.798	$r^2\varepsilon_v$= 0.777 $r^2\varepsilon_s$= 0.776
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 94 MPa	Mr_c= 94 MPa	ε_{vc}= 409 ε_{sc}= 198 Mr_c= 113 MPa υ_c= **-0.32**	ε_{vc}= -63 ε_{sc}= 391 Mr_c= 141 MPa υ_c= 0.66



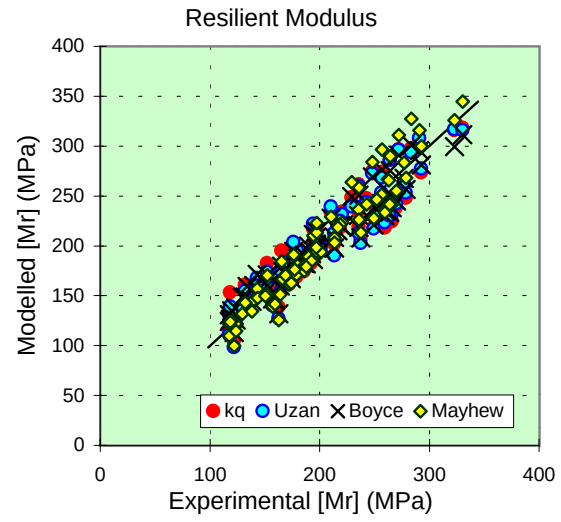


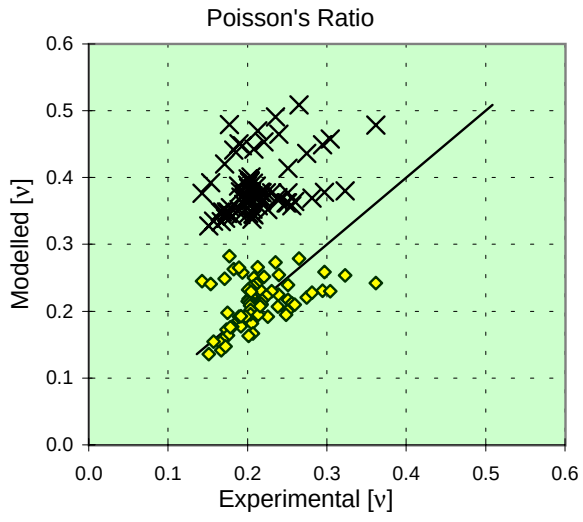


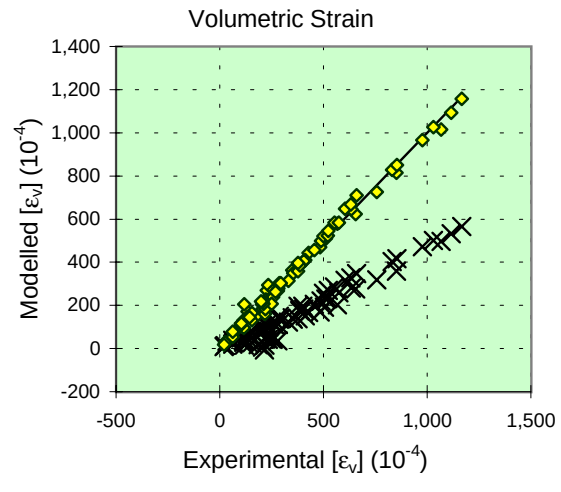


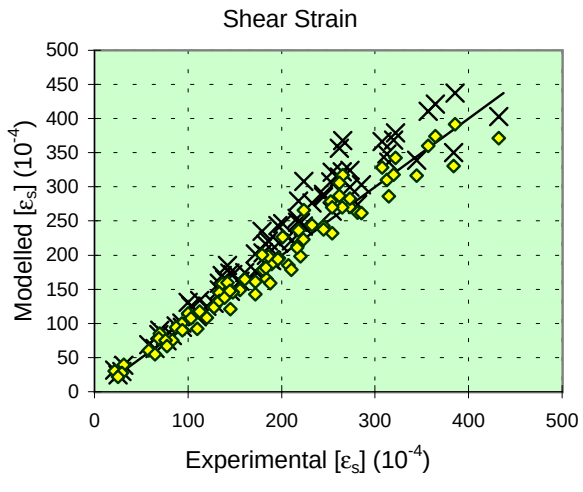
TP-I : LRSB(1) ***Fountainebleau Sand (SFB)*** ***80% Percentile Data***

Experimental Data	Sample Size: 75	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 207 MPa		υ_e = 0.21
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 140,691 k_2 = 0.4421 r^2= 0.755	k_3 = 236,678 k_4 = 0.4070 k_5 = 0.0543 r^2= 0.767	Ga = 73,355 kPa Ka = 126,341 kPa n = 0.3951 r^2= 0.797	Ga = 85,910 kPa Ka = 62,184 kPa n = 0.3006 β = 0.0500 m = 0.3824 $r^2\varepsilon_v$= 0.937 $r^2\varepsilon_s$= 0.856
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 100 MPa	Mr_c= 107 MPa	ε_{vc}= 3 ε_{sc}= 388 Mr_c= 128 MPa υ_c= 0.49	ε_{vc}= 112 ε_{sc}= 395 Mr_c= 108 MPa υ_c= 0.29



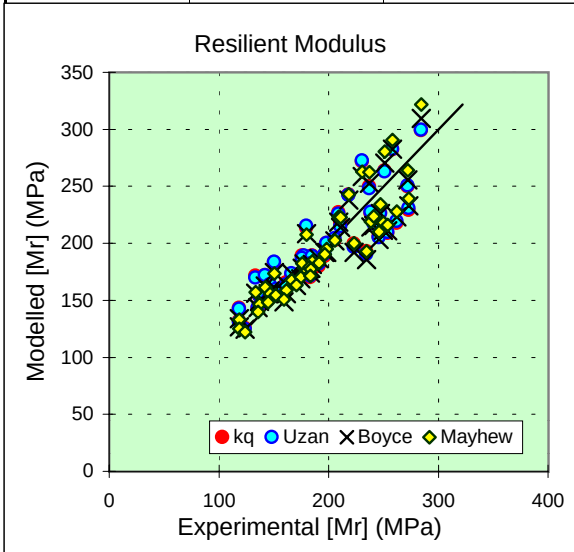


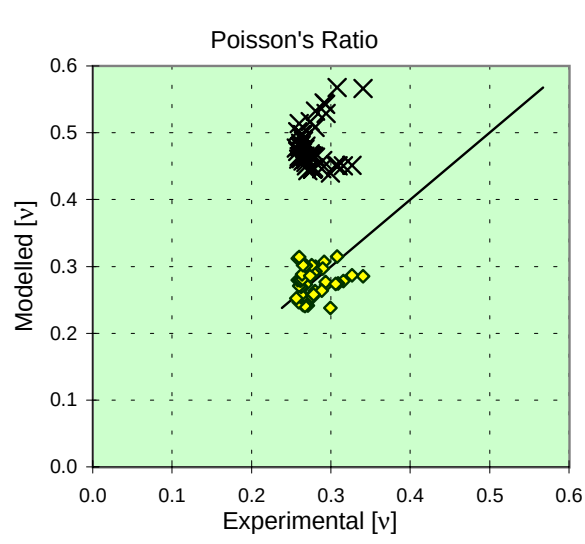


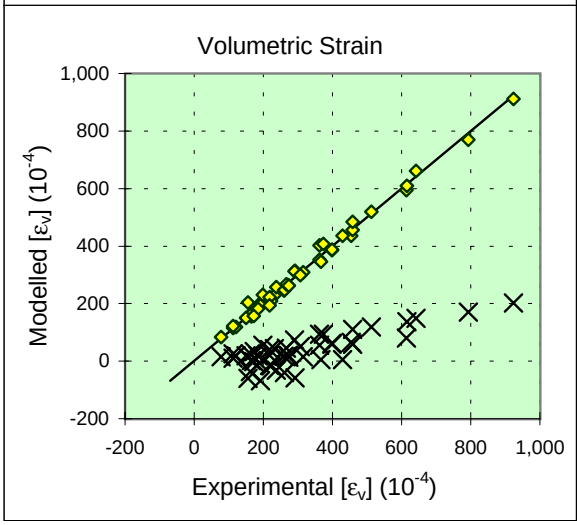


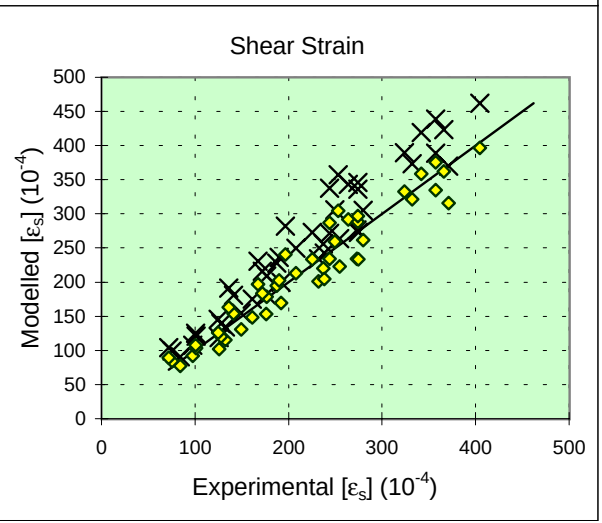
TP-I : LRSB(2) Fountainbleau Sand (SFB) 80% Percentile Data

Experimental Data	Sample Size: 46	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 200 MPa		υ_e = 0.28
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 140,377	k_3 = 220,168	Ga = 64,743 kPa	Ga = 76,007 kPa
	k_2 = 0.4004	k_4 = 0.3931	Ka = 312,439 kPa	Ka = 78,129 kPa
		k_5 = 0.0159	n = 0.4041	n = 0.3928
				β = 0.0593
				m = 0.3926
	r^2= 0.655	r^2= 0.656	r^2= 0.678	$r^2\varepsilon_v$= 0.934 $r^2\varepsilon_s$= 0.812
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 103 MPa	Mr_c= 104 MPa	ε_{vc}= -78 ε_{sc}= 432	ε_{vc}= 73 ε_{sc}= 376
			Mr_c= 129 MPa	Mr_c= 119 MPa
			υ_c= 0.68	υ_c= 0.35



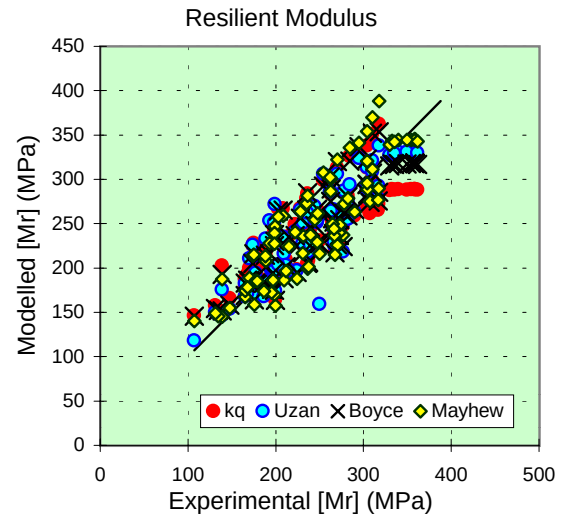


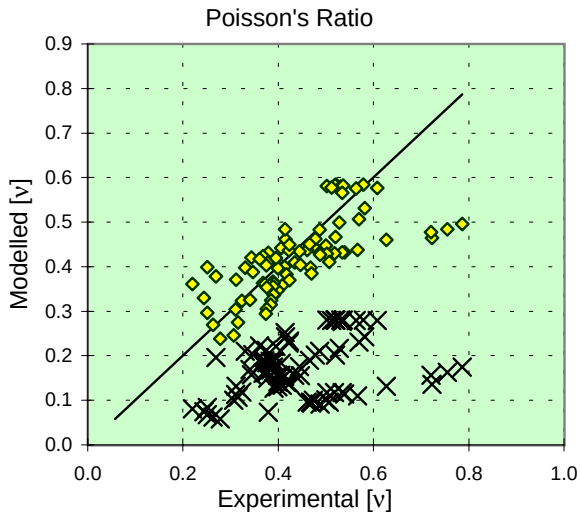


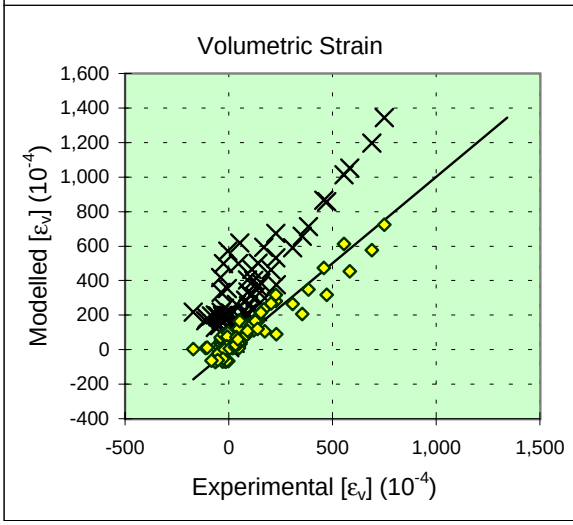


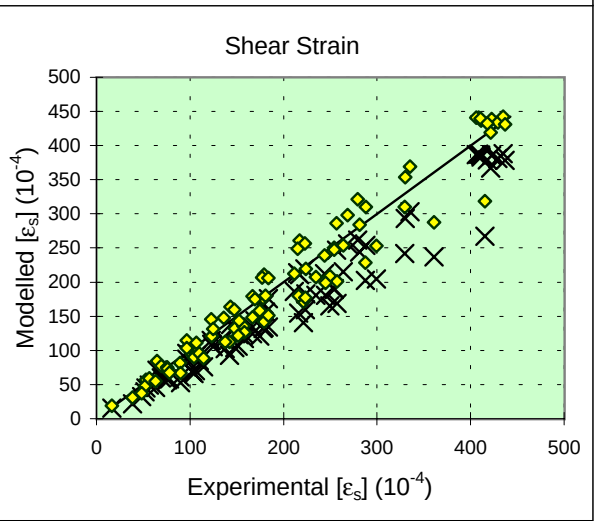
TP-I : LRCF(1) Fountainebleau Sand (SFB) 80% Percentile Data

Experimental Data	Sample Size: 85	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 244 MPa		υ_e = 0.44
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 182,135	k_3 = 305,968	Ga = 104,402 kPa	Ga = 90,962 kPa
	k_2 = 0.3944	k_4 = 0.2590	Ka = 62,720 kPa	Ka = 274,198 kPa
		k_5 = 0.1694	n = 0.3891	n = 0.2762
				β = 0.4928
				m = 1.2026
	r^2= 0.576	r^2= 0.688	r^2= 0.668	$r^2\varepsilon_v$= 0.748 $r^2\varepsilon_s$= 0.830
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 134 MPa	Mr_c= 170 MPa	ε_{vc}= 154 ε_{sc}= 276	ε_{vc}= -34 ε_{sc}= 391
			Mr_c= 136 MPa	Mr_c= 134 MPa
			υ_c= 0.13	υ_c= 0.58



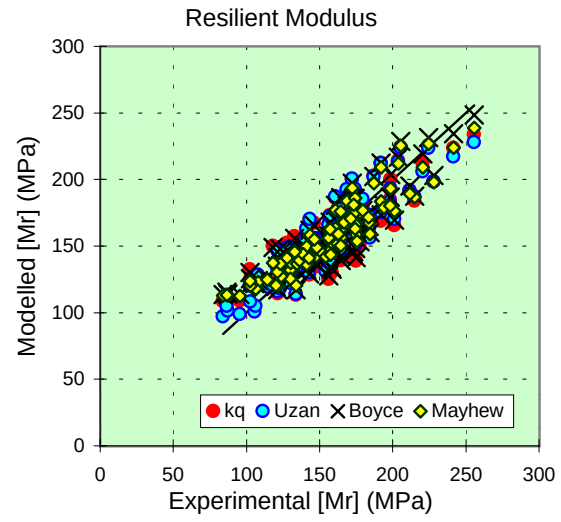


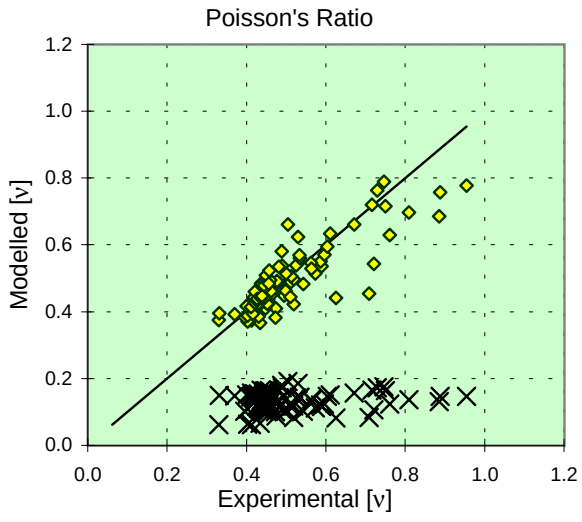


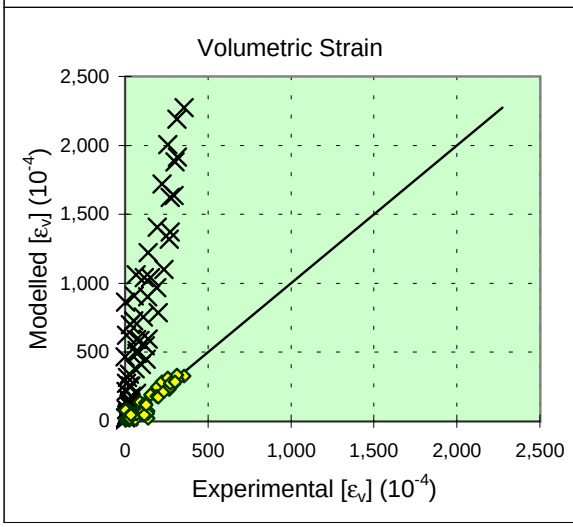


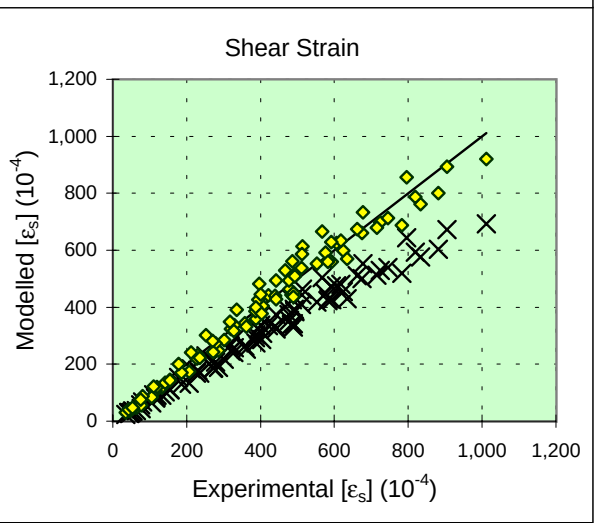
TP-I : LRCF(2) Fountainebleau Sand (SFB) 80% Percentile Data

Experimental Data	Sample Size: 90	p*= 15 kPa @ ω= 0.0%		p_a'= 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 150 MPa		υ_e = 0.51
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 122,540	k_3 = 178,132	Ga = 64,387 kPa	Ga = 48,811 kPa
	k_2 = 0.3034	k_4 = 0.1504	Ka = 46,148 kPa	Ka = 124,479 kPa
		k_5 = 0.1218	n = 0.5331	n = 0.5406
				β = 0.6475
				m = 0.5443
	r^2= 0.630	r^2= 0.689	r^2= 0.660	$r^2\varepsilon_v$= 0.734 $r^2\varepsilon_s$= 0.888
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 97 MPa	Mr_c= 125 MPa	ε_{vc}= 237 ε_{sc}= 341	ε_{vc}= -485 ε_{sc}= 444
			Mr_c= 103 MPa	Mr_c= 319 MPa
			υ_c= 0.06	υ_c= 3.26



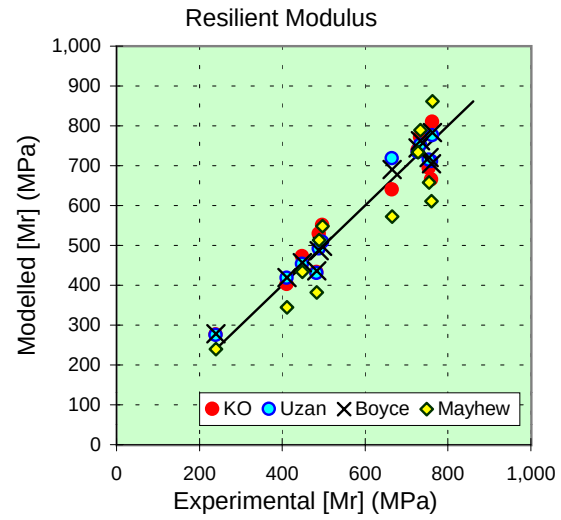


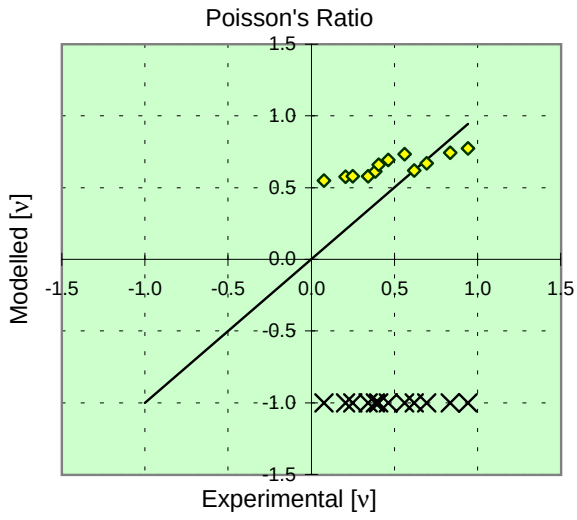


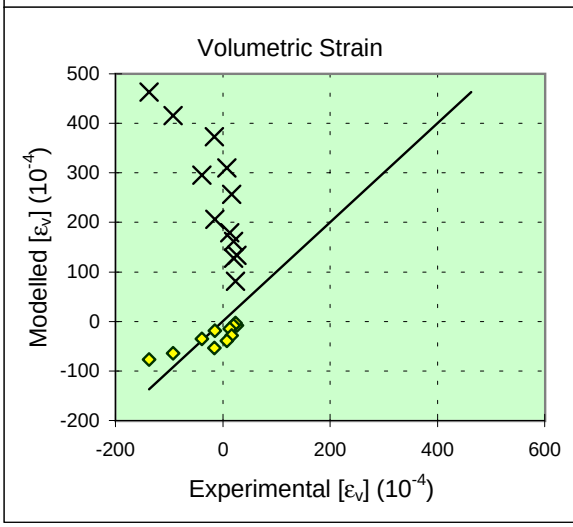


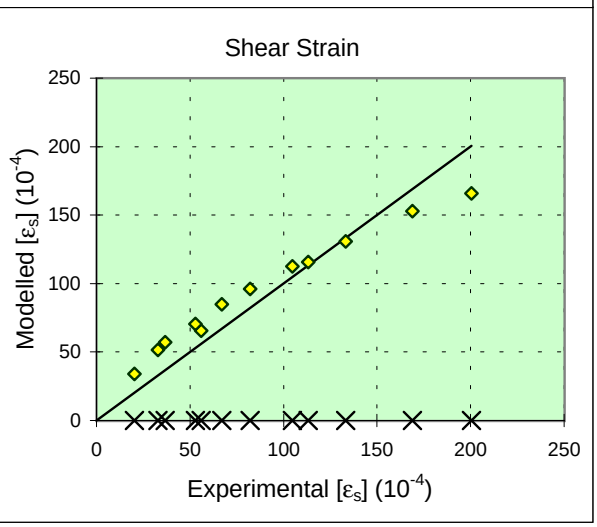
TP-I : LNEC ***Hard Limestone (CCD)*** ***100% Percentile Data***

Experimental Data	Sample Size: 12	p*= 19 kPa @ ω = 3.3%		p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 597 MPa	υ_e = 0.51
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 384,467 k_2 = 0.7201 r^2= 0.802	k_3 = 816,193 k_4 = 0.8444 k_5 = -0.1215 r^2= 0.867	Ga = 765,651,743 kPa Ka = 29,134 kPa n = 0.2759 r^2= 0.875	Ga = 221,426 kPa Ka = 1,112,010 kPa n = -0.0967 β = 0.7980 m = 0.0100 $r^2\varepsilon_v$= 0.506 $r^2\varepsilon_s$= 0.780
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 220 MPa	Mr_c= 180 MPa	ε_{vc}= 468 ε_{sc}= 0 Mr_c= 180 MPa υ_c= **-1.00**	ε_{vc}= -176 ε_{sc}= 286 Mr_c= 274 MPa υ_c= 1.36







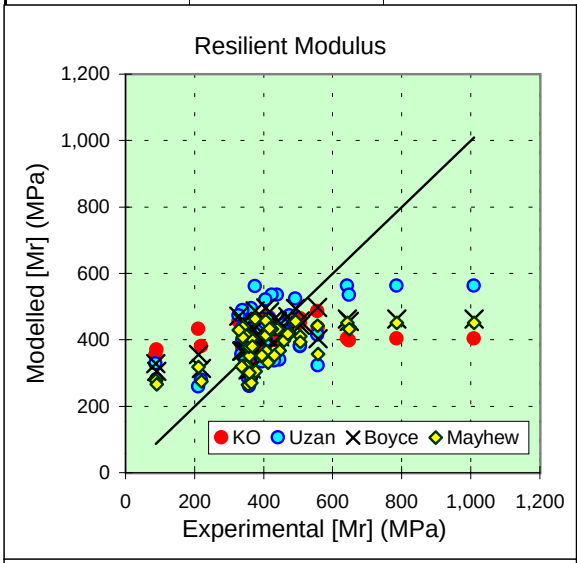


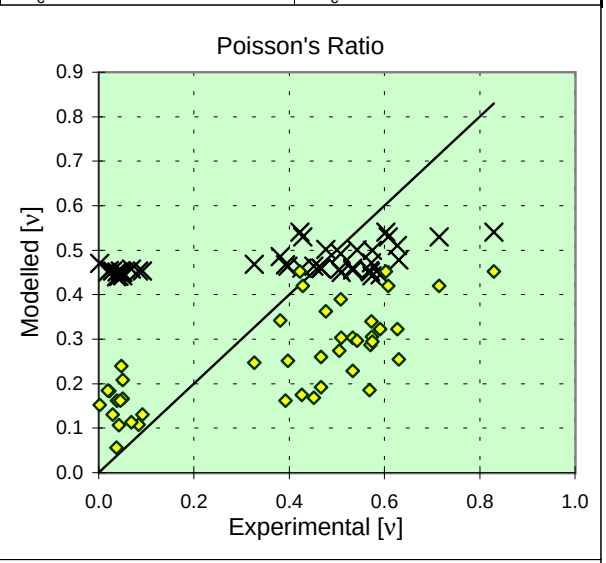
TP-I : UNOT ***Hard Limestone (CCD)*** ***100% Percentile Data***

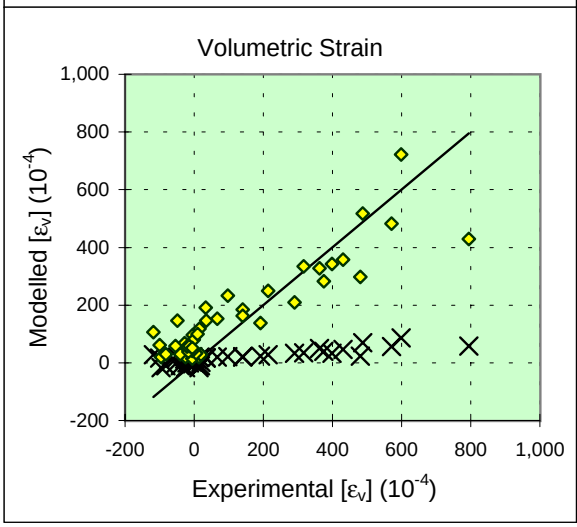
Experimental Data	Sample Size: 43	p*= 19 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 416 MPa	υ_e = 0.37

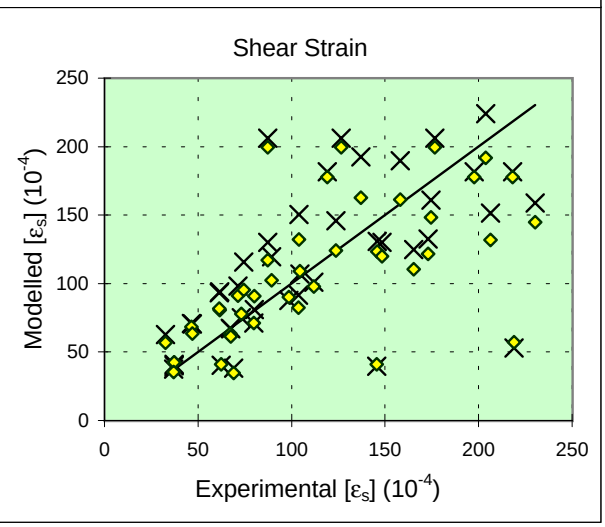
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 355,988	k_3 = 538,559	Ga = 139,501 kPa	Ga = 157,456 kPa
	k_2 = 0.2050	k_4 = -0.1534	Ka = 819,797 kPa	Ka = 193,525 kPa
		k_5 = 0.4462	n = 0.6015	n = 0.4257
				β = 0.3918
				m = 1.2987
	r^2= 0.313	r^2= 0.417	r^2= 0.396	$r^2\varepsilon_v$= 0.650 $r^2\varepsilon_s$= 0.426

Characteristic Values	At	p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**		**Mayhew**	
			ε_{vc}= -4	ε_{sc}= 122	ε_{vc}= -12	ε_{sc}= 151
	Mr_c= 303 MPa	Mr_c= 547 MPa	Mr_c= 415 MPa		Mr_c= 348 MPa	
			υ_c= 0.53		υ_c= 0.58	



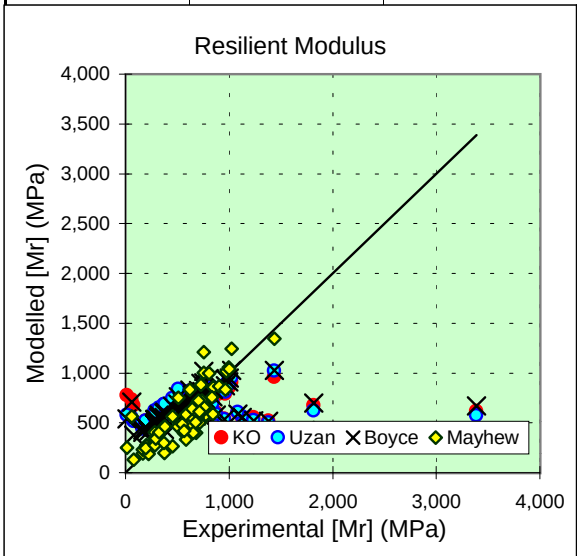


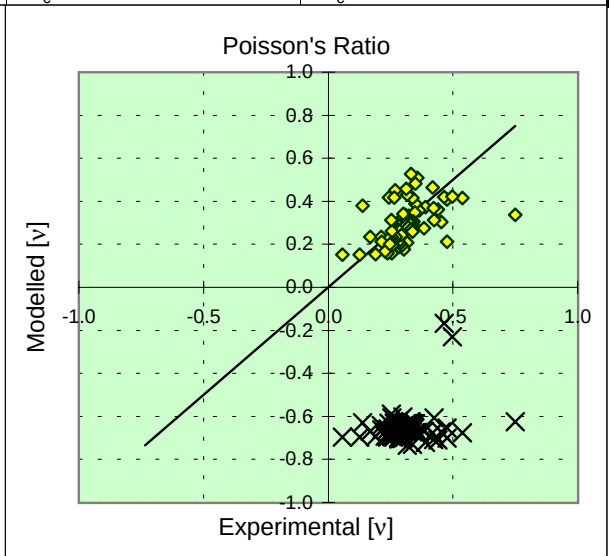


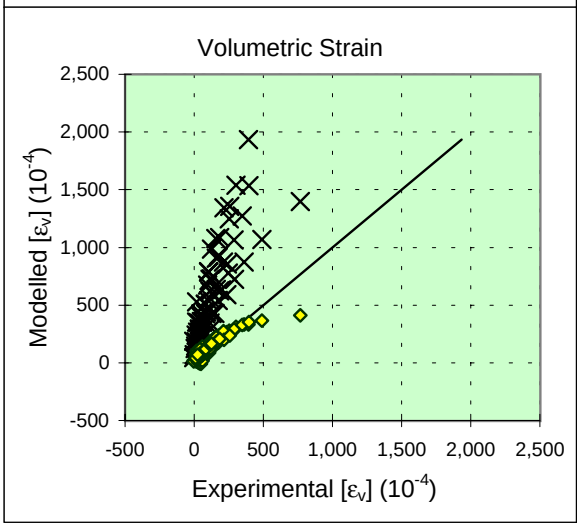


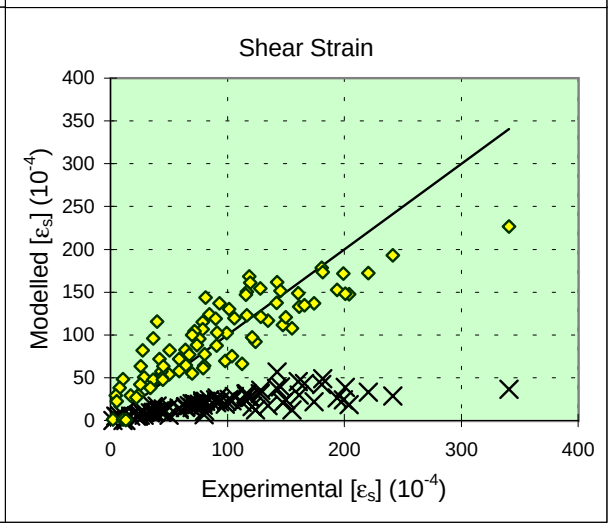
TP-I : LRSB ***Hard Limestone (CCD)*** ***100% Percentile Data***

Experimental Data	Sample Size: 82	p*= 19 kPa @ ω = 3.3%		p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 651 MPa		υ_e = 0.32
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 510,220 k_2 = 0.2801 r^2= 0.316	k_3 = 721,592 k_4 = 0.2467 k_5 = 0.0624 r^2= 0.321	Ga = 905,970 kPa Ka = 64,216 kPa n = 0.5215 r^2= 0.351	Ga = 190,411 kPa Ka = -122,558 kPa n = 0.0791 β = -0.1365 m = -0.2195 $r^2\varepsilon_v$= 0.694 $r^2\varepsilon_s$= 0.646
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 410 MPa	Mr_c= 437 MPa	ε_{vc}= 223 ε_{sc}= 22 Mr_c= 324 MPa υ_c= **-0.79**	ε_{vc}= -138 ε_{sc}= 239 Mr_c= 317 MPa υ_c= 1.28



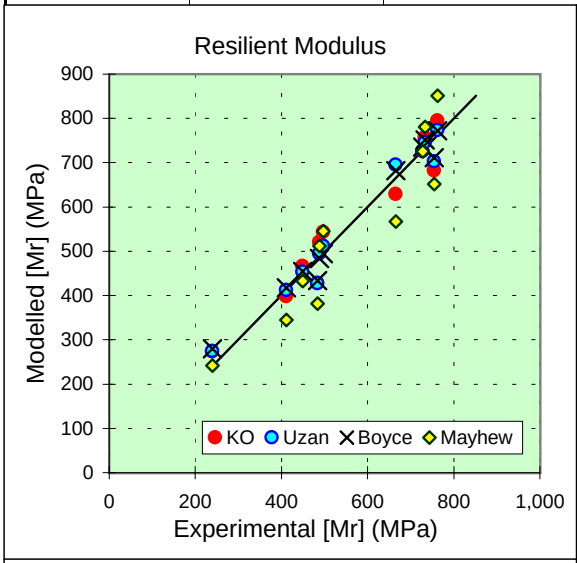


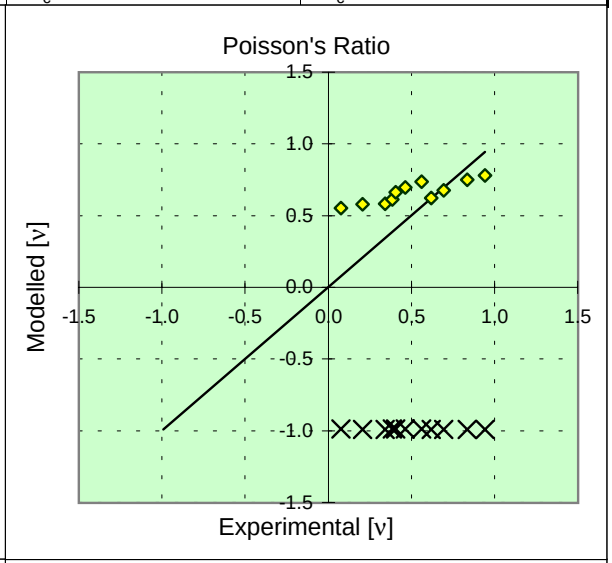


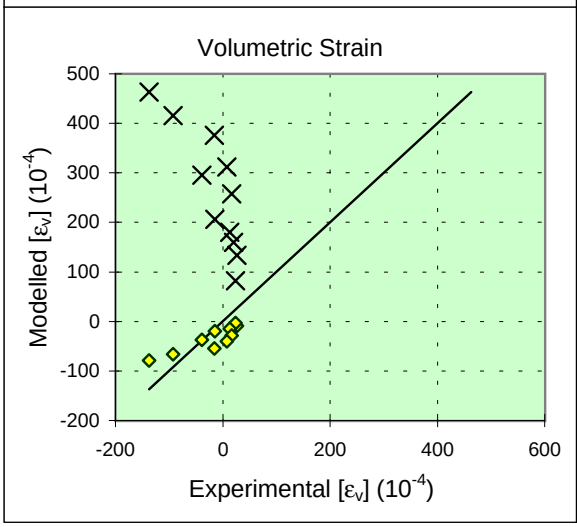


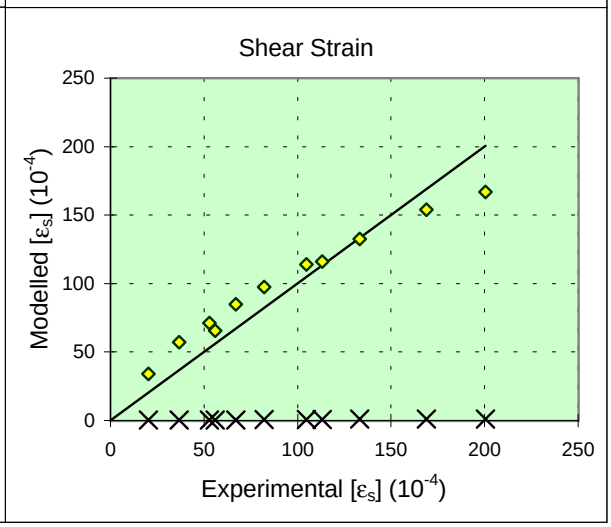
TP-I : LNEC ***Hard Limestone (CCD)*** ***95% Percentile Data***

Experimental Data	Sample Size: 11	p*= 19 kPa @ ω = 3.3%		p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 578 MPa		υ_e = 0.52
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 380,237	k_3 = 812,526	Ga = 27,186,109 kPa	Ga = 218,426 kPa
	k_2 = 0.7126	k_4 = 0.8147	Ka = 29,901 kPa	Ka = 1,117,625 kPa
		k_5 = -0.0976	n = 0.2860	n = -0.0856
				β = 0.8120
				m = 0.0000
	r^2= 0.836	r^2= 0.881	r^2= 0.893	$r^2\varepsilon_v$= 0.509 $r^2\varepsilon_s$= 0.781
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 461 ε_{sc}= 1	ε_{vc}= -182 ε_{sc}= 284
	Mr_c= 218 MPa	Mr_c= 187 MPa	Mr_c= 181 MPa	Mr_c= 283 MPa
			υ_c= **-0.99**	υ_c= 1.42







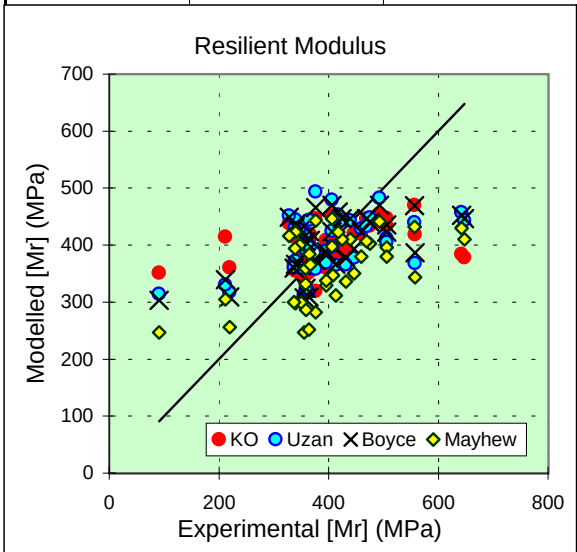


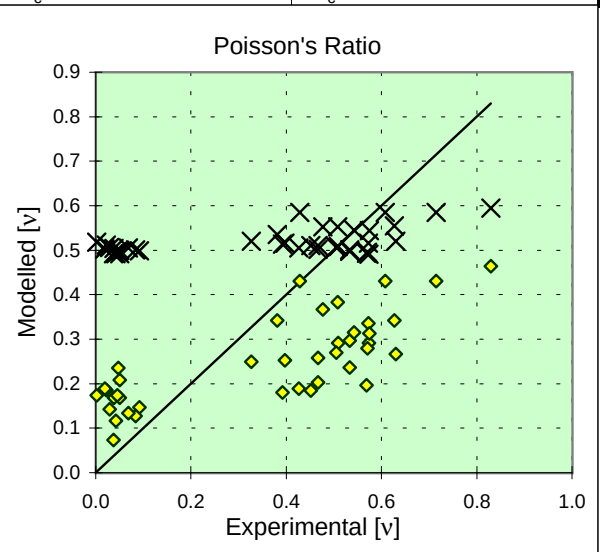
TP-I : UNOT ***Hard Limestone (CCD)*** ***95% Percentile Data***

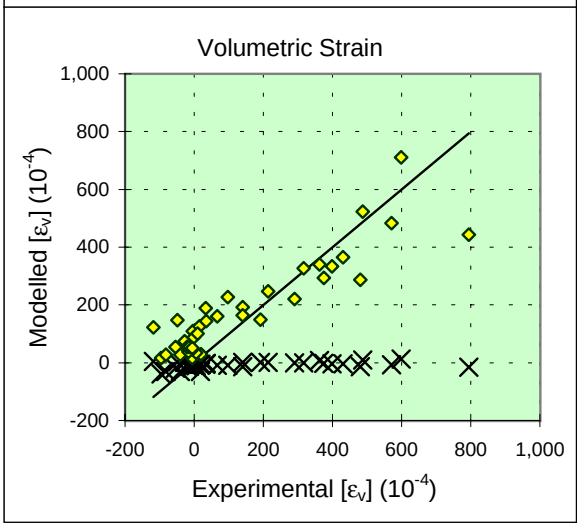
Experimental Data	Sample Size: 40	p*= 19 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 403 MPa	υ_e = 0.36

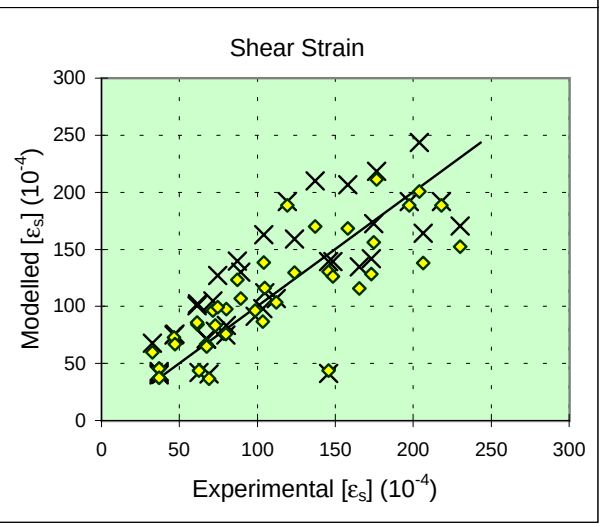
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 335,997	k_3 = 474,104	Ga = 129,255 kPa	Ga = 150,080 kPa
	k_2 = 0.2214	k_4 = 0.0429	Ka = 3,945,368 kPa	Ka = 178,065 kPa
		k_5 = 0.2104	n = 0.6408	n = 0.4063
				β = 0.3784
				m = 1.1567
	r^2= 0.338	r^2= 0.388	r^2= 0.427	$r^2\varepsilon_v$= 0.653 $r^2\varepsilon_s$= 0.578

Characteristic Values				
	At p_1= 6 kPa		p_2 = 15 kPa and	q_1= 4 kPa q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= -15 ε_{sc}= 123	ε_{vc}= -18 ε_{sc}= 164
	Mr_c= 283 MPa	Mr_c= 385 MPa	Mr_c= 439 MPa	Mr_c= 325 MPa
			υ_c= 0.62	υ_c= 0.61







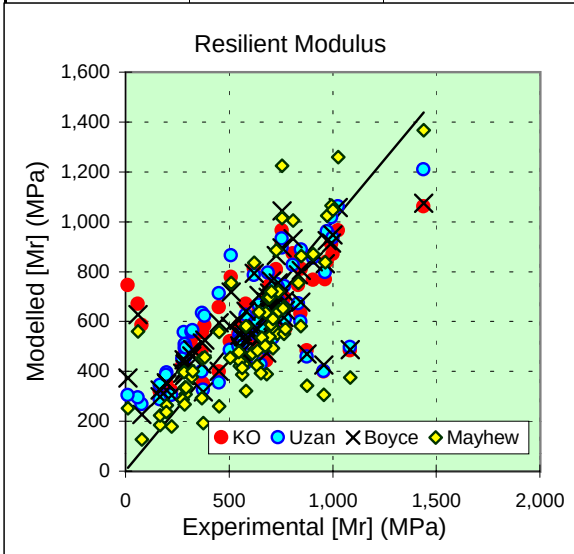


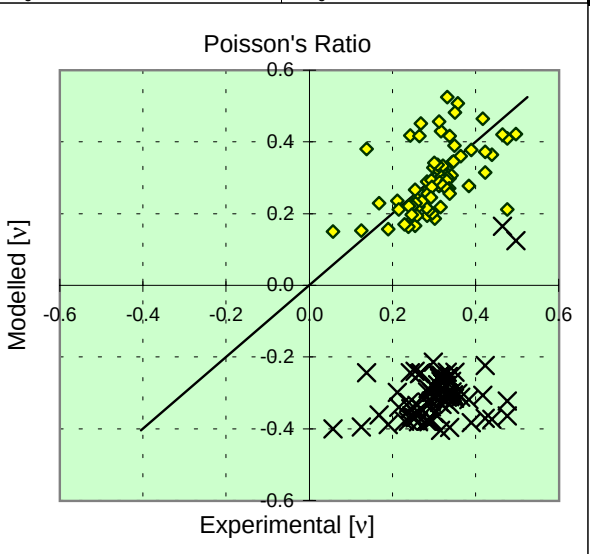
TP-I : LRSB ***Hard Limestone (CCD)*** ***95% Percentile Data***

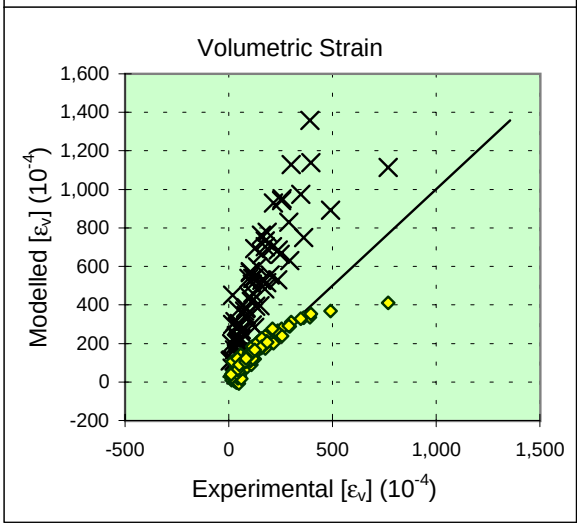
Experimental Data	Sample Size: 77	p*= 19 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 549 MPa	υ_e = 0.31

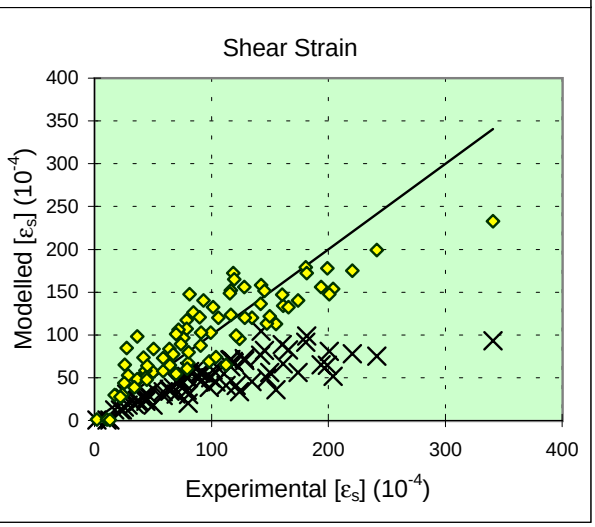
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 365,585	k_3 = 679,247	Ga = 397,931 kPa	Ga = 188,597 kPa
	k_2 = 0.4730	k_4 = 0.3352	Ka = 56,312 kPa	Ka = -122,397 kPa
		k_5 = 0.1830	n = 0.3396	n = 0.0523
				β = -0.1365
				m = -0.2200
	r^2= 0.447	r^2= 0.525	r^2= 0.547	$r^2\varepsilon_v$= 0.689 $r^2\varepsilon_s$= 0.648

Characteristic Values	At	p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**		**Mayhew**	
			ε_{vc}= 237	ε_{sc}= 70	ε_{vc}= -138	ε_{sc}= 254
	Mr_c= 253 MPa	Mr_c= 324 MPa	Mr_c= 237 MPa		Mr_c= 290 MPa	
			υ_c= **-0.50**		υ_c= 1.21	



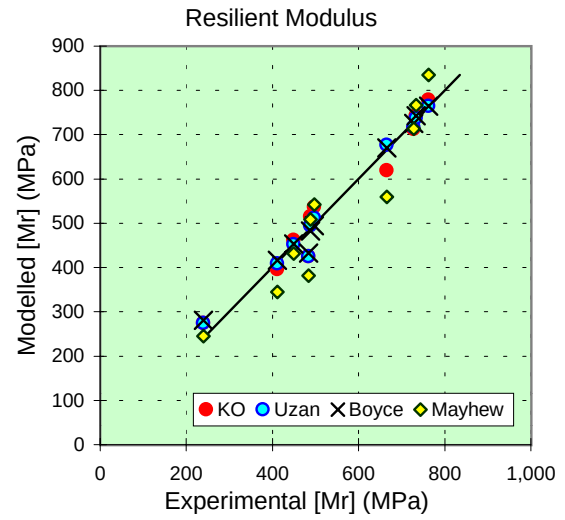


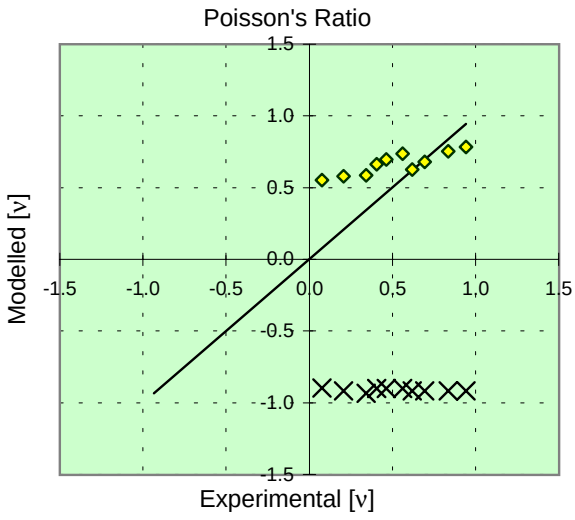


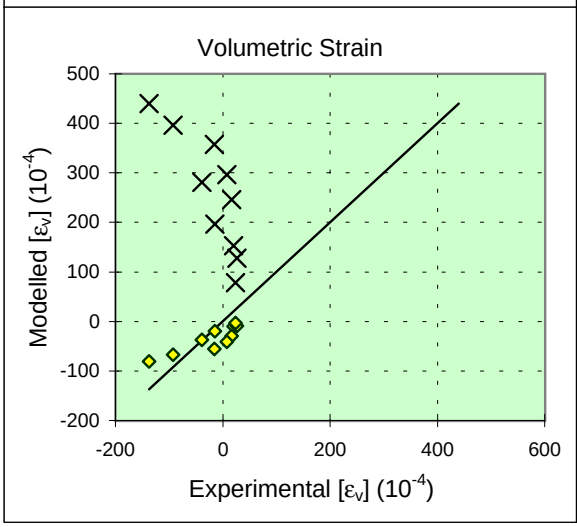


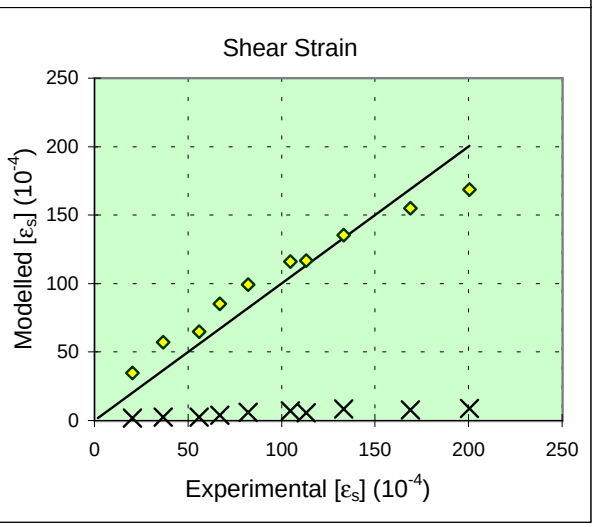
TP-I : LNEC ***Hard Limestone (CCD)*** ***90% Percentile Data***

Experimental Data	Sample Size: 10	p*= 19 kPa @ ω = 3.3%		p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 557 MPa		υ_e = 0.53
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 378,523	k_3 = 802,434	Ga = 3,385,350 kPa	Ga = 213,773 kPa
	k_2 = 0.6974	k_4 = 0.7863	Ka = 31,295 kPa	Ka = 1,115,491 kPa
		k_5 = -0.0821	n = 0.2867	n = -0.0655
				β = 0.8297
				m = 0.0000
	r^2= 0.861	r^2= 0.900	r^2= 0.907	$r^2\varepsilon_v$= 0.515 $r^2\varepsilon_s$= 0.788
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 220 MPa	Mr_c= 193 MPa	ε_{vc}= 439 ε_{sc}= 9	ε_{vc}= -186 ε_{sc}= 279
			Mr_c= 185 MPa	Mr_c= 295 MPa
			υ_c= **-0.95**	υ_c= 1.48







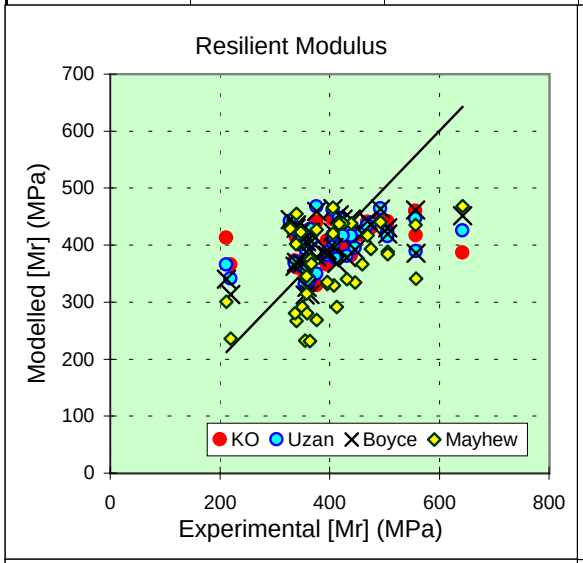


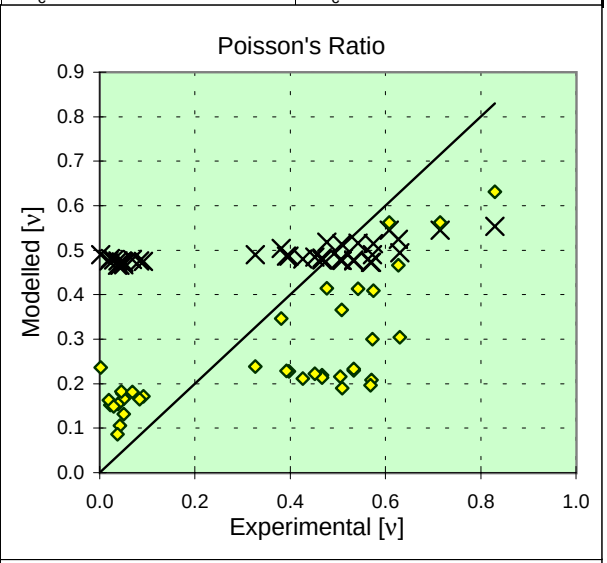
TP-I : UNOT ***Hard Limestone (CCD)*** ***90% Percentile Data***

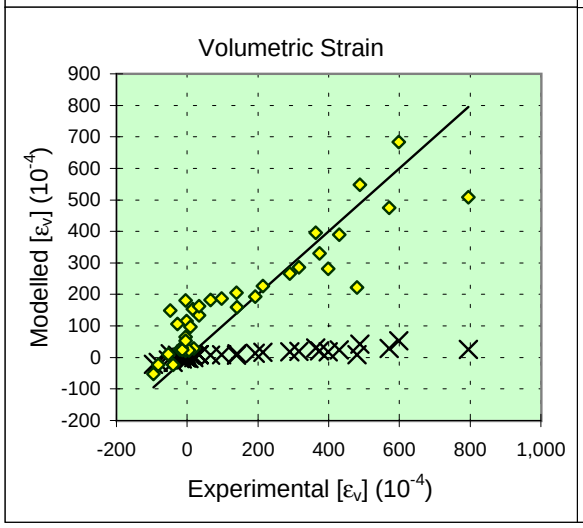
Experimental Data	Sample Size: 38	p*= 19 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 404 MPa	υ_e = 0.35

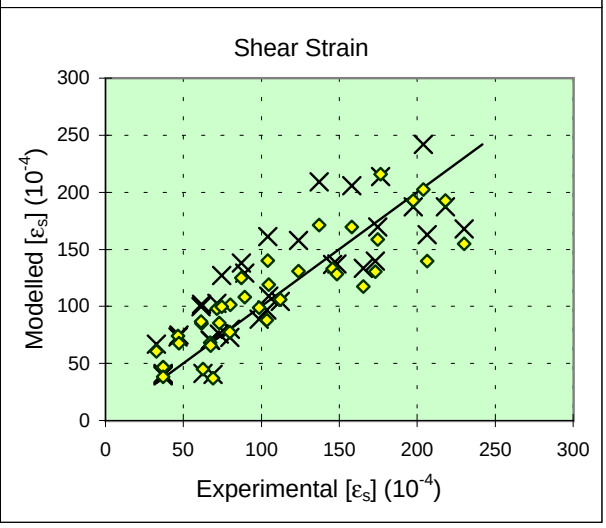
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 344,320	k_3 = 450,646	Ga = 130,682 kPa	Ga = 148,264 kPa
	k_2 = 0.1918	k_4 = 0.0985	Ka = 1,389,371 kPa	Ka = 104,299 kPa
		k_5 = 0.1153	n = 0.6636	n = 0.3880
				β = 0.3056
				m = 0.5868
	r^2= 0.342	r^2= 0.365	r^2= 0.399	$r^2\varepsilon_v$= 0.676 $r^2\varepsilon_s$= 0.657

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= -7 ε_{sc}= 116	ε_{vc}= -109 ε_{sc}= 172
	Mr_c= 297 MPa	Mr_c= 349 MPa	Mr_c= 445 MPa	Mr_c= 464 MPa
			υ_c= 0.56	υ_c= 1.40







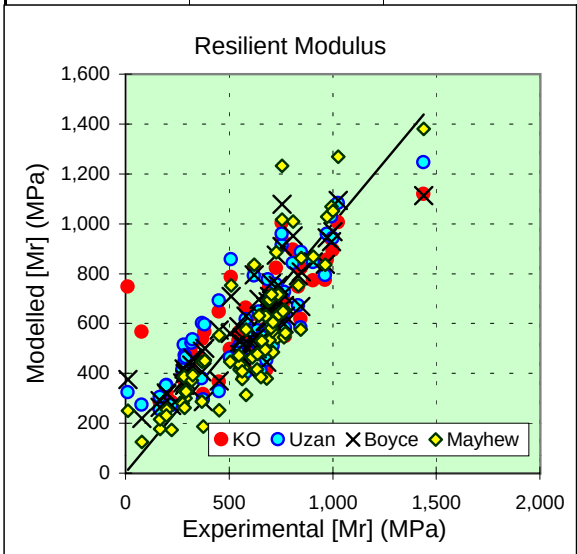


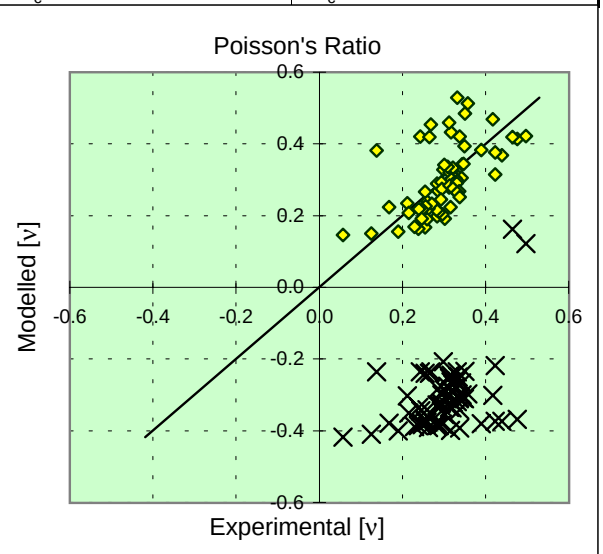
TP-I : LRSB ***Hard Limestone (CCD)*** ***90% Percentile Data***

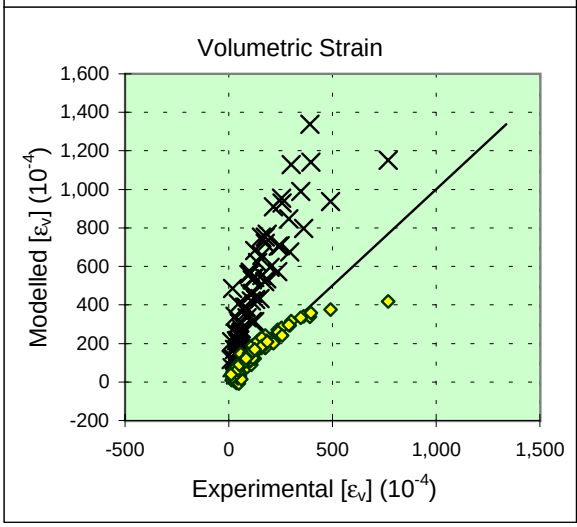
Experimental Data	Sample Size: 73	p*= 19 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 530 MPa	υ_e = 0.31

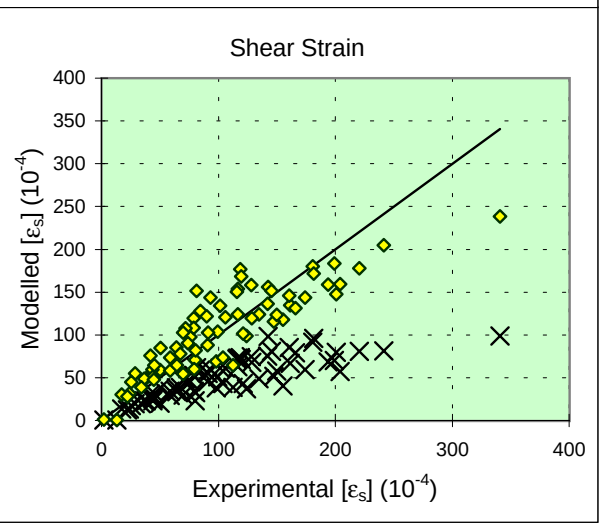
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 331,853	k_3 = 653,148	Ga = 389,825 kPa	Ga = 186,594 kPa
	k_2 = 0.5394	k_4 = 0.4064	Ka = 44,624 kPa	Ka = -124,589 kPa
		k_5 = 0.1692	n = 0.2687	n = 0.0300
				β = -0.1429
				m = -0.2269
	r^2= 0.529	r^2= 0.598	r^2= 0.662	$r^2\varepsilon_v$= 0.696 $r^2\varepsilon_s$= 0.656

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 218 MPa	Mr_c= 275 MPa	ε_{vc}= 277 ε_{sc}= 82	ε_{vc}= -147 ε_{sc}= 267
			Mr_c= 203 MPa	Mr_c= 276 MPa
			υ_c= **-0.50**	υ_c= 1.22







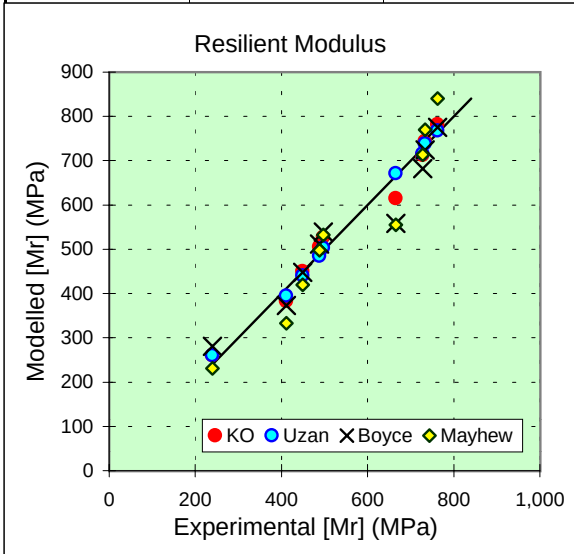


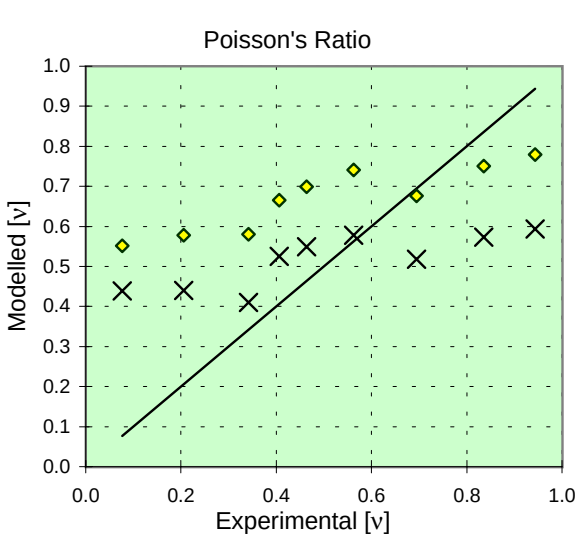
TP-I : LNEC ***Hard Limestone (CCD)*** ***85% Percentile Data***

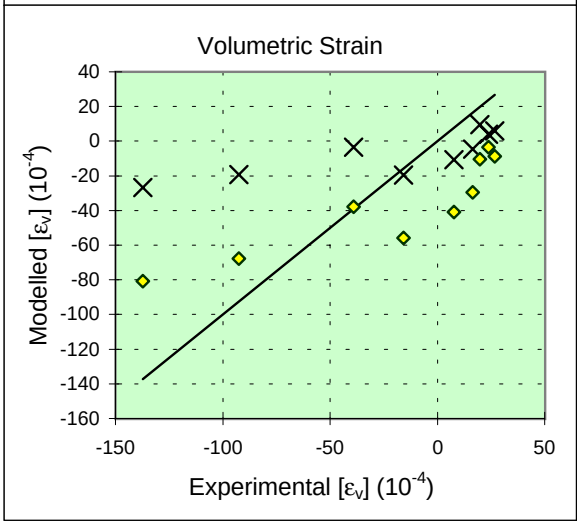
Experimental Data	Sample Size: 9	p*= 19 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 556 MPa		υ_e = 0.51

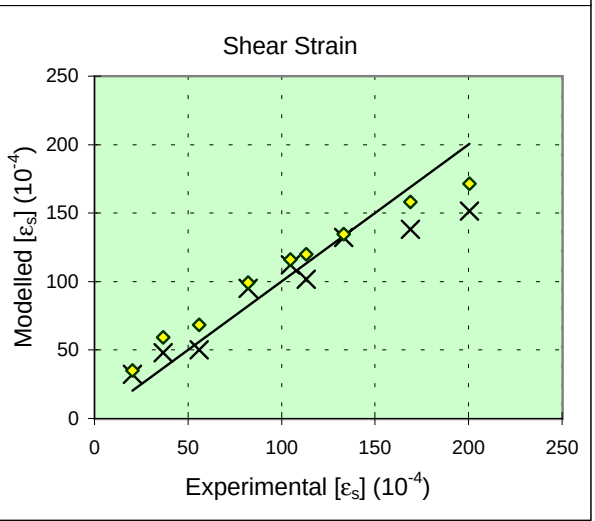
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 365,151	k_3 = 807,495	Ga = 216,532 kPa	Ga = 215,440 kPa
	k_2 = 0.7359	k_4 = 0.8259	Ka = 115,538 kPa	Ka = 1,114,746 kPa
		k_5 = -0.0830	n = 0.0900	n = -0.1068
				β = 0.8336
				m = 0.0000
	r^2= 0.893	r^2= 0.955	r^2= 0.807	$r^2\varepsilon_v$= 0.515 $r^2\varepsilon_s$= 0.800

Characteristic Values	At	p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**		**Mayhew**	
			ε_{vc}= -21	ε_{sc}= 206	ε_{vc}= -187	ε_{sc}= 299
	Mr_c= 206 MPa	Mr_c= 180 MPa	Mr_c= 258 MPa		Mr_c= 265 MPa	
			υ_c= 0.60		υ_c= 1.38	



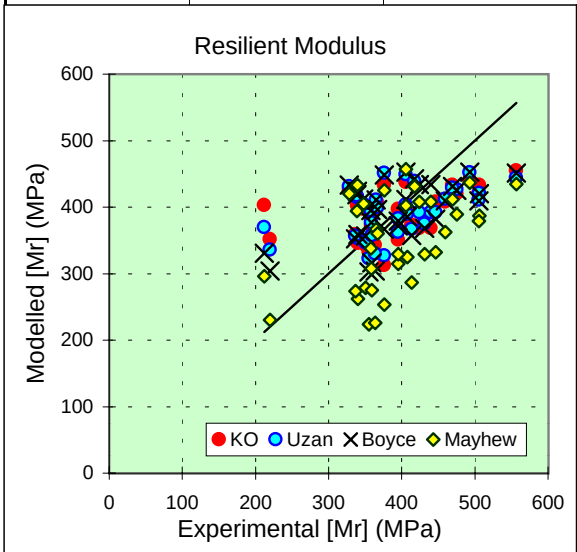


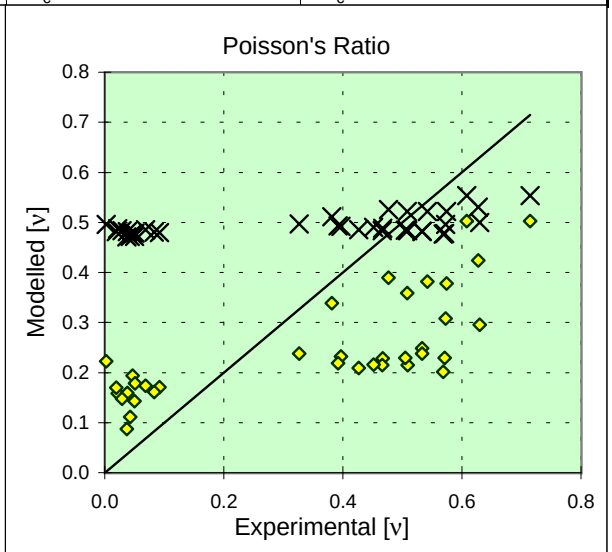


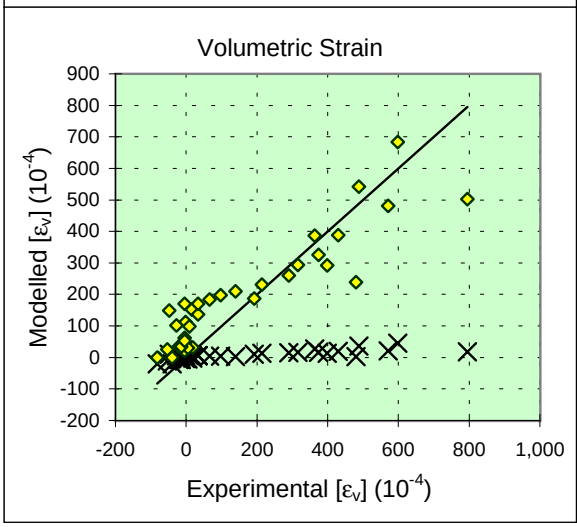


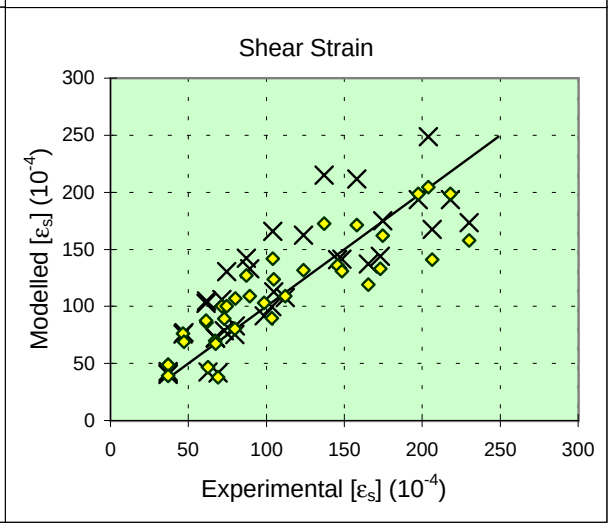
TP-I : UNOT ***Hard Limestone (CCD)*** ***85% Percentile Data***

Experimental Data	Sample Size: 36	p*= 19 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 393 MPa	υ_e = 0.34
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 328,306	k_3 = 433,282	Ga = 126,876 kPa	Ga = 146,114 kPa
	k_2 = 0.2151	k_4 = 0.1465	Ka = 1,562,411 kPa	Ka = 117,464 kPa
		k_5 = 0.0810	n = 0.6571	n = 0.3590
				β = 0.3099
				m = 0.6723
	r^2= 0.378	r^2= 0.393	r^2= 0.420	$r^2\varepsilon_v$= 0.672 $r^2\varepsilon_s$= 0.658
Characteristic Values	At p_1= 6 kPa		p_2 = 15 kPa and	q_1= 4 kPa q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= -9 ε_{sc}= 121	ε_{vc}= -74 ε_{sc}= 184
	Mr_c= 278 MPa	Mr_c= 313 MPa	Mr_c= 431 MPa	Mr_c= 355 MPa
			υ_c= 0.57	υ_c= 0.97







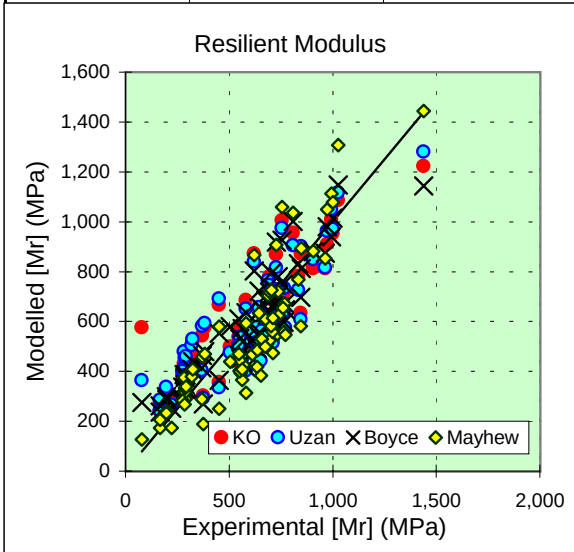


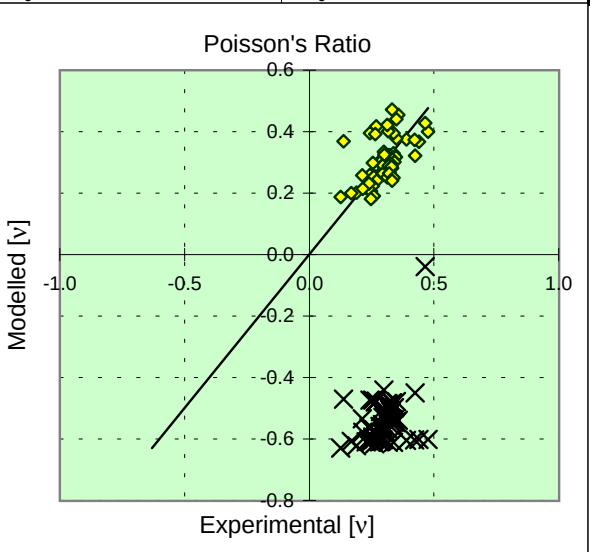
TP-I : LRSB ***Hard Limestone (CCD)*** ***85% Percentile Data***

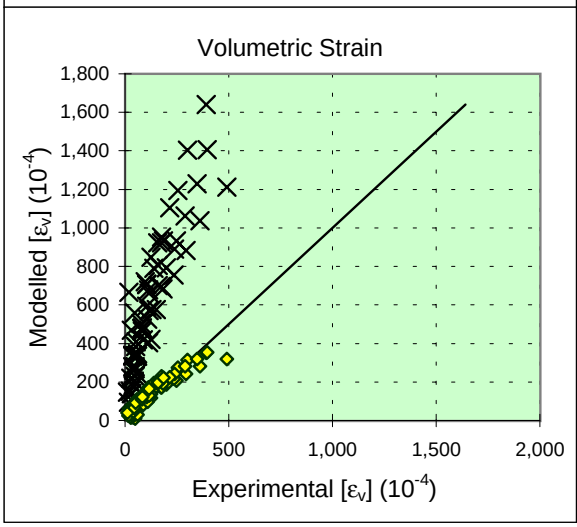
Experimental Data	Sample Size: 69	p*= 19 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 537 MPa	υ_e = 0.30

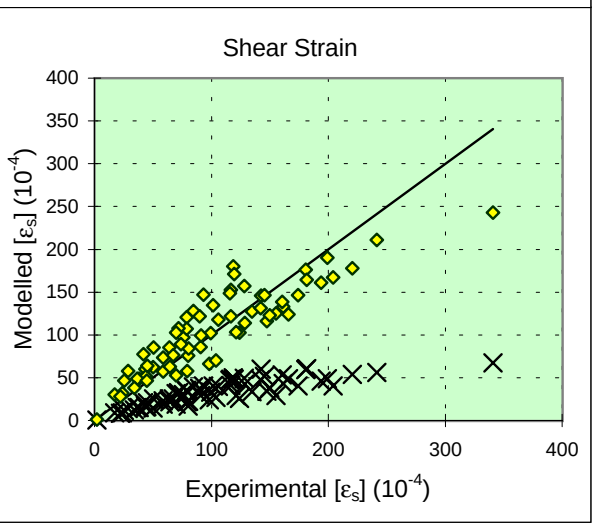
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 318,348	k_3 = 644,412	Ga = 593,747 kPa	Ga = 188,258 kPa
	k_2 = 0.5976	k_4 = 0.5002	Ka = 28,395 kPa	Ka = 2,158 kPa
		k_5 = 0.1054	n = 0.2094	n = -0.0186
				β = 0.0020
				m = 0.0041
	r^2= 0.615	r^2= 0.636	r^2= 0.717	$r^2\varepsilon_v$= 0.757 $r^2\varepsilon_s$= 0.675

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 405 ε_{sc}= 60	ε_{vc}= -49 ε_{sc}= 290
	Mr_c= 200 MPa	Mr_c= 236 MPa	Mr_c= 166 MPa	Mr_c= 191 MPa
			υ_c= **-0.70**	υ_c= 0.67



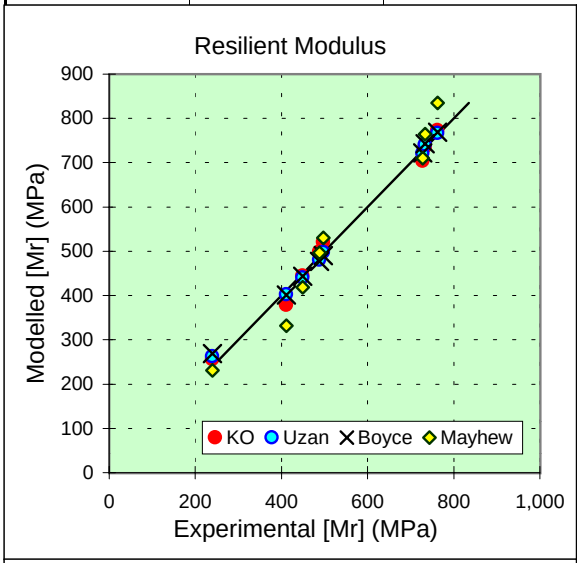


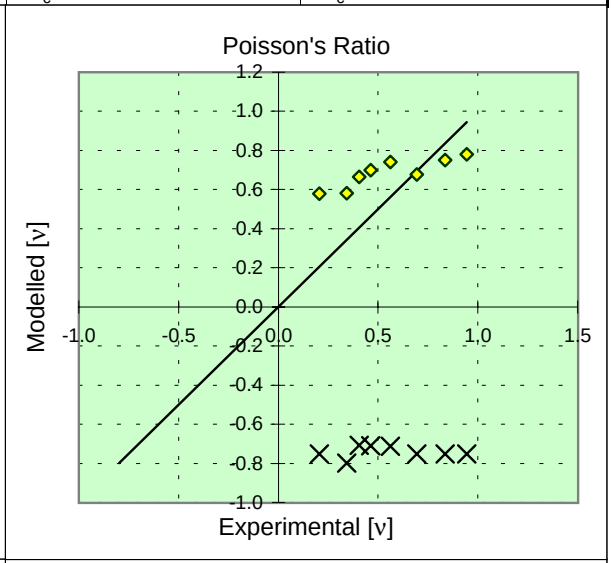


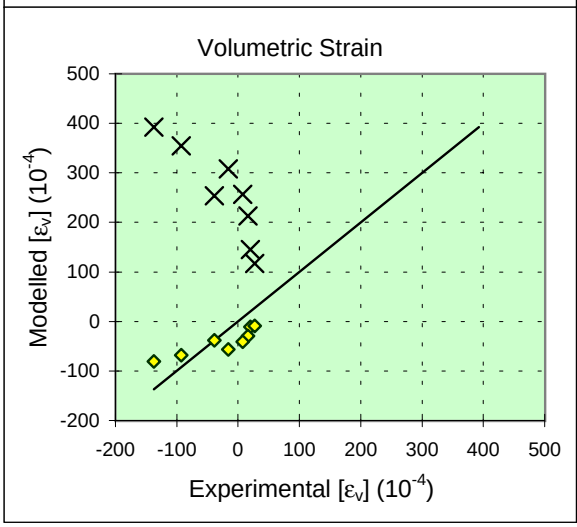


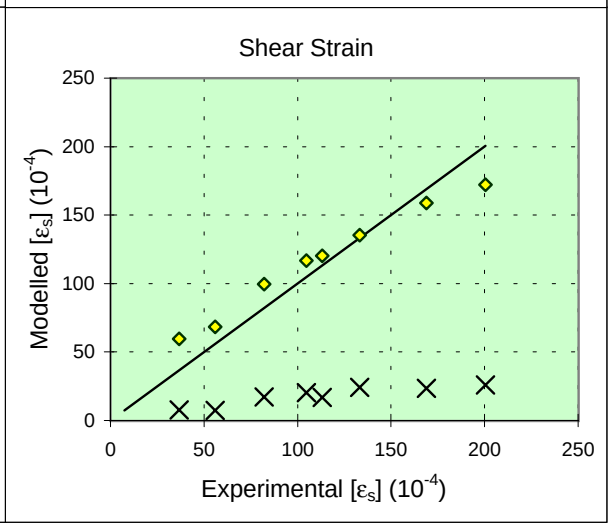
TP-I : LNEC ***Hard Limestone (CCD)*** ***80% Percentile Data***

Experimental Data	Sample Size: 8	p*= 19 kPa @ ω = 3.3%		p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 520 MPa		υ_e = 0.54
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 360,179	k_3 = 807,912	Ga = 1,167,591 kPa	Ga = 214,066 kPa
	k_2 = 0.7381	k_4 = 0.8596	Ka = 28,964 kPa	Ka = 1,116,140 kPa
		k_5 = -0.1145	n = 0.2291	n = -0.1028
				β = 0.8390
				m = 0.0000
	r^2= 0.924	r^2= 0.958	r^2= 0.947	$r^2\varepsilon_v$= 0.508 $r^2\varepsilon_s$= 0.778
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 203 MPa	Mr_c= 173 MPa	ε_{vc}= 426 ε_{sc}= 29	ε_{vc}= -188 ε_{sc}= 299
			Mr_c= 177 MPa	Mr_c= 266 MPa
			υ_c= **-0.84**	υ_c= 1.39







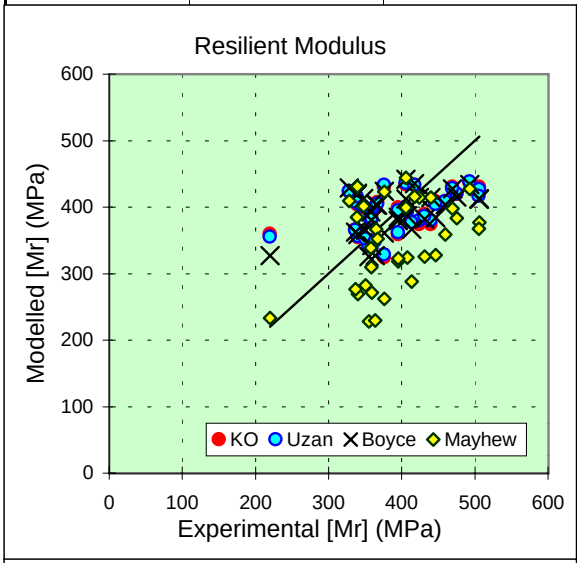


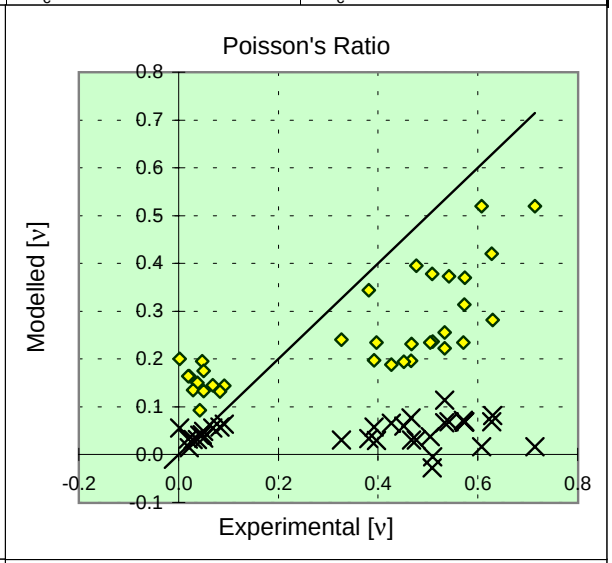
TP-I : UNOT ***Hard Limestone (CCD)*** ***80% Percentile Data***

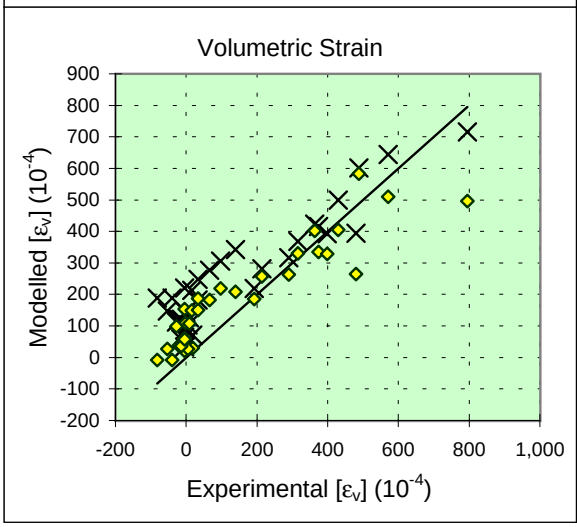
Experimental Data	Sample Size: 34	p*= 19 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 393 MPa	υ_e = 0.35

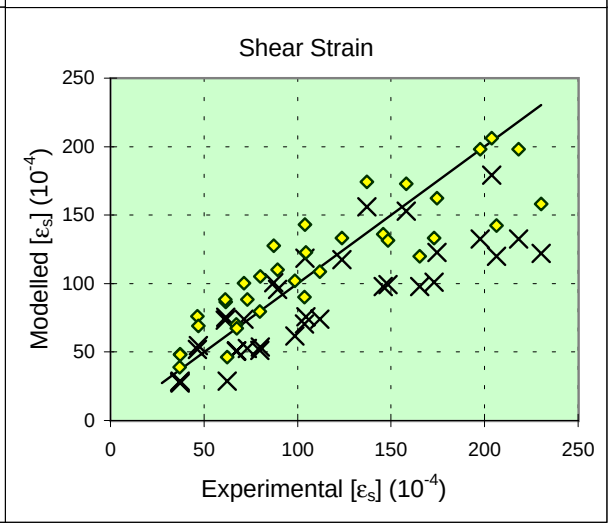
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 338,745	k_3 = 418,828	Ga = 178,336 kPa	Ga = 145,167 kPa
	k_2 = 0.1853	k_4 = 0.1680	Ka = 118,955 kPa	Ka = 129,487 kPa
		k_5 = 0.0190	n = 0.7261	n = 0.3775
				β = 0.3877
				m = 0.8590
	r^2= 0.384	r^2= 0.385	r^2= 0.384	$r^2\varepsilon_v$= 0.674 $r^2\varepsilon_s$= 0.664

Characteristic Values	At	p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**		**Mayhew**	
			ε_{vc}= 98	ε_{sc}= 76	ε_{vc}= -64	ε_{sc}= 179
	Mr_c= 293 MPa	Mr_c= 302 MPa	Mr_c= 373 MPa		Mr_c= 353 MPa	
			υ_c= **-0.15**		υ_c= 0.90	







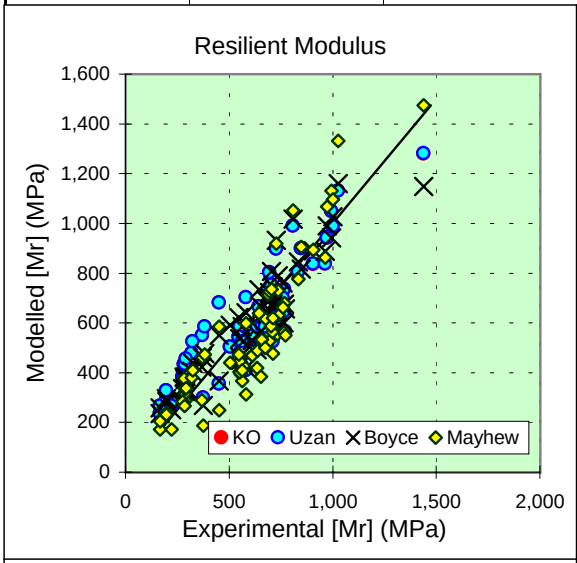


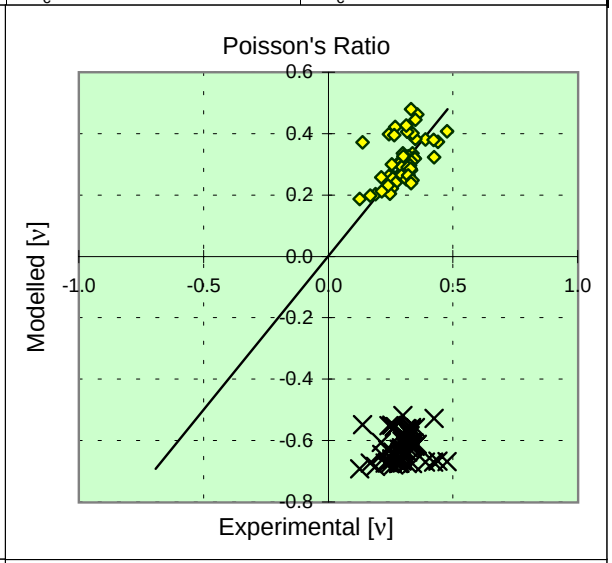
TP-I : LRSB ***Hard Limestone (CCD)*** ***80% Percentile Data***

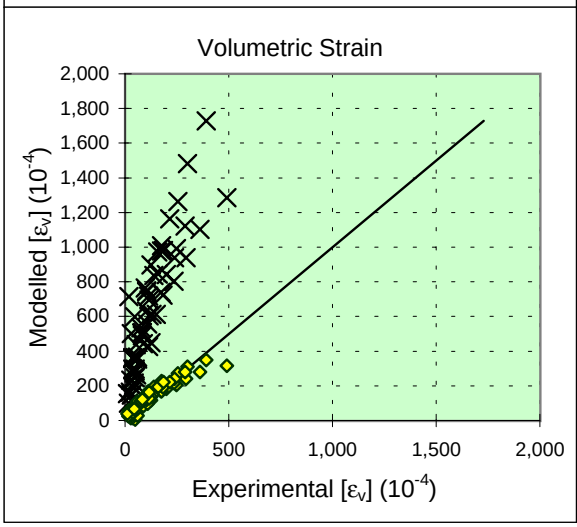
Experimental Data	Sample Size: 65	p*= 19 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 536 MPa		υ_e = 0.30

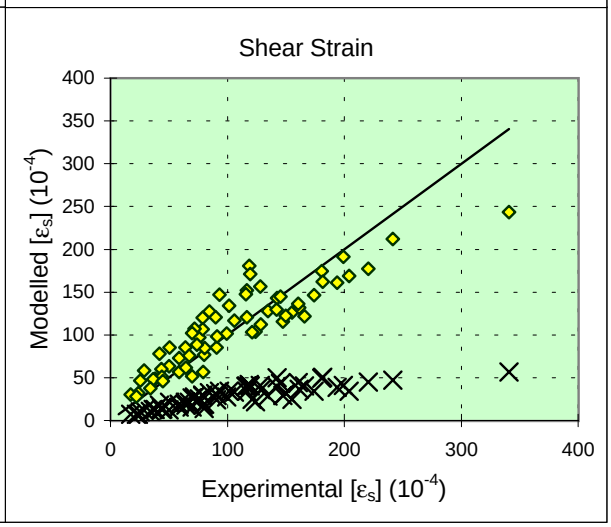
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 316,966	k_3 = 626,401	Ga = 709,057 kPa	Ga = 189,476 kPa
	k_2 = 0.6197	k_4 = 0.6189	Ka = 26,012 kPa	Ka = 403 kPa
		k_5 = 0.0009	n = 0.2019	n = -0.0321
				β = 0.0004
				m = 0.0008
	r^2= 0.674	r^2= 0.674	r^2= 0.733	$r^2\varepsilon_v$= 0.744 $r^2\varepsilon_s$= 0.674

Characteristic Values	At	p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**		**Mayhew**	
			ε_{vc}= 438	ε_{sc}= 51	ε_{vc}= -56	ε_{sc}= 296
	Mr_c= 196 MPa	Mr_c= 196 MPa	Mr_c= 160 MPa		Mr_c= 190 MPa	
			υ_c= **-0.75**		υ_c= 0.69	







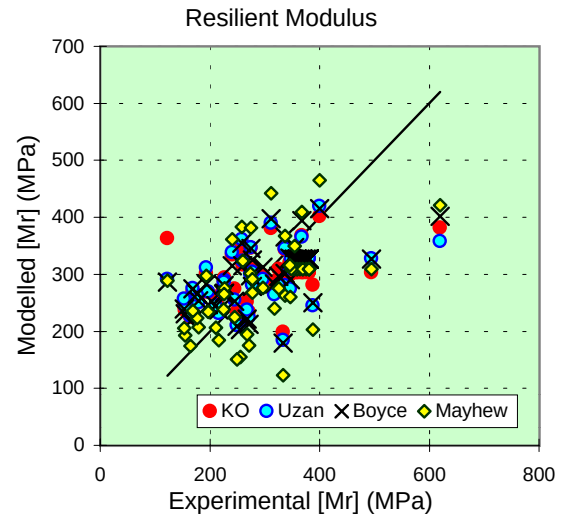


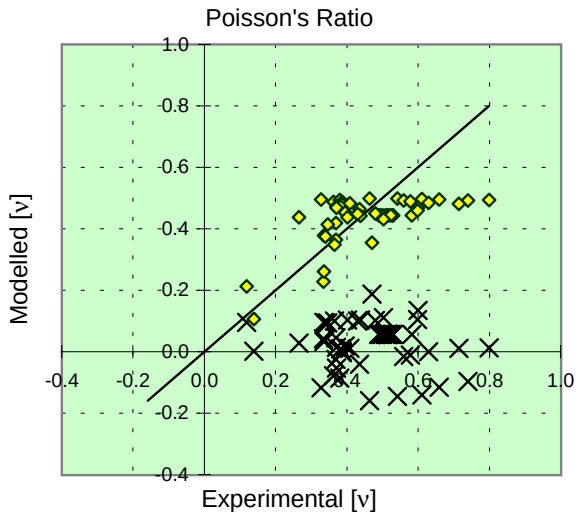
TP-I : UNOT ***Soft Limestone (CCT)*** ***100% Percentile Data***

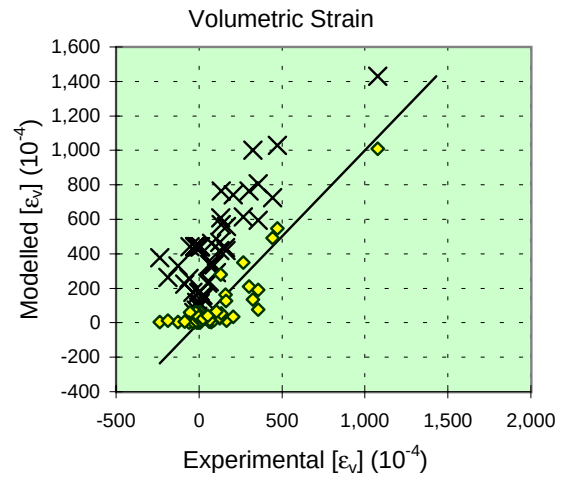
Experimental Data	Sample Size: 52	p*= 80 kPa @	ω = 3.5%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 271 MPa		υ_e = 0.47

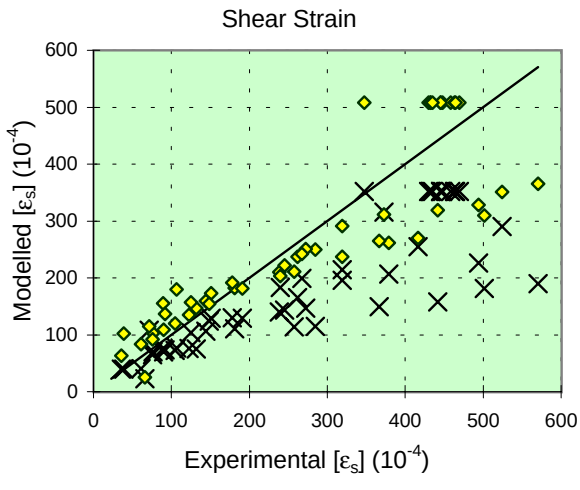
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 229,545	k_3 = 324,594	Ga = 89,556 kPa	Ga = 66,444 kPa
	k_2 = 0.2998	k_4 = 0.2420	Ka = 43,245 kPa	Ka = 1,329,236 kPa
		k_5 = 0.1027	n = 0.2876	n = -0.1190
				β = -0.3971
				m = 3.1692
	r^2= 0.374	r^2= 0.392	r^2= 0.439	$r^2\varepsilon_v$= 0.652 $r^2\varepsilon_s$= 0.655

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 306 ε_{sc}= 124	ε_{vc}= 0 ε_{sc}= 357
	Mr_c= 182 MPa	Mr_c= 194 MPa	Mr_c= 163 MPa	Mr_c= 139 MPa
			υ_c= **-0.39**	υ_c= 0.50







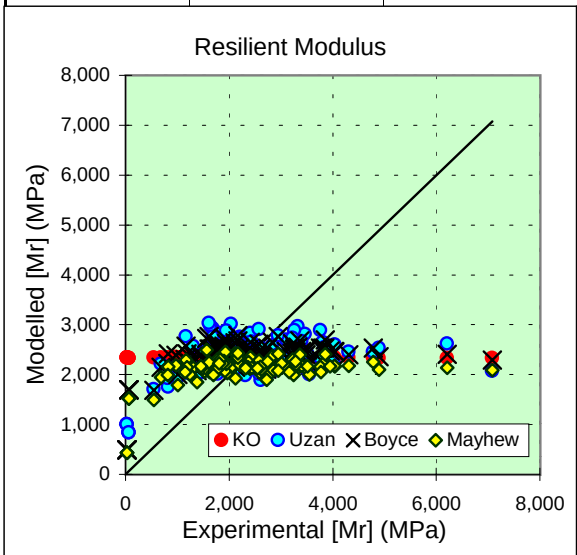


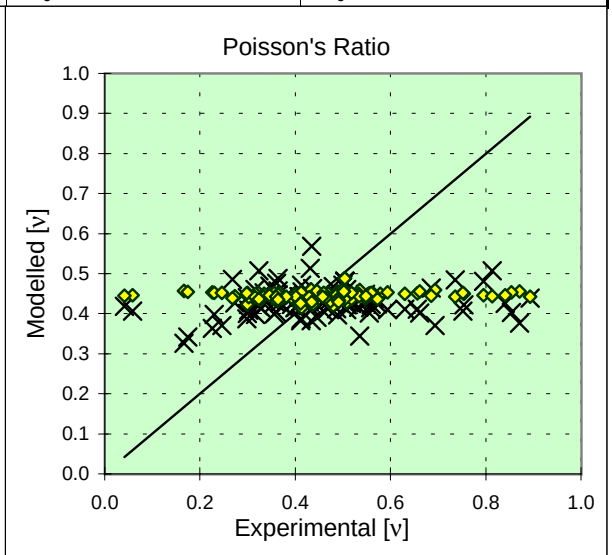
TP-I : LRSB ***Sort Limestone (CCT)*** ***100% Percentile Data***

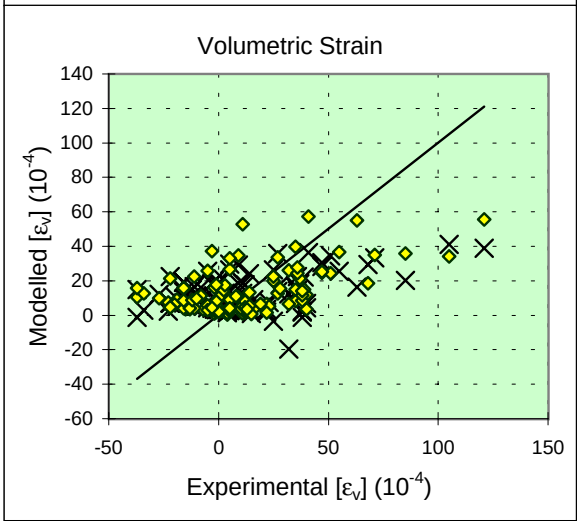
Experimental Data	Sample Size: 104	p*= 80 kPa @	ω = 3.5%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 2,212 MPa	υ_e = 0.46

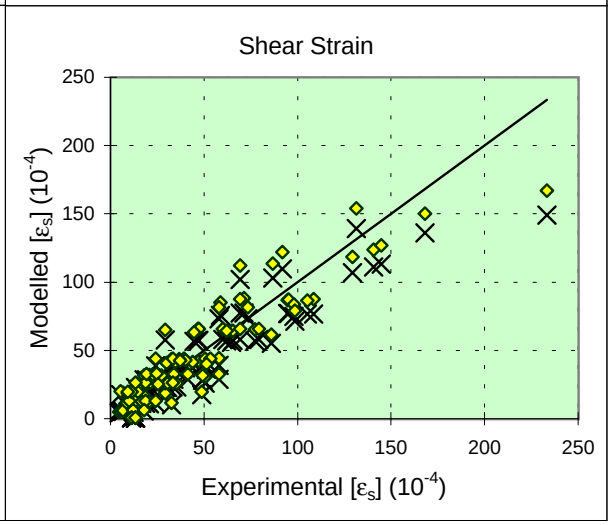
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 2,346,210	k_3 = 2,511,355	Ga = 479,322 kPa	Ga = 420,711 kPa
	k_2 = -0.0047	k_4 = -0.2017	Ka = 2,779,742 kPa	Ka = 7,446,256 kPa
		k_5 = 0.2315	n = 0.5853	n = 0.5567
				β = -0.0322
				m = 1.2826
	r^2= 0.293	r^2= 0.364	r^2= 0.360	$r^2\varepsilon_v$= 0.402 $r^2\varepsilon_s$= 0.725

Characteristic Values				
	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 4 ε_{sc}= 13	ε_{vc}= 1 ε_{sc}= 16
	Mr_c= 2355 MPa	Mr_c= 3184 MPa	Mr_c= 3169 MPa	Mr_c= 3040 MPa
			υ_c= 0.26	υ_c= 0.45







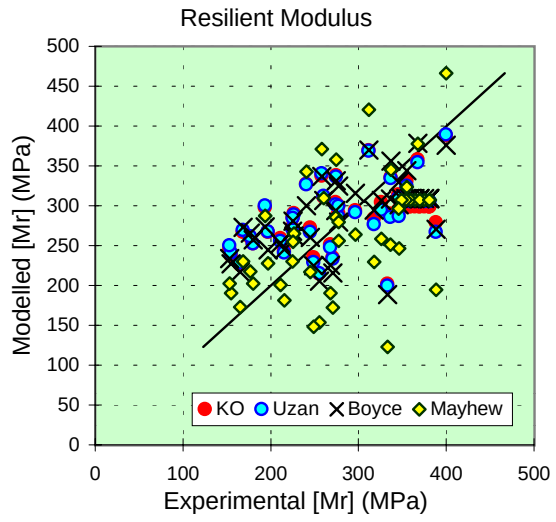


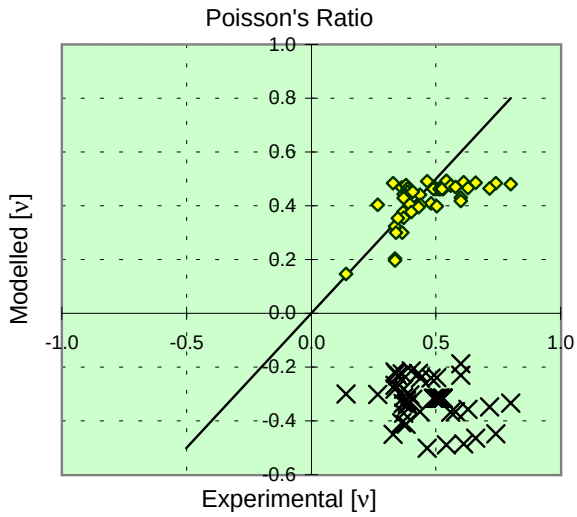
TP-I : UNOT ***Soft Limestone (CCT)*** ***95% Percentile Data***

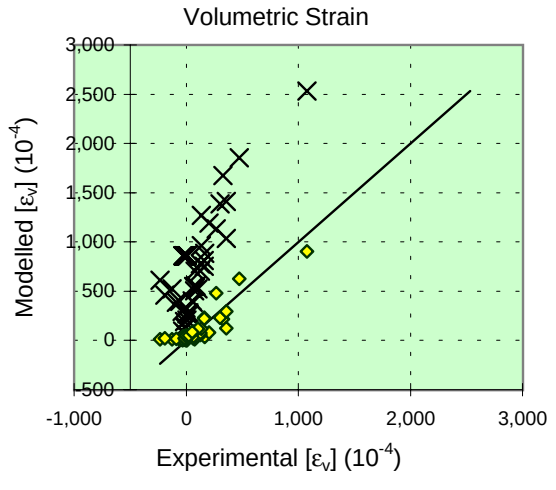
Experimental Data	Sample Size: 49	p*= 80 kPa @	ω = 3.5%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 266 MPa	υ_e = 0.48

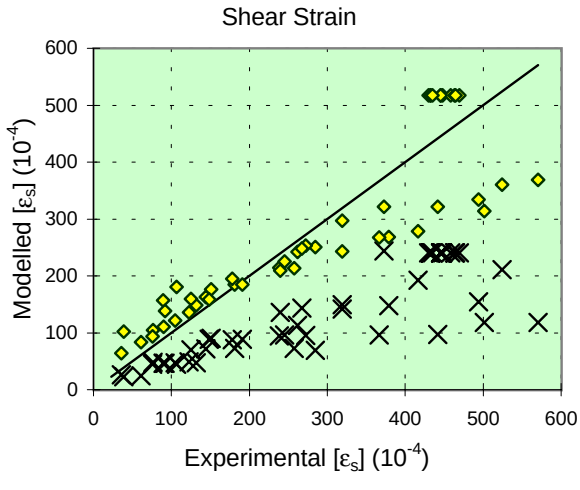
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 230,493	k_3 = 313,806	Ga = 128,019 kPa	Ga = 65,055 kPa
	k_2 = 0.2792	k_4 = 0.2517	Ka = 35,094 kPa	Ka = 562,879 kPa
		k_5 = 0.0321	n = 0.4175	n = -0.1050
				β = 0.5921
				m = 2.5443
	r^2= 0.395	r^2= 0.397	r^2= 0.436	$r^2\varepsilon_v$= 0.670 $r^2\varepsilon_s$= 0.660

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 185 MPa	Mr_c= 192 MPa	ε_{vc}= 417 ε_{sc}= 68	ε_{vc}= 1 ε_{sc}= 355
			Mr_c= 158 MPa	Mr_c= 140 MPa
			υ_c= **-0.68**	υ_c= 0.50



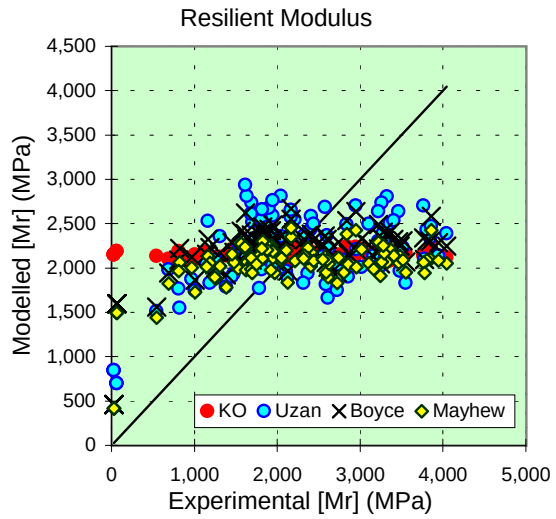


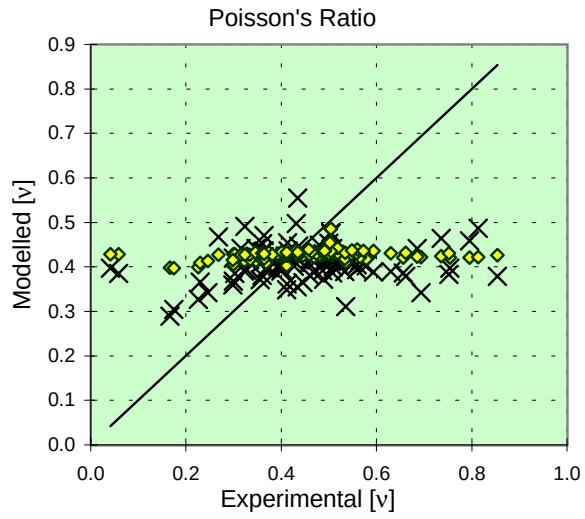


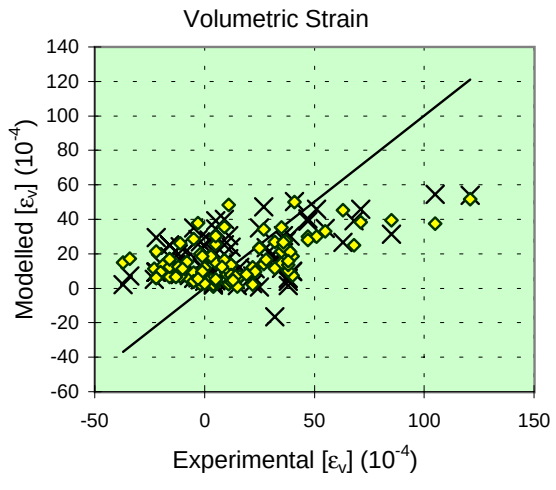


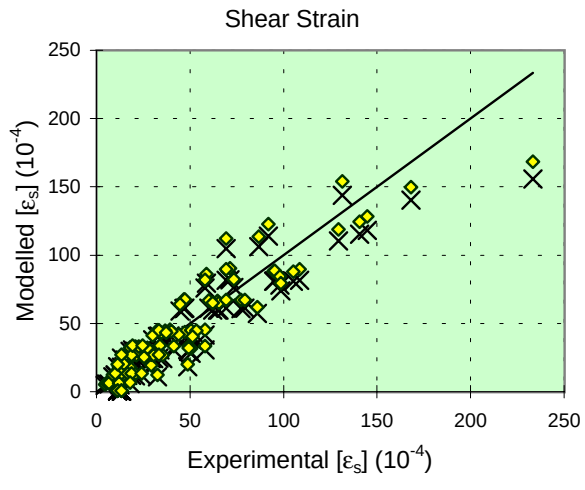
TP-I : LRSB ***Sort Limestone (CCT)*** ***95% Percentile Data***

Experimental Data	Sample Size: 98	p*= 80 kPa @ ω = 3.5%		p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 1,992 MPa	υ_e = 0.45
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 2,078,190 k_2 = 0.0337 r^2= 0.294	k_3 = 2,334,254 k_4 = -0.1906 k_5 = 0.2556 r^2= 0.408	Ga = 452,176 kPa Ka = 2,039,021 kPa n = 0.5606 r^2= 0.395	Ga = 411,113 kPa Ka = 4,129,230 kPa n = 0.5358 β = -0.0421 m = 0.7686 $r^2\varepsilon_v$= 0.409 $r^2\varepsilon_s$= 0.733
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 2024 MPa	Mr_c= 2856 MPa	ε_{vc}= 6 ε_{sc}= 15 Mr_c= 2732 MPa υ_c= 0.21	ε_{vc}= 3 ε_{sc}= 17 Mr_c= 2665 MPa υ_c= 0.36



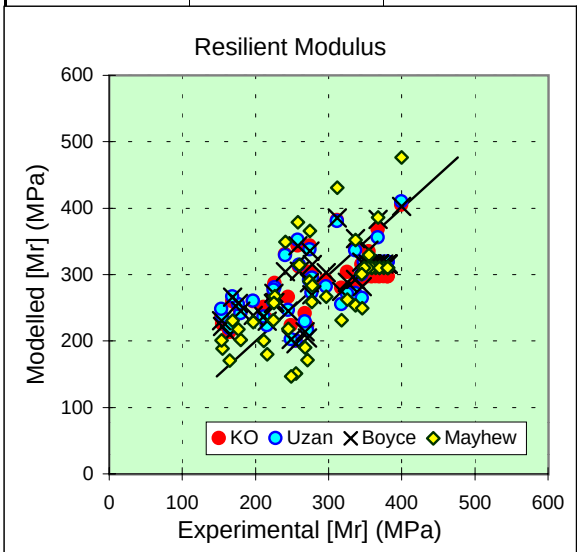


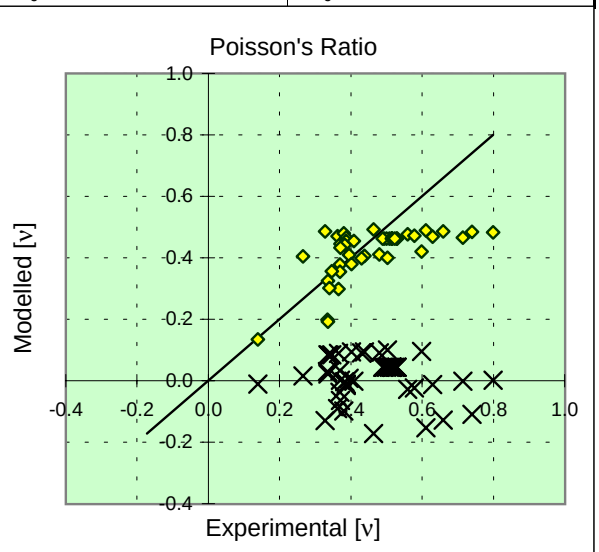


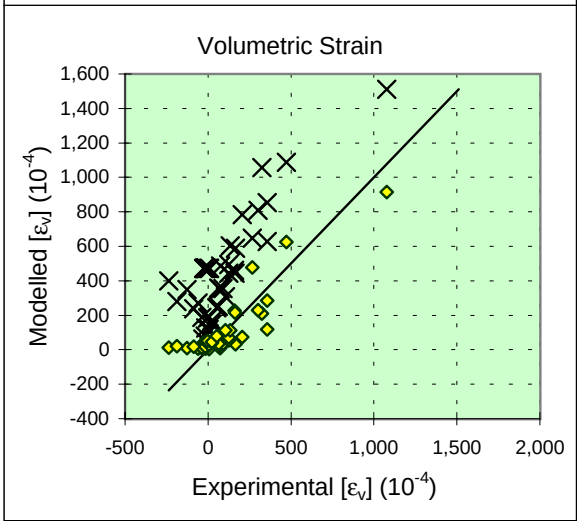


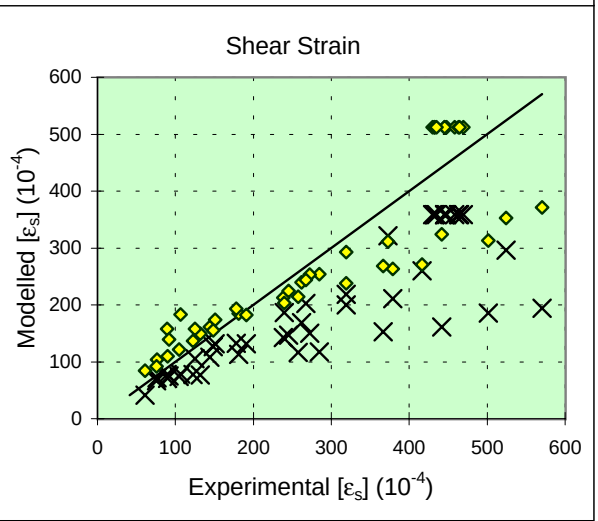
TP-I : UNOT ***Soft Limestone (CCT)*** ***90% Percentile Data***

Experimental Data	Sample Size: 46	p*= 80 kPa @	ω = 3.5%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 258 MPa	υ_e = 0.47
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 218,093	k_3 = 315,152	Ga = 87,751 kPa	Ga = 66,003 kPa
	k_2 = 0.3321	k_4 = 0.2448	Ka = 40,854 kPa	Ka = 593,175 kPa
		k_5 = 0.1072	n = 0.2866	n = -0.1283
				β = 0.5771
				m = 2.6153
	r^2= 0.444	r^2= 0.463	r^2= 0.503	$r^2\varepsilon_v$= 0.670 $r^2\varepsilon_s$= 0.655
Characteristic Values	At p_1= 6 kPa		p_2 = 15 kPa and	q_1= 4 kPa q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 324 ε_{sc}= 126	ε_{vc}= 1 ε_{sc}= 366
	Mr_c= 168 MPa	Mr_c= 186 MPa	Mr_c= 156 MPa	Mr_c= 136 MPa
			υ_c= **-0.40**	υ_c= 0.50







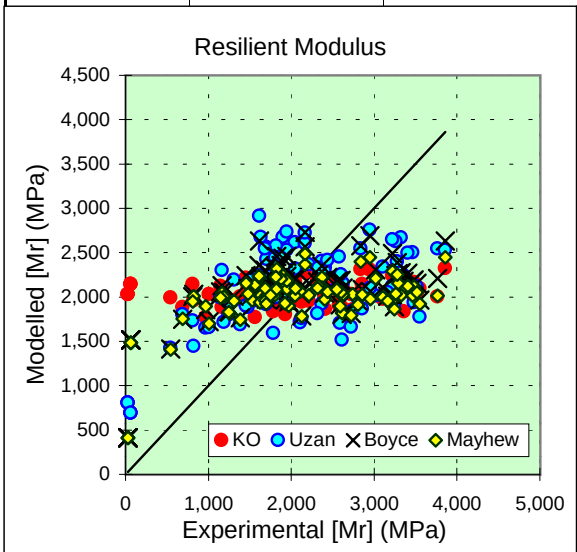


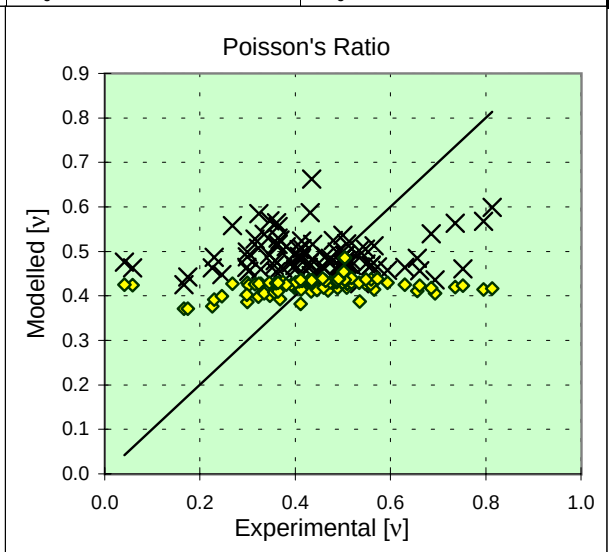
TP-I : LRSB ***Sort Limestone (CCT)*** ***90% Percentile Data***

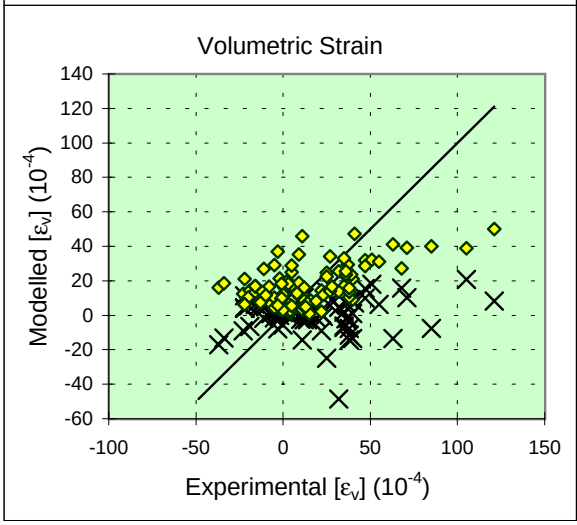
Experimental Data	Sample Size: 93	p*= 80 kPa @	ω = 3.5%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 1,861 MPa	υ_e = 0.44

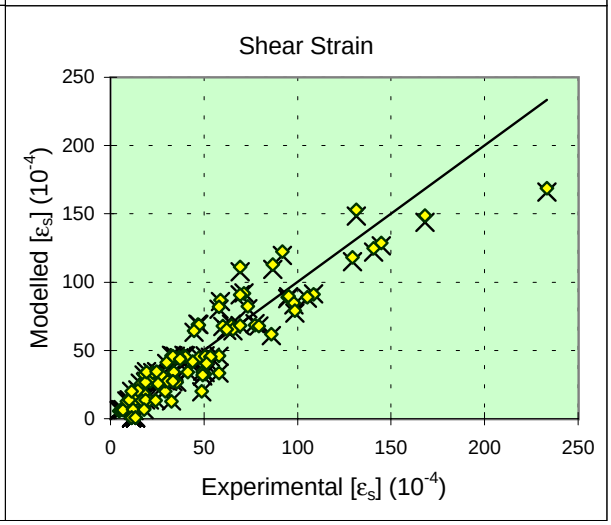
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 1,824,217	k_3 = 2,231,161	Ga = 403,892 kPa	Ga = 404,966 kPa
	k_2 = 0.1072	k_4 = -0.1286	Ka = 4,238,002 kPa	Ka = 3,180,590 kPa
		k_5 = 0.2537	n = 0.4852	n = 0.5167
				β = -0.0279
				m = 0.5946
	r^2= 0.300	r^2= 0.426	r^2= 0.413	$r^2\varepsilon_v$= 0.407 $r^2\varepsilon_s$= 0.733

Characteristic Values				
	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 2 ε_{sc}= 19	ε_{vc}= 5 ε_{sc}= 18
	Mr_c= 1678 MPa	Mr_c= 2433 MPa	Mr_c= 2480 MPa	Mr_c= 2436 MPa
			υ_c= 0.41	υ_c= 0.30







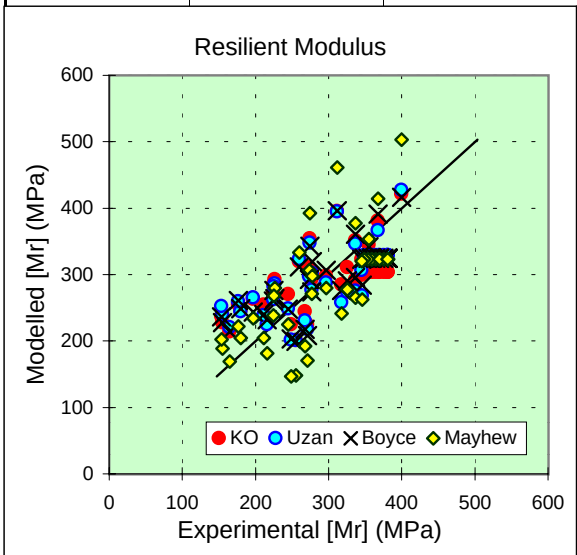


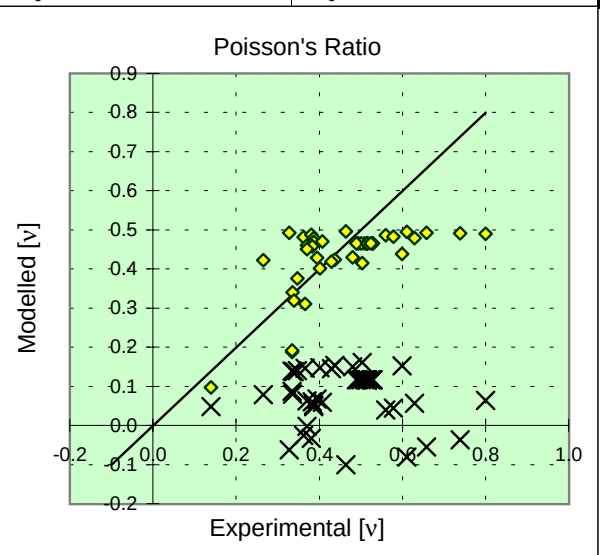
TP-I : UNOT ***Soft Limestone (CCT)*** ***85% Percentile Data***

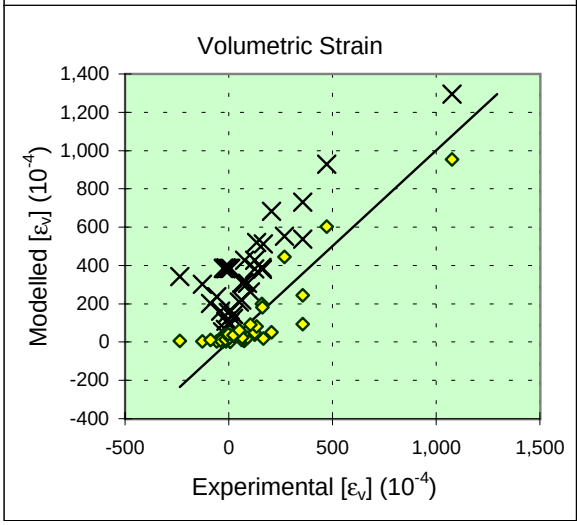
Experimental Data	Sample Size: 43	p*= 80 kPa @	ω = 3.5%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 262 MPa	υ_e = 0.47

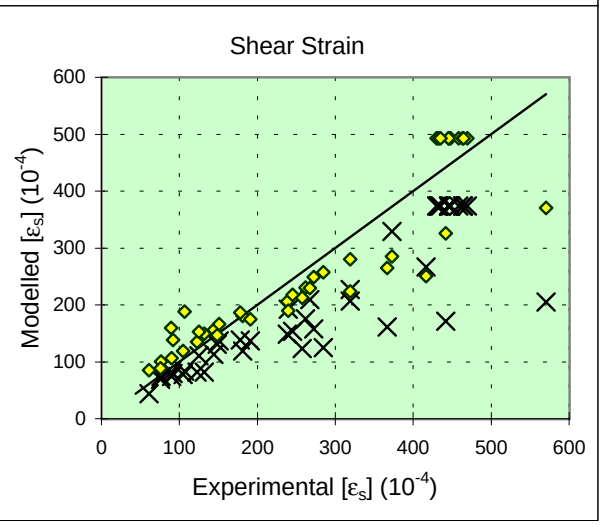
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 219,617	k_3 = 323,885	Ga = 84,484 kPa	Ga = 69,184 kPa
	k_2 = 0.3491	k_4 = 0.2527	Ka = 44,406 kPa	Ka = 796,838 kPa
		k_5 = 0.1197	n = 0.2678	n = -0.1801
				β = 0.5035
				m = 2.9935
	r^2= 0.475	r^2= 0.503	r^2= 0.535	$r^2\varepsilon_v$= 0.683 $r^2\varepsilon_s$= 0.703

Characteristic Values	At p_1= 6 kPa		p_2 = 15 kPa and	q_1= 4 kPa q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 288 ε_{sc}= 136	ε_{vc}= 0 ε_{sc}= 385
	Mr_c= 167 MPa	Mr_c= 187 MPa	Mr_c= 162 MPa	Mr_c= 129 MPa
			υ_c= **-0.34**	υ_c= 0.50



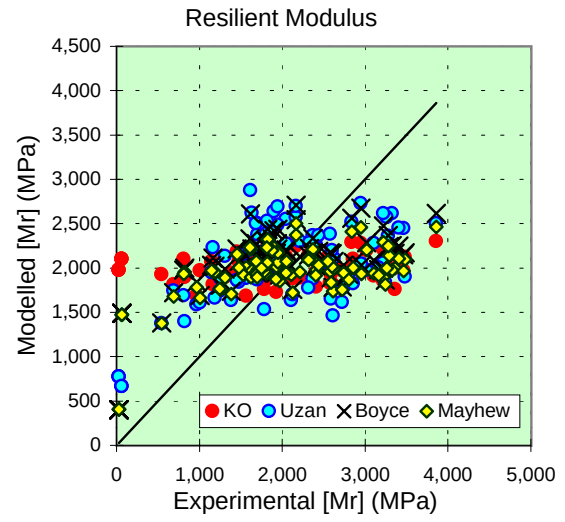


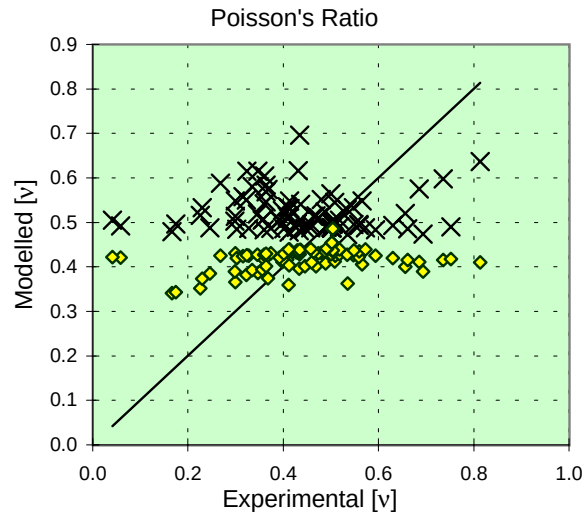


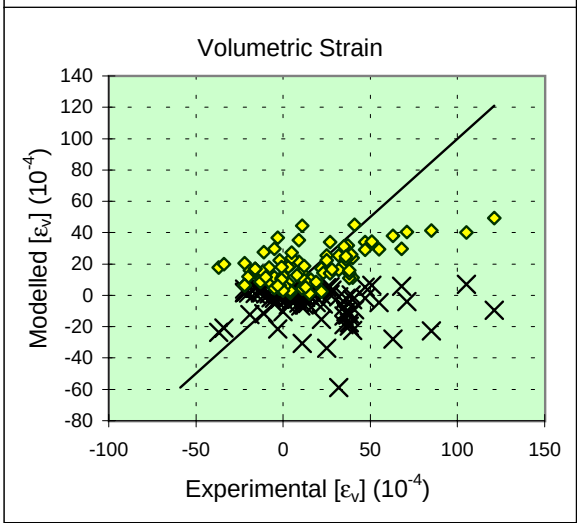


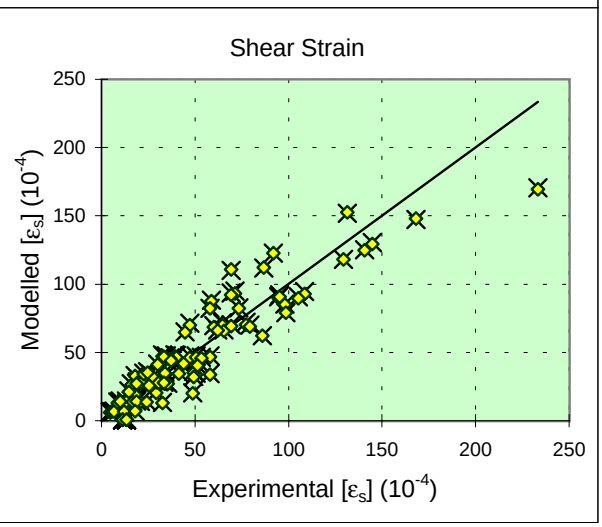
TP-I : LRSB ***Sort Limestone (CCT)*** ***85% Percentile Data***

Experimental Data	Sample Size: 90	p*= 80 kPa @ ω = 3.5%		p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa	Mr_e= 1,799 MPa		υ_e = 0.44
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 1,746,784	k_3 = 2,178,532	Ga = 391,128 kPa	Ga = 398,255 kPa
	k_2 = 0.1221	k_4 = -0.1223	Ka = 9,548,497 kPa	Ka = 2,307,265 kPa
		k_5 = 0.2587	n = 0.4781	n = 0.4980
				β = -0.0269
				m = 0.4266
	r^2= 0.302	r^2= 0.438	r^2= 0.424	$r^2\varepsilon_v$= 0.410 $r^2\varepsilon_s$= 0.737
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 1588 MPa	Mr_c= 2340 MPa	ε_{vc}= 0 ε_{sc}= 20	ε_{vc}= 7 ε_{sc}= 19
			Mr_c= 2521 MPa	Mr_c= 2200 MPa
			υ_c= 0.50	υ_c= 0.24







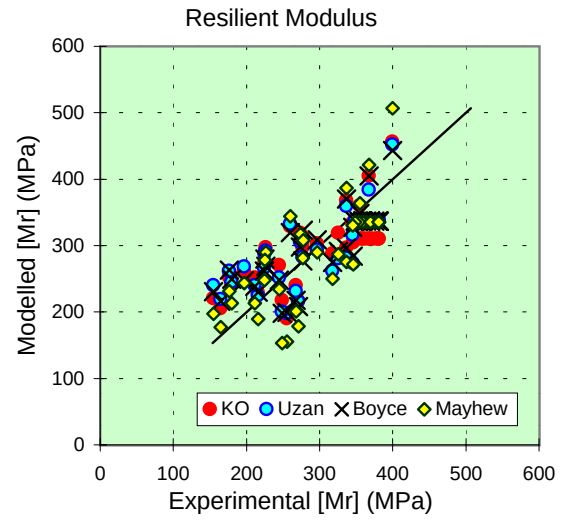


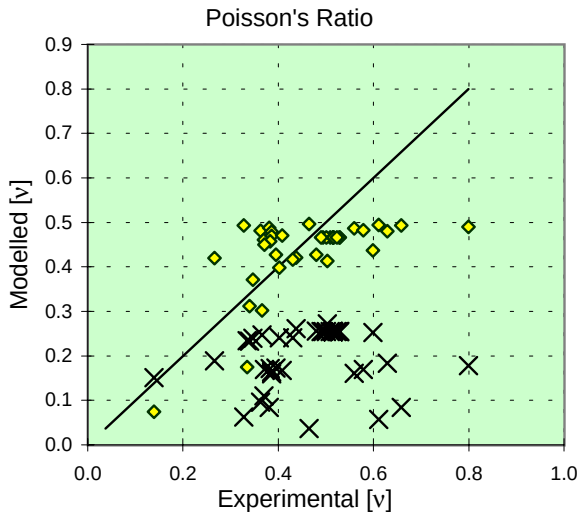
TP-I : UNOT ***Soft Limestone (CCT)*** ***80% Percentile Data***

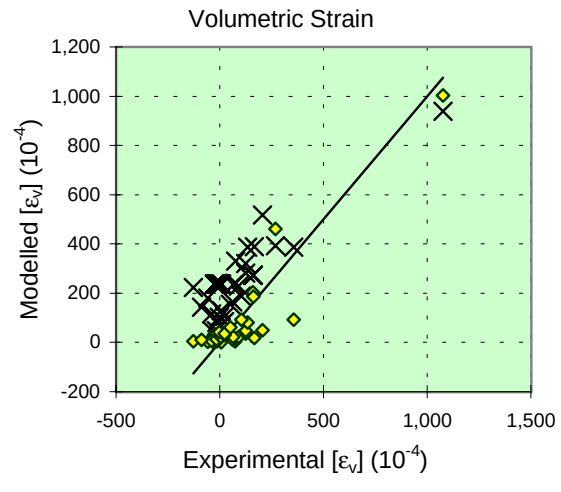
Experimental Data	Sample Size: 40	p*= 80 kPa @	ω = 3.5%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 266 MPa	υ_e = 0.46

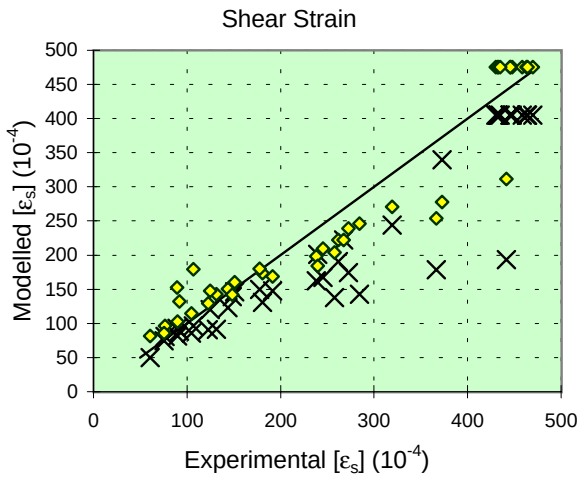
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 211,286	k_3 = 333,963	Ga = 78,692 kPa	Ga = 71,634 kPa
	k_2 = 0.4129	k_4 = 0.2827	Ka = 48,650 kPa	Ka = 801,557 kPa
		k_5 = 0.1235	n = 0.2151	n = -0.1709
				β = 0.5224
				m = 3.0802
	r^2= 0.503	r^2= 0.541	r^2= 0.570	$r^2\varepsilon_v$= 0.697 $r^2\varepsilon_s$= 0.777

Characteristic Values	At p_1= 6 kPa		p_2 = 15 kPa and	q_1= 4 kPa q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 232 ε_{sc}= 161	ε_{vc}= 0 ε_{sc}= 365
	Mr_c= 153 MPa	Mr_c= 182 MPa	Mr_c= 167 MPa	Mr_c= 136 MPa
			υ_c= **-0.19**	υ_c= 0.50







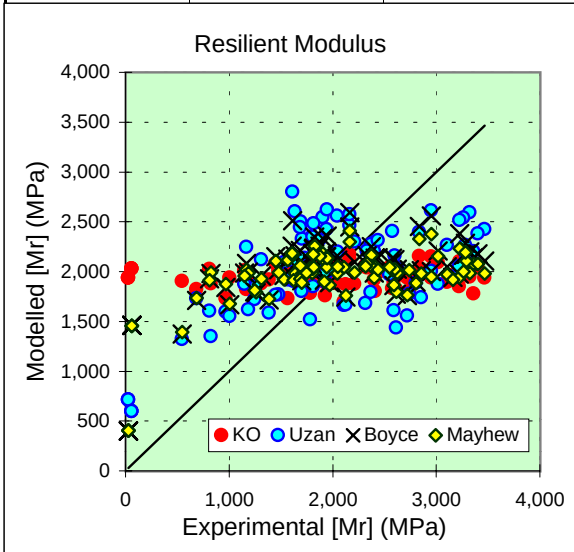


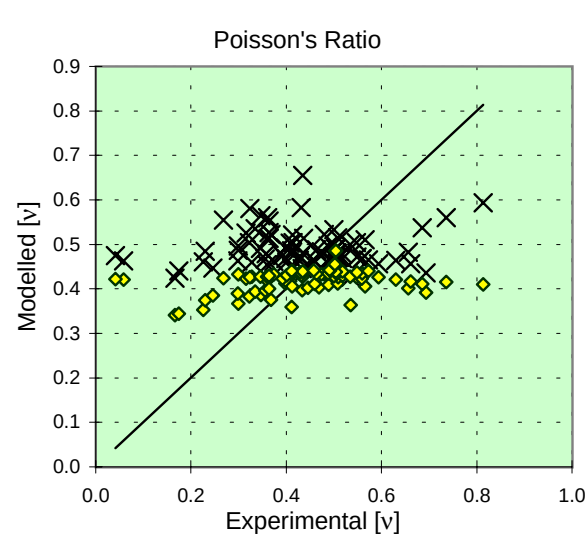
TP-I : LRSB ***Sort Limestone (CCT)*** ***80% Percentile Data***

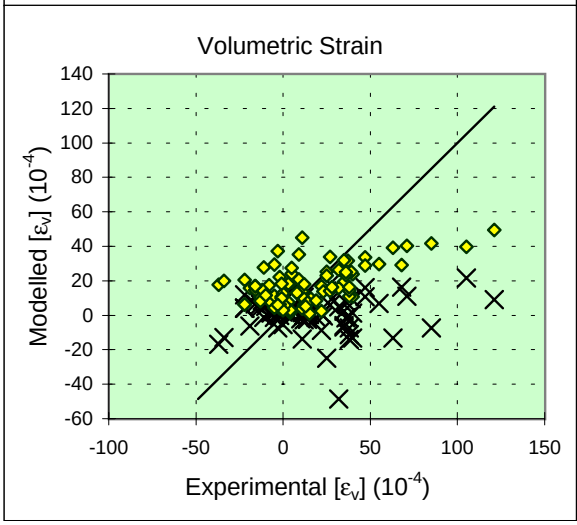
Experimental Data	Sample Size: 87	p*= 80 kPa @	ω = 3.5%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 1,755 MPa	υ_e = 0.44

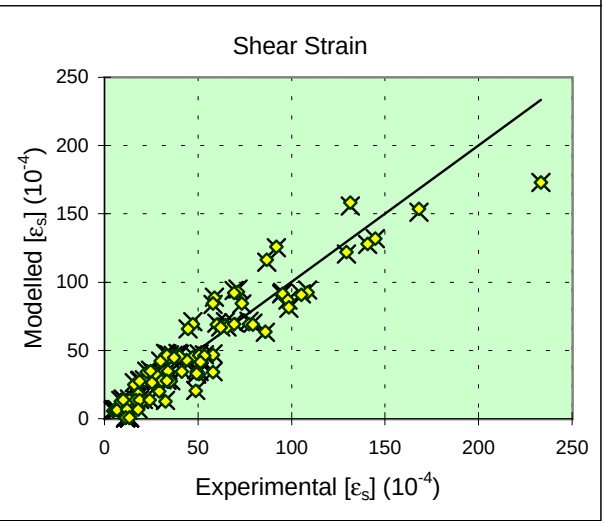
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 1,772,817	k_3 = 2,133,659	Ga = 391,257 kPa	Ga = 399,286 kPa
	k_2 = 0.0884	k_4 = -0.1636	Ka = 4,198,105 kPa	Ka = 2,509,937 kPa
		k_5 = 0.2745	n = 0.5008	n = 0.5331
				β = -0.0373
				m = 0.4635
	r^2= 0.298	r^2= 0.452	r^2= 0.427	$r^2\varepsilon_v$= 0.404 $r^2\varepsilon_s$= 0.749

Characteristic Values				
	At p_1= 6 kPa		p_2 = 15 kPa and	q_1= 4 kPa q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 2 ε_{sc}= 19	ε_{vc}= 6 ε_{sc}= 17
	Mr_c= 1655 MPa	Mr_c= 2453 MPa	Mr_c= 2470 MPa	Mr_c= 2360 MPa
			υ_c= 0.41	υ_c= 0.24



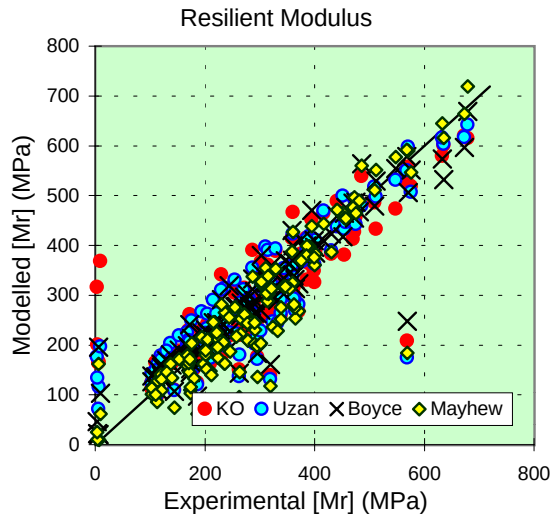


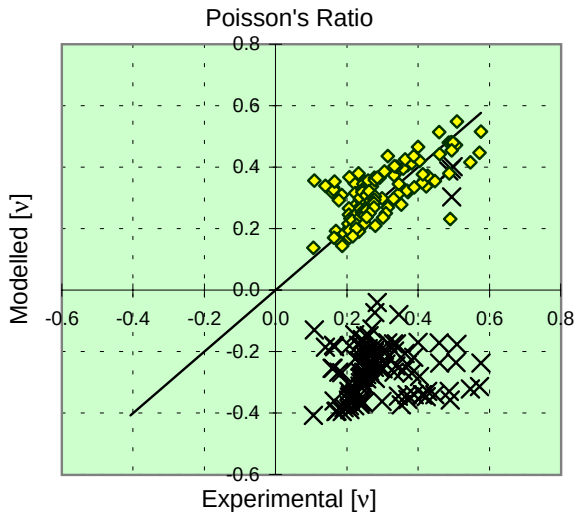


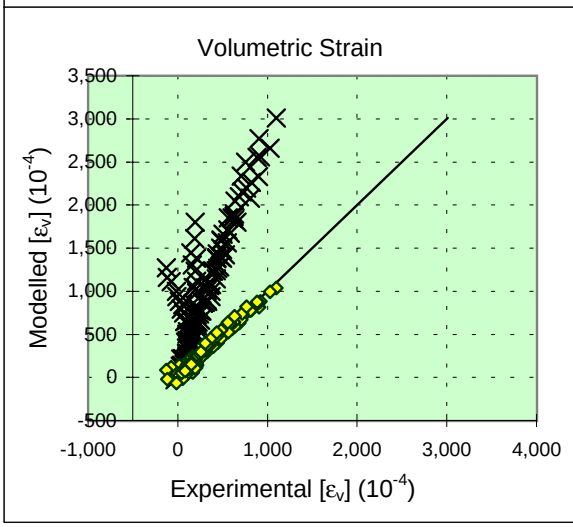


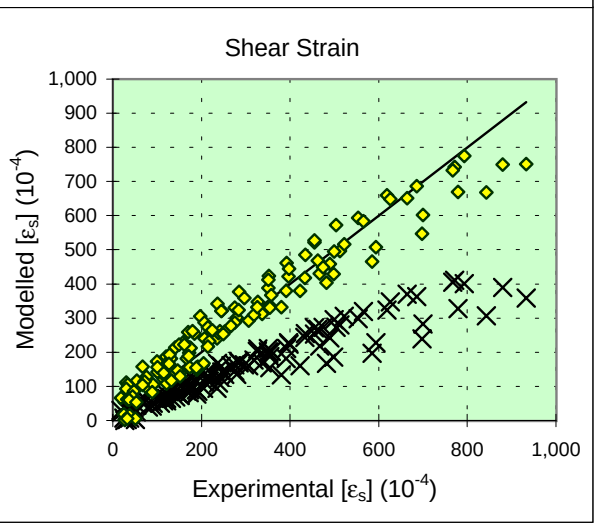
TP-I : LRSB ***Microgranite (MIG)*** ***100% Percentile Data***

Experimental Data	Sample Size: 126	p*= 27 kPa @ ω = 3.3%		p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 235 MPa	υ_e = 0.28
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 133,321 k_2 = 0.6716 r^2= 0.611	k_3 = 290,773 k_4 = 0.4896 k_5 = 0.1570 r^2= 0.670	Ga = 164,617 kPa Ka = 13,531 kPa n = 0.1543 r^2= 0.743	Ga = 81,478 kPa Ka = 38,124 kPa n = -0.0181 β = 0.0595 m = 0.1668 $r^2\varepsilon_v$= 0.858 $r^2\varepsilon_s$= 0.817
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 79 MPa	Mr_c= 105 MPa	ε_{vc}= 691 ε_{sc}= 195 Mr_c= 82 MPa υ_c= **-0.52**	ε_{vc}= 91 ε_{sc}= 543 Mr_c= 83 MPa υ_c= 0.36



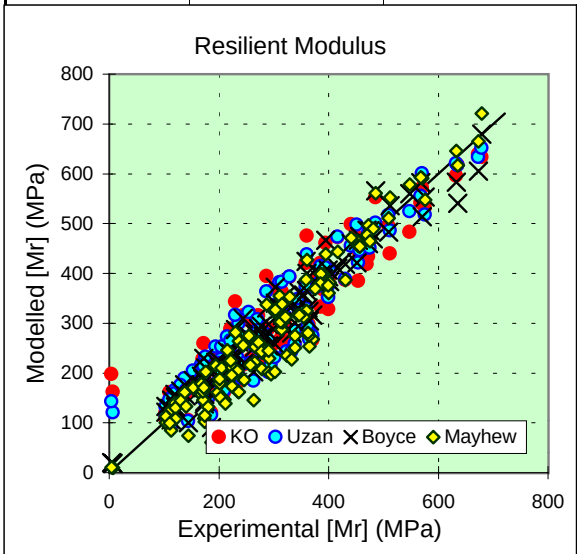


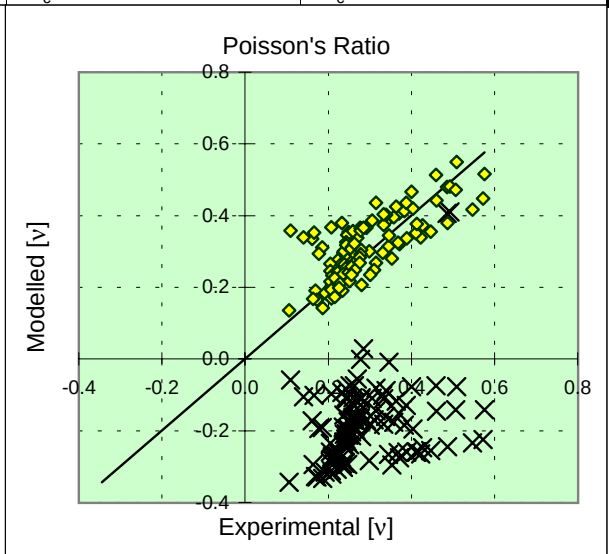


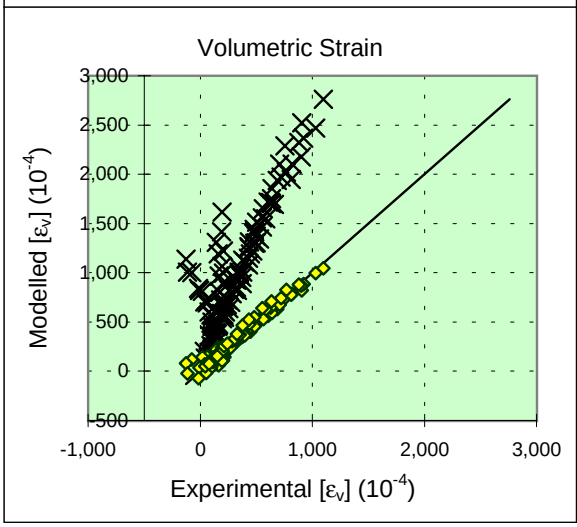


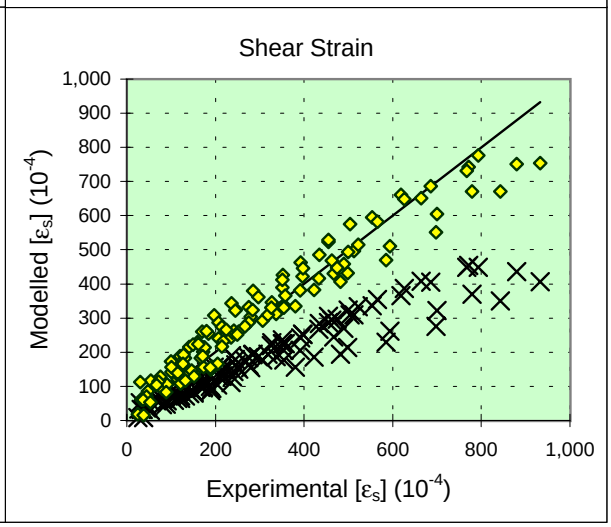
TP-I : LRSB ***Microgranite (MIG)*** ***95% Percentile Data***

Experimental Data	Sample Size: 119	p*= 27 kPa @ ω = 3.3%		p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 233 MPa	υ_e = 0.27
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 129,308	k_3 = 284,410	Ga = 145,882 kPa	Ga = 81,272 kPa
	k_2 = 0.6979	k_4 = 0.5622	Ka = 11,849 kPa	Ka = 38,788 kPa
		k_5 = 0.1217	n = 0.1240	n = -0.0238
				β = 0.0608
				m = 0.1705
	r^2= 0.731	r^2= 0.763	r^2= 0.831	$r^2\varepsilon_v$= 0.858 $r^2\varepsilon_s$= 0.815
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 666 ε_{sc}= 232	ε_{vc}= 90 ε_{sc}= 550
	Mr_c= 75 MPa	Mr_c= 92 MPa	Mr_c= 79 MPa	Mr_c= 83 MPa
			υ_c= **-0.44**	υ_c= 0.37







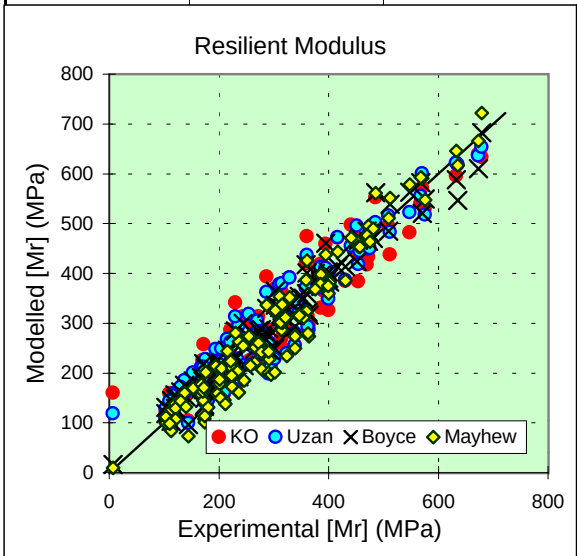


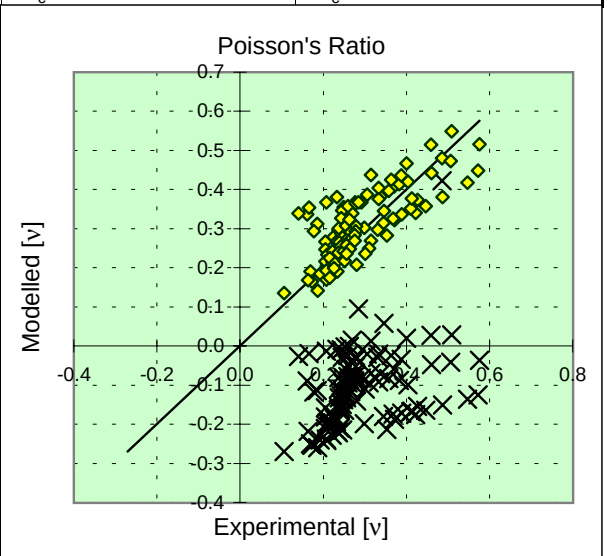
TP-I : LRSB ***Microgranite (MIG)*** ***90% Percentile Data***

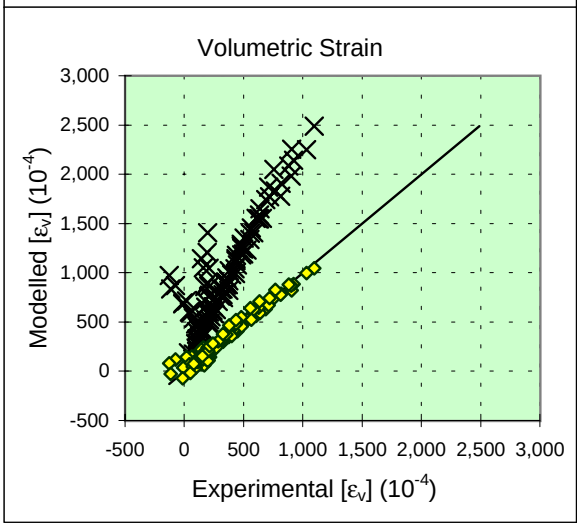
Experimental Data	Sample Size: 113	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 231 MPa	υ_e = 0.27

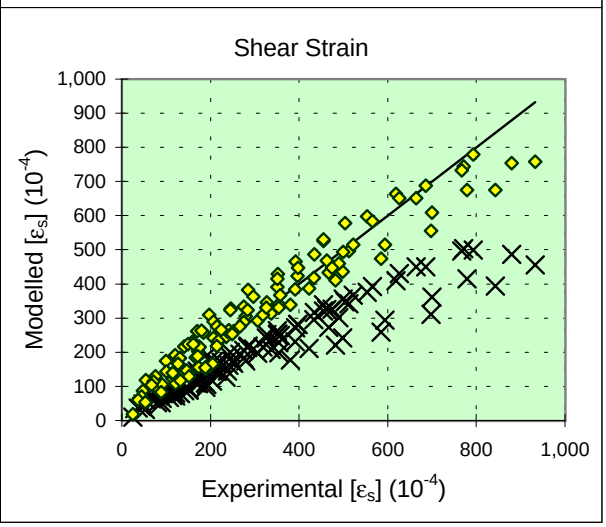
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 127,474	k_3 = 280,902	Ga = 130,504 kPa	Ga = 80,878 kPa
	k_2 = 0.7044	k_4 = 0.5770	Ka = 11,593 kPa	Ka = 38,072 kPa
		k_5 = 0.1202	n = 0.1100	n = -0.0284
				β = 0.0599
				m = 0.1673
	r^2= 0.756	r^2= 0.788	r^2= 0.844	$r^2\varepsilon_v$= 0.856 $r^2\varepsilon_s$= 0.816

Characteristic Values	At	p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**		**Mayhew**	
			ε_{vc}= 608	ε_{sc}= 267	ε_{vc}= 91	ε_{sc}= 558
	Mr_c= 74 MPa	Mr_c= 88 MPa	Mr_c= 79 MPa		Mr_c= 81 MPa	
			υ_c= **-0.36**		υ_c= 0.37	







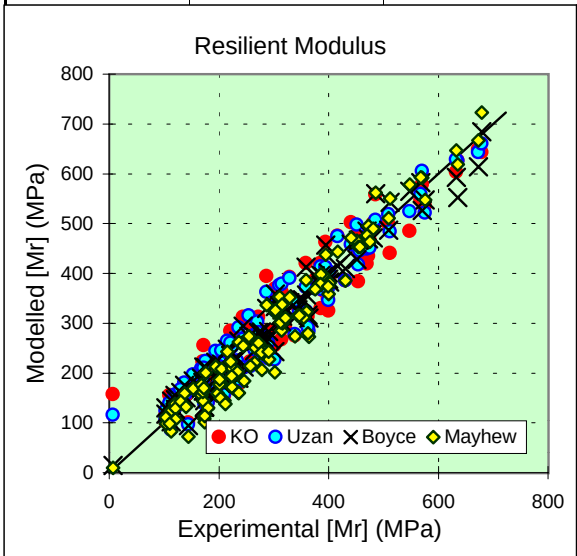


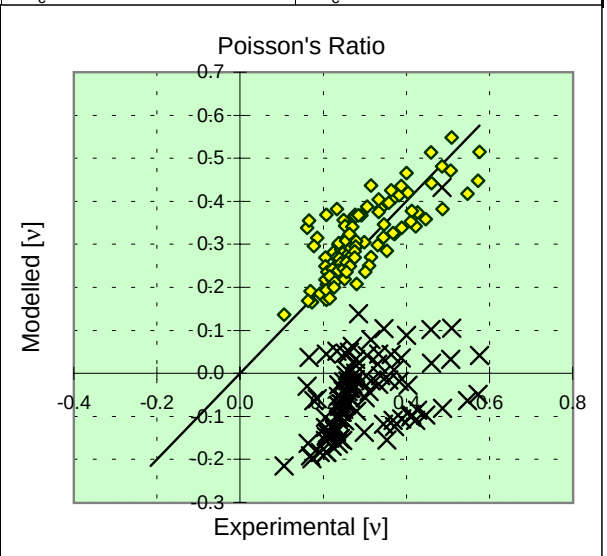
TP-I : LRSB ***Microgranite (MIG)*** ***85% Percentile Data***

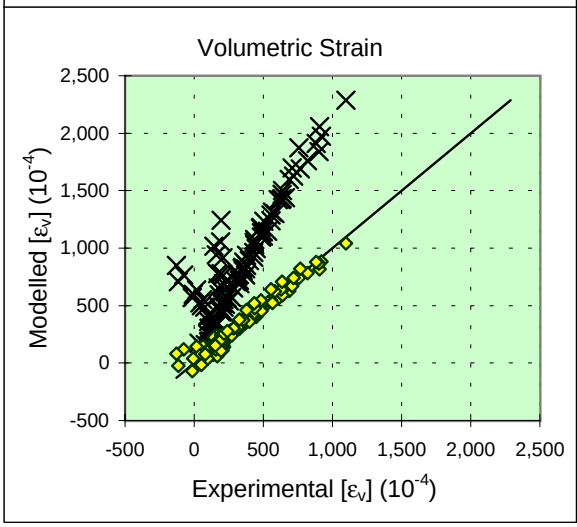
Experimental Data	Sample Size: 107	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 226 MPa	υ_e = 0.28

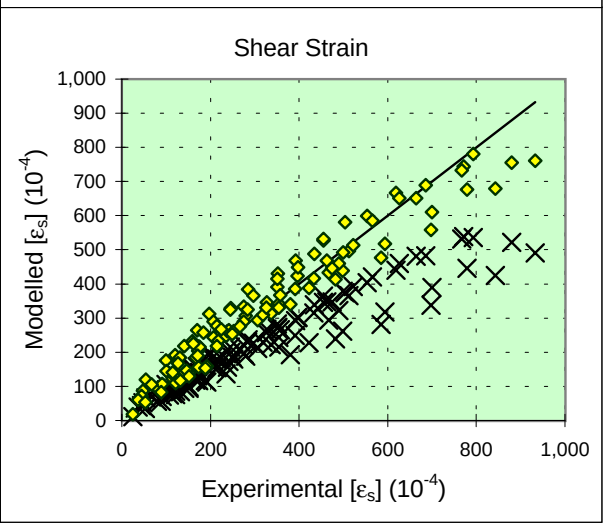
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 124,098	k_3 = 278,076	Ga = 121,339 kPa	Ga = 80,646 kPa
	k_2 = 0.7226	k_4 = 0.5963	Ka = 11,550 kPa	Ka = 38,760 kPa
		k_5 = 0.1190	n = 0.1012	n = -0.0323
				β = 0.0605
				m = 0.1698
	r^2= 0.780	r^2= 0.813	r^2= 0.855	$r^2\varepsilon_v$= 0.847 $r^2\varepsilon_s$= 0.818

Characteristic Values	At	p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**		**Mayhew**	
			ε_{vc}= 560	ε_{sc}= 292	ε_{vc}= 90	ε_{sc}= 564
	Mr_c= 71 MPa	Mr_c= 84 MPa	Mr_c= 80 MPa		Mr_c= 81 MPa	
			υ_c= **-0.30**		υ_c= 0.37	







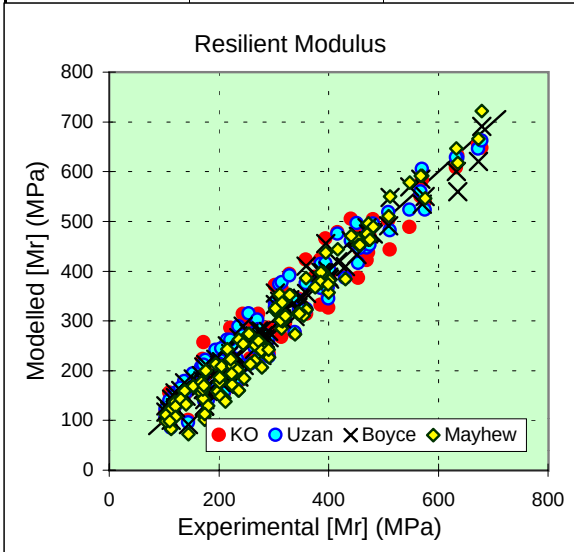


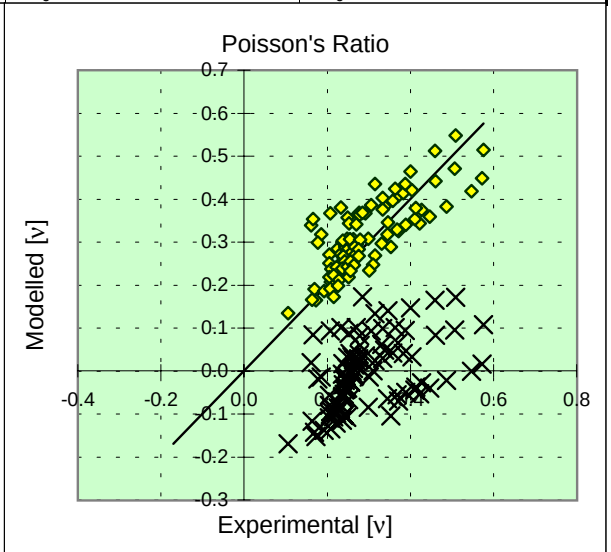
TP-I : LRSB ***Microgranite (MIG)*** ***80% Percentile Data***

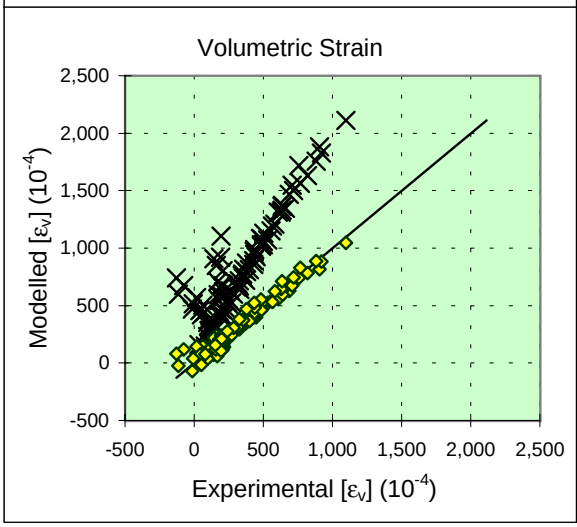
Experimental Data	Sample Size: 101	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 221 MPa	υ_e = 0.28

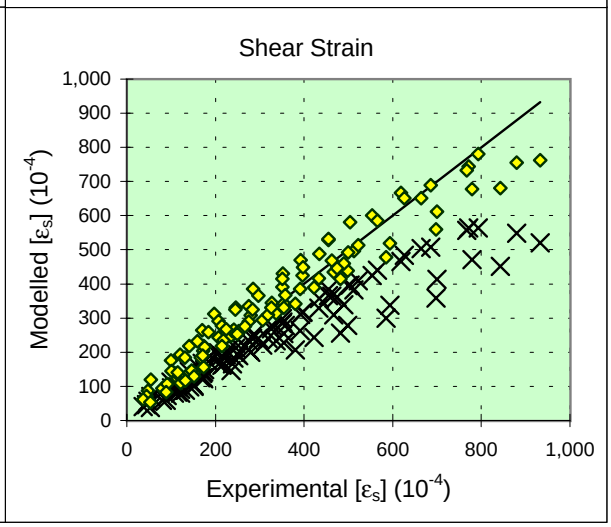
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 124,001	k_3 = 277,192	Ga = 114,963 kPa	Ga = 80,560 kPa
	k_2 = 0.7265	k_4 = 0.6082	Ka = 11,175 kPa	Ka = 42,197 kPa
		k_5 = 0.1121	n = 0.0908	n = -0.0338
				β = 0.0657
				m = 0.1865
	r^2= 0.803	r^2= 0.833	r^2= 0.866	$r^2\varepsilon_v$= 0.844 $r^2\varepsilon_s$= 0.816

Characteristic Values	At	p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**		**Mayhew**	
			ε_{vc}= 519	ε_{sc}= 314	ε_{vc}= 88	ε_{sc}= 566
	Mr_c= 70 MPa	Mr_c= 83 MPa	Mr_c= 80 MPa		Mr_c= 81 MPa	
			υ_c= **-0.24**		υ_c= 0.37	









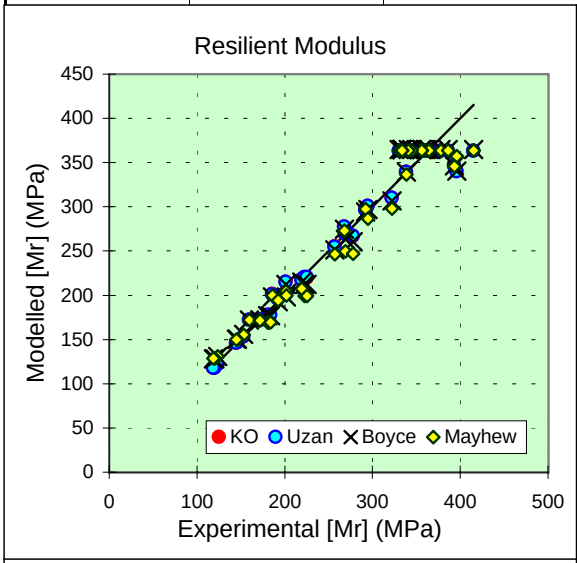
Appendix G.2 RESULTS OF TEST PROGRAMME II FOR SUBGRADE SOILS AND UNBOUND GRANULAR MATERIALS (PHASE 2)

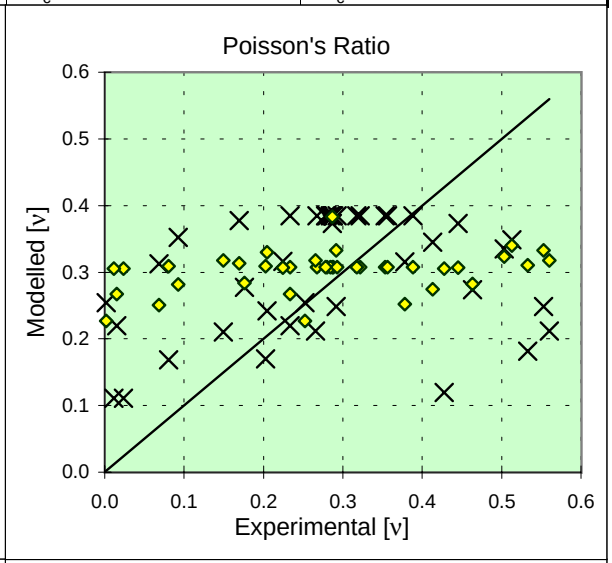
TP-II : LNEC ***Microgranite MIG*** ***100% Percentile Data***

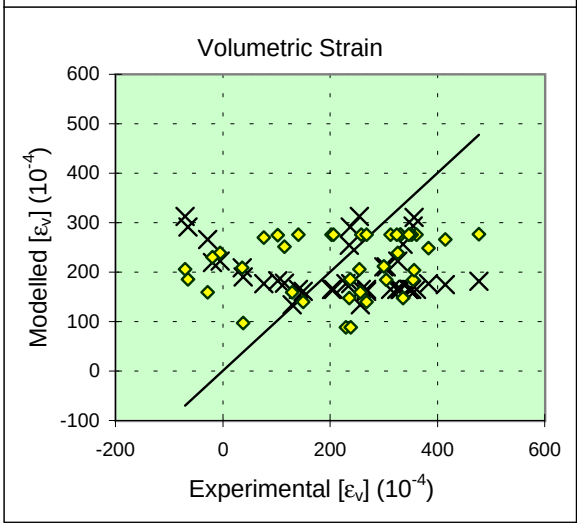
Experimental Data	Sample Size: 41	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 161 MPa	υ_e = 0.23

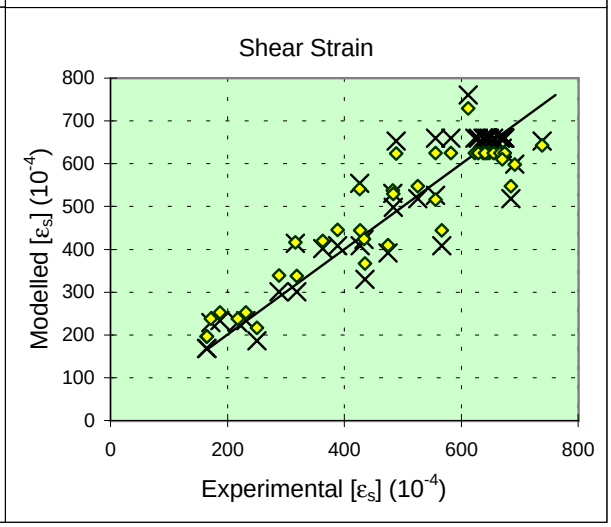
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 139,915	k_3 = 294,384	Ga = 85,009 kPa	Ga = 86,206 kPa
	k_2 = 0.6738	k_4 = 0.6814	Ka = 29,970 kPa	Ka = 93,369 kPa
		k_5 = -0.0062	n = 0.1830	n = 0.0565
				β = 0.1796
				m = 1.0166
	r^2= 0.852	r^2= 0.852	r^2= 0.847	$r^2\varepsilon_v$= 0.310 $r^2\varepsilon_s$= 0.741

Characteristic Values	At	p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**		**Mayhew**	
			ε_{vc}= 273	ε_{sc}= 357	ε_{vc}= 51	ε_{sc}= 446
	Mr_c= 83 MPa	Mr_c= 82 MPa	Mr_c= 96 MPa		Mr_c= 105 MPa	
			υ_c= 0.03		υ_c= 0.40	





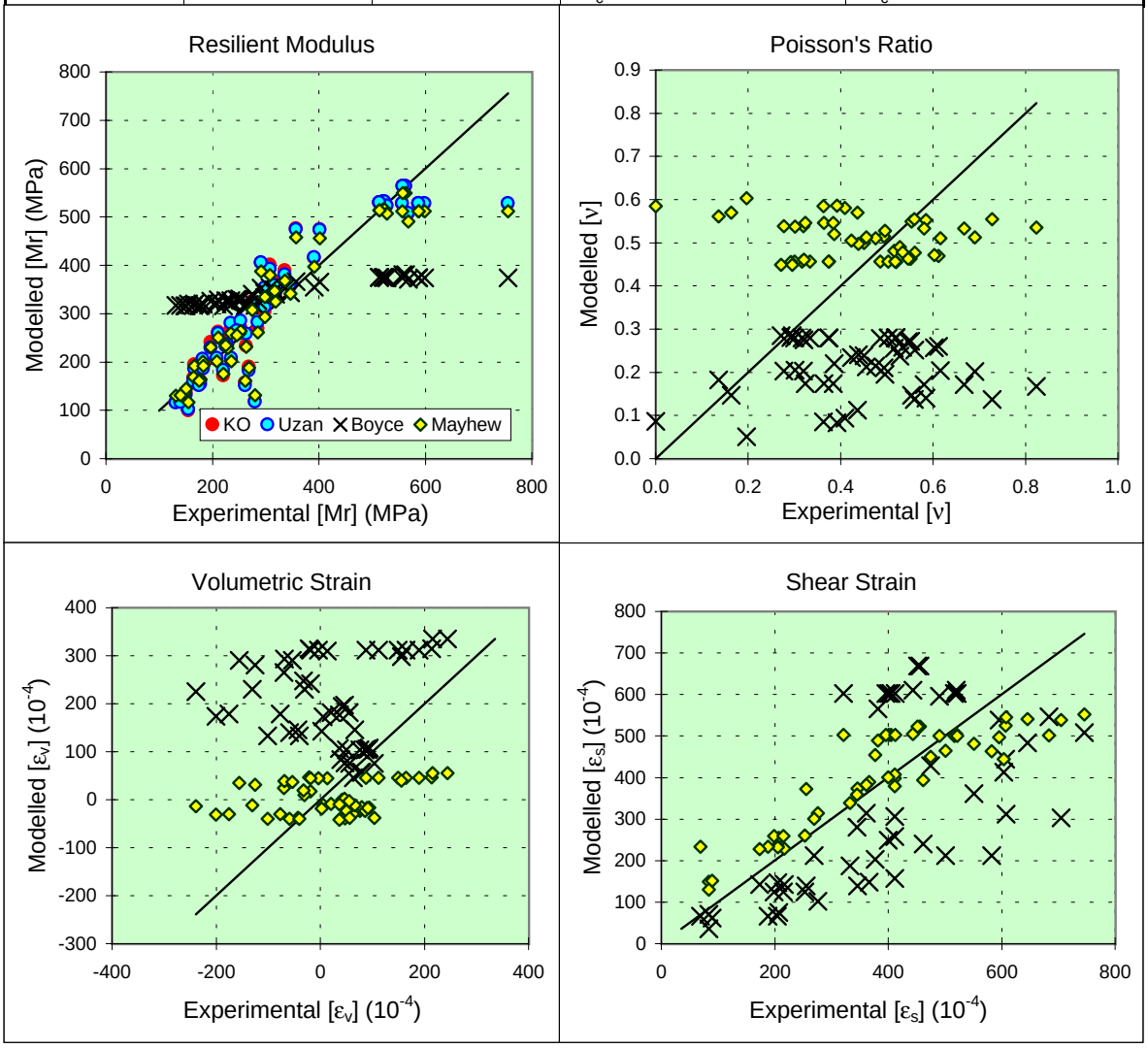




TP-II : LNEC ***Microgranite MIG*** ***100% Percentile Data***

Experimental Data	Sample Size: 52	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 197 MPa	υ_e = 0.43

	kθ	**Uzan**	**Boyce**	**Mayhew**
Modelled Data	k_1 = 148,369 k_2 = 0.8902 r^2= 0.729	k_3 = 417,563 k_4 = 1.0396 k_5 = -0.1075 r^2= 0.731	Ga = 110,277 kPa Ka = 133,000 kPa n = 0.6791 r^2= 0.387	Ga = 99,968 kPa Ka = 2,767 kPa n = -0.1821 β = -0.0018 m = -0.0034 $r^2\varepsilon_v$= 0.312 $r^2\varepsilon_s$= 0.652
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 74 MPa	Mr_c= 63 MPa	ε_{vc}= 87 ε_{sc}= 108 Mr_c= 311 MPa υ_c= 0.02	ε_{vc}= -7 ε_{sc}= 602 Mr_c= 83 MPa υ_c= 0.51

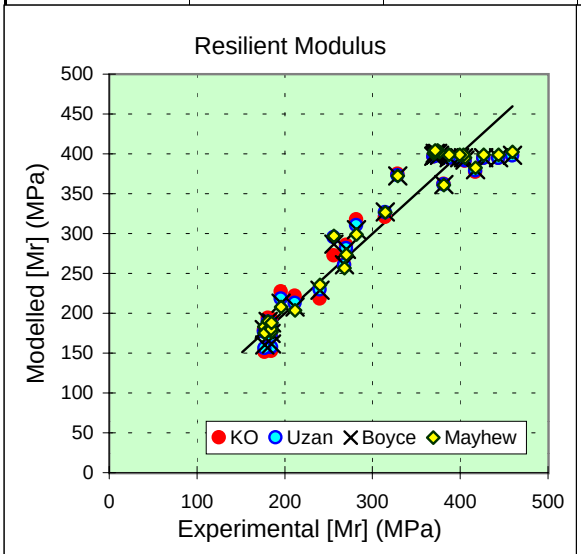


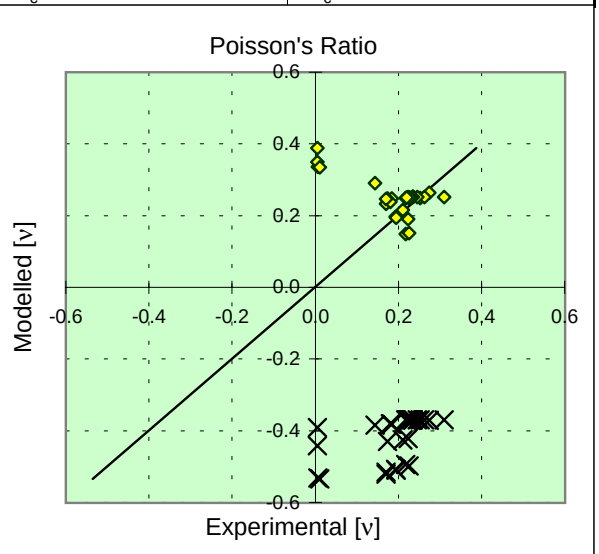
TP-II : LNEC ***Microgranite MIG*** ***100% Percentile Data***

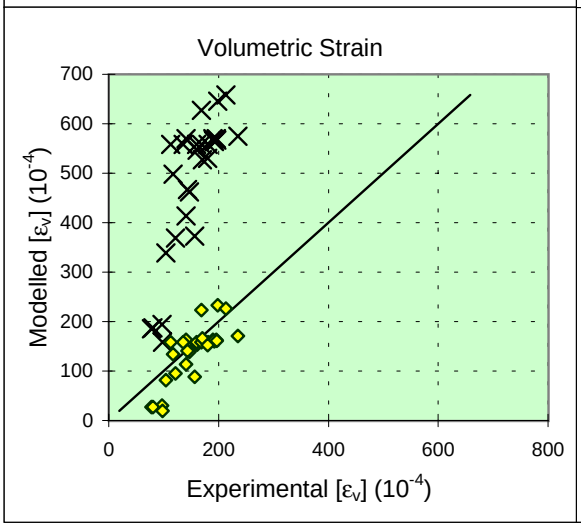
Experimental Data	Sample Size: 29	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 245 MPa	υ_e = 0.14

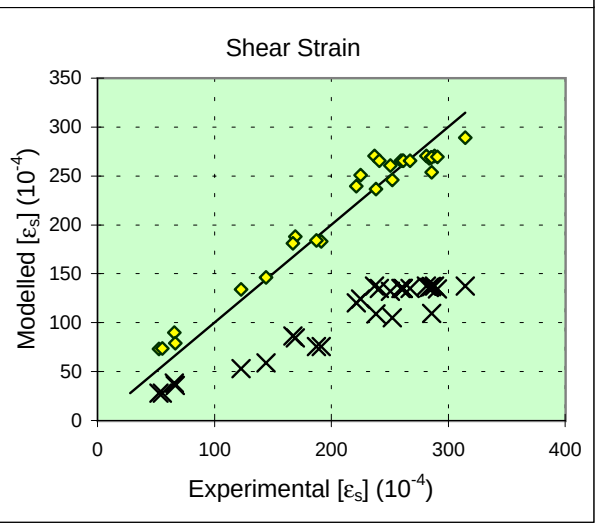
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 198,019	k_3 = 430,968	Ga = 259,430 kPa	Ga = 133,979 kPa
	k_2 = 0.6794	k_4 = 0.7985	Ka = 18,265 kPa	Ka = 50,092,289 kPa
		k_5 = -0.0912	n = 0.1973	n = -0.0052
				β = -66.6829
				m = -0.6012
	r^2= 0.800	r^2= 0.805	r^2= 0.814	$r^2\varepsilon_v$= 0.340 $r^2\varepsilon_s$= 0.843

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 117 MPa	Mr_c= 102 MPa	ε_{vc}= 609 ε_{sc}= 114	ε_{vc}= 673 ε_{sc}= 322
			Mr_c= 105 MPa	Mr_c= 69 MPa
			υ_c= **-0.64**	υ_c= **-0.33**



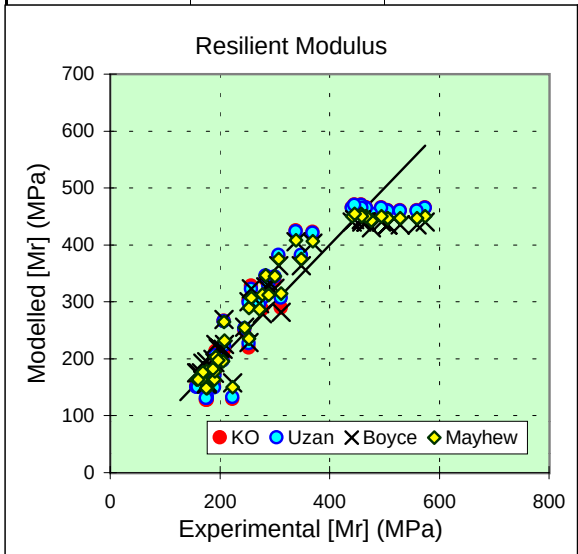


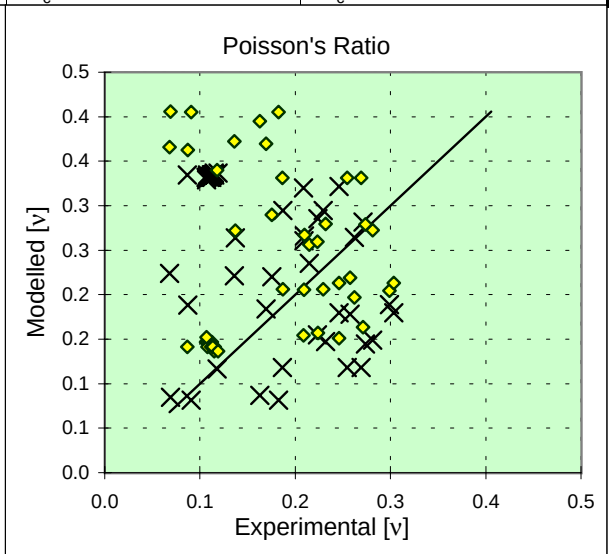


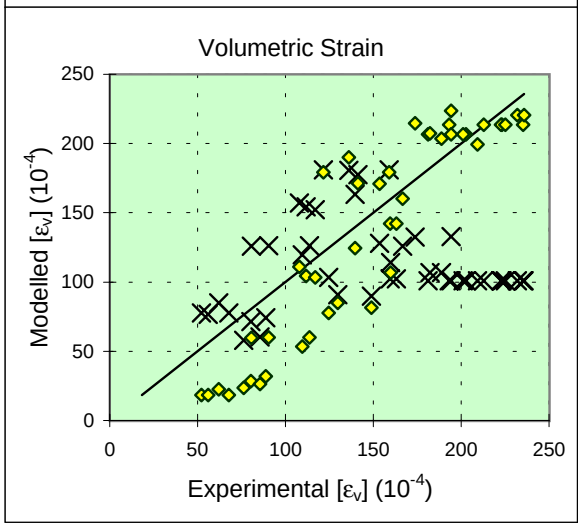


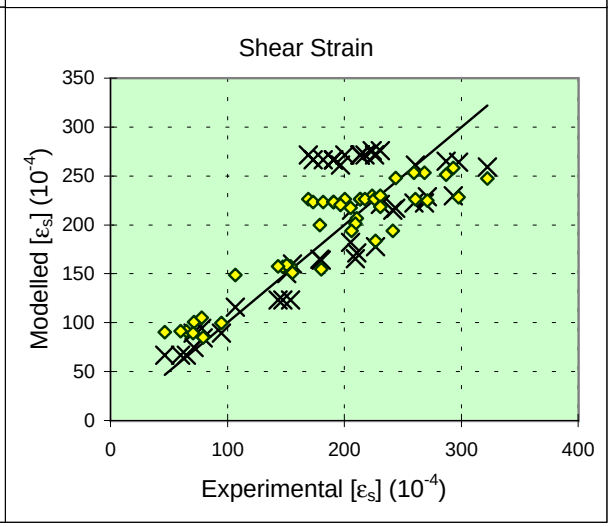
TP-II : LNEC ***Microgranite MIG*** ***100% Percentile Data***

Experimental Data	Sample Size: 45	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 249 MPa	υ_e = 0.19
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 183,658	k_3 = 500,378	Ga = 134,704 kPa	Ga = 164,104 kPa
	k_2 = 0.8877	k_4 = 0.9930	Ka = 15,085 kPa	Ka = 52,509,589 kPa
		k_5 = -0.0805	n = 0.0585	n = -0.2787
				β = -92.2197
				m = -0.1275
	r^2= 0.758	r^2= 0.760	r^2= 0.749	$r^2\varepsilon_v$= 0.550 $r^2\varepsilon_s$= 0.692
Characteristic Values	At p_1= 6 kPa		p_2 = 15 kPa and	q_1= 4 kPa q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 92 MPa	Mr_c= 82 MPa	ε_{vc}= 225 ε_{sc}= 285	ε_{vc}= 367 ε_{sc}= 440
			Mr_c= 119 MPa	Mr_c= 76 MPa
			υ_c= 0.02	υ_c= 0.00





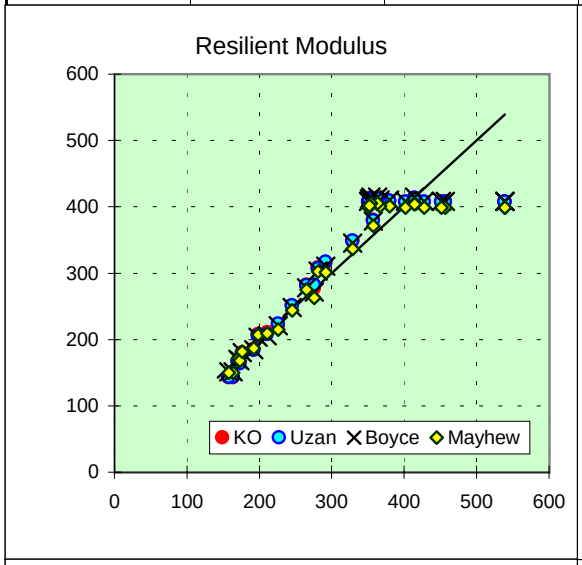


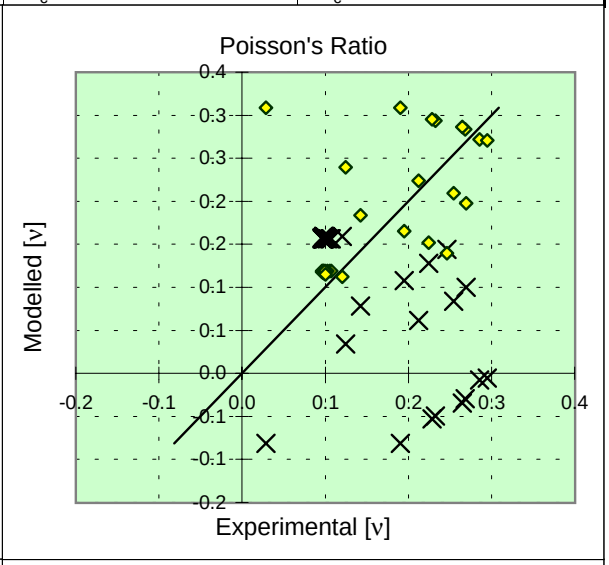


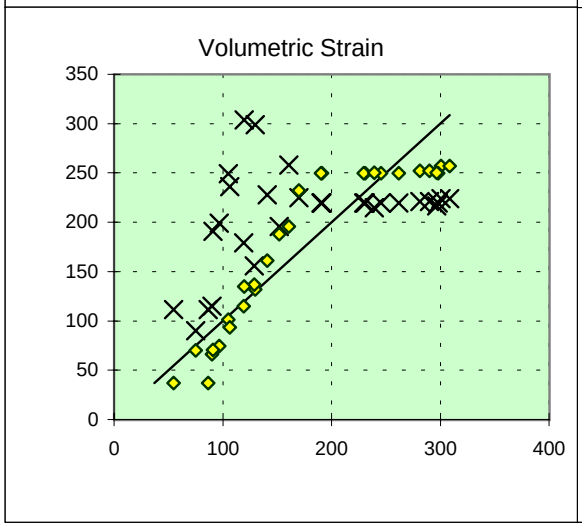
TP-II : LNEC ***Microgranite MIG*** ***100% Percentile Data***

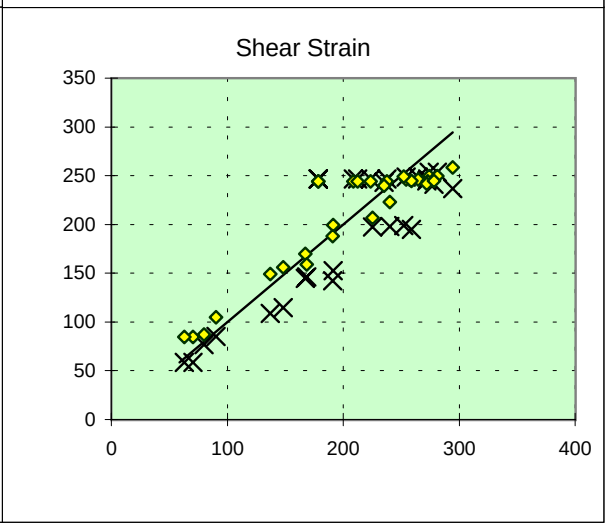
Experimental Data	Sample Size: 29	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 241 MPa	υ_e = 0.19

	kθ	**Uzan**	**Boyce**	**Mayhew**
Modelled Data	k_1 = 191,719 k_2 = 0.7283	k_3 = 430,795 k_4 = 0.7649 k_5 = -0.0281	Ga = 145,223 kPa Ka = 16,686 kPa n = 0.0944	Ga = 149,045 kPa Ka = 127,016 kPa n = -0.1635 β = 0.1014 m = 0.9764
	r^2= 0.711	r^2= 0.711	r^2= 0.714	$r^2\varepsilon_v$= 0.711 $r^2\varepsilon_s$= 0.723
	At p_1= 6 kPa		p_2 = 15 kPa and	q_1= 4 kPa q_2= 54 kPa
Characteristic Values	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 109 MPa	Mr_c= 104 MPa	ε_{vc}= 349 ε_{sc}= 247 Mr_c= 110 MPa υ_c= **-0.18**	ε_{vc}= 55 ε_{sc}= 390 Mr_c= 118 MPa υ_c= 0.38







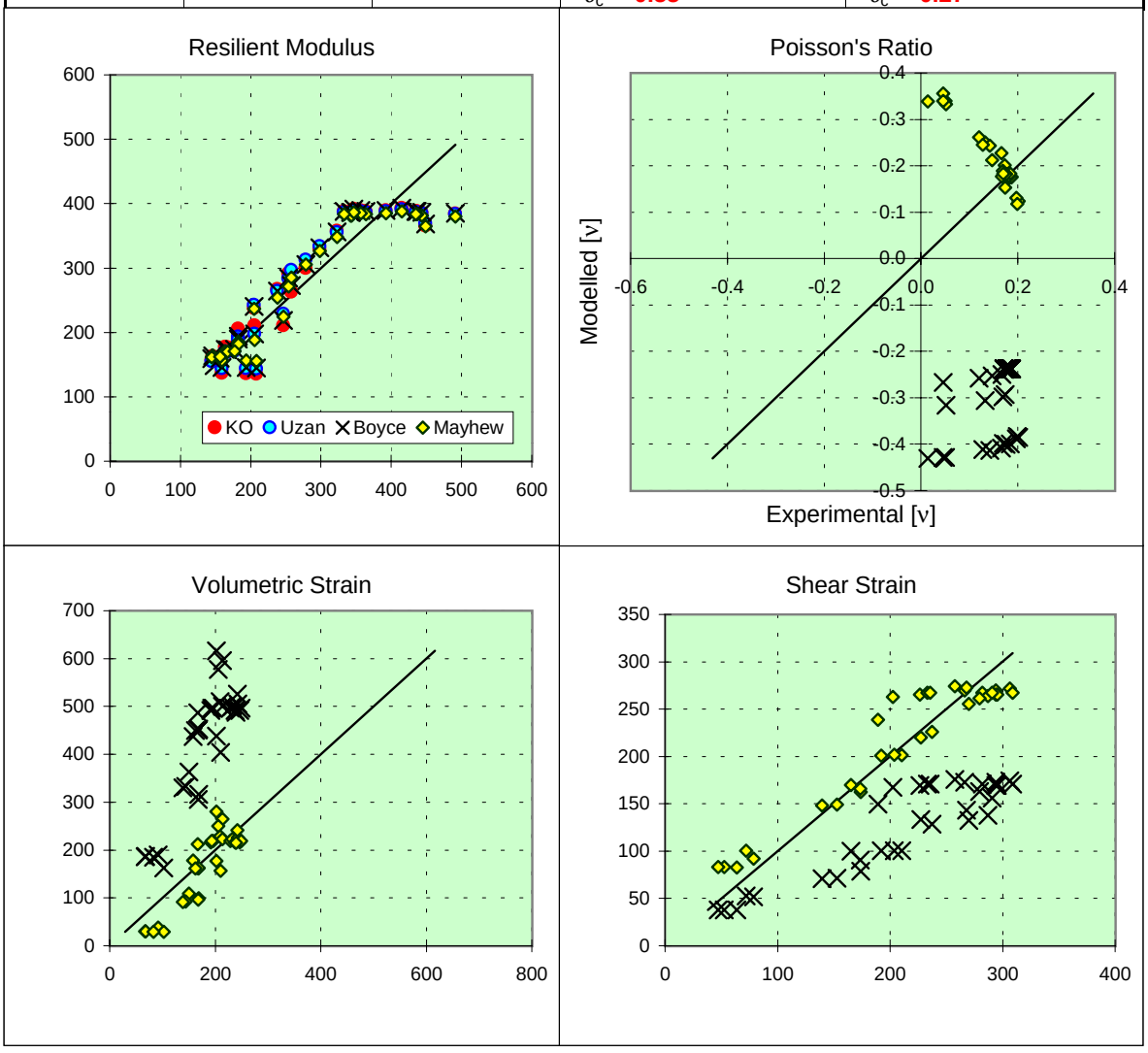


TP-II : LNEC ***Microgranite MIG*** ***100% Percentile Data***

Experimental Data	Sample Size: 33	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 228 MPa	υ_e = 0.13

Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 183,841	k_3 = 427,322	Ga = 209,225 kPa	Ga = 135,814 kPa
	k_2 = 0.7233	k_4 = 0.9100	Ka = 14,608 kPa	Ka = 44,005,113 kPa
		k_5 = -0.1487	n = 0.1417	n = -0.0888
				β = -80.1623
				m = -0.4255
	r^2= 0.723	r^2= 0.730	r^2= 0.734	$r^2\varepsilon_v$= 0.456 $r^2\varepsilon_s$= 0.769

Characteristic Values	At	p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**		**Mayhew**	
			ε_{vc}= 609	ε_{sc}= 157	ε_{vc}= 664	ε_{sc}= 372
	Mr_c= 105 MPa	Mr_c= 85 MPa	Mr_c= 96 MPa		Mr_c= 65 MPa	
			υ_c= **-0.55**		υ_c= **-0.27**	

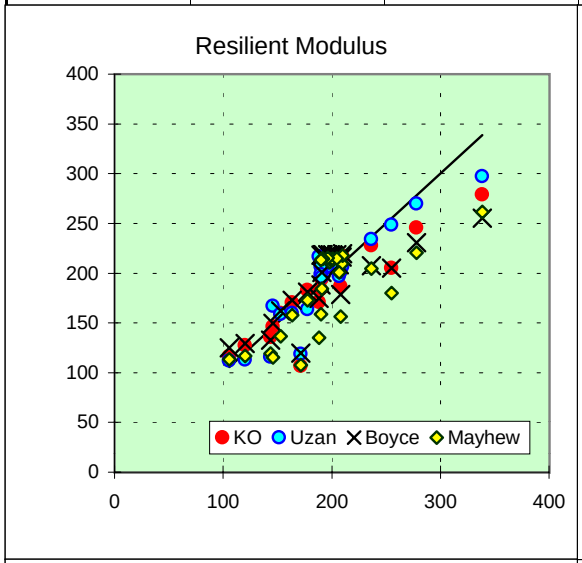


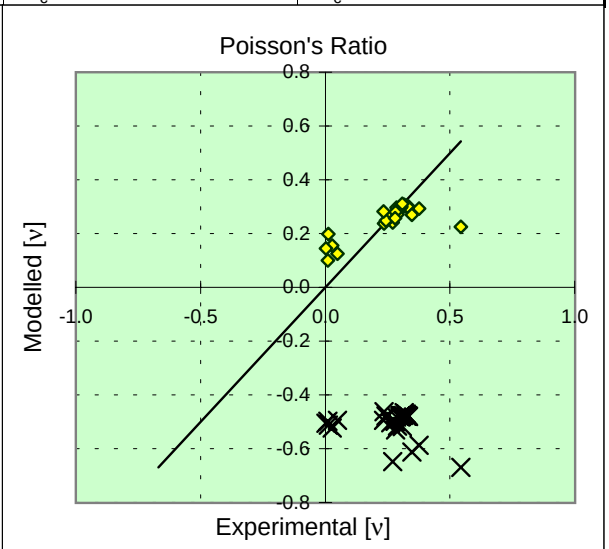
TP-II : UNOT ***Microgranite (MIG)*** ***100% Percentile Data***

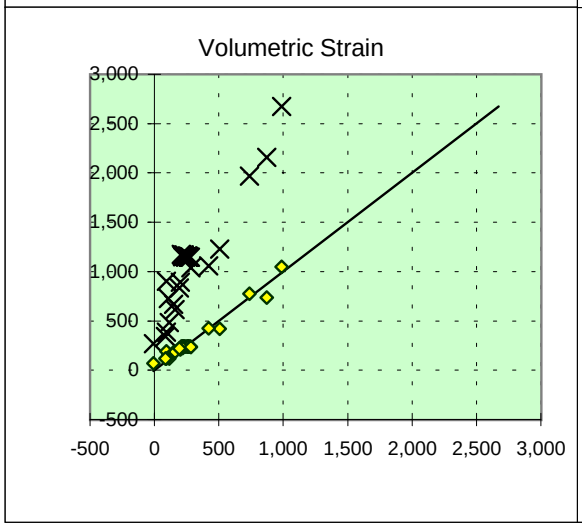
Experimental Data	Sample Size: 30	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 168 MPa	υ_e = 0.28

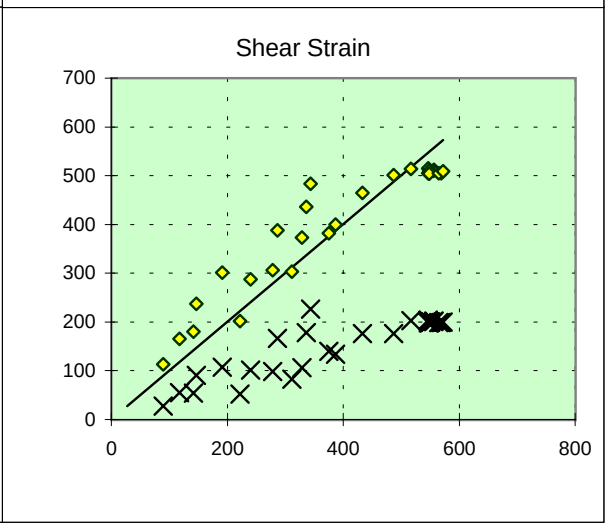
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 133,614	k_3 = 239,899	Ga = 173,206 kPa	Ga = 69,790 kPa
	k_2 = 0.4687	k_4 = 0.8724	Ka = 19,372 kPa	Ka = 65,456 kPa
		k_5 = -0.3400	n = 0.4491	n = 0.1297
				β = 0.2055
				m = 0.8375
	r^2= 0.613	r^2= 0.726	r^2= 0.554	$r^2\varepsilon_v$= 0.854 $r^2\varepsilon_s$= 0.747

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 746 ε_{sc}= 106	ε_{vc}= 66 ε_{sc}= 480
	Mr_c= 93 MPa	Mr_c= 57 MPa	Mr_c= 91 MPa	Mr_c= 96 MPa
			υ_c= **-0.71**	υ_c= 0.39







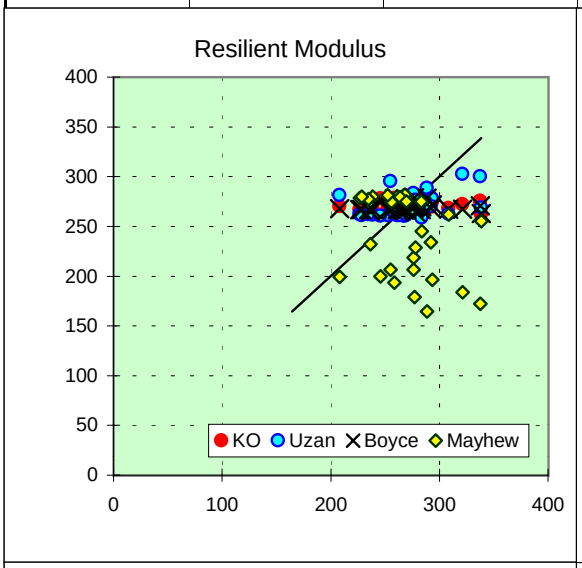


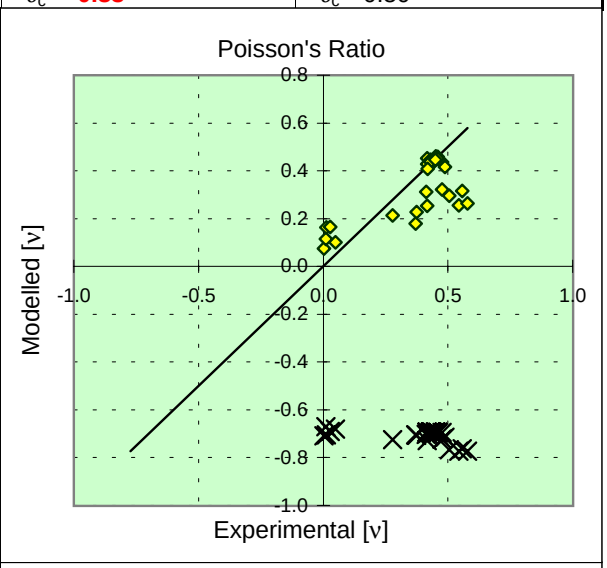
TP-II : UNOT ***Microgranite (MIG)*** ***100% Percentile Data***

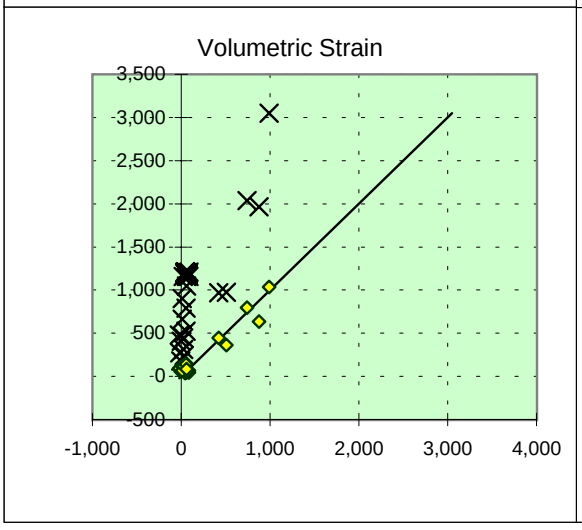
Experimental Data	Sample Size: 30	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 276 MPa	υ_e = 0.39

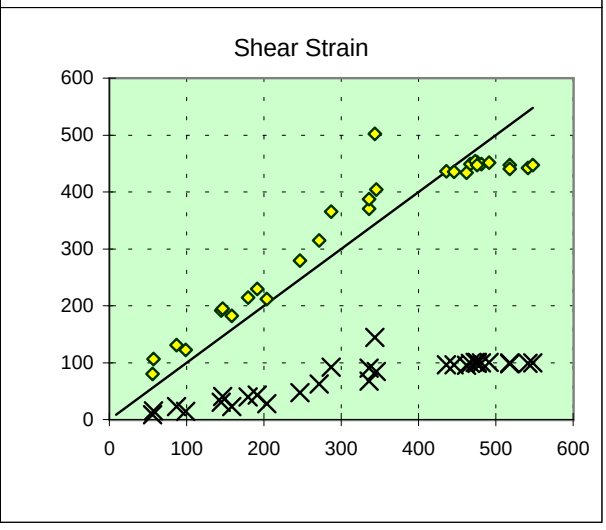
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 277,409	k_3 = 275,996	Ga = 349,307 kPa	Ga = 79,614 kPa
	k_2 = -0.0362	k_4 = 0.1448	Ka = 36,828 kPa	Ka = 71,927 kPa
		k_5 = -0.1637	n = 0.9842	n = 0.4910
				β = 0.4309
				m = 1.2821
	r^2= 0.301	r^2= 0.355	r^2= 0.290	$r^2\varepsilon_v$= 0.793 $r^2\varepsilon_s$= 0.755

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 285 MPa	Mr_c= 232 MPa	ε_{vc}= 259 ε_{sc}= 19	ε_{vc}= -1 ε_{sc}= 214
			Mr_c= 289 MPa	Mr_c= 234 MPa
			υ_c= **-0.83**	υ_c= 0.50







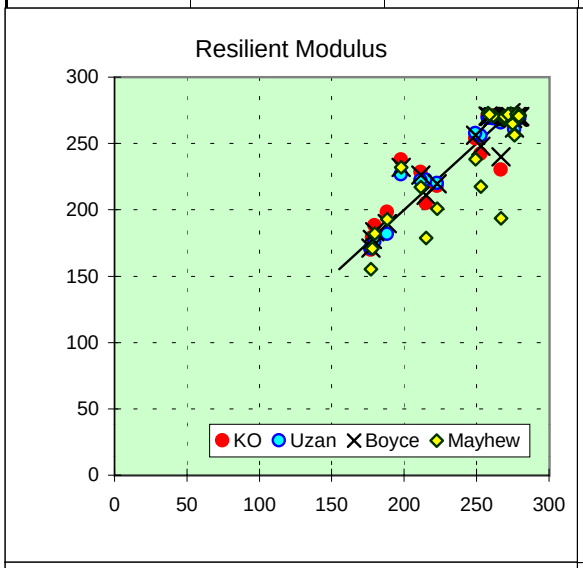


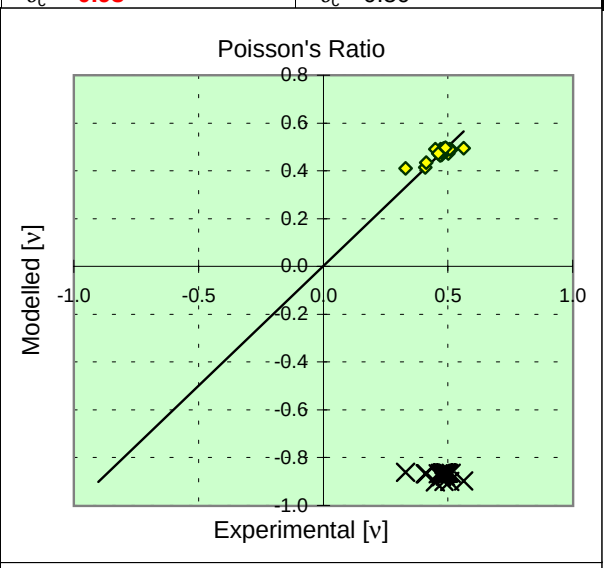
TP-II : UNOT ***Microgranite (MIG)*** ***100% Percentile Data***

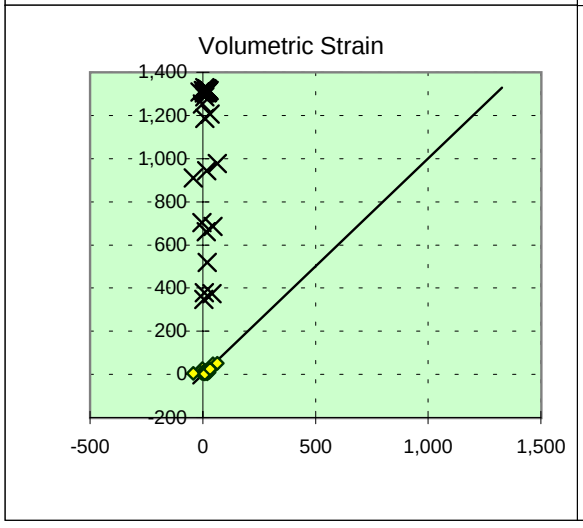
Experimental Data	Sample Size: 25	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 216 MPa	υ_e = 0.46

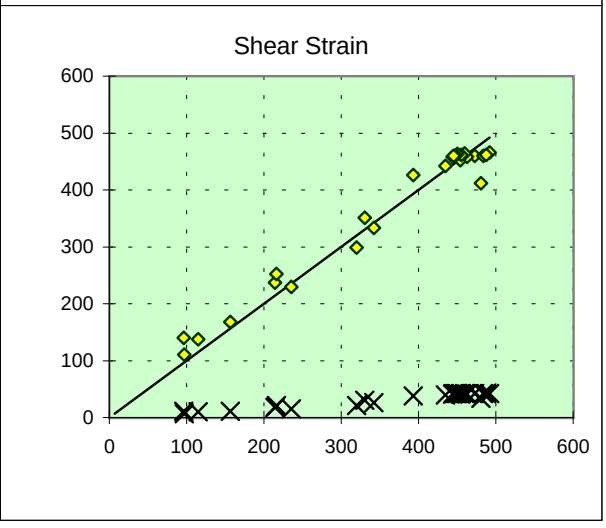
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 193,243	k_3 = 294,321	Ga = 820,842 kPa	Ga = 76,211 kPa
	k_2 = 0.3273	k_4 = 0.5645	Ka = 23,833 kPa	Ka = 199,806 kPa
		k_5 = -0.1938	n = 0.6397	n = 0.3545
				β = 0.7285
				m = 3.3442
	r^2= 0.728	r^2= 0.812	r^2= 0.774	$r^2\varepsilon_v$= 0.486 $r^2\varepsilon_s$= 0.874

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 150 MPa	Mr_c= 115 MPa	ε_{vc}= 570 ε_{sc}= 16	ε_{vc}= 0 ε_{sc}= 289
			Mr_c= 141 MPa	Mr_c= 173 MPa
			υ_c= **-0.93**	υ_c= 0.50







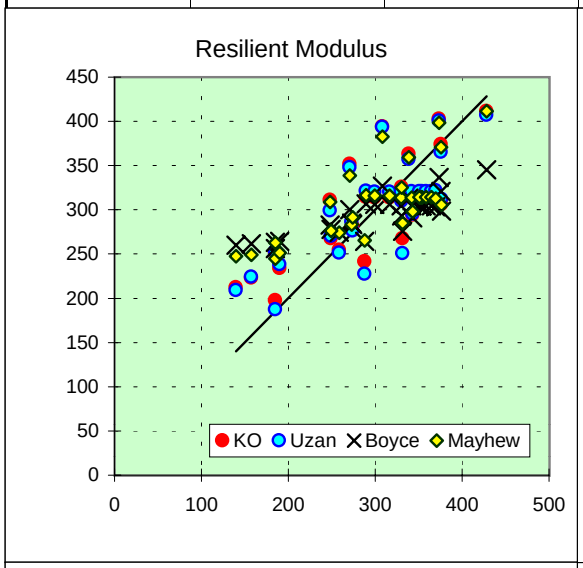


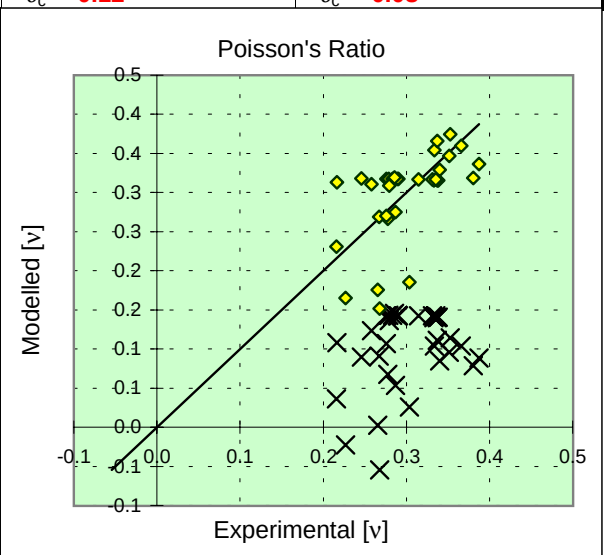
TP-II : LRSB ***Microgranite (MIG)*** ***100% Percentile Data***

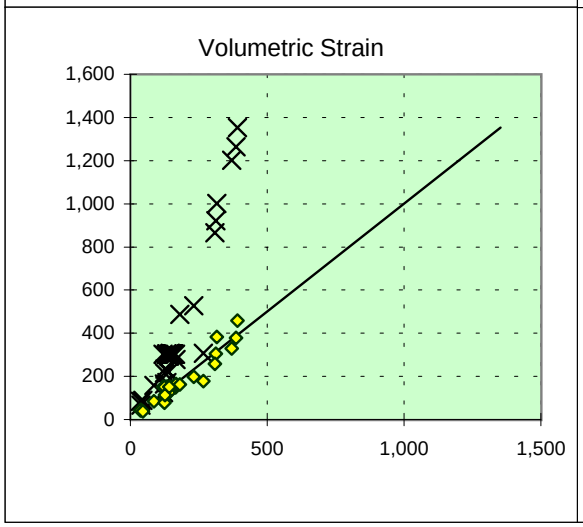
Experimental Data	Sample Size: 33	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 251 MPa	υ_e = 0.27

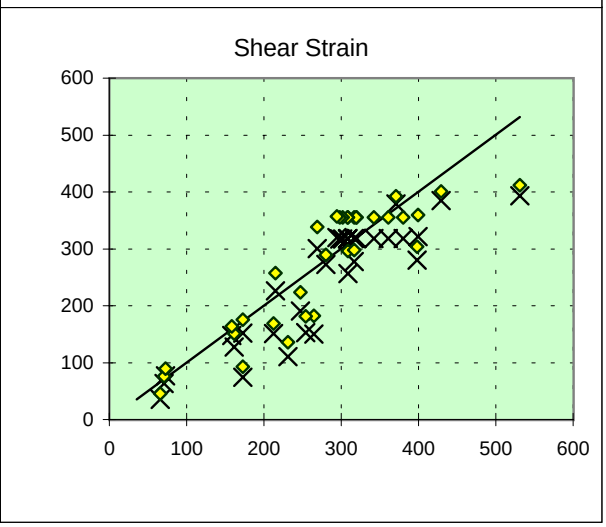
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 229,866	k_3 = 319,249	Ga = 107,440 kPa	Ga = 96,715 kPa
	k_2 = 0.3040	k_4 = 0.2391	Ka = 89,015 kPa	Ka = 94,667 kPa
		k_5 = 0.0825	n = 0.6623	n = 0.5758
				β = -0.0314
				m = 0.1846
	r^2= 0.548	r^2= 0.554	r^2= 0.456	$r^2\varepsilon_v$= 0.770 $r^2\varepsilon_s$= 0.654

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 137 ε_{sc}= 115	ε_{vc}= 158 ε_{sc}= 150
	Mr_c= 181 MPa	Mr_c= 194 MPa	Mr_c= 254 MPa	Mr_c= 204 MPa
			υ_c= **-0.12**	υ_c= **-0.08**







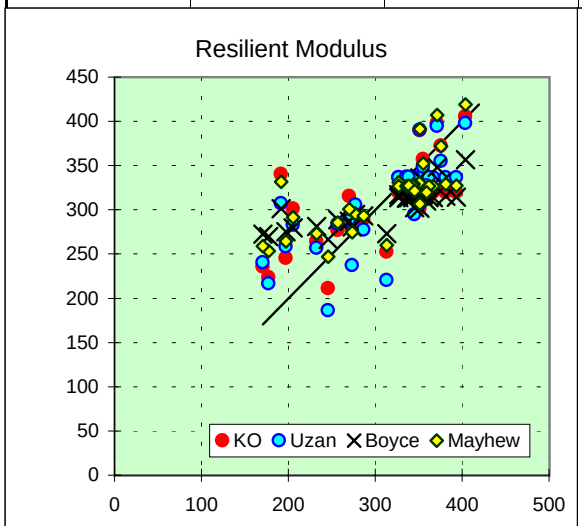


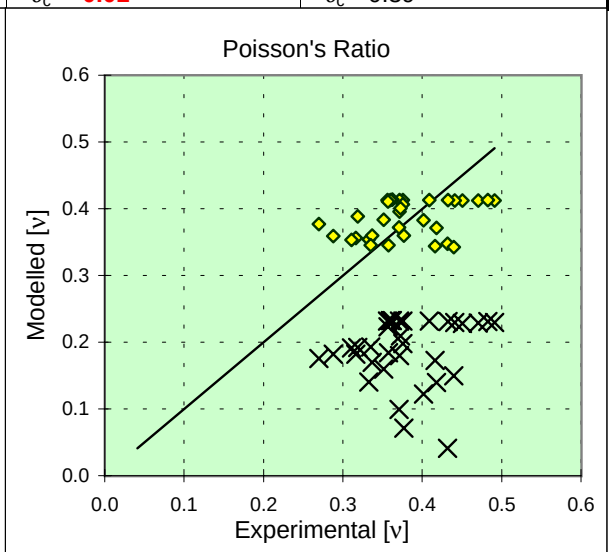
TP-II : LRSB ***Microgranite (MIG)*** ***100% Percentile Data***

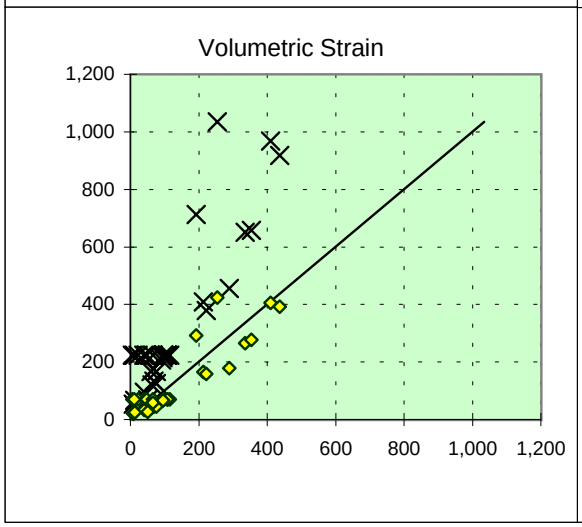
Experimental Data	Sample Size: 33	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 259 MPa	υ_e = 0.37

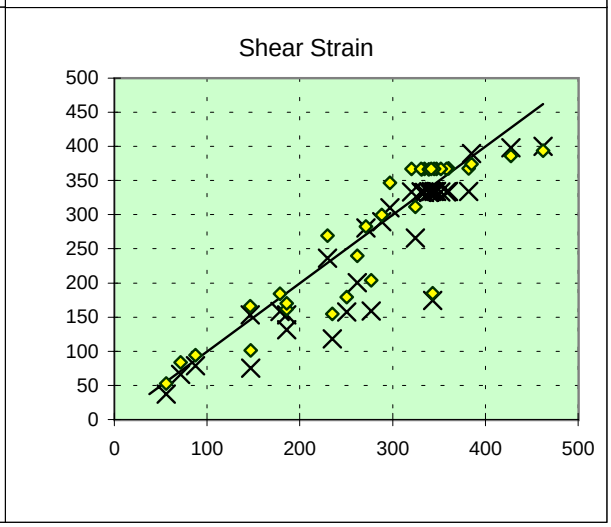
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 241,525	k_3 = 322,076	Ga = 103,902 kPa	Ga = 95,297 kPa
	k_2 = 0.2712	k_4 = 0.1188	Ka = 111,042 kPa	Ka = 288,586 kPa
		k_5 = 0.1929	n = 0.6474	n = 0.4915
				β = 0.1396
				m = 0.7494
	r^2= 0.498	r^2= 0.538	r^2= 0.463	$r^2\varepsilon_v$= 0.683 $r^2\varepsilon_s$= 0.683

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 196 MPa	Mr_c= 229 MPa	ε_{vc}= 107 ε_{sc}= 122	ε_{vc}= 23 ε_{sc}= 178
			Mr_c= 268 MPa	Mr_c= 259 MPa
			υ_c= **-0.01**	υ_c= 0.39







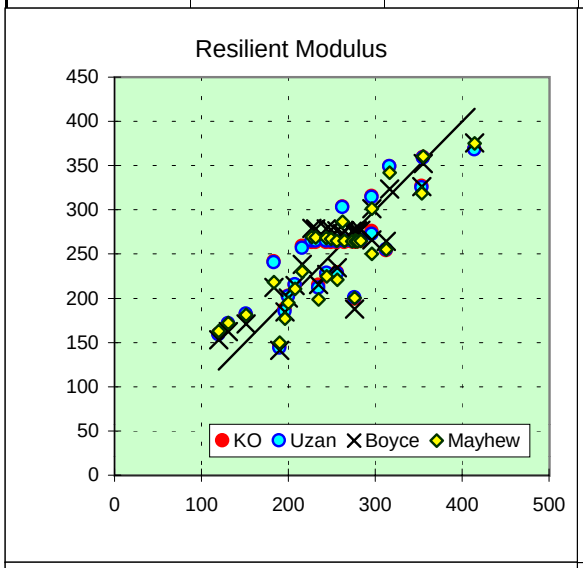


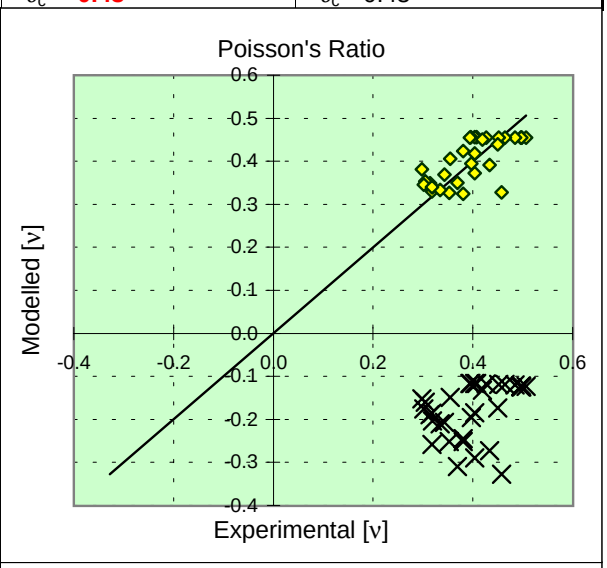
TP-II : LRSB ***Microgranite (MIG)*** ***100% Percentile Data***

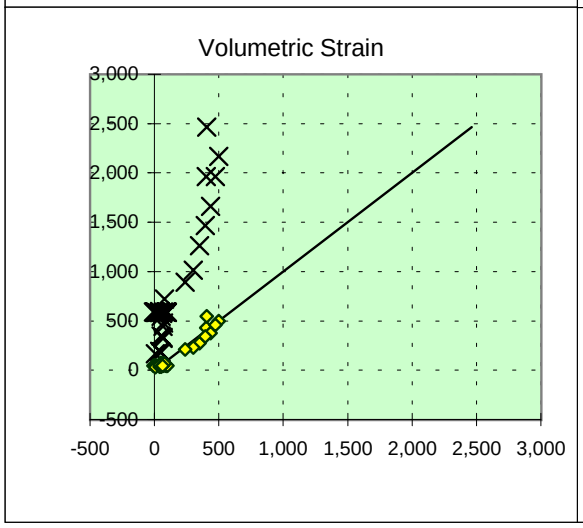
Experimental Data	Sample Size: 33	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 205 MPa	υ_e = 0.38

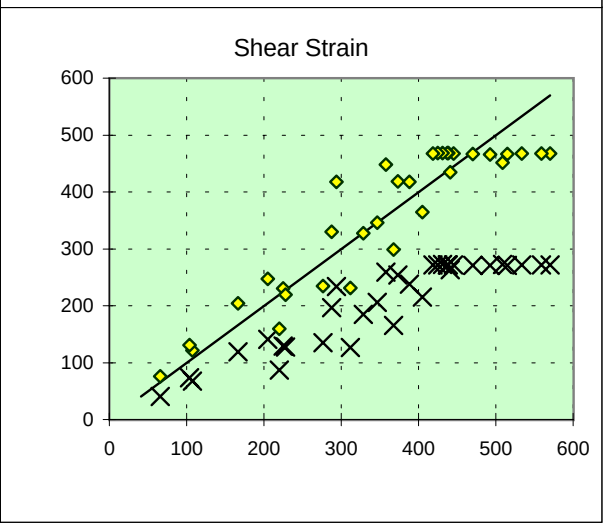
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 177,556	k_3 = 269,723	Ga = 130,058 kPa	Ga = 75,798 kPa
	k_2 = 0.3817	k_4 = 0.3672	Ka = 31,655 kPa	Ka = 152,416 kPa
		k_5 = 0.0186	n = 0.3952	n = 0.3448
				β = 0.1733
				m = 0.5108
	r^2= 0.639	r^2= 0.639	r^2= 0.663	$r^2\varepsilon_v$= 0.808 $r^2\varepsilon_s$= 0.725

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 132 MPa	Mr_c= 134 MPa	ε_{vc}= 435 ε_{sc}= 157	ε_{vc}= 24 ε_{sc}= 295
			Mr_c= 120 MPa	Mr_c= 161 MPa
			υ_c= **-0.43**	υ_c= 0.43







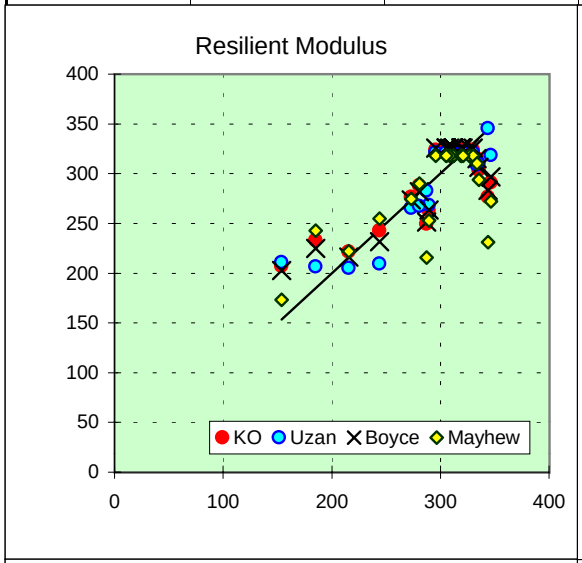


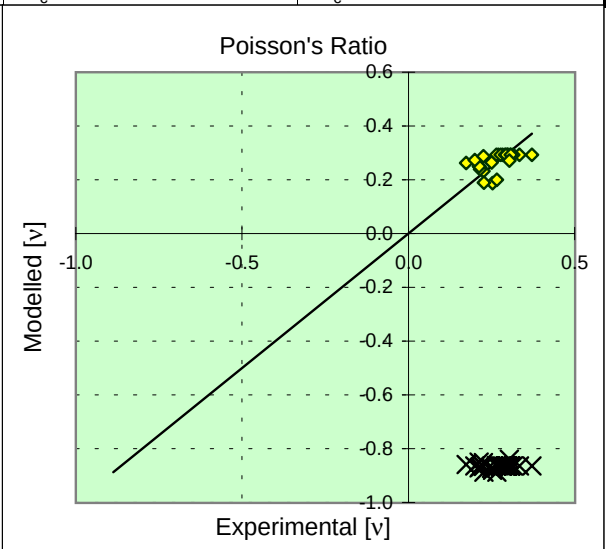
TP-II : DUT ***Microgranite (MIG)*** ***100% Percentile Data***

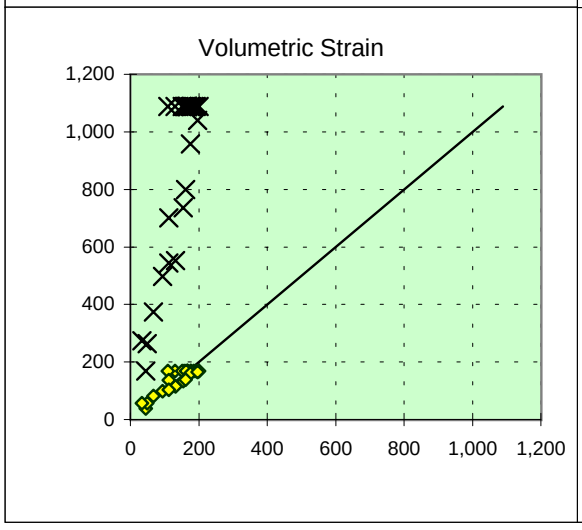
Experimental Data	Sample Size: 25	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 260 MPa	υ_e = 0.23

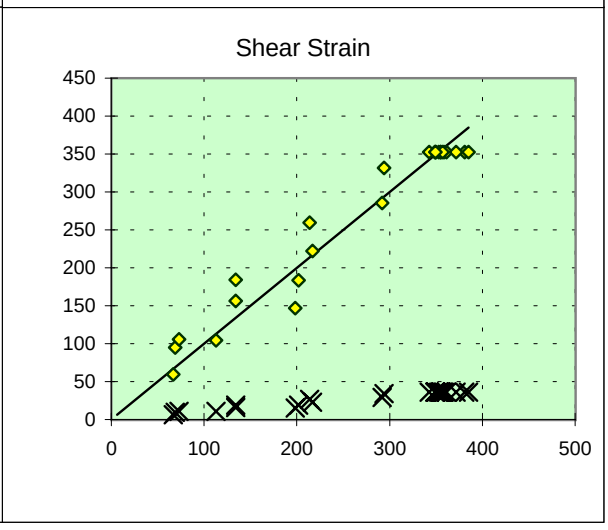
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 232,279	k_3 = 370,678	Ga = 1,029,079 kPa	Ga = 105,825 kPa
	k_2 = 0.3109	k_4 = 0.7252	Ka = 28,009 kPa	Ka = 97,355 kPa
		k_5 = -0.3512	n = 0.6351	n = 0.6343
				β = 0.0824
				m = 0.5431
	r^2= 0.591	r^2= 0.708	r^2= 0.619	$r^2\varepsilon_v$= 0.683 $r^2\varepsilon_s$= 0.849

Characteristic Values	At p_1= 6 kPa		p_2 = 15 kPa and	q_1= 4 kPa q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 487 ε_{sc}= 13	ε_{vc}= 98 ε_{sc}= 123
	Mr_c= 182 MPa	Mr_c= 118 MPa	Mr_c= 166 MPa	Mr_c= 275 MPa
			υ_c= **-0.94**	υ_c= 0.02







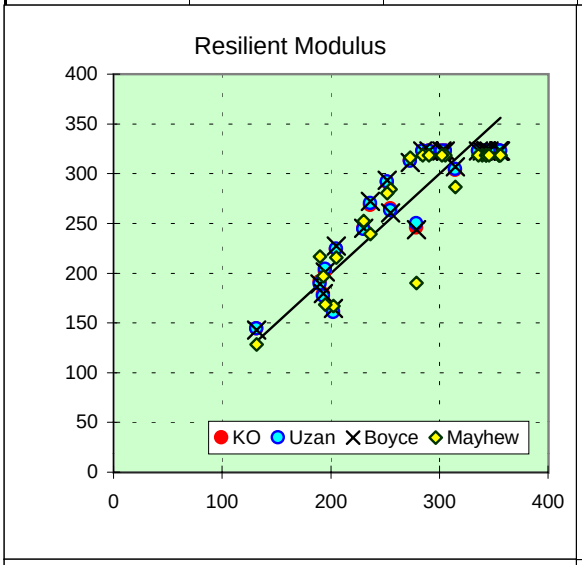


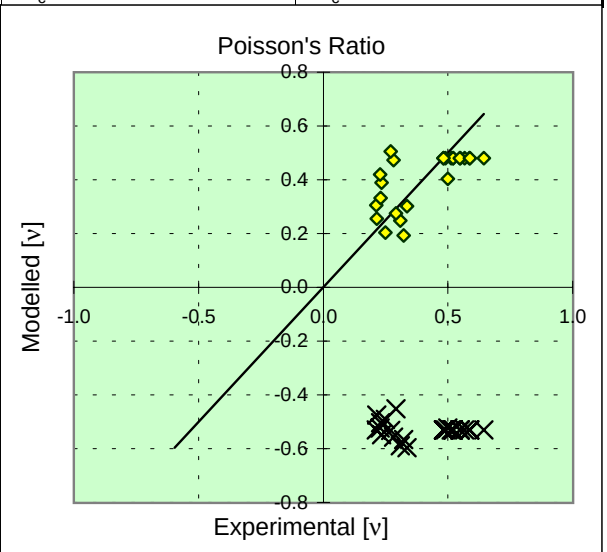
TP-II : DUT ***Microgranite (MIG)*** ***100% Percentile Data***

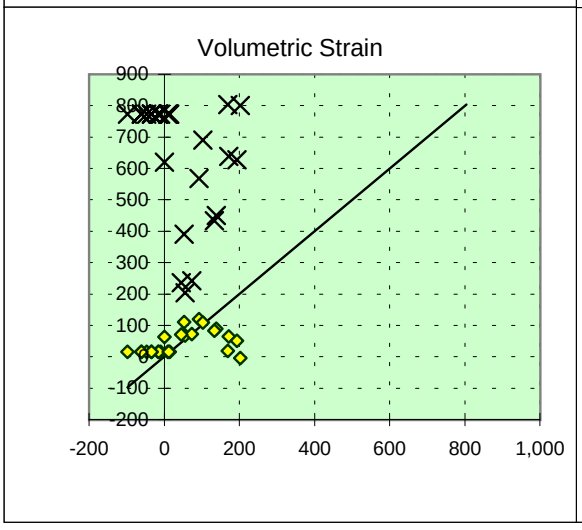
Experimental Data	Sample Size: 25	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 206 MPa	υ_e = 0.27

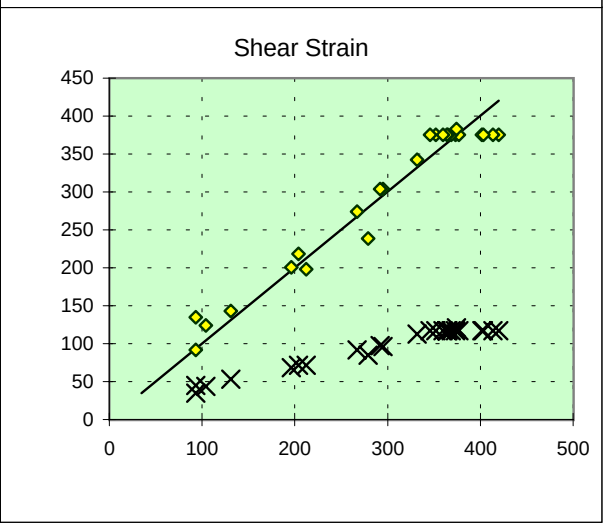
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 174,177	k_3 = 338,291	Ga = 303,566 kPa	Ga = 94,210 kPa
	k_2 = 0.5946	k_4 = 0.6303	Ka = 22,766 kPa	Ka = 28,564 kPa
		k_5 = -0.0318	n = 0.3751	n = 0.5186
				β = 0.1315
				m = 0.3154
	r^2= 0.715	r^2= 0.715	r^2= 0.714	$r^2\varepsilon_v$= 0.363 $r^2\varepsilon_s$= 0.853

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 632 ε_{sc}= 70	ε_{vc}= 79 ε_{sc}= 172
	Mr_c= 110 MPa	Mr_c= 106 MPa	Mr_c= 112 MPa	Mr_c= 228 MPa
			υ_c= **-0.76**	υ_c= 0.18







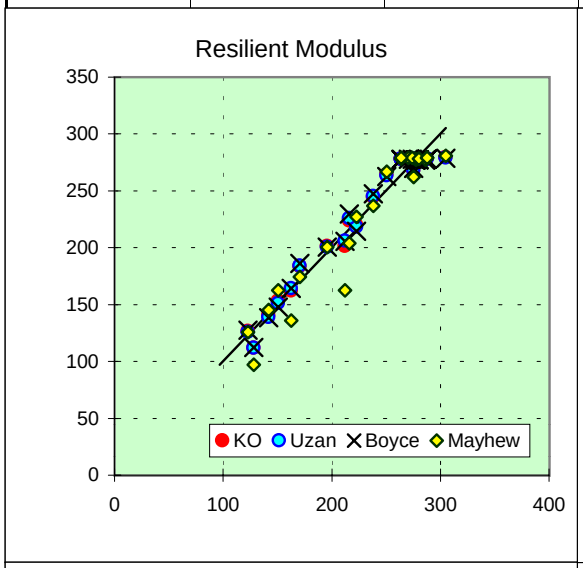


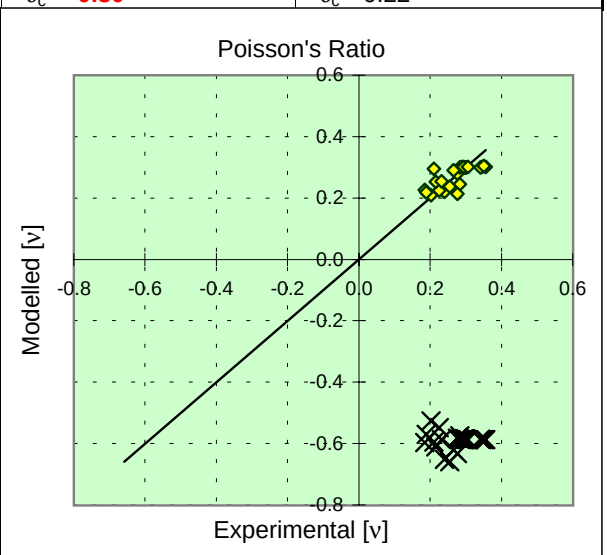
TP-II : DUT ***Microgranite (MIG)*** ***100% Percentile Data***

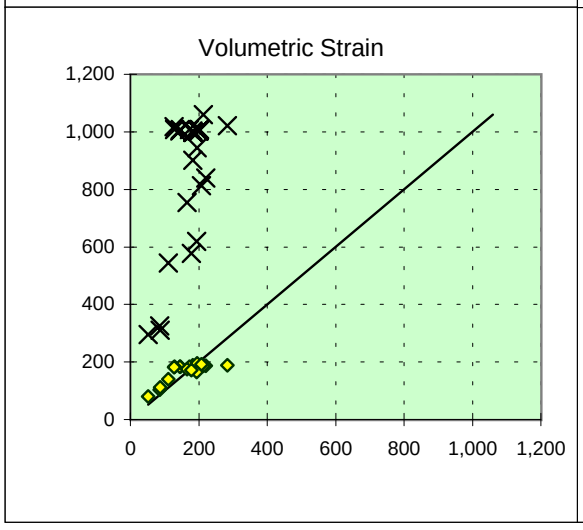
Experimental Data	Sample Size: 25	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 167 MPa	υ_e = 0.23

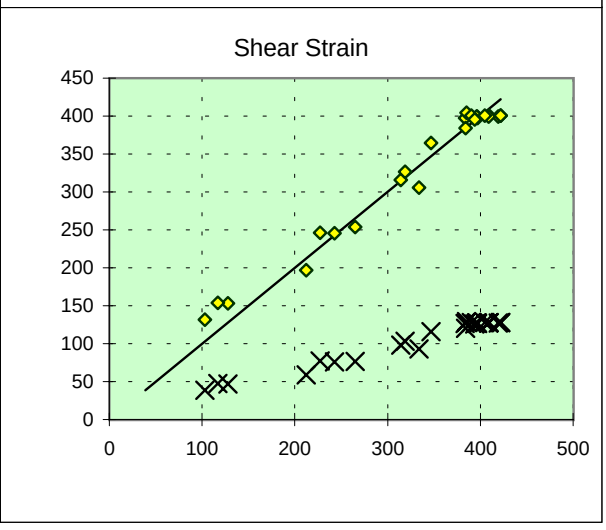
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 138,689	k_3 = 287,464	Ga = 294,669 kPa	Ga = 94,117 kPa
	k_2 = 0.6513	k_4 = 0.6941	Ka = 15,023 kPa	Ka = 47,084 kPa
		k_5 = -0.0367	n = 0.2996	n = 0.2447
				β = 0.1705
				m = 0.6339
	r^2= 0.877	r^2= 0.879	r^2= 0.872	$r^2\varepsilon_v$= 0.547 $r^2\varepsilon_s$= 0.882

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 84 MPa	Mr_c= 80 MPa	ε_{vc}= 913 ε_{sc}= 83	ε_{vc}= 109 ε_{sc}= 287
			Mr_c= 80 MPa	Mr_c= 142 MPa
			υ_c= **-0.80**	υ_c= 0.22







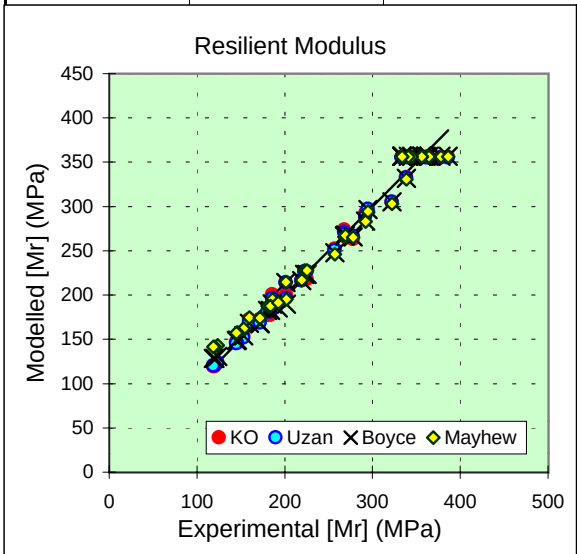


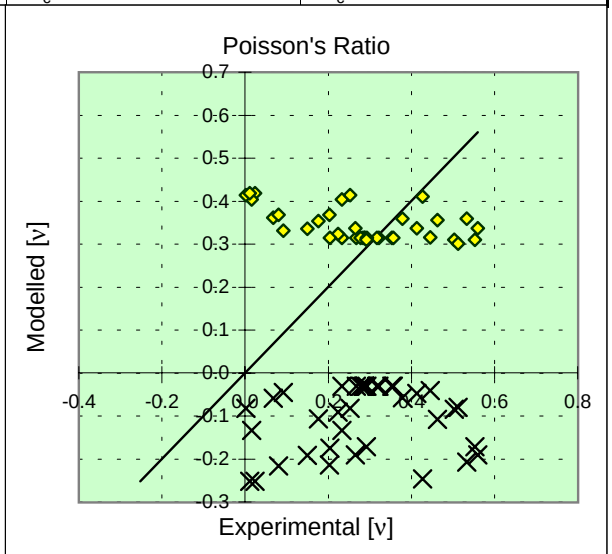
TP-II : LNEC ***Microgranite MIG*** ***90% Percentile Data***

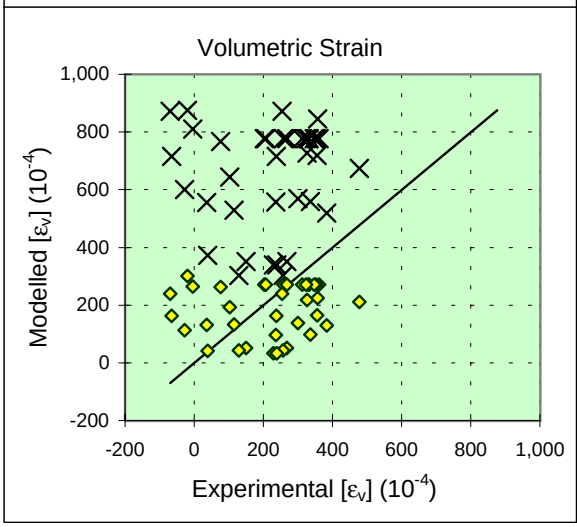
Experimental Data	Sample Size: 37	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 162 MPa	υ_e = 0.23

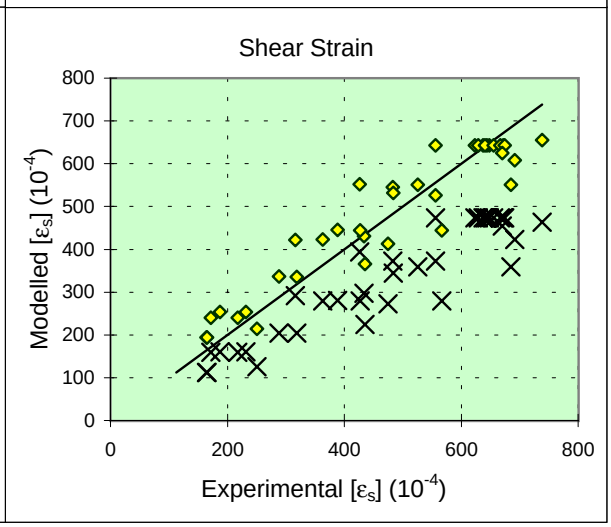
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 140,871	k_3 = 300,388	Ga = 120,093 kPa	Ga = 84,570 kPa
	k_2 = 0.6537	k_4 = 0.7384	Ka = 20,162 kPa	Ka = 1,110,755 kPa
		k_5 = -0.0691	n = 0.2231	n = 0.0813
				β = -1.2381
				m = -0.0547
	r^2= 0.907	r^2= 0.910	r^2= 0.905	$r^2\varepsilon_v$= 0.199 $r^2\varepsilon_s$= 0.769

Characteristic Values	At	p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**		**Mayhew**	
			ε_{vc}= 555	ε_{sc}= 234	ε_{vc}= 198	ε_{sc}= 434
	Mr_c= 85 MPa	Mr_c= 78 MPa	Mr_c= 88 MPa		Mr_c= 90 MPa	
			υ_c= **-0.38**		υ_c= 0.18	







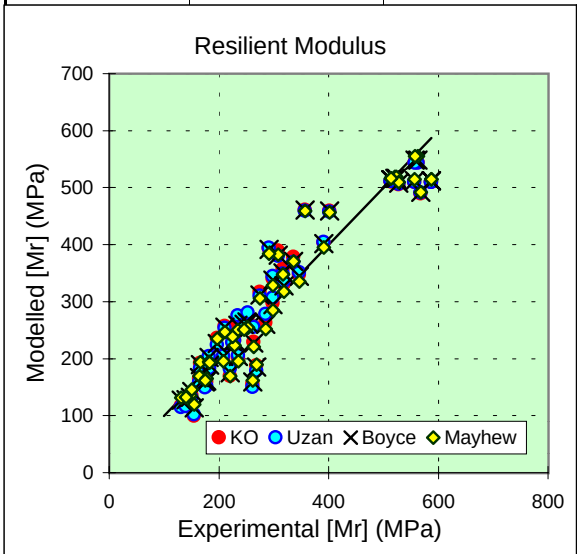


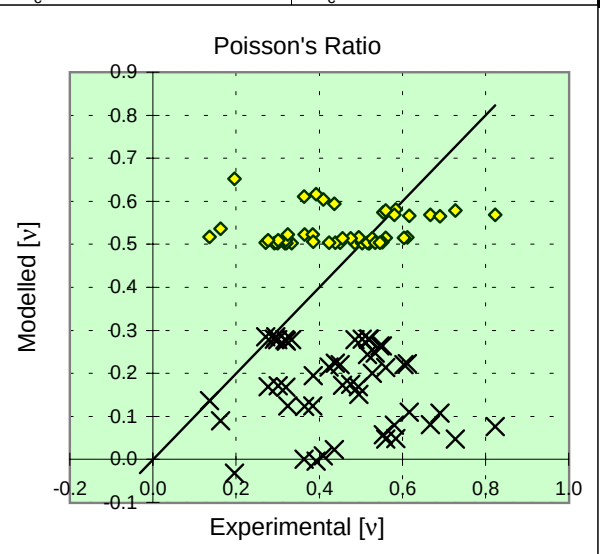
TP-II : LNEC ***Microgranite MIG*** ***90% Percentile Data***

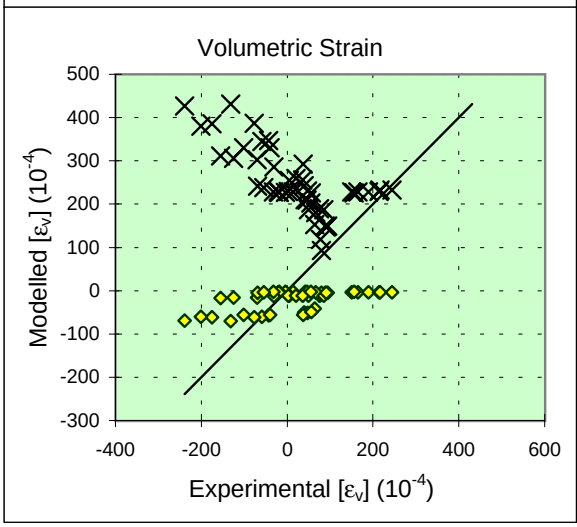
Experimental Data	Sample Size: 49	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 194 MPa	υ_e = 0.45

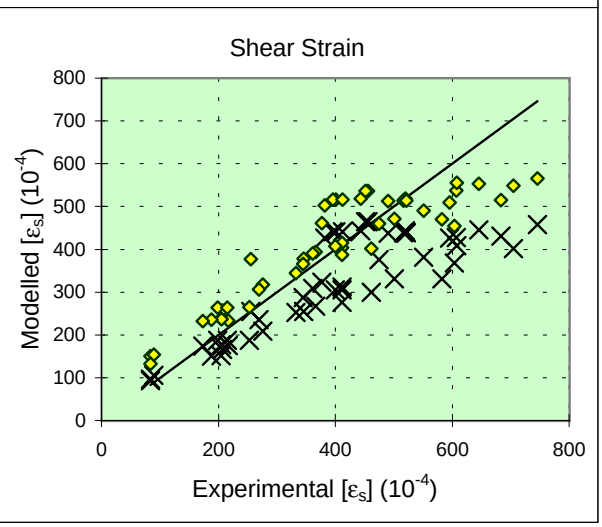
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 147,165	k_3 = 407,286	Ga = 121,044 kPa	Ga = 97,726 kPa
	k_2 = 0.8714	k_4 = 1.0309	Ka = 254 kPa	Ka = 9,450,621 kPa
		k_5 = -0.1148	n = 0.0015	n = -0.1719
				β = -1.1405
				m = -1.4641
	r^2= 0.780	r^2= 0.783	r^2= 0.792	$r^2\varepsilon_v$= 0.319 $r^2\varepsilon_s$= 0.677

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 415 ε_{sc}= 352	ε_{vc}= -181 ε_{sc}= 604
	Mr_c= 75 MPa	Mr_c= 63 MPa	Mr_c= 83 MPa	Mr_c= 100 MPa
			υ_c= **-0.12**	υ_c= 0.82



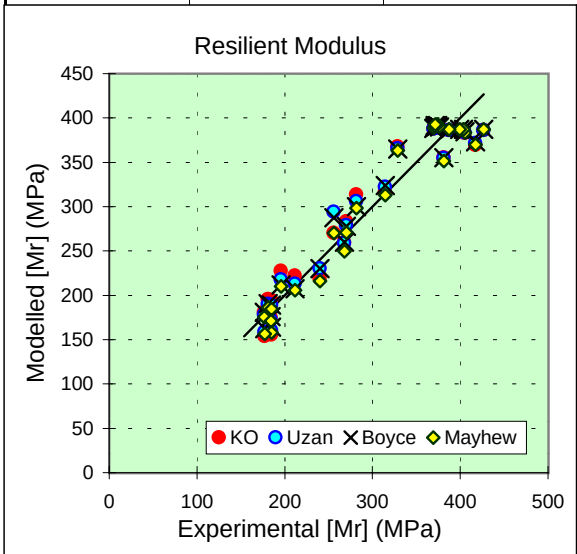


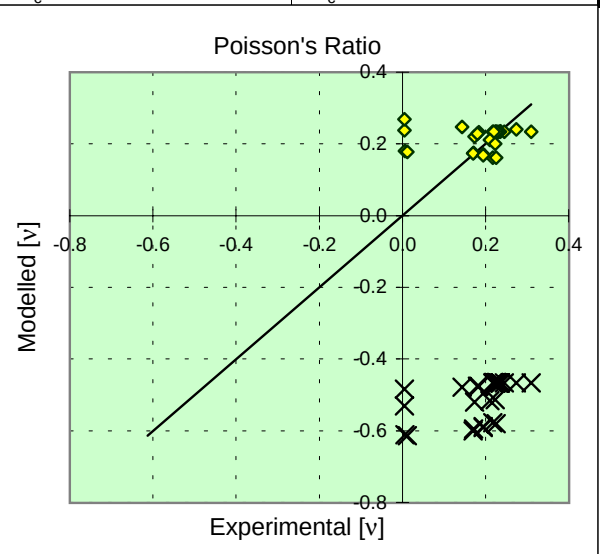


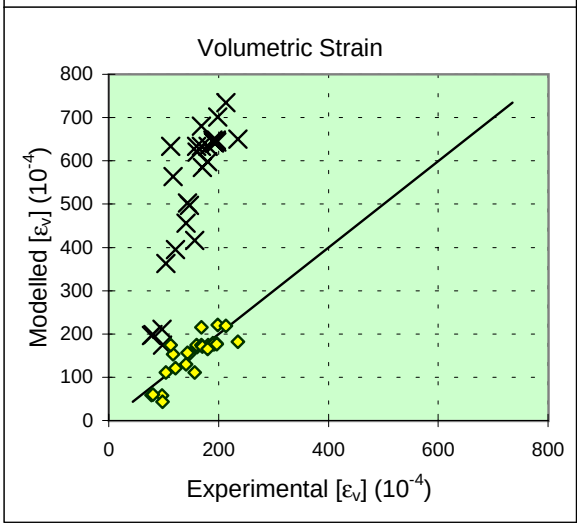


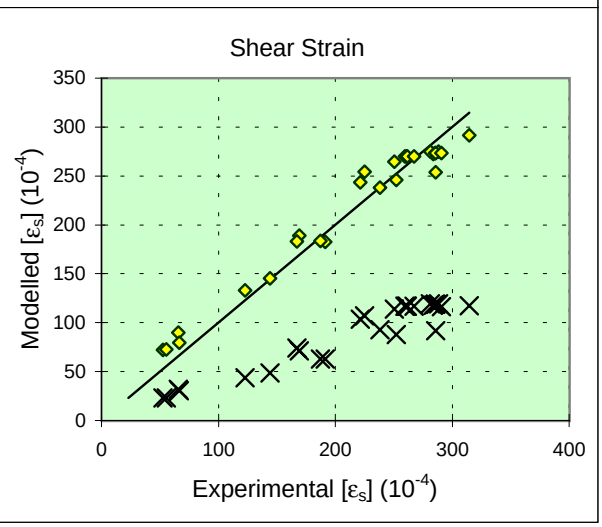
TP-II : LNEC ***Microgranite MIG*** ***90% Percentile Data***

Experimental Data	Sample Size: 27	p*= 27 kPa @ ω = 3.3%		p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 244 MPa	υ_e = 0.14
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 199,243	k_3 = 421,290	Ga = 298,931 kPa	Ga = 131,602 kPa
	k_2 = 0.6520	k_4 = 0.7763	Ka = 19,440 kPa	Ka = -1,180 kPa
		k_5 = -0.0952	n = 0.2357	n = 0.0149
				β = 0.0003
				m = -0.0028
	r^2= 0.823	r^2= 0.831	r^2= 0.842	$r^2\varepsilon_v$= 0.534 $r^2\varepsilon_s$= 0.862
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 634 ε_{sc}= 92	ε_{vc}= 265 ε_{sc}= 316
	Mr_c= 120 MPa	Mr_c= 104 MPa	Mr_c= 107 MPa	Mr_c= 105 MPa
			υ_c= **-0.71**	υ_c= 0.00





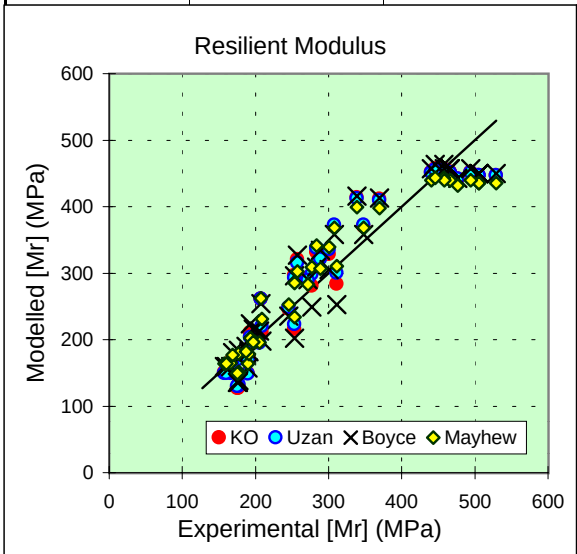


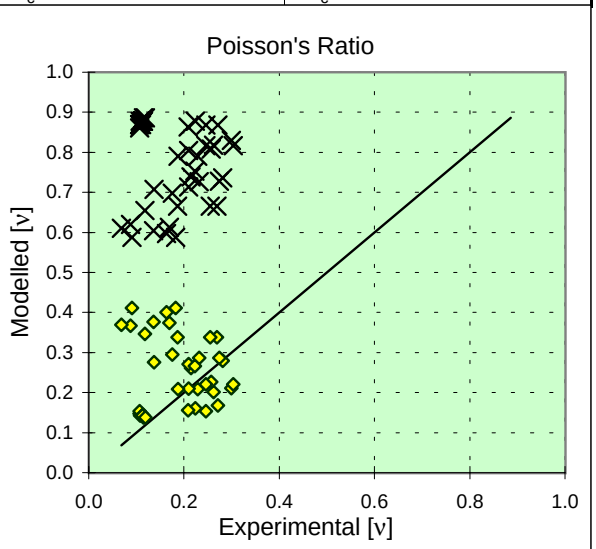


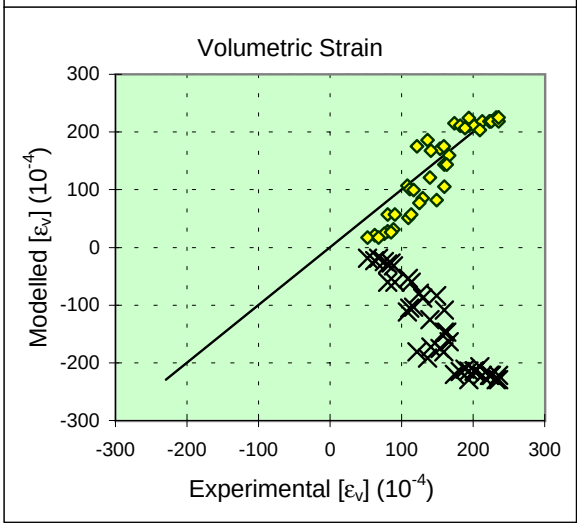
TP-II : LNEC	*Microgranite MIG*			*90% Percentile Data*
Experimental Data	Sample Size: 42	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 244 MPa	υ_e = 0.19

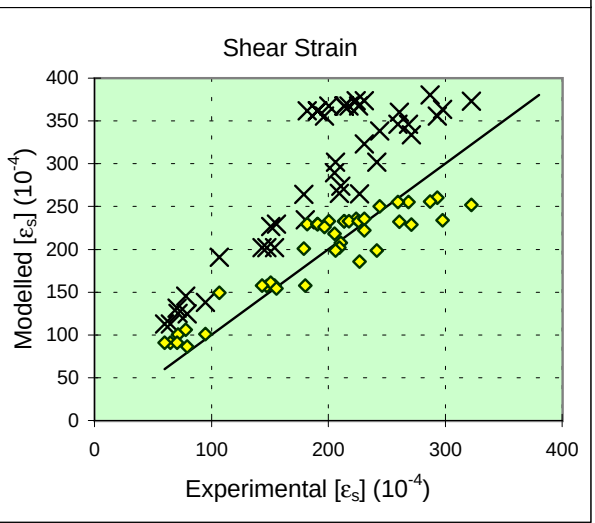
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 181,663	k_3 = 484,736	Ga = 100,145 kPa	Ga = 159,670 kPa
	k_2 = 0.8707	k_4 = 0.9678	Ka = 5,782,735 kPa	Ka = 3,554,994 kPa
		k_5 = -0.0749	n = -0.0923	n = -0.2588
				β = -6.4351
				m = -0.0831
	r^2= 0.787	r^2= 0.789	r^2= 0.790	$r^2\varepsilon_v$= 0.537 $r^2\varepsilon_s$= 0.711

Characteristic Values	At p_1= 6 kPa		p_2 = 15 kPa and	q_1= 4 kPa q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= -195 ε_{sc}= 508	ε_{vc}= 346 ε_{sc}= 435
	Mr_c= 92 MPa	Mr_c= 83 MPa	Mr_c= 127 MPa	Mr_c= 78 MPa
			υ_c= 0.94	υ_c= 0.02







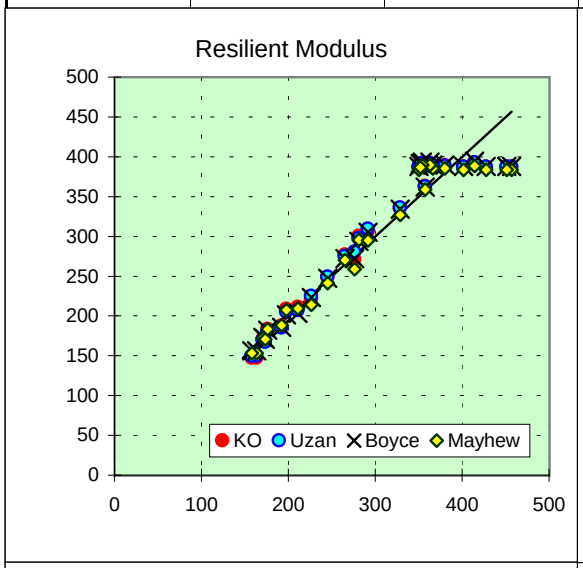


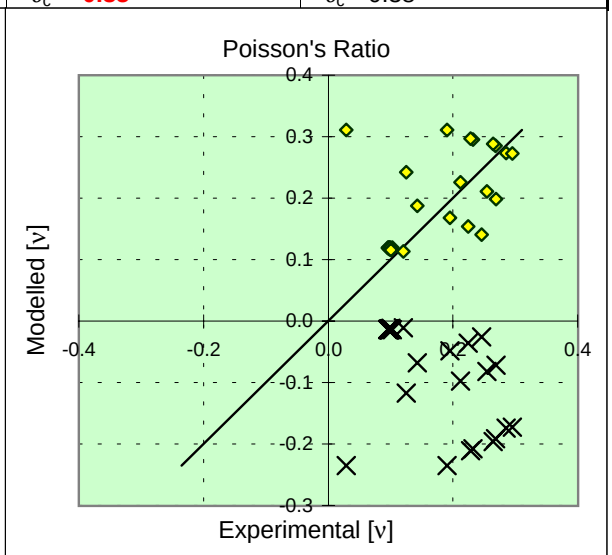
TP-II : LNEC ***Microgranite MIG*** ***90% Percentile Data***

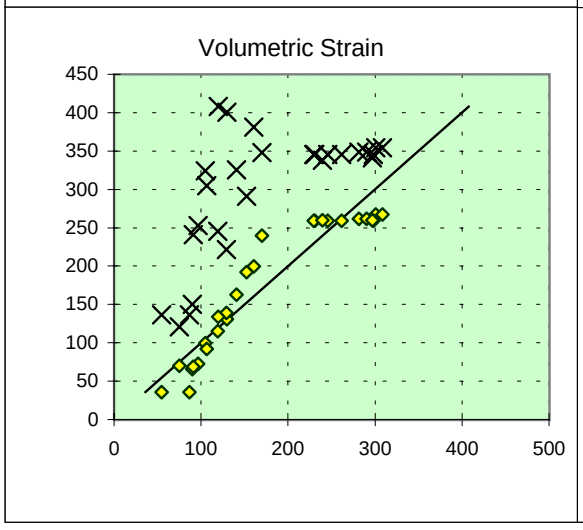
Experimental Data	Sample Size: 27	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 238 MPa	υ_e = 0.19

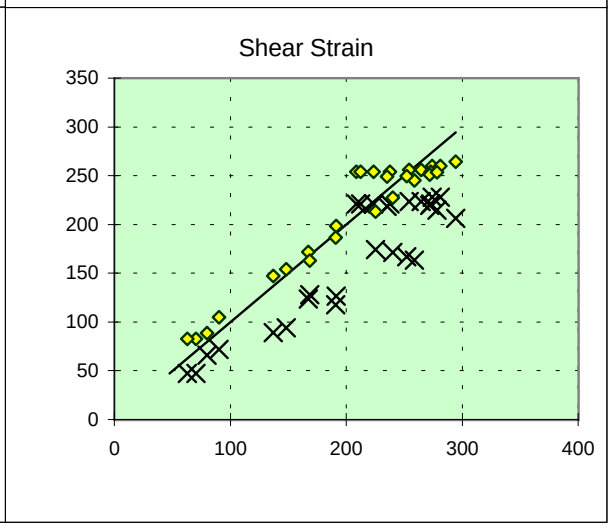
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 193,908	k_3 = 410,176	Ga = 161,117 kPa	Ga = 142,979 kPa
	k_2 = 0.6685	k_4 = 0.7261	Ka = 22,059 kPa	Ka = 129,030 kPa
		k_5 = -0.0442	n = 0.1677	n = -0.1219
				β = 0.0945
				m = 1.0090
	r^2= 0.805	r^2= 0.806	r^2= 0.809	$r^2\varepsilon_v$= 0.752 $r^2\varepsilon_s$= 0.803

Characteristic Values	At	p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**		**Mayhew**	
			ε_{vc}= 427	ε_{sc}= 194	ε_{vc}= 53	ε_{sc}= 376
	Mr_c= 115 MPa	Mr_c= 108 MPa	Mr_c= 111 MPa		Mr_c= 122 MPa	
			υ_c= **-0.35**		υ_c= 0.38	







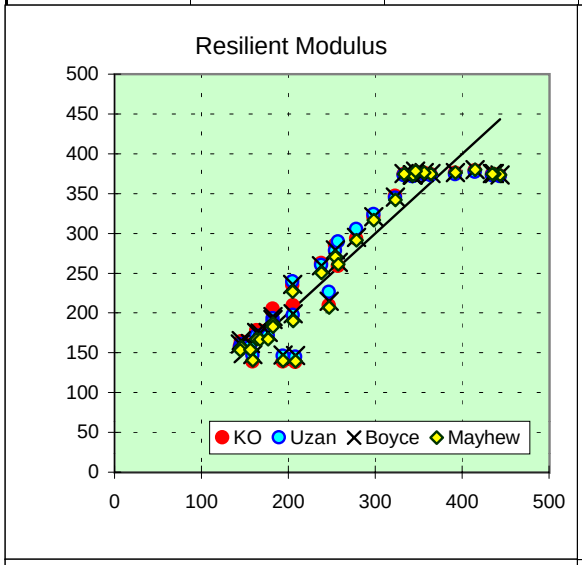


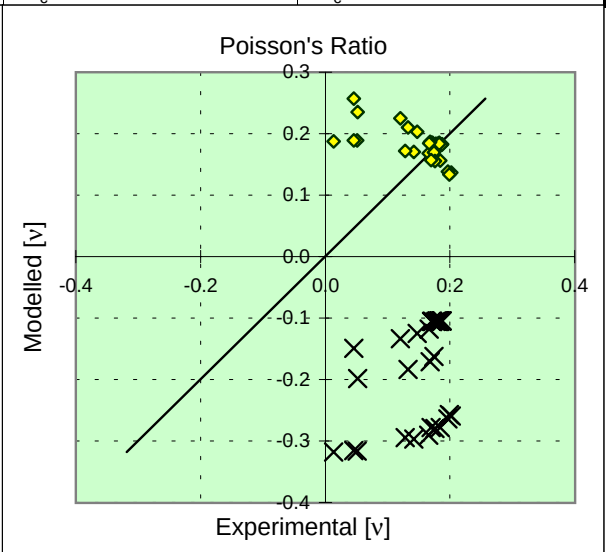
TP-II : LNEC ***Microgranite MIG*** ***90% Percentile Data***

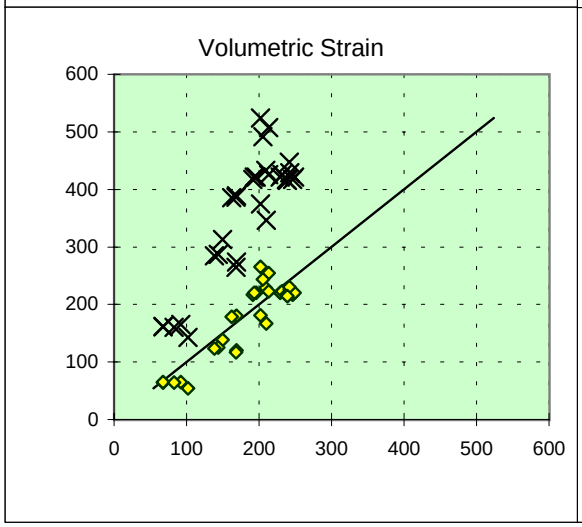
Experimental Data	Sample Size: 31	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 225 MPa	υ_e = 0.13

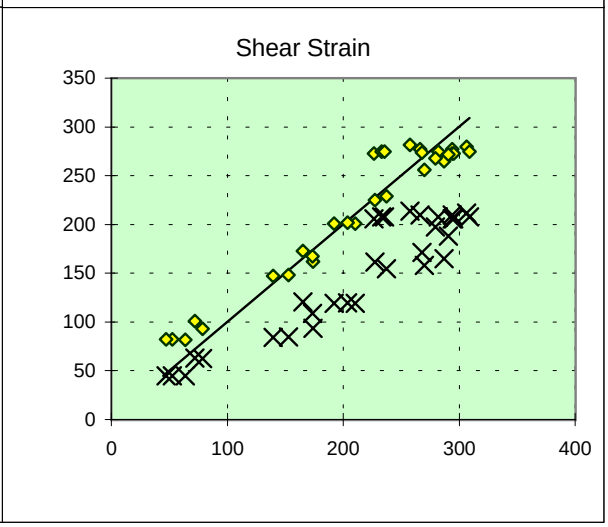
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 184,100	k_3 = 409,999	Ga = 171,947 kPa	Ga = 131,893 kPa
	k_2 = 0.6870	k_4 = 0.8616	Ka = 18,416 kPa	Ka = -981 kPa
		k_5 = -0.1394	n = 0.1613	n = -0.0619
				β = 0.0006
				m = -0.0023
	r^2= 0.754	r^2= 0.763	r^2= 0.768	$r^2\varepsilon_v$= 0.624 $r^2\varepsilon_s$= 0.809

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 512 ε_{sc}= 184	ε_{vc}= 326 ε_{sc}= 364
	Mr_c= 108 MPa	Mr_c= 89 MPa	Mr_c= 102 MPa	Mr_c= 89 MPa
			υ_c= **-0.43**	υ_c= **-0.02**







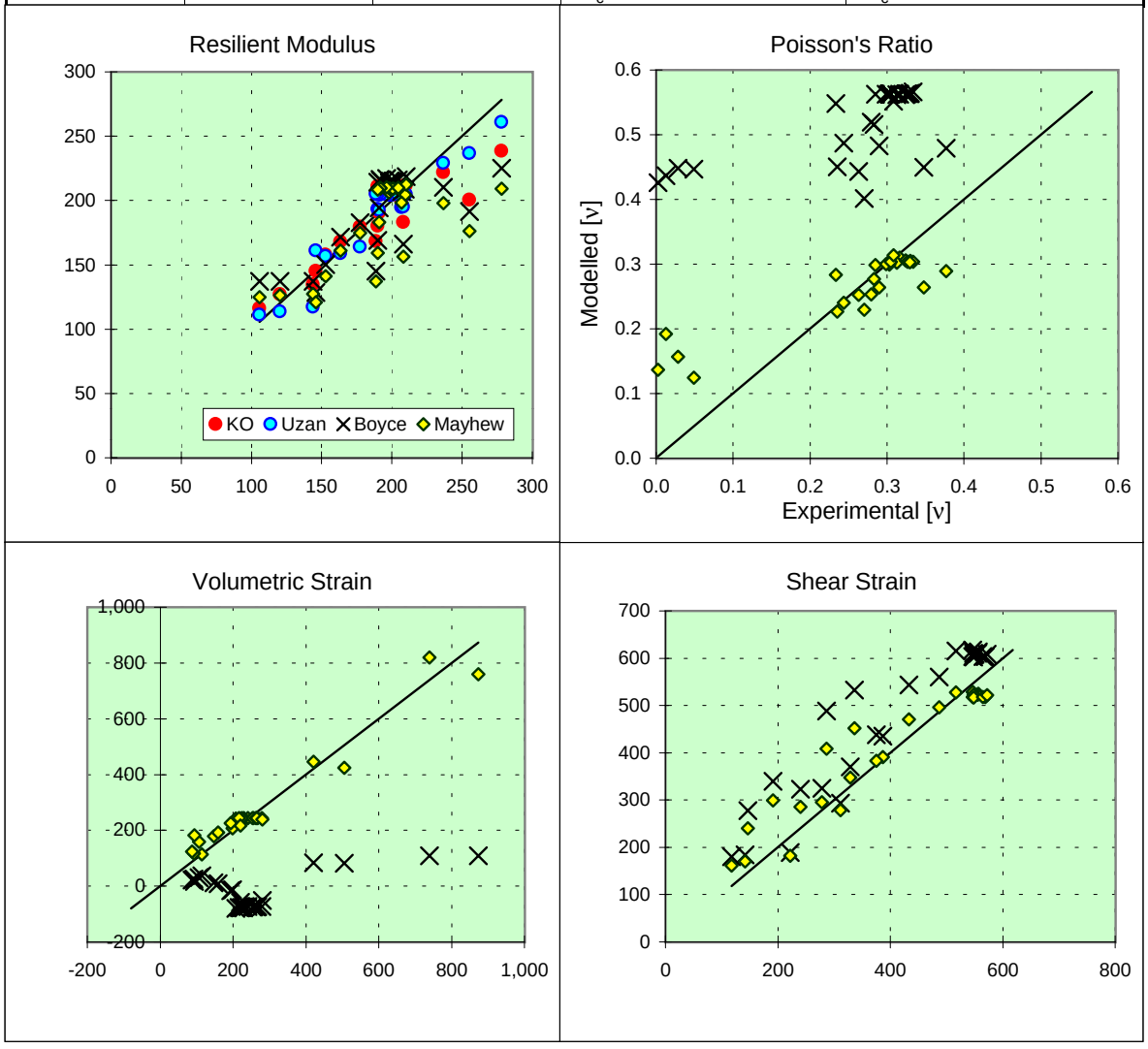


TP-II : UNOT ***Microgranite (MIG)*** ***90% Percentile Data***

Experimental Data	Sample Size: 28	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 169 MPa	υ_e = 0.24

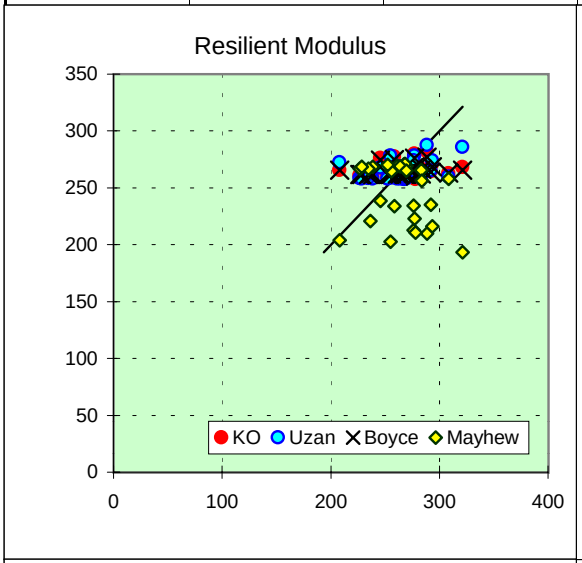
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 132,826	k_3 = 233,118	Ga = 57,552 kPa	Ga = 67,587 kPa
	k_2 = 0.4509	k_4 = 0.8029	Ka = 117,362 kPa	Ka = 66,081 kPa
		k_5 = -0.2846	n = 0.3157	n = 0.2265
				β = 0.2288
				m = 0.9239
	r^2= 0.650	r^2= 0.779	r^2= 0.502	$r^2\varepsilon_v$= 0.830 $r^2\varepsilon_s$= 0.765

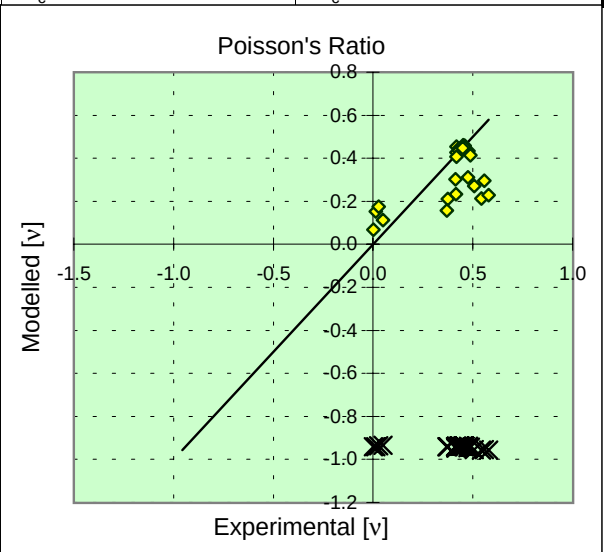
Characteristic Values	At	p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**		**Mayhew**	
			ε_{vc}= 23	ε_{sc}= 411	ε_{vc}= 55	ε_{sc}= 414
	Mr_c= 94 MPa	Mr_c= 61 MPa	Mr_c= 117 MPa		Mr_c= 112 MPa	
			υ_c= 0.45		υ_c= 0.39	

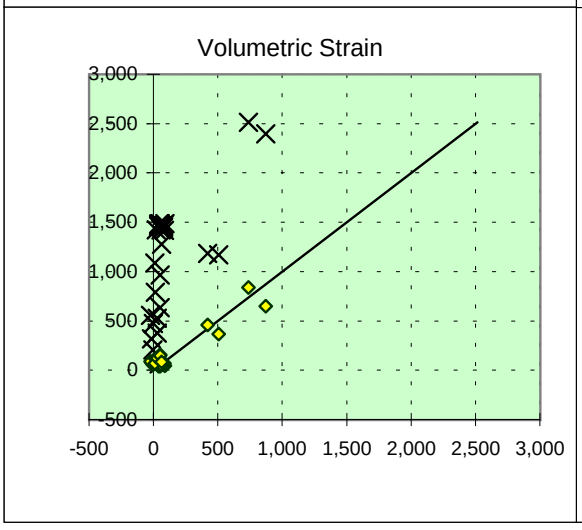


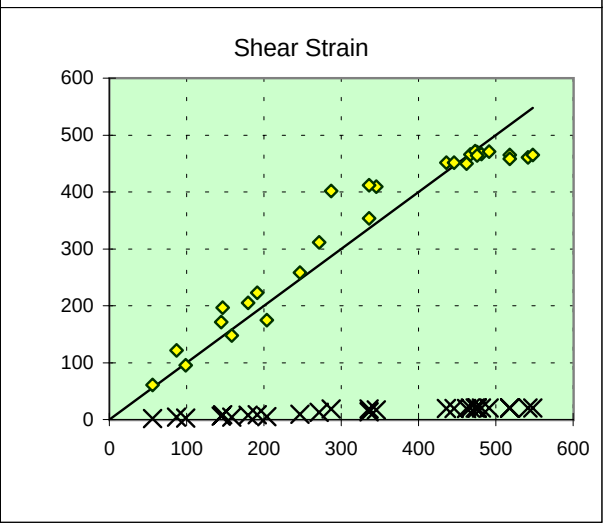
TP-II : UNOT ***Microgranite (MIG)*** ***90% Percentile Data***

Experimental Data	Sample Size: 28	p*= 27 kPa @ ω = 3.3%		p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 274 MPa	υ_e = 0.39
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 275,626	k_3 = 265,847	Ga = 1,709,470 kPa	Ga = 75,658 kPa
	k_2 = -0.0523	k_4 = 0.0486	Ka = 30,977 kPa	Ka = 71,676 kPa
		k_5 = -0.0943	n = 1.0312	n = 0.7063
				β = 0.4514
				m = 1.3794
	r^2= 0.316	r^2= 0.338	r^2= 0.305	$r^2\varepsilon_v$= 0.749 $r^2\varepsilon_s$= 0.804
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 290 ε_{sc}= 4	ε_{vc}= -2 ε_{sc}= 150
	Mr_c= 287 MPa	Mr_c= 257 MPa	Mr_c= 284 MPa	Mr_c= 334 MPa
			υ_c= **-0.97**	υ_c= 0.51







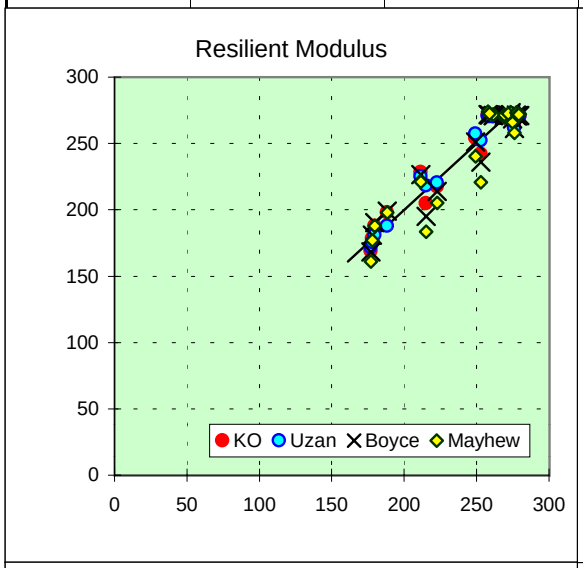


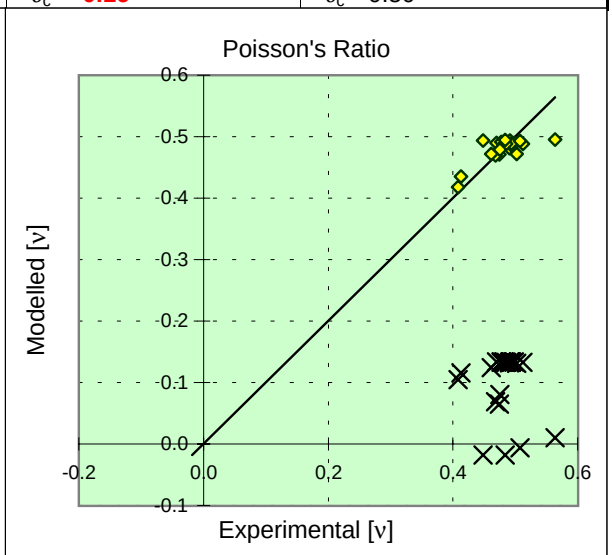
TP-II : UNOT ***Microgranite (MIG)*** ***90% Percentile Data***

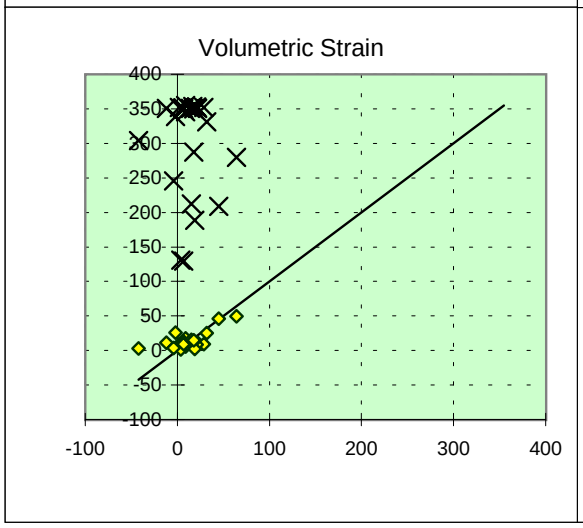
Experimental Data	Sample Size: 23	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 210 MPa	υ_e = 0.48

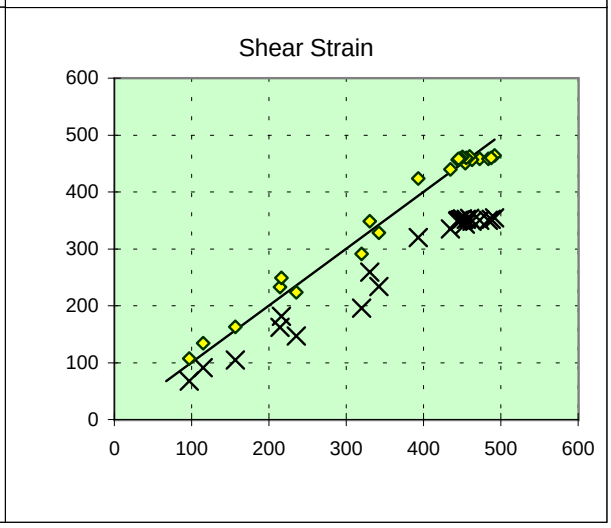
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 192,872	k_3 = 289,290	Ga = 99,024 kPa	Ga = 76,389 kPa
	k_2 = 0.3305	k_4 = 0.4846	Ka = 59,634 kPa	Ka = 202,661 kPa
		k_5 = -0.1317	n = 0.5135	n = 0.3771
				β = 0.7416
				m = 3.5641
	r^2= 0.826	r^2= 0.852	r^2= 0.799	$r^2\varepsilon_v$= 0.475 $r^2\varepsilon_s$= 0.899

Characteristic Values				
	At p_1= 6 kPa		p_2 = 15 kPa and	q_1= 4 kPa q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 217 ε_{sc}= 165	ε_{vc}= 0 ε_{sc}= 276
	Mr_c= 149 MPa	Mr_c= 126 MPa	Mr_c= 170 MPa	Mr_c= 181 MPa
			υ_c= **-0.16**	υ_c= 0.50







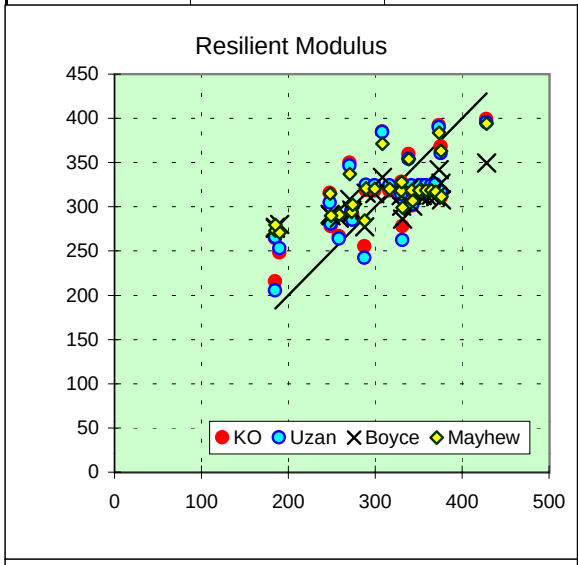


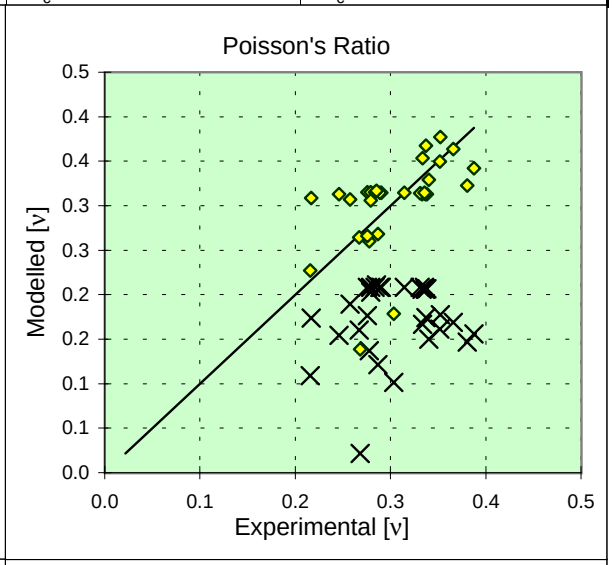
TP-II : LRSB ***Microgranite (MIG)*** ***90% Percentile Data***

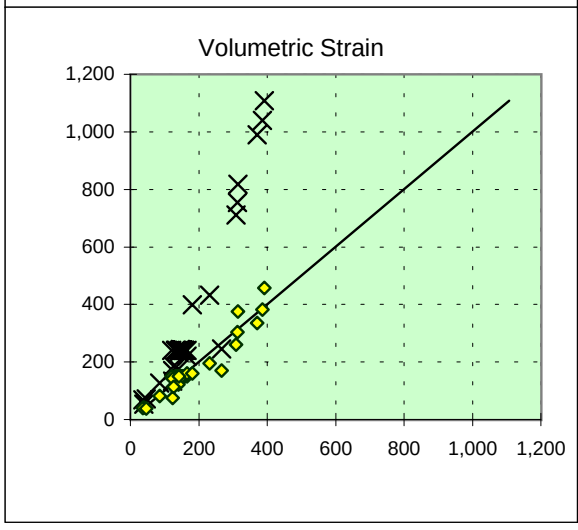
Experimental Data	Sample Size: 31	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 266 MPa	υ_e = 0.27

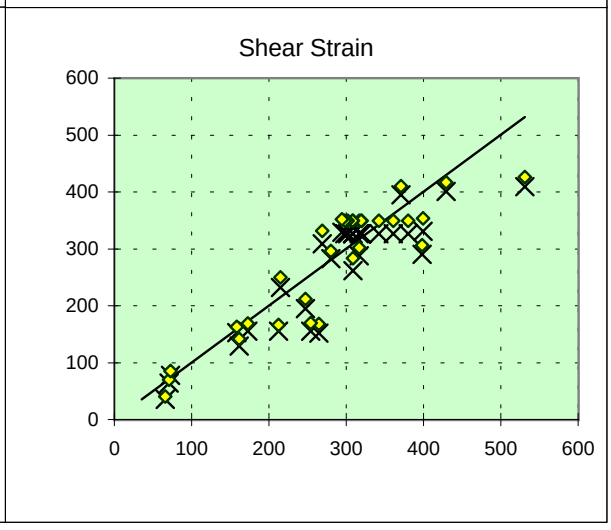
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 244,615	k_3 = 322,297	Ga = 104,342 kPa	Ga = 97,820 kPa
	k_2 = 0.2556	k_4 = 0.1954	Ka = 110,002 kPa	Ka = 118,506 kPa
		k_5 = 0.0748	n = 0.6781	n = 0.6435
				β = -0.0401
				m = 0.2341
	r^2= 0.503	r^2= 0.510	r^2= 0.439	$r^2\varepsilon_v$= 0.776 $r^2\varepsilon_s$= 0.686

Characteristic Values				
	At p_1= 6 kPa		p_2 = 15 kPa and	q_1= 4 kPa q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 107 ε_{sc}= 115	ε_{vc}= 144 ε_{sc}= 131
	Mr_c= 200 MPa	Mr_c= 213 MPa	Mr_c= 279 MPa	Mr_c= 231 MPa
			υ_c= **-0.03**	υ_c= **-0.09**







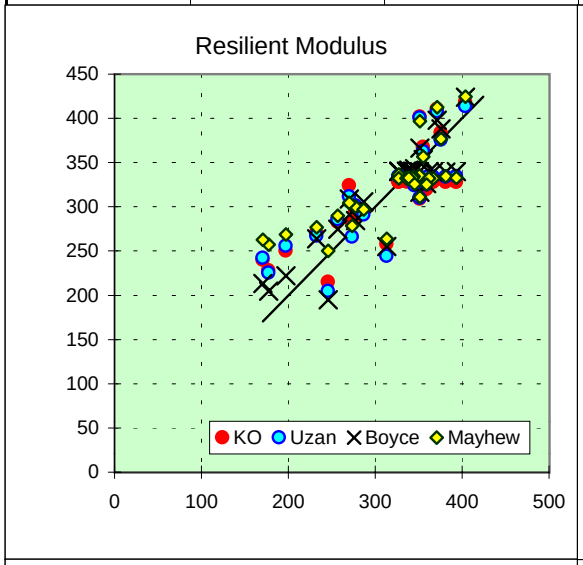


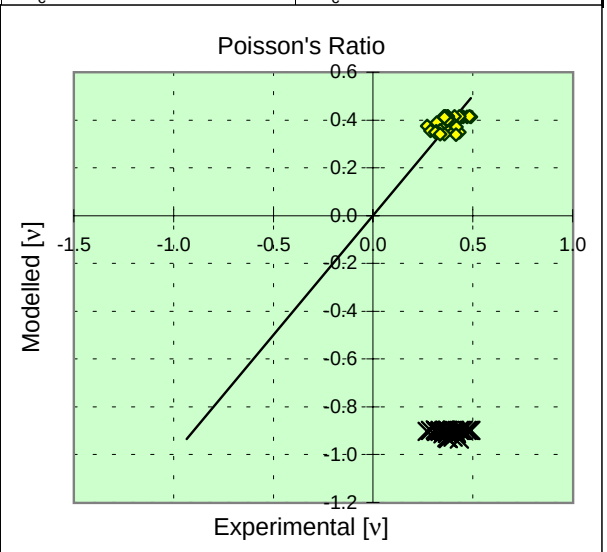
TP-II : LRSB ***Micrograniite (MIG)*** ***90% Percentile Data***

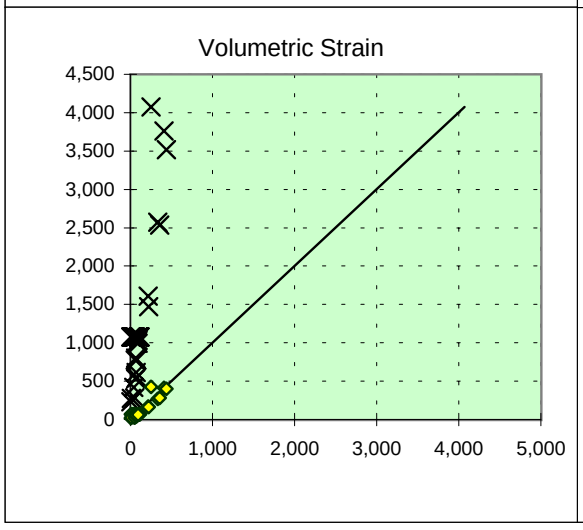
Experimental Data	Sample Size: 31	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 268 MPa	υ_e = 0.37

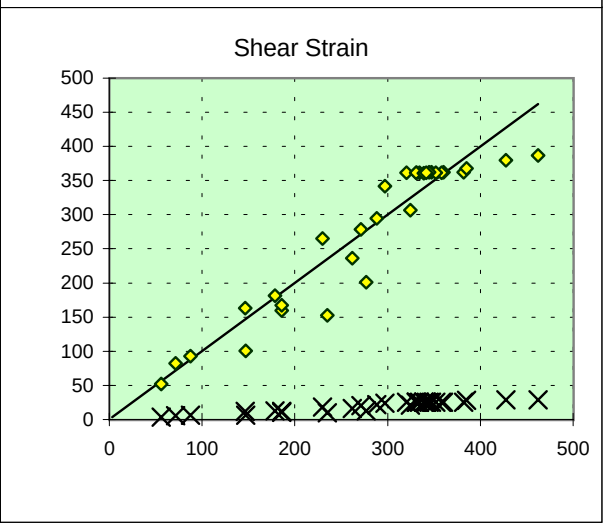
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 246,293	k_3 = 332,073	Ga = 1,364,663 kPa	Ga = 96,751 kPa
	k_2 = 0.2773	k_4 = 0.2157	Ka = 27,137 kPa	Ka = 291,514 kPa
		k_5 = 0.0757	n = 0.5817	n = 0.4896
				β = 0.1524
				m = 0.7777
	r^2= 0.593	r^2= 0.601	r^2= 0.686	$r^2\varepsilon_v$= 0.714 $r^2\varepsilon_s$= 0.767

Characteristic Values	At	p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**		**Mayhew**	
			ε_{vc}= 520	ε_{sc}= 11	ε_{vc}= 21	ε_{sc}= 176
	Mr_c= 198 MPa	Mr_c= 212 MPa	Mr_c= 156 MPa		Mr_c= 263 MPa	
			υ_c= **-0.95**		υ_c= 0.40	







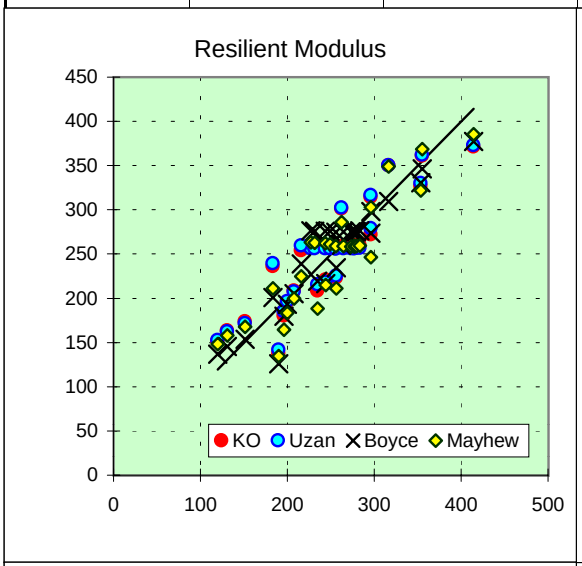


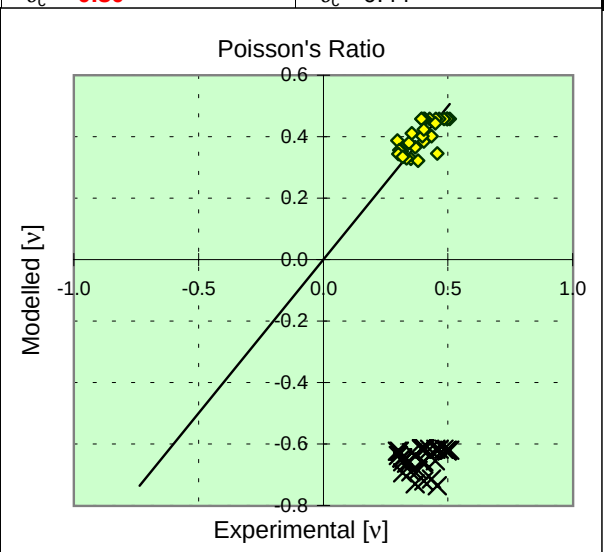
TP-II : LRSB ***Micrangranite (MIG)*** ***90% Percentile Data***

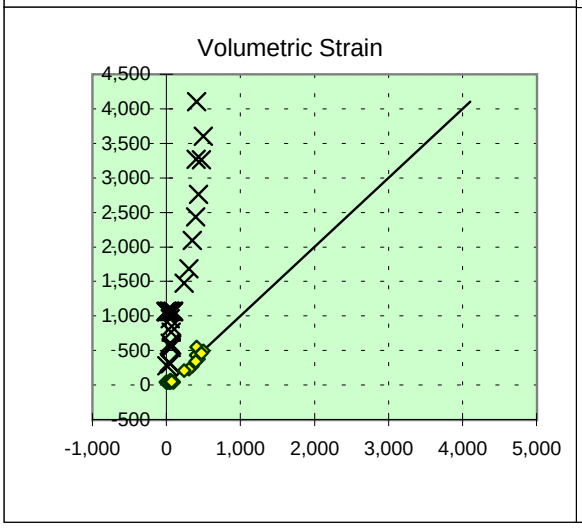
Experimental Data	Sample Size: 31	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 202 MPa	υ_e = 0.38

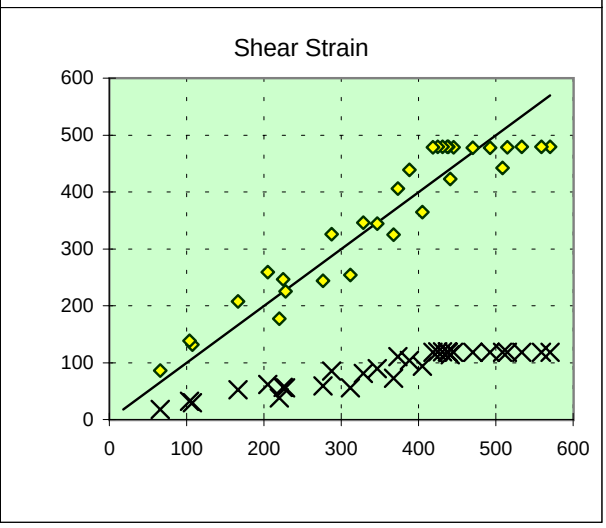
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 169,748	k_3 = 266,584	Ga = 298,410 kPa	Ga = 74,287 kPa
	k_2 = 0.4090	k_4 = 0.4434	Ka = 19,164 kPa	Ka = 153,516 kPa
		k_5 = -0.0431	n = 0.3900	n = 0.2823
				β = 0.1774
				m = 0.5167
	r^2= 0.695	r^2= 0.697	r^2= 0.739	$r^2\varepsilon_v$= 0.807 $r^2\varepsilon_s$= 0.773

Characteristic Values	At	p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**		**Mayhew**	
			ε_{vc}= 757	ε_{sc}= 69	ε_{vc}= 23	ε_{sc}= 339
	Mr_c= 123 MPa	Mr_c= 119 MPa	Mr_c= 96 MPa		Mr_c= 141 MPa	
			υ_c= **-0.80**		υ_c= 0.44	







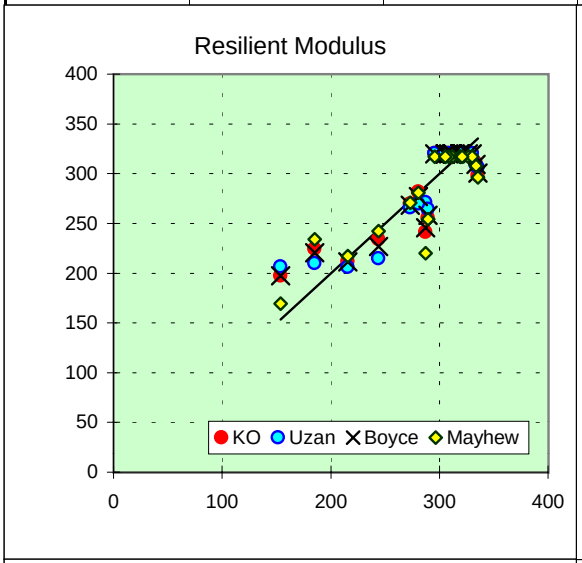


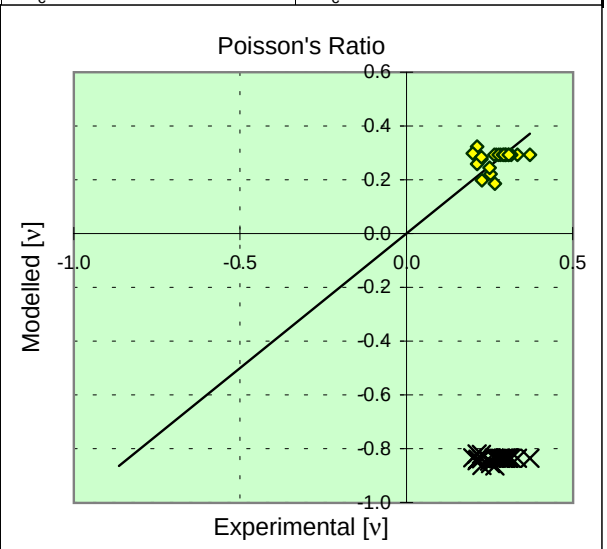
TP-II : DUT ***Microgranite (MIG)*** ***90% Percentile Data***

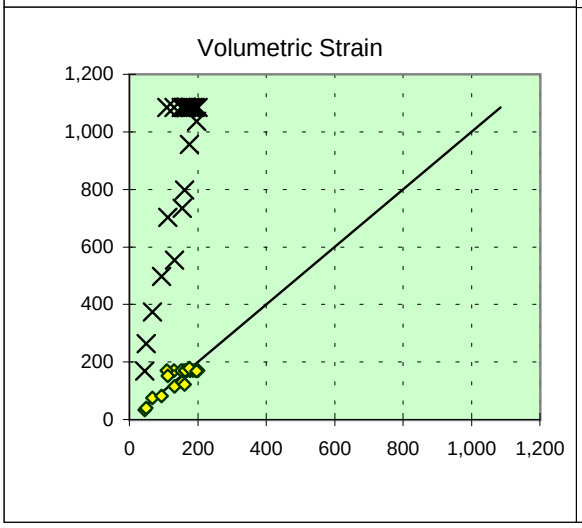
Experimental Data	Sample Size: 23	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 239 MPa	υ_e = 0.23

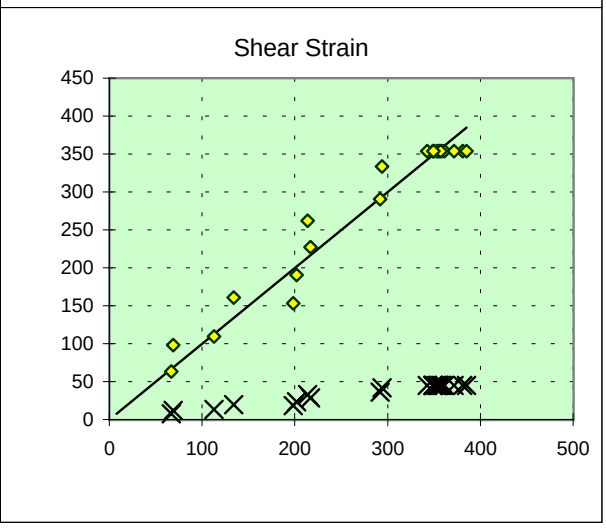
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 223,268	k_3 = 357,376	Ga = 835,258 kPa	Ga = 105,625 kPa
	k_2 = 0.3369	k_4 = 0.6297	Ka = 27,868 kPa	Ka = 106,353 kPa
		k_5 = -0.2639	n = 0.6299	n = 0.5971
				β = -0.1065
				m = 0.0738
	r^2= 0.681	r^2= 0.710	r^2= 0.693	$r^2\varepsilon_v$= 0.626 $r^2\varepsilon_s$= 0.856

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 172 MPa	Mr_c= 129 MPa	ε_{vc}= 490 ε_{sc}= 16	ε_{vc}= 199 ε_{sc}= 132
			Mr_c= 163 MPa	Mr_c= 199 MPa
			υ_c= **-0.92**	υ_c= **-0.21**







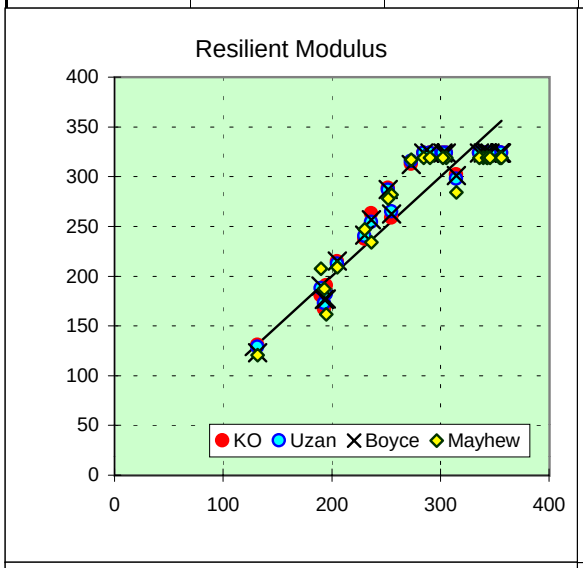


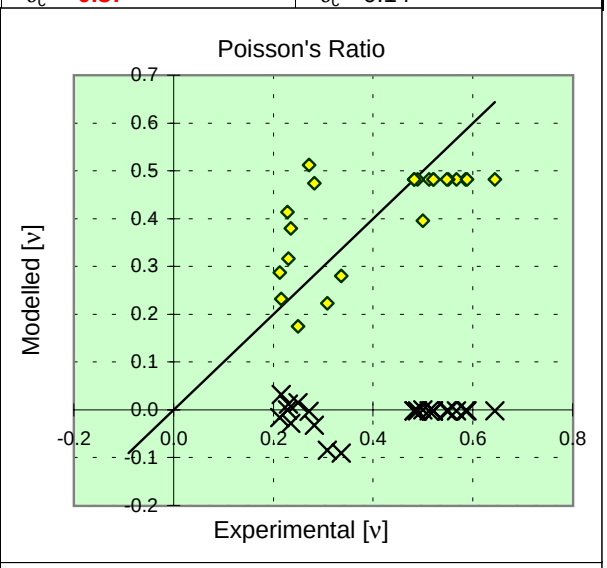
TP-II : DUT ***Microgranite (MIG)*** ***90% Percentile Data***

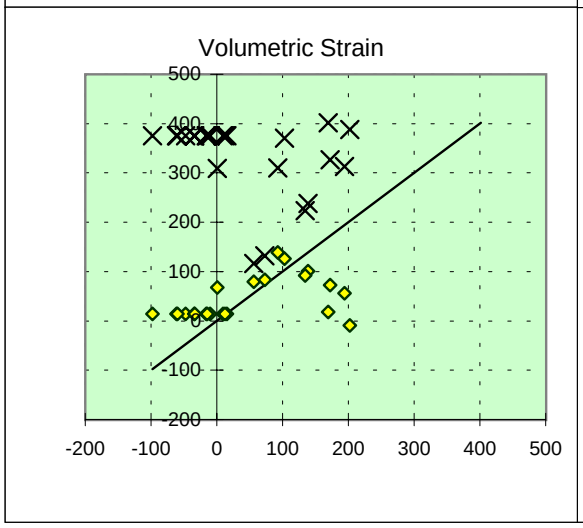
Experimental Data	Sample Size: 23	p*= 27 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 189 MPa	υ_e = 0.24

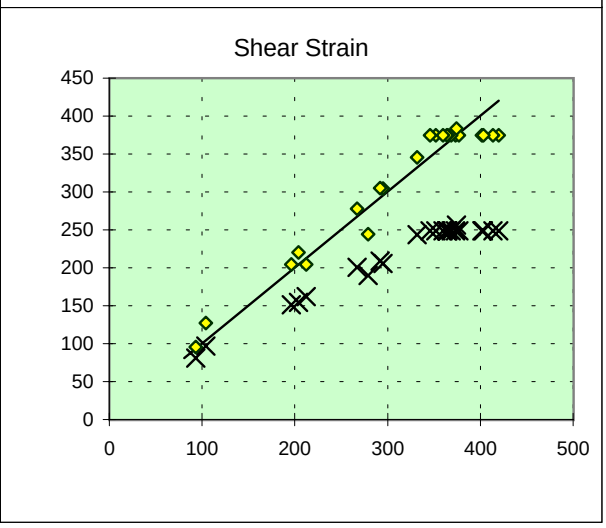
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 161,853	k_3 = 323,378	Ga = 143,905 kPa	Ga = 94,388 kPa
	k_2 = 0.6671	k_4 = 0.5386	Ka = 33,187 kPa	Ka = 22,850 kPa
		k_5 = 0.1208	n = 0.3090	n = 0.4893
				β = 0.1204
				m = 0.2847
	r^2= 0.740	r^2= 0.744	r^2= 0.745	$r^2\varepsilon_v$= 0.375 $r^2\varepsilon_s$= 0.842

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 96 MPa	Mr_c= 109 MPa	ε_{vc}= 386 ε_{sc}= 166	ε_{vc}= 95 ε_{sc}= 181
			Mr_c= 126 MPa	Mr_c= 210 MPa
			υ_c= **-0.37**	υ_c= 0.14



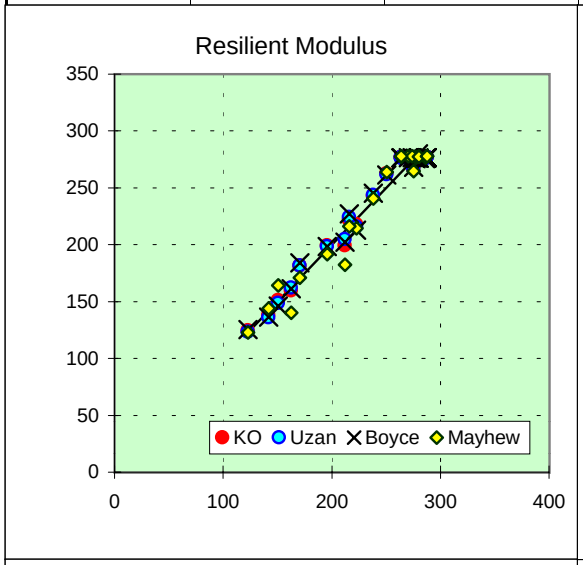


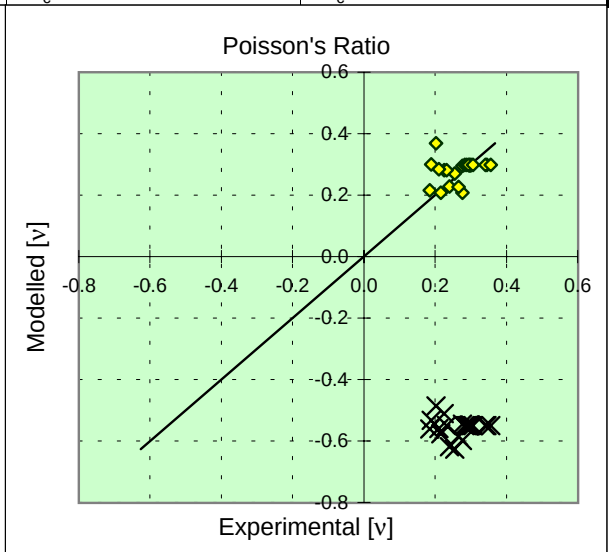


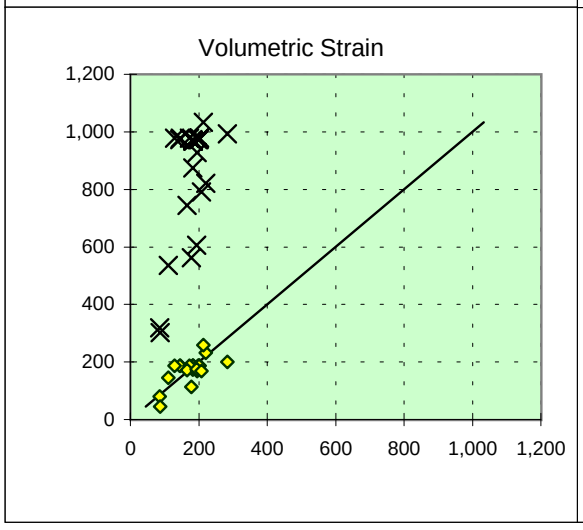


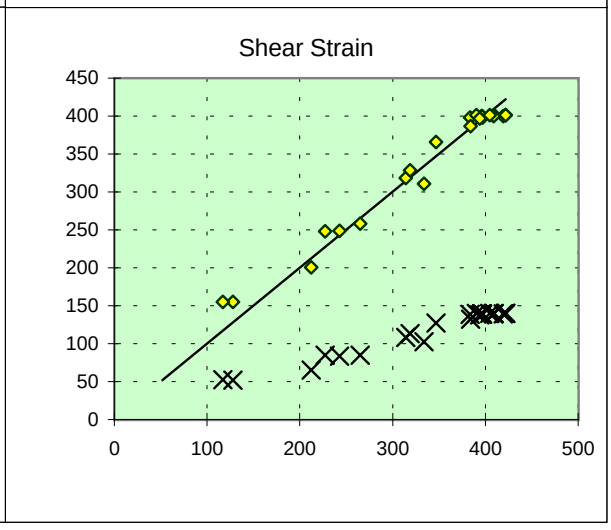
TP-II : DUT ***Microgranite (MIG)*** ***90% Percentile Data***

Experimental Data	Sample Size: 23	p*= 27 kPa @ ω = 3.3%		p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 167 MPa	υ_e = 0.22
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 136,341	k_3 = 286,706	Ga = 269,094 kPa	Ga = 93,987 kPa
	k_2 = 0.6627	k_4 = 0.7120	Ka = 14,842 kPa	Ka = 547,832 kPa
		k_5 = -0.0424	n = 0.2883	n = 0.2301
				β = -1.8046
				m = -1.4703
	r^2= 0.895	r^2= 0.897	r^2= 0.889	$r^2\varepsilon_v$= 0.446 $r^2\varepsilon_s$= 0.879
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 910 ε_{sc}= 93	ε_{vc}= -69 ε_{sc}= 296
	Mr_c= 81 MPa	Mr_c= 77 MPa	Mr_c= 79 MPa	Mr_c= 196 MPa
			υ_c= **-0.78**	υ_c= 0.74



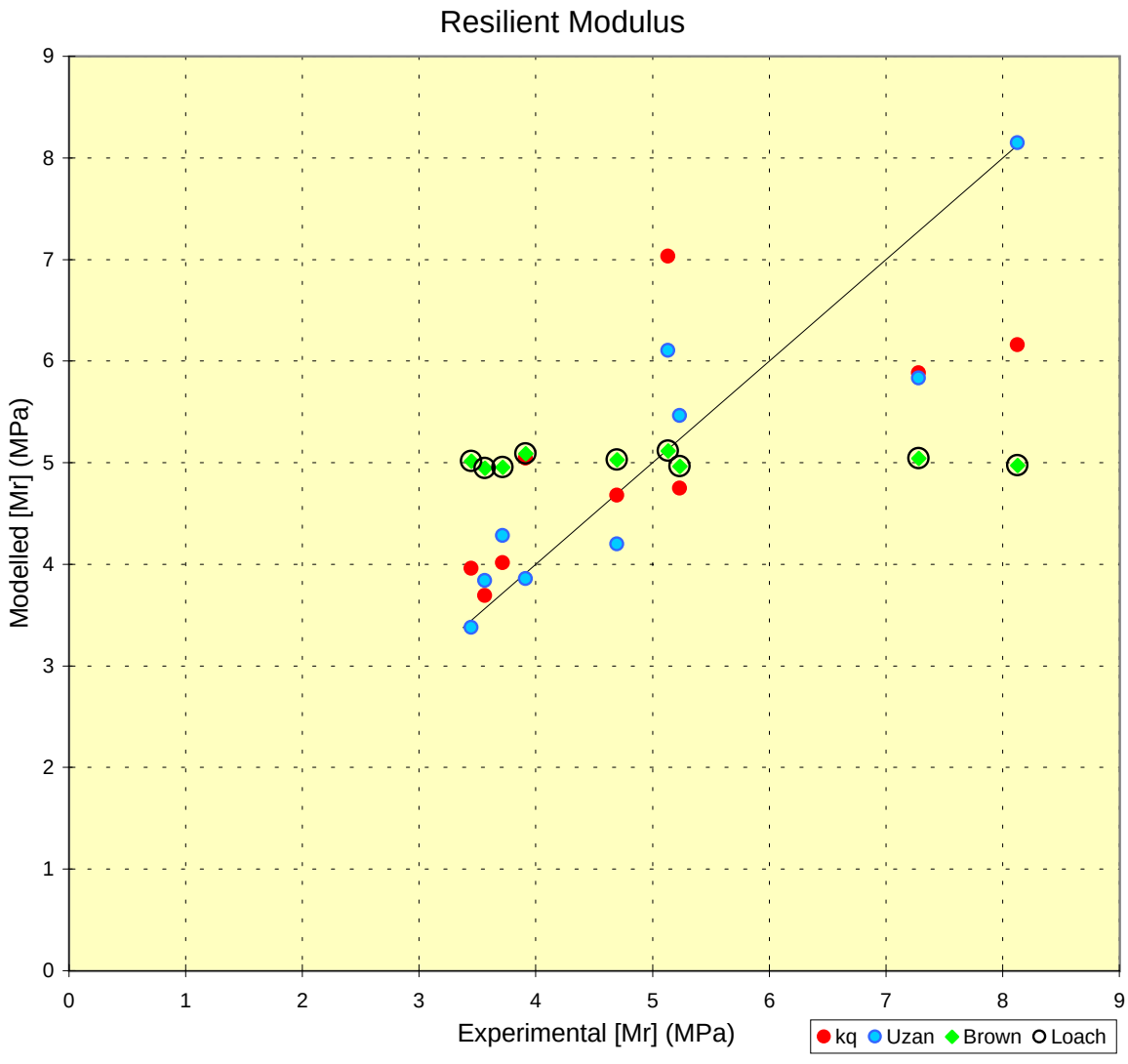






TP-II : LNEC ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 9	Suction (s) = 40 kPa @ ω= 36%		1,380 kg/m3
	Chara'tic Values at q_2 = 26 kPa	Mr_e= 5 MPa	υ_e = 0.50	
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k1 = 4,502	k3 = 2,969	A = 5,028	C = 12,570
	k2 = -0.3740	k4 = -0.6202	B = 0.0241	D = 1.0241
		k5 = 0.4308		
	r^2= 0.496	r^2= 0.833	r^2= 0.001	r^2= 0.001
Characteristic Values			At: p2 = 12 kPa	& q2= 26 kPa
	Mr_c= 7 MPa	Mr_c= 6 MPa	Mr_c= 5 MPa	Mr_c= 5 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	486	0.15	468	0.11	0.12	615	0.25	1538	0.25
t=	9.26	-2.52	6.34	-5.57	3.48	8.17	0.10	8.17	4.11
Prob(t)=	0%	4%	0%	0%	1%	0%	93%	0%	0%

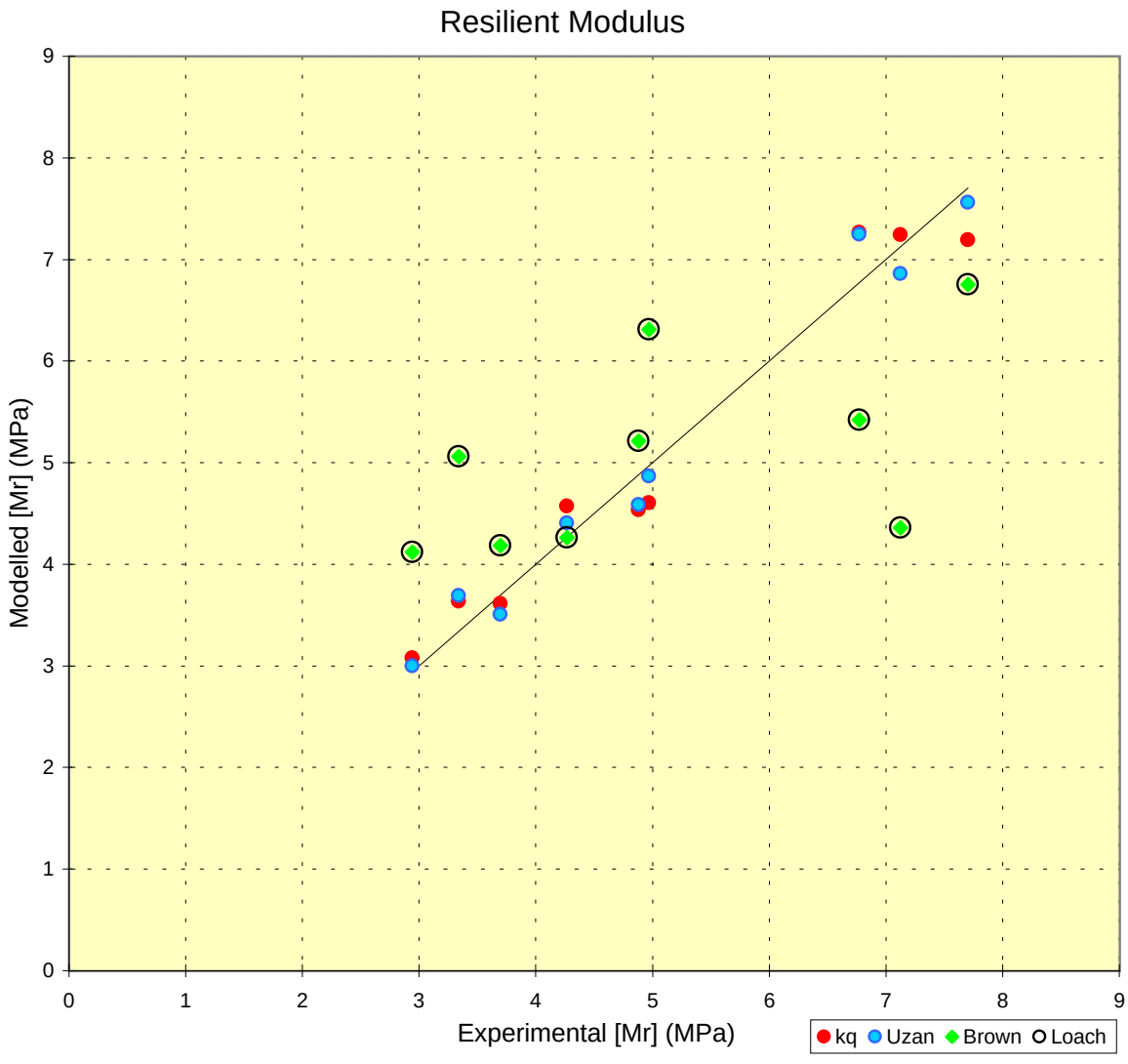
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-II : LNEC ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 9	Suction (s) = 40 kPa @ ω= 37%		1,370 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 6 MPa	υ_e = 0.51
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k1 = 3,983	k3 = 1,776	A = 5,155	C = 12,887
	k2 = -0.7140	k4 = -0.6788	B = 0.3527	D = 1.3527
		k5 = -0.0838		
	r^2= 0.960	r^2= 0.976	r^2= 0.300	r^2= 0.300
Characteristic Values			At: p2 = 12 kPa	& q2= 26 kPa
	Mr_c= 9 MPa	Mr_c= 9 MPa	Mr_c= 6 MPa	Mr_c= 6 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	155	0.06	147	0.05	0.04	526	0.20	1315	0.20
t=	25.69	-12.22	12.07	-13.06	-2.05	9.80	1.78	9.80	6.81
Prob(t)=	0%	0%	0%	0%	9%	0%	12%	0%	0%

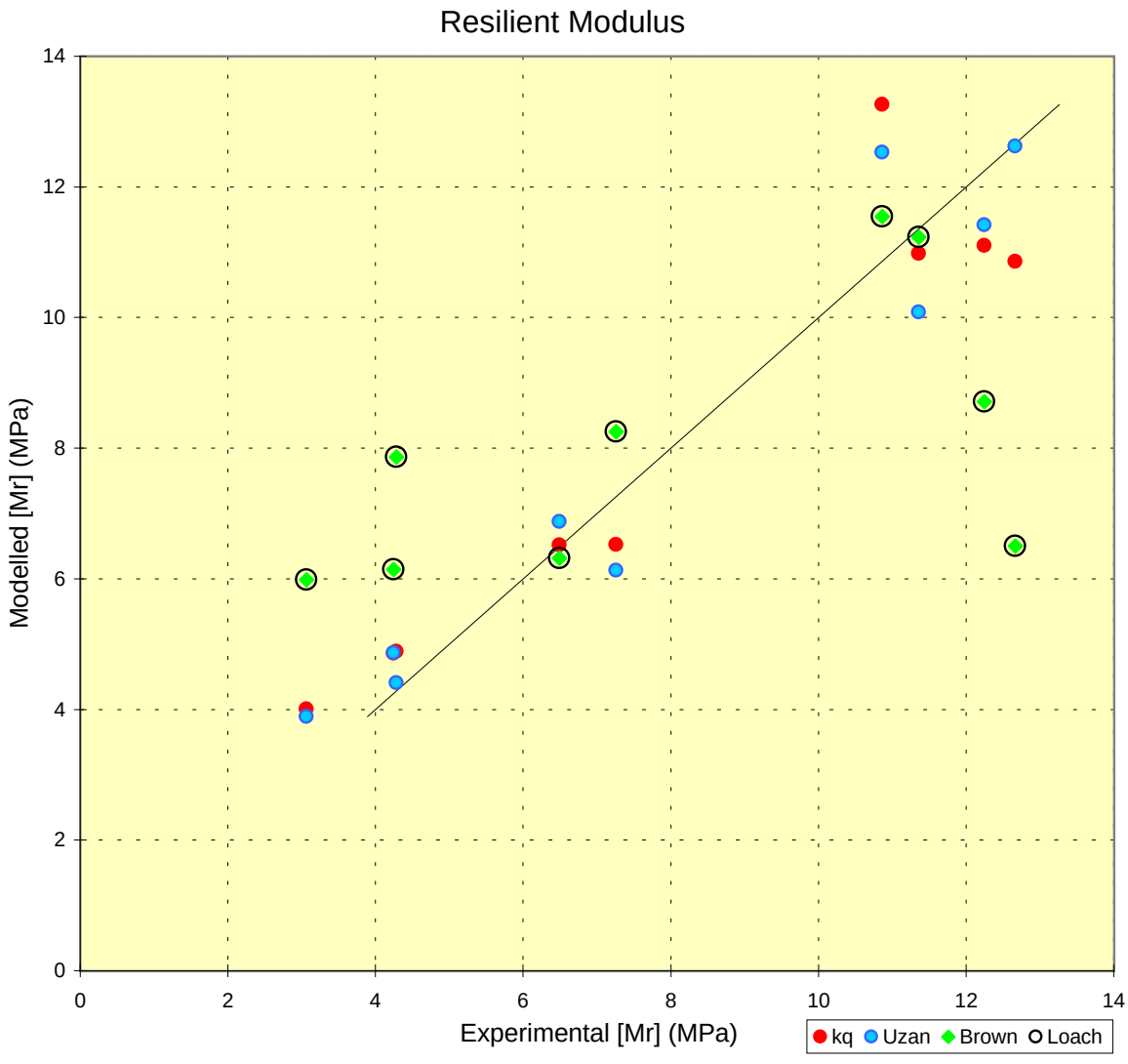
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The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-II : LNEC ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 9	Suction (s) = 40 kPa @ ω= 36%		1,380 kg/m3
	Chara'tic Values at q_2 = 26 kPa	Mr_e= 10 MPa	υ_e = 0.52	
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k1 = 5,541	k3 = 2,292	A = 8,128	C = 20,320
	k2 = -0.7312	k4 = -0.8888	B = 0.4625	D = 1.4625
		k5 = 0.2022		
	r^2= 0.889	r^2= 0.933	r^2= 0.327	r^2= 0.327
Characteristic Values			At: p2 = 12 kPa	& q2= 26 kPa
	Mr_c= 12 MPa	Mr_c= 12 MPa	Mr_c= 10 MPa	Mr_c= 10 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	595	0.12	462	0.13	0.10	1141	0.25	2852	0.25
t=	9.32	-6.24	4.96	-7.11	2.05	7.13	1.83	7.13	5.79
Prob(t)=	0%	0%	0%	0%	9%	0%	11%	0%	0%

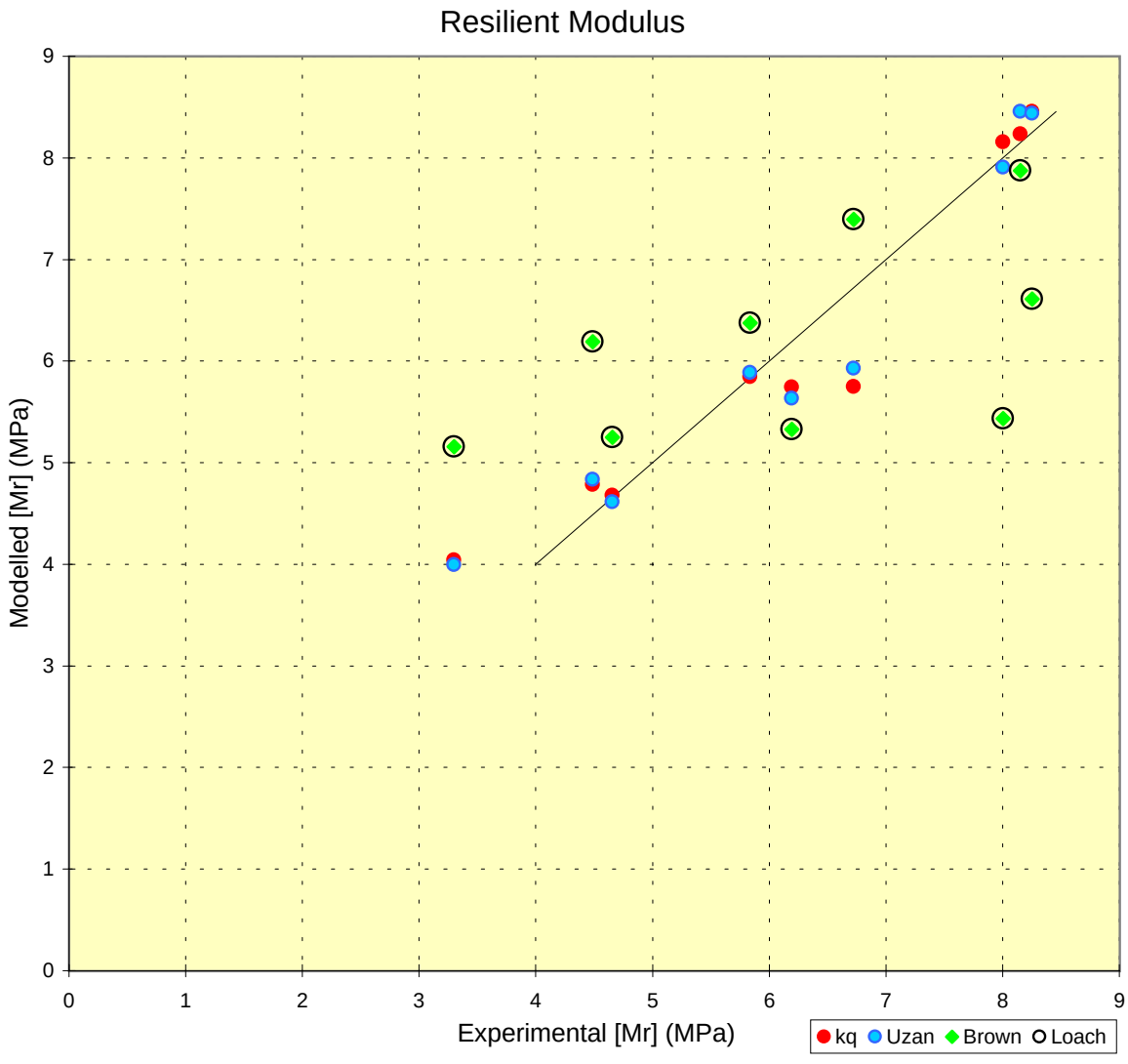
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The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-II : LNEC ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 9	Suction (s) = 40 kPa @ ω= 36%		1,370 kg/m3
	Chara'tic Values at q_2 = 26 kPa	Mr_e= 7 MPa	υ_e = 0.51	
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k1 = 5,336	k3 = 2,935	A = 6,316	C = 15,789
	k2 = -0.5349	k4 = -0.5133	B = 0.3032	D = 1.3032
		k5 = -0.0471		
	r^2= 0.927	r^2= 0.934	r^2= 0.309	r^2= 0.309
Characteristic Values			At: p2 = 12 kPa	& q2= 26 kPa
	Mr_c= 9 MPa	Mr_c= 9 MPa	Mr_c= 7 MPa	Mr_c= 7 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	203	0.06	297	0.07	0.06	535	0.17	1338	0.17
t=	26.24	-8.92	9.89	-7.58	-0.77	11.80	1.78	11.80	7.66
Prob(t)=	0%	0%	0%	0%	47%	0%	12%	0%	0%

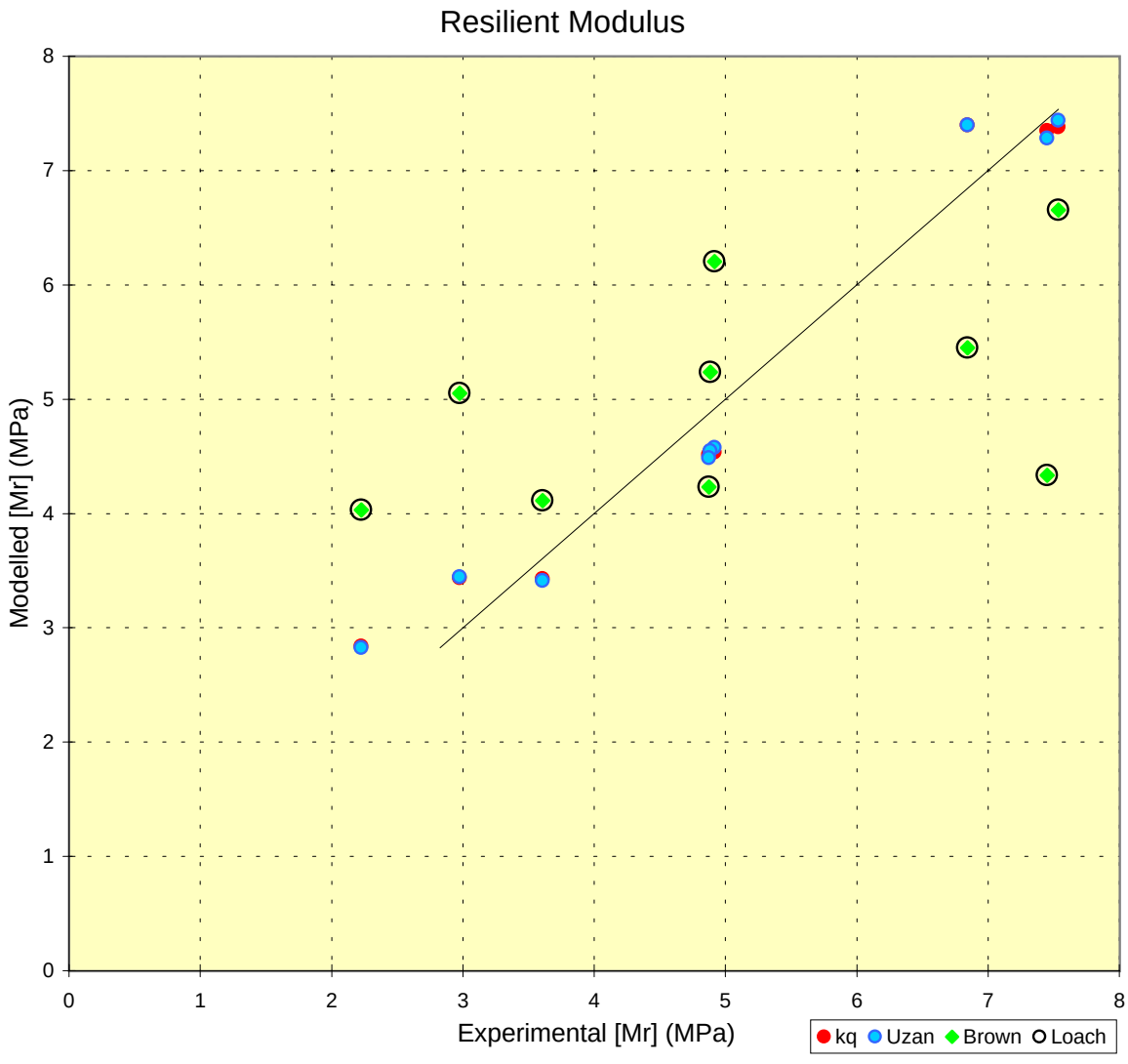
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The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-II : LNEC ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 9	Suction (s) = 40 kPa @ ω= 36%		1,370 kg/m3
	Chara'tic Values at q_2 = 26 kPa	Mr_e= 6 MPa	υ_e = 0.54	
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k1 = 3,964	k3 = 1,817	A = 5,154	C = 12,884
	k2 = -0.7061	k4 = -0.7003	B = 0.3639	D = 1.3639
		k5 = -0.0146		
	r^2= 0.955	r^2= 0.955	r^2= 0.242	r^2= 0.242
Characteristic Values			At: p2 = 12 kPa	& q2= 26 kPa
	Mr_c= 8 MPa	Mr_c= 8 MPa	Mr_c= 6 MPa	Mr_c= 6 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	180	0.06	217	0.07	0.06	607	0.24	1517	0.24
t=	22.02	-11.12	8.37	-9.60	-0.22	8.49	1.51	8.49	5.66
Prob(t)=	0%	0%	0%	0%	83%	0%	17%	0%	0%

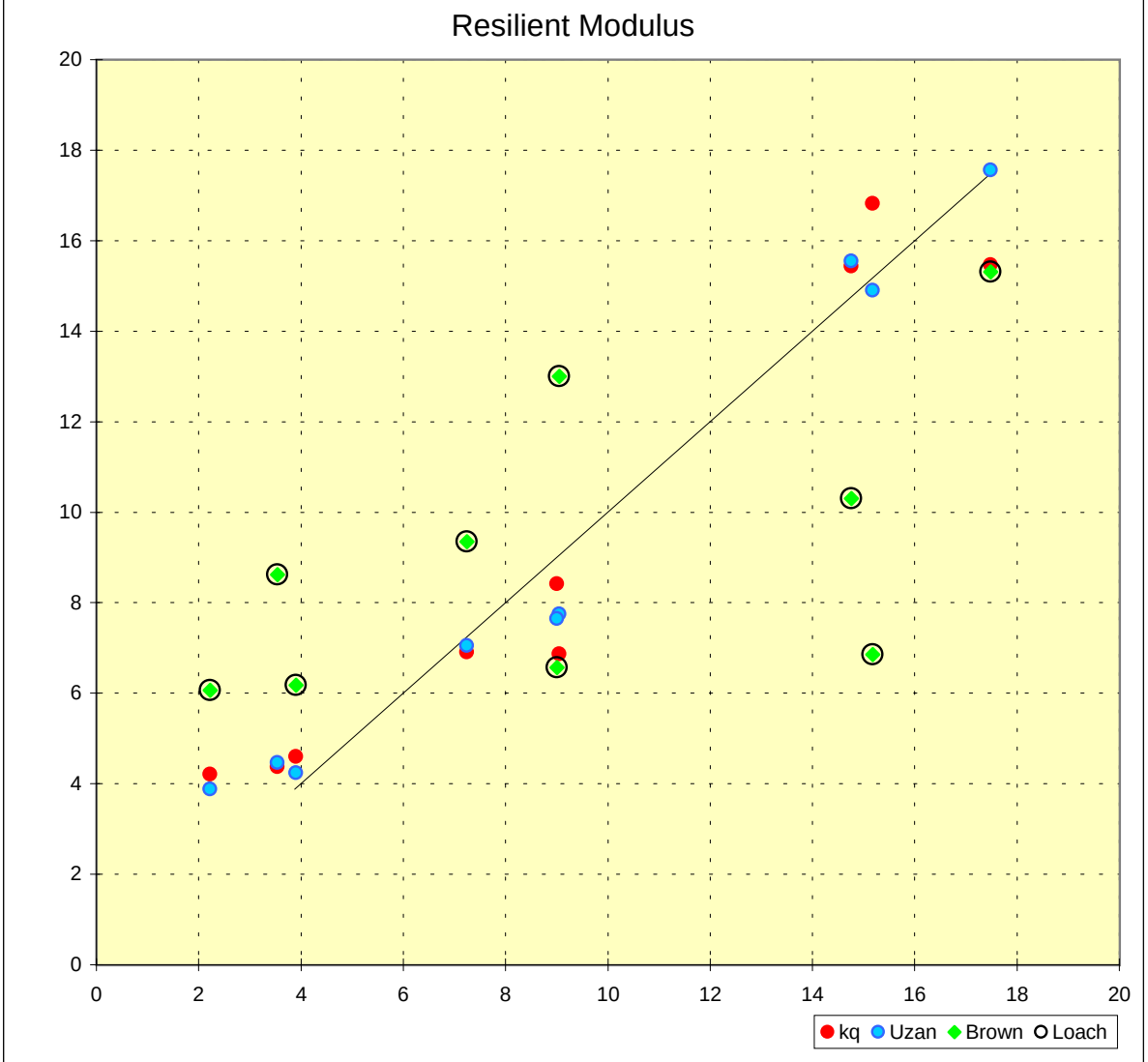
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The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-II : LNEC ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 9	Suction (s) = 40 kPa @ ω= 37%		1,370 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 13 MPa	υ_e = 0.61
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k1 = 7,736	k3 = 1,722	A = 9,739	C = 24,349
	k2 = -1.2847	k4 = -1.2151	B = 0.7026	D = 1.7026
		k5 = -0.2124		
	r^2= 0.930	r^2= 0.968	r^2= 0.333	r^2= 0.333
Characteristic Values			At: p2 = 12 kPa	& q2= 26 kPa
	Mr_c= 30 MPa	Mr_c= 32 MPa	Mr_c= 13 MPa	Mr_c= 13 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	645	0.16	326	0.12	0.08	1710	0.37	4274	0.37
t=	12.00	-7.84	5.28	-9.84	-2.71	5.70	1.89	5.70	4.59
Prob(t)=	0%	0%	0%	0%	4%	0%	10%	0%	0%

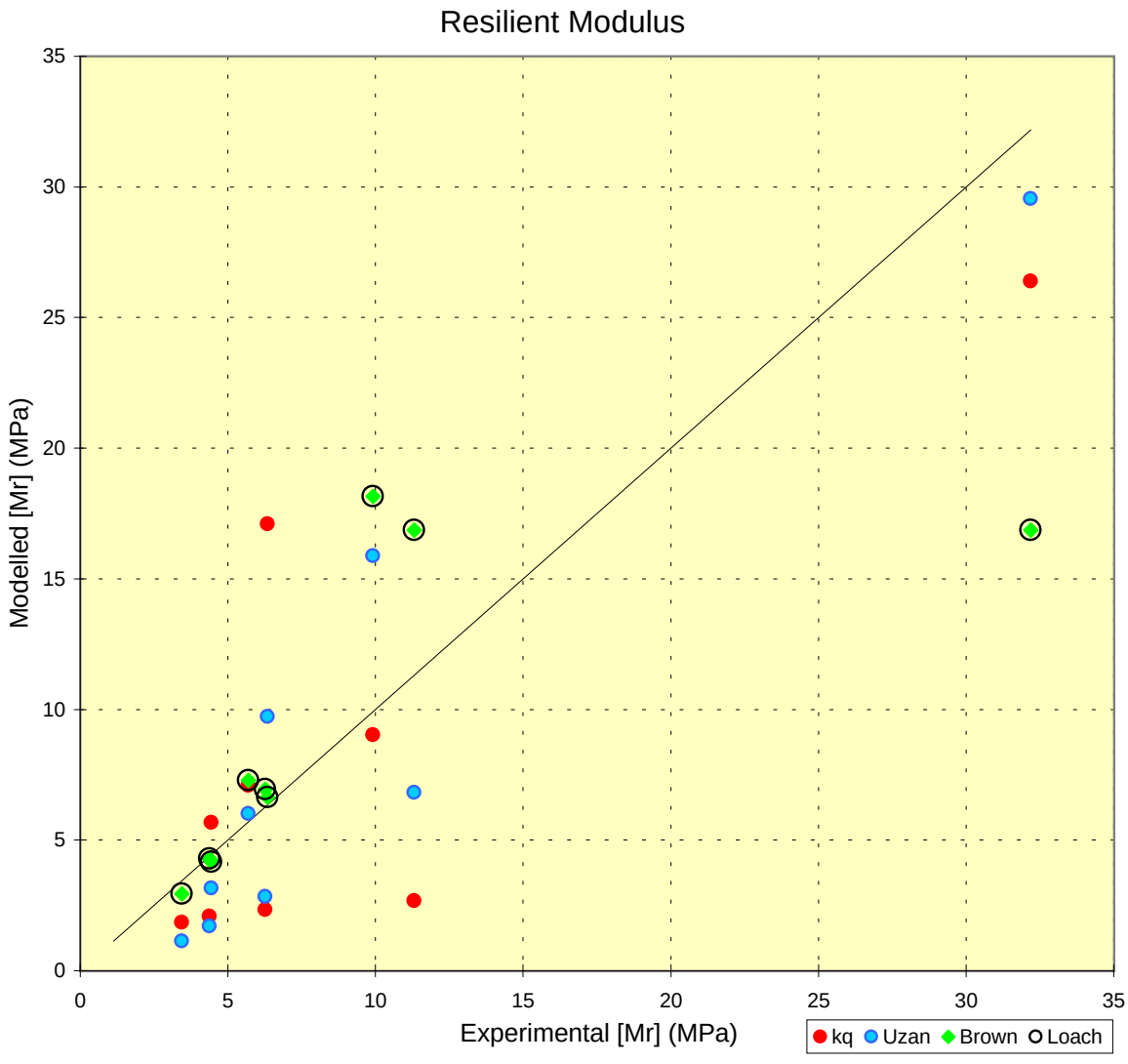
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The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-II : UNOT ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 9	Suction (s) =	40 kPa @ ω=	#### #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 11 MPa	υ_e = 0.78
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k1 = 9,772	k3 = 406	A = 4,510	C = 11,275
	k2 = -1.9452	k4 = -1.2446	B = 1.3446	D = 2.3446
		k5 = -1.2035		
	r^2= 0.608	r^2= 0.843	r^2= 0.475	r^2= 0.475
Characteristic Values			At: p2 = 12 kPa	& q2= 26 kPa
	Mr_c= 77 MPa	Mr_c= 31 MPa	Mr_c= 8 MPa	Mr_c= 8 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	2808	0.66	377	0.36	0.49	2847	0.69	7118	0.69
t=	3.48	-2.94	1.08	-3.44	-2.43	1.58	1.96	1.58	3.41
Prob(t)=	1%	2%	32%	1%	5%	16%	9%	16%	1%

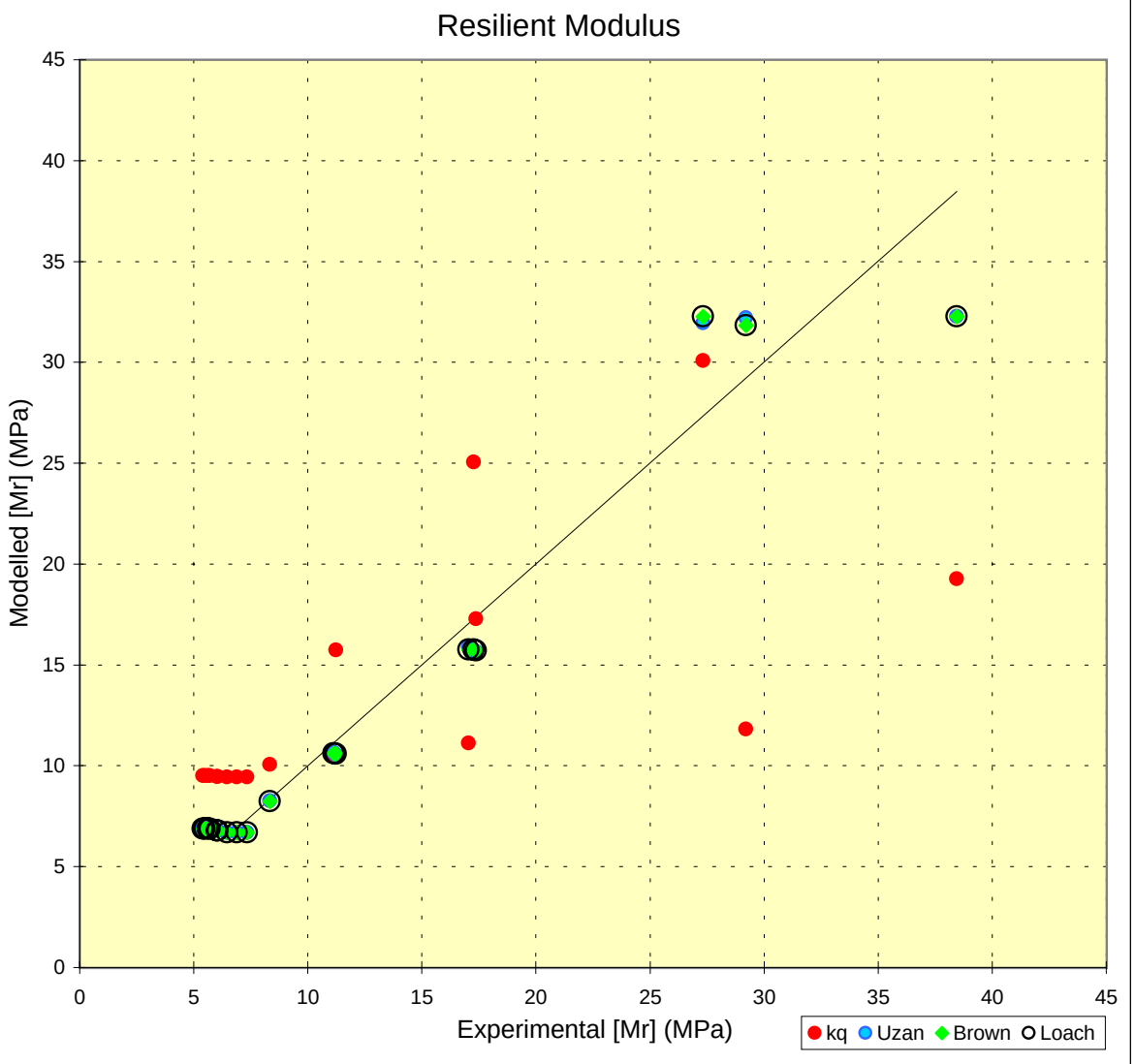
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-II : UNOT ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 18	Suction (s) =	40 kPa @ ω=	#### #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 23 MPa	υ_e = 0.57
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k1 = 19,870	k3 = 4,885	A = 11,765	C = 29,413
	k2 = -0.7854	k4 = 0.0179	B = 0.9610	D = 1.9610
		k5 = -0.9700		
	r^2= 0.445	r^2= 0.948	r^2= 0.948	r^2= 0.948
Characteristic Values			At: p2 = 12 kPa	& q2= 26 kPa
	Mr_c= 46 MPa	Mr_c= 17 MPa	Mr_c= 18 MPa	Mr_c= 18 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	2541	0.21	536	0.08	0.07	650	0.06	1626	0.06
t=	7.82	-3.67	9.12	0.23	-13.01	18.09	15.46	18.09	31.55
Prob(t)=	0%	0%	0%	82%	0%	0%	0%	0%	0%

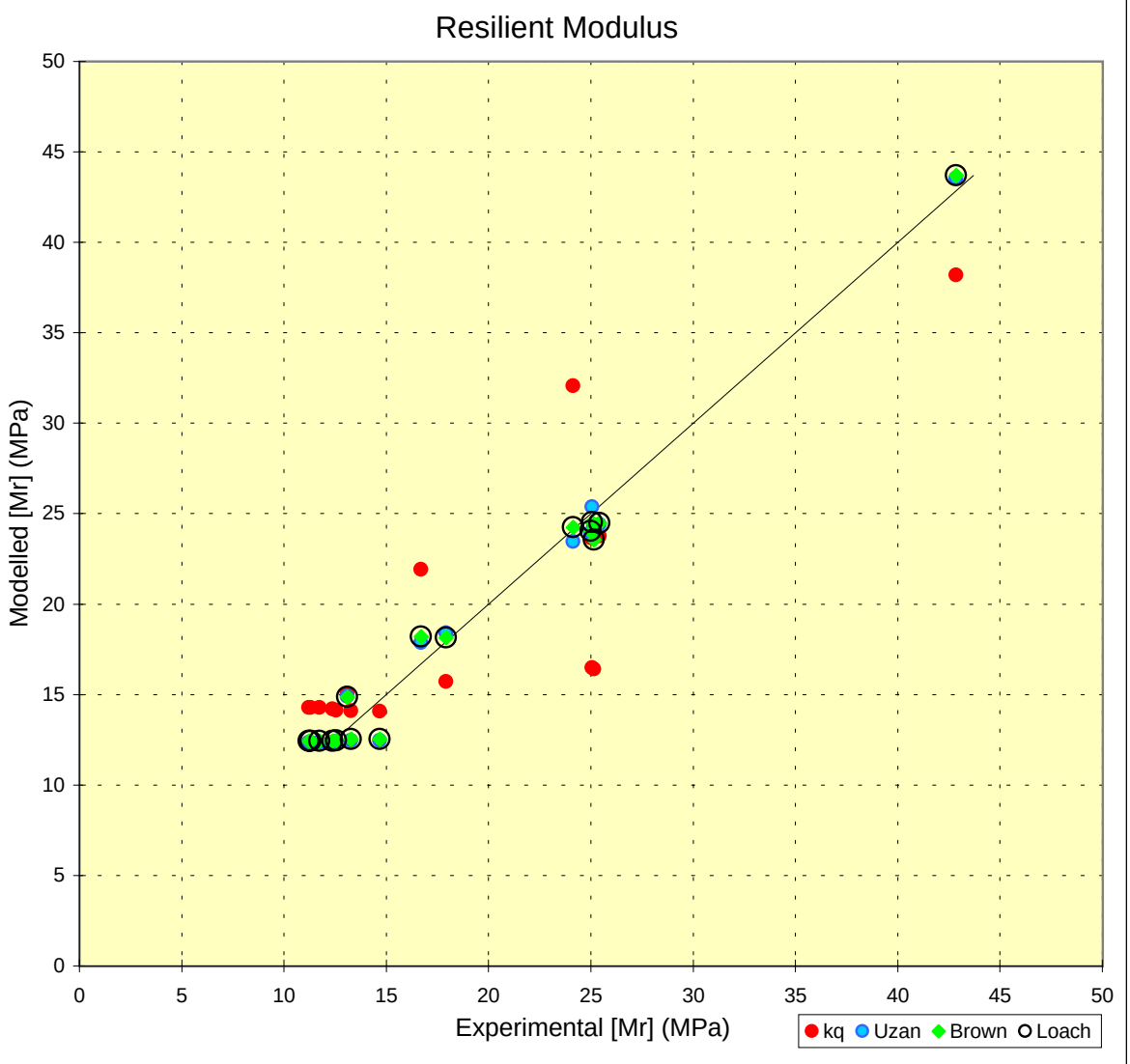
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-II : UNOT ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 16	Suction (s) =	40 kPa @ ω=	#### #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 29 MPa	υ_e = 0.81
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k1 = 27,194	k3 = 10,482	A = 21,009	C = 52,522
	k2 = -0.6642	k4 = 0.0668	B = 0.7466	D = 1.7466
		k5 = -0.8072		
	r^2= 0.720	r^2= 0.984	r^2= 0.982	r^2= 0.982
Characteristic Values			At: p2 = 12 kPa	& q2= 26 kPa
	Mr_c= 55 MPa	Mr_c= 27 MPa	Mr_c= 29 MPa	Mr_c= 29 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	1713	0.10	336	0.05	0.05	319	0.02	797	0.02
t=	15.87	-6.60	31.18	1.29	-15.28	65.92	30.12	65.92	70.45
Prob(t)=	0%	0%	0%	22%	0%	0%	0%	0%	0%

The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

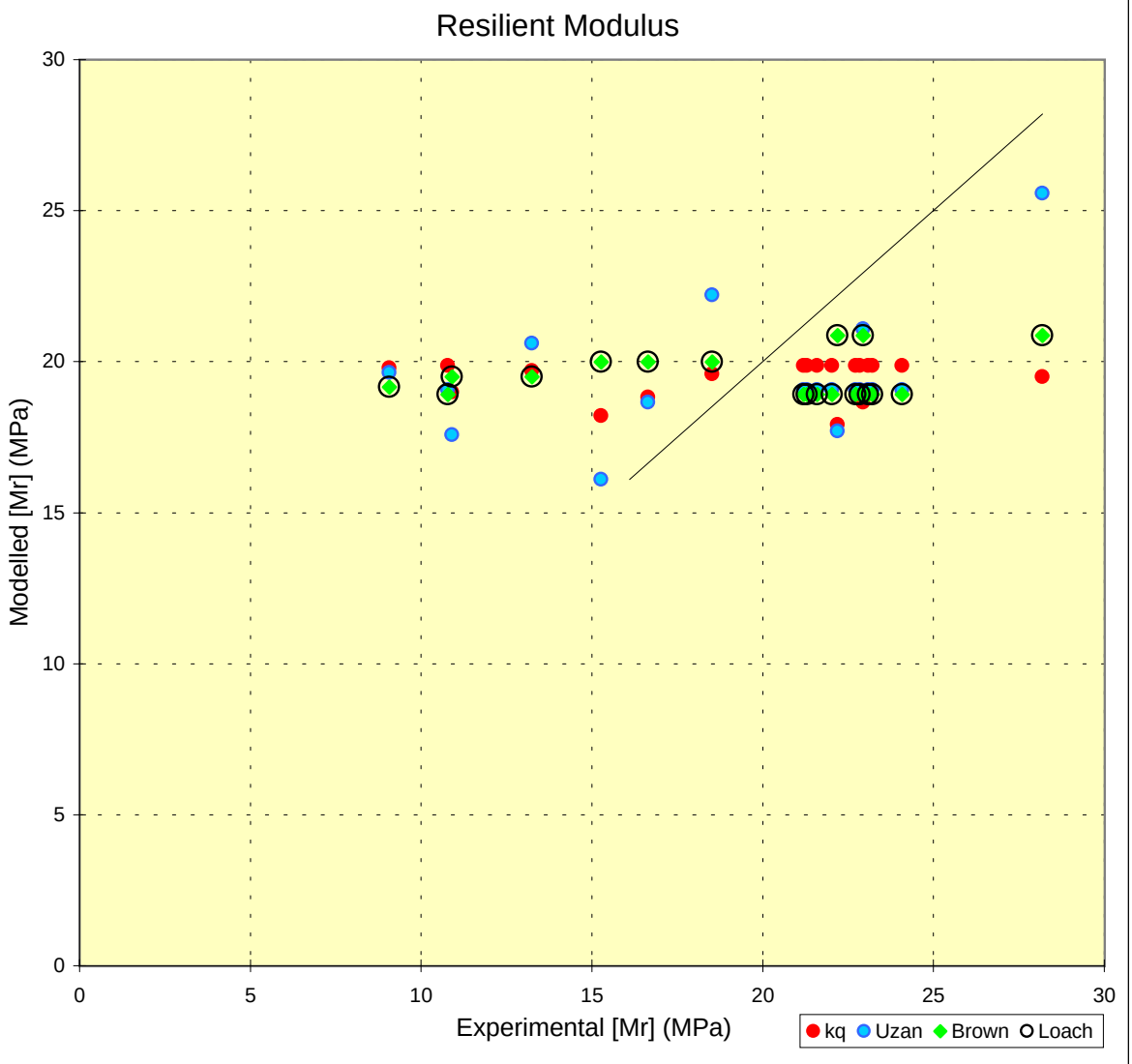
The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-II : UNOT ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 19	Suction (s) =	40 kPa @ ω=	36% 1,220 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 19 MPa	υ_e = 0.39

	kθ	**Uzan**	**Brown**	**Loach**
Modelled Data	k1 = 18,580	k3 = 18,661	A = 19,642	C = 49,105
	k2 = 0.0716	k4 = 0.3120	B = 0.0619	D = 1.0619
		k5 = -0.2368		
	r^2= 0.014	r^2= 0.132	r^2= 0.017	r^2= 0.017
Characteristic Values			At: p2 = 12 kPa	& q2= 26 kPa
	Mr_c= 17 MPa	Mr_c= 13 MPa	Mr_c= 20 MPa	Mr_c= 20 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	2197	0.15	1885	0.22	0.14	1271	0.10	3179	0.10
t=	8.46	0.48	9.90	1.45	-1.64	15.45	0.59	15.45	10.19
Prob(t)=	0%	64%	0%	17%	12%	0%	56%	0%	0%

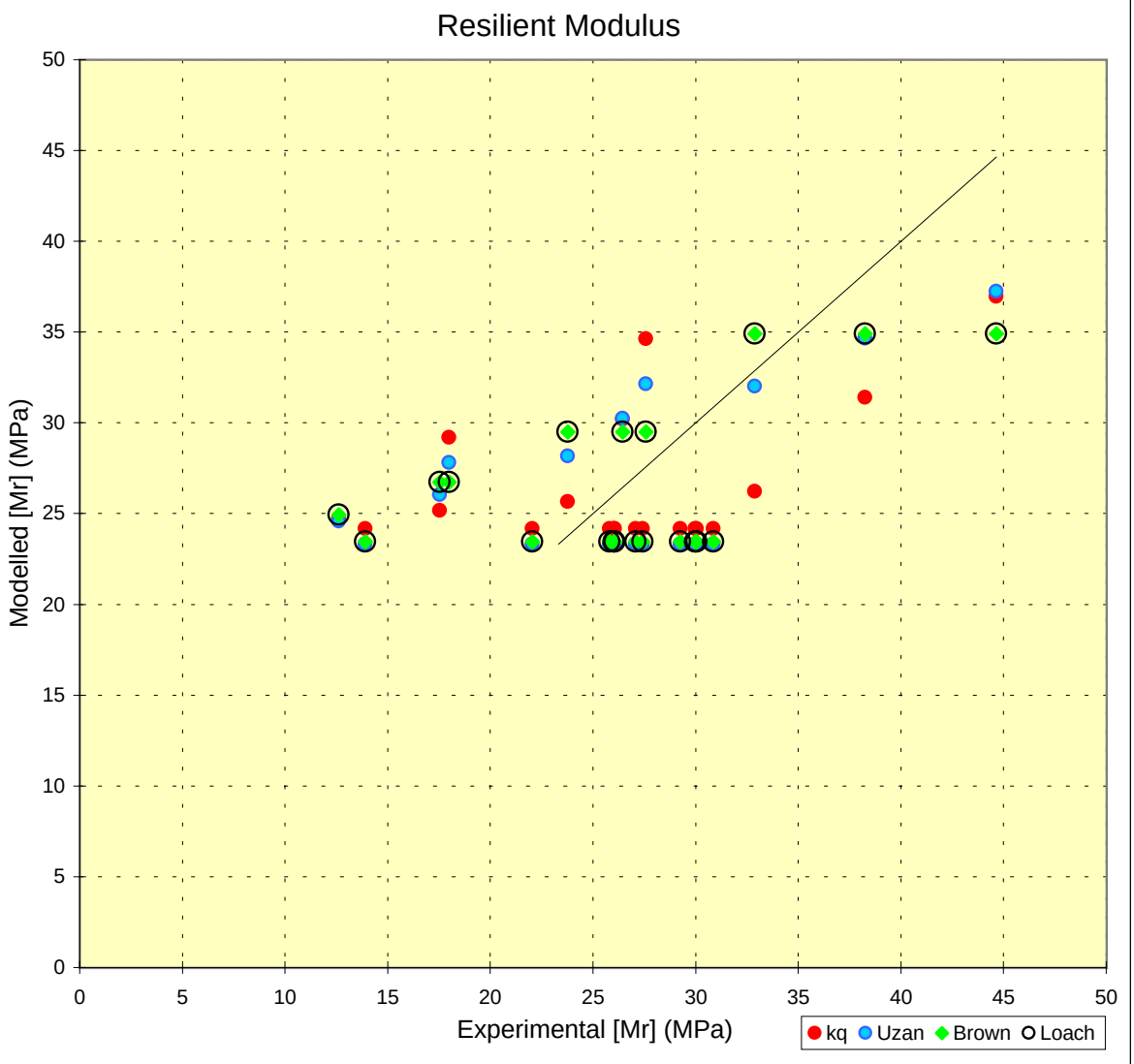
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-II : UNOT ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 20 Suction (s) = 40 kPa @ ω= 35% 1,240 kg/m3			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 30 MPa	υ_e = 0.42
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k1 = 31,846	k3 = 21,883	A = 27,507	C = 68,768
	k2 = -0.2908	k4 = -0.1281	B = 0.2432	D = 1.2432
		k5 = -0.1716		
	r^2= 0.246	r^2= 0.308	r^2= 0.284	r^2= 0.284
Characteristic Values			At: p2 = 12 kPa	& q2= 26 kPa
	Mr_c= 43 MPa	Mr_c= 36 MPa	Mr_c= 31 MPa	Mr_c= 31 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	2544	0.11	2072	0.17	0.13	1513	0.08	3784	0.08
t=	12.52	-2.70	10.56	-0.75	-1.29	18.17	2.96	18.17	15.14
Prob(t)=	0%	1%	0%	46%	21%	0%	1%	0%	0%

The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

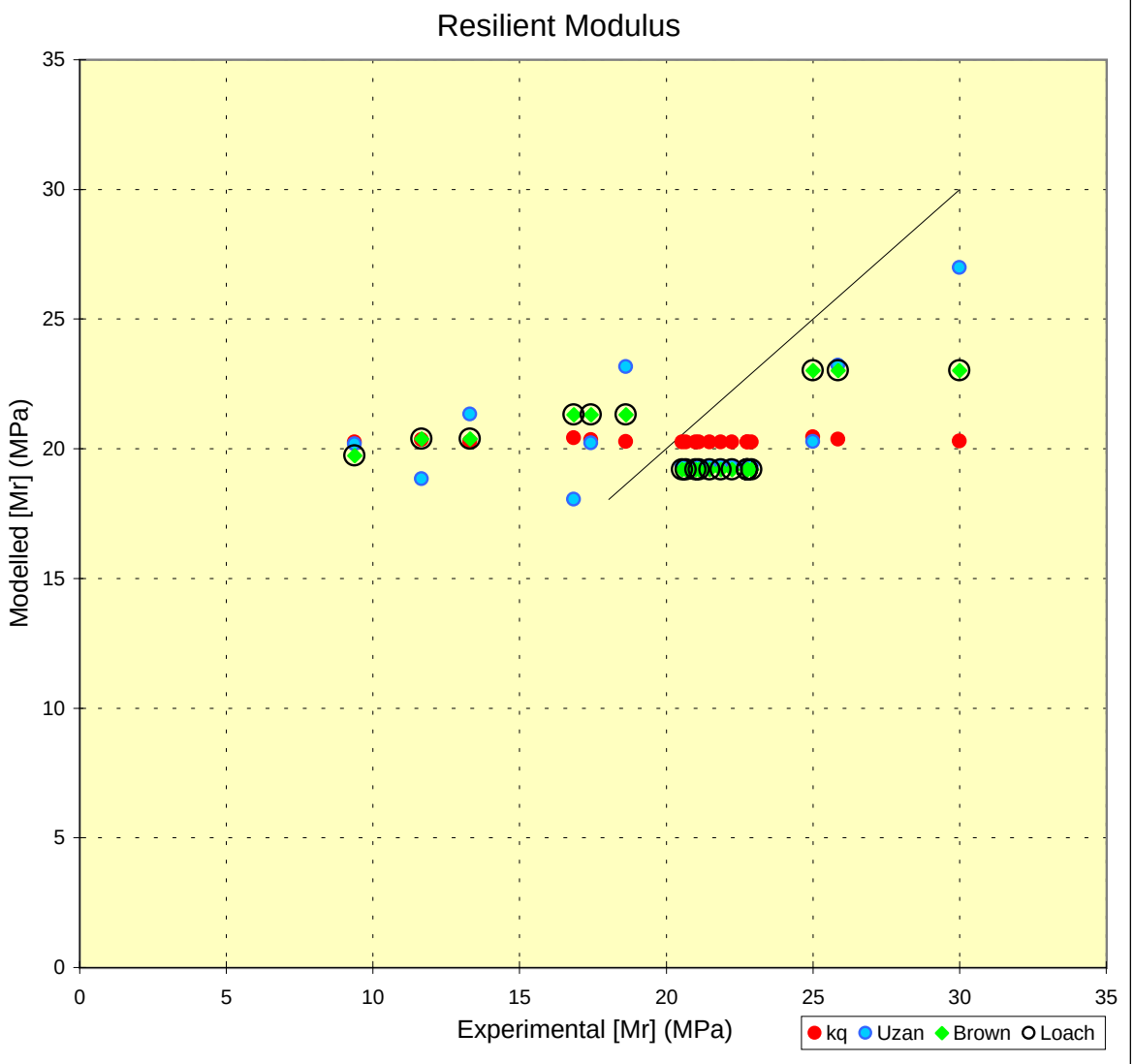
The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-II : UNOT ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 19	Suction (s) =	40 kPa @ ω=	36% 1,220 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 21 MPa	υ_e = 1.10

	kθ	**Uzan**	**Brown**	**Loach**
Modelled Data	k1 = 20,377	k3 = 18,790	A = 20,641	C = 51,604
	k2 = -0.0065	k4 = 0.2424	B = 0.1111	D = 1.1111
		k5 = -0.2456		
	r^2= 0.000	r^2= 0.168	r^2= 0.075	r^2= 0.075
Characteristic Values			At: p2 = 12 kPa	& q2= 26 kPa
	Mr_c= 21 MPa	Mr_c= 16 MPa	Mr_c= 22 MPa	Mr_c= 22 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	2035	0.13	1647	0.18	0.12	1152	0.09	2881	0.09
t=	10.01	-0.05	11.41	1.34	-2.00	17.91	1.29	17.91	12.89
Prob(t)=	0%	96%	0%	20%	6%	0%	21%	0%	0%

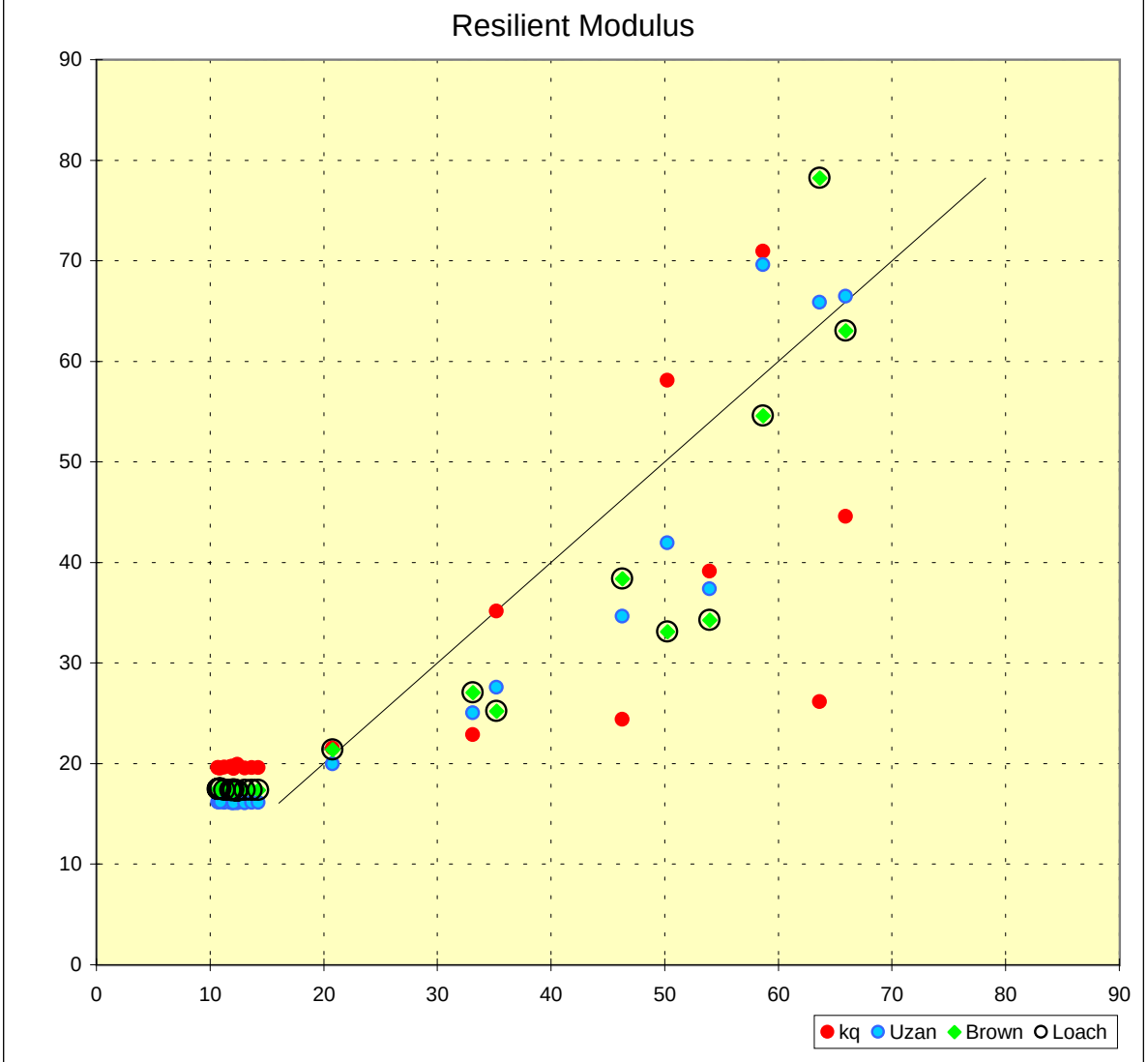
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-II : LRCF ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 22	Suction (s) =	40 kPa @ ω= 36%	1,861 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 51 MPa	υ_e = 0.76
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k1 = 46,166	k3 = 12,670	A = 27,467	C = 68,667
	k2 = -0.8835	k4 = -0.3247	B = 0.7495	D = 1.7495
		k5 = -0.6488		
	r^2= 0.574	r^2= 0.887	r^2= 0.824	r^2= 0.824
Characteristic Values			At: p2 = 12 kPa	& q2= 26 kPa
	Mr_c= 118 MPa	Mr_c= 62 MPa	Mr_c= 38 MPa	Mr_c= 38 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	4603	0.16	1543	0.10	0.08	2098	0.08	5246	0.08
t=	10.03	-5.39	8.21	-3.29	-8.56	13.09	9.53	13.09	22.25
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

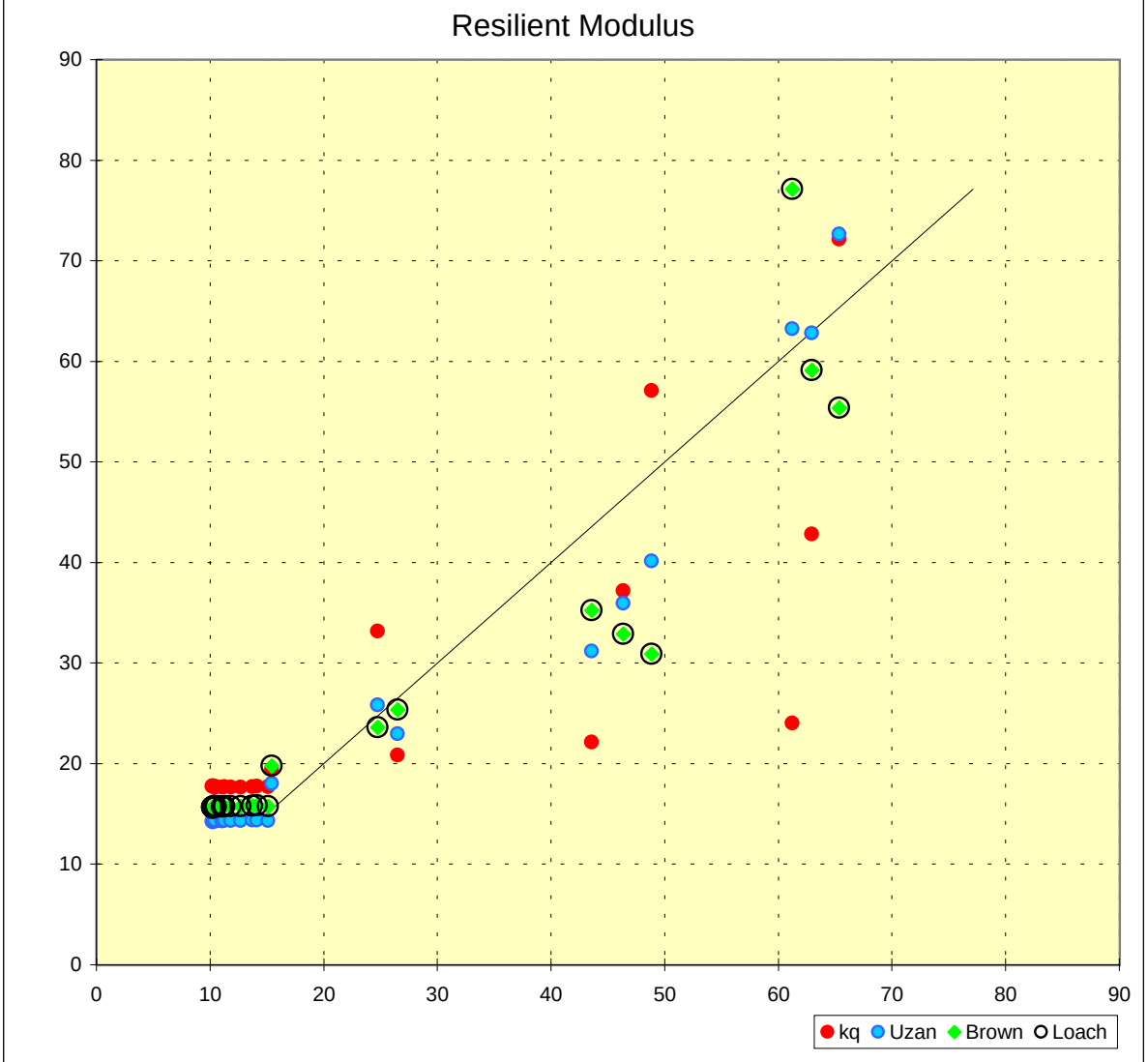
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-II : LRCF ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 22	Suction (s) = 40 kPa @ ω= 36%		1,860 kg/m3
	Chara'tic Values at q_2 = 26 kPa	Mr_e= 49 MPa	υ_e = 0.86	
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k1 = 44,747	k3 = 10,955	A = 25,703	C = 64,257
	k2 = -0.9630	k4 = -0.3711	B = 0.8099	D = 1.8099
		k5 = -0.6971		
	r^2= 0.625	r^2= 0.934	r^2= 0.853	r^2= 0.853
Characteristic Values			At: p2 = 12 kPa	& q2= 26 kPa
	Mr_c= 125 MPa	Mr_c= 63 MPa	Mr_c= 37 MPa	Mr_c= 37 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	4175	0.16	1104	0.08	0.06	1900	0.08	4750	0.08
t=	10.72	-6.08	9.92	-4.91	-11.14	13.53	10.52	13.53	23.50
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

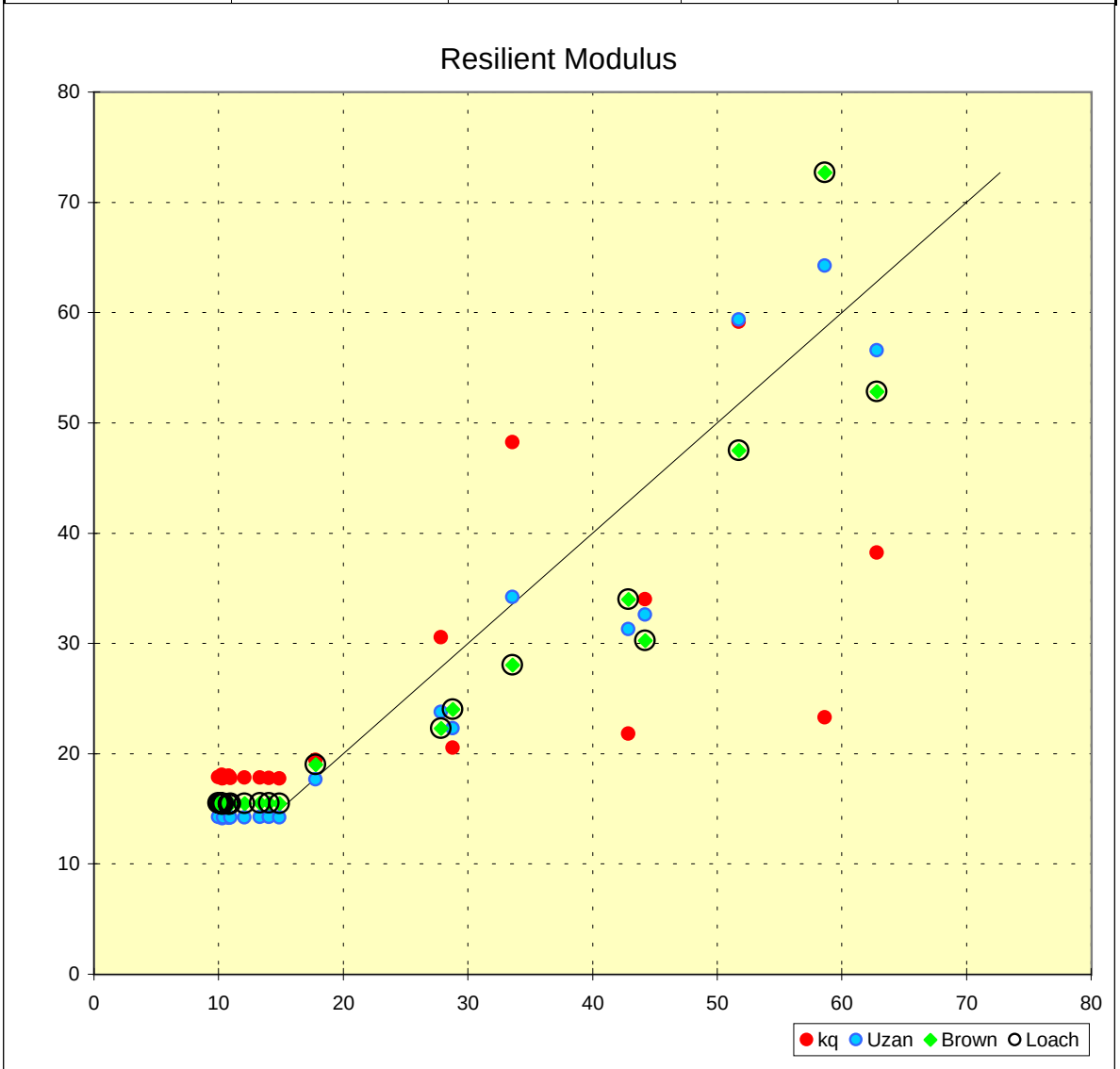
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The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-II : LRCF ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 22	Suction (s) =	40 kPa @ ω= 34%	1,865 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 44 MPa	υ_e = 0.60
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k1 = 39,216	k3 = 11,168	A = 23,771	C = 59,427
	k2 = -0.8199	k4 = -0.2736	B = 0.7108	D = 1.7108
		k5 = -0.6521		
	r^2= 0.488	r^2= 0.909	r^2= 0.859	r^2= 0.859
Characteristic Values			At: p2 = 12 kPa	& q2= 26 kPa
	Mr_c= 94 MPa	Mr_c= 49 MPa	Mr_c= 32 MPa	Mr_c= 32 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	4387	0.18	1201	0.08	0.06	1622	0.06	4054	0.06
t=	8.94	-4.57	9.30	-3.24	-10.97	14.66	11.16	14.66	26.87
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

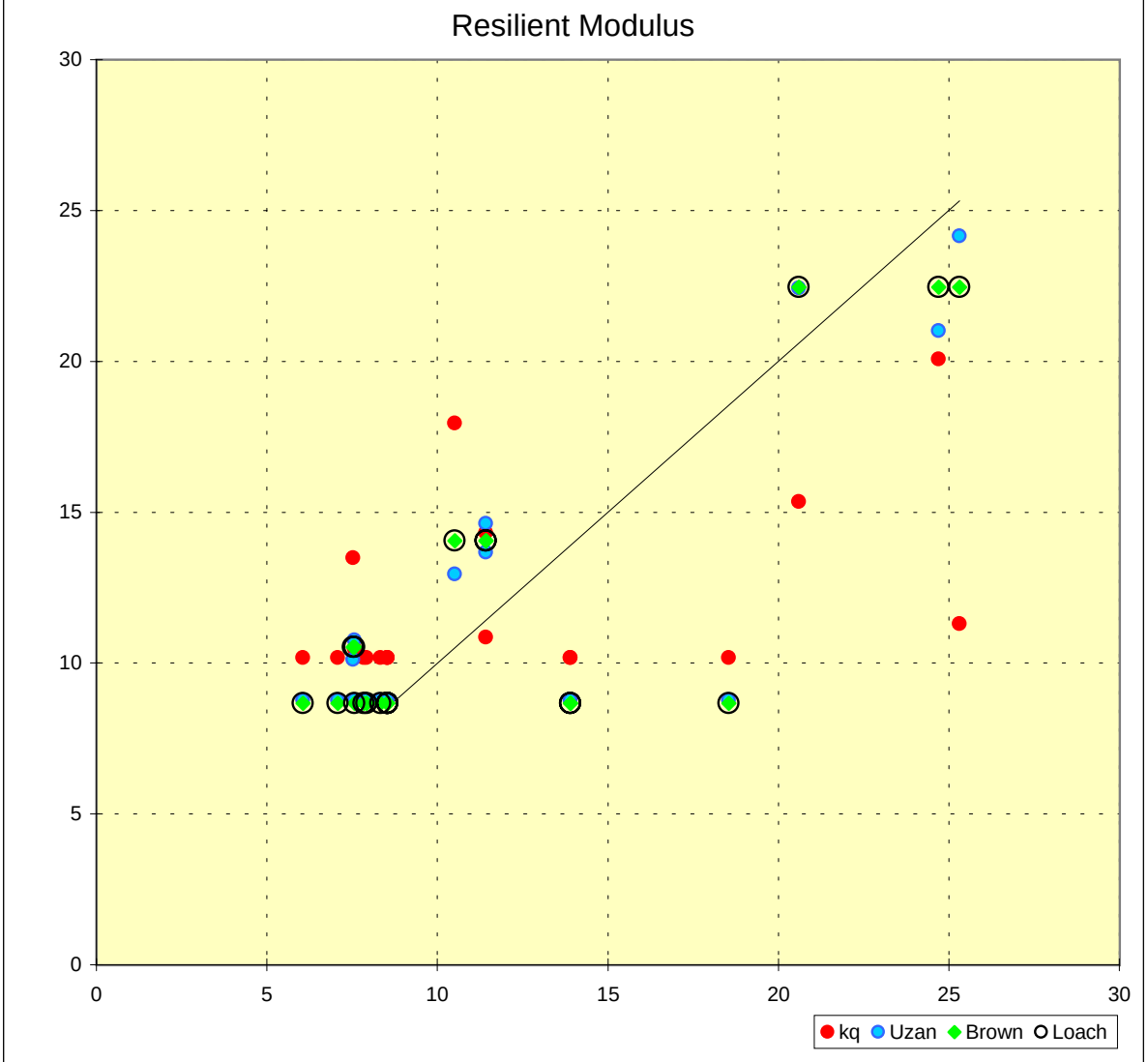
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The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-II : DUT ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 20 Suction (s) = 40 kPa @ ω= 36% #DIV/0!			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 18 MPa	υ_e = 0.37
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k1 = 16,191	k3 = 6,205	A = 13,168	C = 32,920
	k2 = -0.5162	k4 = 0.1248	B = 0.8265	D = 1.8265
		k5 = -0.9019		
	r^2= 0.240	r^2= 0.673	r^2= 0.663	r^2= 0.663
Characteristic Values			At: p2 = 12 kPa	& q2= 26 kPa
	Mr_c= 28 MPa	Mr_c= 16 MPa	Mr_c= 19 MPa	Mr_c= 19 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	2093	0.19	923	0.17	0.16	859	0.13	2147	0.13
t=	7.73	-2.69	6.72	0.73	-5.57	15.33	6.61	15.33	14.60
Prob(t)=	0%	1%	0%	47%	0%	0%	0%	0%	0%

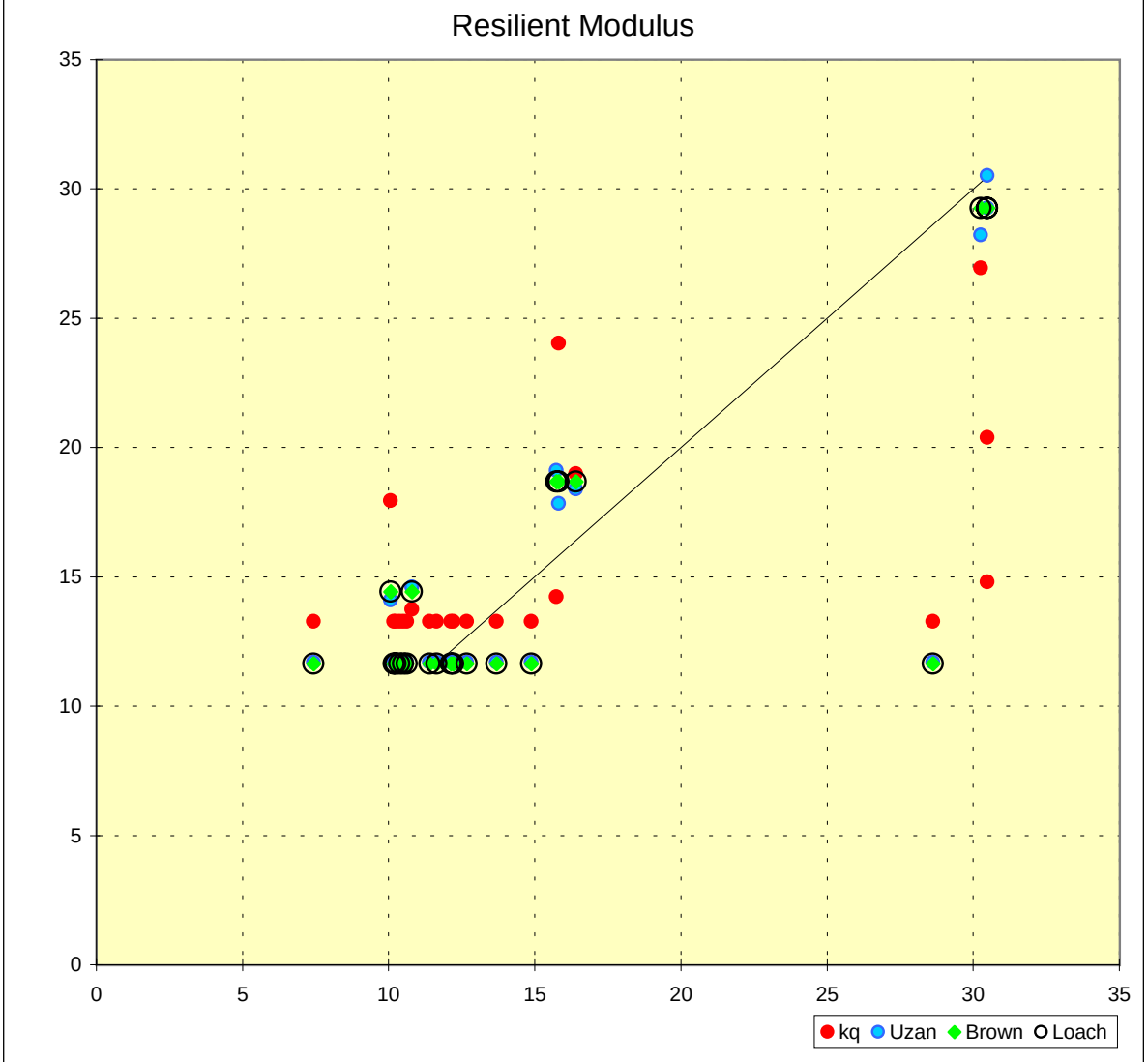
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The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-II : DUT	***London Clay (LOC)***			***100% Percentile Data***
Experimental Data	Sample Size: 22	Suction (s) =	40 kPa @ ω=	36% #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 24 MPa	υ_e = 0.39

	kθ	**Uzan**	**Brown**	**Loach**
Modelled Data	k1 = 21,582 k2 = -0.5391	k3 = 8,338 k4 = 0.0707 k5 = -0.8564	A = 17,527 B = 0.8115	C = 43,817 D = 1.8115
	r^2= 0.280	r^2= 0.666	r^2= 0.662	r^2= 0.662
Characteristic Values			At: p2 = 12 kPa	& q2= 26 kPa
	Mr_c= 38 MPa	Mr_c= 23 MPa	Mr_c= 25 MPa	Mr_c= 25 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	2533	0.17	1114	0.16	0.16	1029	0.12	2571	0.12
t=	8.52	-3.15	7.48	0.43	-5.48	17.04	7.04	17.04	15.70
Prob(t)=	0%	1%	0%	67%	0%	0%	0%	0%	0%

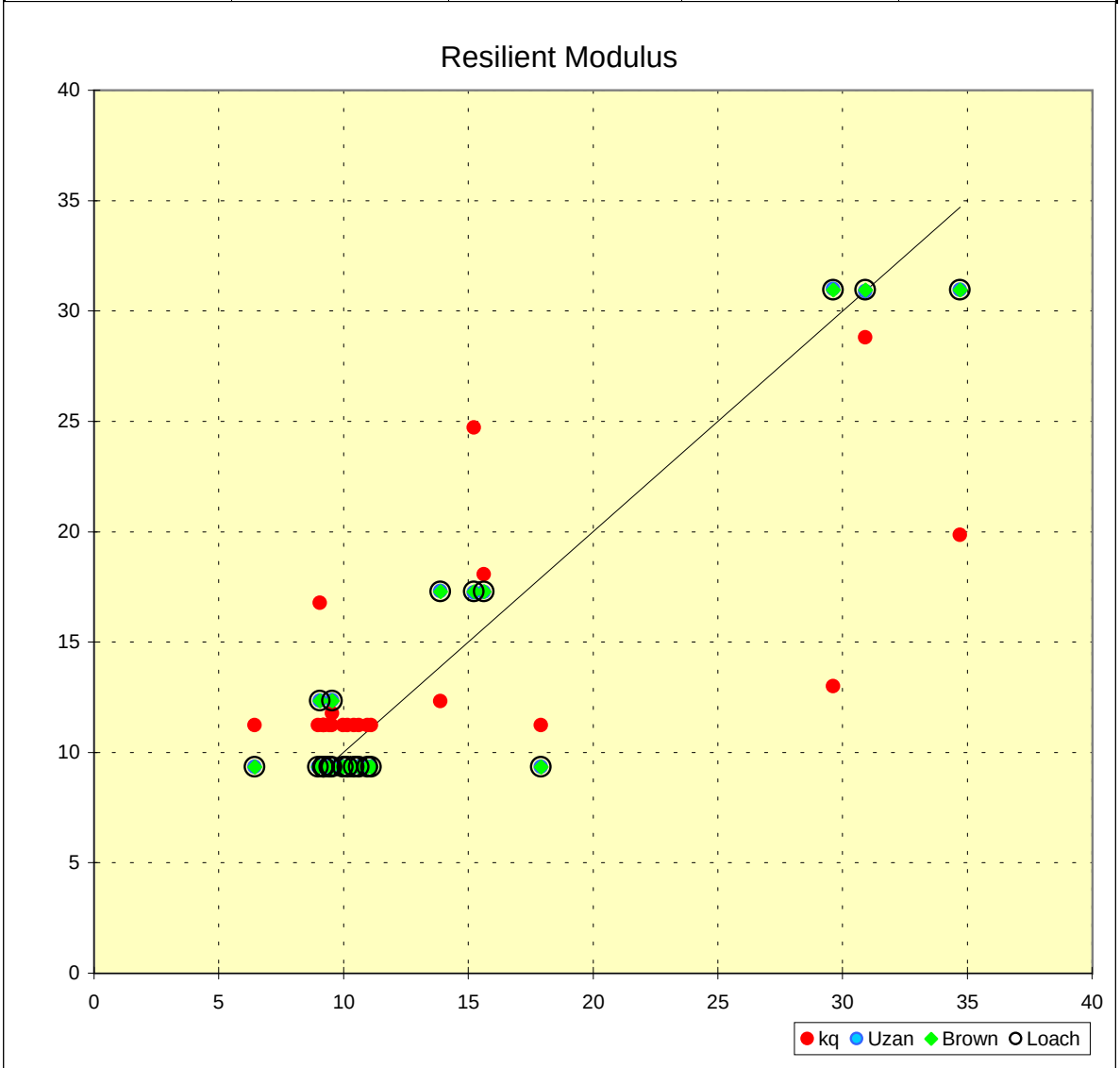
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-II : DUT ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 22	Suction (s) = 40 kPa @ ω= 36%		#DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 25 MPa	υ_e = 0.49
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 21,435	k_3 = 6,056	A = 15,903	C = 39,759
	k_2 = -0.7166	k_4 = 0.0030	B = 1.0538	D = 2.0538
		k_5 = -1.0556		
	r^2= 0.409	r^2= 0.888	r^2= 0.888	r^2= 0.888
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	Mr_c= 46 MPa	Mr_c= 25 MPa	Mr_c= 25 MPa	Mr_c= 25 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	2347	0.17	595	0.10	0.10	650	0.08	1625	0.08
t=	9.13	-4.20	10.18	0.03	-10.45	24.47	13.61	24.47	26.53
Prob(t)=	0%	0%	0%	98%	0%	0%	0%	0%	0%

The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

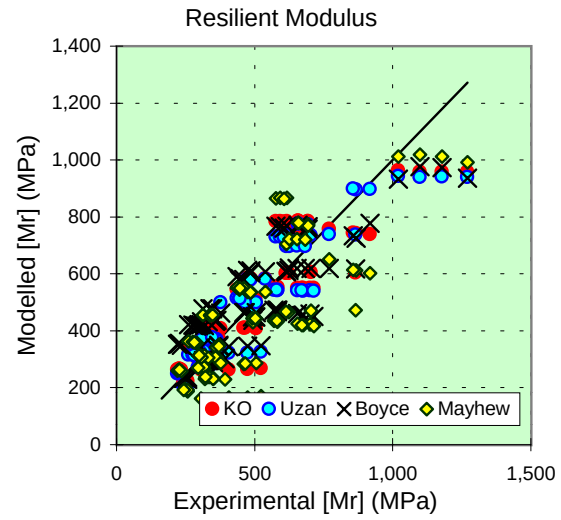
Appendix G.3 RESULTS OF TEST PROGRAMME III FOR SUBGRADE SOILS AND UNBOUND GRANULAR MATERIALS (PHASE 5)

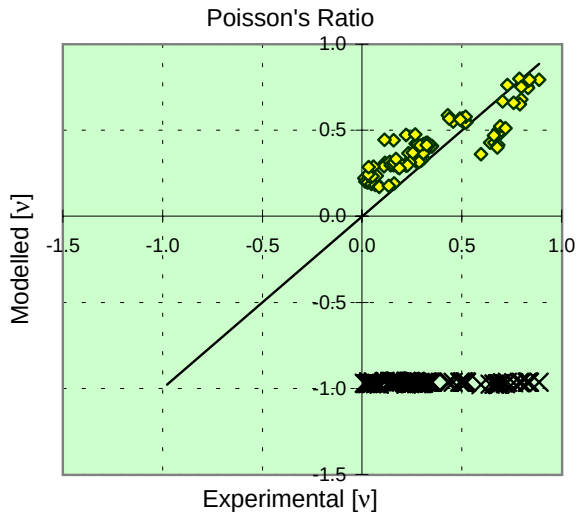
TP-III : LRPC ***Soft Limestone (CCT)*** ***100% Percentile Data***

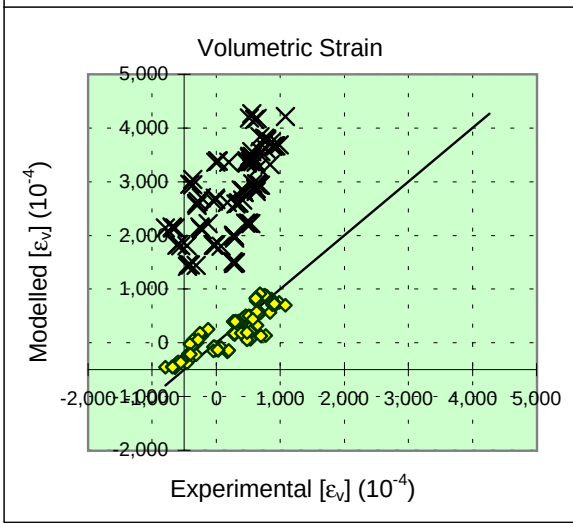
Experimental Data	Sample Size: 91	p*= 80 kPa @	ω = 3.5%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 332 MPa	υ_e = 0.38

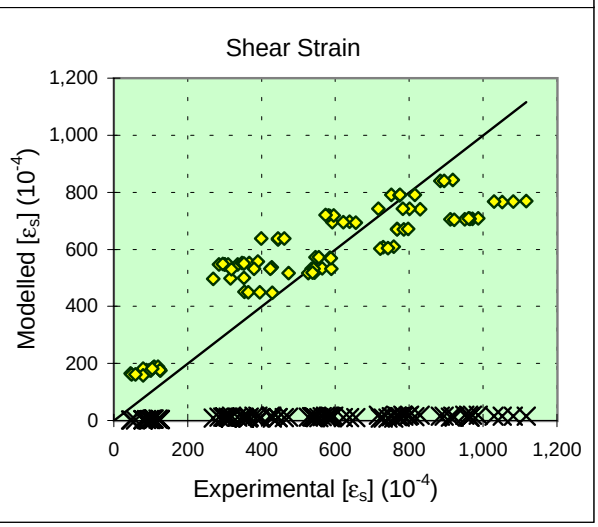
	kθ	**Uzan**	**Boyce**	**Mayhew**
Modelled Data	k_1 = 134,642 k_2 = 0.7812	k_3 = 342,841 k_4 = 0.9584 k_5 = -0.1944	Ga = 3,492,597 kPa Ka = 15,801 kPa n = 0.2091	Ga = 57,872 kPa Ka = -240,546 kPa n = -0.1899 β = -1.3542 m = -0.4906
	r^2= 0.675	r^2= 0.723	r^2= 0.612	$r^2\varepsilon_v$= 0.625 $r^2\varepsilon_s$= 0.630

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 73 MPa	Mr_c= 64 MPa	ε_{vc}= 764 ε_{sc}= 4 Mr_c= 109 MPa υ_c= **-0.99**	ε_{vc}= 155 ε_{sc}= 469 Mr_c= 89 MPa υ_c= 0.25



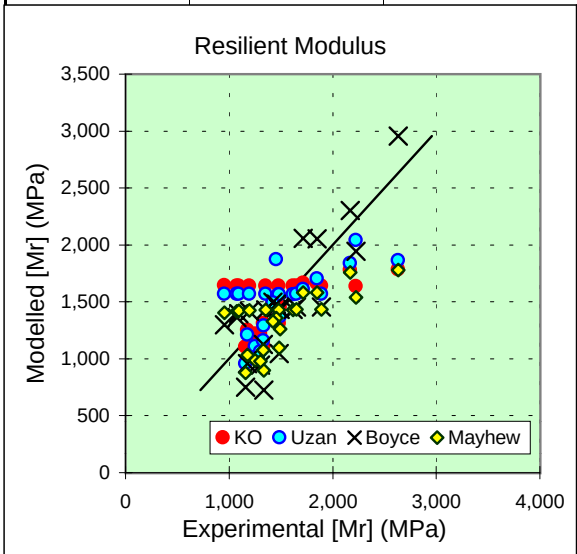


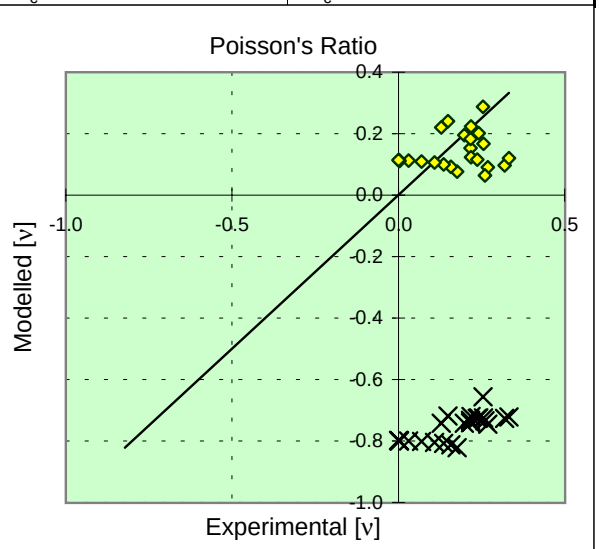


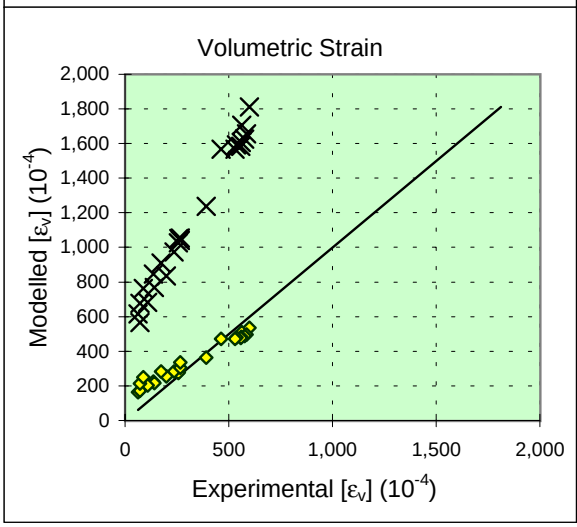


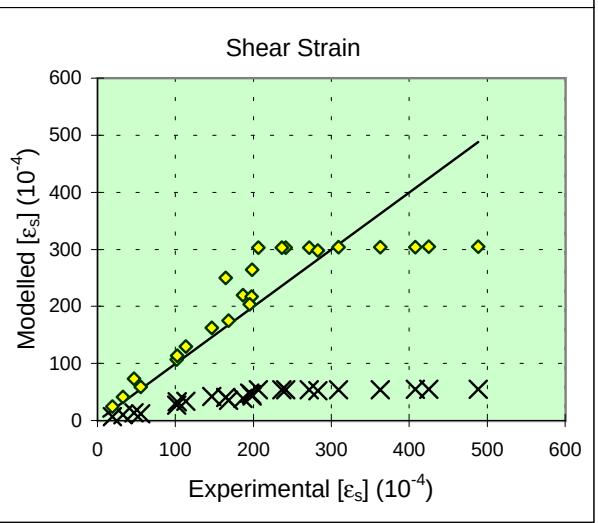
TP-III : LRPC ***Soft Limestone (CCT)*** ***100% Percentile Data***

Experimental Data	Sample Size: 25	p*= 80 kPa @ ω = 3.5%		p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa	Mr_e= 1,428 MPa		υ_e = 0.27
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 880,413	k_3 = 1,211,027	Ga = 965,101 kPa	Ga = 253,567 kPa
	k_2 = 0.2842	k_4 = 0.5471	Ka = -1,300 kPa	Ka = 2,202 kPa
		k_5 = -0.1902	n = -0.0051	n = 0.3476
				β = -0.0004
				m = 0.0023
	r^2= 0.361	r^2= 0.427	r^2= 0.489	$r^2\varepsilon_v$= 0.717 $r^2\varepsilon_s$= 0.607
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 706 MPa	Mr_c= 487 MPa	ε_{vc}= 373 ε_{sc}= 20	ε_{vc}= 104 ε_{sc}= 39
			Mr_c= 207 MPa	Mr_c= 494 MPa
			υ_c= **-0.88**	υ_c= **-0.42**







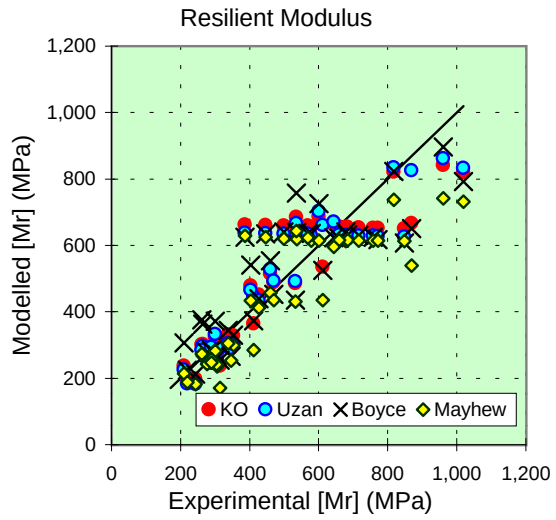


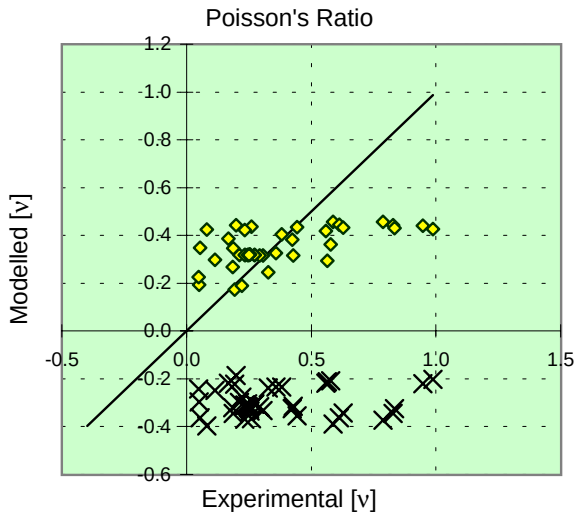
TP-III : LRPC ***Soft Limestone (CCT)*** ***100% Percentile Data***

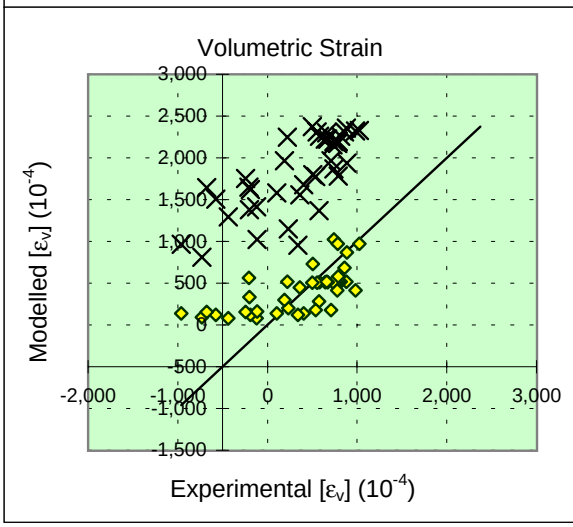
Experimental Data	Sample Size: 43	p*= 80 kPa @	ω = 3.5%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 278 MPa	υ_e = 0.47

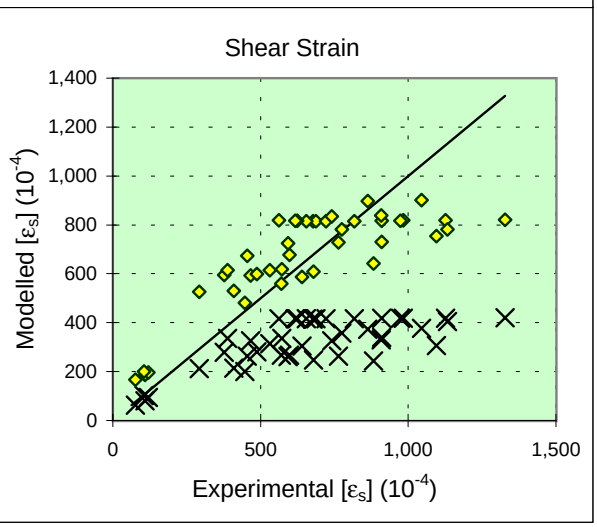
	kθ	**Uzan**	**Boyce**	**Mayhew**
Modelled Data	k_1 = 122,860 k_2 = 0.7646	k_3 = 308,870 k_4 = 0.9479 k_5 = -0.1792	Ga = 135,872 kPa Ka = 9,144 kPa n = 0.0683	Ga = 54,324 kPa Ka = 504,946 kPa n = -0.1551 β = 0.1669 m = 1.3737
	r^2= 0.637	r^2= 0.667	r^2= 0.613	$r^2\varepsilon_v$= 0.460 $r^2\varepsilon_s$= 0.543

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 68 MPa	Mr_c= 58 MPa	ε_{vc}= 582 ε_{sc}= 123 Mr_c= 107 MPa υ_c= **-0.61**	ε_{vc}= 10 ε_{sc}= 468 Mr_c= 105 MPa υ_c= 0.48





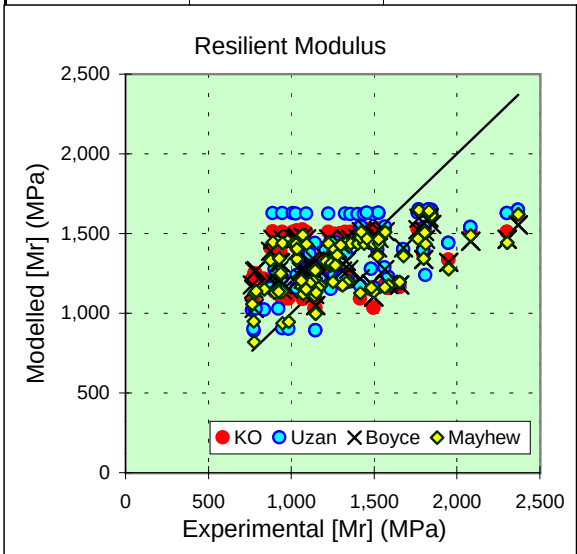


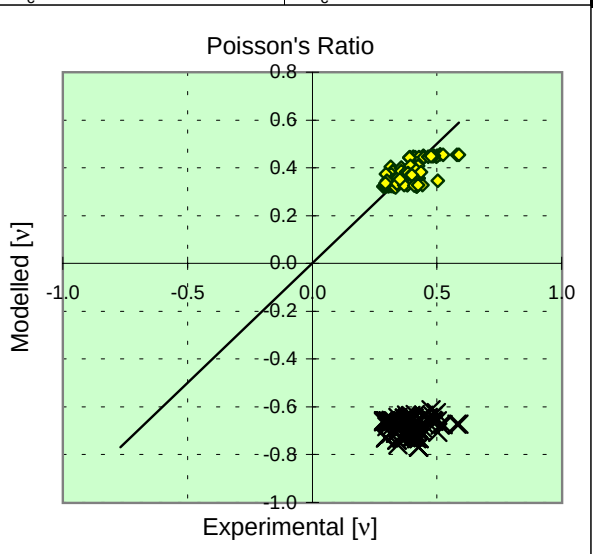


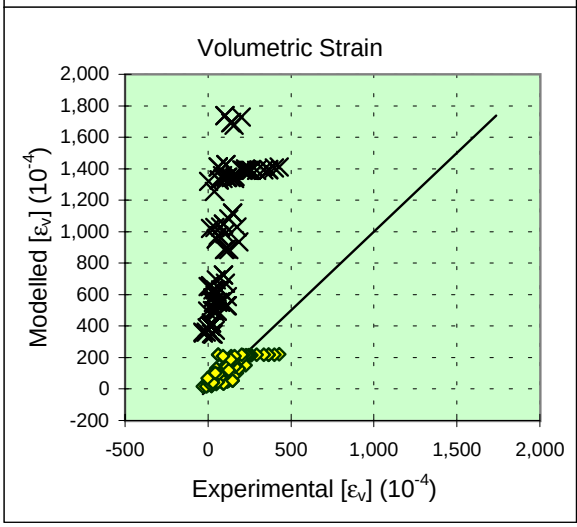
TP-III : LRPC	*Soft Limestone (CCT)*			*100% Percentile Data*
Experimental Data	Sample Size: 96	p*= 80 kPa @	ω = 3.5%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 1,074 MPa	υ_e = 0.44

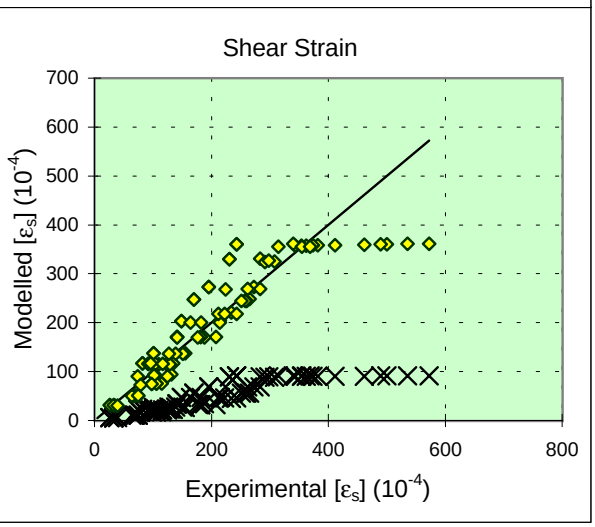
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 881,177	k_3 = 1,078,340	Ga = 1,311,665 kPa	Ga = 256,044 kPa
	k_2 = 0.2440	k_4 = 0.0461	Ka = 147,496 kPa	Ka = 3,422,185 kPa
		k_5 = 0.1988	n = 0.7330	n = 0.5007
				β = -1.0048
				m = 0.6967
	r^2= 0.362	r^2= 0.411	r^2= 0.366	$r^2\varepsilon_v$= 0.542 $r^2\varepsilon_s$= 0.686

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 85 ε_{sc}= 4	ε_{vc}= 6 ε_{sc}= 29
	Mr_c= 729 MPa	Mr_c= 876 MPa	Mr_c= 919 MPa	Mr_c= 1521 MPa
			υ_c= **-0.90**	υ_c= 0.33



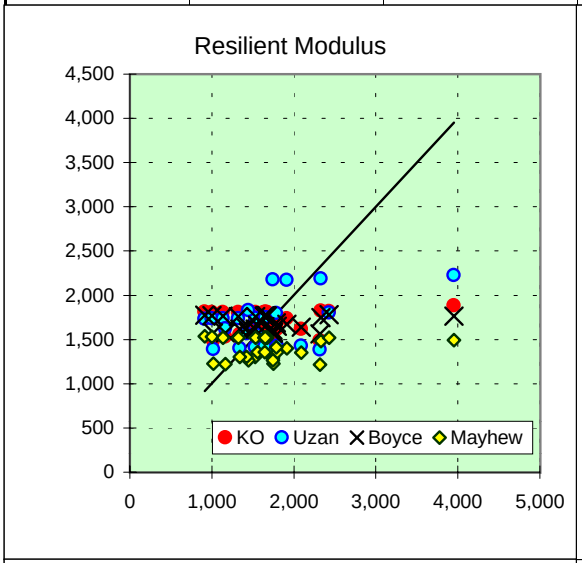


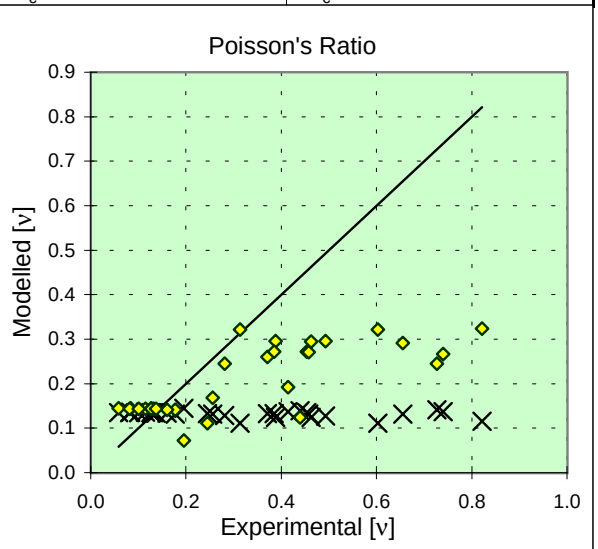


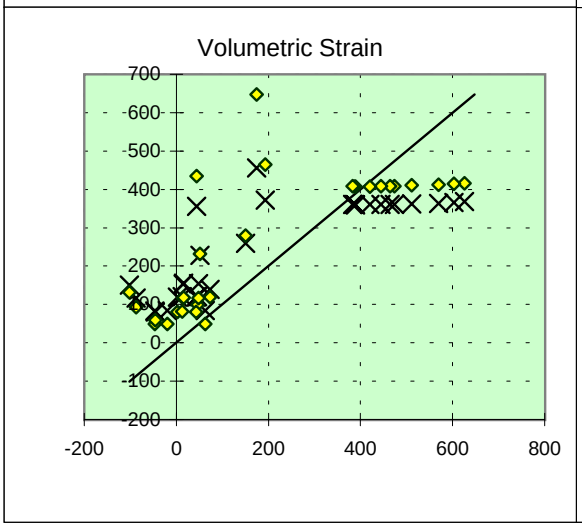


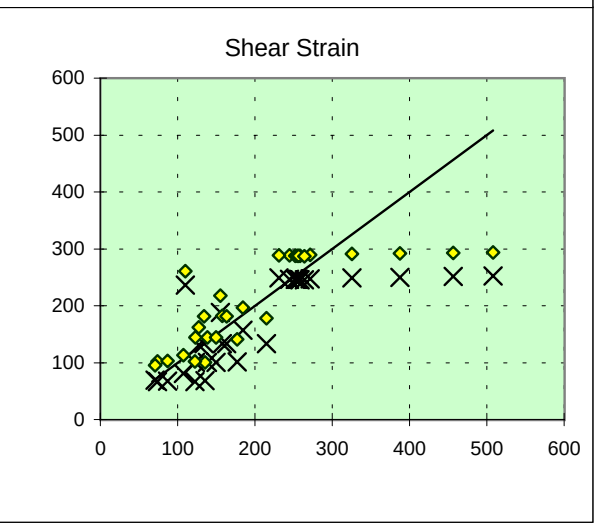
TP-III : LRPC ***Hard Limestone (CCD)*** ***100% Percentile Data***

Experimental Data	Sample Size: 31	p*= 19 kPa @ ω = 3.3%		p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa	Mr_e= 1,632 MPa		υ_e = 0.65
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 1,370,631	k_3 = 2,657,825	Ga = 648,475 kPa	Ga = 459,032 kPa
	k_2 = 0.1262	k_4 = 0.7344	Ka = 621,366 kPa	Ka = 898,958 kPa
		k_5 = -0.6868	n = 0.8593	n = 0.6861
				β = 0.0373
				m = 1.3264
	r^2= 0.300	r^2= 0.346	r^2= 0.291	$r^2\varepsilon_v$= 0.515 $r^2\varepsilon_s$= 0.531
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 17 ε_{sc}= 16	ε_{vc}= 6 ε_{sc}= 32
	Mr_c= 1242 MPa	Mr_c= 1019 MPa	Mr_c= 1903 MPa	Mr_c= 1419 MPa
			υ_c= **-0.07**	υ_c= 0.36







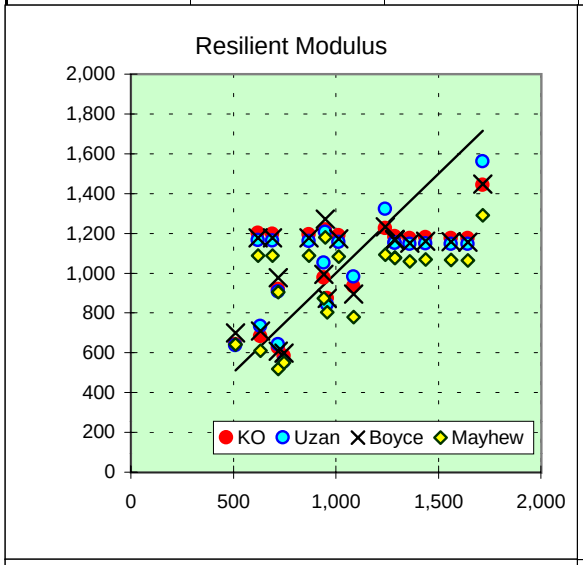


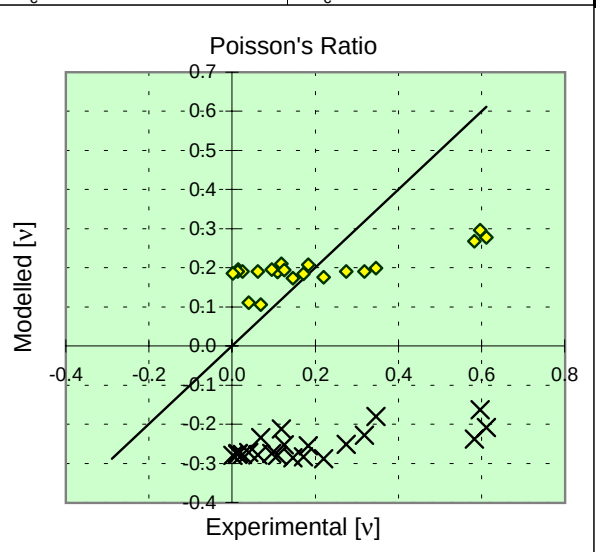
TP-III : LRPC ***Hard Limestone (CCD)*** ***100% Percentile Data***

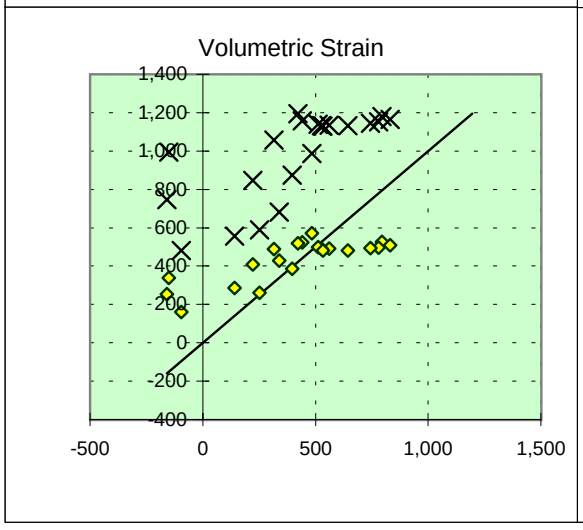
Experimental Data	Sample Size: 22	p*= 19 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 608 MPa	υ_e = 0.34

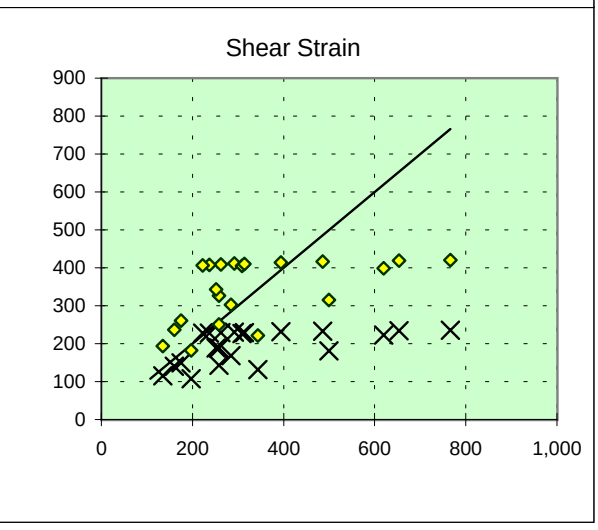
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 309,518	k_3 = 713,810	Ga = 389,730 kPa	Ga = 231,883 kPa
	k_2 = 0.6134	k_4 = 0.9348	Ka = 74,595 kPa	Ka = 629 kPa
		k_5 = -0.3038	n = 0.3378	n = 0.3942
				β = 0.0007
				m = 0.0017
	r^2= 0.426	r^2= 0.440	r^2= 0.417	$r^2\varepsilon_v$= 0.482 $r^2\varepsilon_s$= 0.402

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 173 ε_{sc}= 72	ε_{vc}= -18 ε_{sc}= 109
	Mr_c= 192 MPa	Mr_c= 149 MPa	Mr_c= 285 MPa	Mr_c= 508 MPa
			υ_c= **-0.38**	υ_c= 0.66







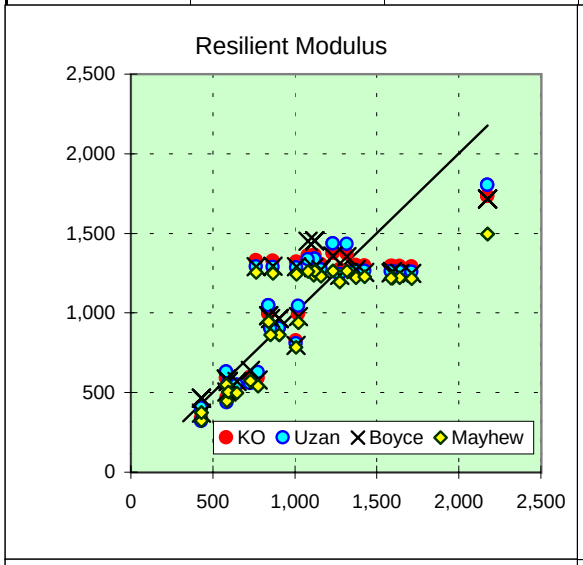


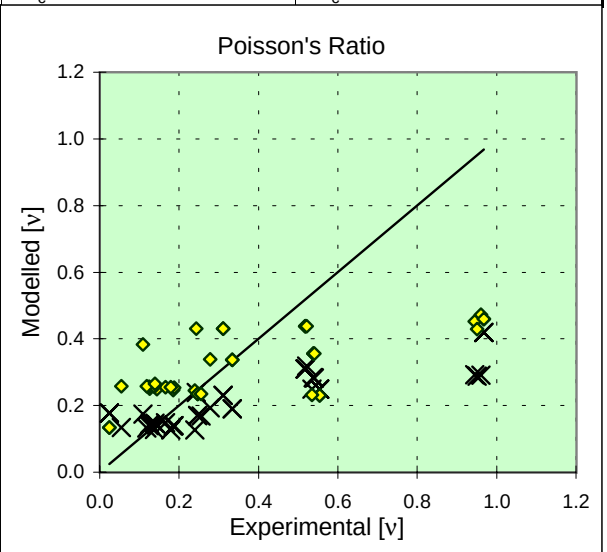
TP-III : LRPC ***Hard Limestone (CCD)*** ***100% Percentile Data***

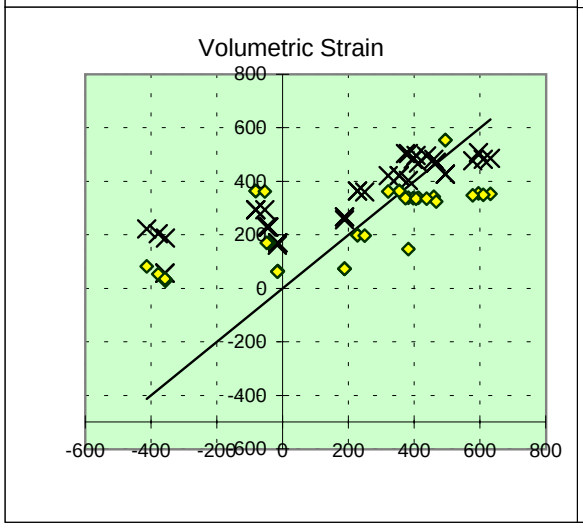
Experimental Data	Sample Size: 39	p*= 19 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 401 MPa	υ_e = 0.72

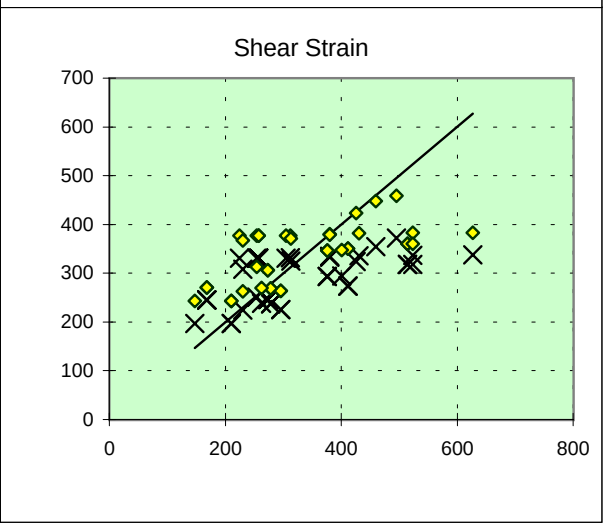
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 201,815	k_3 = 586,248	Ga = 192,823 kPa	Ga = 154,056 kPa
	k_2 = 0.8609	k_4 = 1.0563	Ka = 16,992 kPa	Ka = 1,652,980 kPa
		k_5 = -0.2040	n = 0.0369	n = -0.0518
				β = -0.0153
				m = 1.5745
	r^2= 0.596	r^2= 0.604	r^2= 0.583	$r^2\varepsilon_v$= 0.464 $r^2\varepsilon_s$= 0.433

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 82 ε_{sc}= 255	ε_{vc}= 3 ε_{sc}= 377
	Mr_c= 103 MPa	Mr_c= 91 MPa	Mr_c= 164 MPa	Mr_c= 131 MPa
			υ_c= 0.26	υ_c= 0.49



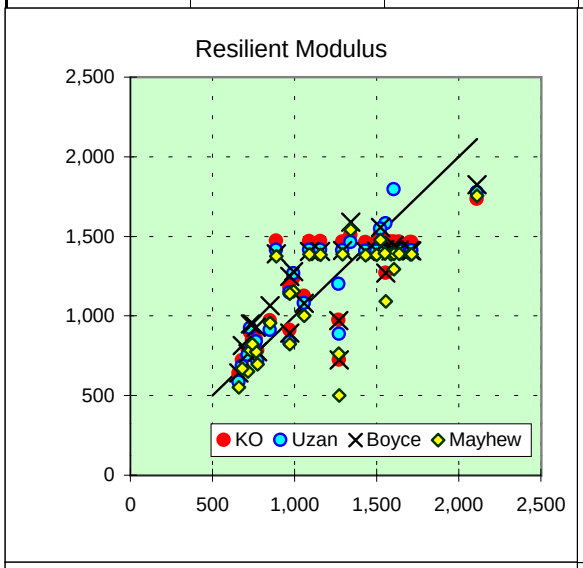


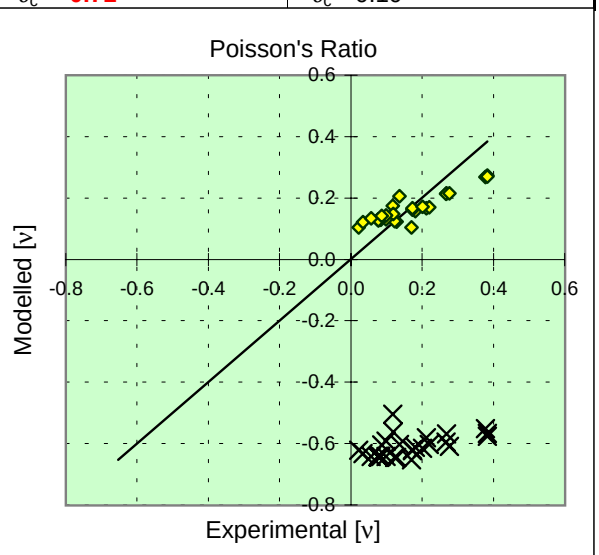


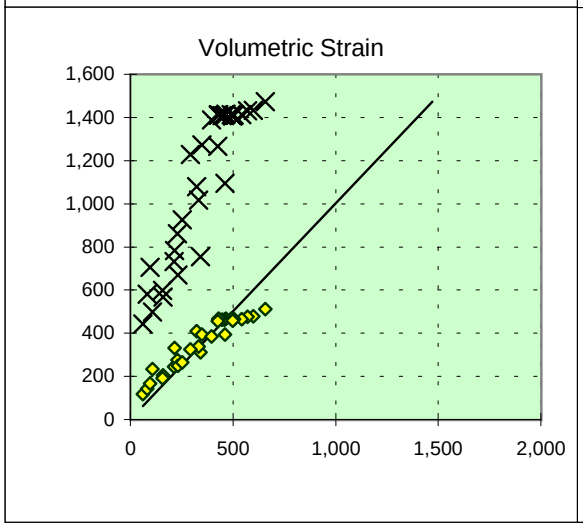


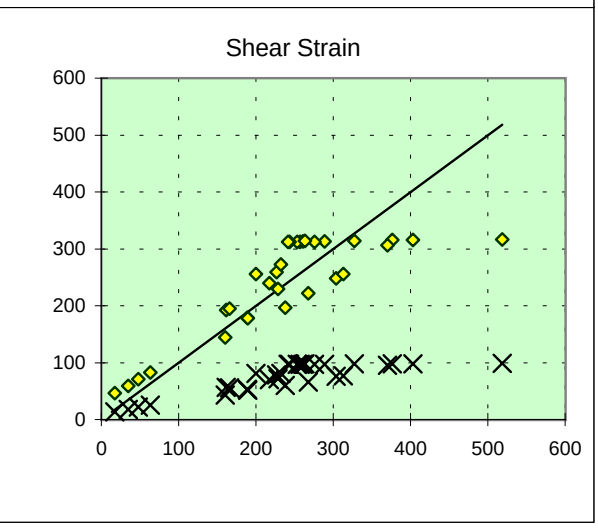
TP-III : LRPC ***Hard Limestone (CCD)2*** ***100% Percentile Data***

Experimental Data	Sample Size: 32	p*= 19 kPa @ ω = 3.3%		p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa	Mr_e= 885 MPa		υ_e = 0.21
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 456,403	k_3 = 890,400	Ga = 963,427 kPa	Ga = 283,689 kPa
	k_2 = 0.5309	k_4 = 0.7230	Ka = 74,228 kPa	Ka = 4,619 kPa
		k_5 = -0.1864	n = 0.3702	n = 0.3200
				β = 0.0018
				m = 0.0080
	r^2= 0.531	r^2= 0.582	r^2= 0.532	$r^2\varepsilon_v$= 0.725 $r^2\varepsilon_s$= 0.570
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 302 MPa	Mr_c= 257 MPa	ε_{vc}= 191 ε_{sc}= 27	ε_{vc}= 63 ε_{sc}= 102
			Mr_c= 355 MPa	Mr_c= 357 MPa
			υ_c= **-0.71**	υ_c= 0.10





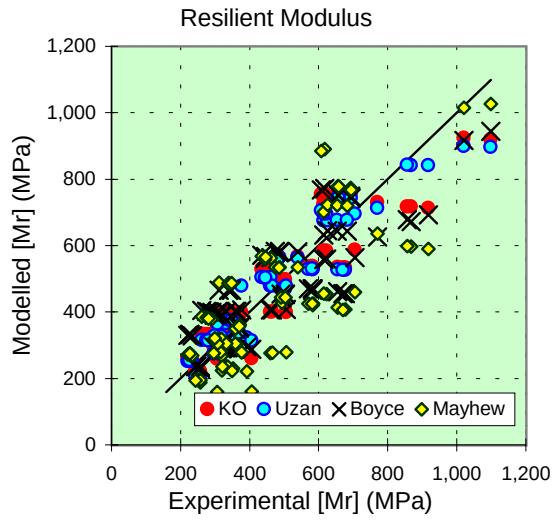


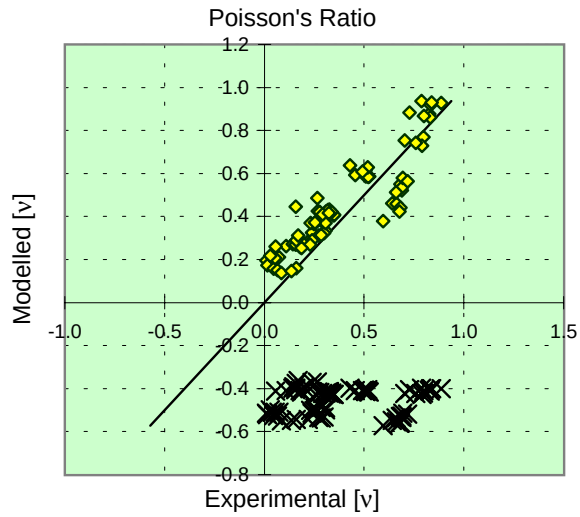


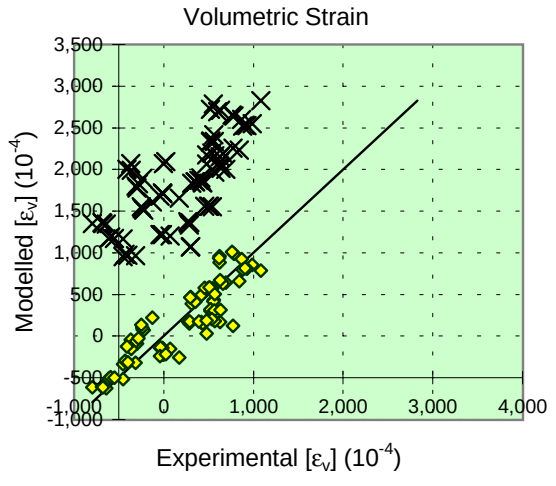
TP-III : LRPC	***Soft Limestone (CCT)***			***90% Percentile Data***
Experimental Data	Sample Size: 82	p*= 80 kPa @	ω = 3.5%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 317 MPa	υ_e = 0.41

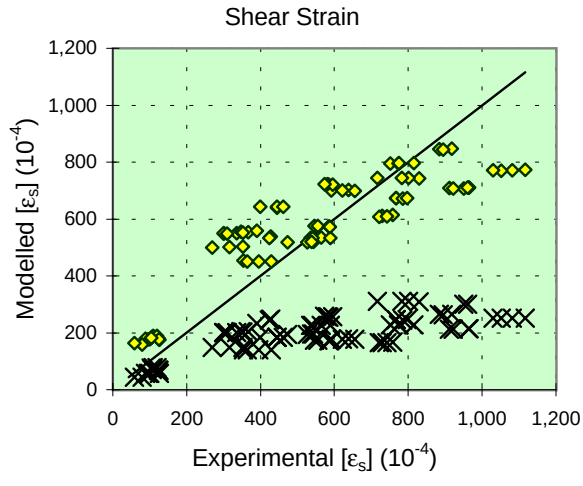
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 134,720	k_3 = 337,072	Ga = 196,429 kPa	Ga = 57,516 kPa
	k_2 = 0.7647	k_4 = 0.9054	Ka = 14,278 kPa	Ka = -210,437 kPa
		k_5 = -0.1691	n = 0.1266	n = -0.1929
				β = -1.4973
				m = -0.4989
	r^2= 0.726	r^2= 0.776	r^2= 0.628	$r^2\varepsilon_v$= 0.665 $r^2\varepsilon_s$= 0.633

Characteristic Values	At	p_1= 6 kPa	p_2 = 15 kPa	and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**		**Mayhew**	
			ε_{vc}= 611	ε_{sc}= 76	ε_{vc}= 138	ε_{sc}= 474
	Mr_c= 74 MPa	Mr_c= 68 MPa	Mr_c= 114 MPa		Mr_c= 90 MPa	
			υ_c= **-0.74**		υ_c= 0.28	



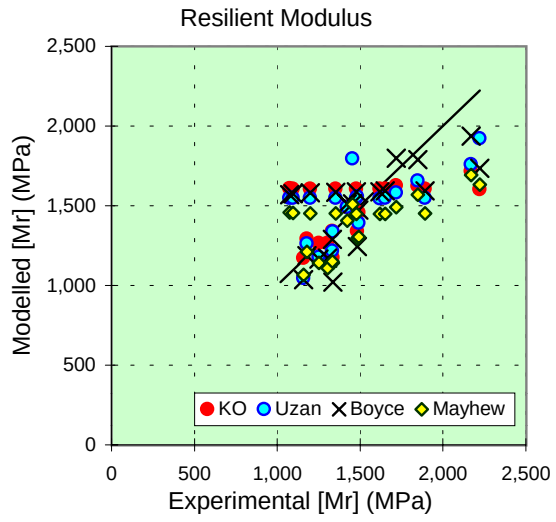


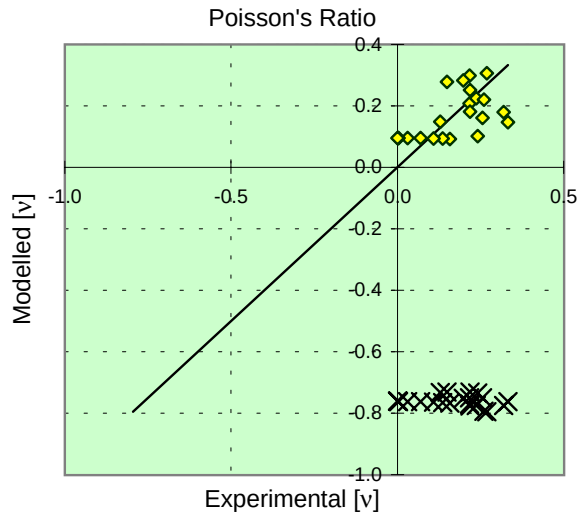


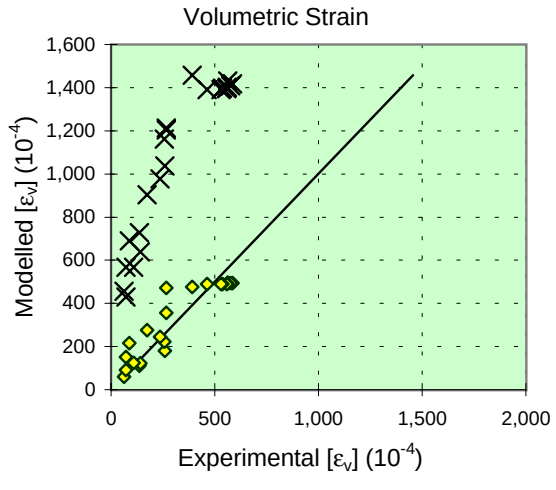


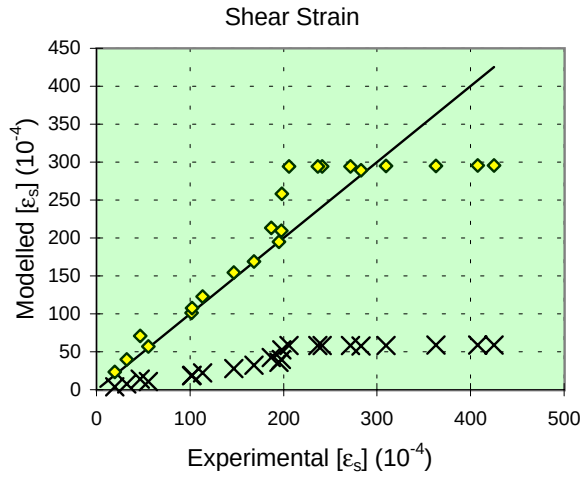
TP-III : LRPC ***Soft Limestone (CCT)*** ***90% Percentile Data***

Experimental Data	Sample Size: 22	p*= 80 kPa @ ω = 3.5%		p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa	Mr_e= 1,413 MPa		υ_e = 0.27
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 975,254	k_3 = 1,264,545	Ga = 1,489,303 kPa	Ga = 267,303 kPa
	k_2 = 0.2277	k_4 = 0.4396	Ka = 98,934 kPa	Ka = 944,781 kPa
		k_5 = -0.1558	n = 0.4612	n = 0.3696
				β = -0.4274
				m = 0.7615
	r^2= 0.393	r^2= 0.464	r^2= 0.454	$r^2\varepsilon_v$= 0.715 $r^2\varepsilon_s$= 0.691
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 817 MPa	Mr_c= 609 MPa	ε_{vc}= 149 ε_{sc}= 5	ε_{vc}= 16 ε_{sc}= 36
			Mr_c= 530 MPa	Mr_c= 1100 MPa
			υ_c= **-0.91**	υ_c= 0.18







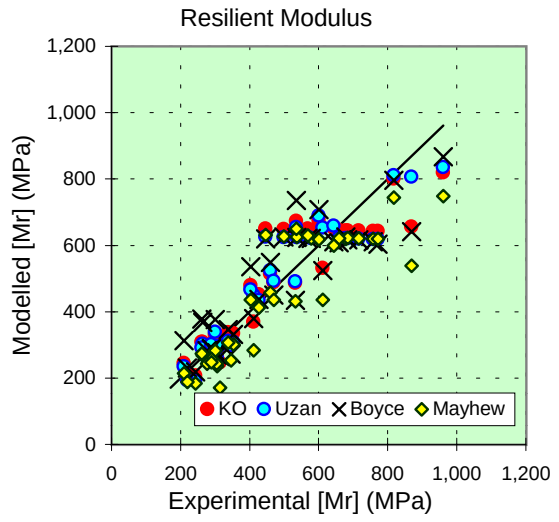


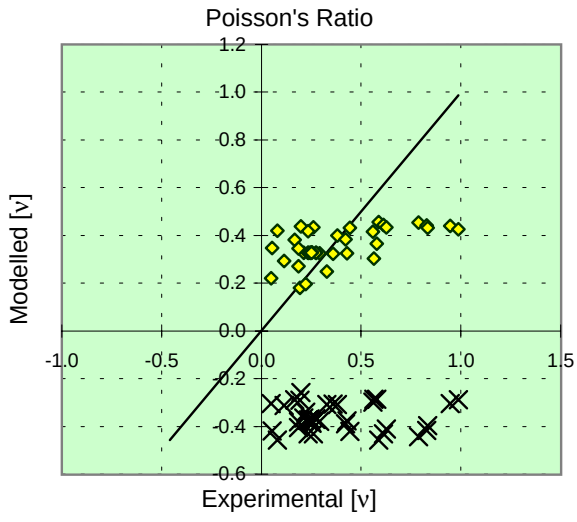
TP-III : LRPC ***Soft Limestone (CCT)*** ***90% Percentile Data***

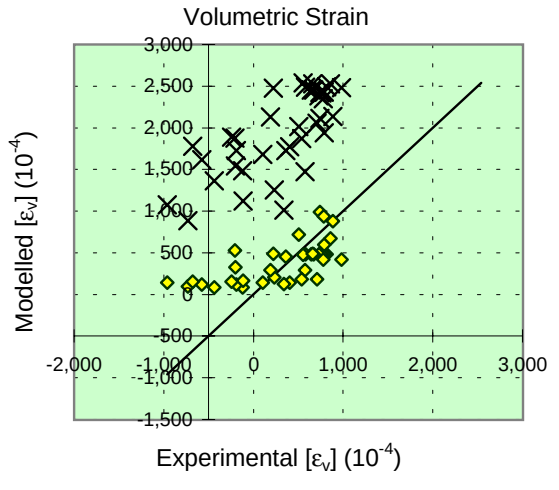
Experimental Data	Sample Size: 39	p*= 80 kPa @	ω = 3.5%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 277 MPa	υ_e = 0.47

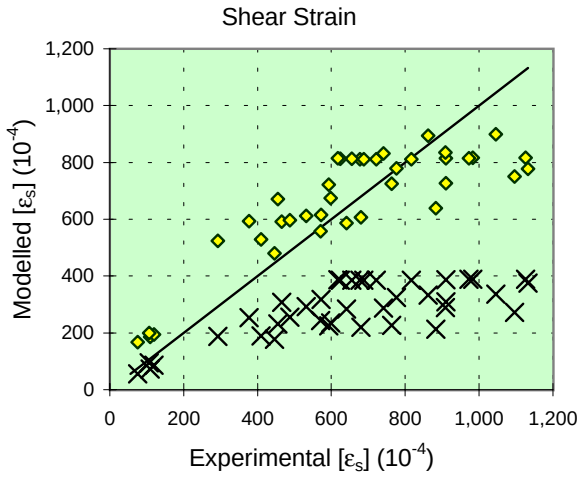
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 131,034	k_3 = 315,587	Ga = 153,831 kPa	Ga = 54,527 kPa
	k_2 = 0.7283	k_4 = 0.9044	Ka = 13,870 kPa	Ka = 472,589 kPa
		k_5 = -0.1737	n = 0.1146	n = -0.1547
				β = 0.1854
				m = 1.3342
	r^2= 0.710	r^2= 0.745	r^2= 0.665	$r^2\varepsilon_v$= 0.445 $r^2\varepsilon_s$= 0.608

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 582 ε_{sc}= 100	ε_{vc}= 11 ε_{sc}= 466
	Mr_c= 74 MPa	Mr_c= 64 MPa	Mr_c= 112 MPa	Mr_c= 105 MPa
			υ_c= **-0.66**	υ_c= 0.48



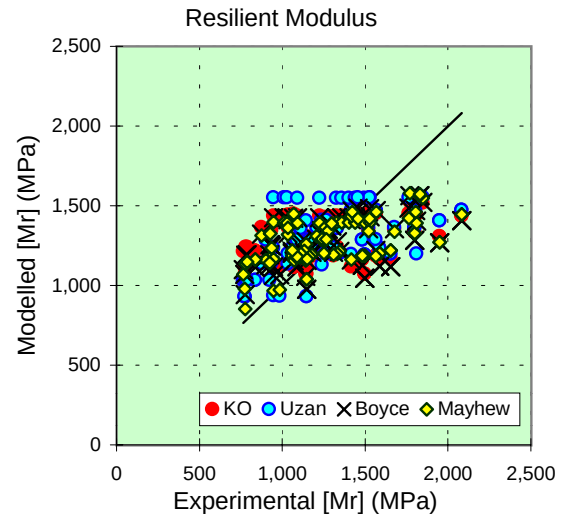


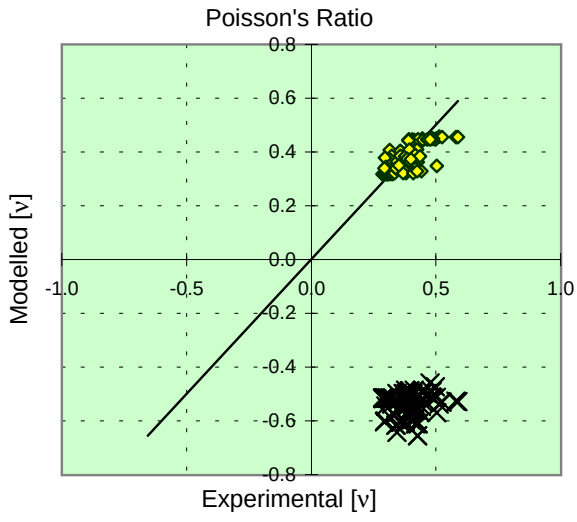


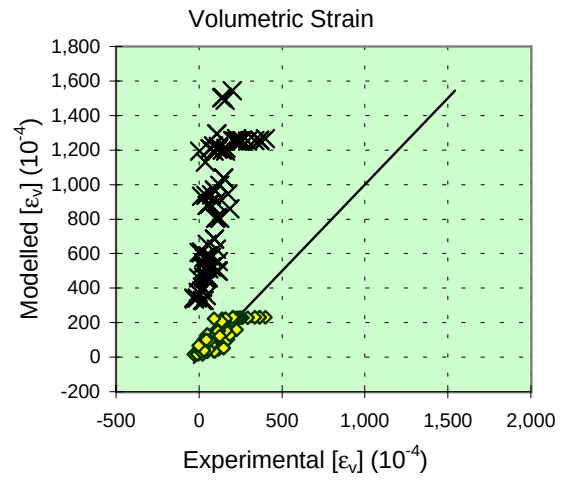


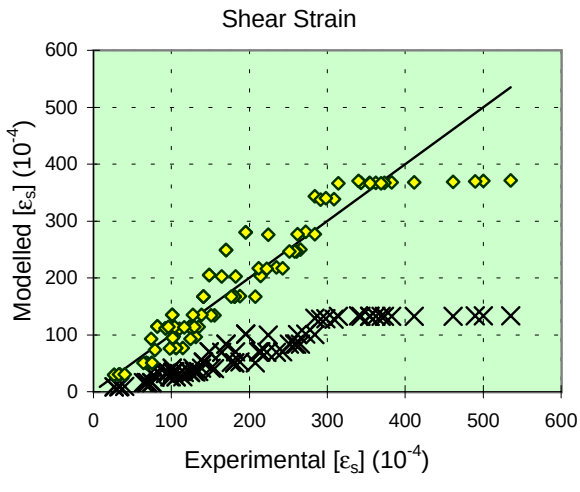
TP-III : LRPC ***Soft Limestone (CCT)*** ***90% Percentile Data***

Experimental Data	Sample Size: 90	p*= 80 kPa @ ω = 3.5%		p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa	Mr_e= 1,089 MPa		υ_e = 0.45
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 949,106	k_3 = 1,095,955	Ga = 853,243 kPa	Ga = 261,134 kPa
	k_2 = 0.1880	k_4 = 0.0078	Ka = 151,862 kPa	Ka = 3,774,852 kPa
		k_5 = 0.1872	n = 0.6886	n = 0.5425
				β = -1.0655
				m = 0.7908
	r^2= 0.351	r^2= 0.417	r^2= 0.367	$r^2\varepsilon_v$= 0.597 $r^2\varepsilon_s$= 0.758
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 86 ε_{sc}= 6	ε_{vc}= 5 ε_{sc}= 26
	Mr_c= 820 MPa	Mr_c= 963 MPa	Mr_c= 873 MPa	Mr_c= 1696 MPa
			υ_c= **-0.84**	υ_c= 0.34



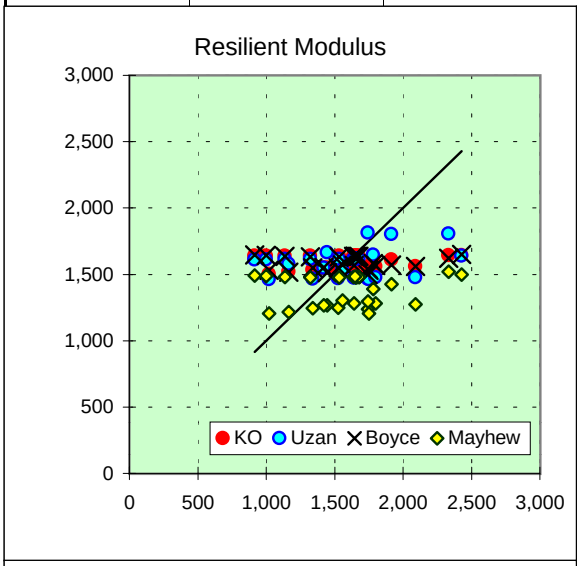


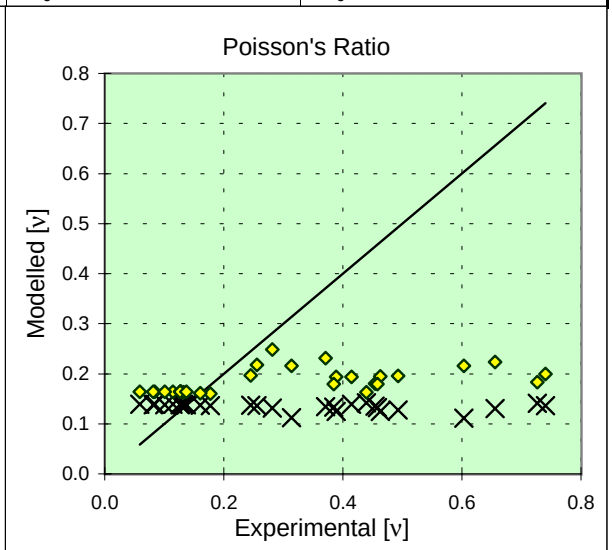


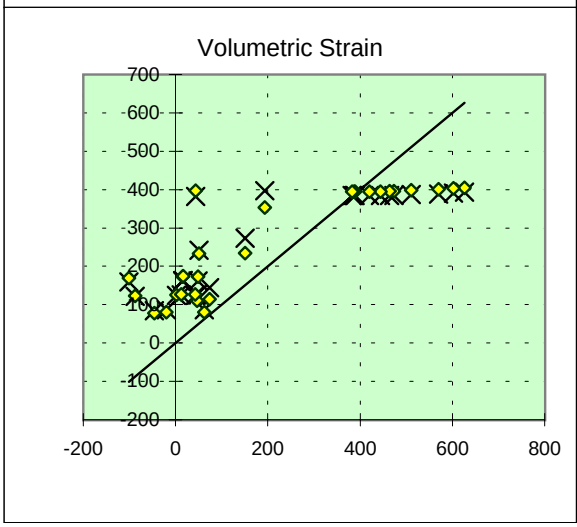


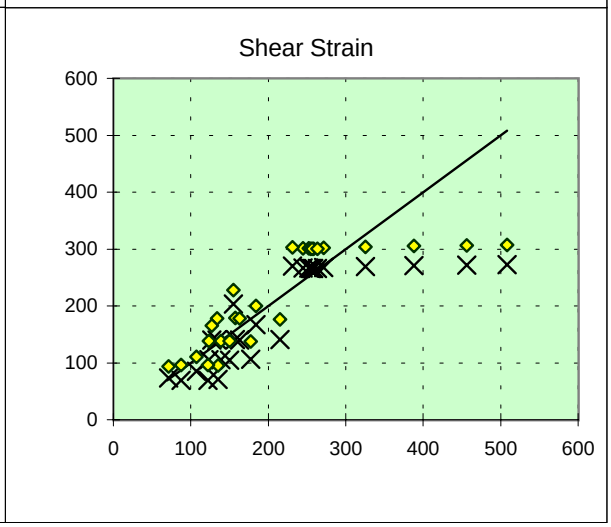
TP-III : LRPC ***Hard Limestone (CCD)*** ***90% Percentile Data***

Experimental Data	Sample Size: 28	p*= 19 kPa @ ω = 3.3%		p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 1,586 MPa	υ_e = 0.62
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 1,449,636 k_2 = 0.0558	k_3 = 2,001,132 k_4 = 0.3501 k_5 = -0.3346	Ga = 620,255 kPa Ka = 615,736 kPa n = 0.8901	Ga = 474,325 kPa Ka = 1,000,000 kPa n = 0.7565 β = -0.1000 m = 1.0000
	r^2= 0.300	r^2= 0.319	r^2= 0.291	$r^2\varepsilon_v$= 0.560 $r^2\varepsilon_s$= 0.587
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 1388 MPa	Mr_c= 1273 MPa	ε_{vc}= 17 ε_{sc}= 16 Mr_c= 1929 MPa υ_c= **-0.07**	ε_{vc}= 13 ε_{sc}= 27 Mr_c= 1436 MPa υ_c= 0.16



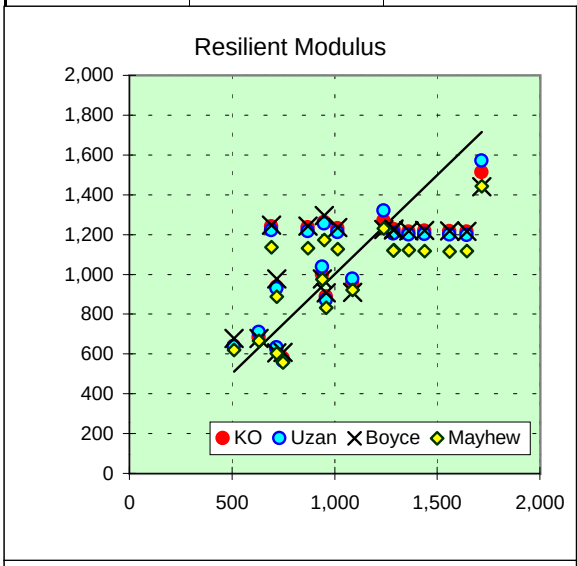


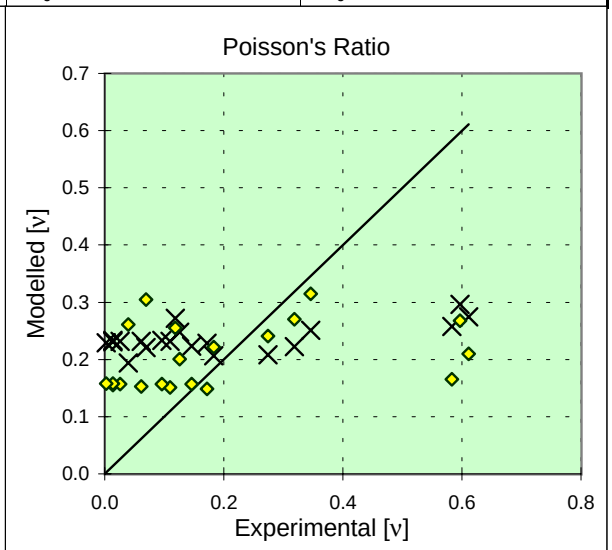


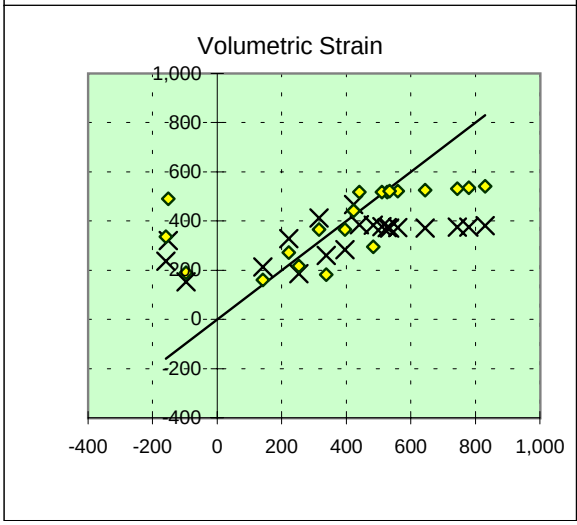


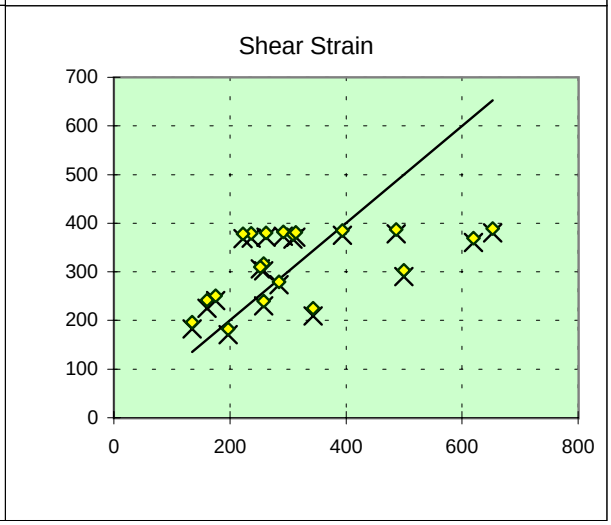
TP-III : LRPC ***Hard Limestone (CCD)*** ***90% Percentile Data***

Experimental Data	Sample Size: 20	p*= 19 kPa @ ω = 3.3%		p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa	Mr_e= 536 MPa		υ_e = 0.35
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 294,626	k_3 = 656,346	Ga = 244,473 kPa	Ga = 227,231 kPa
	k_2 = 0.6514	k_4 = 0.8142	Ka = 166,127 kPa	Ka = 791,396 kPa
		k_5 = -0.1565	n = 0.3526	n = 0.3089
				β = -0.3781
				m = 0.5990
	r^2= 0.516	r^2= 0.518	r^2= 0.495	$r^2\varepsilon_v$= 0.432 $r^2\varepsilon_s$= 0.391
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa and	q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 177 MPa	Mr_c= 157 MPa	ε_{vc}= 57 ε_{sc}= 111	ε_{vc}= 57 ε_{sc}= 130
			Mr_c= 344 MPa	Mr_c= 305 MPa
			υ_c= 0.15	υ_c= 0.19







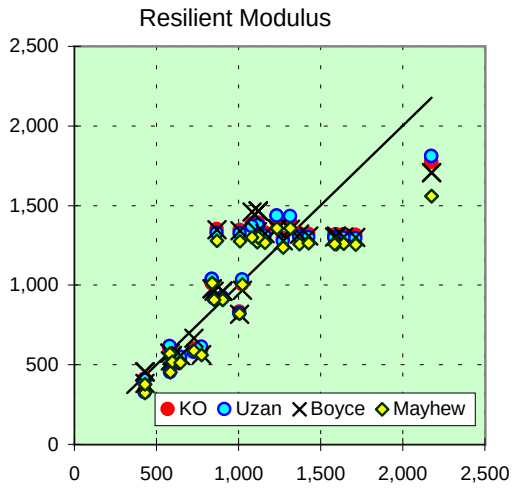


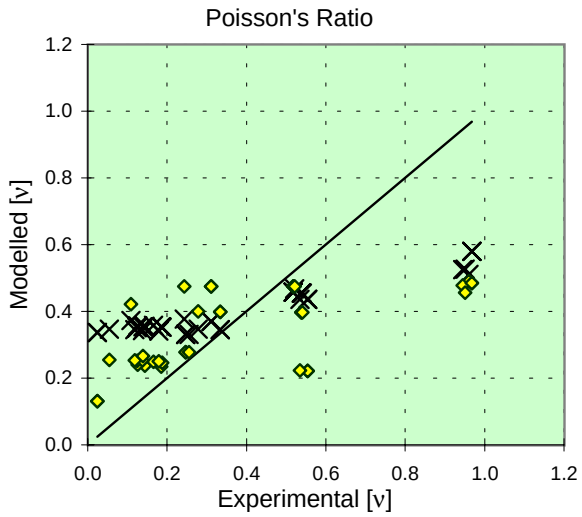
TP-III : LRPC ***Hard Limestone (CCD)*** ***90% Percentile Data***

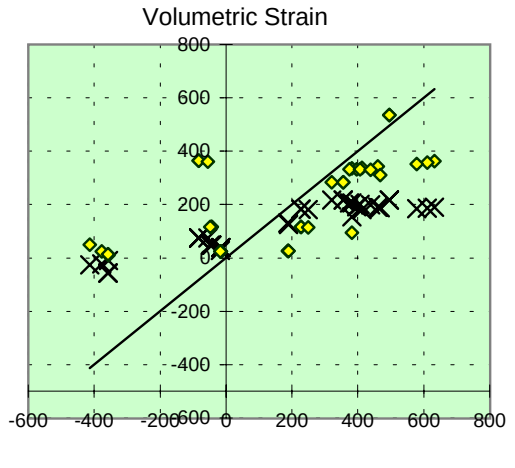
Experimental Data	Sample Size: 37	p*= 19 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 354 MPa	υ_e = 0.72

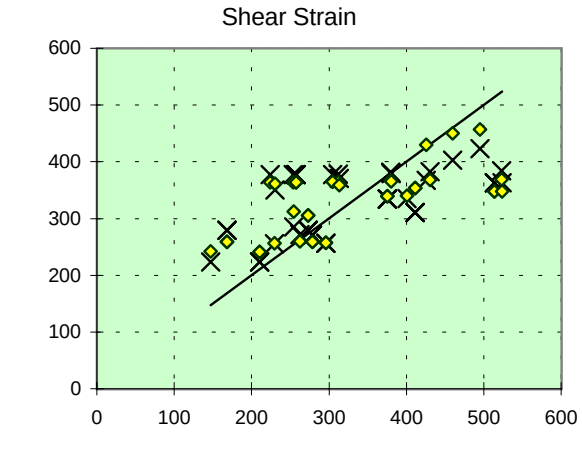
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 198,589	k_3 = 557,105	Ga = 169,721 kPa	Ga = 154,123 kPa
	k_2 = 0.8764	k_4 = 0.9845	Ka = 27,472 kPa	Ka = 7,963,395 kPa
		k_5 = -0.1144	n = 0.0404	n = -0.0837
				β = -0.3813
				m = 2.3088
	r^2= 0.659	r^2= 0.661	r^2= 0.636	$r^2\varepsilon_v$= 0.463 $r^2\varepsilon_s$= 0.460

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 7 ε_{sc}= 288	ε_{vc}= 0 ε_{sc}= 400
	Mr_c= 100 MPa	Mr_c= 94 MPa	Mr_c= 170 MPa	Mr_c= 124 MPa
			υ_c= 0.48	υ_c= 0.50







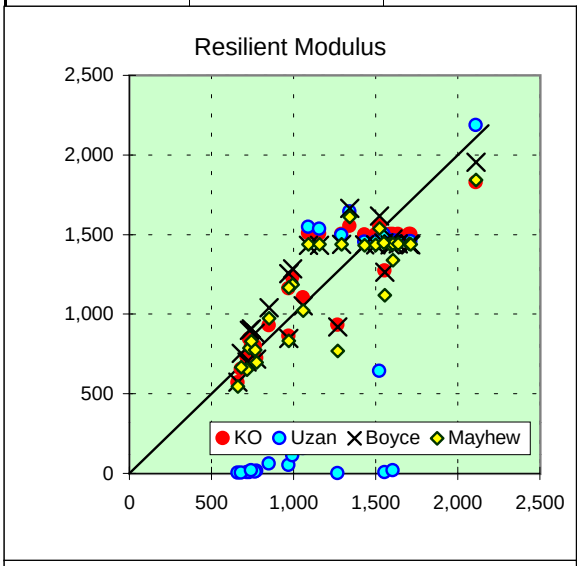


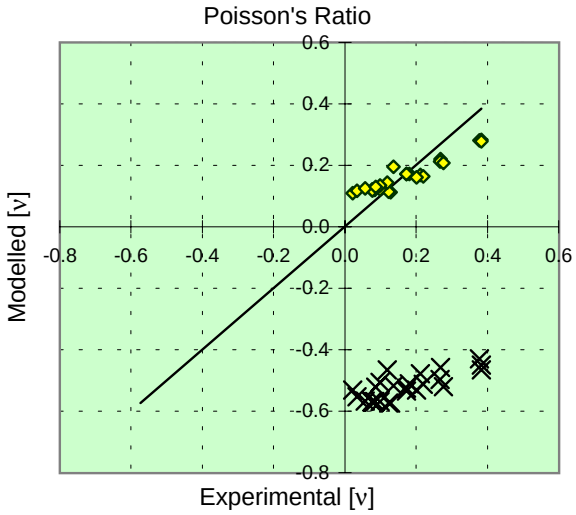
TP-III : LRPC ***Hard Limestone (CCD)2*** ***90% Percentile Data***

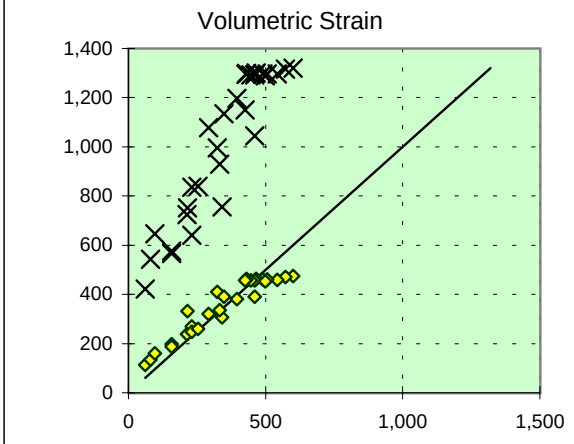
Experimental Data	Sample Size: 29	p*= 19 kPa @	ω = 3.3%	p_a = 100 kPa
	Characteristic Values at q2 = 54 kPa		Mr_e= 794 MPa	υ_e = 0.22

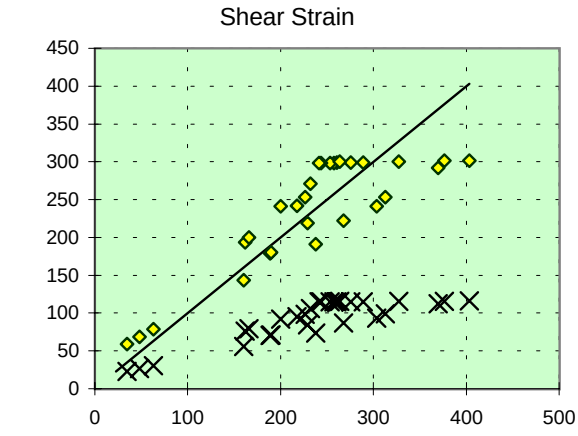
Modelled Data	**kθ**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 385,009	k_3 = 1,003	Ga = 720,075 kPa	Ga = 282,618 kPa
	k_2 = 0.6196	k_4 = 1.2707	Ka = 56,957 kPa	Ka = 1,567 kPa
		k_5 = 3.2975	n = 0.2559	n = 0.2752
				β = 0.0007
				m = 0.0027
	r^2= 0.674	r^2= -0.315	r^2= 0.644	$r^2\varepsilon_v$= 0.745 $r^2\varepsilon_s$= 0.642

Characteristic Values	At p_1= 6 kPa		p_2 = 15 kPa and	q_1= 4 kPa q_2= 54 kPa
	kθ	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}= 218 ε_{sc}= 45	ε_{vc}= 58 ε_{sc}= 111
	Mr_c= 238 MPa	Mr_c= 0 MPa	Mr_c= 285 MPa	Mr_c= 341 MPa
			υ_c= **-0.61**	υ_c= 0.14



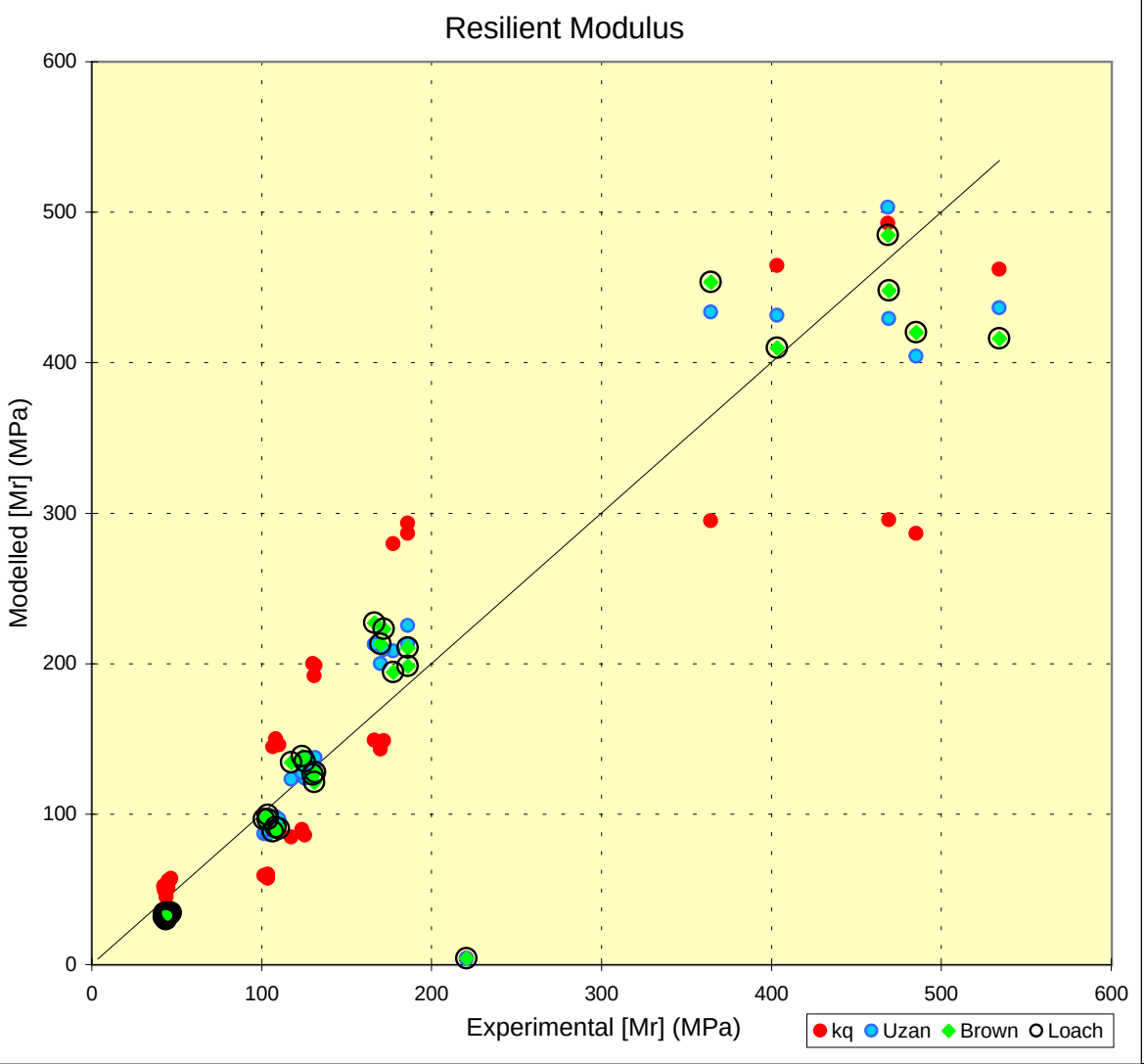






TP-III : LNEC ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 41	Suction (s) =	40 kPa @ ω=	25% 1,510 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 177 MPa	υ_e = 0.31
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 179,314	k_3 = 58,863	A = 236,298	C = 590,745
	k_2 = -1.6984	k_4 = -0.3041	B = 1.3031	D = 2.3031
		k_5 = -1.1109		
	r^2= 0.753	r^2= 0.894	r^2= 0.889	r^2= 0.889
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 1,091 MPa	Mr_c= 512 MPa	Mr_c= 419 MPa	Mr_c= 419 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	14591	0.18	10813	0.21	0.16	10613	0.09	26533	0.09
t=	12.29	-9.25	5.44	-1.44	-6.91	22.26	13.74	22.26	24.28
Prob(t)=	0%	0%	0%	16%	0%	0%	0%	0%	0%

The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

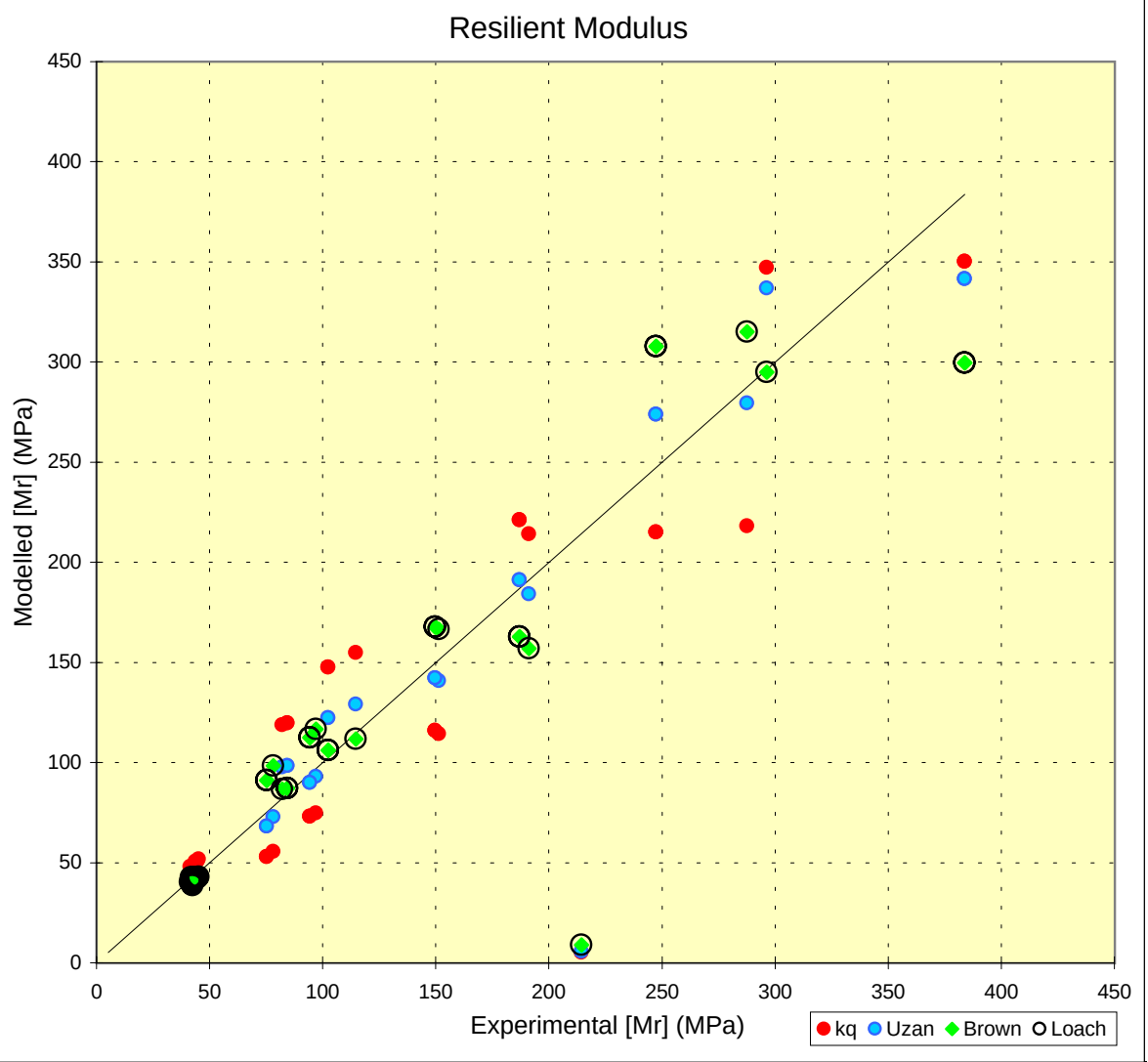
The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : 0 ***0.0*** ***100% Percentile Data***

Experimental Data	Sample Size: 41	Suction (s) =	40 kPa @ ω=	26%	1,492 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 133 MPa	υ_e = 0.32	

Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 137,948	k_3 = 42,643	A = 174,630	C = 436,574
	k_2 = -1.4891	k_4 = -0.7219	B = 0.9686	D = 1.9686
		k_5 = -0.5671		
	r^2= 0.795	r^2= 0.856	r^2= 0.808	r^2= 0.808

Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 672 MPa	Mr_c= 438 MPa	Mr_c= 267 MPa	Mr_c= 267 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	8692	0.13	7801	0.21	0.14	8660	0.09	21649	0.09
t=	15.87	-11.29	5.47	-3.49	-4.02	20.17	11.18	20.17	22.72
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

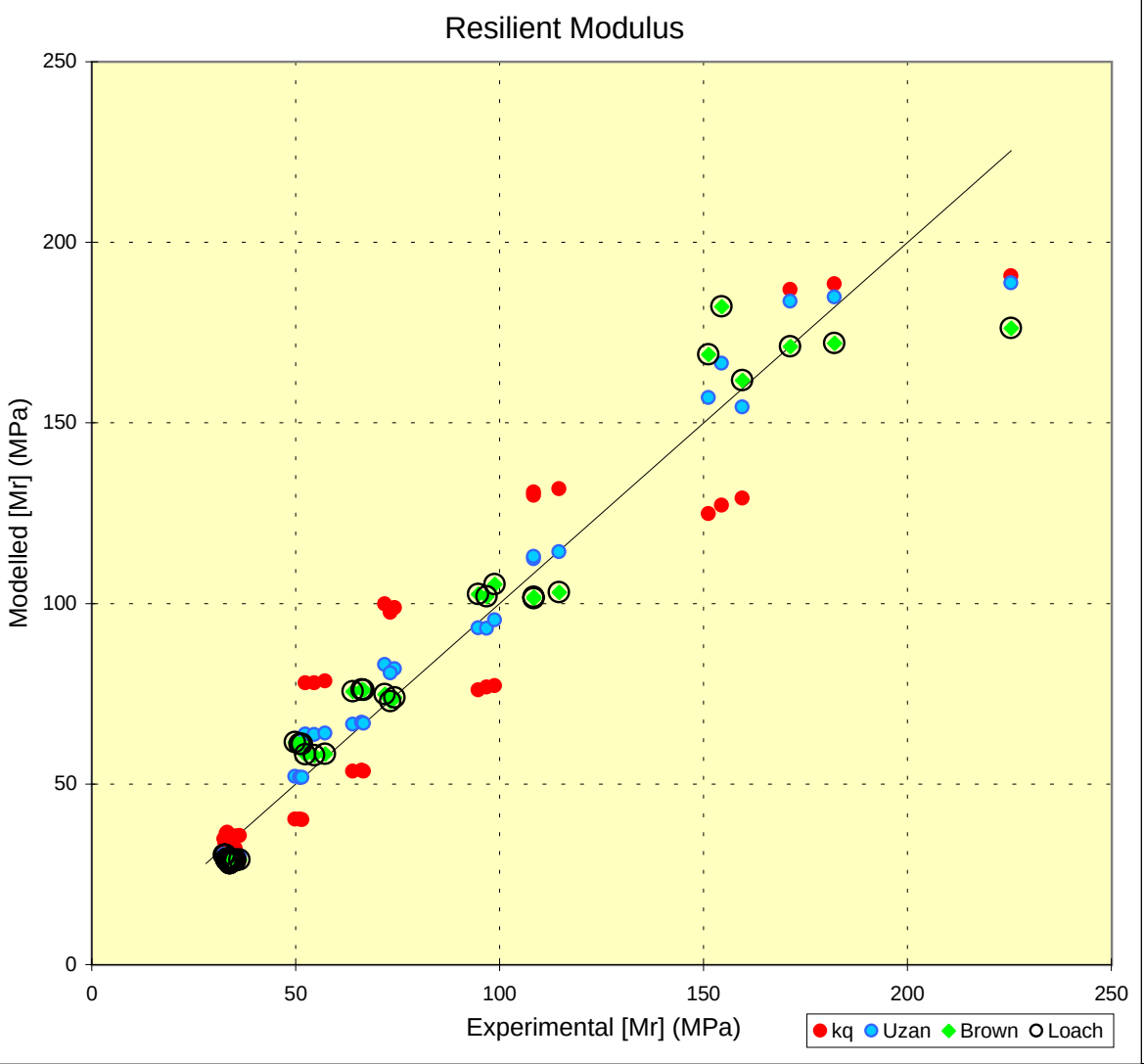
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : 0 ***0.0*** ***100% Percentile Data***

Experimental Data	Sample Size: 41	Suction (s) =	40 kPa @ ω=	26% 1,446 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 119 MPa	υ_e = 0.31
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 88,229	k_3 = 37,159	A = 107,458	C = 268,645
	k_2 = -1.2038	k_4 = -0.4400	B = 0.8331	D = 1.8331
		k_5 = -0.5695		
	r^2= 0.891	r^2= 0.973	r^2= 0.949	r^2= 0.949
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 317 MPa	Mr_c= 208 MPa	Mr_c= 155 MPa	Mr_c= 155 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	3117	0.07	2338	0.08	0.05	2278	0.04	5694	0.04
t=	28.31	-16.21	15.90	-5.69	-10.71	47.18	23.42	47.18	51.53
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

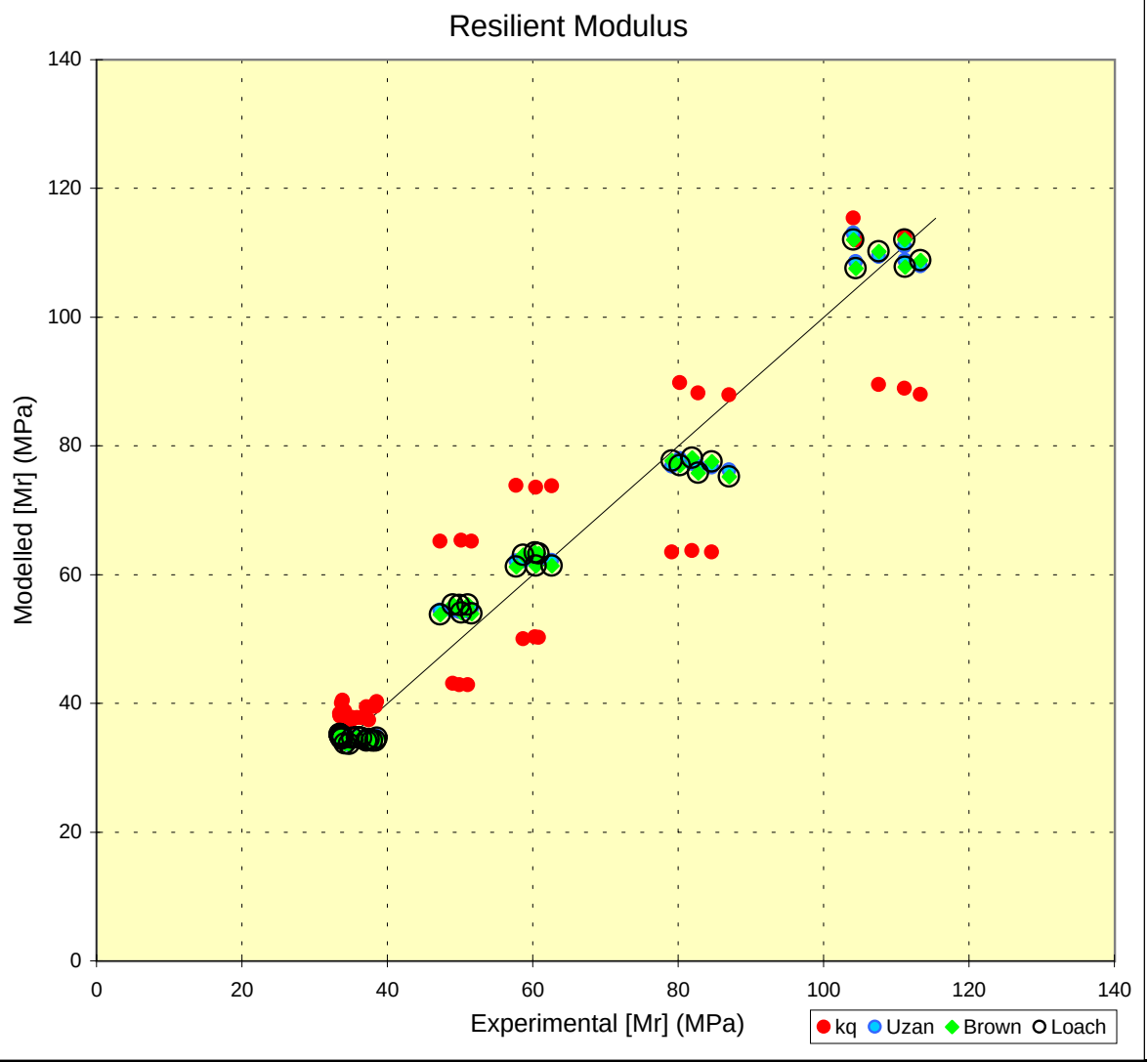
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The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 41 Suction (s) = 40 kPa @ ω= 26% 1,456 kg/m3			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 86 MPa	υ_e = 0.26
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 69,079	k_3 = 46,818	A = 78,960	C = 197,399
	k_2 = -0.7464	k_4 = -0.0516	B = 0.5329	D = 1.5329
		k_5 = -0.5019		
	r^2= 0.832	r^2= 0.978	r^2= 0.977	r^2= 0.977
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 153 MPa	Mr_c= 103 MPa	Mr_c= 100 MPa	Mr_c= 100 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	1904	0.06	1651	0.05	0.03	790	0.01	1976	0.01
t=	36.28	-13.56	28.36	-1.09	-16.01	99.92	38.79	99.92	111.59
Prob(t)=	0%	0%	0%	28%	0%	0%	0%	0%	0%

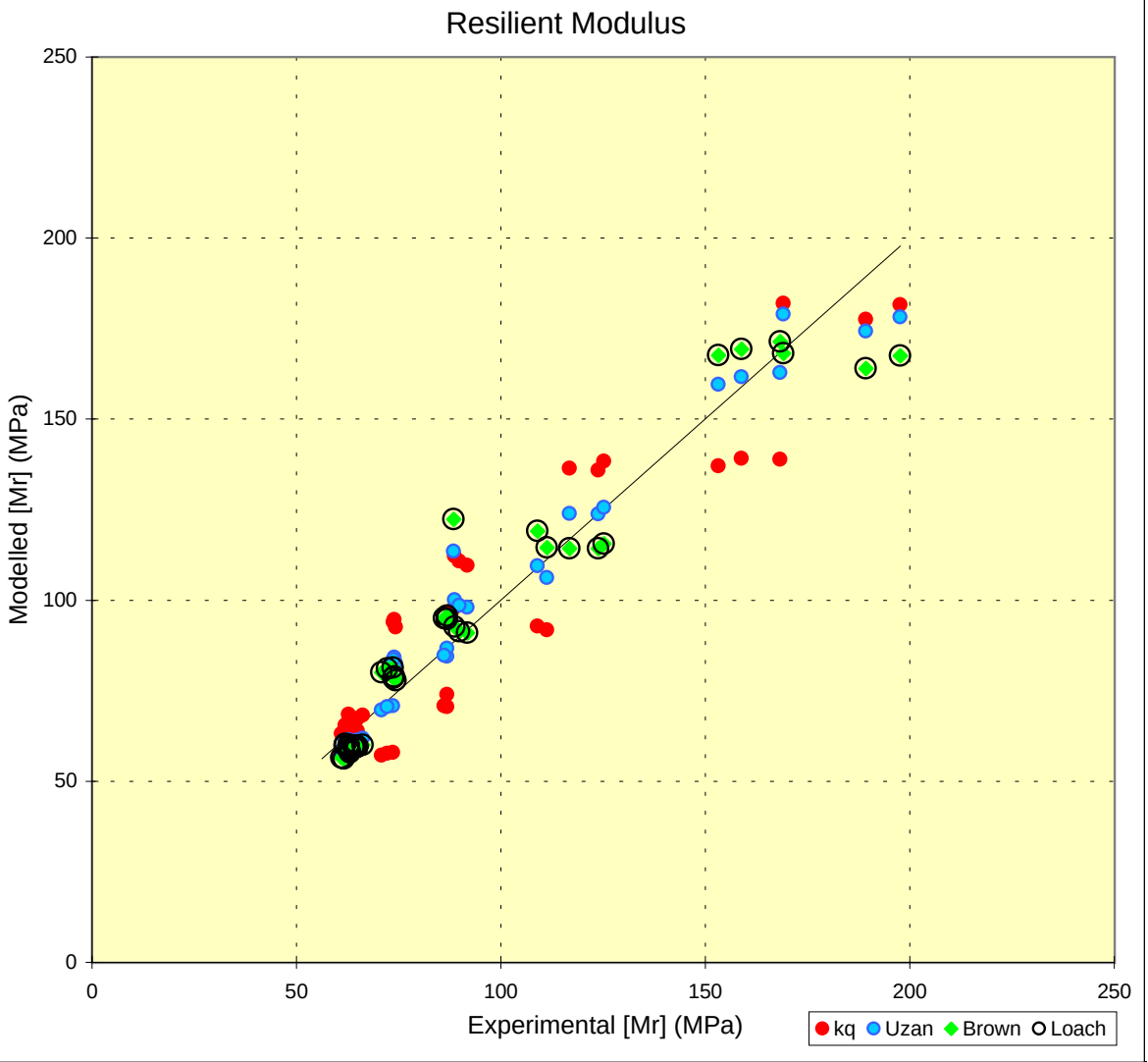
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The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : 0 ***0.0*** ***100% Percentile Data***

Experimental Data	Sample Size: 41	Suction (s) =	40 kPa @ ω=	25% 1,478 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 134 MPa	υ_e = 0.27
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 101,177	k_3 = 54,916	A = 117,194	C = 292,985
	k_2 = -0.8786	k_4 = -0.3467	B = 0.5528	D = 1.5528
		k_5 = -0.3621		
	r^2= 0.877	r^2= 0.962	r^2= 0.930	r^2= 0.930
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 257 MPa	Mr_c= 190 MPa	Mr_c= 149 MPa	Mr_c= 149 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	2318	0.05	2759	0.06	0.04	1931	0.02	4826	0.02
t=	43.64	-17.41	19.90	-5.58	-9.37	60.70	23.15	60.70	65.03
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

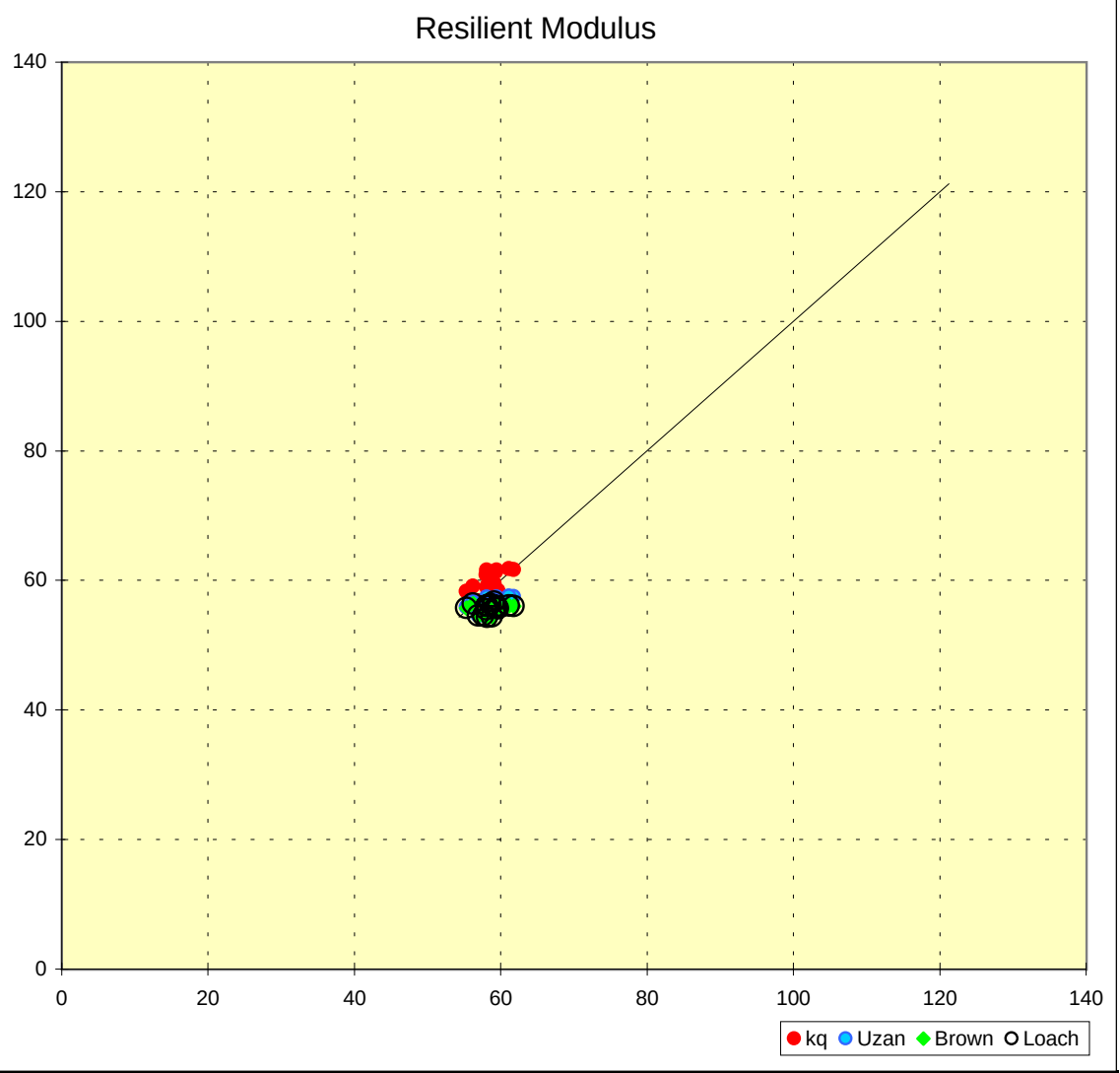
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The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 41	Suction (s) =	40 kPa @ ω=	25% 1,472 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 96 MPa	υ_e = 0.30
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 79,863	k_3 = 52,639	A = 89,493	C = 223,732
	k_2 = -0.5832	k_4 = -0.2453	B = 0.3862	D = 1.3862
		k_5 = -0.2461		
	r^2= 0.882	r^2= 0.972	r^2= 0.931	r^2= 0.931
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 148 MPa	Mr_c= 125 MPa	Mr_c= 106 MPa	Mr_c= 106 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	1127	0.03	1406	0.03	0.02	1041	0.02	2603	0.02
t=	70.87	-18.07	37.45	-7.24	-11.19	85.96	24.03	85.96	86.26
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

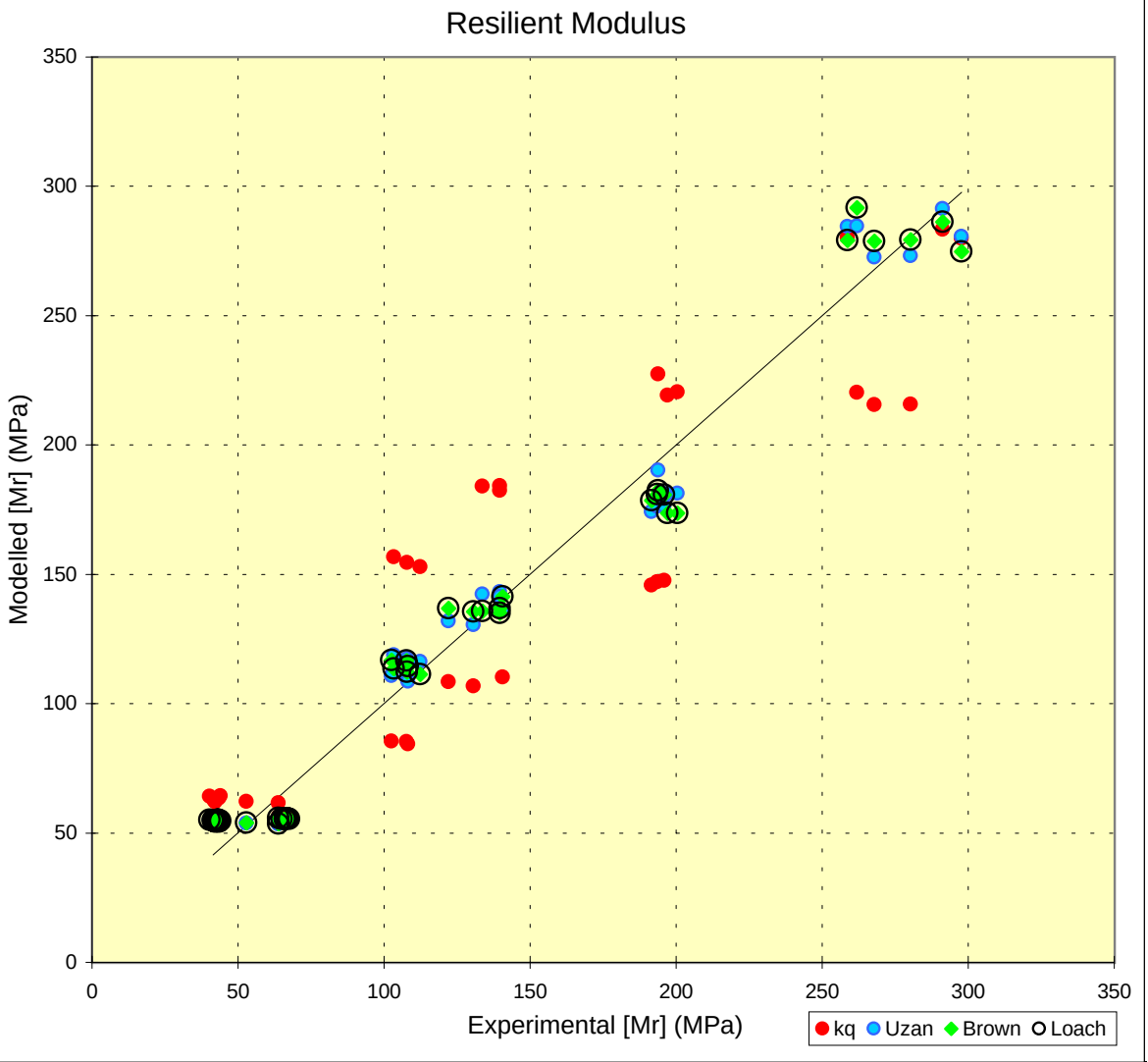
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The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : 0 ***0.0*** ***100% Percentile Data***

Experimental Data	Sample Size: 41	Suction (s) =	40 kPa @ ω=	25% 1,453 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 203 MPa	υ_e = 0.48
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 328,042	k_3 = 93,350	A = 186,355	C = 465,887
	k_2 = -1.4431	k_4 = -0.2262	B = 0.6765	D = 1.6765
		k_5 = -0.5882		
	r^2= 0.853	r^2= 0.978	r^2= 0.974	r^2= 0.974
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 1,521 MPa	Mr_c= 338 MPa	Mr_c= 251 MPa	Mr_c= 251 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	18421	0.12	3694	0.10	0.04	2613	0.02	6532	0.02
t=	17.81	-12.12	25.27	-2.35	-13.85	71.33	31.77	71.33	78.73
Prob(t)=	0%	0%	0%	2%	0%	0%	0%	0%	0%

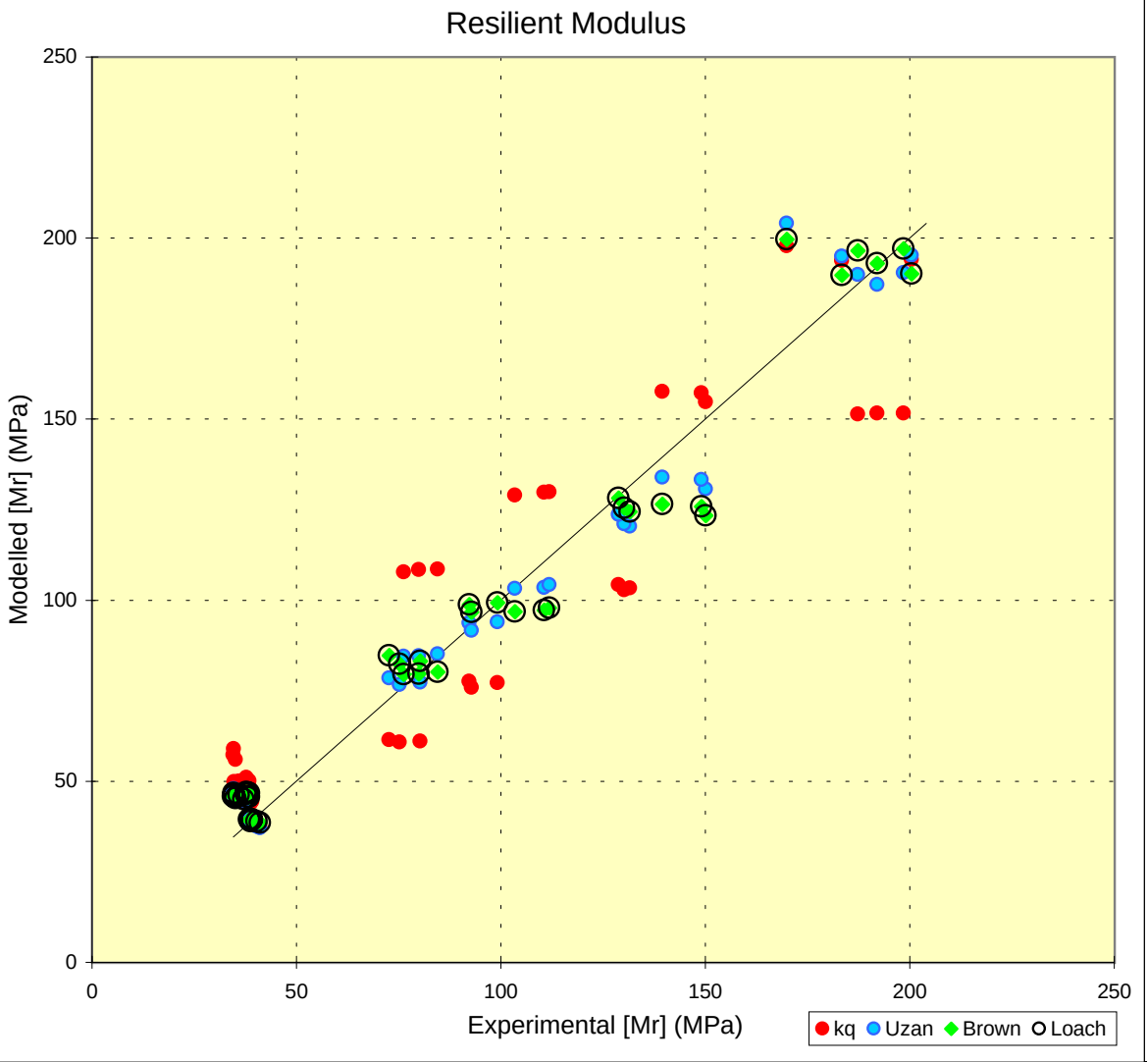
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

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The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 41	Suction (s) = 40 kPa @ ω= 25%		1,461 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 143 MPa	υ_e = 0.49
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 229,484	k_3 = 64,736	A = 129,983	C = 324,959
	k_2 = -1.4187	k_4 = -0.3133	B = 0.6549	D = 1.6549
		k_5 = -0.5324		
	r^2= 0.860	r^2= 0.971	r^2= 0.964	r^2= 0.964
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 1,037 MPa	Mr_c= 262 MPa	Mr_c= 173 MPa	Mr_c= 173 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	12471	0.11	2864	0.11	0.05	2097	0.02	5243	0.02
t=	18.40	-12.34	22.60	-2.93	-11.37	61.98	26.24	61.98	66.30
Prob(t)=	0%	0%	0%	1%	0%	0%	0%	0%	0%

The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

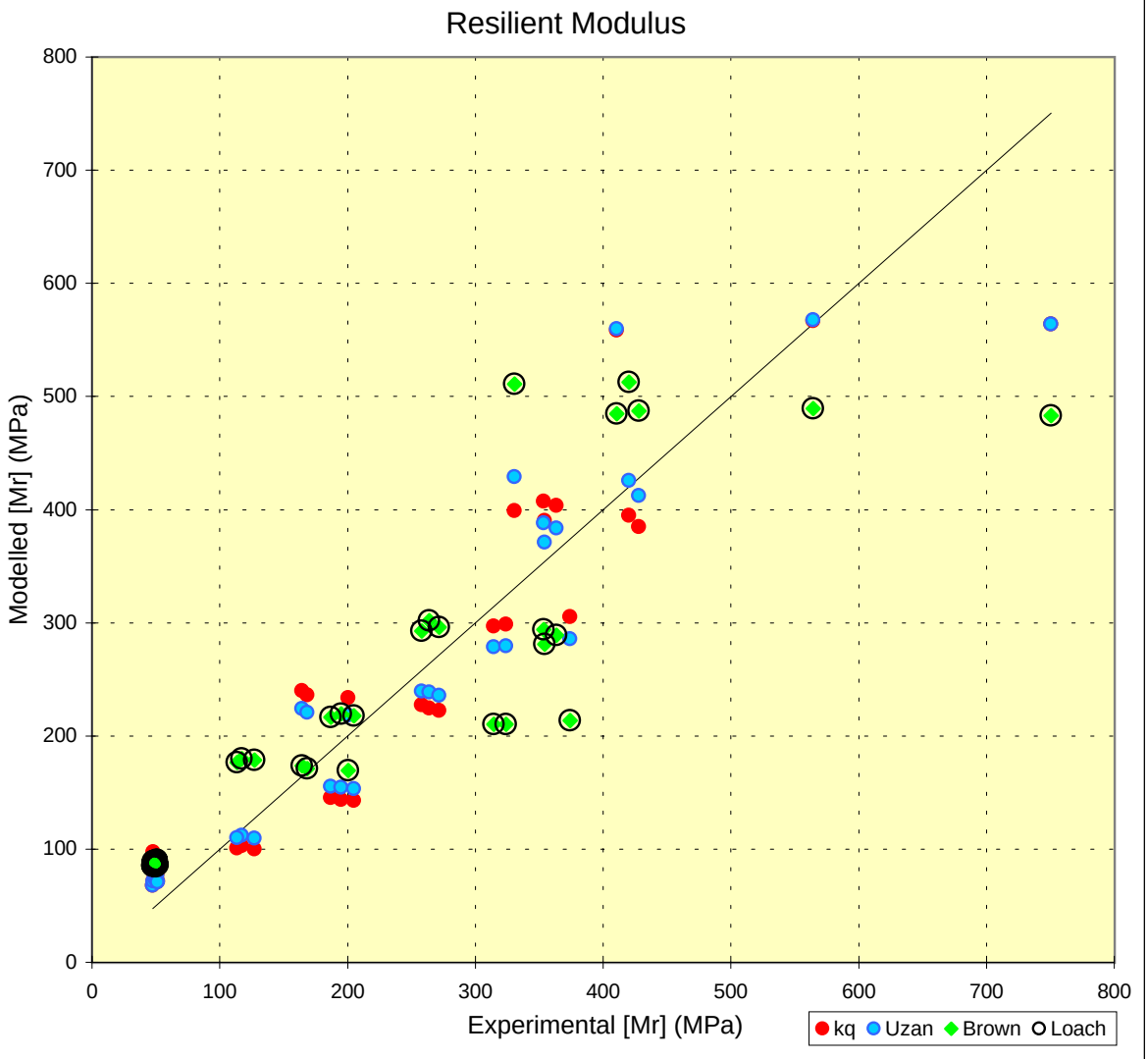
The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : 0 ***0.0*** ***100% Percentile Data***

Experimental Data	Sample Size: 41	Suction (s) =	40 kPa @ ω=	25%	1,511 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 361 MPa	υ_e = 0.52	

Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 711,270	k_3 = 78,145	A = 298,687	C = 746,717
	k_2 = -2.1128	k_4 = -1.7440	B = 0.7713	D = 1.7713
		k_5 = -0.1636		
	r^2= 0.887	r^2= 0.894	r^2= 0.764	r^2= 0.764

Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 6,723 MPa	Mr_c= 4,231 MPa	Mr_c= 419 MPa	Mr_c= 419 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	45021	0.18	12205	0.30	0.12	17203	0.09	43009	0.09
t=	15.80	-11.95	6.40	-5.82	-1.42	17.36	8.22	17.36	18.88
Prob(t)=	0%	0%	0%	0%	17%	0%	0%	0%	0%

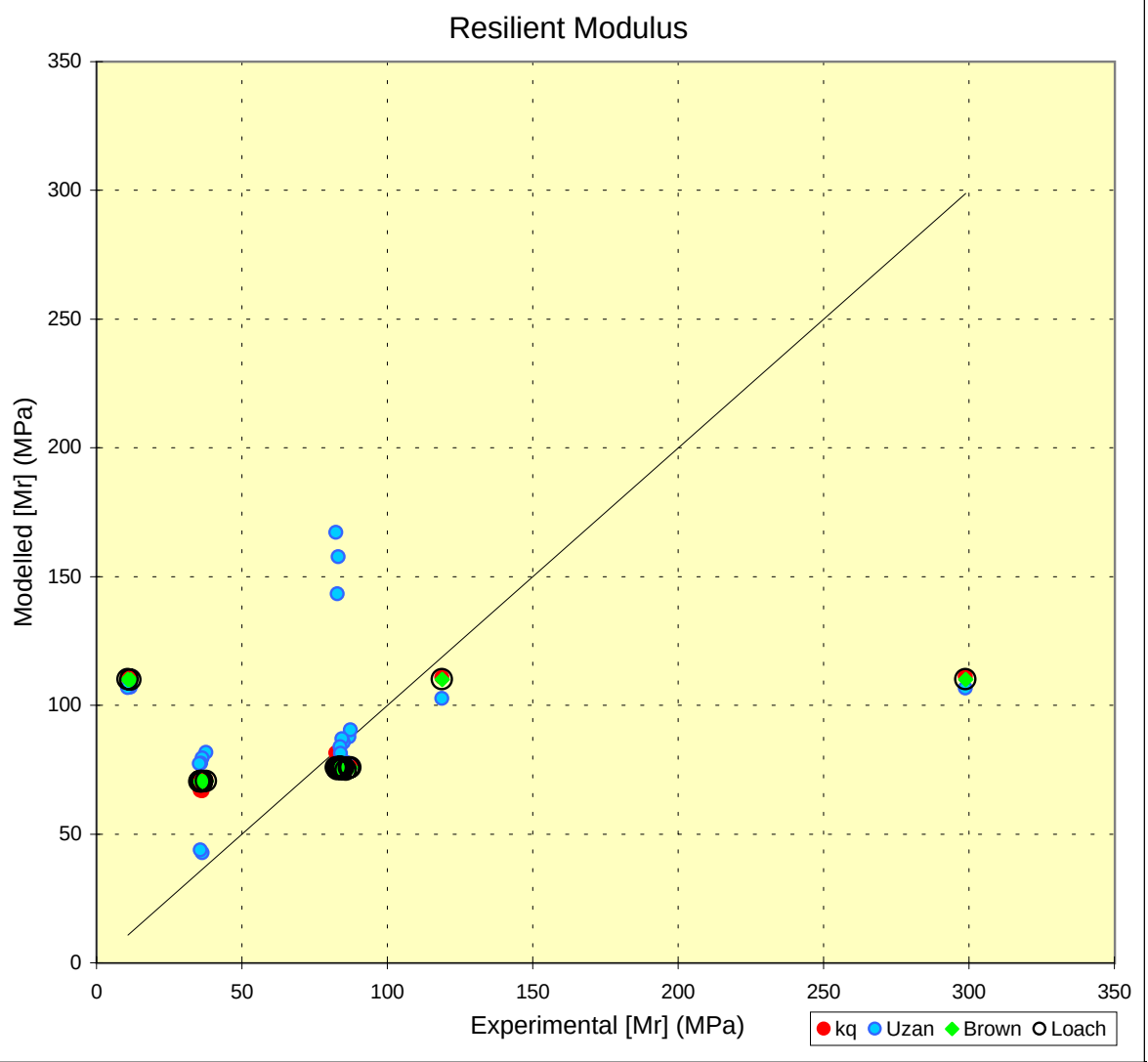
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The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 21	Suction (s) = 40 kPa @ ω= 25%		1,504 kg/m3
	Chara'tic Values at q_2 = 26 kPa	Mr_e= 119 MPa	υ_e = 0.24	
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 118,670	k_3 = 9,896	A = 97,679	C = 244,198
	k_2 = -0.5317	k_4 = -5.5795	B = 0.2070	D = 1.2070
		k_5 = 2.0595		
	r^2= 0.058	r^2= 0.089	r^2= 0.050	r^2= 0.050
Characteristic Values		At:	p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 209 MPa	Mr_c= 105,173 MPa	Mr_c= 107 MPa	Mr_c= 107 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	51569	0.63	41496	10.87	4.34	27415	0.26	68539	0.26
t=	2.30	-0.84	0.24	-0.51	0.47	3.56	0.79	3.56	4.64
Prob(t)=	4%	42%	82%	62%	65%	0%	44%	0%	0%

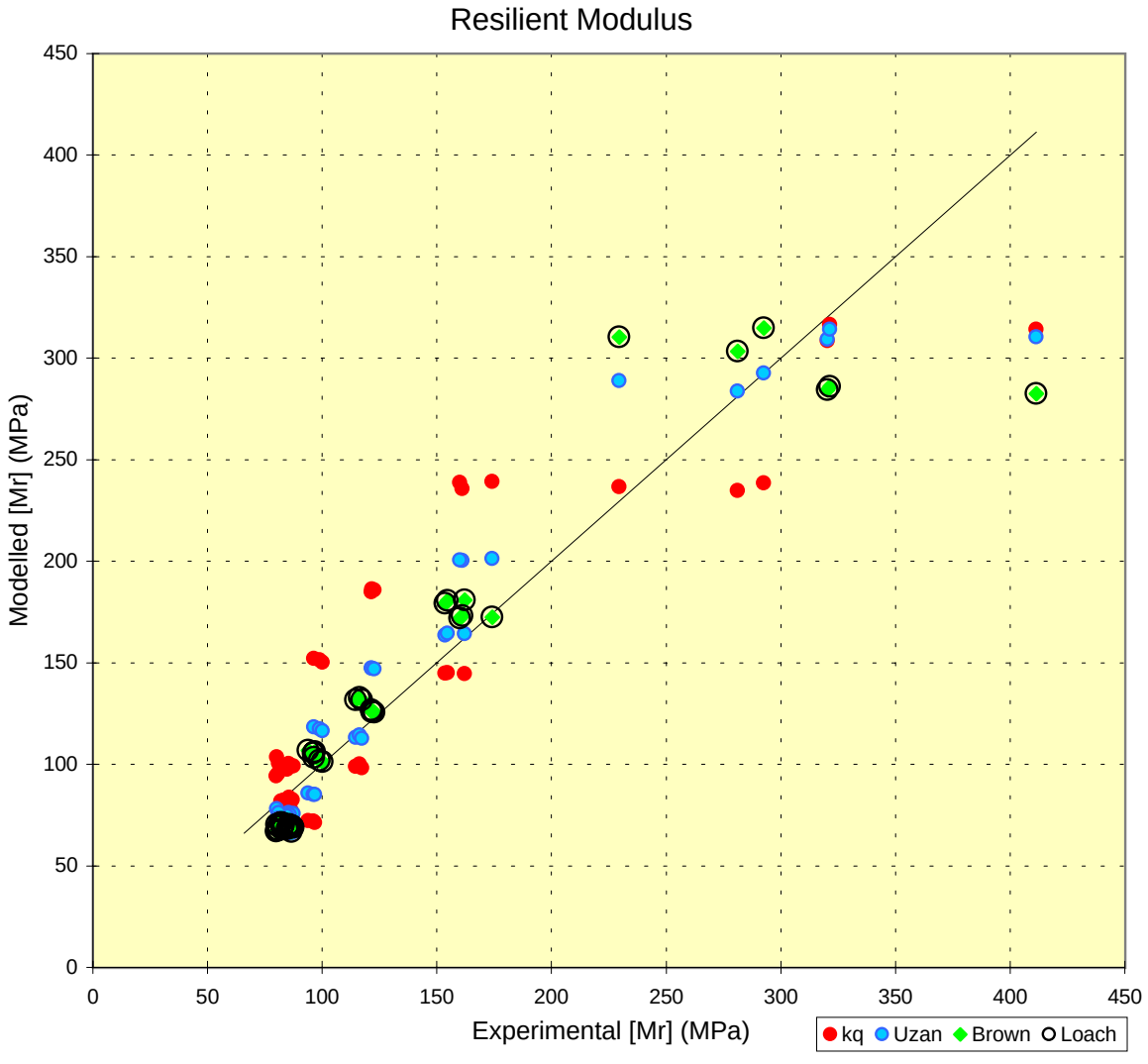
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The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : 0 ***0.0*** ***100% Percentile Data***

Experimental Data	Sample Size: 41	Suction (s) =	40 kPa @ ω=	25% 1,482 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 217 MPa	υ_e = 0.26
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 382,311	k_3 = 65,105	A = 177,864	C = 444,659
	k_2 = -1.8199	k_4 = -0.8393	B = 0.7714	D = 1.7714
		k_5 = -0.4819		
	r^2= 0.812	r^2= 0.903	r^2= 0.857	r^2= 0.857
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 2,647 MPa	Mr_c= 768 MPa	Mr_c= 249 MPa	Mr_c= 249 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	27337	0.19	7670	0.24	0.10	7309	0.07	18273	0.07
t=	13.99	-9.77	8.49	-3.44	-4.70	24.33	11.55	24.33	26.51
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

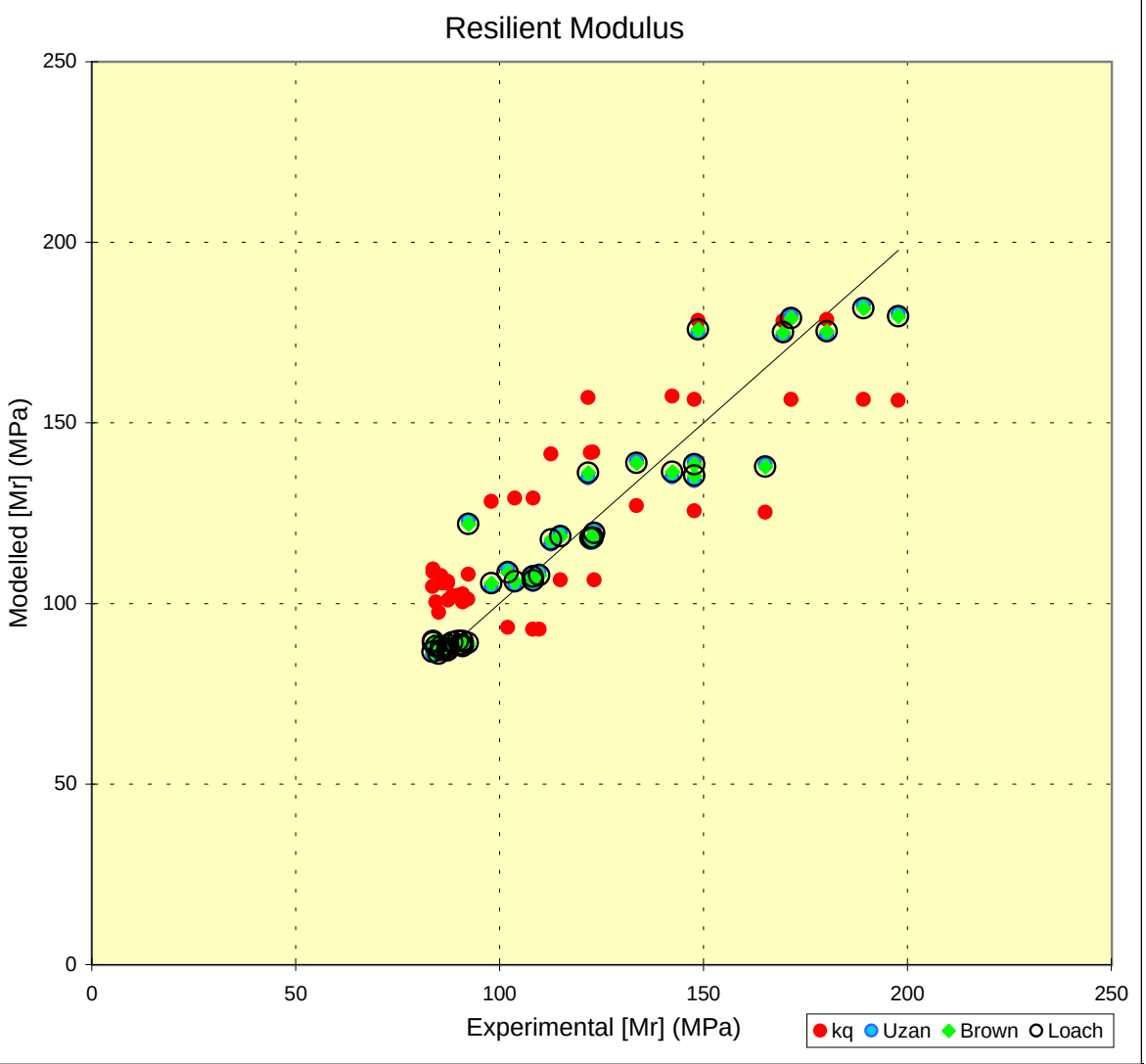
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The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***London Clay (LOC)*** ***100% Percentile Data***

Experimental Data	Sample Size: 41 Suction (s) = 40 kPa @ ω= 25% 1,504 kg/m3			
	Chara'tic Values at q_2 = 26 kPa Mr_e= 155 MPa υ_e = 0.21			
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 194,441	k_3 = 100,124	A = 139,225	C = 348,061
	k_2 = -0.7976	k_4 = 0.0501	B = 0.3762	D = 1.3762
		k_5 = -0.3953		
	r^2= 0.709	r^2= 0.901	r^2= 0.901	r^2= 0.901
Characteristic Values	At: p_2 = 12 kPa & q_2= 26 kPa			
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 454 MPa	Mr_c= 154 MPa	Mr_c= 164 MPa	Mr_c= 164 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	10736	0.10	4950	0.13	0.06	2392	0.02	5979	0.02
t=	18.11	-7.94	20.23	0.37	-6.95	58.21	15.05	58.21	55.07
Prob(t)=	0%	0%	0%	71%	0%	0%	0%	0%	0%

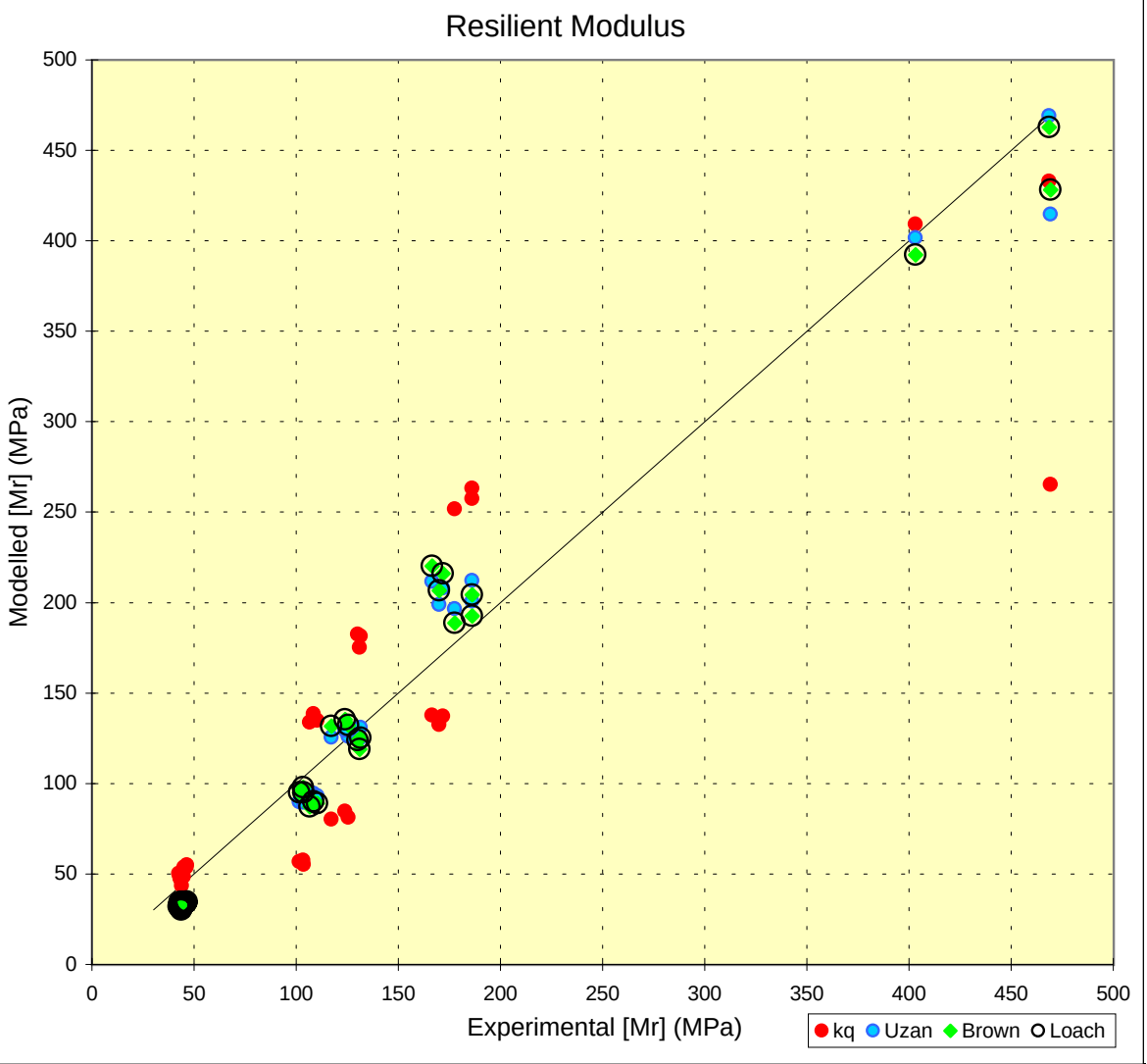
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The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***London Clay (LOC)*** ***90% Percentile Data***

Experimental Data	Sample Size: 37 Suction (s) = 40 kPa @ ω= 25% 1,510 kg/m3			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 232 MPa	υ_e = 0.26
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 164,371	k_3 = 63,883	A = 228,766	C = 571,915
	k_2 = -1.6272	k_4 = -0.1765	B = 1.2773	D = 2.2773
		k_5 = -1.1545		
	r^2= 0.808	r^2= 0.974	r^2= 0.971	r^2= 0.971
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 927 MPa	Mr_c= 447 MPa	Mr_c= 401 MPa	Mr_c= 401 MPa



Exactness of the estimated parameter value

Model	kθ		Uzan			Brown		Loach	
Parameter	**k1**	**k2**	**k3**	**k4**	**k5**	**A**	**B**	**C**	**D**
Std.Error=	10446	0.1457506	5050	0.1	0.078	4613	0.041816	11532	0.041816
t=	16	-11.16	13	-1.76	-14.81	50	30.55	50	54.46
Prob(t)=	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00
its estimated value.									

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

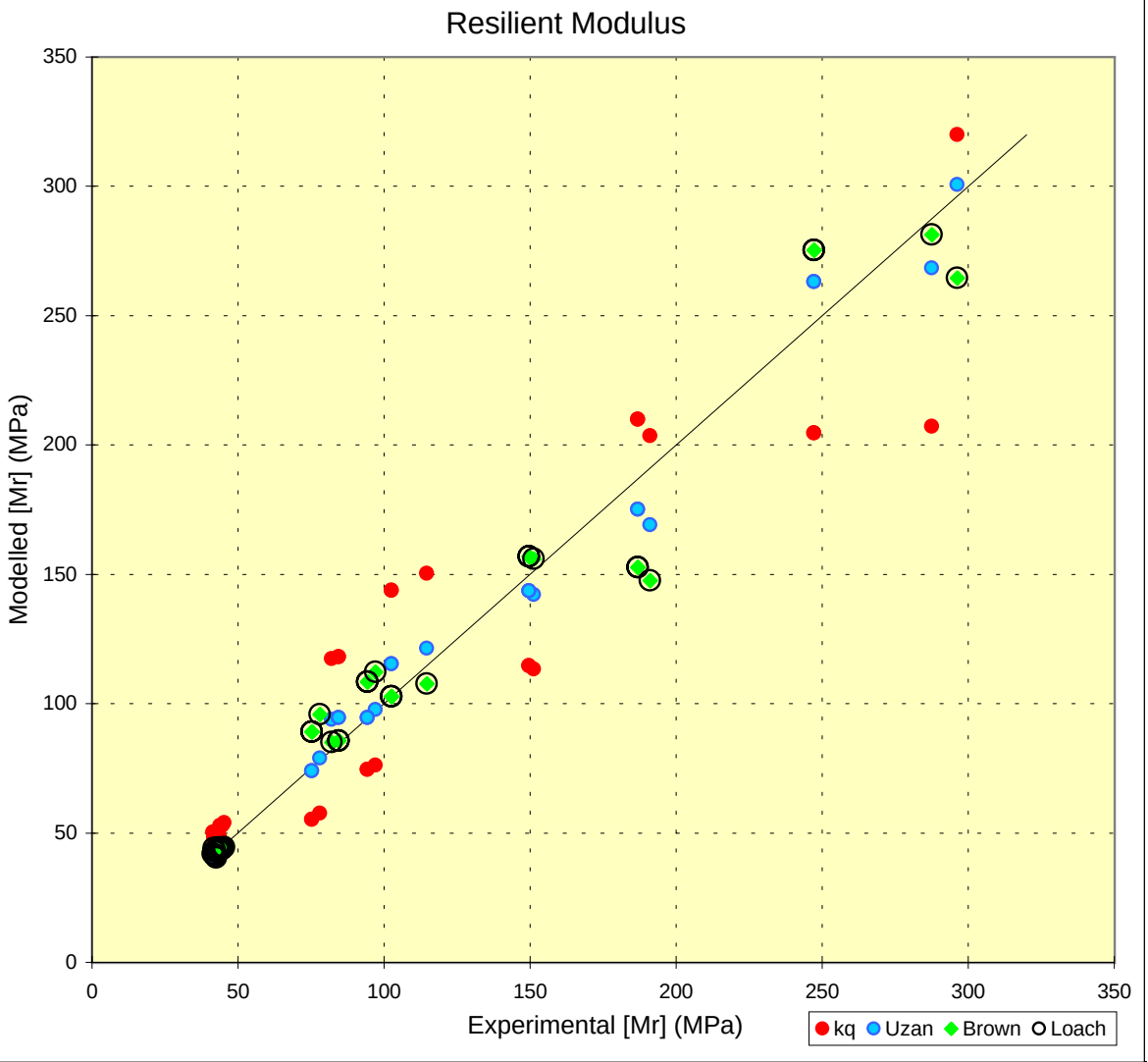
The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : 0 ***0.0*** ***90% Percentile Data***

Experimental Data	Sample Size: 38	Suction (s) =	40 kPa @ ω=	26%	1,492 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 180 MPa	υ_e = 0.33	

Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 134,967	k_3 = 50,331	A = 162,931	C = 407,328
	k_2 = -1.3931	k_4 = -0.5031	B = 0.8963	D = 1.8963
		k_5 = -0.6335		
	r^2= 0.867	r^2= 0.987	r^2= 0.959	r^2= 0.959

Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 594 MPa	Mr_c= 352 MPa	Mr_c= 241 MPa	Mr_c= 241 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	5399	0.10	2366	0.06	0.03	3286	0.03	8214	0.03
t=	25.00	-14.00	21.28	-9.04	-18.41	49.59	26.22	49.59	55.48
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

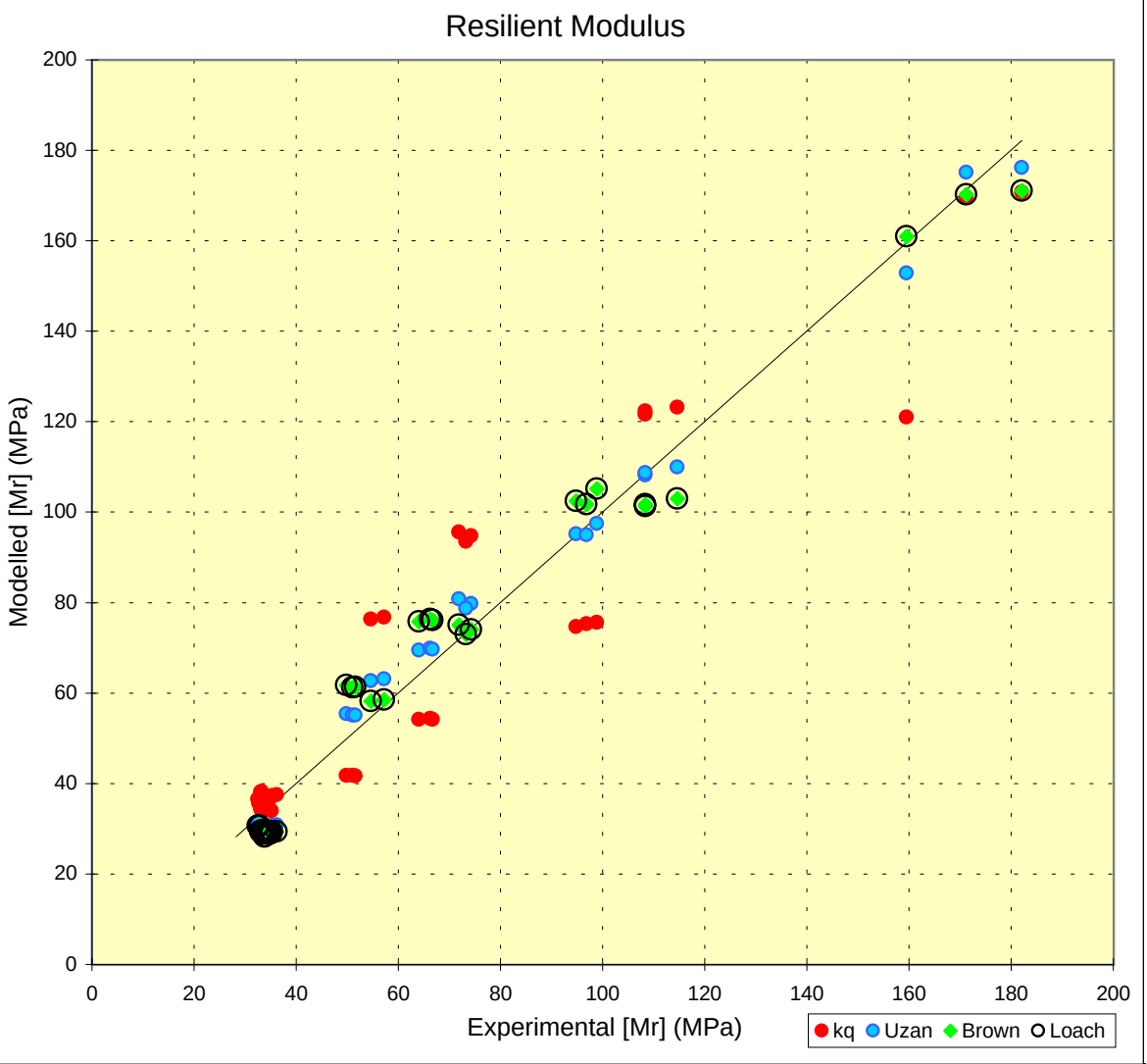
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The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : 0 ***0.0*** ***90% Percentile Data***

Experimental Data	Sample Size: 37 Suction (s) = 40 kPa @ ω= 26% 1,446 kg/m3			
	Chara'tic Values at q_2 = 26 kPa Mr_e= 108 MPa υ_e = 0.31			
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 85,442	k_3 = 41,474	A = 107,319	C = 268,297
	k_2 = -1.0983	k_4 = -0.3066	B = 0.8258	D = 1.8258
		k_5 = -0.6186		
	r^2= 0.893	r^2= 0.988	r^2= 0.974	r^2= 0.974
Characteristic Values	At: p_2 = 12 kPa & q_2= 26 kPa			
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 275 MPa	Mr_c= 186 MPa	Mr_c= 154 MPa	Mr_c= 154 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	2677	0.07	1549	0.05	0.04	1548	0.02	3870	0.02
t=	31.92	-16.64	26.78	-6.16	-16.84	69.33	34.16	69.33	75.54
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

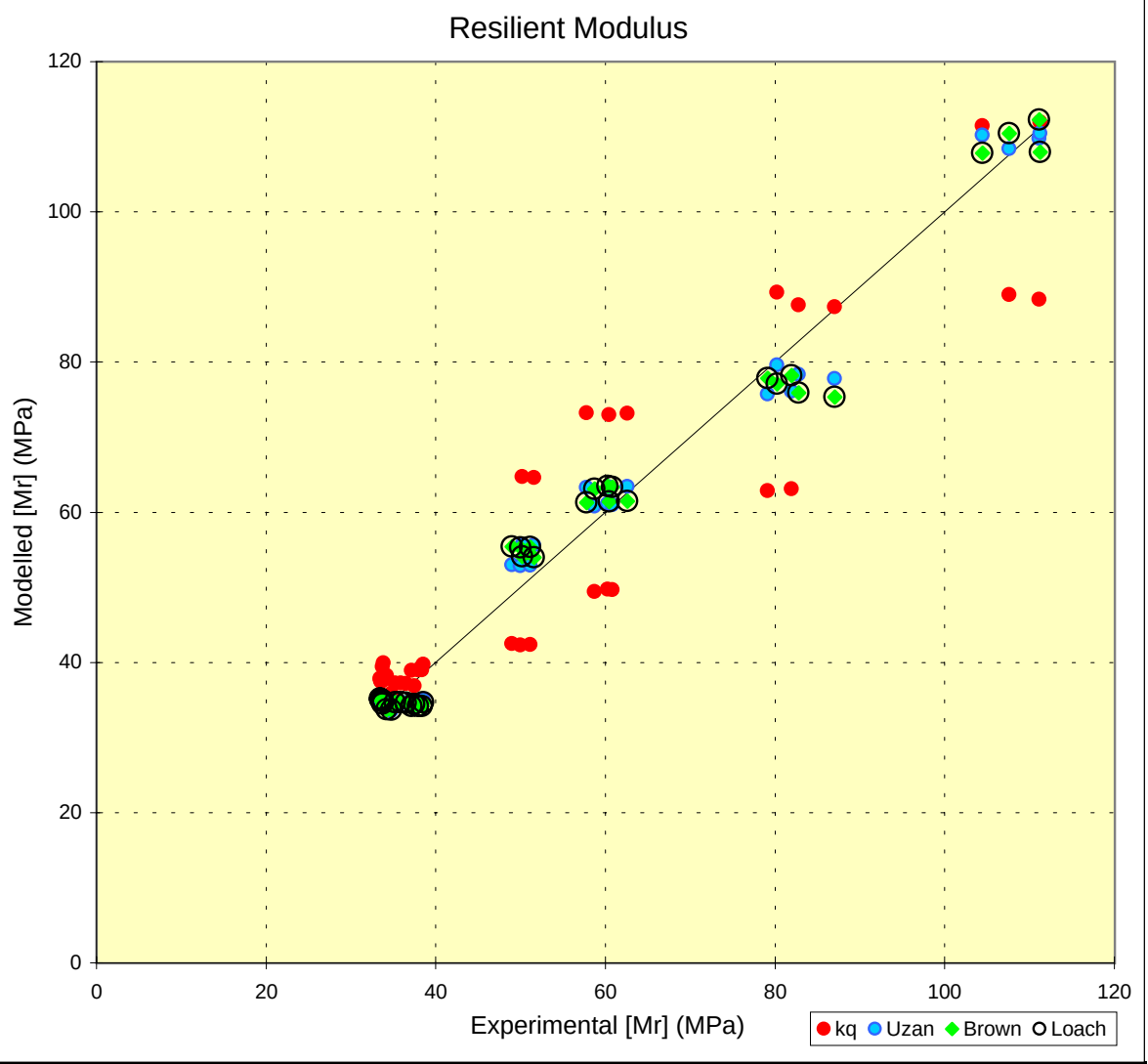
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TP-III : LNEC ***London Clay (LOC)*** ***90% Percentile Data***

Experimental Data	Sample Size: 37 Suction (s) = 40 kPa @ ω= 26% 1,456 kg/m3			
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 84 MPa	υ_e = 0.26
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 68,490	k_3 = 44,554	A = 79,073	C = 197,684
	k_2 = -0.7531	k_4 = -0.1261	B = 0.5339	D = 1.5339
		k_5 = -0.4581		
	r^2= 0.855	r^2= 0.983	r^2= 0.978	r^2= 0.978
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 153 MPa	Mr_c= 109 MPa	Mr_c= 100 MPa	Mr_c= 100 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	1799	0.05	1390	0.04	0.03	818	0.01	2045	0.01
t=	38.06	-14.39	32.06	-3.01	-16.41	96.69	39.23	96.69	112.72
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

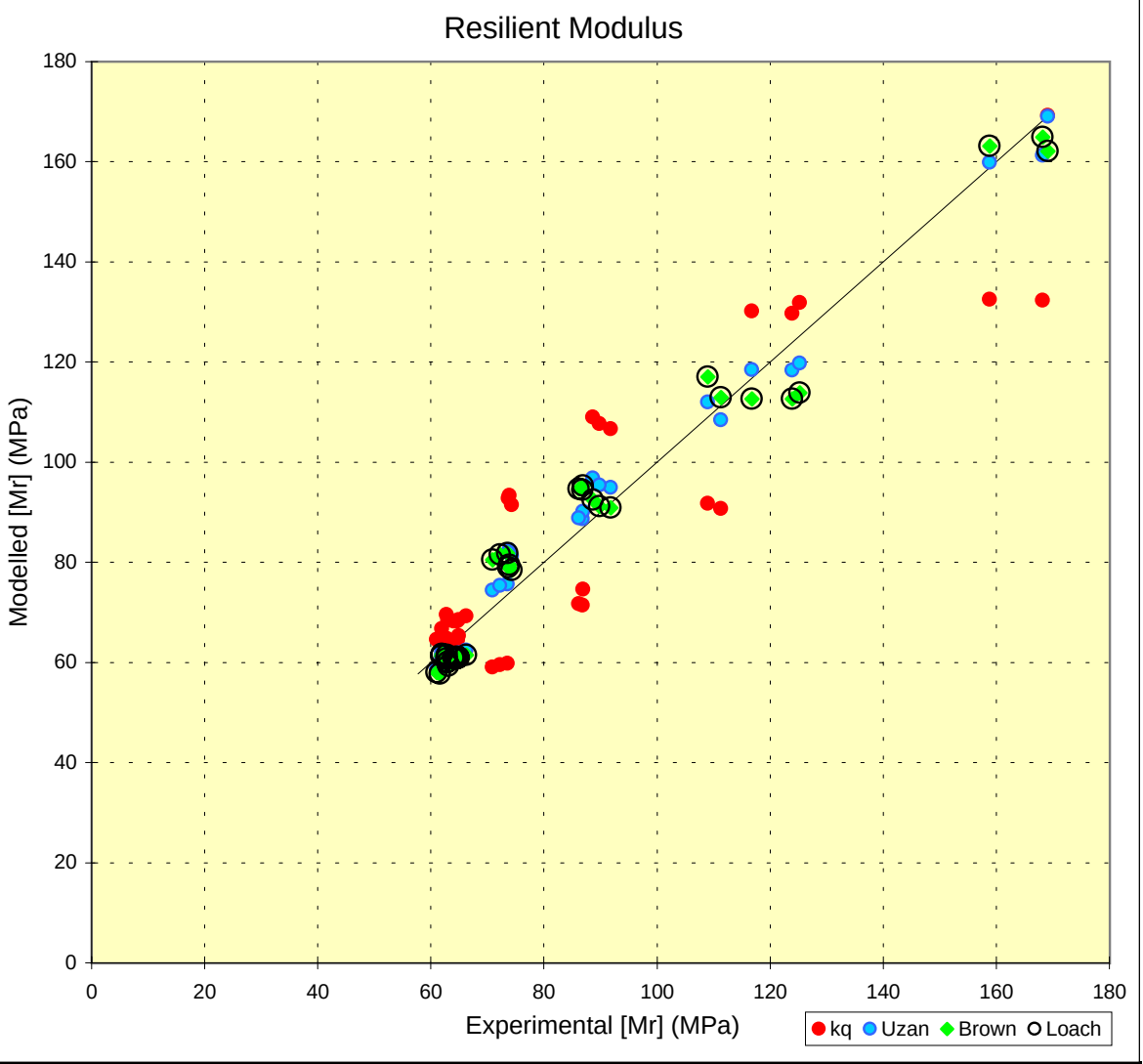
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TP-III : 0 ***0.0*** ***90% Percentile Data***

Experimental Data	Sample Size: 37 Suction (s) = 40 kPa @ ω= 25% 1,478 kg/m3			
	Chara'tic Values at q_2 = 26 kPa Mr_e= 124 MPa υ_e = 0.26			
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 99,197	k_3 = 61,963	A = 115,335	C = 288,338
	k_2 = -0.7992	k_4 = -0.1984	B = 0.5206	D = 1.5206
		k_5 = -0.4159		
	r^2= 0.816	r^2= 0.982	r^2= 0.966	r^2= 0.966
Characteristic Values	At: p_2 = 12 kPa & q_2= 26 kPa			
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 232 MPa	Mr_c= 167 MPa	Mr_c= 145 MPa	Mr_c= 145 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	2443	0.06	1859	0.04	0.02	1280	0.02	3201	0.02
t=	40.60	-13.44	33.33	-5.25	-18.12	90.07	34.29	90.07	100.16
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

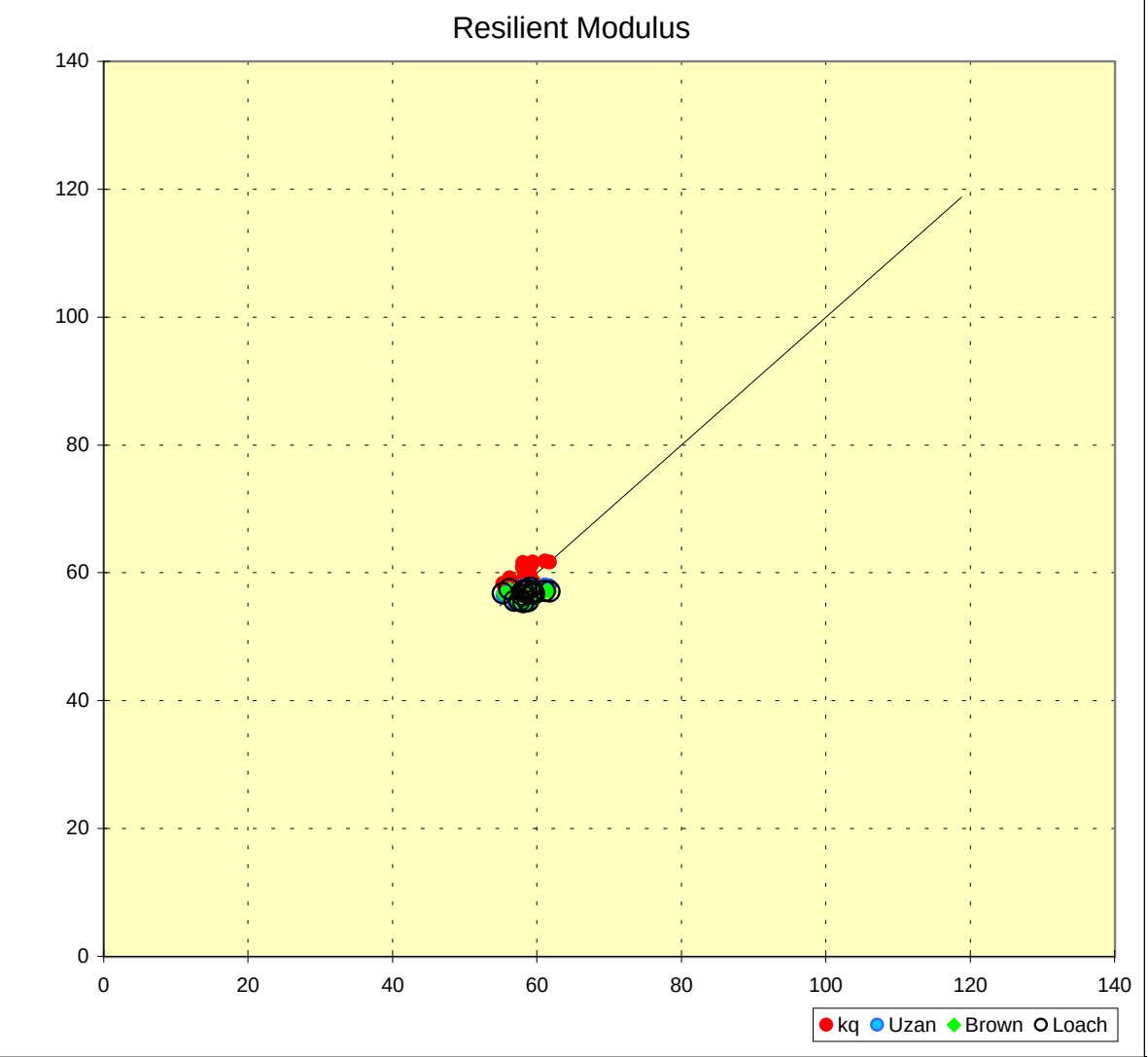
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TP-III : LNEC ***London Clay (LOC)*** ***90% Percentile Data***

Experimental Data	Sample Size: 37 Suction (s) = 40 kPa @ ω= 25% 1,472 kg/m3			
	Chara'tic Values at q_2 = 26 kPa Mr_e= 95 MPa υ_e = 0.30			
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 79,767	k_3 = 53,854	A = 89,226	C = 223,066
	k_2 = -0.5802	k_4 = -0.2241	B = 0.3691	D = 1.3691
		k_5 = -0.2483		
	r^2= 0.876	r^2= 0.974	r^2= 0.942	r^2= 0.942
Characteristic Values	At: p_2 = 12 kPa & q_2= 26 kPa			
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 148 MPa	Mr_c= 122 MPa	Mr_c= 105 MPa	Mr_c= 105 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	1172	0.04	1491	0.03	0.02	989	0.01	2473	0.01
t=	68.06	-16.54	36.12	-6.46	-11.61	90.21	24.71	90.21	91.67
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

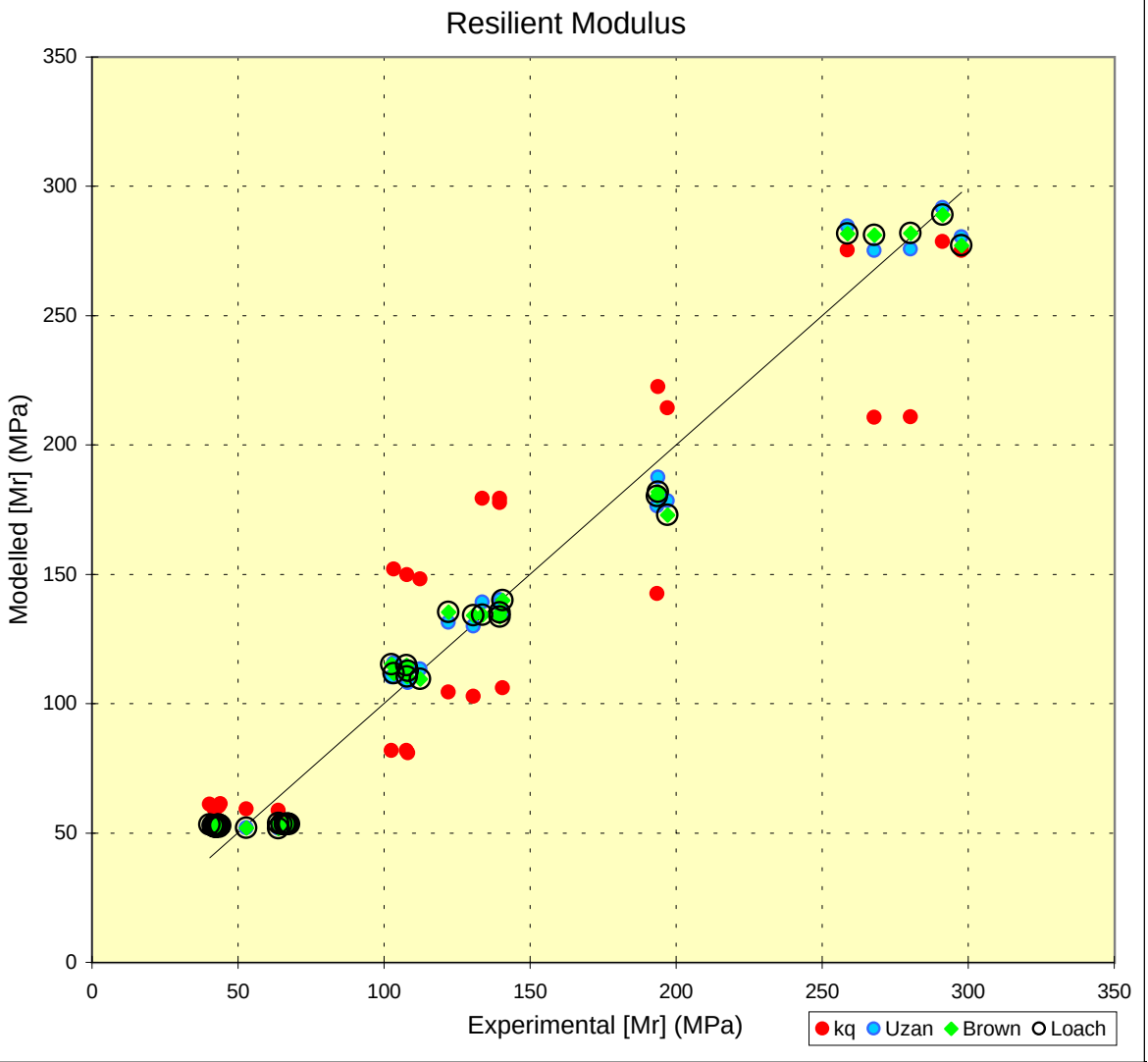
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TP-III : 0 ***0.0*** ***90% Percentile Data***

Experimental Data	Sample Size: 37	Suction (s) =	40 kPa @ ω=	25% 1,453 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 199 MPa	υ_e = 0.50
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 323,492	k_3 = 92,992	A = 185,900	C = 464,749
	k_2 = -1.4742	k_4 = -0.1776	B = 0.6953	D = 1.6953
		k_5 = -0.6229		
	r^2= 0.863	r^2= 0.982	r^2= 0.980	r^2= 0.980
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 1,551 MPa	Mr_c= 318 MPa	Mr_c= 252 MPa	Mr_c= 252 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	18593	0.12	3546	0.10	0.04	2506	0.02	6265	0.02
t=	17.40	-12.29	26.22	-1.86	-14.45	74.18	35.60	74.18	86.81
Prob(t)=	0%	0%	0%	7%	0%	0%	0%	0%	0%

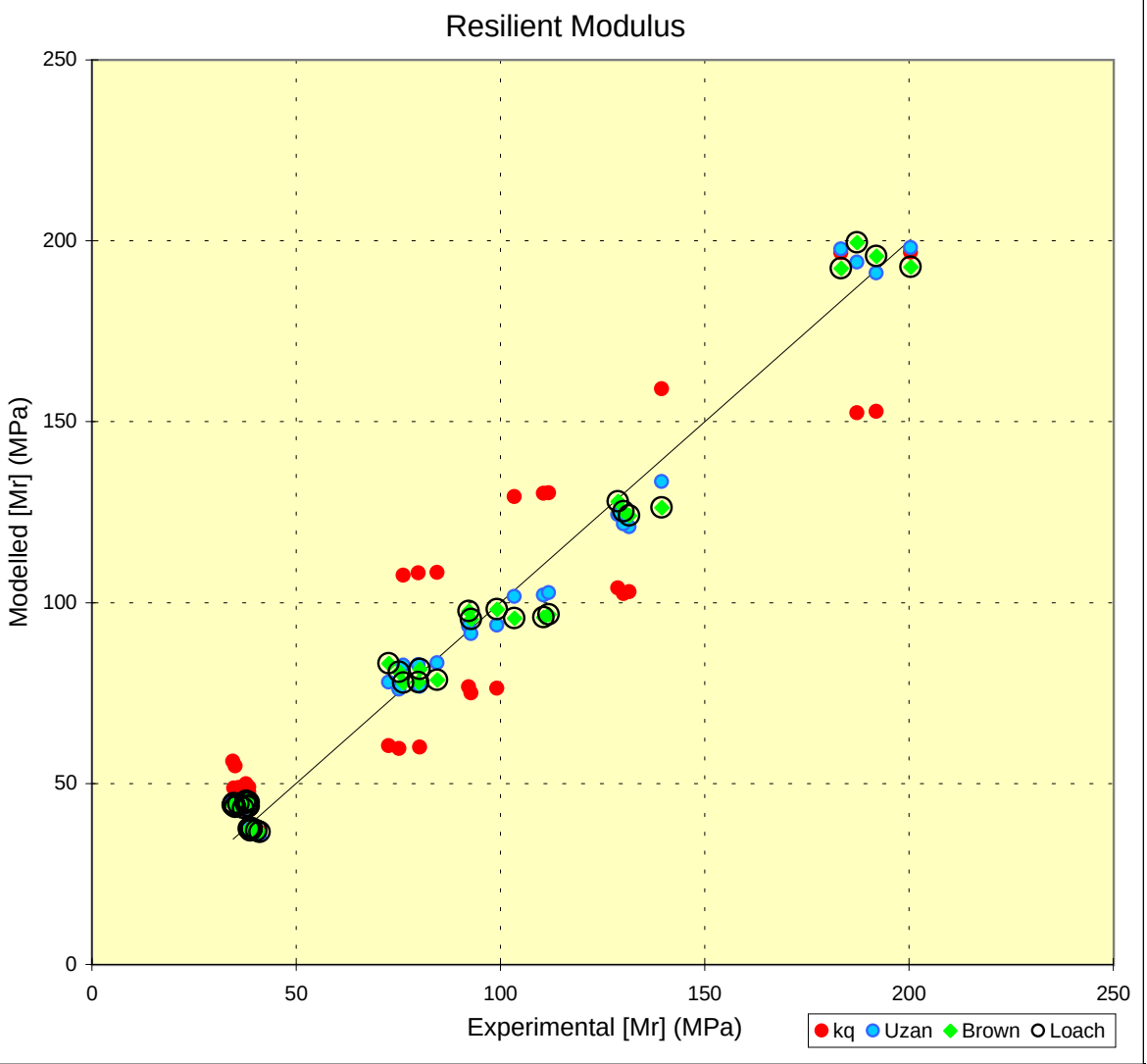
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TP-III : LNEC ***London Clay (LOC)*** ***90% Percentile Data***

Experimental Data	Sample Size: 36	Suction (s) = 40 kPa @ ω= 25%		1,461 kg/m3
	Chara'tic Values at q_2 = 26 kPa	Mr_e= 136 MPa	υ_e = 0.49	
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 233,867	k_3 = 64,034	A = 129,808	C = 324,520
	k_2 = -1.4585	k_4 = -0.2829	B = 0.6808	D = 1.6808
		k_5 = -0.5693		
	r^2= 0.856	r^2= 0.986	r^2= 0.980	r^2= 0.980
Characteristic Values		At: p_2 = 12 kPa		& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 1,103 MPa	Mr_c= 255 MPa	Mr_c= 175 MPa	Mr_c= 175 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	14626	0.12	1981	0.08	0.04	1680	0.02	4201	0.02
t=	15.99	-12.21	32.33	-3.52	-16.05	77.25	34.98	77.25	86.36
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

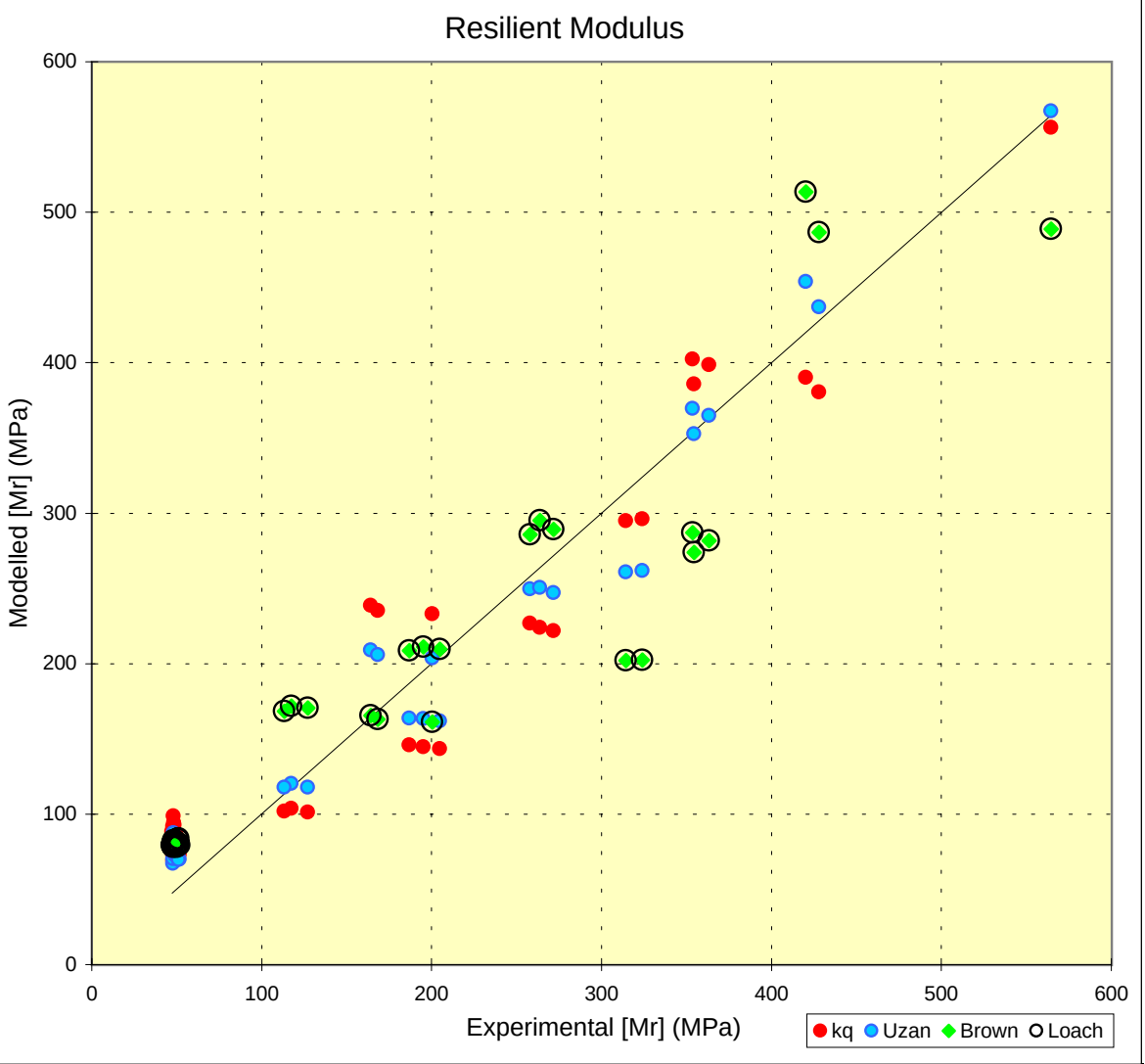
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TP-III : 0 ***0.0*** ***90% Percentile Data***

Experimental Data	Sample Size: 37	Suction (s) =	40 kPa @ ω=	25% 1,511 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 328 MPa	υ_e = 0.53
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 695,634	k_3 = 85,568	A = 291,762	C = 729,406
	k_2 = -2.0773	k_4 = -1.4157	B = 0.8064	D = 1.8064
		k_5 = -0.3138		
	r^2= 0.931	r^2= 0.965	r^2= 0.854	r^2= 0.854
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 6,332 MPa	Mr_c= 2,793 MPa	Mr_c= 416 MPa	Mr_c= 416 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	39417	0.13	6746	0.16	0.06	12771	0.07	31927	0.07
t=	17.65	-15.40	12.68	-8.98	-4.99	22.85	10.96	22.85	24.55
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

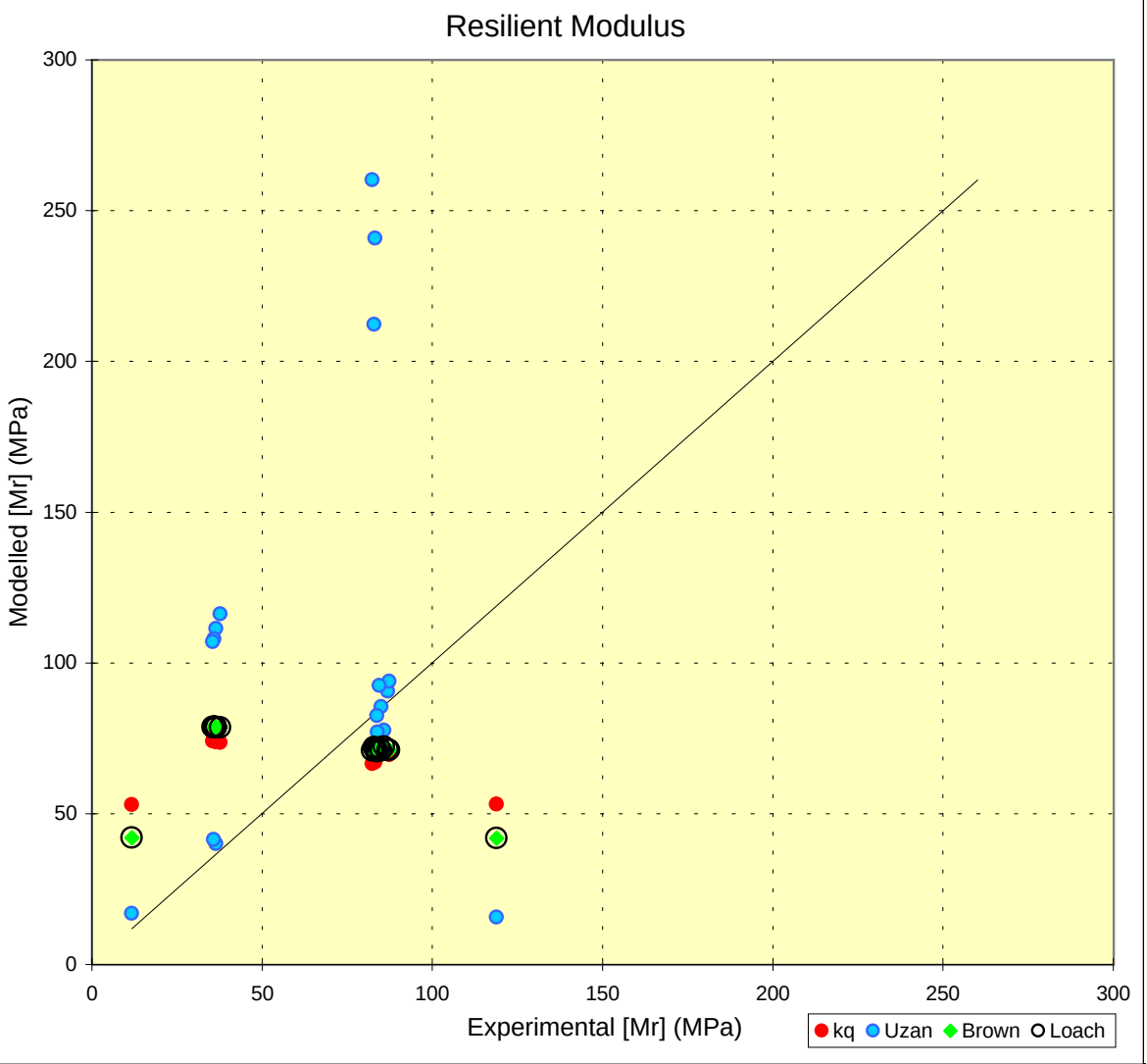
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TP-III : LNEC ***London Clay (LOC)*** ***90% Percentile Data***

Experimental Data	Sample Size: 19	Suction (s) = 40 kPa @ ω= 25%		1,504 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 93 MPa	υ_e = 0.22
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 50,427	k_3 = 1,690	A = 49,568	C = 123,921
	k_2 = 0.3925	k_4 = -9.2588	B = -0.2920	D = 0.7080
		k_5 = 4.5250		
	r^2= 0.084	r^2= 0.940	r^2= 0.190	r^2= 0.190
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 33 MPa	Mr_c= ##########	Mr_c= 44 MPa	Mr_c= 44 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	26484	0.60	925	1.30	0.66	19877	0.31	49693	0.31
t=	1.90	0.65	1.83	-7.10	6.83	2.49	-0.95	2.49	2.31
Prob(t)=	9%	53%	11%	0%	0%	3%	37%	3%	5%

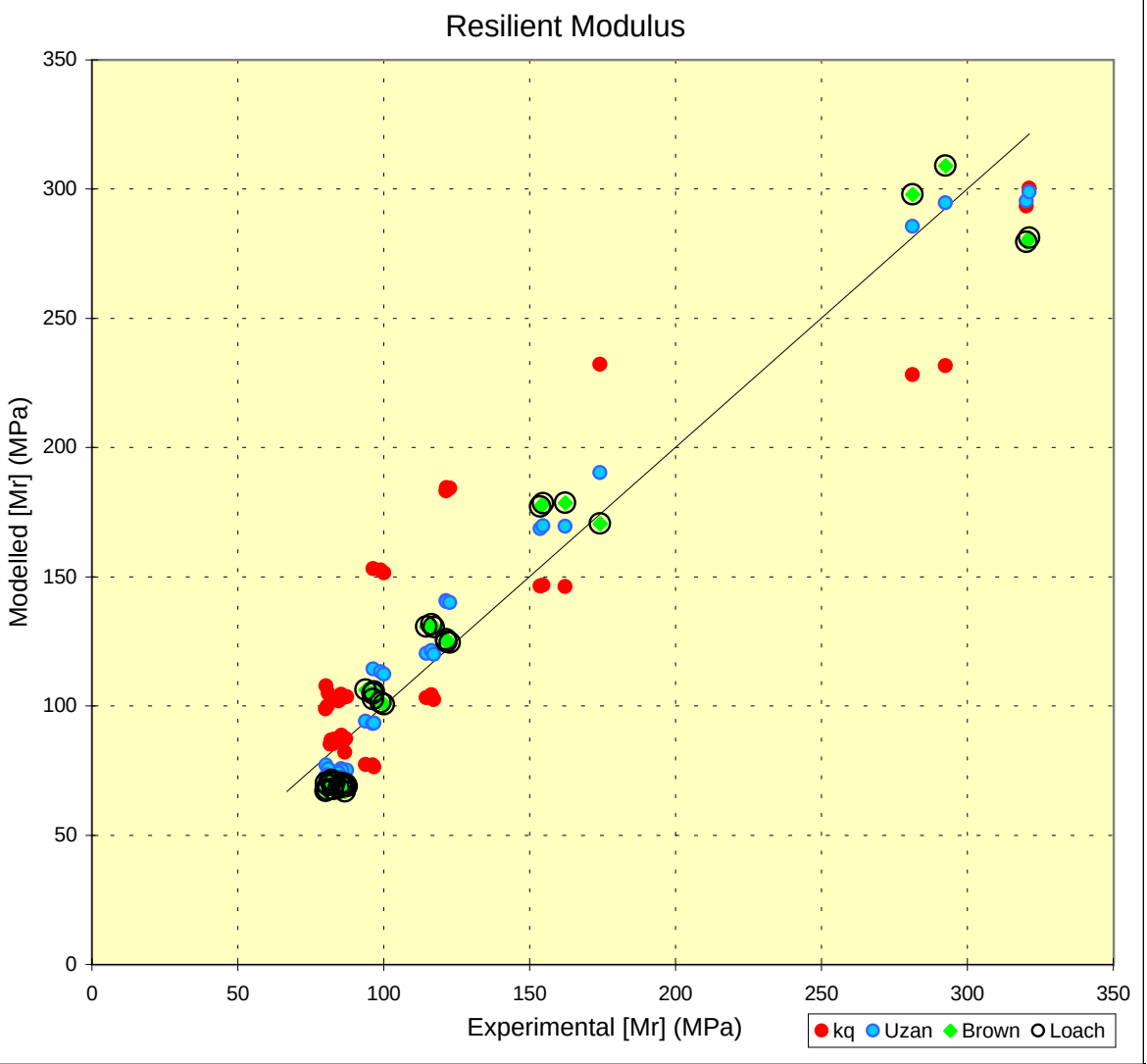
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TP-III : 0 ***0.0*** ***90% Percentile Data***

Experimental Data	Sample Size: 37 Suction (s) = 40 kPa @ ω= 25% 1,482 kg/m3			
	Chara'tic Values at q_2 = 26 kPa Mr_e= 204 MPa υ_e = 0.26			
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 357,149	k_3 = 73,858	A = 175,723	C = 439,309
	k_2 = -1.6709	k_4 = -0.5380	B = 0.7624	D = 1.7624
		k_5 = -0.5626		
	r^2= 0.827	r^2= 0.966	r^2= 0.943	r^2= 0.943
Characteristic Values	At: p_2 = 12 kPa & q_2= 26 kPa			
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 2,110 MPa	Mr_c= 506 MPa	Mr_c= 246 MPa	Mr_c= 246 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	25573	0.16	4496	0.14	0.06	4246	0.04	10615	0.04
t=	13.97	-10.41	16.43	-3.80	-9.25	41.39	19.38	41.39	44.81
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

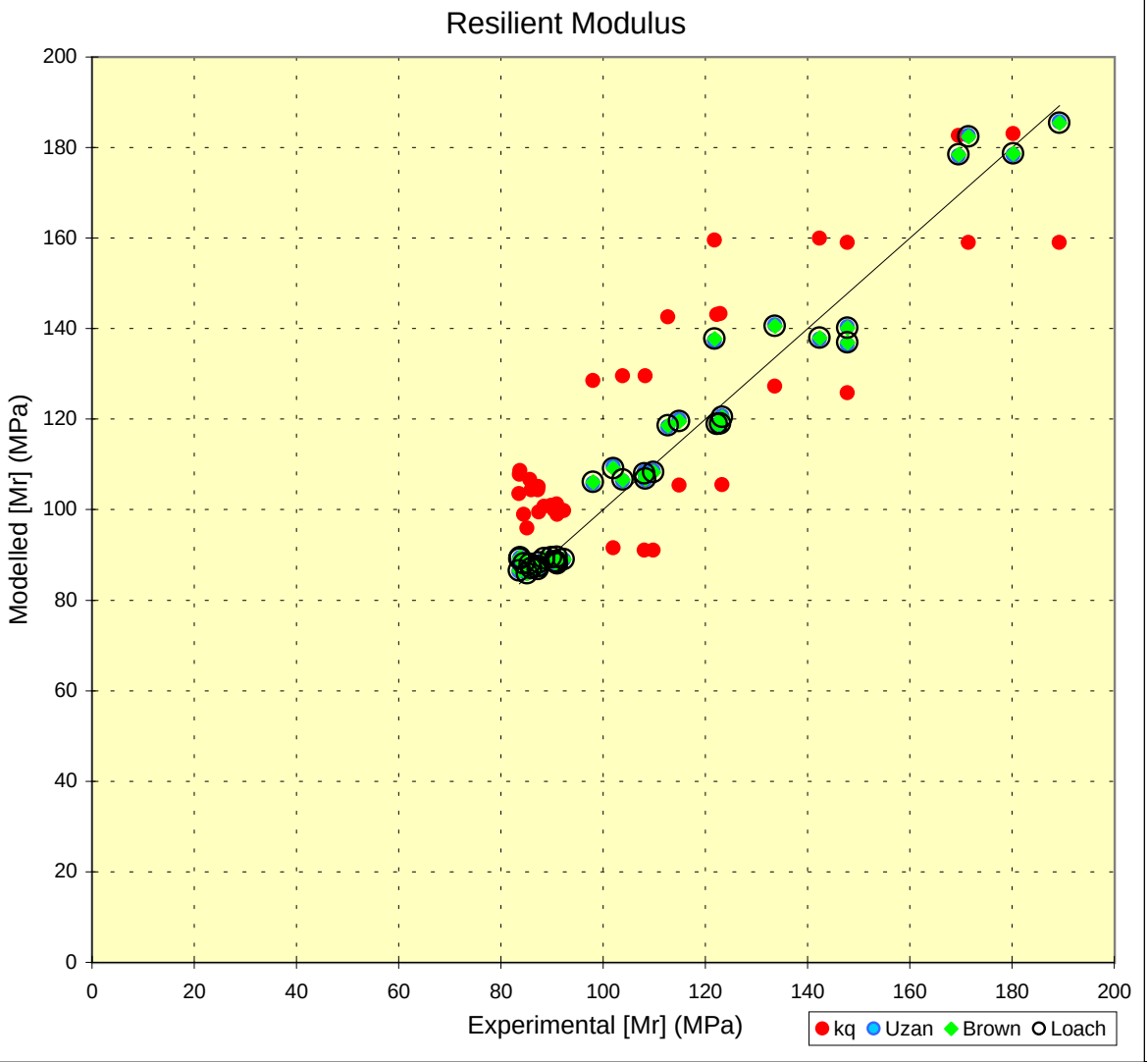
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TP-III : LNEC ***London Clay (LOC)*** ***90% Percentile Data***

Experimental Data	Sample Size: 37	Suction (s) = 40 kPa @ ω= 25%		1,504 kg/m3
	Chara'tic Values at q_2 = 26 kPa	Mr_e= 153 MPa	υ_e = 0.21	
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 200,496	k_3 = 99,312	A = 140,963	C = 352,407
	k_2 = -0.8515	k_4 = 0.0133	B = 0.3868	D = 1.3868
		k_5 = -0.3916		
	r^2= 0.766	r^2= 0.967	r^2= 0.967	r^2= 0.967
Characteristic Values	At: p_2 = 12 kPa & q_2= 26 kPa			
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 496 MPa	Mr_c= 164 MPa	Mr_c= 167 MPa	Mr_c= 167 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	10852	0.10	3119	0.08	0.03	1518	0.02	3794	0.02
t=	18.48	-8.74	31.84	0.16	-11.51	92.89	25.67	92.89	92.04
Prob(t)=	0%	0%	0%	87%	0%	0%	0%	0%	0%

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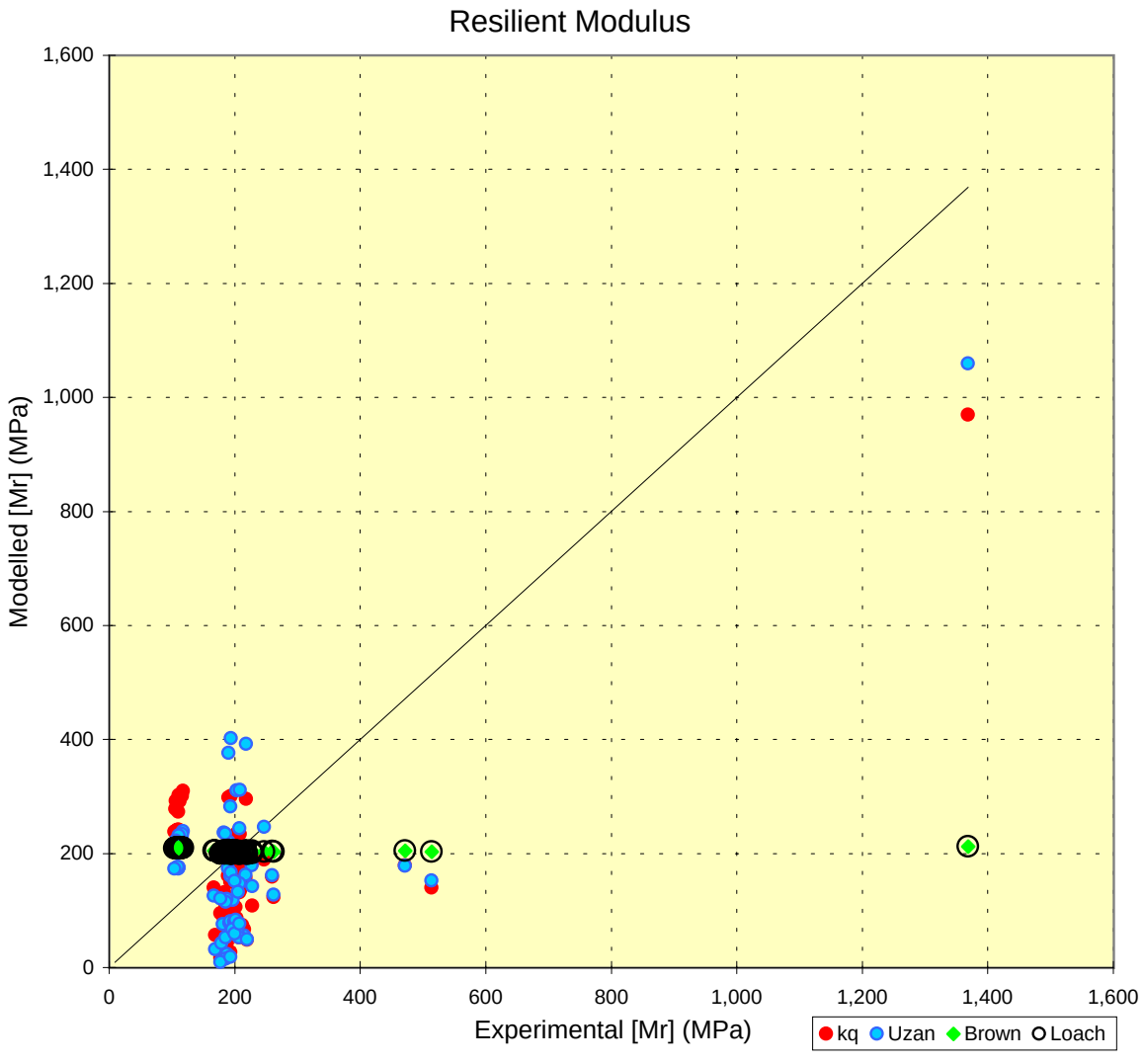
The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***100% Percentile Data***

Experimental Data	Sample Size: 81	Suction (s) =	80 kPa @ ω=	20%	1,691 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 185 MPa	υ_e = 0.25	

Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 46,493	k_3 = 341,326	A = 204,523	C = 255,654
	k_2 = 1.6527	k_4 = 2.5199	B = -0.0195	D = 0.9805
		k_5 = -0.4588		
	r^2= 0.164	r^2= 0.289	r^2= 0.000	r^2= 0.000

Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 8 MPa	Mr_c= 3 MPa	Mr_c= 203 MPa	Mr_c= 101 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	9609	0.16	25006	0.31	0.14	16556	0.10	20696	0.10
t=	4.84	10.06	13.65	8.12	-3.17	12.35	-0.20	12.35	10.01
Prob(t)=	0%	0%	0%	0%	0%	0%	84%	0%	0%

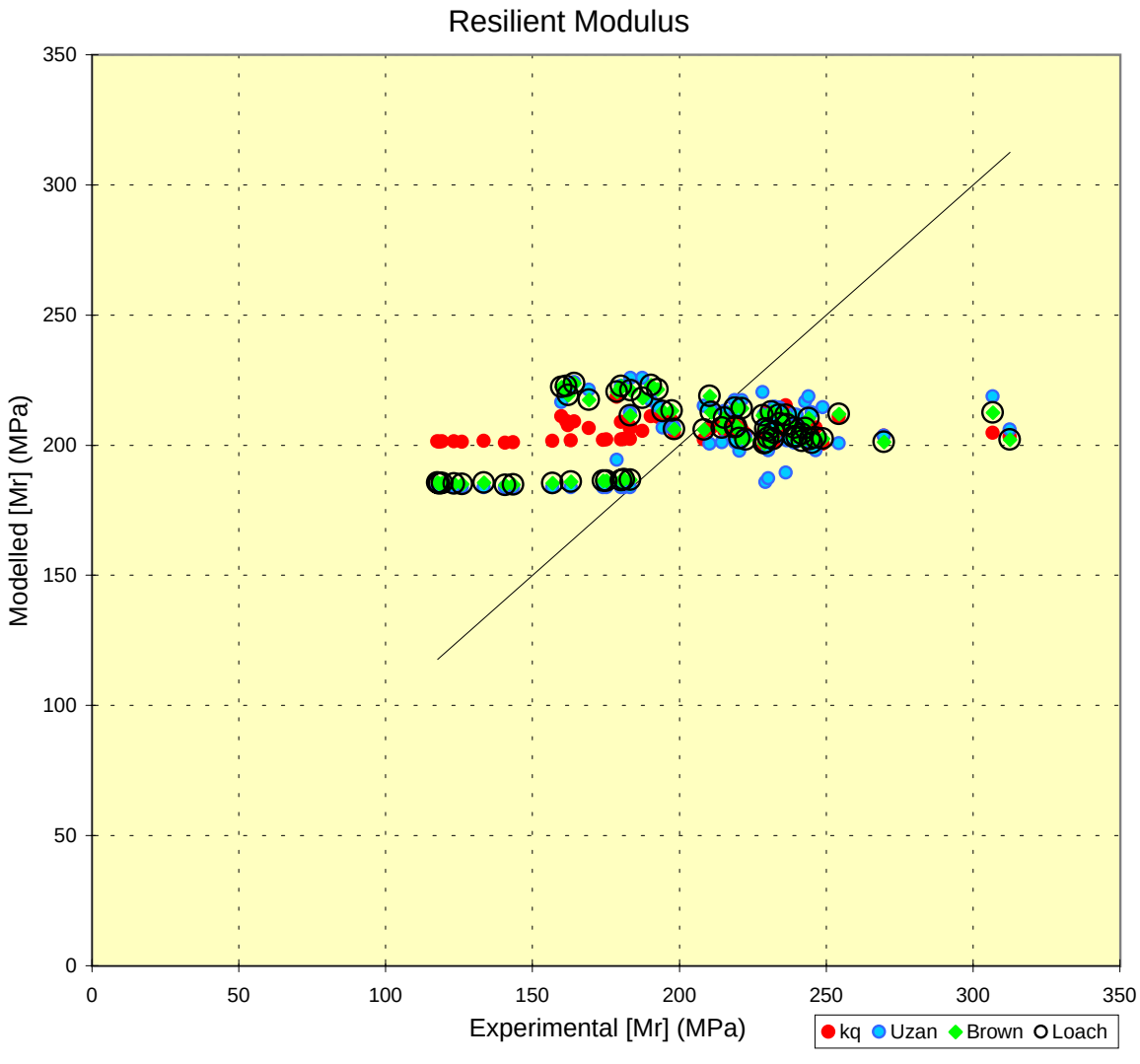
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TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***100% Percentile Data***

Experimental Data	Sample Size: 79	Suction (s) =	80 kPa @ ω=	20% 1,694 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 225 MPa	υ_e = 0.21
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 213,268	k_3 = 210,514	A = 205,069	C = 256,336
	k_2 = -0.0537	k_4 = 0.1461	B = 0.0840	D = 1.0840
		k_5 = -0.1339		
	r^2= 0.009	r^2= 0.130	r^2= 0.097	r^2= 0.097
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 226 MPa	Mr_c= 184 MPa	Mr_c= 213 MPa	Mr_c= 106 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	10742	0.06	7242	0.09	0.04	4448	0.03	5560	0.03
t=	19.85	-0.83	29.07	1.70	-3.06	46.11	2.59	46.11	33.36
Prob(t)=	0%	41%	0%	9%	0%	0%	1%	0%	0%

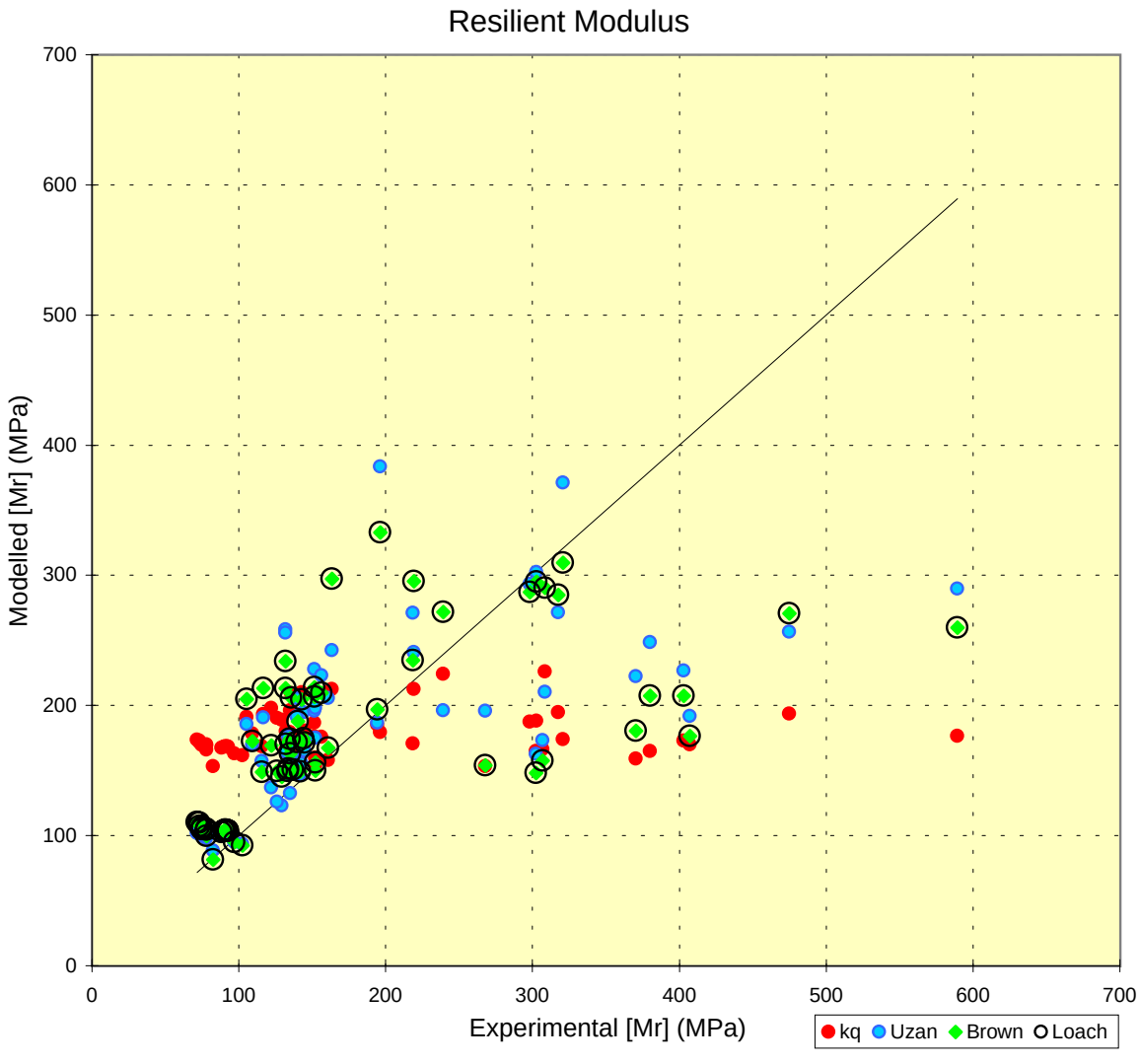
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***100% Percentile Data***

Experimental Data	Sample Size: 65	Suction (s) =	80 kPa @ ω=	20% 1,705 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 239 MPa	υ_e = 0.28
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 198,663	k_3 = 166,262	A = 150,934	C = 188,667
	k_2 = -0.2388	k_4 = 0.4457	B = 0.5083	D = 1.5083
		k_5 = -0.6382		
	r^2= 0.021	r^2= 0.430	r^2= 0.366	r^2= 0.366
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 256 MPa	Mr_c= 151 MPa	Mr_c= 189 MPa	Mr_c= 94 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	22260	0.19	19372	0.17	0.10	12775	0.09	15969	0.09
t=	8.92	-1.24	8.58	2.55	-6.25	11.81	5.56	11.81	16.49
Prob(t)=	0%	22%	0%	1%	0%	0%	0%	0%	0%

The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

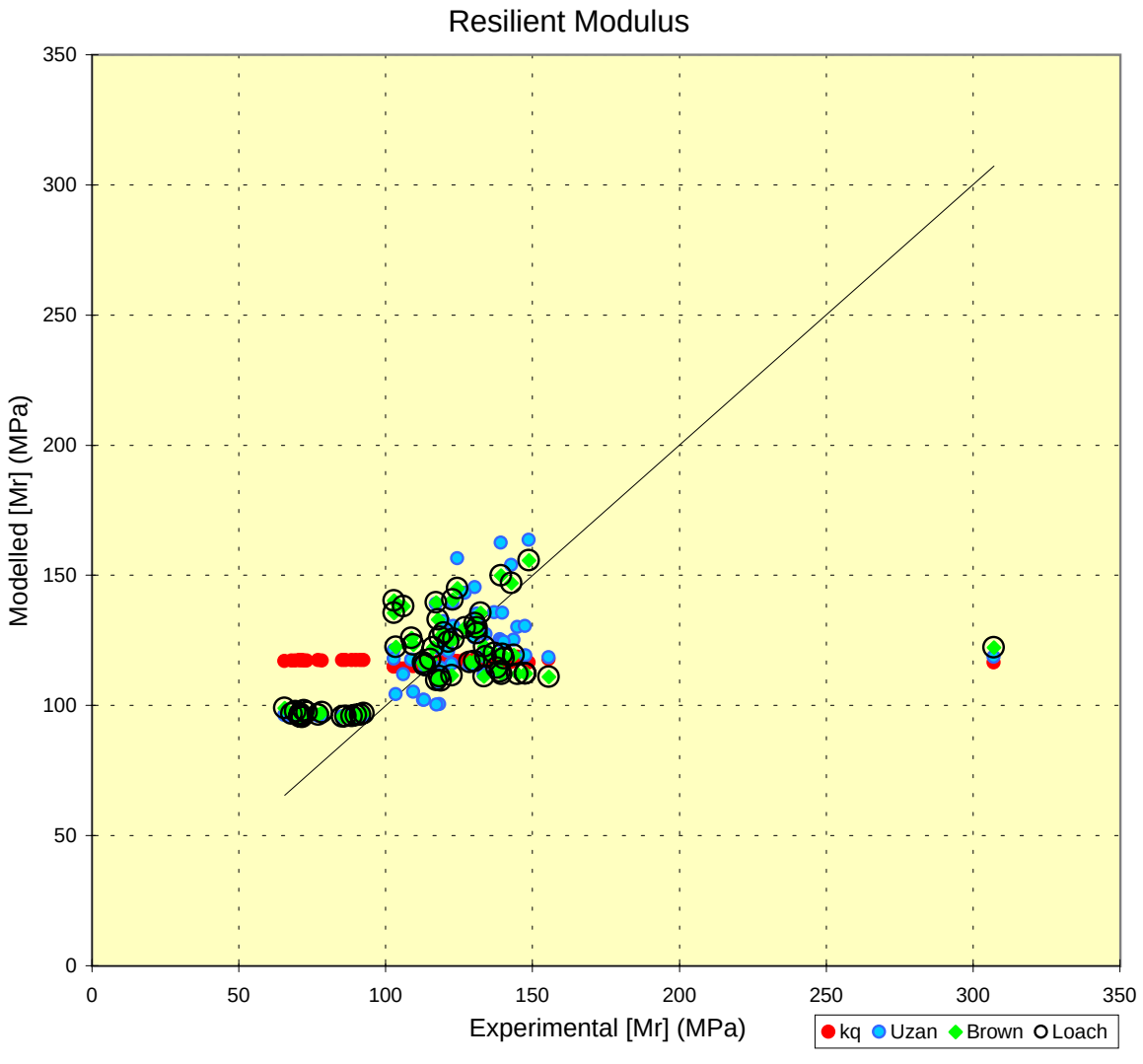
The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***100% Percentile Data***

Experimental Data	Sample Size: 65	Suction (s) =	80 kPa @ ω=	20%	1,704 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 141 MPa		υ_e = 0.19

Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 115,183	k_3 = 123,680	A = 113,295	C = 141,619
	k_2 = 0.0257	k_4 = 0.2820	B = 0.2130	D = 1.2130
		k_5 = -0.2721		
	r^2= 0.001	r^2= 0.313	r^2= 0.234	r^2= 0.234

Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 112 MPa	Mr_c= 97 MPa	Mr_c= 124 MPa	Mr_c= 62 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	8555	0.12	7656	0.11	0.05	3974	0.05	4968	0.05
t=	13.46	0.22	16.16	2.62	-5.06	28.51	4.12	28.51	23.48
Prob(t)=	0%	83%	0%	1%	0%	0%	0%	0%	0%

The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

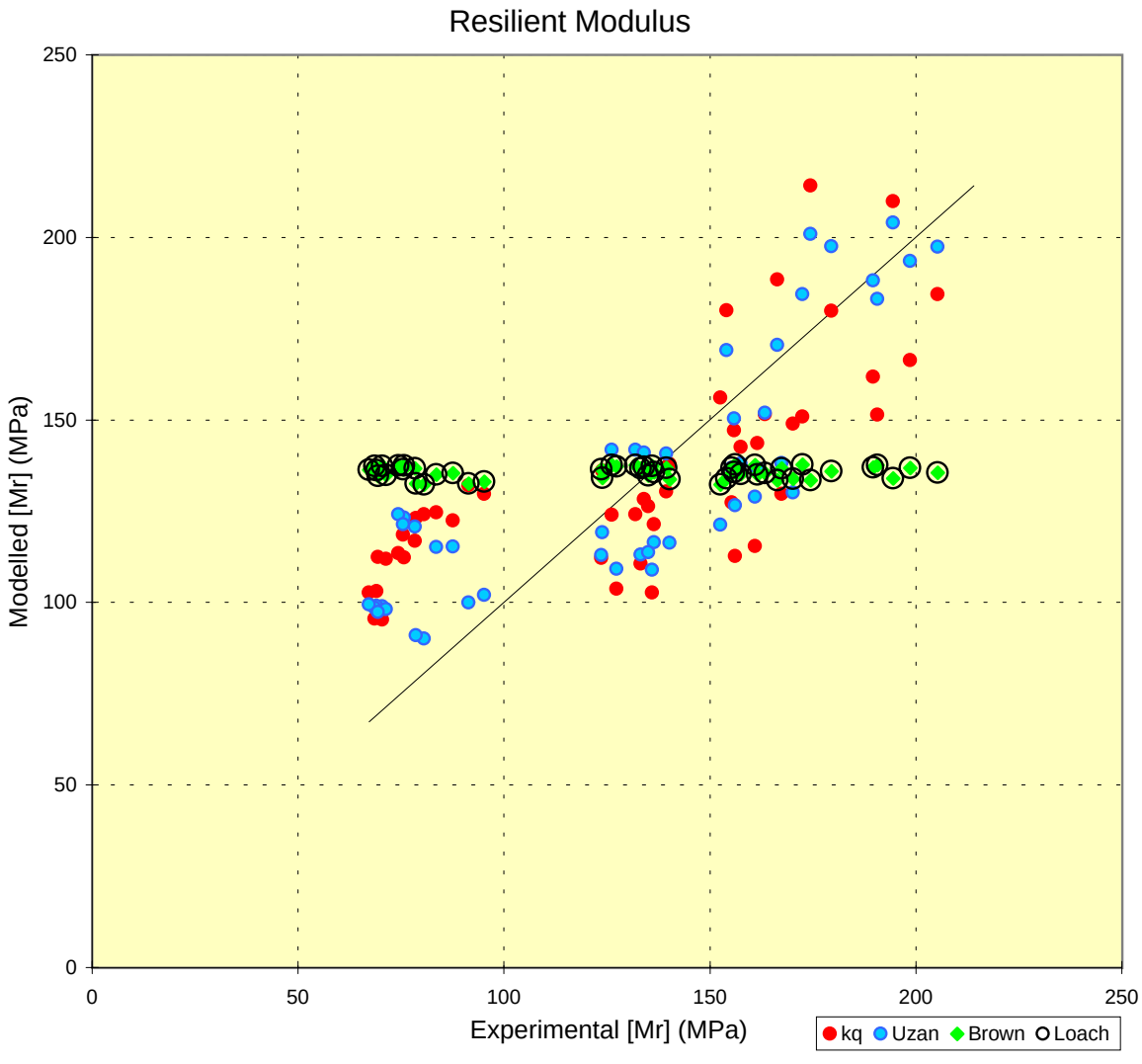
The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***100% Percentile Data***

Experimental Data	Sample Size: 48	Suction (s) = 80 kPa @ ω= 20%	1,698 kg/m3
	Chara'tic Values at q_2 = 26 kPa	Mr_e= 129 MPa	υ_e = 0.51

Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 158,917	k_3 = 105,010	A = 137,516	C = 171,895
	k_2 = -0.4733	k_4 = -0.6087	B = -0.0241	D = 0.9759
		k_5 = 0.2728		
	r^2= 0.543	r^2= 0.703	r^2= 0.002	r^2= 0.002

Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 263 MPa	Mr_c= 271 MPa	Mr_c= 136 MPa	Mr_c= 68 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	5343	0.07	6220	0.06	0.06	9591	0.10	11989	0.10
t=	29.74	-6.98	16.88	-9.49	4.53	14.34	-0.25	14.34	10.22
Prob(t)=	0%	0%	0%	0%	0%	0%	80%	0%	0%

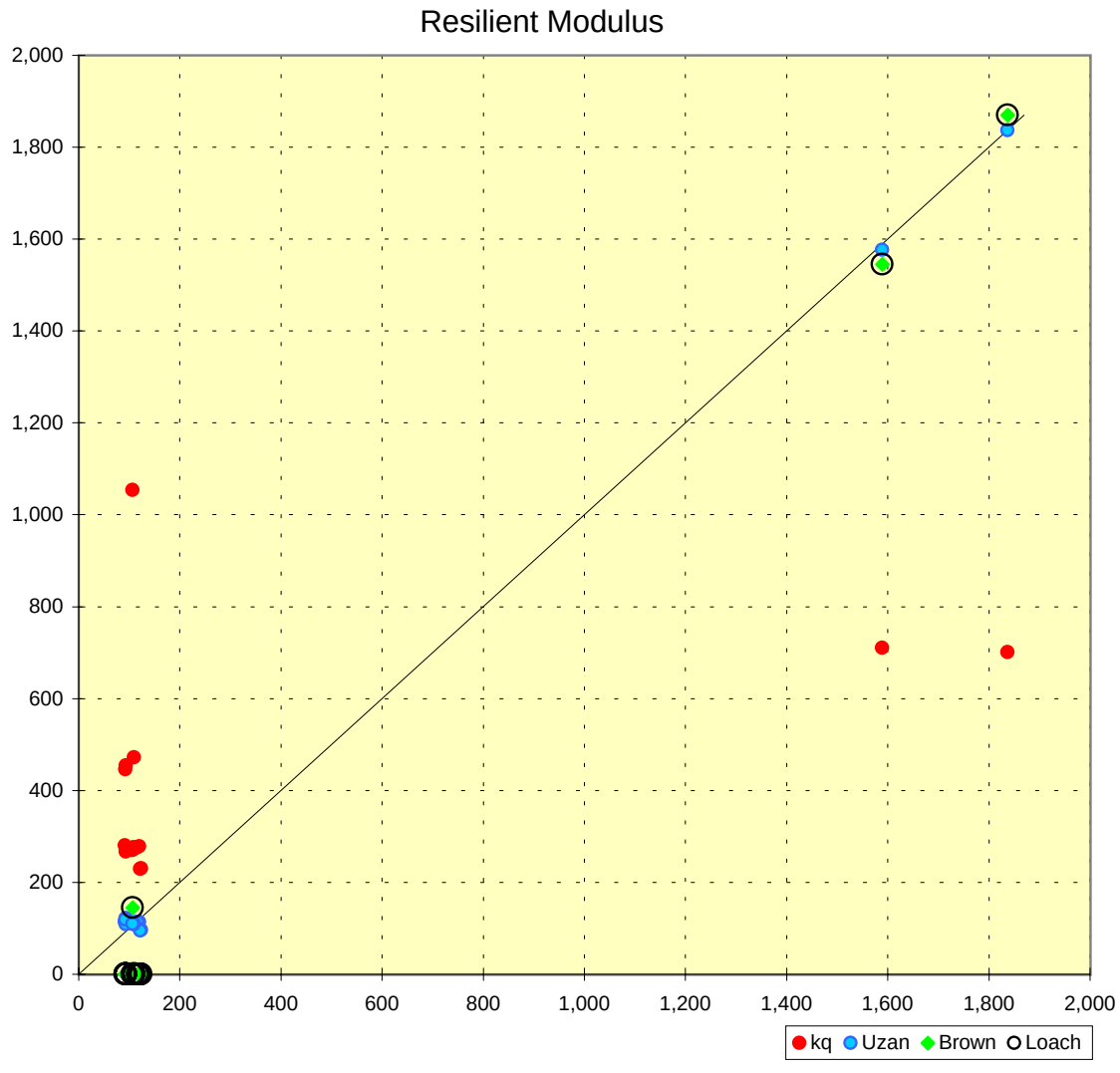
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***100% Percentile Data***

Experimental Data	Sample Size: 16	Suction (s) =	80 kPa @ ω=	20% 1,699 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 891 MPa	υ_e = 0.45
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 405,718	k_3 = 1,619,185	A = 818	C = 1,023
	k_2 = -0.7299	k_4 = 2.5683	B = 5.5997	D = 6.5997
		k_5 = -3.0344		
	r^2= 0.267	r^2= 0.999	r^2= 0.972	r^2= 0.972
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 882 MPa	Mr_c= 383 MPa	Mr_c= 10 MPa	Mr_c= 5 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	172750	0.43	226526	0.16	0.11	1566	1.40	1958	1.40
t=	2.35	-1.68	7.15	15.93	-28.58	0.52	4.00	0.52	4.71
Prob(t)=	4%	12%	0%	0%	0%	61%	0%	61%	0%

The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

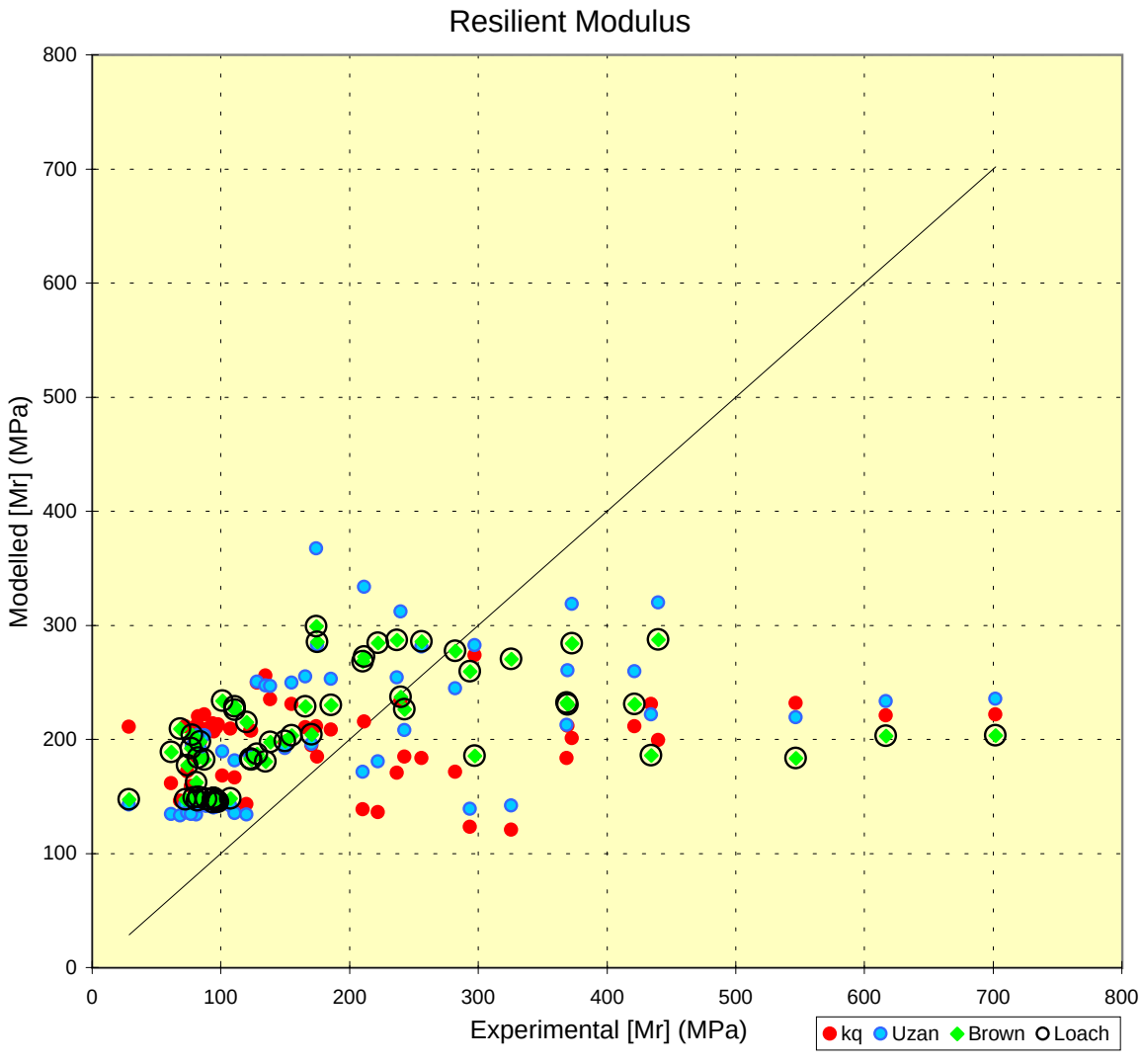
The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***100% Percentile Data***

Experimental Data	Sample Size: 59	Suction (s) = 80 kPa @ ω= 20%	1,696 kg/m3
	Chara'tic Values at q_2 = 26 kPa	Mr_e= 265 MPa	υ_e = 0.44

Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 158,258	k_3 = 253,275	A = 185,047	C = 231,309
	k_2 = 0.4978	k_4 = 0.7242	B = 0.3602	D = 1.3602
		k_5 = -0.4796		
	r^2= 0.043	r^2= 0.223	r^2= 0.112	r^2= 0.112

Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 93 MPa	Mr_c= 101 MPa	Mr_c= 217 MPa	Mr_c= 108 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	28766	0.28	38271	0.25	0.14	19081	0.13	23851	0.13
t=	5.50	1.79	6.62	2.87	-3.50	9.70	2.69	9.70	10.16
Prob(t)=	0%	8%	0%	1%	0%	0%	1%	0%	0%

The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

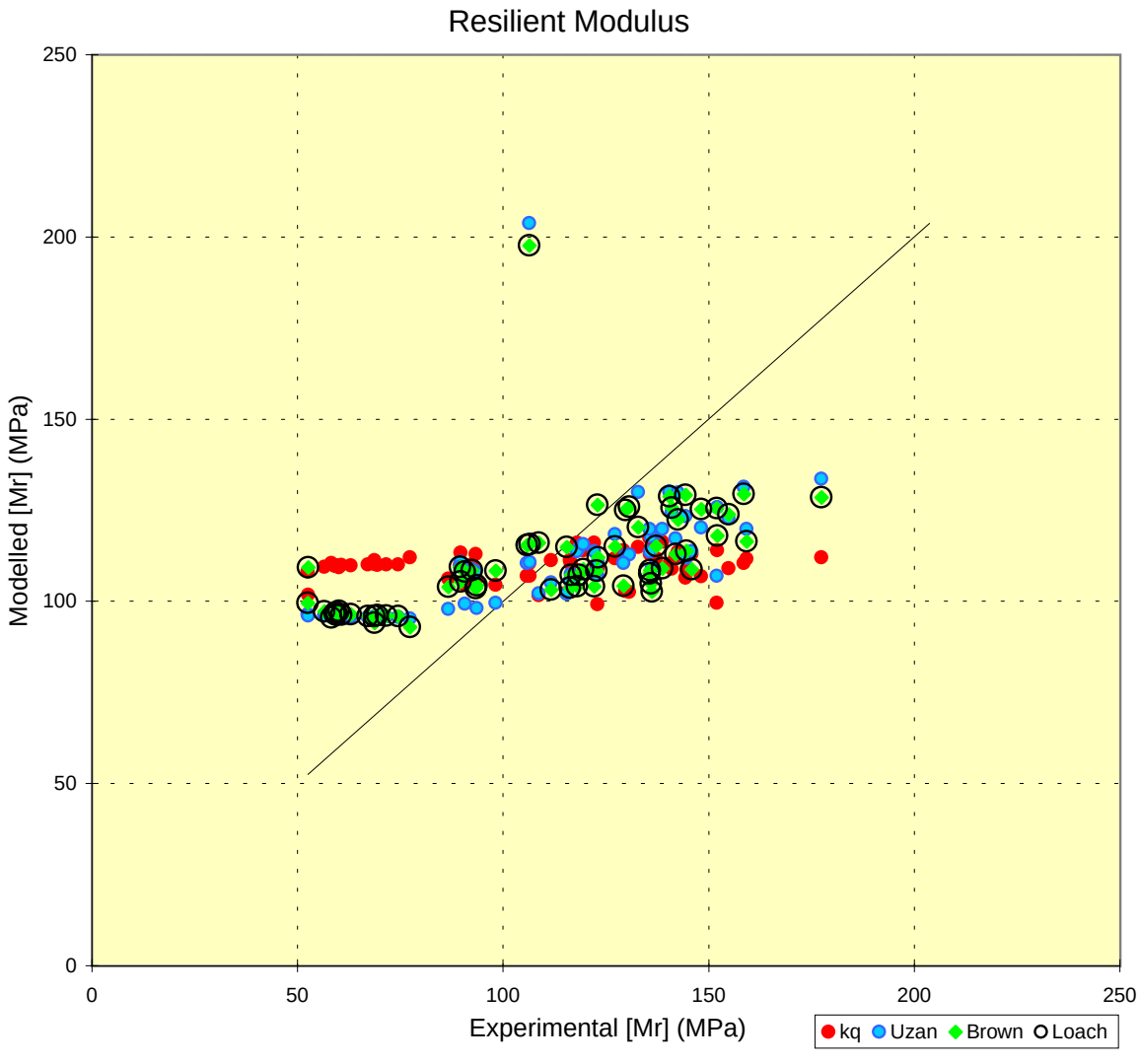
The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***100% Percentile Data***

Experimental Data	Sample Size: 65	Suction (s) = 80 kPa @ ω= 20%	1,717 kg/m3
	Chara'tic Values at q_2 = 26 kPa	Mr_e= 142 MPa	υ_e = 0.35

Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 105,148	k_3 = 112,536	A = 104,518	C = 130,647
	k_2 = 0.1040	k_4 = 0.1731	B = 0.1769	D = 1.1769
		k_5 = -0.1840		
	r^2= 0.013	r^2= 0.334	r^2= 0.294	r^2= 0.294

Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 94 MPa	Mr_c= 99 MPa	Mr_c= 113 MPa	Mr_c= 56 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	6498	0.11	7455	0.09	0.03	3746	0.04	4682	0.04
t=	16.18	0.96	15.10	1.96	-5.30	27.90	4.98	27.90	33.12
Prob(t)=	0%	34%	0%	5%	0%	0%	0%	0%	0%

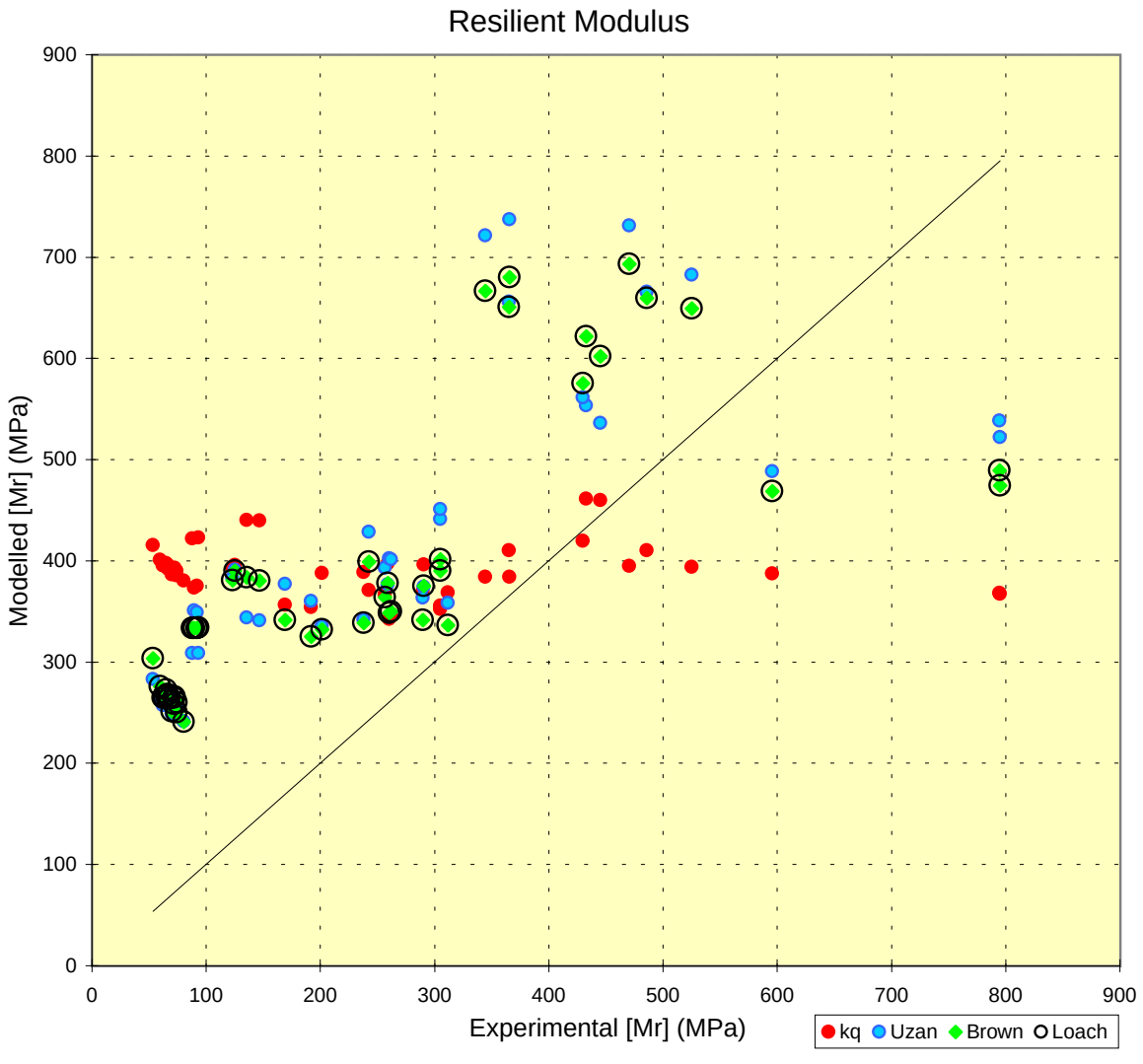
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

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The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***100% Percentile Data***

Experimental Data	Sample Size: 51 Suction (s) = 80 kPa @ ω= 20% 1,721 kg/m3			
	Chara'tic Values at q_2 = 26 kPa Mr_e= 430 MPa υ_e = 0.69			
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 433,871	k_3 = 349,135	A = 343,756	C = 429,695
	k_2 = -0.2111	k_4 = 0.2188	B = 0.5022	D = 1.5022
		k_5 = -0.5442		
	r^2= 0.004	r^2= 0.127	r^2= 0.122	r^2= 0.122
Characteristic Values	At: p_2 = 12 kPa & q_2= 26 kPa			
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 543 MPa	Mr_c= 455 MPa	Mr_c= 428 MPa	Mr_c= 214 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	85608	0.37	96385	0.35	0.22	61160	0.20	76450	0.20
t=	5.07	-0.57	3.62	0.63	-2.50	5.62	2.49	5.62	7.44
Prob(t)=	0%	57%	0%	53%	2%	0%	2%	0%	0%

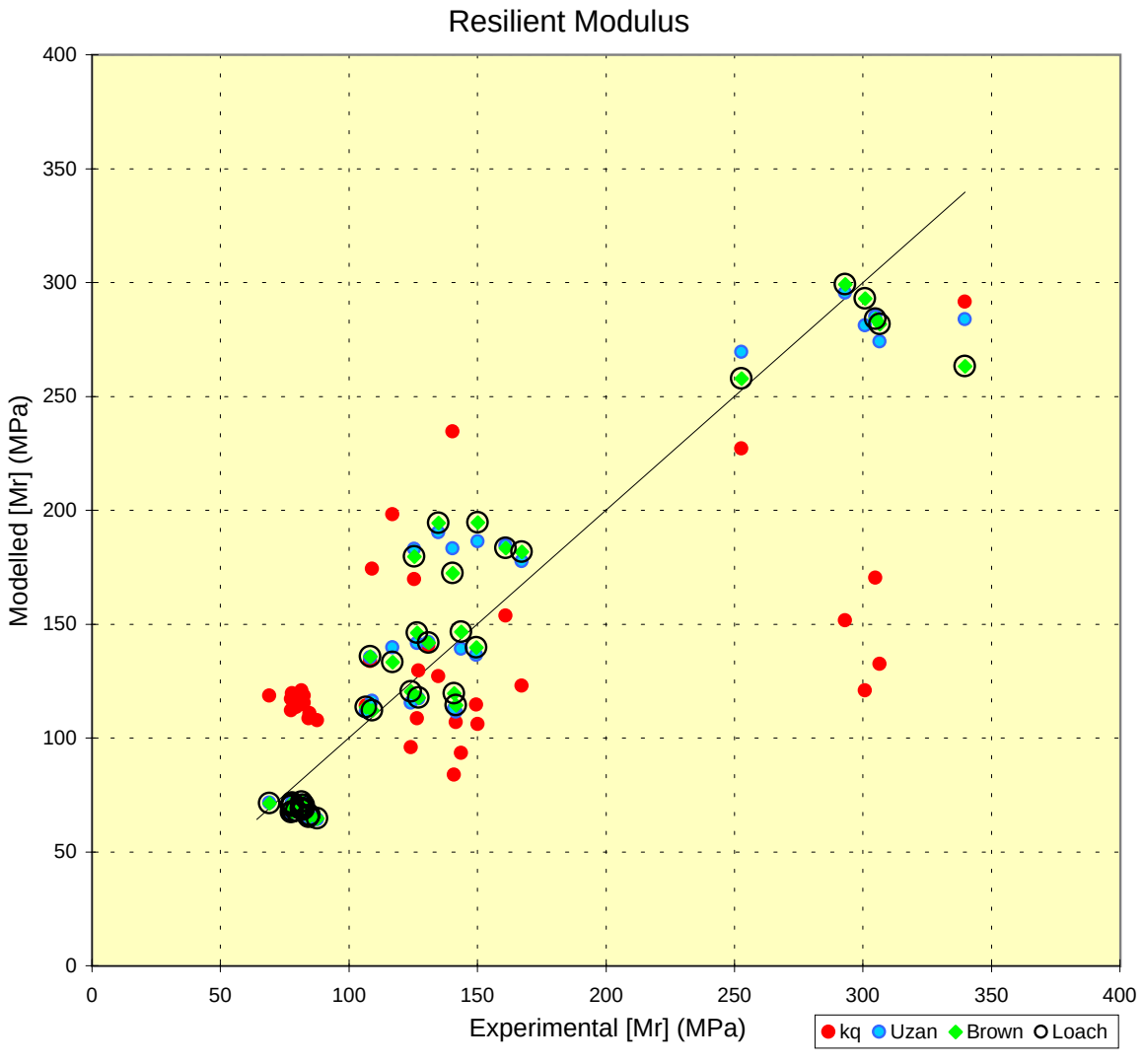
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***100% Percentile Data***

Experimental Data	Sample Size: 41	Suction (s) =	80 kPa @ ω=	20% #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 206 MPa	υ_e = 0.23
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 185,454	k_3 = 94,411	A = 116,351	C = 145,438
	k_2 = -0.7331	k_4 = -0.0935	B = 0.6933	D = 1.6933
		k_5 = -0.6710		
	r^2= 0.292	r^2= 0.907	r^2= 0.902	r^2= 0.902
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 404 MPa	Mr_c= 287 MPa	Mr_c= 158 MPa	Mr_c= 79 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	16136	0.17	5821	0.07	0.04	4833	0.04	6041	0.04
t=	11.49	-4.44	16.22	-1.42	-15.22	24.07	16.94	24.07	41.37
Prob(t)=	0%	0%	0%	17%	0%	0%	0%	0%	0%

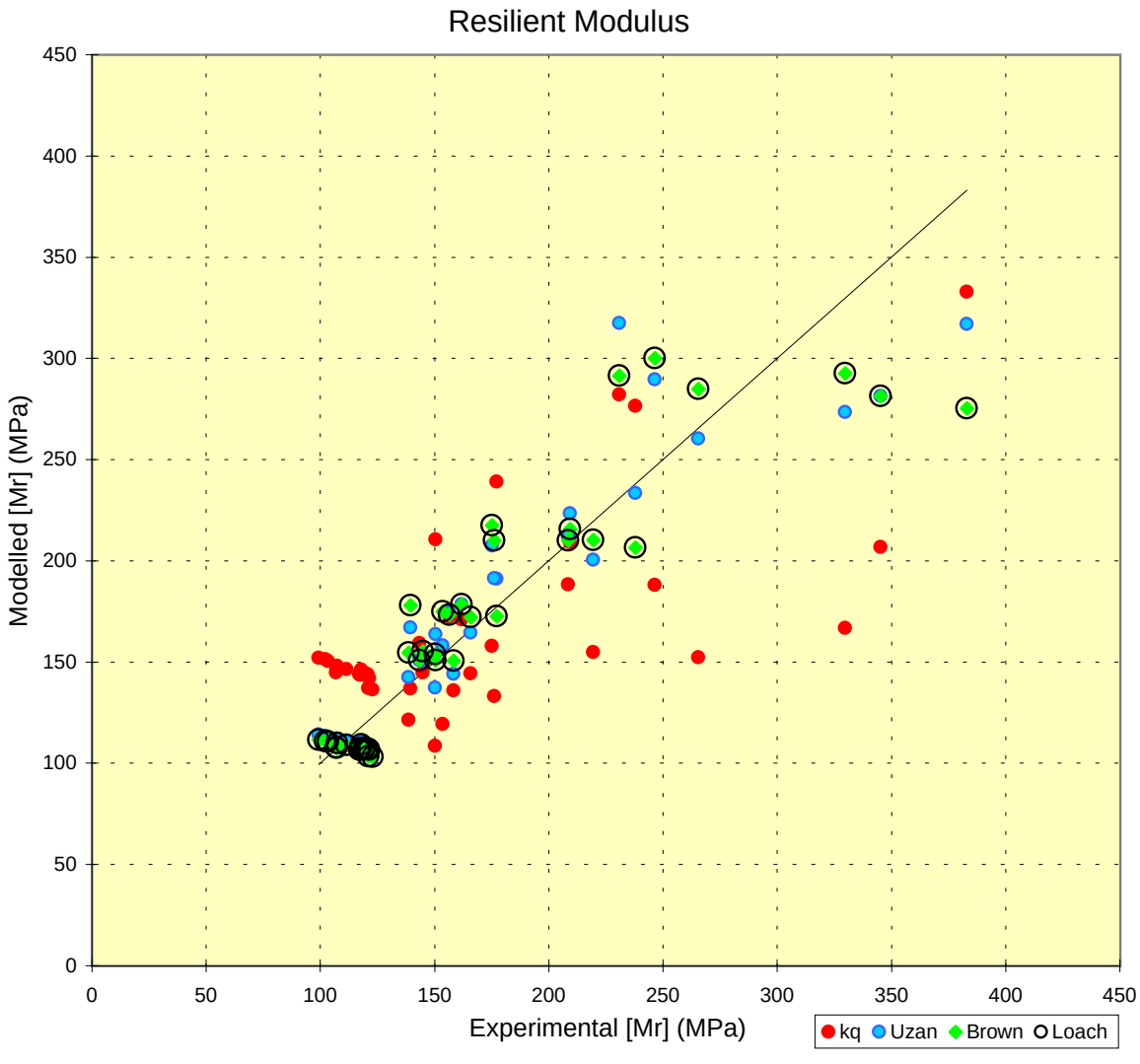
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***100% Percentile Data***

Experimental Data	Sample Size: 41	Suction (s) =	80 kPa @ ω=	20% #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 232 MPa	υ_e = 0.29
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 222,487	k_3 = 123,953	A = 153,000	C = 191,250
	k_2 = -0.6601	k_4 = -0.1920	B = 0.4877	D = 1.4877
		k_5 = -0.4279		
	r^2= 0.441	r^2= 0.857	r^2= 0.825	r^2= 0.825
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 449 MPa	Mr_c= 335 MPa	Mr_c= 189 MPa	Mr_c= 95 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	12463	0.10	6271	0.06	0.04	5162	0.04	6452	0.04
t=	17.85	-6.30	19.77	-2.98	-10.83	29.64	13.34	29.64	40.70
Prob(t)=	0%	0%	0%	1%	0%	0%	0%	0%	0%

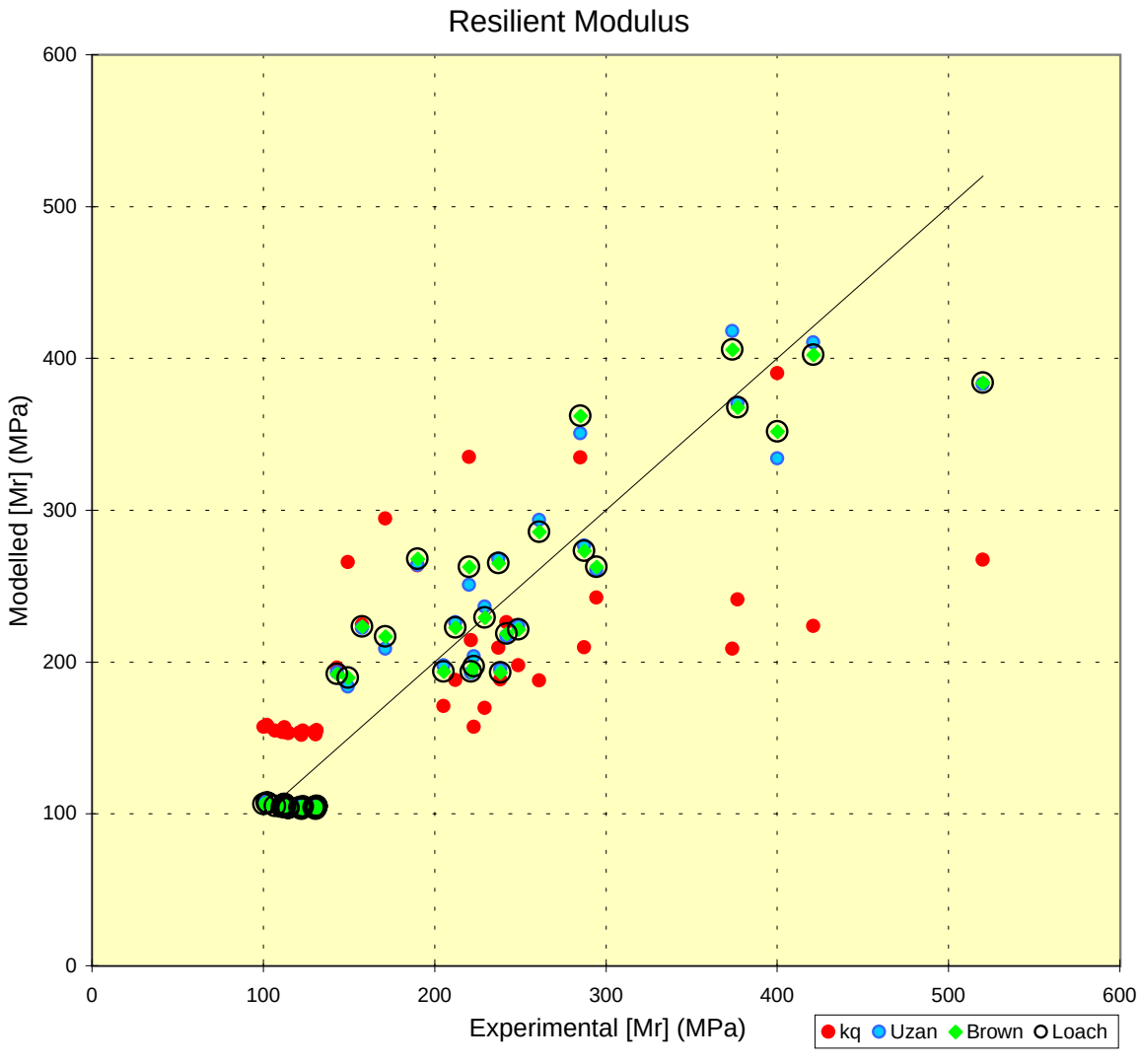
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***100% Percentile Data***

Experimental Data	Sample Size: 41	Suction (s) =	80 kPa @ ω=	20% #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 285 MPa	υ_e = 0.25
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 280,753	k_3 = 179,167	A = 193,997	C = 242,496
	k_2 = -0.5329	k_4 = 0.0633	B = 0.4802	D = 1.4802
		k_5 = -0.5005		
	r^2= 0.378	r^2= 0.869	r^2= 0.866	r^2= 0.866
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 495 MPa	Mr_c= 308 MPa	Mr_c= 239 MPa	Mr_c= 120 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	21426	0.11	9269	0.07	0.04	7104	0.03	8881	0.03
t=	13.10	-4.82	19.33	0.86	-12.03	27.31	14.19	27.31	43.72
Prob(t)=	0%	0%	0%	40%	0%	0%	0%	0%	0%

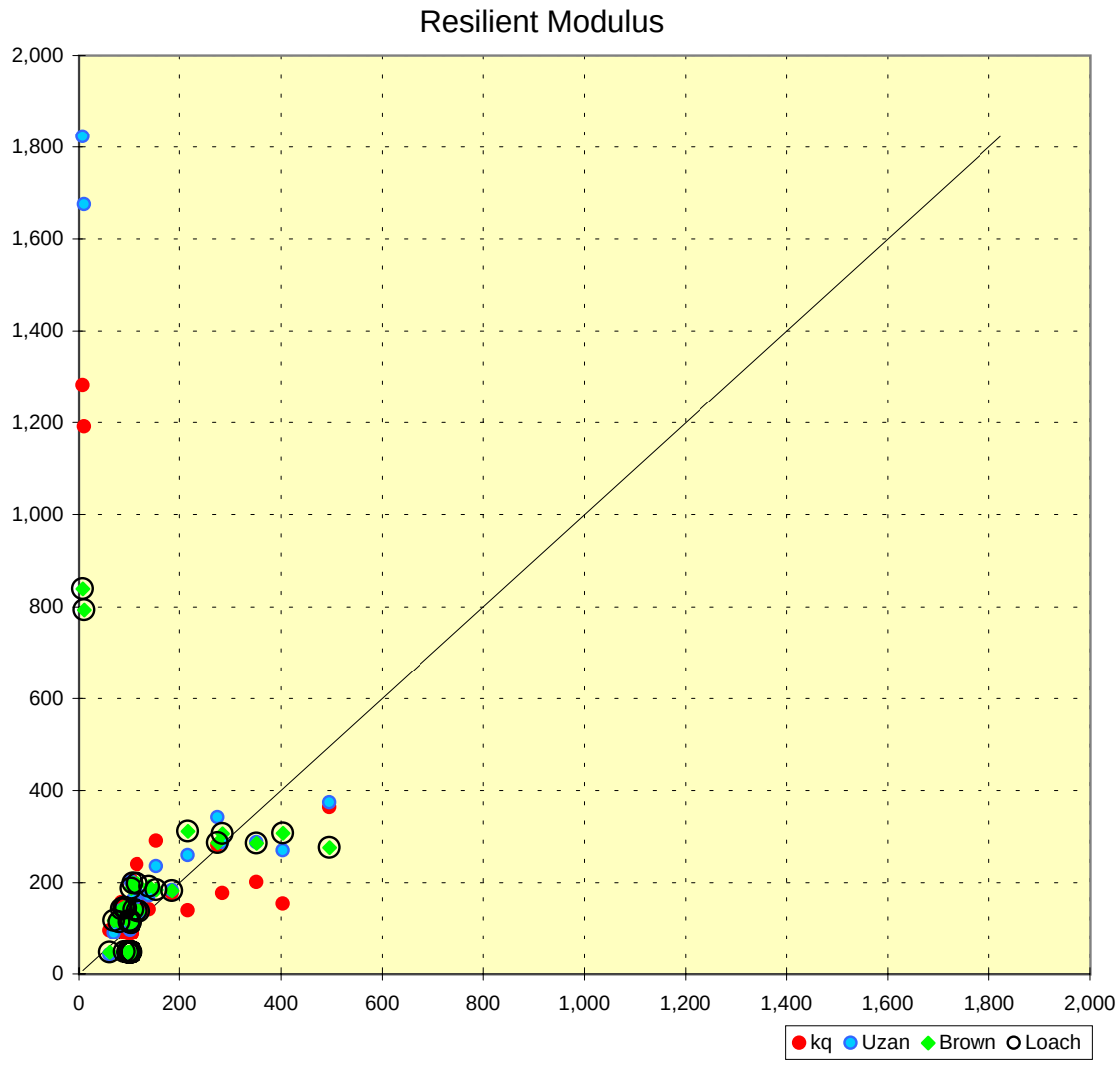
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***100% Percentile Data***

Experimental Data	Sample Size: 38	Suction (s) =	80 kPa @ ω=	20% #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 165 MPa	υ_e = 0.23
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 221,852	k_3 = 77,884	A = 115,986	C = 144,982
	k_2 = -0.8124	k_4 = -0.3996	B = 0.7119	D = 1.7119
		k_5 = -0.6163		
	r^2= 0.430	r^2= 0.651	r^2= 0.579	r^2= 0.579
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 526 MPa	Mr_c= 426 MPa	Mr_c= 159 MPa	Mr_c= 79 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	19634	0.16	13568	0.15	0.13	14987	0.12	18734	0.12
t=	11.30	-5.23	5.74	-2.63	-4.73	7.74	5.95	7.74	14.32
Prob(t)=	0%	0%	0%	1%	0%	0%	0%	0%	0%

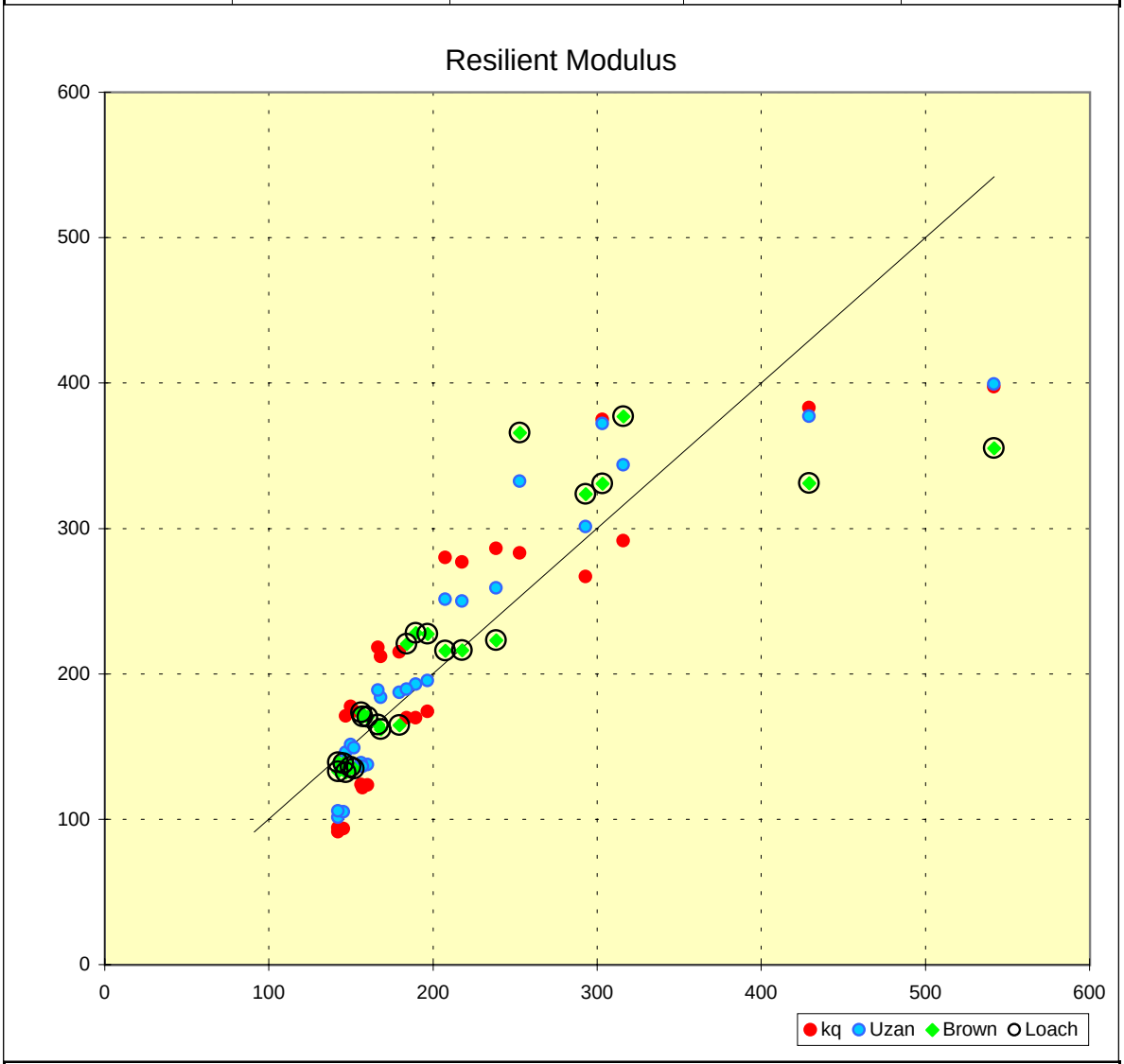
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***100% Percentile Data***

Experimental Data	Sample Size: 24	Suction (s) =	80 kPa @ ω=	20% #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 304 MPa	υ_e = 0.27
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 194,903	k_3 = 73,139	A = 138,733	C = 173,416
	k_2 = -1.1010	k_4 = -0.6459	B = 0.7200	D = 1.7200
		k_5 = -0.3730		
	r^2= 0.724	r^2= 0.797	r^2= 0.695	r^2= 0.695
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 628 MPa	Mr_c= 490 MPa	Mr_c= 190 MPa	Mr_c= 95 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	12436	0.15	13689	0.20	0.14	14495	0.10	18118	0.10
t=	15.67	-7.48	5.34	-3.23	-2.65	9.57	6.98	9.57	16.67
Prob(t)=	0%	0%	0%	0%	1%	0%	0%	0%	0%

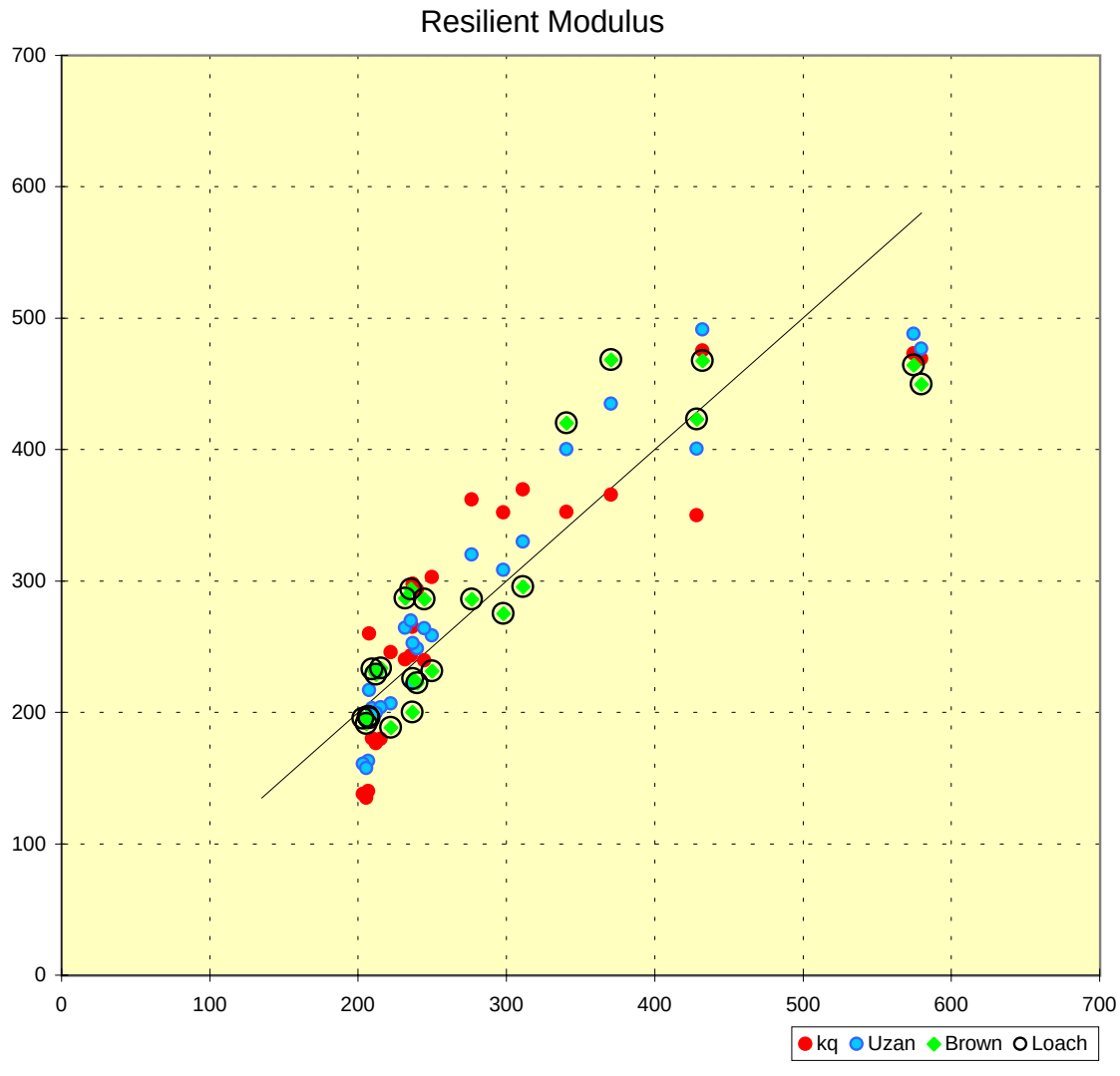
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***100% Percentile Data***

Experimental Data	Sample Size: 24	Suction (s) =	80 kPa @ ω=	20% #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 388 MPa	υ_e = 0.30
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 540,962	k_3 = 131,811	A = 194,924	C = 243,655
	k_2 = -1.4705	k_4 = -0.6892	B = 0.6043	D = 1.6043
		k_5 = -0.3707		
	r^2= 0.736	r^2= 0.851	r^2= 0.788	r^2= 0.788
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 2,583 MPa	Mr_c= 966 MPa	Mr_c= 254 MPa	Mr_c= 127 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	38855	0.19	15338	0.23	0.10	13650	0.07	17063	0.07
t=	13.92	-7.71	8.59	-2.97	-3.88	14.28	9.20	14.28	24.43
Prob(t)=	0%	0%	0%	1%	0%	0%	0%	0%	0%

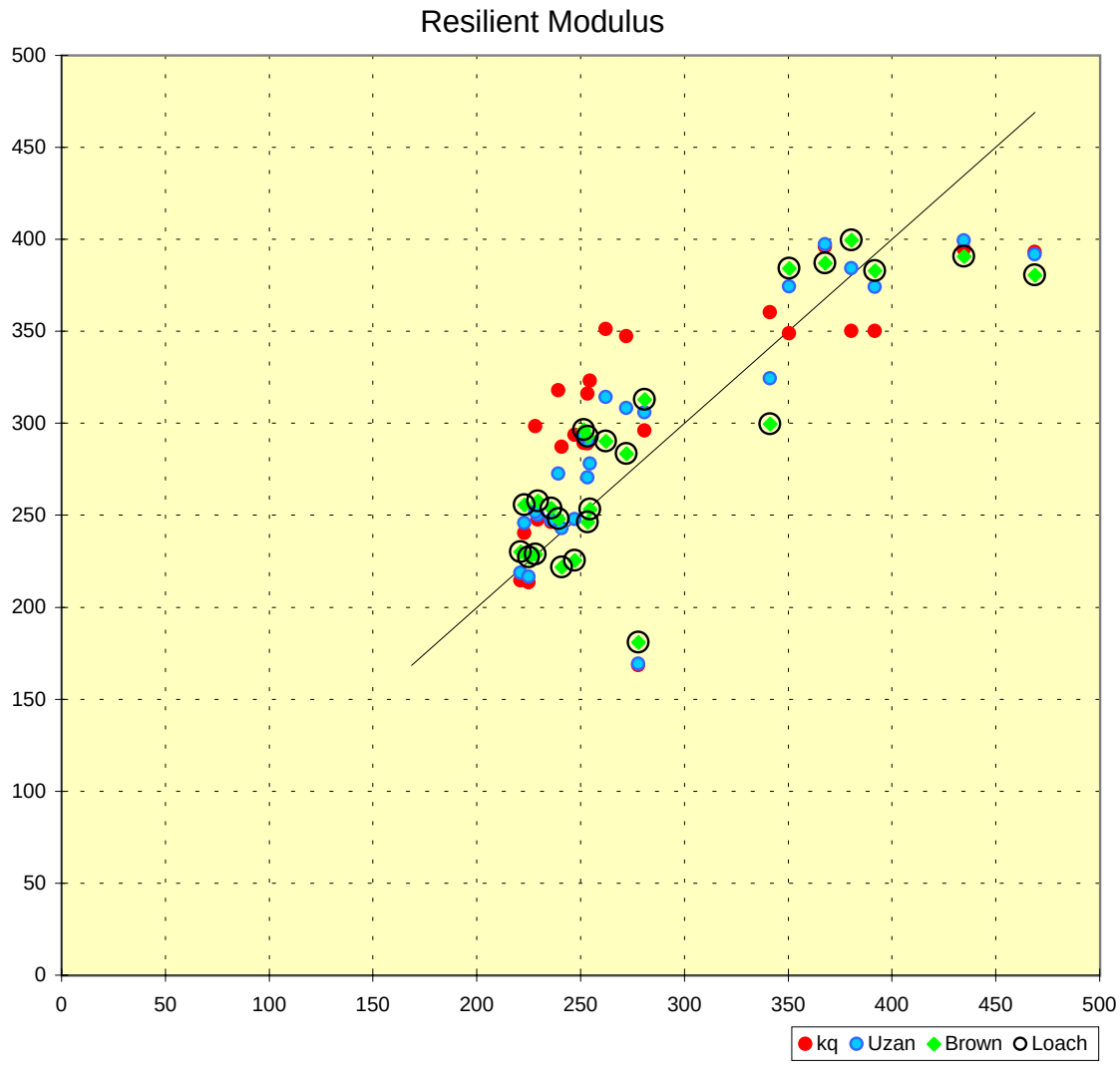
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The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***100% Percentile Data***

Experimental Data	Sample Size: 24	Suction (s) =	80 kPa @ ω=	20% #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 326 MPa	υ_e = 0.27
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 585,412	k_3 = 204,897	A = 226,027	C = 282,534
	k_2 = -0.9233	k_4 = -0.4035	B = 0.3526	D = 1.3526
		k_5 = -0.2230		
	r^2= 0.675	r^2= 0.745	r^2= 0.717	r^2= 0.717
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 1,562 MPa	Mr_c= 663 MPa	Mr_c= 264 MPa	Mr_c= 132 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	65212	0.16	16041	0.31	0.11	14998	0.06	18748	0.06
t=	8.98	-5.61	12.77	-1.31	-1.95	15.07	6.29	15.07	24.15
Prob(t)=	0%	0%	0%	21%	7%	0%	0%	0%	0%

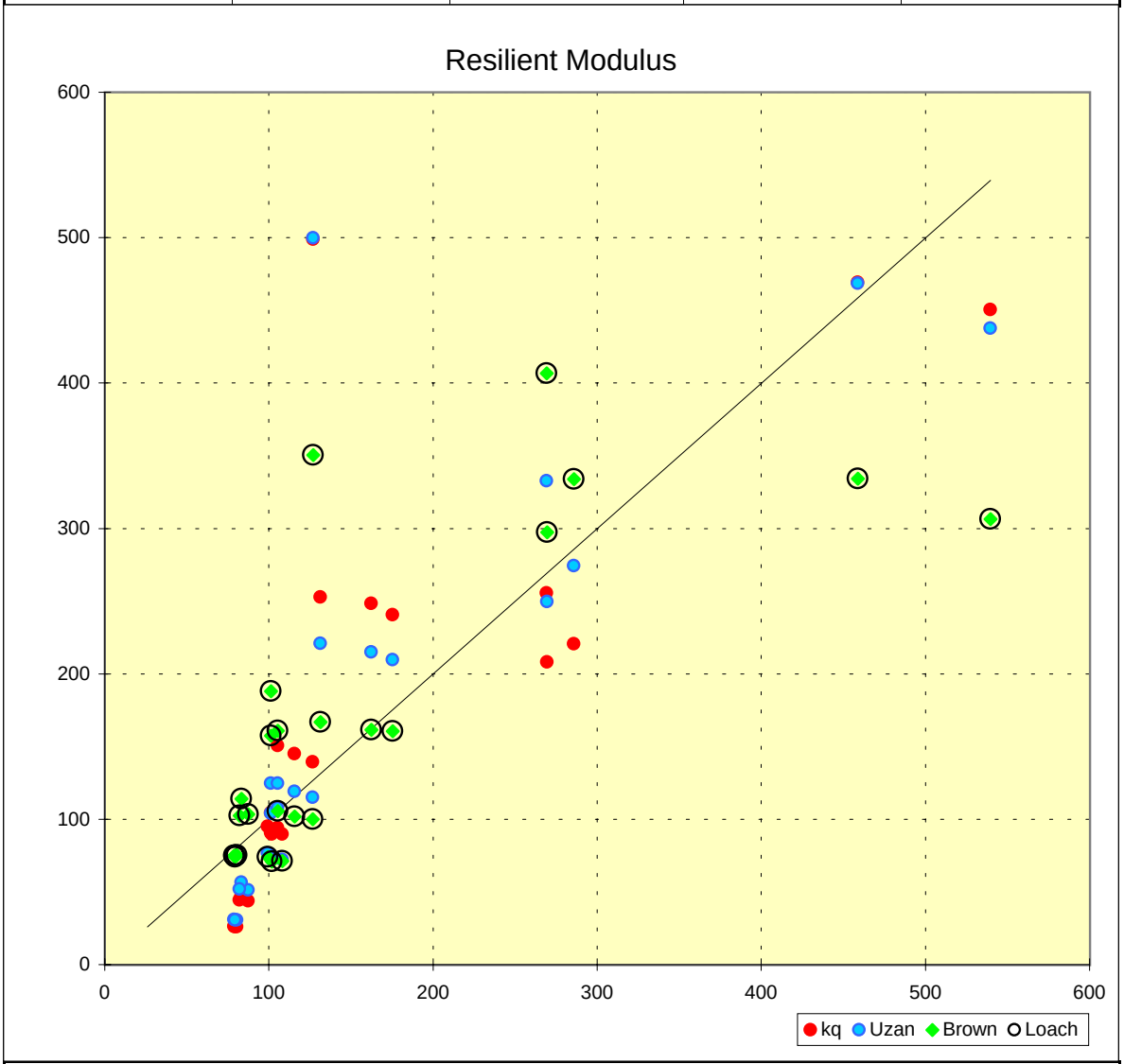
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The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***100% Percentile Data***

Experimental Data	Sample Size: 24	Suction (s) =	80 kPa @ ω=	20% #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 253 MPa	υ_e = 0.41
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 117,164	k_3 = 13,773	A = 75,898	C = 94,872
	k_2 = -2.2563	k_4 = -1.5984	B = 1.1810	D = 2.1810
		k_5 = -0.5328		
	r^2= 0.821	r^2= 0.878	r^2= 0.666	r^2= 0.666
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 1,290 MPa	Mr_c= 898 MPa	Mr_c= 127 MPa	Mr_c= 64 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	13651	0.25	4425	0.28	0.18	16565	0.20	20707	0.20
t=	8.58	-9.02	3.11	-5.74	-2.99	4.58	5.97	4.58	11.02
Prob(t)=	0%	0%	1%	0%	1%	0%	0%	0%	0%

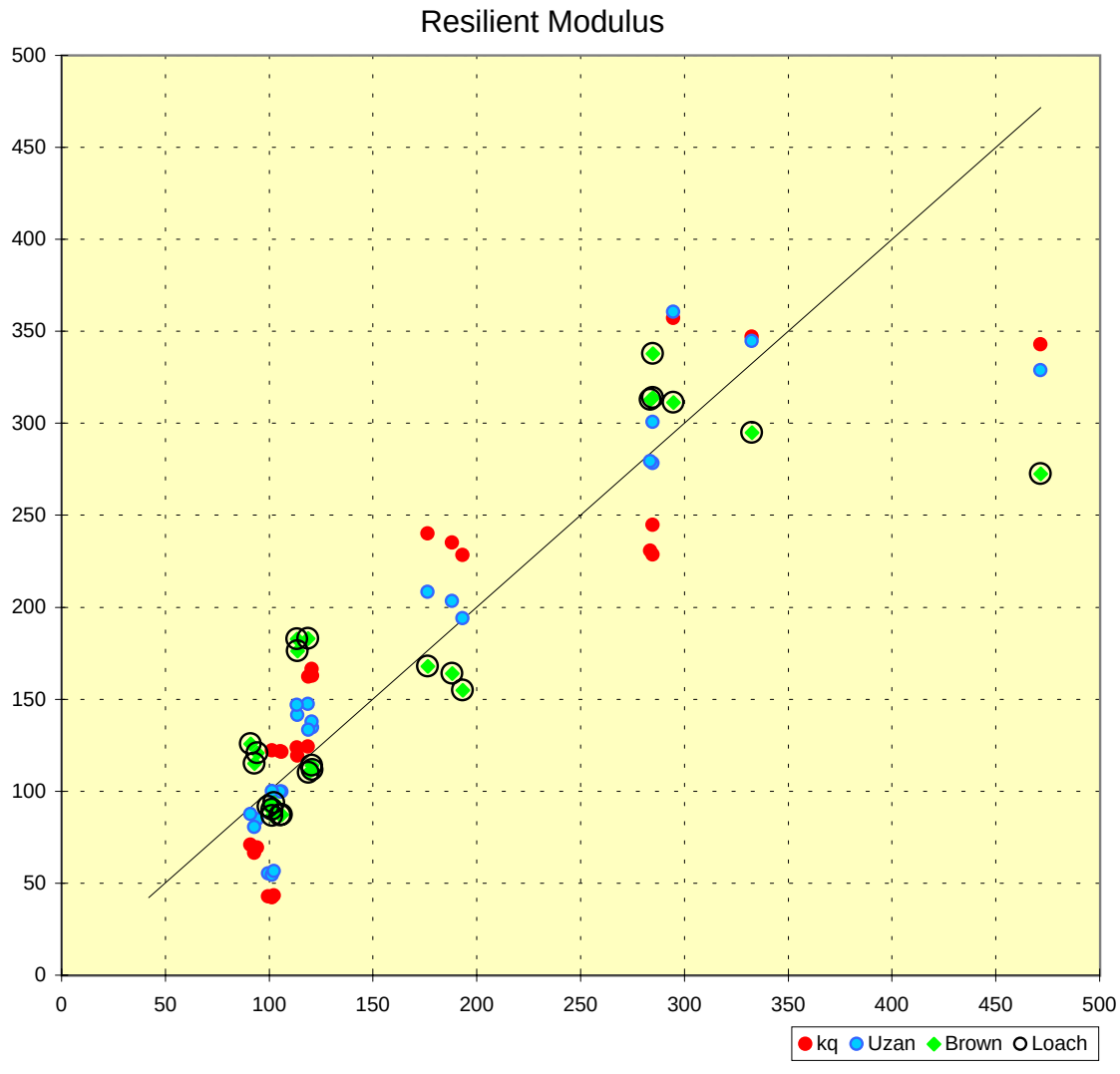
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TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***100% Percentile Data***

Experimental Data	Sample Size: 24	Suction (s) =	80 kPa @ ω=	20% #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 257 MPa	υ_e = 0.31
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 481,422	k_3 = 37,901	A = 89,908	C = 112,385
	k_2 = -2.6076	k_4 = -1.5378	B = 0.9339	D = 1.9339
		k_5 = -0.4759		
	r^2= 0.767	r^2= 0.844	r^2= 0.725	r^2= 0.725
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 7,701 MPa	Mr_c= 2,007 MPa	Mr_c= 135 MPa	Mr_c= 68 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	50529	0.35	8877	0.39	0.15	13215	0.13	16518	0.13
t=	9.53	-7.56	4.27	-3.93	-3.19	6.80	7.09	6.80	14.69
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

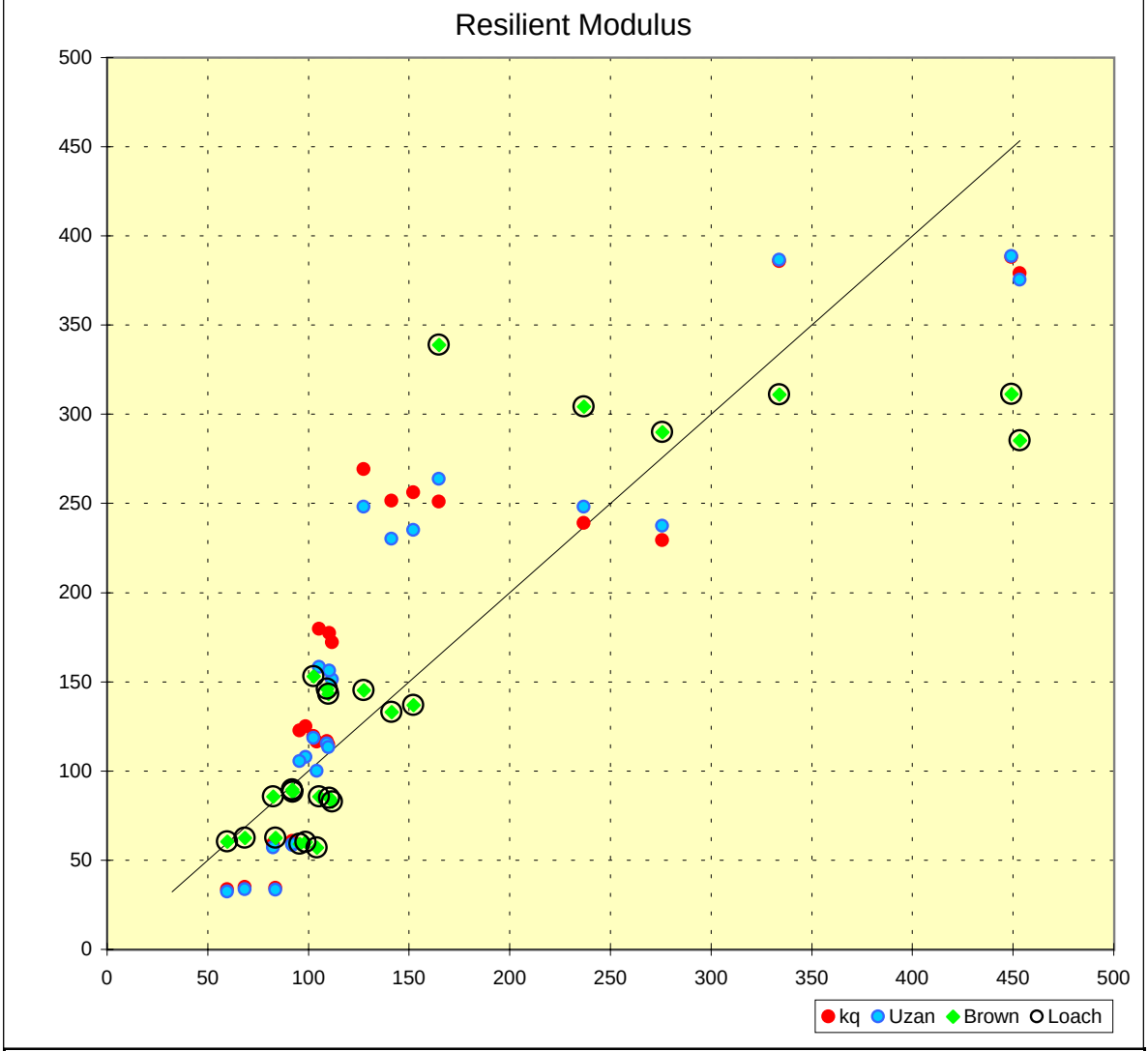
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TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***100% Percentile Data***

Experimental Data	Sample Size: 24	Suction (s) =	80 kPa @ ω=	20% #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 239 MPa	υ_e = 0.24
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 2,012,591	k_3 = 31,118	A = 60,343	C = 75,429
	k_2 = -3.7221	k_4 = -3.4167	B = 1.1796	D = 2.1796
		k_5 = -0.1747		
	r^2= 0.849	r^2= 0.853	r^2= 0.661	r^2= 0.661
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= ##########	Mr_c= 63,623 MPa	Mr_c= 101 MPa	Mr_c= 51 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	606022	0.57	12072	0.85	0.34	23272	0.30	29090	0.30
t=	3.32	-6.48	2.58	-4.01	-0.51	2.59	3.94	2.59	7.28
Prob(t)=	1%	0%	2%	0%	62%	2%	0%	2%	0%

The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

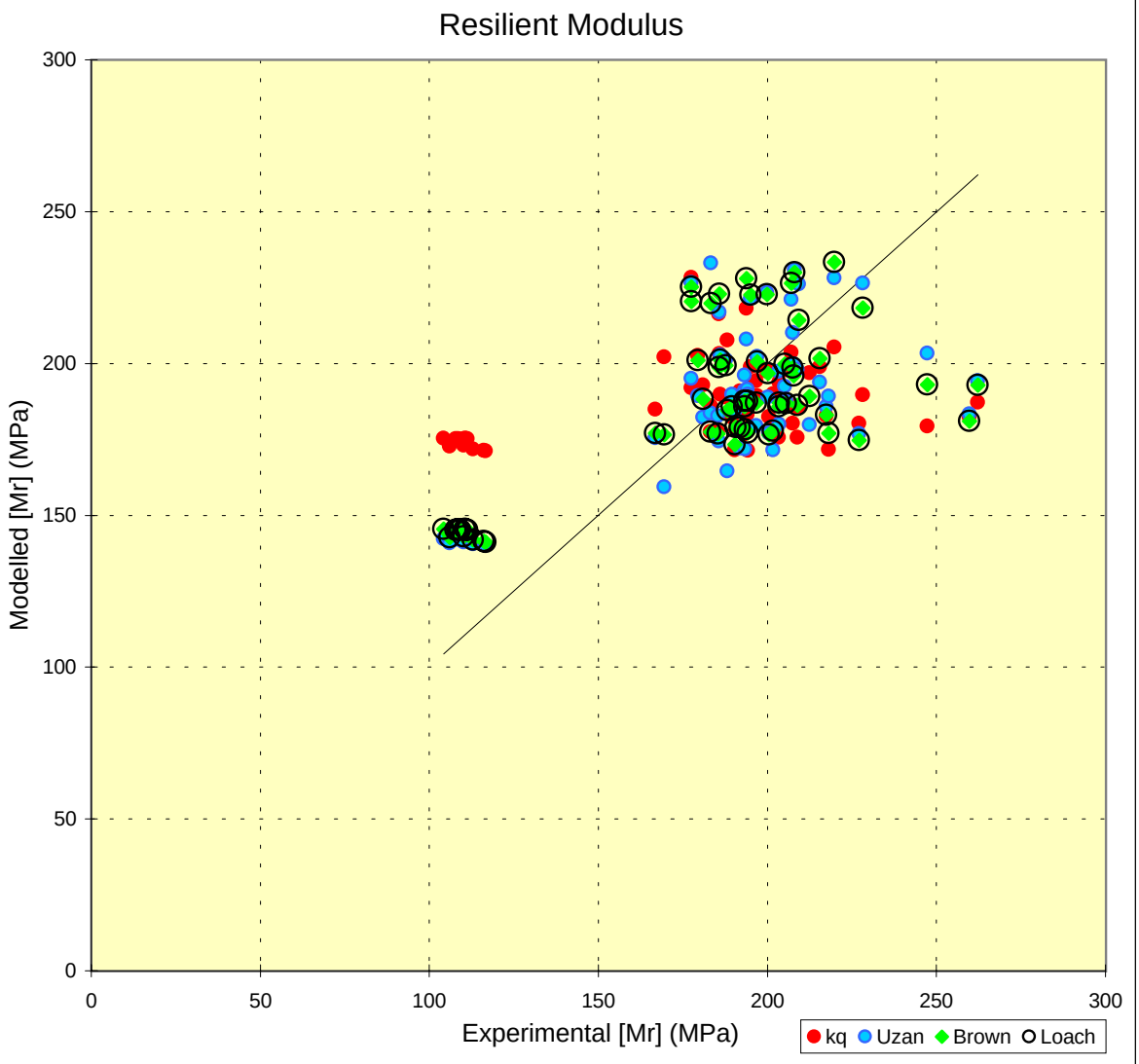
The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***90% Percentile Data***

Experimental Data	Sample Size: 73	Suction (s) =	80 kPa @ ω=	20% 1,691 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 213 MPa	υ_e = 0.24

Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 206,170	k_3 = 180,037	A = 178,129	C = 222,661
	k_2 = -0.1640	k_4 = 0.1688	B = 0.1846	D = 1.1846
		k_5 = -0.2481		
	r^2= 0.108	r^2= 0.522	r^2= 0.469	r^2= 0.469

Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 245 MPa	Mr_c= 175 MPa	Mr_c= 220 MPa	Mr_c= 220 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	8356	0.06	5258	0.06	0.03	3682	0.03	4603	0.03
t=	24.67	-2.84	34.24	2.72	-7.24	48.37	7.10	48.37	45.60
Prob(t)=	0%	1%	0%	1%	0%	0%	0%	0%	0%

The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

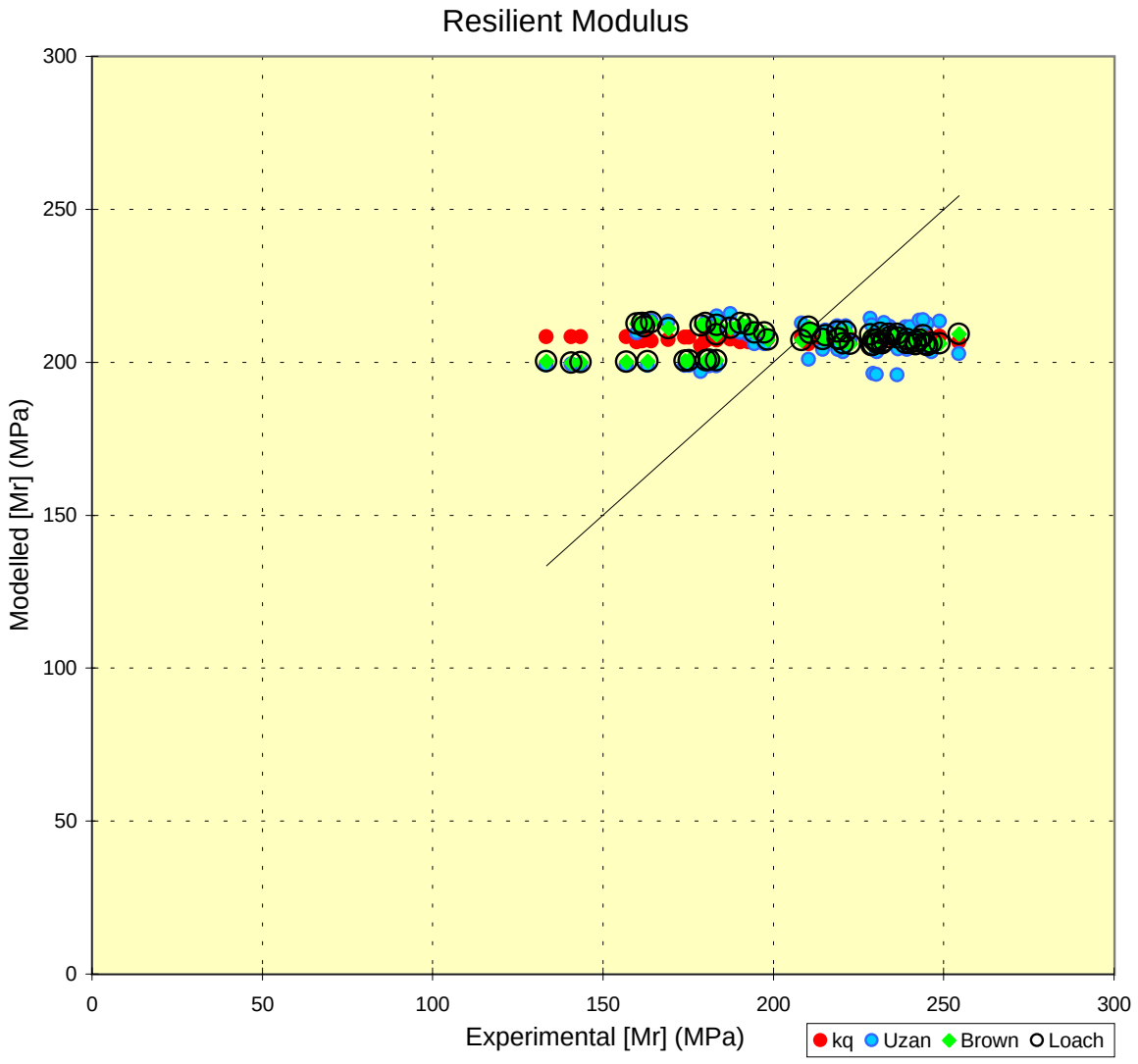
The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***90% Percentile Data***

Experimental Data	Sample Size: 71	Suction (s) =	80 kPa @ ω=	20% 1,694 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 217 MPa	υ_e = 0.22

Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 206,197	k_3 = 211,305	A = 206,960	C = 258,699
	k_2 = 0.0092	k_4 = 0.0869	B = 0.0278	D = 1.0278
		k_5 = -0.0580		
	r^2= 0.001	r^2= 0.039	r^2= 0.017	r^2= 0.017

Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 204 MPa	Mr_c= 189 MPa	Mr_c= 214 MPa	Mr_c= 214 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	8131	0.05	6037	0.07	0.04	3727	0.03	4659	0.03
t=	25.36	0.18	35.00	1.28	-1.57	55.52	0.99	55.52	36.51
Prob(t)=	0%	86%	0%	21%	12%	0%	33%	0%	0%

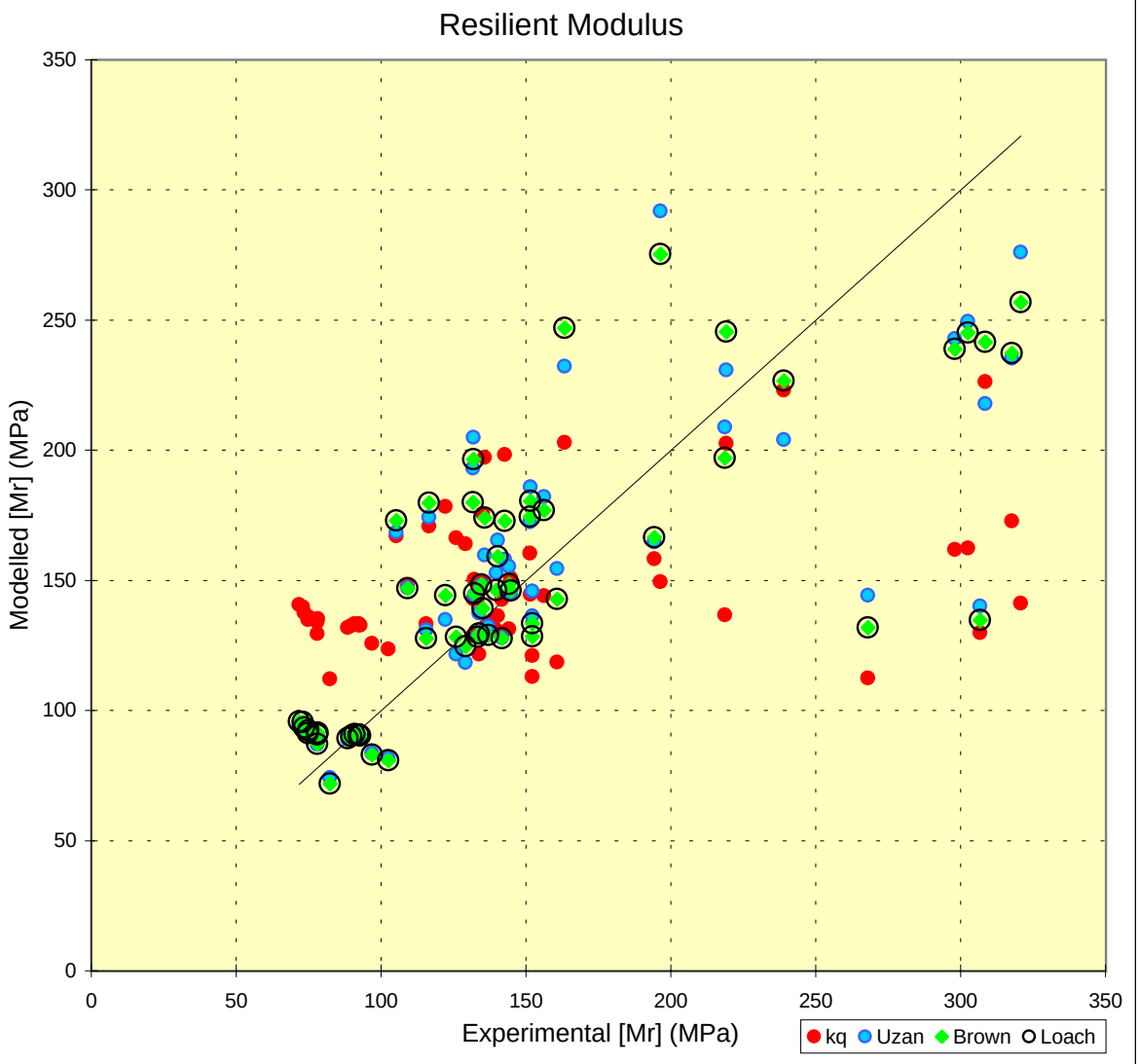
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The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***90% Percentile Data***

Experimental Data	Sample Size: 58	Suction (s) =	80 kPa @ ω=	20% 1,705 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 195 MPa	υ_e = 0.24
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 179,483	k_3 = 125,542	A = 129,251	C = 161,564
	k_2 = -0.4309	k_4 = 0.1552	B = 0.4856	D = 1.4856
		k_5 = -0.5326		
	r^2= 0.133	r^2= 0.604	r^2= 0.590	r^2= 0.590
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 284 MPa	Mr_c= 185 MPa	Mr_c= 224 MPa	Mr_c= 224 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	13030	0.13	9868	0.11	0.07	6694	0.06	8368	0.06
t=	13.77	-3.24	12.72	1.43	-8.16	19.31	8.72	19.31	26.67
Prob(t)=	0%	0%	0%	16%	0%	0%	0%	0%	0%

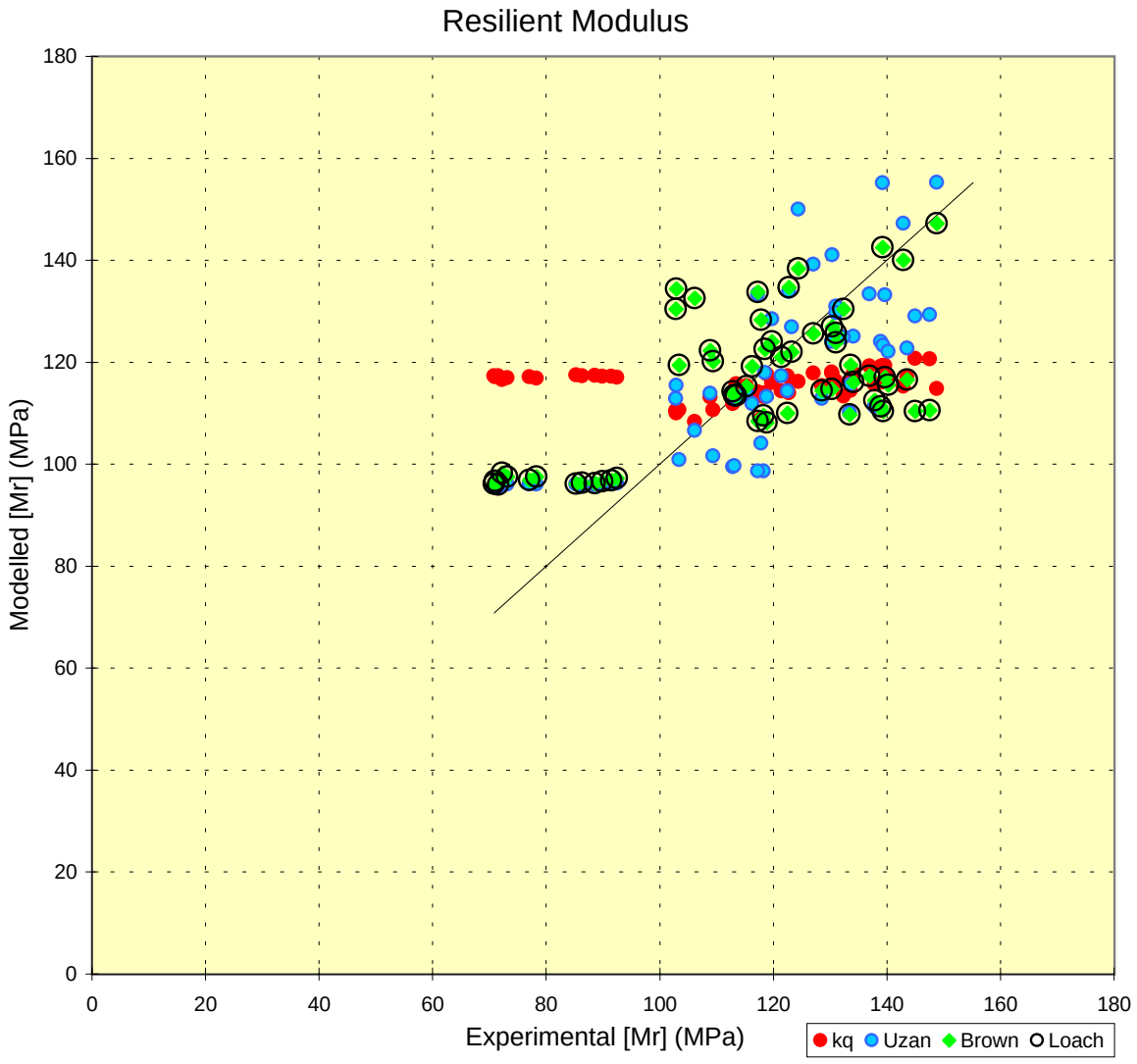
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The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***90% Percentile Data***

Experimental Data	Sample Size: 58	Suction (s) =	80 kPa @ ω=	20% 1,704 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 134 MPa	υ_e = 0.20
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 111,269	k_3 = 123,097	A = 111,481	C = 139,351
	k_2 = 0.0728	k_4 = 0.2945	B = 0.1865	D = 1.1865
		k_5 = -0.2496		
	r^2= 0.015	r^2= 0.606	r^2= 0.398	r^2= 0.398
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 103 MPa	Mr_c= 91 MPa	Mr_c= 138 MPa	Mr_c= 138 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	5534	0.08	3972	0.05	0.03	2464	0.03	3079	0.03
t=	20.11	0.92	30.99	5.36	-8.76	45.25	5.78	45.25	36.78
Prob(t)=	0%	36%	0%	0%	0%	0%	0%	0%	0%

The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

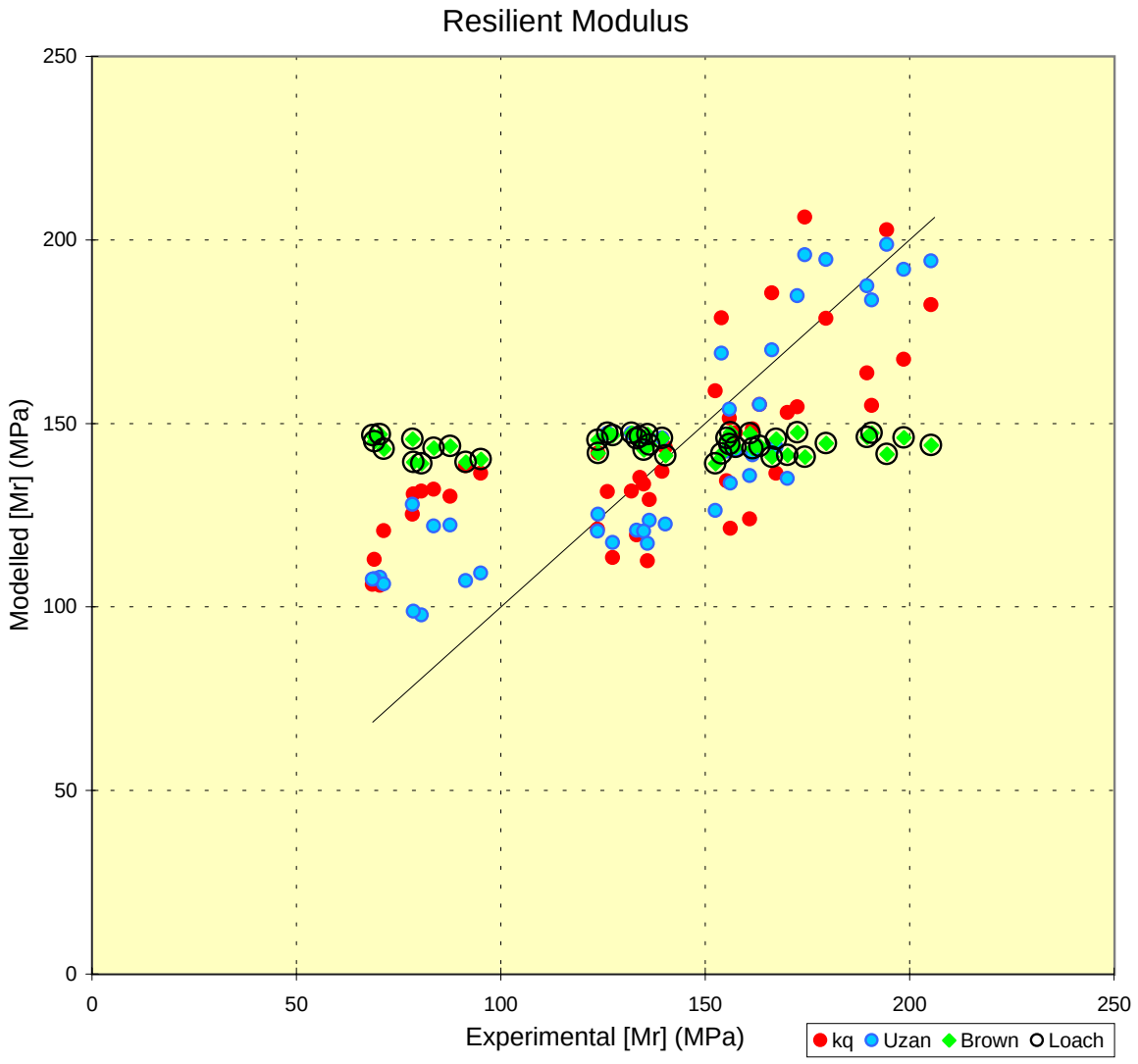
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TP-III : LNEC	***Seine et Marne Silt (LIM)***			***90% Percentile Data***
Experimental Data	Sample Size: 43	Suction (s) =	80 kPa @ ω= 20%	1,698 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 132 MPa	υ_e = 0.52

Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 161,237	k_3 = 114,046	A = 147,118	C = 183,898
	k_2 = -0.3898	k_4 = -0.5232	B = -0.0348	D = 0.9652
		k_5 = 0.2462		
	r^2= 0.503	r^2= 0.704	r^2= 0.006	r^2= 0.006

Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 244 MPa	Mr_c= 253 MPa	Mr_c= 141 MPa	Mr_c= 141 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	4943	0.06	6099	0.06	0.05	8760	0.08	10951	0.08
t=	32.62	-6.02	18.70	-8.88	4.70	16.79	-0.43	16.79	12.04
Prob(t)=	0%	0%	0%	0%	0%	0%	67%	0%	0%

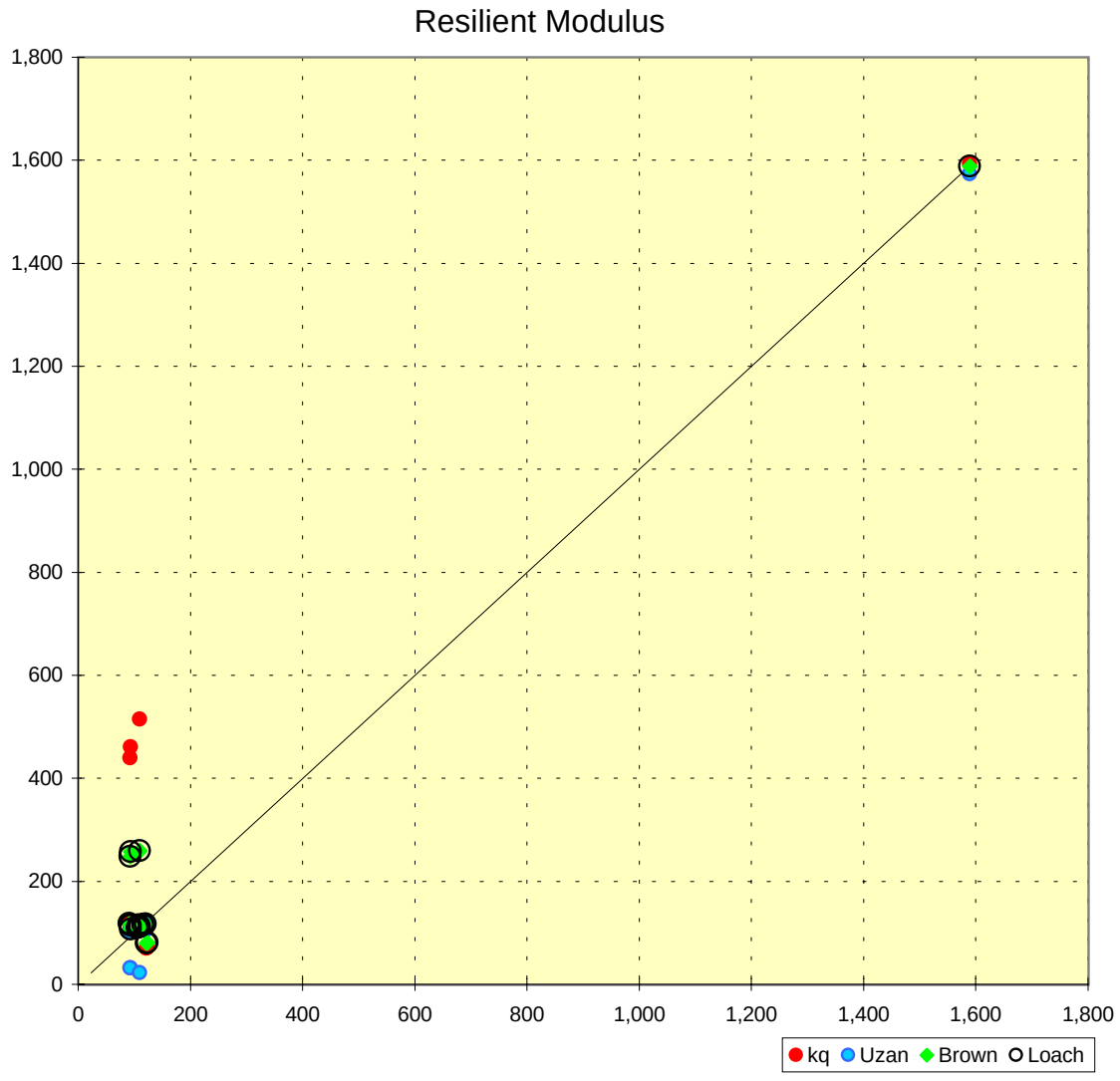
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The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

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TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***90% Percentile Data***

Experimental Data	Sample Size: 14	Suction (s) =	80 kPa @ ω=	20% 1,699 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 784 MPa	υ_e = 0.51
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 338,543	k_3 = 65,456,970	A = 262,761	C = 328,451
	k_2 = -2.0186	k_4 = 7.0901	B = 1.3357	D = 2.3357
		k_5 = -6.0502		
	r^2= 0.996	r^2= 1.000	r^2= 0.998	r^2= 0.998
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 2,895 MPa	Mr_c= 52 MPa	Mr_c= 1,192 MPa	Mr_c= 1,192 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	16426	0.06	######	1.00	0.67	12277	0.04	15346	0.04
t=	20.61	-31.53	1.22	7.06	-9.00	21.40	37.86	21.40	66.21
Prob(t)=	0%	0%	26%	0%	0%	0%	0%	0%	0%

The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

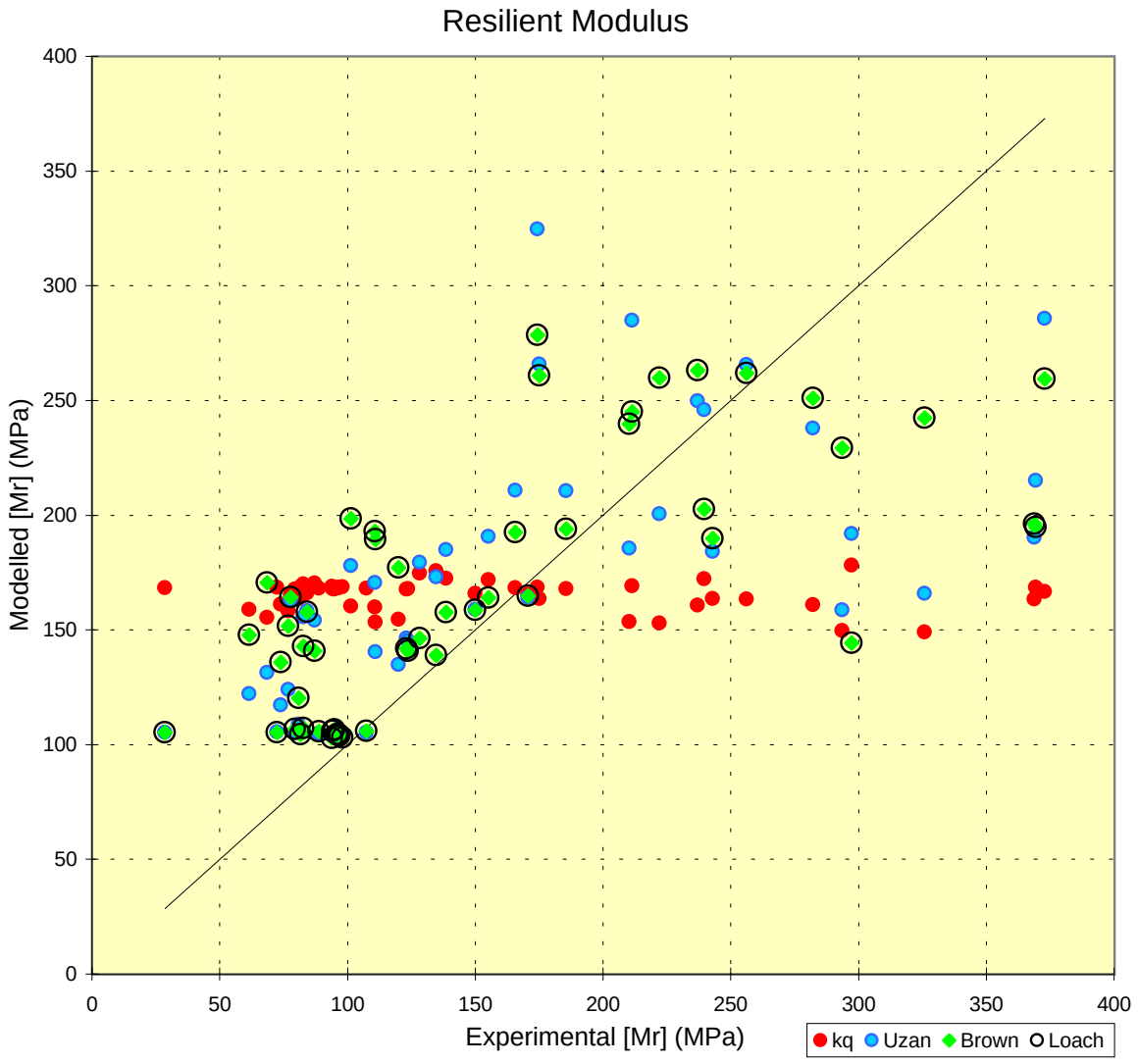
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TP-III : LNEC	***Seine et Marne Silt (LIM)***			***90% Percentile Data***
Experimental Data	Sample Size: 53	Suction (s) =	80 kPa @ ω= 20%	1,696 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 216 MPa	υ_e = 0.42

Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 158,121	k_3 = 168,533	A = 144,018	C = 180,023
	k_2 = 0.1089	k_4 = 0.4531	B = 0.4950	D = 1.4950
		k_5 = -0.5721		
	r^2= 0.003	r^2= 0.394	r^2= 0.319	r^2= 0.319

Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 141 MPa	Mr_c= 137 MPa	Mr_c= 252 MPa	Mr_c= 252 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	19484	0.21	19931	0.16	0.10	11957	0.10	14946	0.10
t=	8.12	0.52	8.46	2.76	-5.54	12.05	4.89	12.05	14.76
Prob(t)=	0%	60%	0%	1%	0%	0%	0%	0%	0%

The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

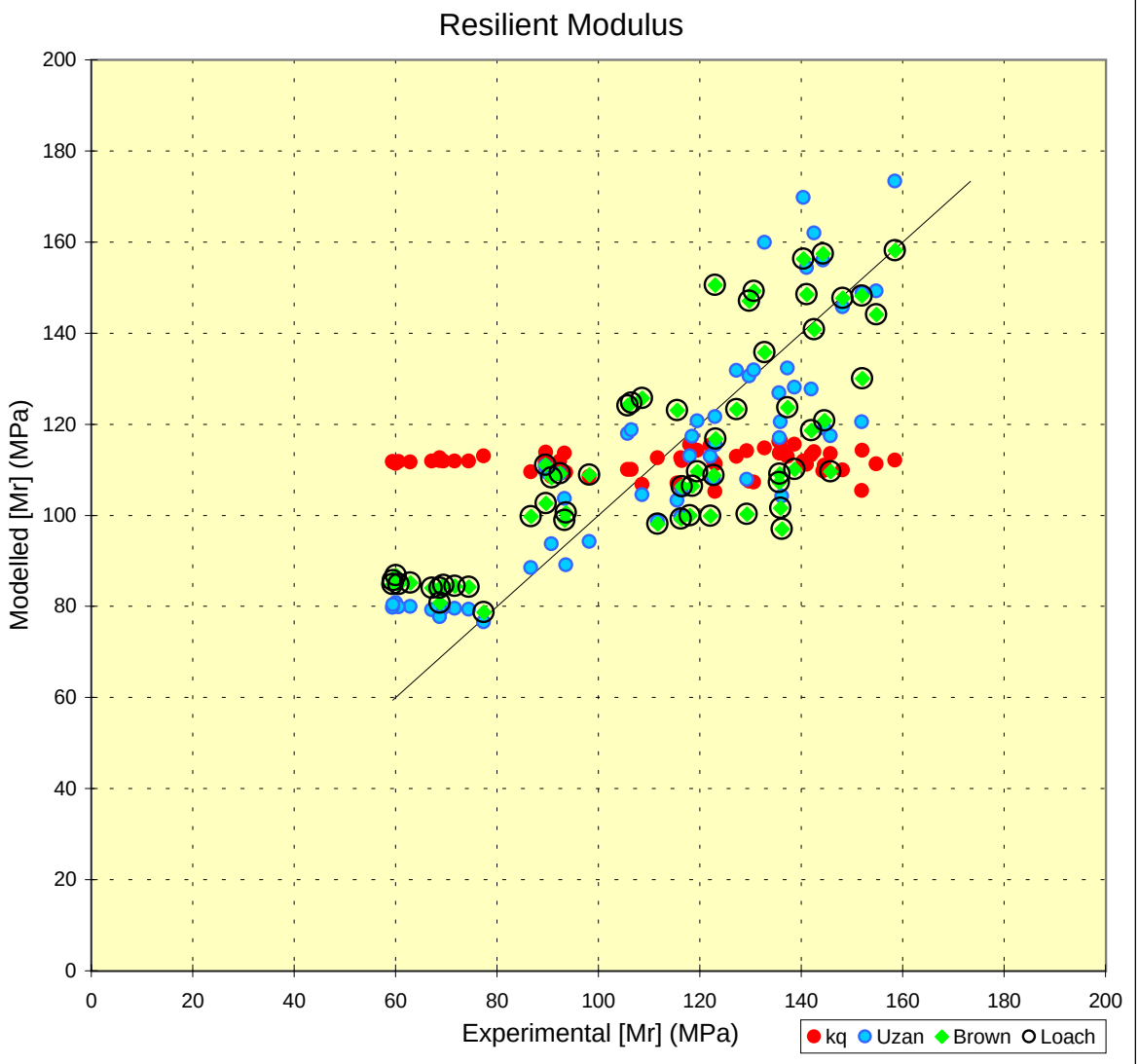
The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC	***Seine et Marne Silt (LIM)***			***90% Percentile Data***
Experimental Data	Sample Size: 57	Suction (s) =	80 kPa @ ω=	20% 1,717 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 144 MPa	υ_e = 0.34

Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 108,884	k_3 = 107,722	A = 100,835	C = 126,044
	k_2 = 0.0614	k_4 = 0.2827	B = 0.3722	D = 1.3722
		k_5 = -0.4563		
	r^2= 0.007	r^2= 0.759	r^2= 0.600	r^2= 0.600

Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 102 MPa	Mr_c= 108 MPa	Mr_c= 154 MPa	Mr_c= 154 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	6028	0.10	3886	0.05	0.04	2926	0.04	3657	0.04
t=	18.06	0.64	27.72	5.86	-12.17	34.46	8.68	34.46	31.98
Prob(t)=	0%	53%	0%	0%	0%	0%	0%	0%	0%

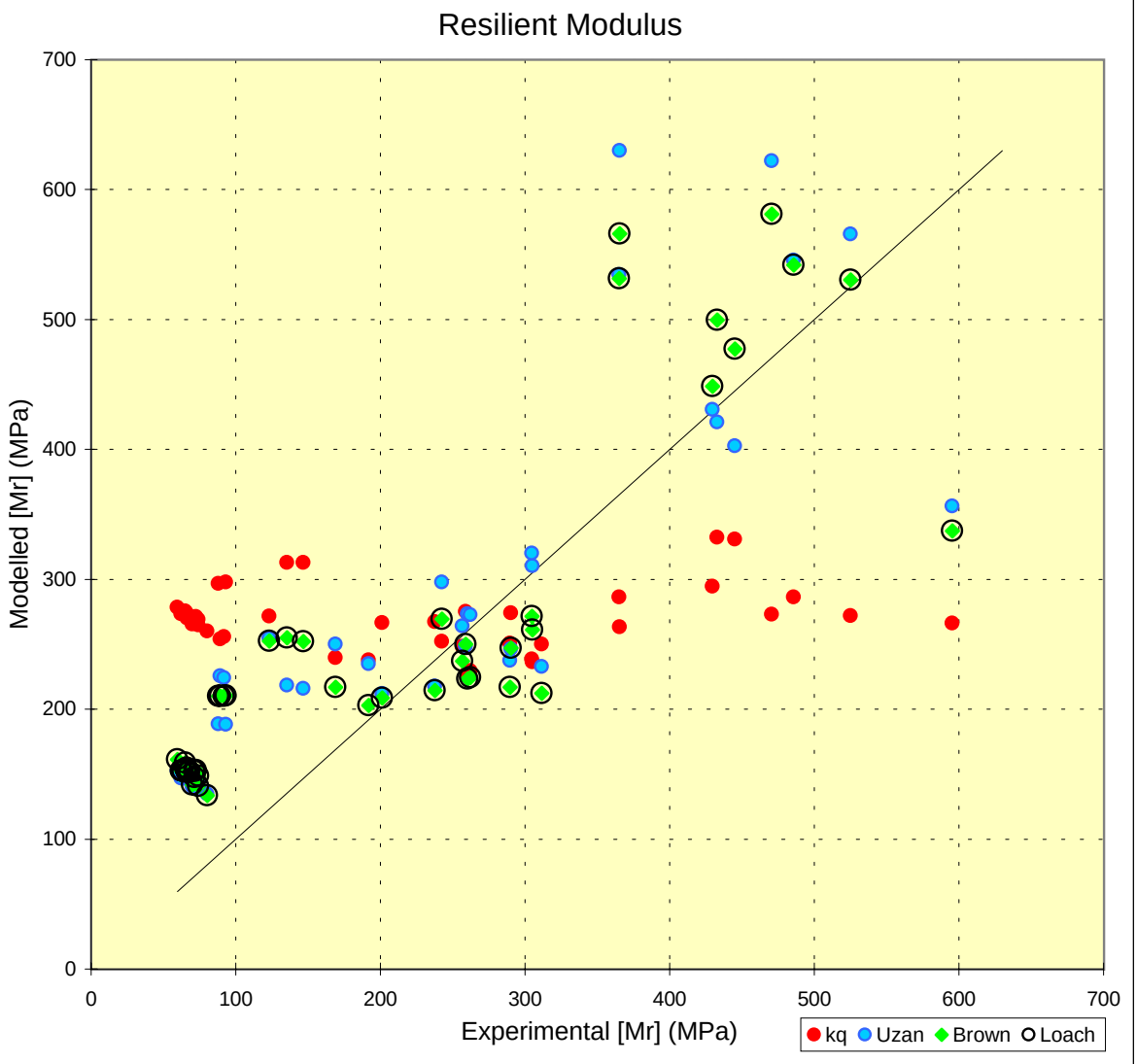
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The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***90% Percentile Data***

Experimental Data	Sample Size: 46	Suction (s) =	80 kPa @ ω=	20% 1,721 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 398 MPa	υ_e = 0.69
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 307,495	k_3 = 224,896	A = 219,058	C = 273,823
	k_2 = -0.2679	k_4 = 0.3096	B = 0.6982	D = 1.6982
		k_5 = -0.7524		
	r^2= 0.012	r^2= 0.495	r^2= 0.471	r^2= 0.471
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 409 MPa	Mr_c= 319 MPa	Mr_c= 483 MPa	Mr_c= 483 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	45823	0.28	35745	0.19	0.12	25237	0.11	31546	0.11
t=	6.71	-0.96	6.29	1.62	-6.24	8.68	6.08	8.68	14.78
Prob(t)=	0%	34%	0%	11%	0%	0%	0%	0%	0%

The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

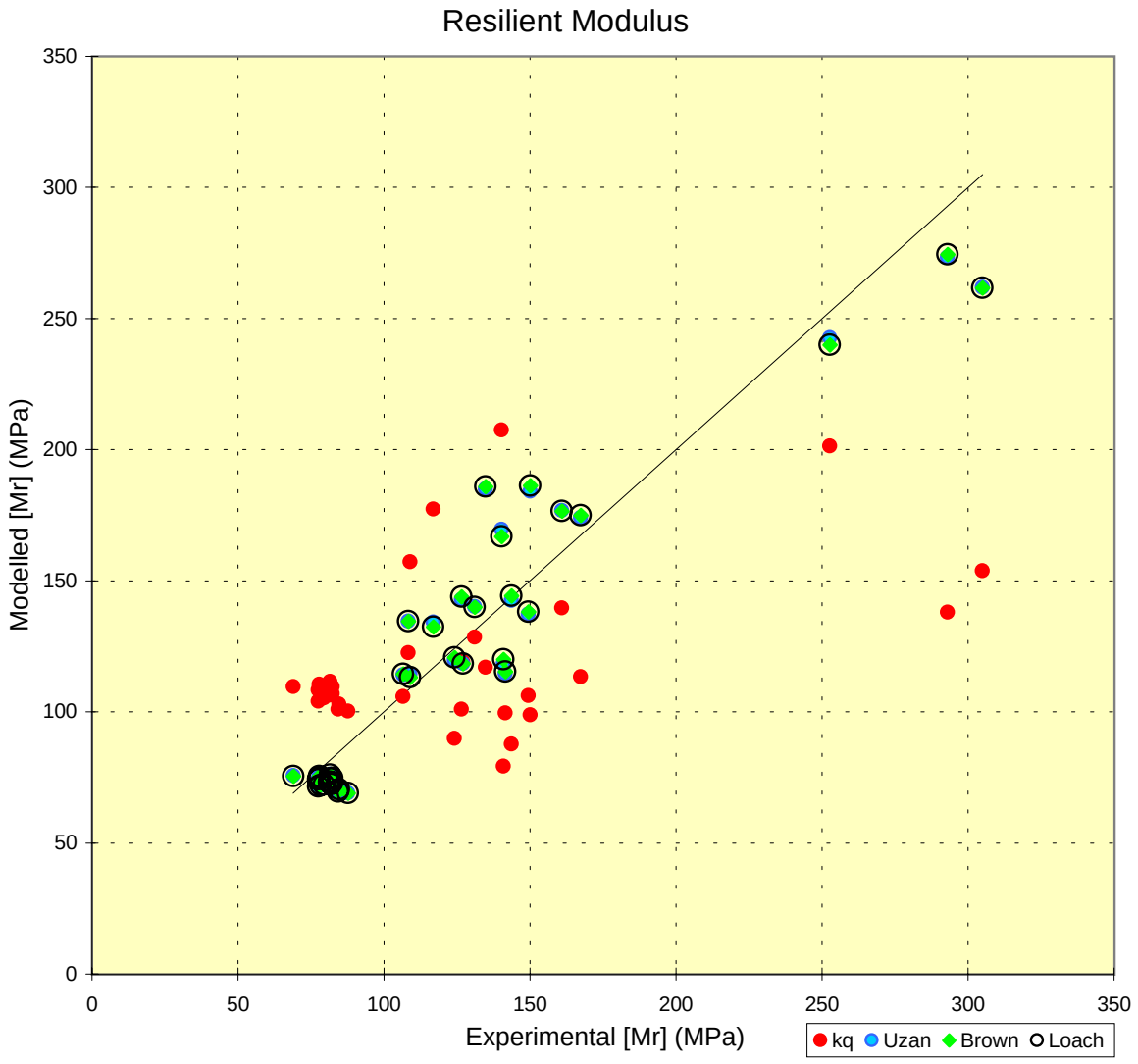
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TP-III : LNEC	***Seine et Marne Silt (LIM)***			***90% Percentile Data***
Experimental Data	Sample Size: 37	Suction (s) =	80 kPa @ ω=	20% #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 184 MPa	υ_e = 0.22

Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 166,519	k_3 = 100,576	A = 117,104	C = 146,380
	k_2 = -0.6859	k_4 = -0.0237	B = 0.6248	D = 1.6248
		k_5 = -0.6182		
	r^2= 0.250	r^2= 0.908	r^2= 0.907	r^2= 0.907

Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 345 MPa	Mr_c= 245 MPa	Mr_c= 238 MPa	Mr_c= 238 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	16884	0.19	5478	0.08	0.04	3551	0.03	4438	0.03
t=	9.86	-3.60	18.36	-0.31	-15.10	32.98	18.31	32.98	47.61
Prob(t)=	0%	0%	0%	76%	0%	0%	0%	0%	0%

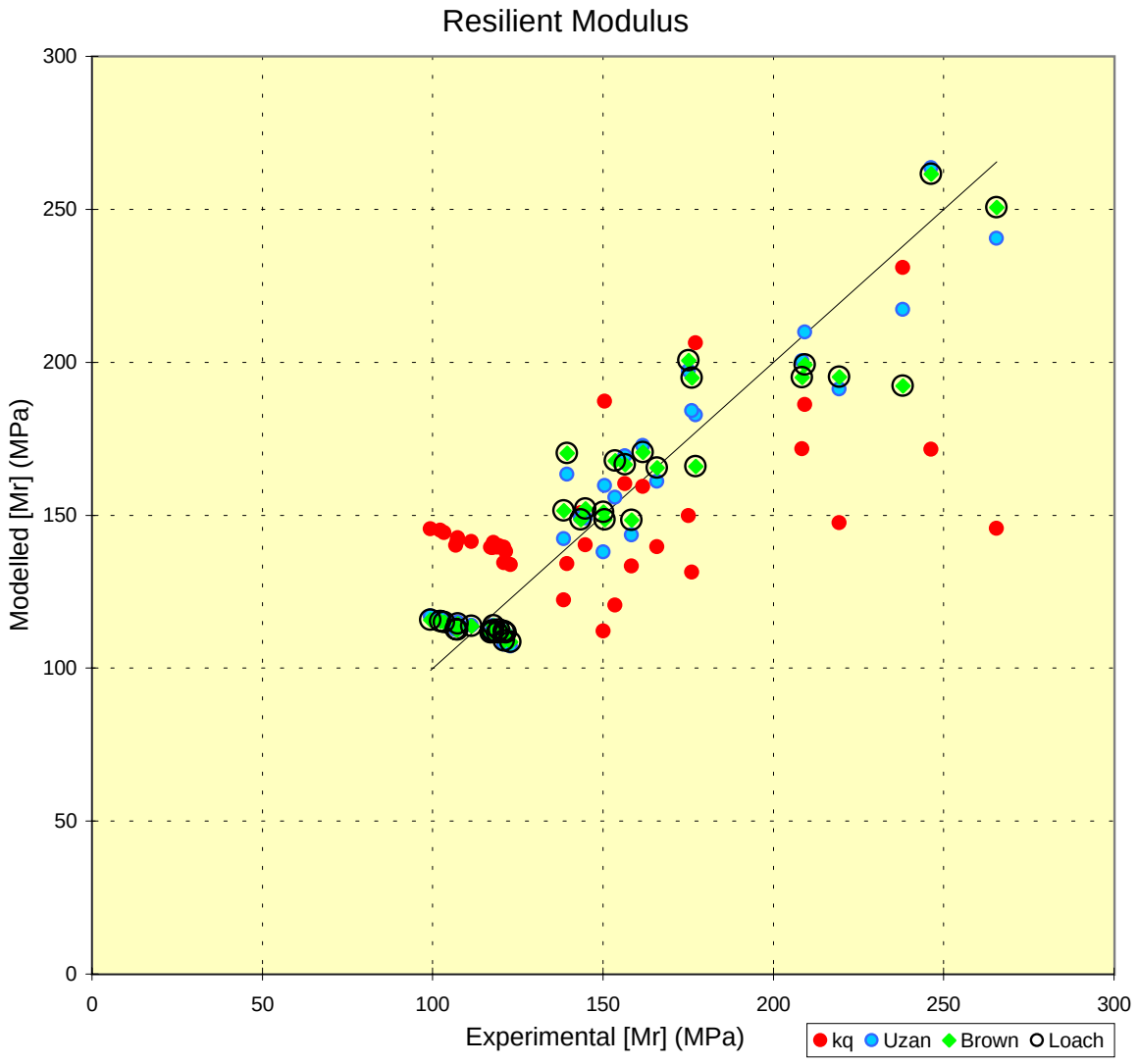
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TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***90% Percentile Data***

Experimental Data	Sample Size: 37	Suction (s) =	80 kPa @ ω= 20%	#DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 203 MPa	υ_e = 0.27
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 195,230	k_3 = 126,071	A = 150,244	C = 187,805
	k_2 = -0.5102	k_4 = -0.1615	B = 0.4012	D = 1.4012
		k_5 = -0.3745		
	r^2= 0.276	r^2= 0.915	r^2= 0.888	r^2= 0.888
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 336 MPa	Mr_c= 297 MPa	Mr_c= 237 MPa	Mr_c= 237 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	14187	0.13	3964	0.05	0.02	2594	0.02	3243	0.02
t=	13.76	-4.00	31.80	-3.38	-16.65	57.91	17.02	57.91	59.46
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

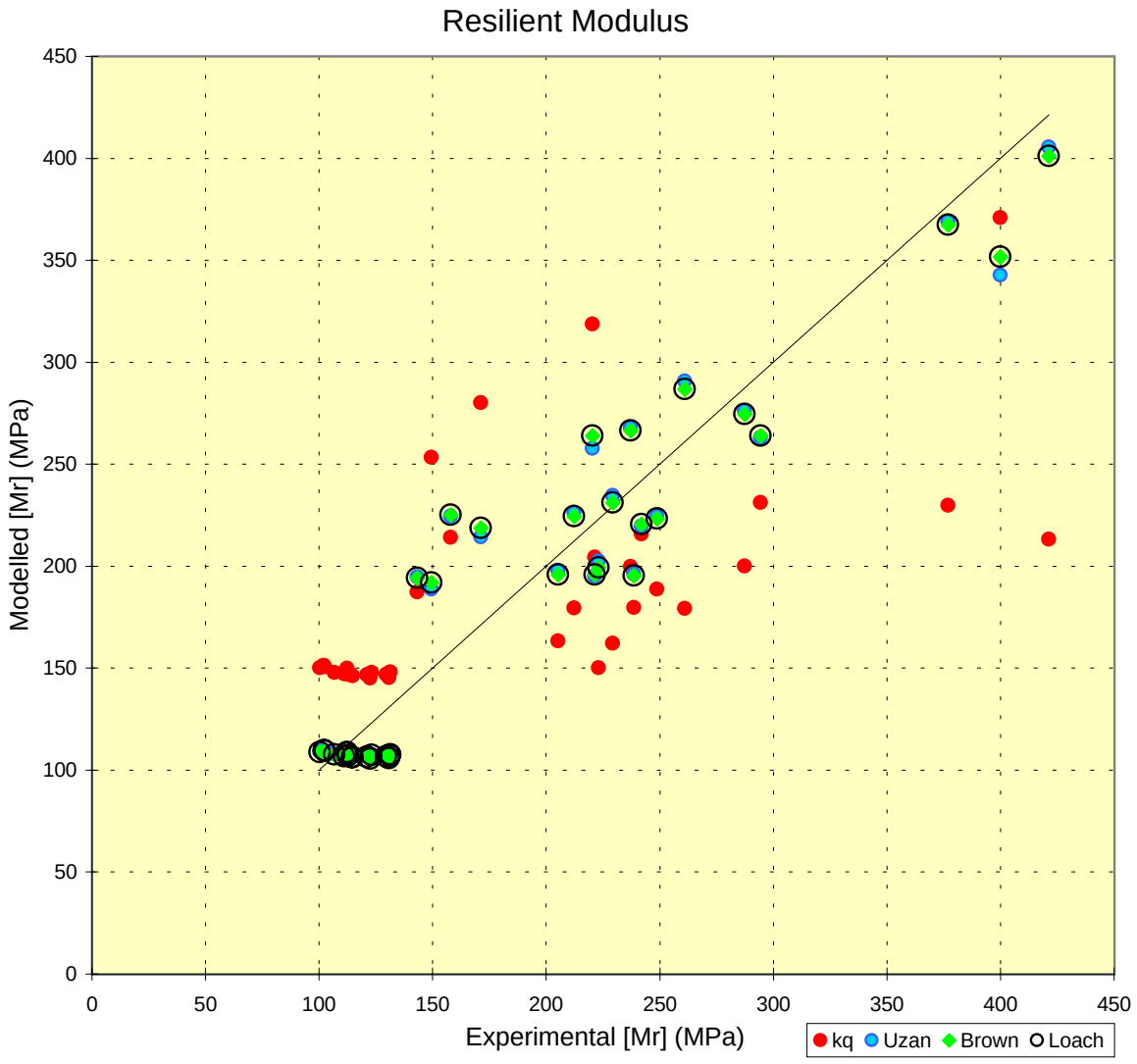
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TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***90% Percentile Data***

Experimental Data	Sample Size: 37	Suction (s) =	80 kPa @ ω=	20% #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 269 MPa	υ_e = 0.22
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 267,320	k_3 = 178,949	A = 196,136	C = 245,170
	k_2 = -0.5298	k_4 = 0.0326	B = 0.4712	D = 1.4712
		k_5 = -0.4824		
	r^2= 0.414	r^2= 0.911	r^2= 0.910	r^2= 0.910
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 470 MPa	Mr_c= 321 MPa	Mr_c= 334 MPa	Mr_c= 334 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	20486	0.10	6707	0.06	0.03	5023	0.03	6279	0.03
t=	13.05	-5.17	26.68	0.55	-14.11	39.05	17.70	39.05	55.28
Prob(t)=	0%	0%	0%	59%	0%	0%	0%	0%	0%

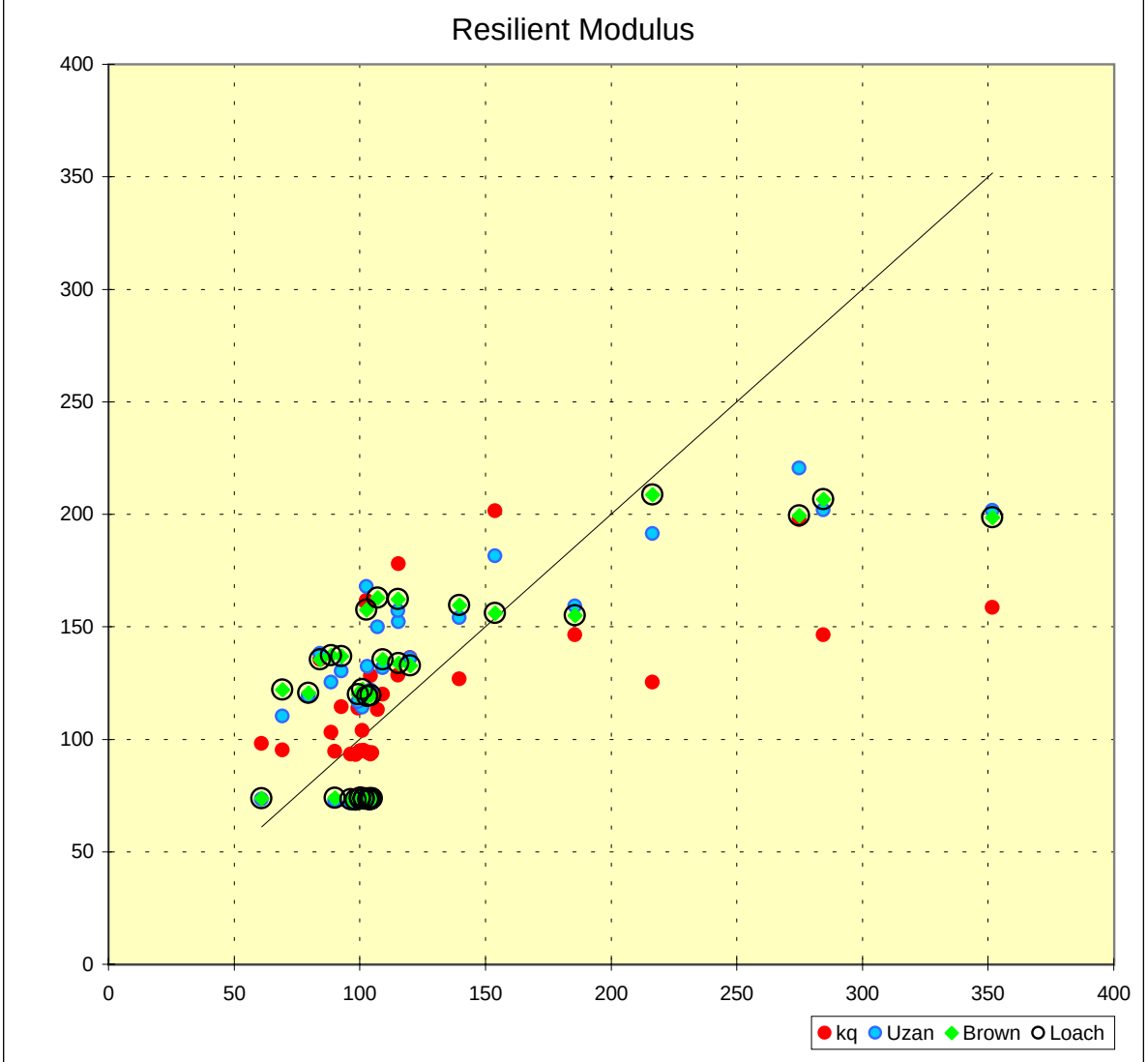
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TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***90% Percentile Data***

Experimental Data	Sample Size: 34	Suction (s) =	80 kPa @ ω=	20% #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 152 MPa	υ_e = 0.27
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 169,259	k_3 = 101,801	A = 121,104	C = 151,380
	k_2 = -0.5264	k_4 = -0.2066	B = 0.3920	D = 1.3920
		k_5 = -0.3245		
	r^2= 0.354	r^2= 0.555	r^2= 0.521	r^2= 0.521
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 296 MPa	Mr_c= 247 MPa	Mr_c= 189 MPa	Mr_c= 189 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	15143	0.13	9757	0.15	0.09	7581	0.07	9476	0.07
t=	11.18	-4.10	10.43	-1.38	-3.76	15.98	5.78	15.98	20.54
Prob(t)=	0%	0%	0%	18%	0%	0%	0%	0%	0%

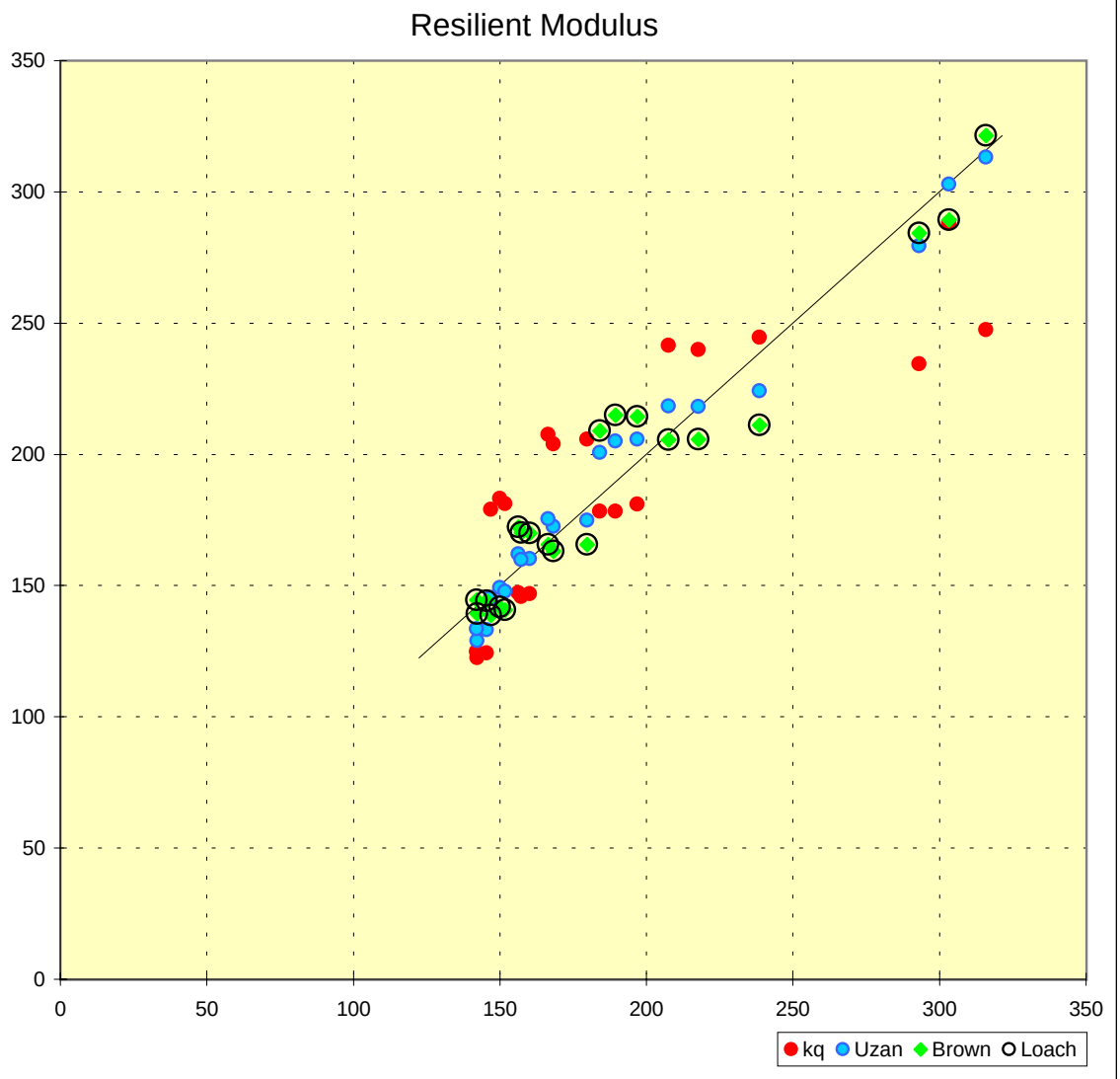
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TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***90% Percentile Data***

Experimental Data	Sample Size: 21	Suction (s) =	80 kPa @ ω=	20% #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 260 MPa	υ_e = 0.29
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 193,889	k_3 = 109,668	A = 144,265	C = 180,331
	k_2 = -0.6666	k_4 = -0.2164	B = 0.5770	D = 1.5770
		k_5 = -0.4546		
	r^2= 0.682	r^2= 0.971	r^2= 0.936	r^2= 0.936
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 394 MPa	Mr_c= 324 MPa	Mr_c= 277 MPa	Mr_c= 277 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	7029	0.10	4346	0.05	0.03	3881	0.03	4851	0.03
t=	27.58	-6.38	25.24	-4.69	-13.32	37.18	17.66	37.18	48.27
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

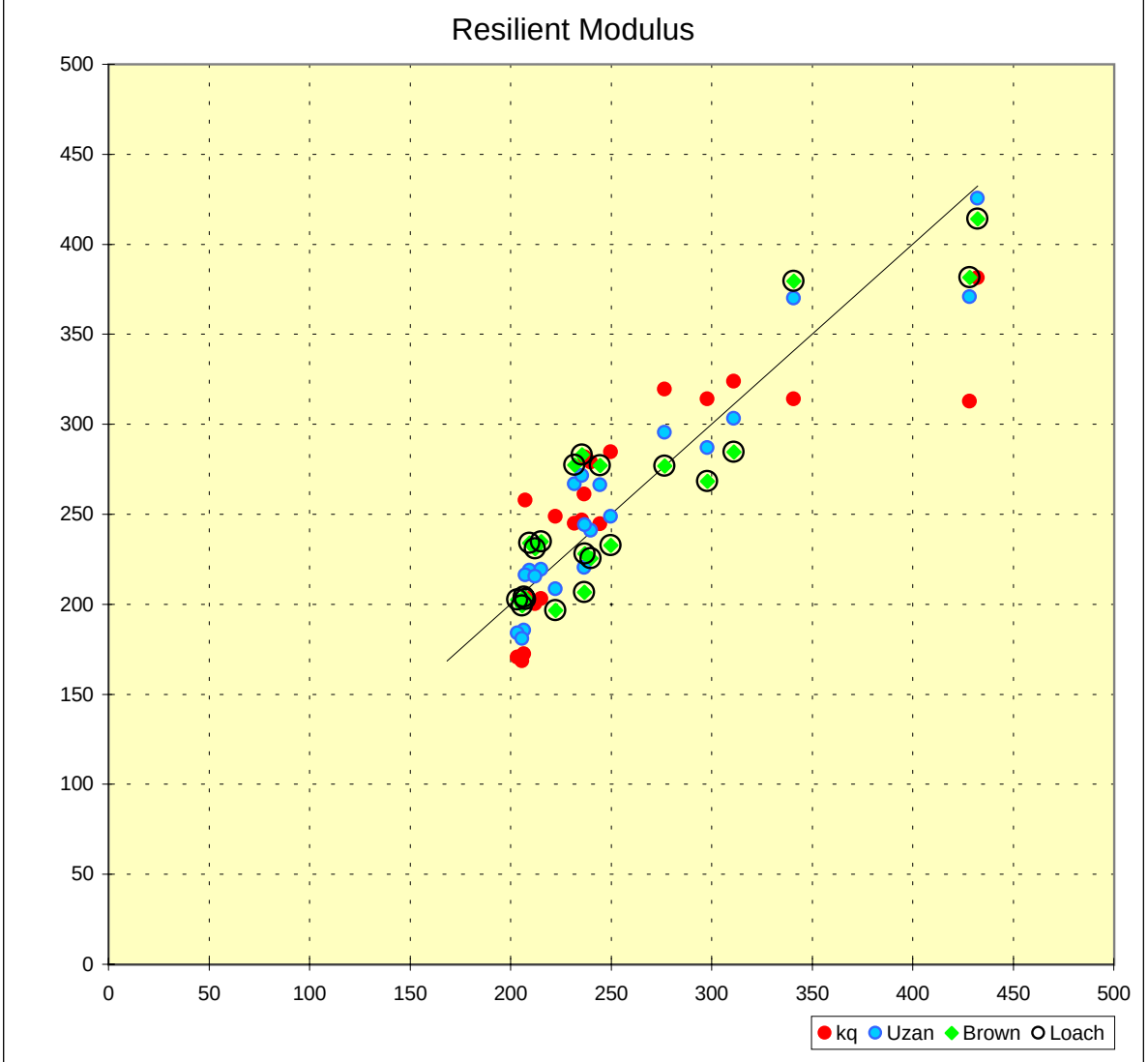
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TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***90% Percentile Data***

Experimental Data	Sample Size: 21	Suction (s) =	80 kPa @ ω=	20% #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 339 MPa	υ_e = 0.31
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 414,898	k_3 = 159,183	A = 202,344	C = 252,930
	k_2 = -0.9545	k_4 = -0.3729	B = 0.4947	D = 1.4947
		k_5 = -0.3629		
	r^2= 0.656	r^2= 0.893	r^2= 0.842	r^2= 0.842
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 1,145 MPa	Mr_c= 583 MPa	Mr_c= 354 MPa	Mr_c= 354 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	31057	0.16	9815	0.13	0.06	7670	0.05	9588	0.05
t=	13.36	-6.04	16.22	-2.91	-6.25	26.38	10.94	26.38	33.07
Prob(t)=	0%	0%	0%	1%	0%	0%	0%	0%	0%

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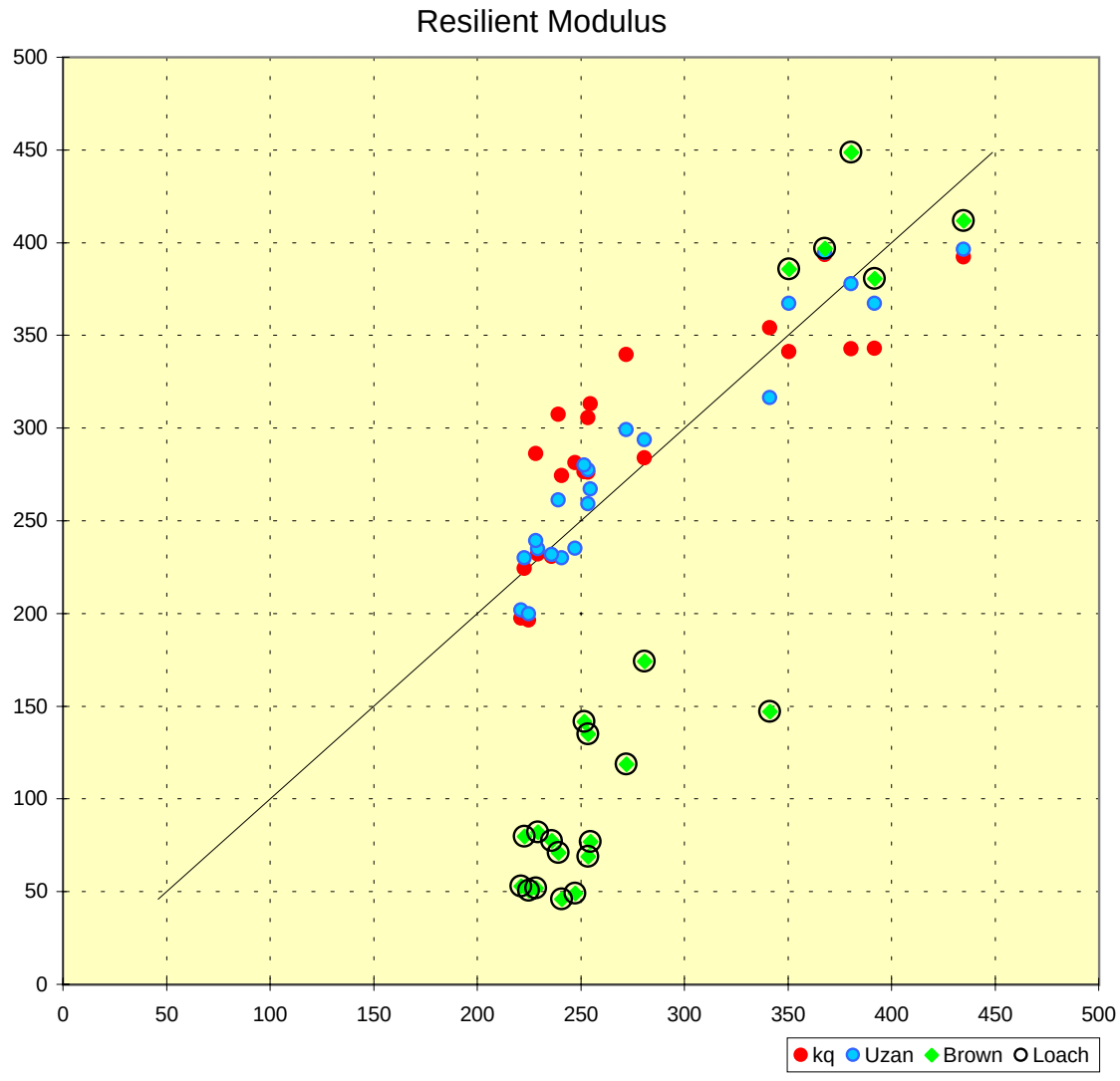
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TP-III : LNEC	***Seine et Marne Silt (LIM)***			***90% Percentile Data***
Experimental Data	Sample Size: 21	Suction (s) =	80 kPa @ ω=	20% #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 336 MPa	υ_e = 0.31

Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 611,416	k_3 = 188,296	A = 49,495	C = 61,869
	k_2 = -1.0396	k_4 = -0.4869	B = 1.3645	D = 2.3645
		k_5 = -0.2350		
	r^2= 0.808	r^2= 0.907	r^2= 0.846	r^2= 0.846

Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 1,846 MPa	Mr_c= 742 MPa	Mr_c= 232 MPa	Mr_c= 232 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	57559	0.14	9662	0.19	0.07	13241	0.21	16551	0.21
t=	10.62	-7.39	19.49	-2.63	-3.60	3.74	6.46	3.74	11.20
Prob(t)=	0%	0%	0%	2%	0%	0%	0%	0%	0%

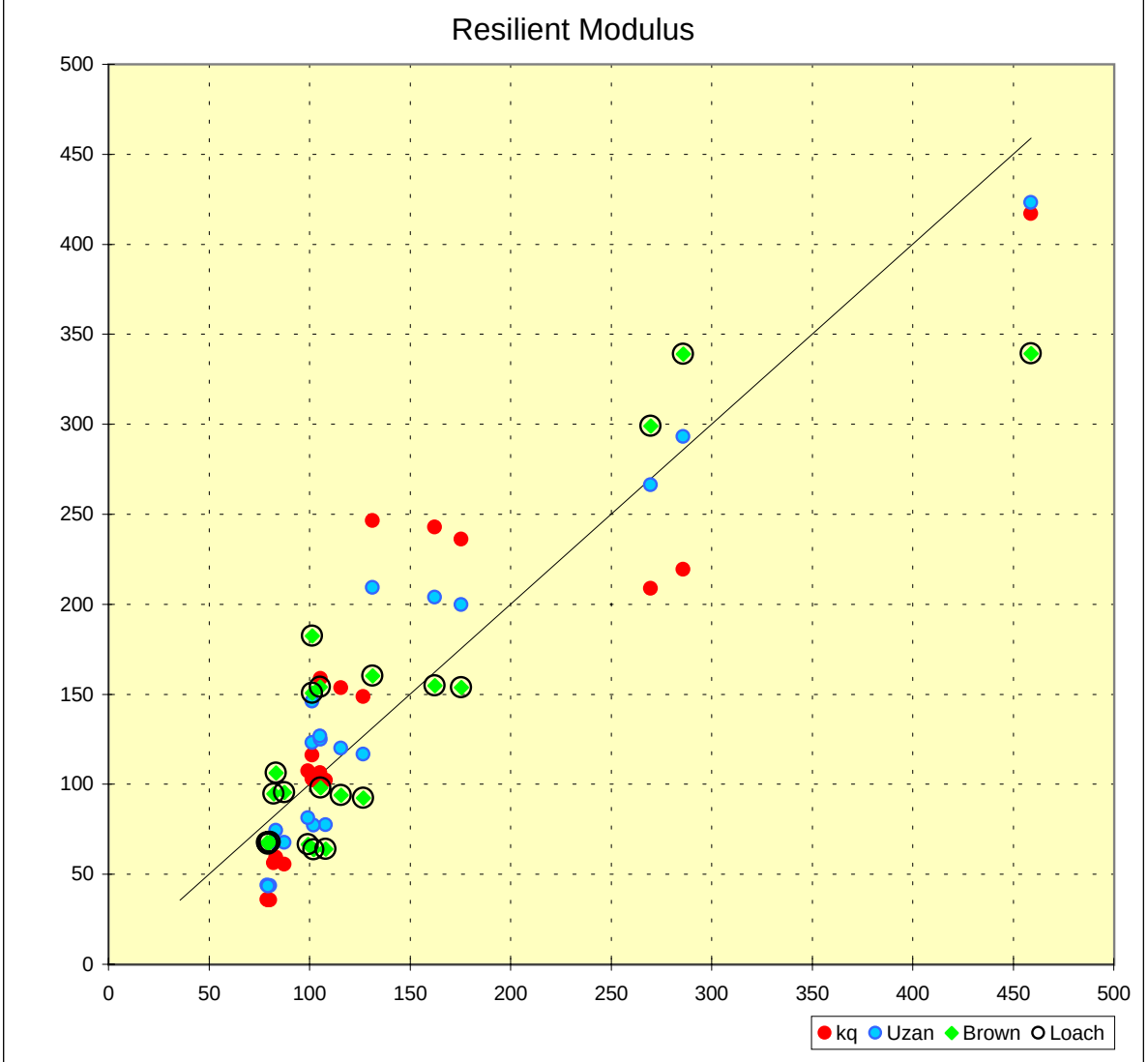
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TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***90% Percentile Data***

Experimental Data	Sample Size: 21	Suction (s) =	80 kPa @ ω=	20% #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 233 MPa	υ_e = 0.41
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 128,183	k_3 = 23,512	A = 68,498	C = 85,623
	k_2 = -1.9178	k_4 = -1.0955	B = 1.2748	D = 2.2748
		k_5 = -0.6853		
	r^2= 0.807	r^2= 0.921	r^2= 0.783	r^2= 0.783
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 985 MPa	Mr_c= 635 MPa	Mr_c= 290 MPa	Mr_c= 290 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	11293	0.21	4658	0.20	0.14	10738	0.15	13423	0.15
t=	11.35	-8.94	5.05	-5.43	-4.88	6.38	8.24	6.38	14.70
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

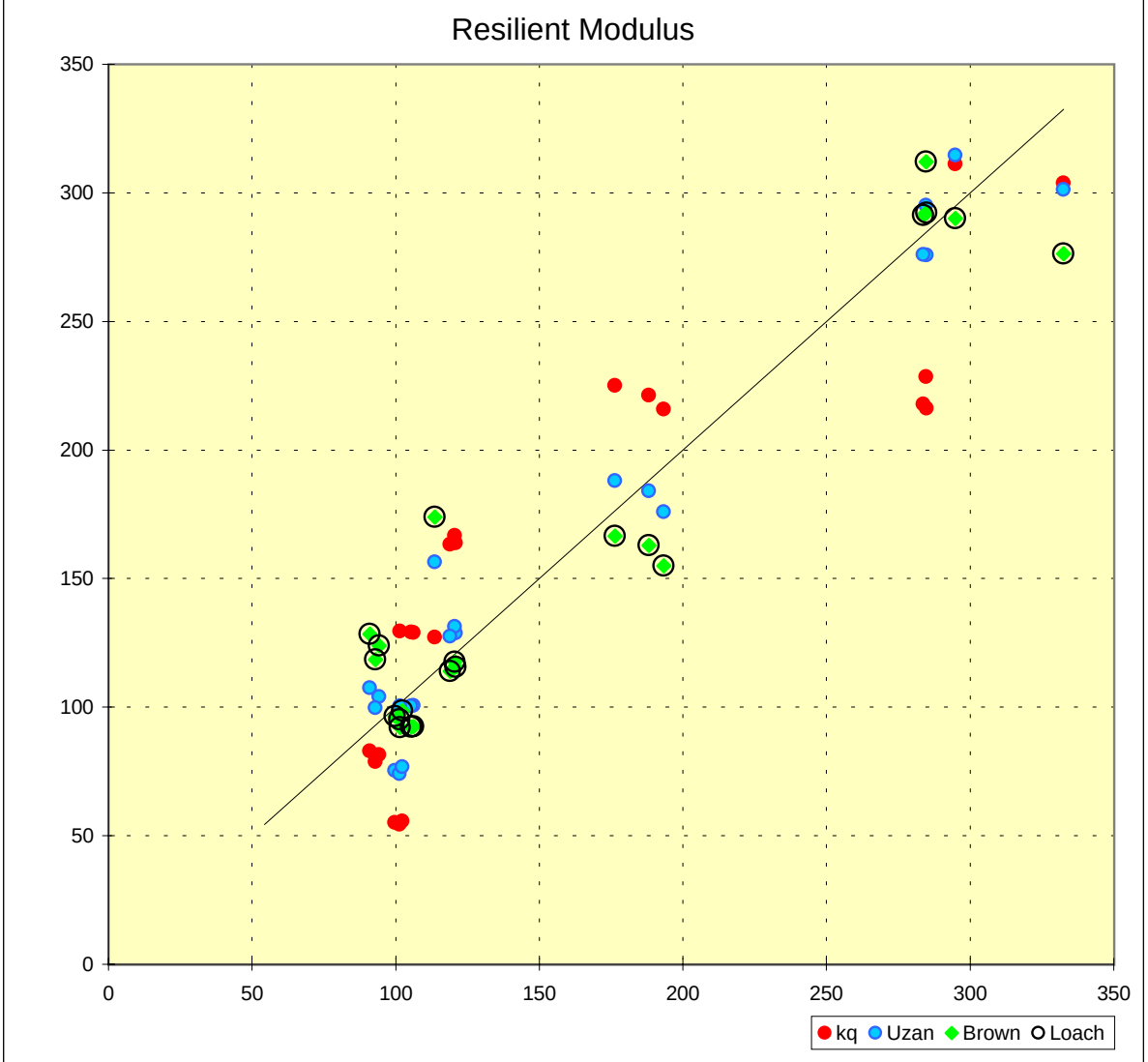
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TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***90% Percentile Data***

Experimental Data	Sample Size: 21	Suction (s) =	80 kPa @ ω=	20% #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 249 MPa	υ_e = 0.33
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 396,942	k_3 = 56,855	A = 94,996	C = 118,746
	k_2 = -2.1284	k_4 = -0.8012	B = 0.8394	D = 1.8394
		k_5 = -0.5939		
	r^2= 0.764	r^2= 0.952	r^2= 0.902	r^2= 0.902
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= 3,815 MPa	Mr_c= 719 MPa	Mr_c= 246 MPa	Mr_c= 246 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	41100	0.30	6032	0.19	0.07	6895	0.07	8619	0.07
t=	9.66	-7.00	9.43	-4.24	-8.23	13.78	12.78	13.78	28.01
Prob(t)=	0%	0%	0%	0%	0%	0%	0%	0%	0%

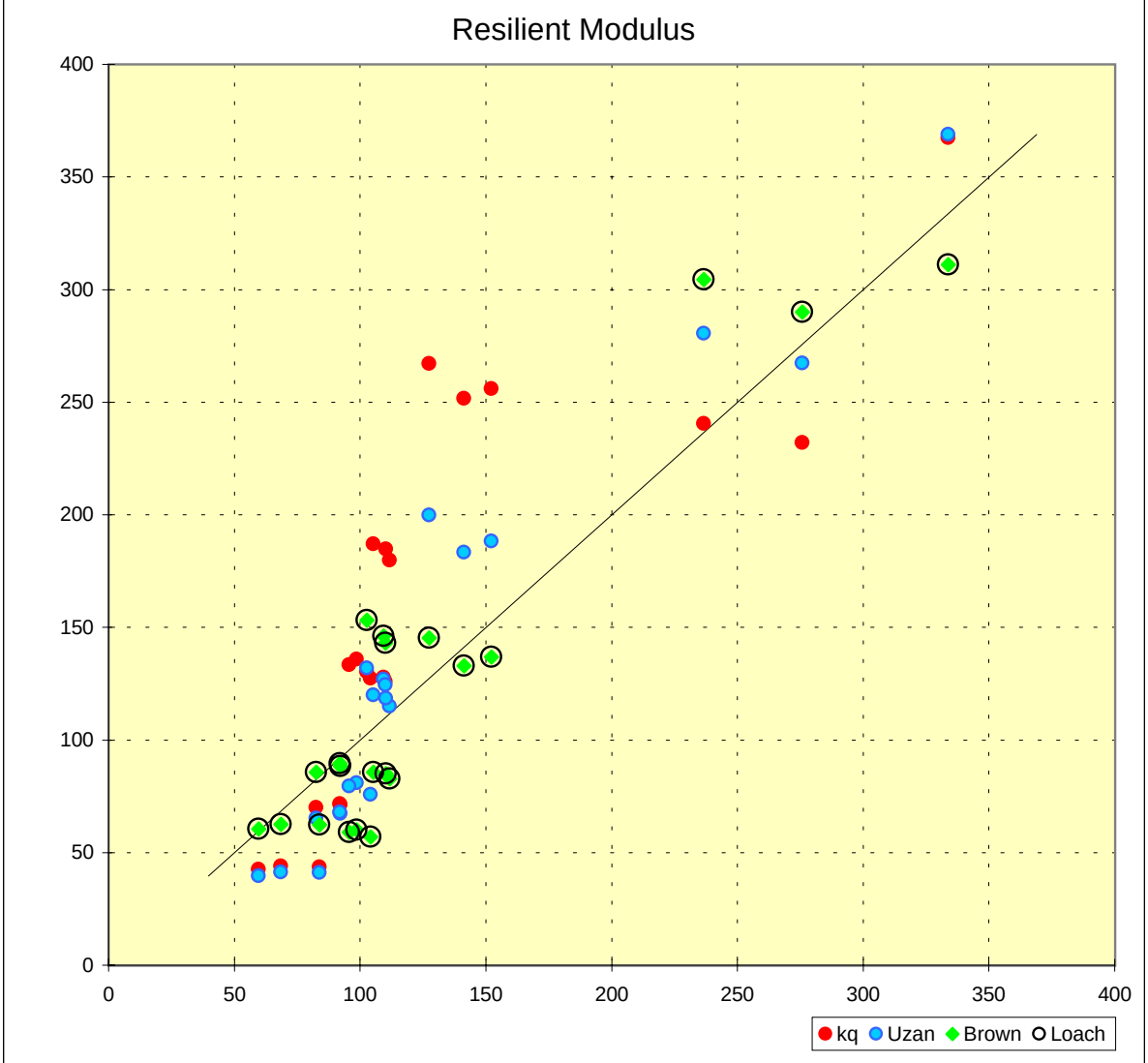
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

TP-III : LNEC ***Seine et Marne Silt (LIM)*** ***90% Percentile Data***

Experimental Data	Sample Size: 21	Suction (s) =	80 kPa @ ω=	20% #DIV/0!
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 197 MPa	υ_e = 0.28
Modelled Data	**kθ**	**Uzan**	**Brown**	**Loach**
	k_1 = 1,581,710	k_3 = 34,406	A = 60,343	C = 75,429
	k_2 = -3.2897	k_4 = -2.0312	B = 1.1796	D = 2.1796
		k_5 = -0.6458		
	r^2= 0.862	r^2= 0.908	r^2= 0.661	r^2= 0.661
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kθ	**Uzan**	**Brown**	**Loach**
	Mr_c= ##########	Mr_c= 6,663 MPa	Mr_c= 229 MPa	Mr_c= 229 MPa



Exactness of the estimated parameter value

Model	**kθ**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	415340	0.47	9071	0.73	0.31	23272	0.30	29090	0.30
t=	3.81	-6.96	3.79	-2.78	-2.07	2.59	3.94	2.59	7.28
Prob(t)=	0%	0%	0%	2%	6%	2%	0%	2%	0%

The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

Appendix G.4 SUMMARY OF THE CORRELATION COEFFICIENTS FOR TEST PROGRAMME I

Appendix F. 1 – Understanding the Results

Subgrade Soils

For each model the variables as described above are calculated for the test data. A small report generated by NLREG lists each variable, the minimum and maximum value and the mean and standard deviation of the variable data.

Calculated Parameter Values

For each parameter of each model the initial parameter estimate (which is generally taken as 1) is shown in the report. Also, the final parameter estimate, the standard error of the estimated parameter value as well as the 't' and the Prob(t) values. The significance of these statistical values is discussed in turn:

The Final Parameter Estimate

NLREG uses a model/trust-region technique along with an adaptive choice of the model Hessian. The algorithm is essentially a combination of Gauss-Newton and Levenberg-Marquardt methods, however, the adaptive algorithm often works better than either of these methods alone.

The basis for the minimisation technique used by NLREG is to compute the sum of the squared residuals for one set of parameter values. Each parameter value is then slightly altered and the sum of squared residuals recomputed to see how the parameter value change affects the sum of the squared residuals. By dividing the difference between the original and new sum of squared residual values by the amount the parameter was altered, NLREG is able to determine the approximate partial derivative with respect to the parameter. This partial derivative is used by NLREG to decide how to alter the value of the parameter for the next iteration.

When the modelled function is well behaved, and the starting value for the parameter is not too far from the optimum value, the procedure will eventually converge to the best estimate for the parameter. This procedure is carried out simultaneously for all parameters and is, in fact, a minimisation problem in n-dimensional space, where 'n' is the number of parameters.

The Standard Error of the Estimated Parameter

The standard error values that are associated with computed parameters give an indication of how exact the estimated value is: the smaller the standard error, the more confident one can be that the actual value of the parameter's value matches its estimated value. It is somewhat similar to taking a sample from a large set of observations and computing the mean. In that case the standard error, or standard deviation, of the mean indicates how likely the sample mean matches the mean of the entire set that is being sampled. In the case of a function with multiple parameters there is a separate standard error value for each parameter because the confidence and accuracy of each estimated value may be different.

The 't' Statistic

The 't' statistic is computed by dividing the estimated value of the parameter by its standard error. This statistic is a measure of the likelihood that the actual value of the parameter is not zero. The larger the absolute value of t, the less likely that the actual value of the parameter could be zero

The Prob(t) Value

The Prob(t) is defined as the probability of obtaining the estimated value of the parameter if the actual parameter value is zero. The smaller the value of Prob(t), the more significant the parameter and the less likely that the actual parameter value is zero. For example, assume the estimated value of a parameter is 1.0 and its standard error is 0.7. Then the t value would be 1.43 (1.0/0.7). If the computed Prob(t) value was 0.05 then this indicates that there is only a 0.05 (5%) chance that the actual value of the parameter could be zero. If Prob(t) was 0.001 this indicates there is only 1 chance in 1000 that the parameter could be zero. If Prob(t) was 0.92 this indicates that there is a 92% probability that the actual value of the parameter could be zero; this implies that the term of the regression equation containing the parameter can be eliminated without significantly affecting the accuracy of the regression. One thing that can cause Prob(t) to be near 1.00 is having redundant parameters.

Appendix G.5 INTRODUCTION OF A RANDOM ERROR OF DIFFERING VARIATION TO DATA

Summary of the Parameters

UNOT	kO	Uzan	Brown	Loach
100%	0.635	0.750	0.710	0.710
95%	0.827	0.837	0.725	0.725
90%	0.884	0.908	0.819	0.819
85%	0.896	0.943	0.892	0.892
80%	0.896	0.943	0.892	0.892
Trend	1	1	1	1

LRSB(1	kO	Uzan	Brown	Loach
100%	0.488	0.786	0.555	0.555
95%	0.836	0.843	0.350	0.350
90%	0.814	0.838	0.453	0.453
85%	0.836	0.871	0.498	0.498
80%	0.833	0.890	0.568	0.568
Trend	1	1	0	0

LRSB(2	kO	Uzan	Brown	Loach
100%	0.272	0.801	0.667	0.667
95%	0.394	0.799	0.623	0.623
90%	0.669	0.784	0.478	0.478
85%	0.705	0.830	0.504	0.504
80%	0.828	0.850	0.371	0.371
Trend	1	0	a	a

LRCF(1	kO	Uzan	Brown	Loach
100%	0.344	0.484	0.402	0.402
95%	0.510	0.813	0.726	0.726
90%	0.516	0.888	0.819	0.819
85%	0.515	0.917	0.854	0.854
80%	0.519	0.923	0.862	0.862
Trend	1	1	1	1

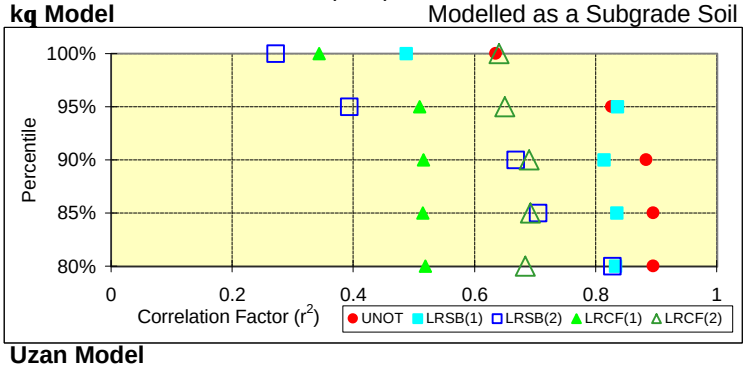
LRCF(2	kO	Uzan	Brown	Loach
100%	0.641	0.736	0.709	0.709
95%	0.650	0.759	0.734	0.734
90%	0.691	0.804	0.768	0.768
85%	0.692	0.834	0.789	0.789
80%	0.684	0.859	0.819	0.819
Trend	0	1	1	1

Trend Summary

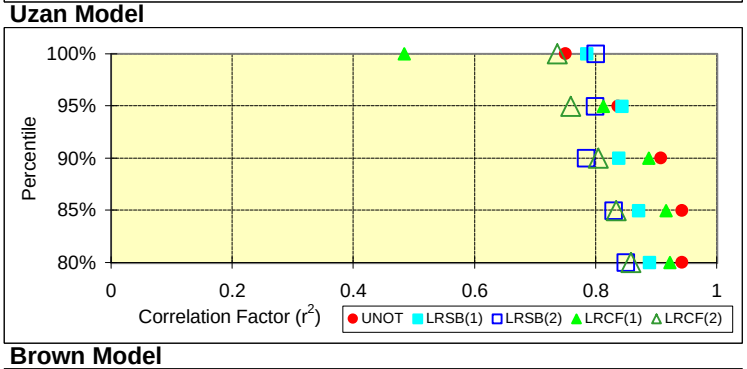
Getting Better	14
No.Change	4
Getting Worst	2
Total	20

Correlation (r^2) of the Models at Differing Outlier Percentiles
TP-I Fountainebleau Sand (SFB)

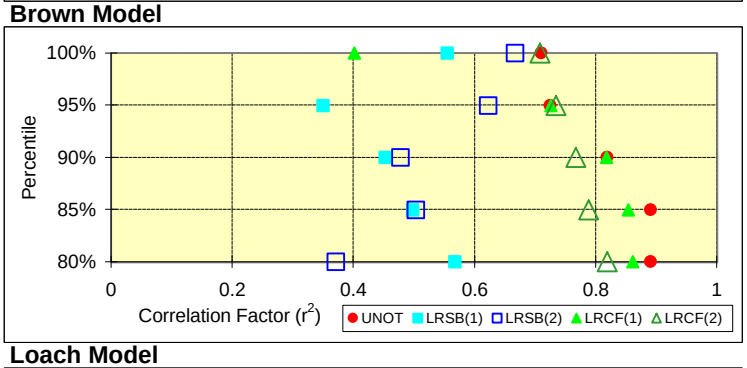
kq Model Modelled as a Subgrade Soil



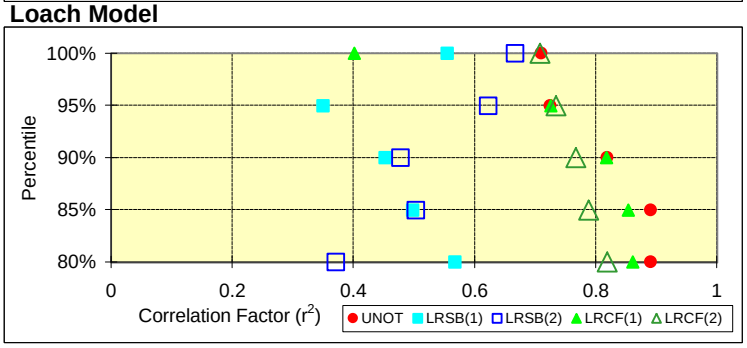
Uzan Model



Brown Model



Loach Model



Summary of the Parameters

LNEC	kO	Uzan	Brown	Loach
100%	0.000	0.599	0.447	0.447
95%	0.026	0.421	0.365	0.365
90%	0.173	0.551	0.507	0.507
85%	0.283	0.524	0.518	0.518
80%	0.536	0.702	0.693	0.693
Trend	1	1	1	1

UNOT	kO	Uzan	Brown	Loach
100%	0.105	0.318	0.298	0.298
95%	0.025	0.423	0.419	0.419
90%	0.005	0.587	0.551	0.551
85%	0.022	0.718	0.695	0.695
80%	0.044	0.801	0.789	0.789
Trend	a	1	1	1

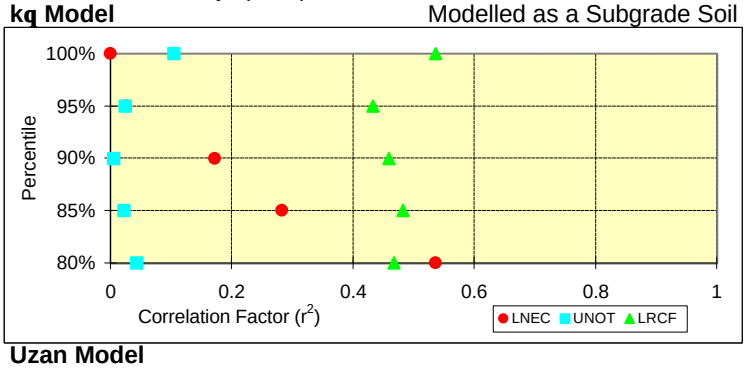
LRCF	kO	Uzan	Brown	Loach
100%	0.537	0.740	0.628	0.628
95%	0.433	0.691	0.591	0.591
90%	0.459	0.739	0.619	0.619
85%	0.483	0.794	0.674	0.674
80%	0.468	0.816	0.711	0.711
Trend	0	0	0	0

Trend Summary

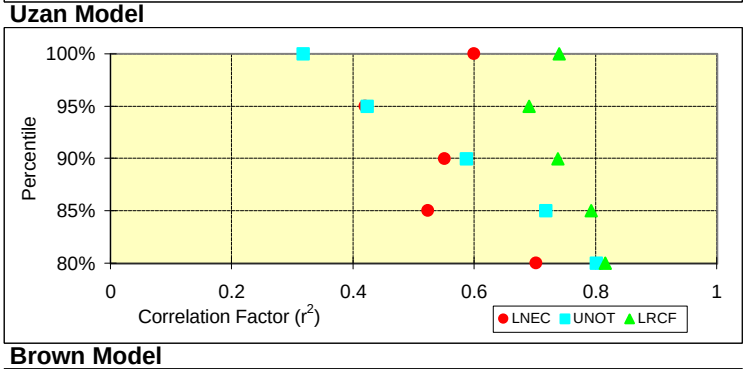
Getting Better	7
No.Change	4
Getting Worst	1
Total	12

Correlation (r^2) of the Models at Differing Outlier Percentiles
TP-I London Clay (LOC)

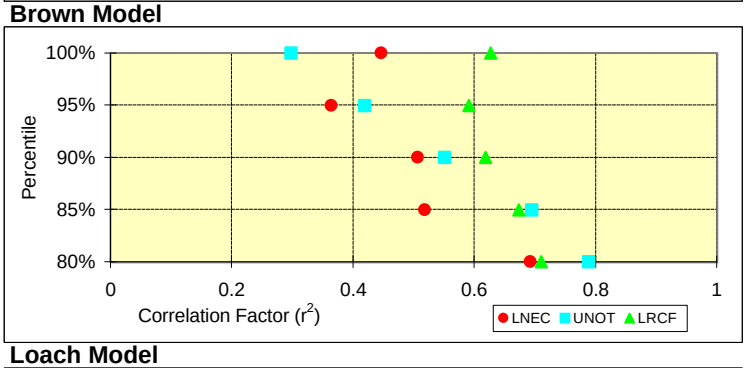
kq Model Modelled as a Subgrade Soil



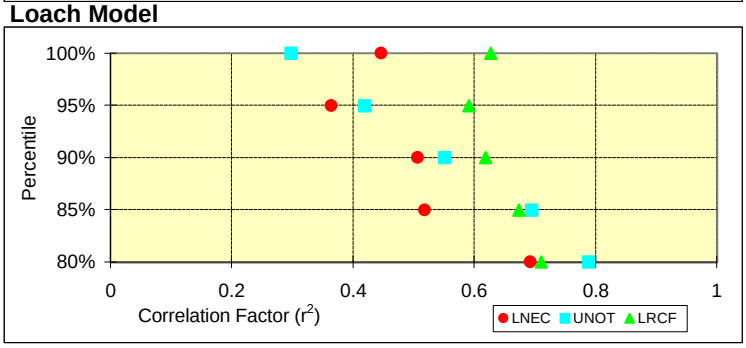
Uzan Model



Brown Model



Loach Model



Summary of the Parameters

UNOT	kq	Uzan	Boyce	Mayhew (e_v)	Mayhew (e_s)
100%	0.667	0.673	0.706	0.786	0.792
95%	0.787	0.789	0.752	0.783	0.784
90%	0.814	0.814	0.768	0.783	0.776
85%	0.826	0.827	0.788	0.781	0.771
80%	0.841	0.841	0.798	0.777	0.776
Trend	1	1	0	0	0

LRSB(1)	kq	Uzan	Boyce	Mayhew (e_v)	Mayhew (e_s)
100%	0.497	0.705	0.460	0.939	0.848
95%	0.626	0.700	0.349	0.939	0.844
90%	0.713	0.720	0.801	0.938	0.831
85%	0.733	0.743	0.825	0.937	0.847
80%	0.755	0.767	0.797	0.937	0.856
Trend	1	0	1	0	0

LRSB(2)	kq	Uzan	Boyce	Mayhew (e_v)	Mayhew (e_s)
100%	0.392	0.696	0.427	0.916	0.790
95%	0.462	0.664	0.569	0.922	0.781
90%	0.574	0.622	0.717	0.928	0.779
85%	0.627	0.629	0.794	0.933	0.790
80%	0.655	0.656	0.678	0.934	0.812
Trend	1	0	1	0	0

LRCF(1)	kq	Uzan	Boyce	Mayhew (e_v)	Mayhew (e_s)
100%	0.427	0.492	0.460	0.701	0.732
95%	0.516	0.654	0.572	0.692	0.732
90%	0.545	0.660	0.625	0.659	0.740
85%	0.558	0.684	0.643	0.744	0.824
80%	0.576	0.688	0.668	0.748	0.830
Trend	1	1	1	0	1

LRCF(2)	kq	Uzan	Boyce	Mayhew (e_v)	Mayhew (e_s)
100%	0.576	0.637	0.639	0.471	0.787
95%	0.583	0.634	0.648	0.522	0.814
90%	0.596	0.653	0.642	0.589	0.848
85%	0.615	0.672	0.648	0.661	0.877
80%	0.630	0.689	0.660	0.734	0.888
Trend	0	0	0	1	1

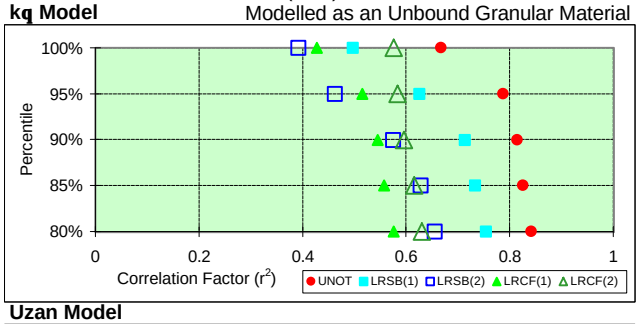
Trend Summary

Getting Better	12
No.Change	13
Getting Worst	0
Total	25

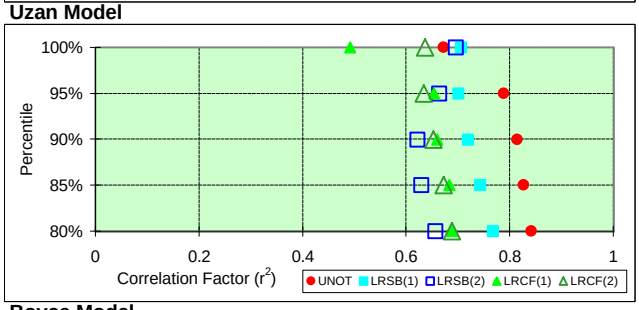
Correlation (r^2) of the Models at Differing Outlier Percentiles

TP-I Fountainebleau Sand (SFB)

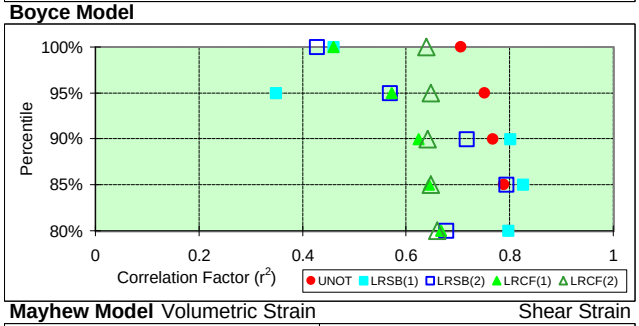
kq Model Modelled as an Unbound Granular Material



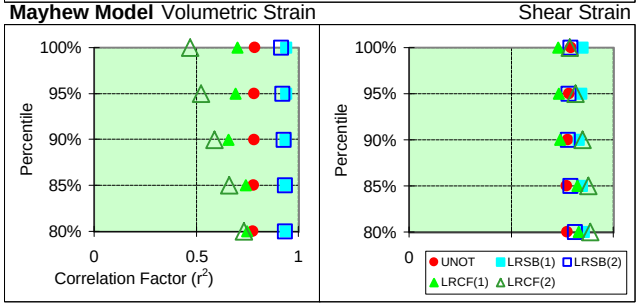
Uzan Model



Boyce Model



Mayhew Model Volumetric Strain Shear Strain



Summary of the Parameters

LNEC	kO	Uzan	Boyce	Mayhew (e_v)	Mayhew (e_s)
100%	0.802	0.867	0.875	0.506	0.780
95%	0.836	0.881	0.893	0.509	0.781
90%	0.861	0.900	0.907	0.515	0.788
85%	0.893	0.955	0.807	0.515	0.800
80%	0.924	0.958	0.947	0.508	0.778
Trend	0	0	0	0	0

UNOT	kO	Uzan	Boyce	Mayhew (e_v)	Mayhew (e_s)
100%	0.313	0.417	0.396	0.650	0.426
95%	0.338	0.388	0.427	0.653	0.578
90%	0.342	0.365	0.399	0.676	0.657
85%	0.378	0.393	0.420	0.672	0.658
80%	0.384	0.385	0.384	0.674	0.664
Trend	0	0	0	0	1

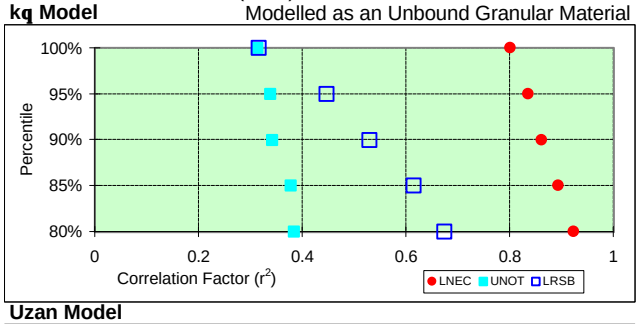
LRSB	kO	Uzan	Boyce	Mayhew (e_v)	Mayhew (e_s)
100%	0.316	0.321	0.351	0.694	0.646
95%	0.447	0.525	0.547	0.689	0.648
90%	0.529	0.598	0.662	0.696	0.656
85%	0.615	0.636	0.717	0.757	0.675
80%	0.674	0.674	0.733	0.744	0.674
Trend	1	1	1	0	0

Trend Summary

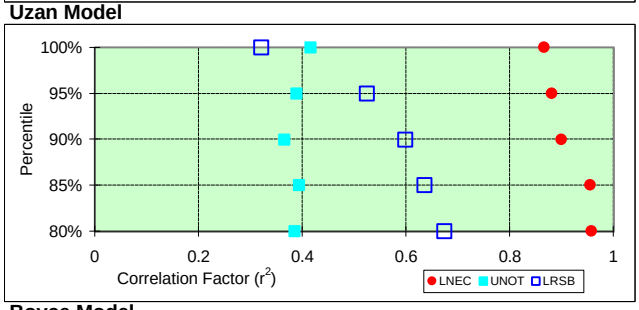
Getting Better	4
No.Change	11
Getting Worst	0
Total	15

Correlation (r^2) of the Models at Differing Outlier Percentiles
TP-I Hard Limestone (CCD)

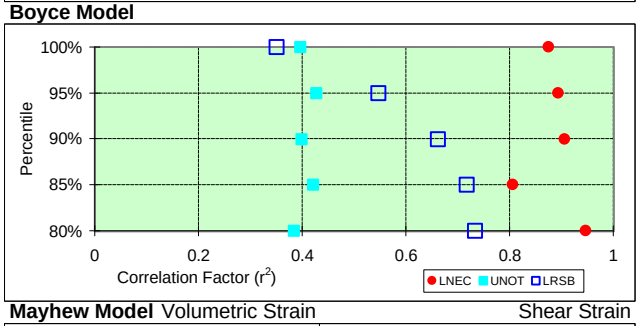
kq Model Modelled as an Unbound Granular Material



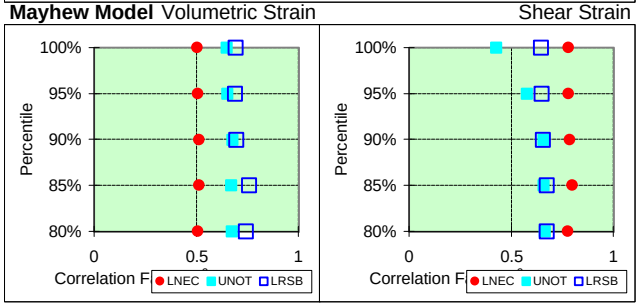
Uzan Model



Boyce Model



Mayhew Model Volumetric Strain Shear Strain



Summary of the Parameters

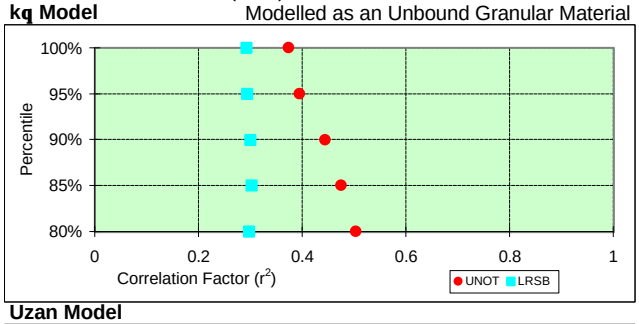
UNOT	kO	Uzan	Boyce	Mayhew (e_v)	Mayhew (e_s)
100%	0.374	0.392	0.439	0.652	0.655
95%	0.395	0.397	0.436	0.670	0.660
90%	0.444	0.463	0.503	0.670	0.655
85%	0.475	0.503	0.535	0.683	0.703
80%	0.503	0.541	0.570	0.697	0.777
Trend	1	1	1	0	0

LRSB	kO	Uzan	Boyce	Mayhew (e_v)	Mayhew (e_s)
100%	0.293	0.364	0.360	0.402	0.725
95%	0.294	0.408	0.395	0.409	0.733
90%	0.300	0.426	0.413	0.407	0.733
85%	0.302	0.438	0.424	0.410	0.737
80%	0.298	0.452	0.427	0.404	0.749
Trend	0	0	0	0	0

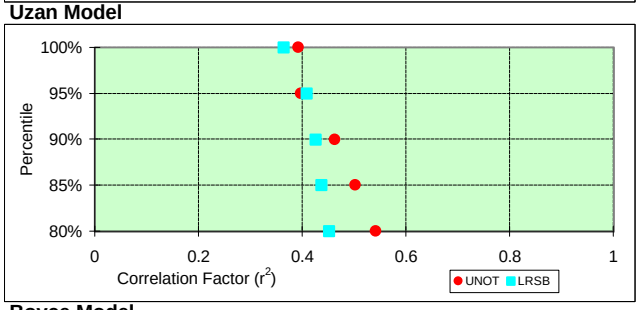
Correlation (r^2) of the Models at Differing Outlier Percentiles

TP-I Soft Limestone (CCT)

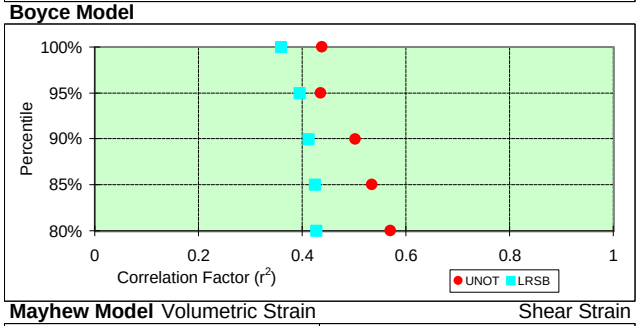
kq Model Modelled as an Unbound Granular Material



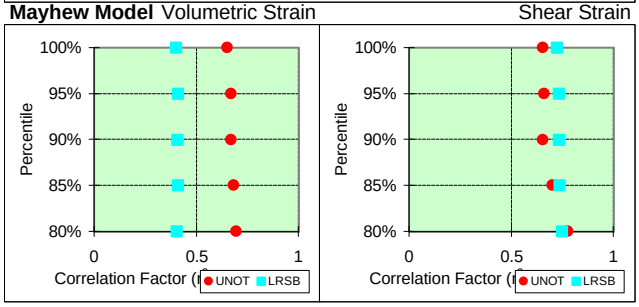
Uzan Model



Boyce Model



Mayhew Model Volumetric Strain Shear Strain



Trend Summary

Getting Better	3
No.Change	7
Getting Worst	0
Total	10

Summary of the Parameters

LRSB	kO	Uzan	Boyce	Mayhew (ev)	Mayhew (es)
100%	0.611	0.670	0.743	0.858	0.817
95%	0.731	0.763	0.831	0.858	0.815
90%	0.756	0.788	0.844	0.856	0.816
85%	0.780	0.813	0.855	0.847	0.818
80%	0.803	0.833	0.866	0.844	0.816
Trend	1	1	1	0	0

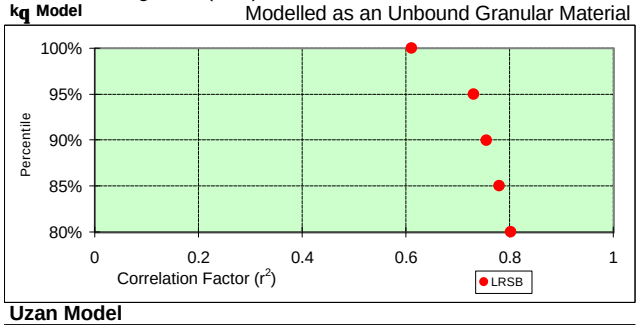
Trend Summary

Getting Better	3
No.Change	2
Getting Worst	0
Total	5

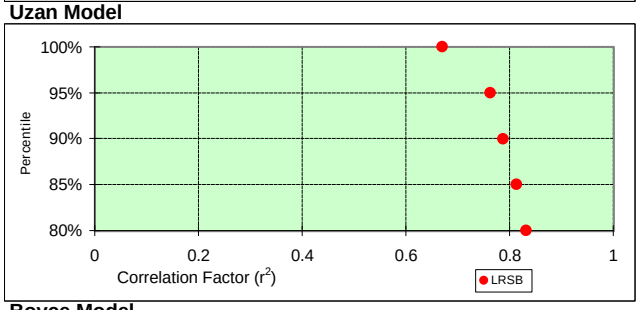
Correlation of the Models at Differing Percentiles

TP-I Microgranite (MIG)

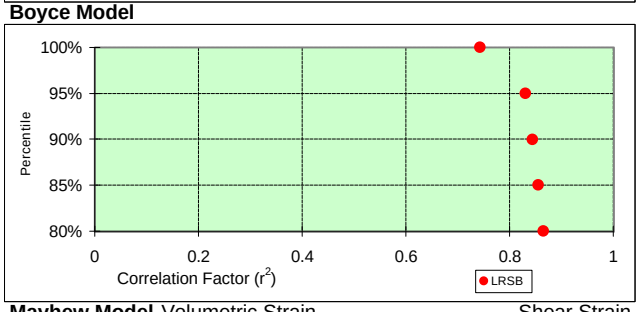
k_q Model Modelled as an Unbound Granular Material



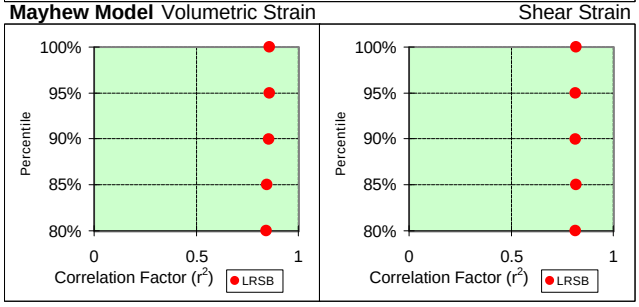
Uzan Model



Boyce Model



Mayhew Model Volumetric Strain Shear Strain

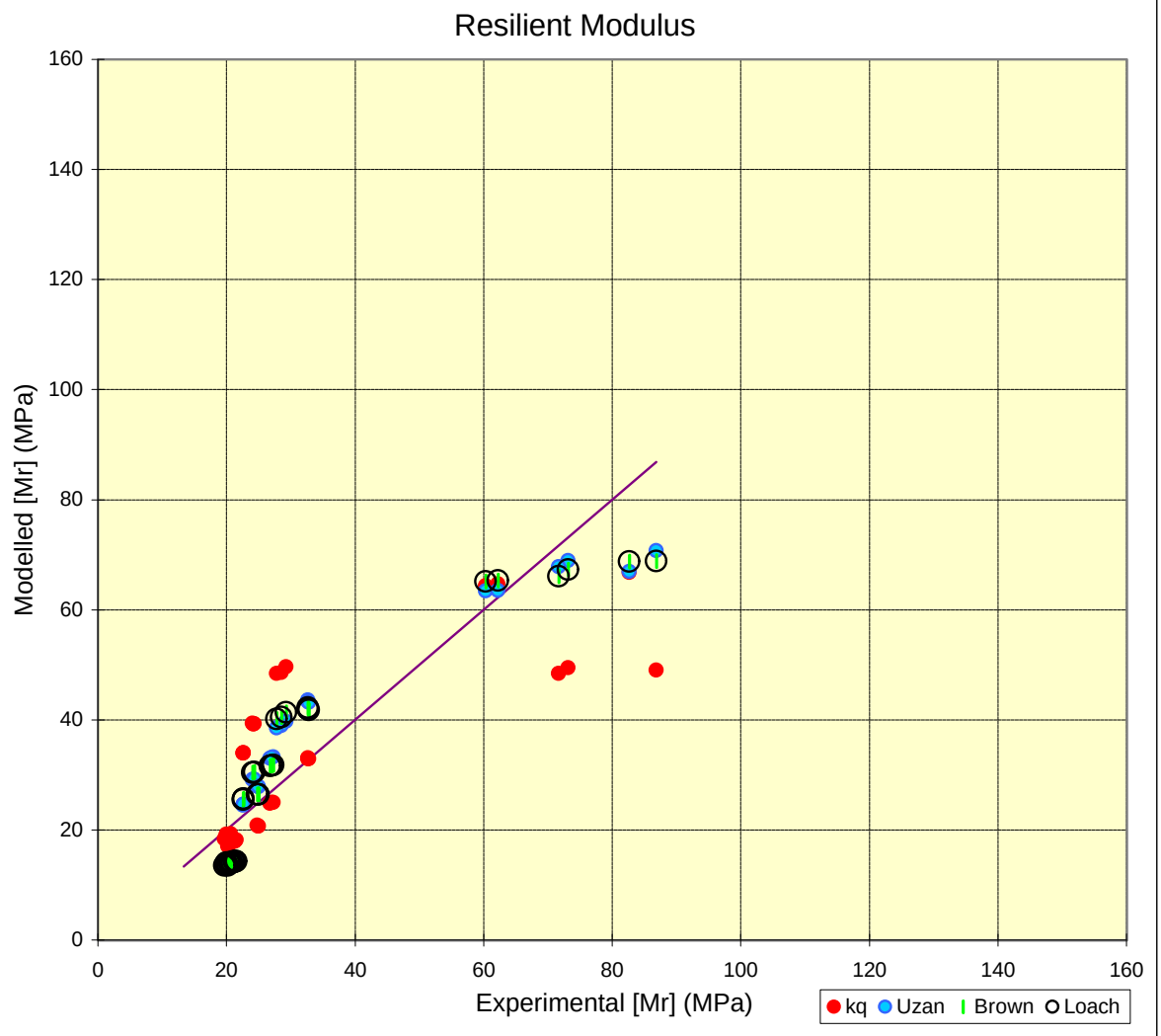


Appendix G.6 SUMMARY OF THE ANALYSIS PARAMETERS AND COEFFICIENTS FOR ALL THREE TEST PROGRAMMES

Error Analysis	***Data based on London Clay (LOC)***			***Dirty Data:*** **0%**
Experimental Data	Sample Size: 41	Suction (s) =	40 kPa @ ω=	26% 1,456 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 45 MPa	υ_e = 0.33

Modelled Data	**kq**	**Uzan**	**Brown**	**Loach**
	k_1 = 36,396	k_3 = 24,466	A = 42,850	C = 107,125
	k_2 = -0.8825	k_4 = 0.1558	B = 0.7216	D = 1.7216
		k_5 = -0.8175		
	r^2= 0.605	r^2= 0.835	r^2= 0.830	r^2= 0.830

Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kq	**Uzan**	**Brown**	**Loach**
	Mr_c= 93 MPa	Mr_c= 53 MPa	Mr_c= 59 MPa	Mr_c= 59 MPa



Exactness of the estimated parameter value

Model	**kq**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	2044	0.11	3034	0.16	0.11	1482	0.05	3705	0.05
t=	17.81	-7.78	8.06	0.95	-7.26	28.92	13.62	28.92	32.50
Prob(t)=	0%	0%	0%	35%	0%	0%	0%	0%	0%

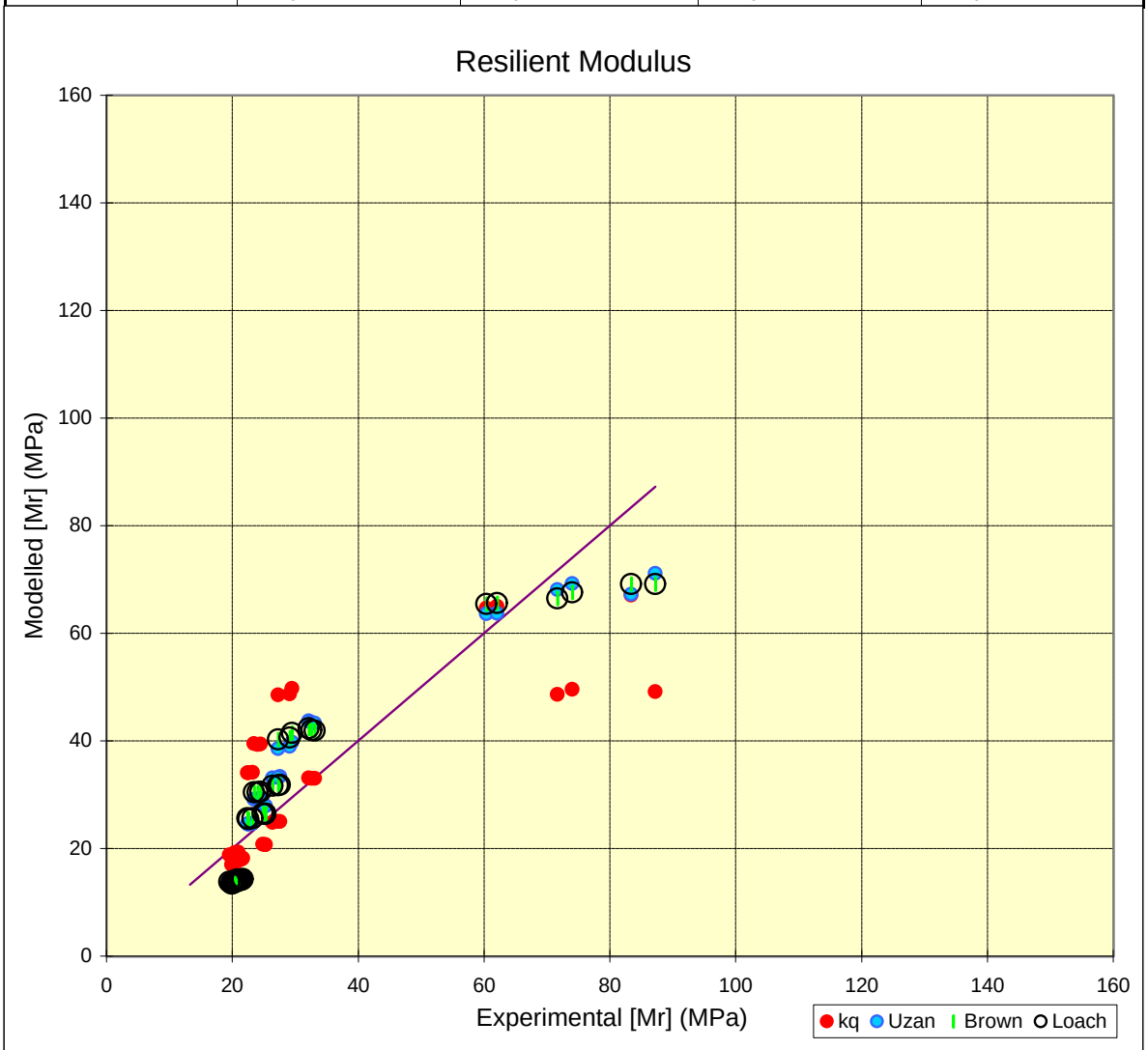
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

Error Analysis ***Data based on London Clay (LOC)*** ***Dirty Data: 2%***

Experimental Data	Sample Size: 41 Suction (s) = 40 kPa @ ω= 26% 1,456 kg/m3			
	Chara'tic Values at q_2 = 26 kPa Mr_e= 45 MPa υ_e = 0.33			
Modelled Data	**kq**	**Uzan**	**Brown**	**Loach**
	k_1 = 36,470	k_3 = 24,501	A = 42,955	C = 107,386
	k_2 = -0.8855	k_4 = 0.1595	B = 0.7253	D = 1.7253
		k_5 = -0.8236		
	r^2= 0.602	r^2= 0.833	r^2= 0.829	r^2= 0.829
Characteristic Values	At: p_2 = 12 kPa & q_2= 26 kPa			
	kq	**Uzan**	**Brown**	**Loach**
	Mr_c= 93 MPa	Mr_c= 53 MPa	Mr_c= 59 MPa	Mr_c= 59 MPa



Exactness of the estimated parameter value

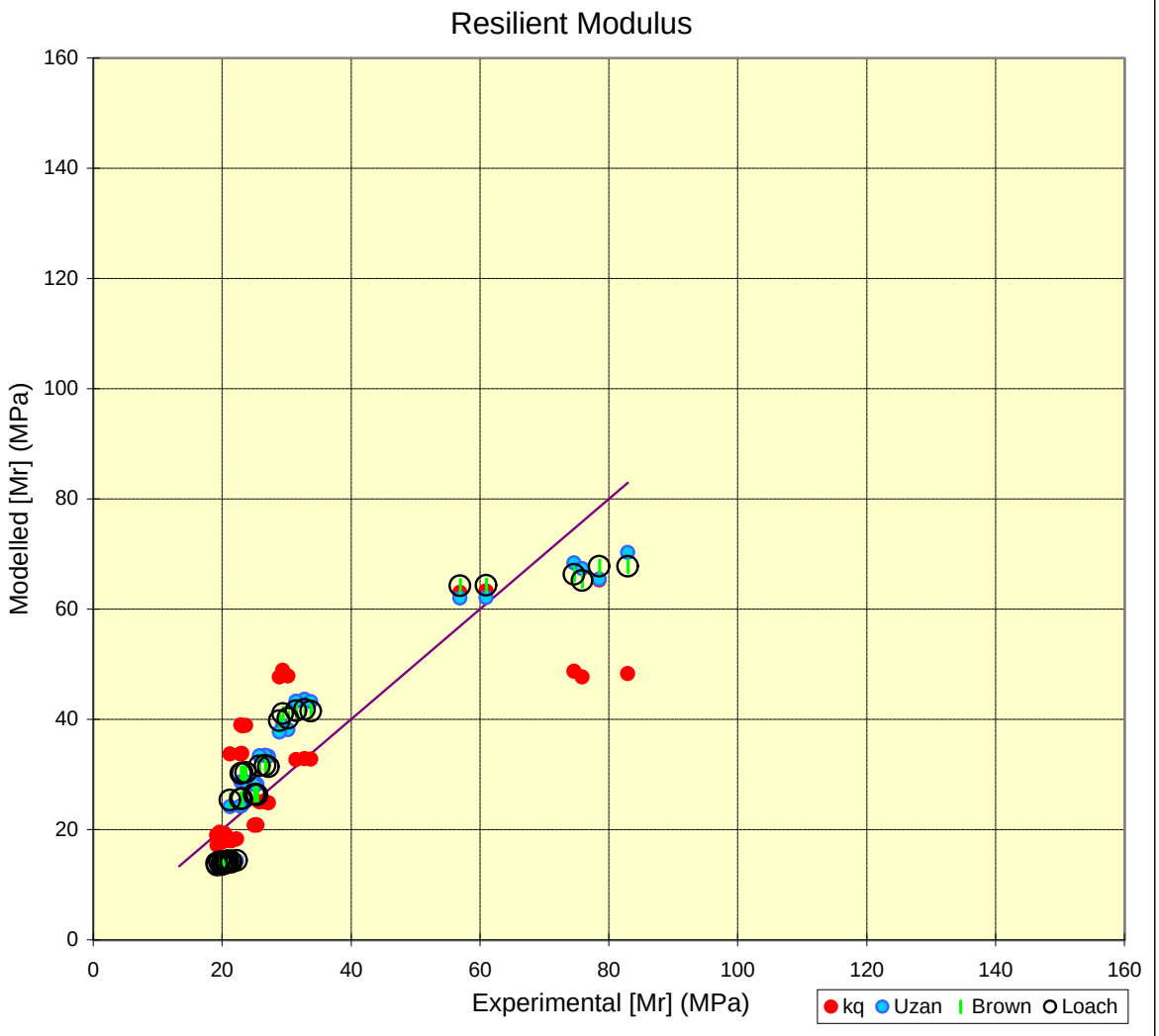
Model	**kq**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	2066	0.11	3068	0.17	0.11	1501	0.05	3752	0.05
t=	17.65	-7.74	7.99	0.96	-7.24	28.62	13.53	28.62	32.18
Prob(t)=	0%	0%	0%	34%	0%	0%	0%	0%	0%

The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

Error Analysis	***Data based on London Clay (LOC)***			***Dirty Data:*** **5%**
Experimental Data	Sample Size: 41	Suction (s) = 40 kPa @ ω= 26%		1,456 kg/m3
	Chara'tic Values at q_2 = 26 kPa	Mr_e= 44 MPa		υ_e = 0.33
Modelled Data	**kq**	**Uzan**	**Brown**	**Loach**
	k_1 = 36,077	k_3 = 25,145	A = 42,444	C = 106,109
	k_2 = -0.8624	k_4 = 0.2018	B = 0.7127	D = 1.7127
		k_5 = -0.8377		
	r^2= 0.596	r^2= 0.841	r^2= 0.834	r^2= 0.834
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kq	**Uzan**	**Brown**	**Loach**
	Mr_c= 90 MPa	Mr_c= 51 MPa	Mr_c= 58 MPa	Mr_c= 58 MPa



Exactness of the estimated parameter value

Model	**kq**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	2021	0.11	3002	0.16	0.11	1436	0.05	3591	0.05
t=	17.85	-7.63	8.38	1.27	-7.66	29.55	13.81	29.55	33.18
Prob(t)=	0%	0%	0%	21%	0%	0%	0%	0%	0%

The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

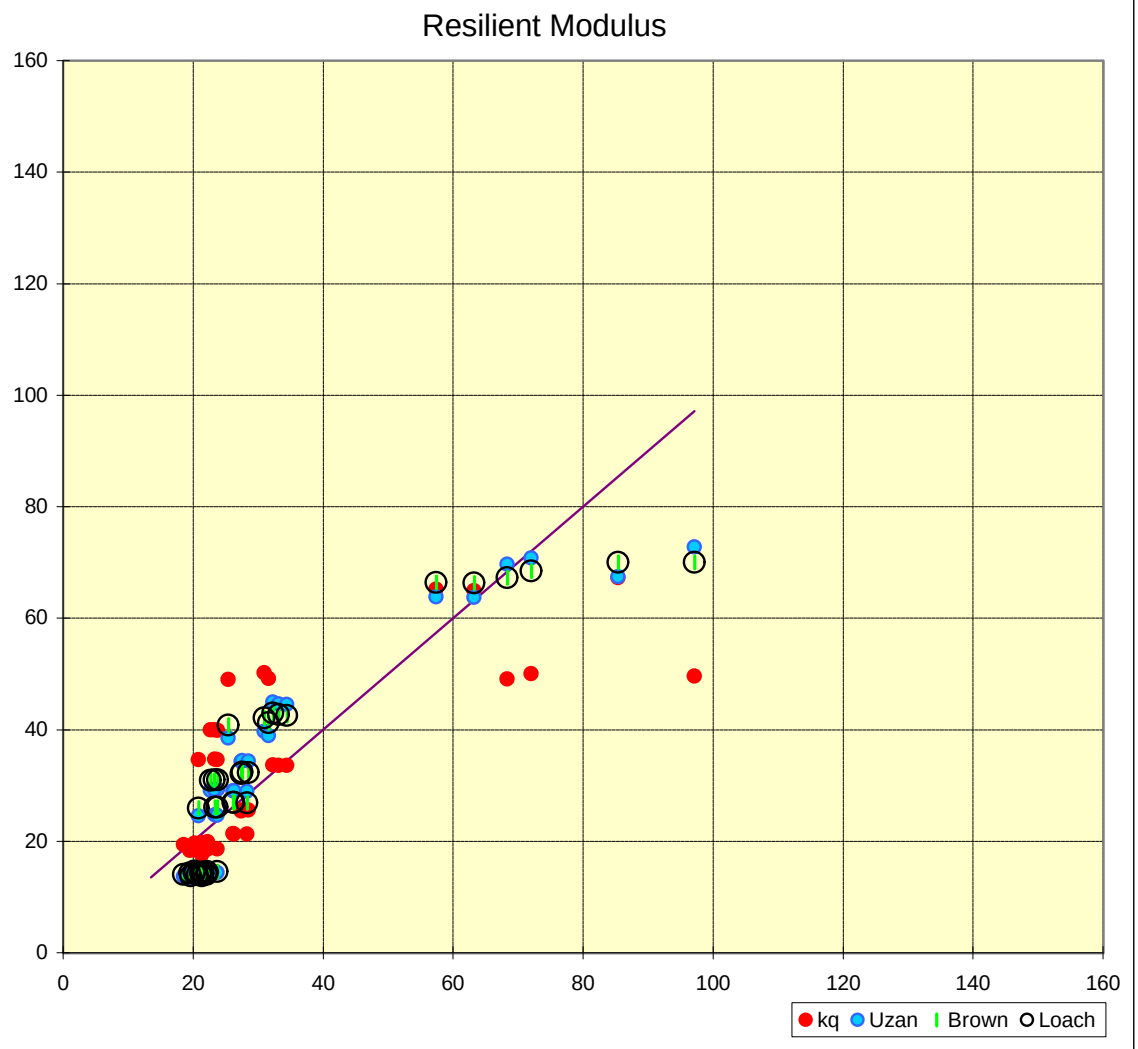
The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

Error Analysis	***Data based on London Clay (LOC)***			***Dirty Data:*** **10%**
Experimental Data	Sample Size: 41	Suction (s) =	40 kPa @ ω=	26% 1,456 kg/m3
	Chara'tic Values at q_2 = 26 kPa		Mr_e= 45 MPa	υ_e = 0.33

Modelled Data	**kq**	**Uzan**	**Brown**	**Loach**
	k_1 = 37,027	k_3 = 25,949	A = 43,614	C = 109,034
	k_2 = -0.8681	k_4 = 0.2192	B = 0.7209	D = 1.7209
		k_5 = -0.8560		
	r^2= 0.565	r^2= 0.808	r^2= 0.799	r^2= 0.799

Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kq	**Uzan**	**Brown**	**Loach**
	Mr_c= 93 MPa	Mr_c= 52 MPa	Mr_c= 60 MPa	Mr_c= 60 MPa



Exactness of the estimated parameter value

Model	**kq**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	2216	0.12	3502	0.18	0.12	1668	0.06	4169	0.06
t=	16.71	-7.19	7.41	1.22	-6.91	26.15	12.31	26.15	29.39
Prob(t)=	0%	0%	0%	23%	0%	0%	0%	0%	0%

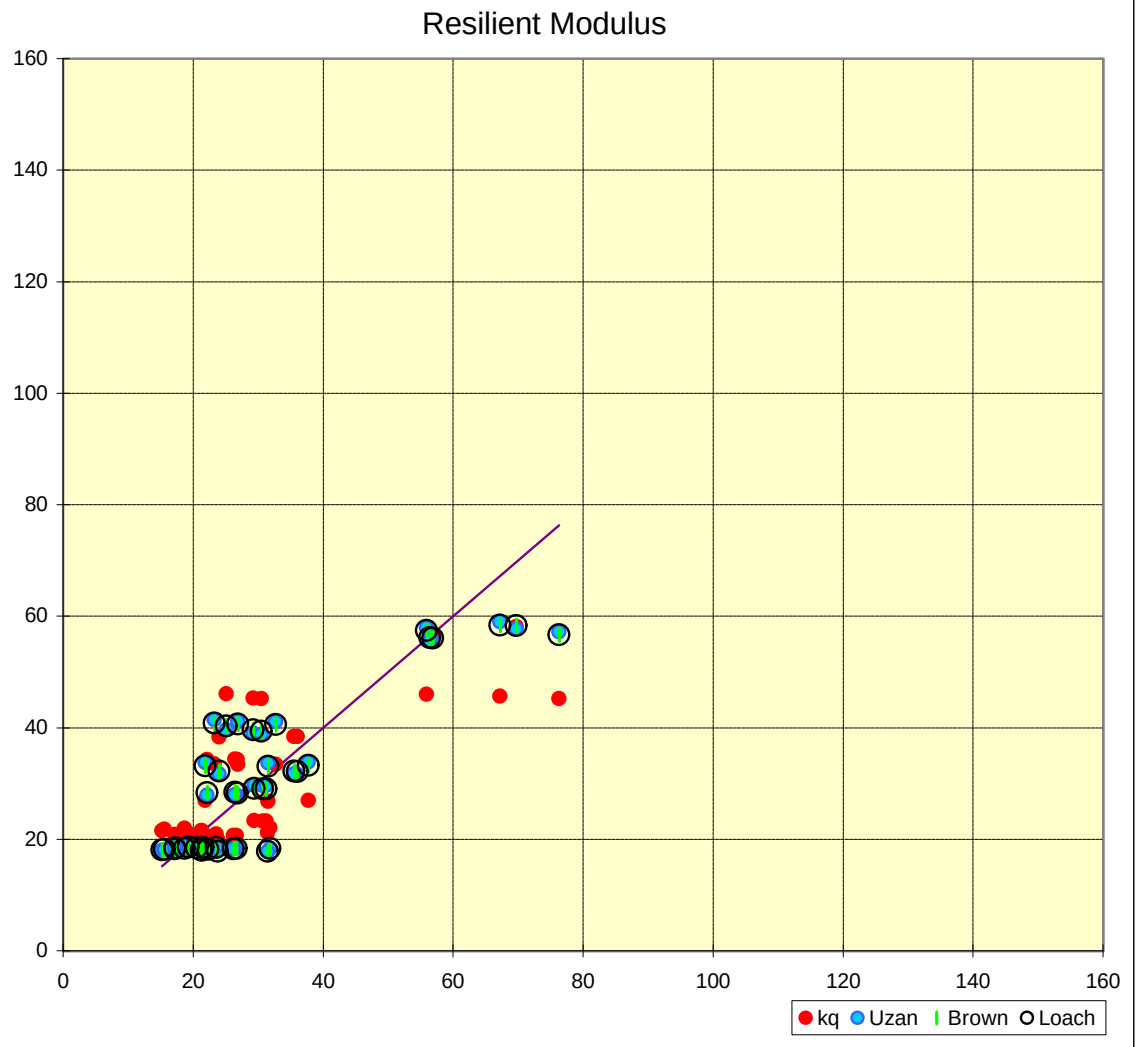
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

Error Analysis ***Data based on London Clay (LOC)*** ***Dirty Data:*** **30%**

Experimental Data	Sample Size: 41 Suction (s) = 40 kPa @ ω= 26% 1,456 kg/m3 Chara'tic Values at q_2 = 26 kPa Mr_e= 43 MPa υ_e = 0.33			
Modelled Data	**kq** k_1 = 36,155 k_2 = -0.6908 r^2= 0.563	**Uzan** k_3 = 26,531 k_4 = 0.0603 k_5 = -0.5628 r^2= 0.724	**Brown** A = 41,296 B = 0.5266 r^2= 0.723	**Loach** C = 103,241 D = 1.5266 r^2= 0.723
Characteristic Values			At: p_2 = 12 kPa	& q_2= 26 kPa
	kq Mr_c= 75 MPa	**Uzan** Mr_c= 50 MPa	**Brown** Mr_c= 52 MPa	**Loach** Mr_c= 52 MPa



Exactness of the estimated parameter value

Model	**kq**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	1727	0.09	3481	0.18	0.12	1543	0.05	3858	0.05
t=	20.94	-7.29	7.62	0.34	-4.76	26.76	10.31	26.76	29.89
Prob(t)=	0%	0%	0%	74%	0%	0%	0%	0%	0%

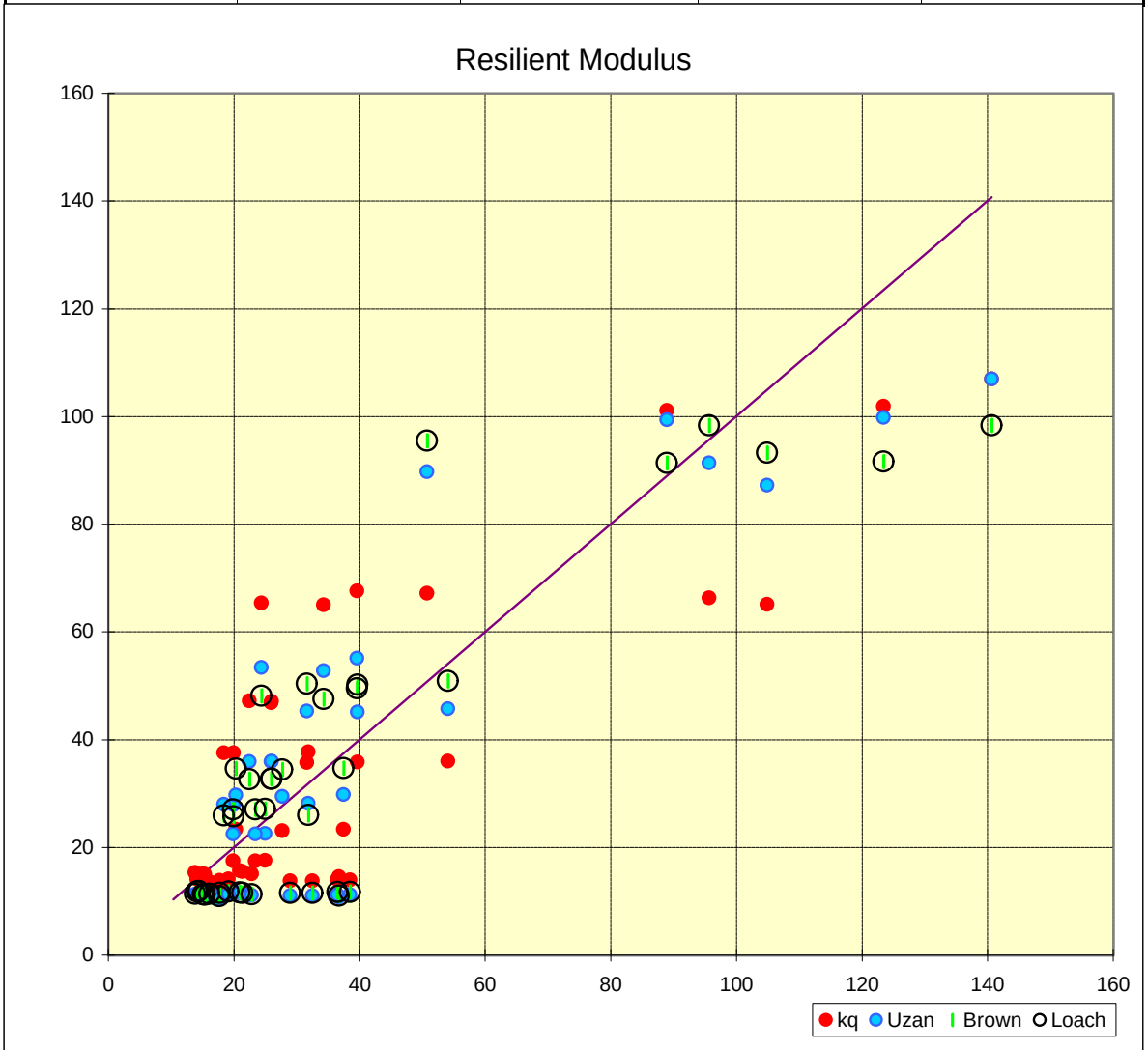
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

Error Analysis ***Data based on London Clay (LOC)*** ***Dirty Data:*** **50%**

Experimental Data	Sample Size: 41 Suction (s) = 40 kPa @ ω= 26% 1,456 kg/m3			
	Chara'tic Values at q_2 = 26 kPa Mr_e= 57 MPa υ_e = 0.33			
Modelled Data	**kq**	**Uzan**	**Brown**	**Loach**
	k_1 = 41,794	k_3 = 15,263	A = 51,915	C = 129,789
	k_2 = -1.3669	k_4 = -0.4518	B = 0.9736	D = 1.9736
		k_5 = -0.7249		
	r^2= 0.640	r^2= 0.740	r^2= 0.721	r^2= 0.721
Characteristic Values	At: p_2 = 12 kPa & q_2= 26 kPa			
	kq	**Uzan**	**Brown**	**Loach**
	Mr_c= 179 MPa	Mr_c= 108 MPa	Mr_c= 80 MPa	Mr_c= 80 MPa



Exactness of the estimated parameter value

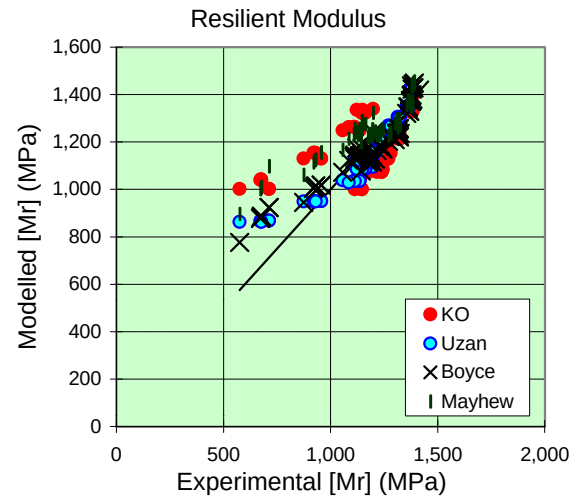
Model	**kq**		**Uzan**			**Brown**		**Loach**	
Parameter	k1	k2	k3	k4	k5	A	B	C	D
Std.Error=	3592	0.17	3750	0.28	0.20	3331	0.11	8327	0.11
t=	11.63	-7.97	4.07	-1.61	-3.71	15.59	9.11	15.59	18.47
Prob(t)=	0%	0%	0%	12%	0%	0%	0%	0%	0%

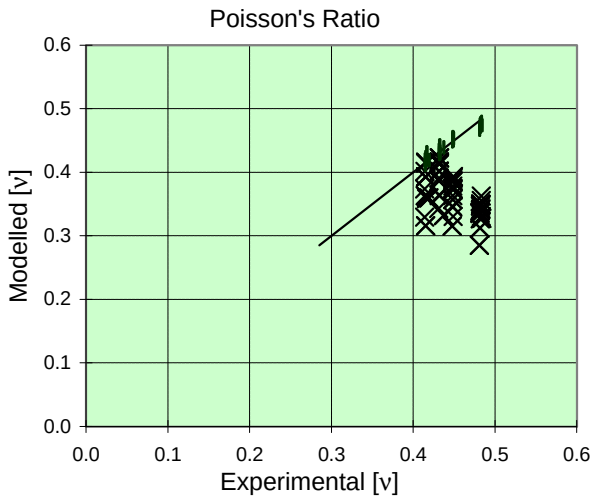
The smaller the standard error, the more confident one can be that the parameter's value matches its estimated value.

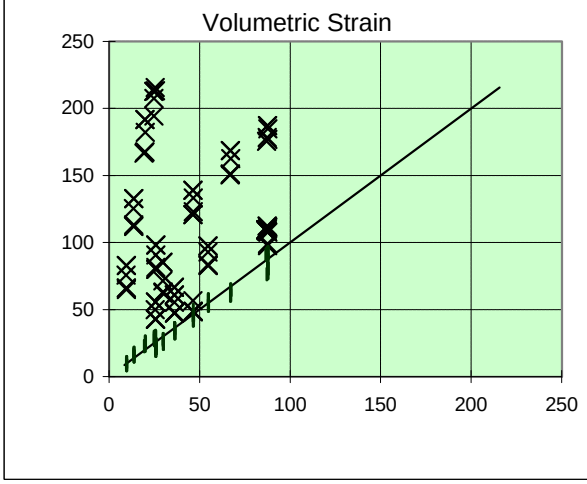
The larger the absolute value of t, the less likely that the actual value of the parameter could be zero.

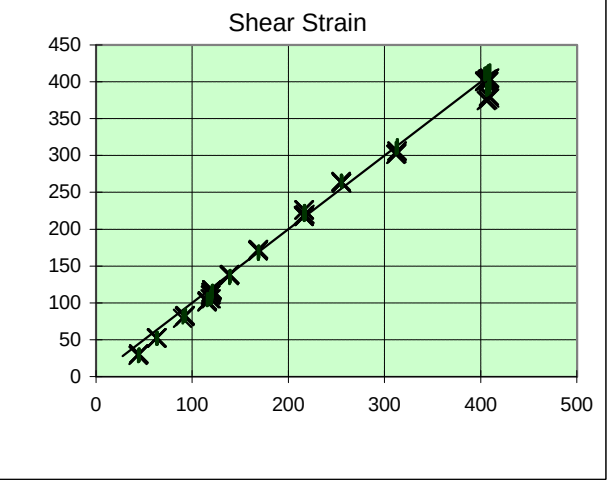
The smaller the value of Prob(t), the more significant the parameter and the less likely that the parameter value is zero.

Error Analysis	***Data based on Soft Limestone (CCD)***			***Dirty Data: 0%***
Experimental Data	Sample Size: 96	p*= 80 kPa @ w = 3.5%		p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 1,014 MPa	υ_e = 0.46
Modelled Data	**kq** k_1 = 889,858 k_2 = 0.1819 r^2= 0.468	**Uzan** k_3 = 1,018,387 k_4 = -0.0186 k_5 = 0.1979 r^2= 0.749	**Boyce** Ga = 254,843 kPa Ka = 719,935 kPa n = 0.5986 r^2= 0.728	**Mayhew** Ga = 260,388 kPa Ka = 6,206,351 kPa n = 0.6404 β = -0.8257 m = 0.5919 $r^2\varepsilon_v$= 0.891 $r^2\varepsilon_s$= 0.952
Characteristic Values	At p_1= 6 kPa		p_2 = 15 kPa and	q_1= 4 kPa q_2= 54 kPa
	kq Mr_c= 772 MPa	**Uzan** Mr_c= 934 MPa	**Boyce** ε_{vc}=18 ε_{sc}= 24 Mr_c= 1429 MPa υ_c= 0.04	**Mayhew** ε_{vc}=4 ε_{sc}= 22 Mr_c= 2066 MPa υ_c= 0.36



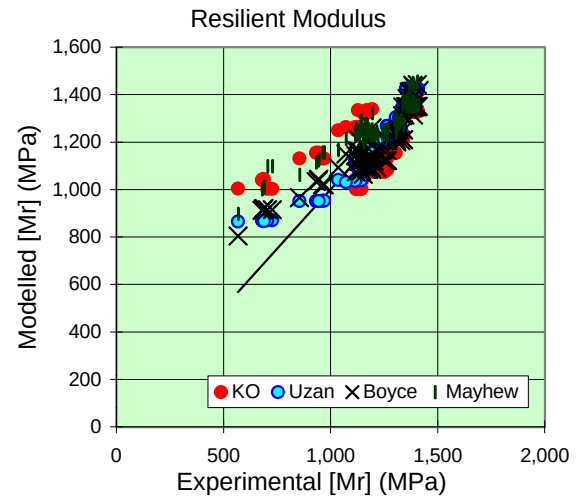


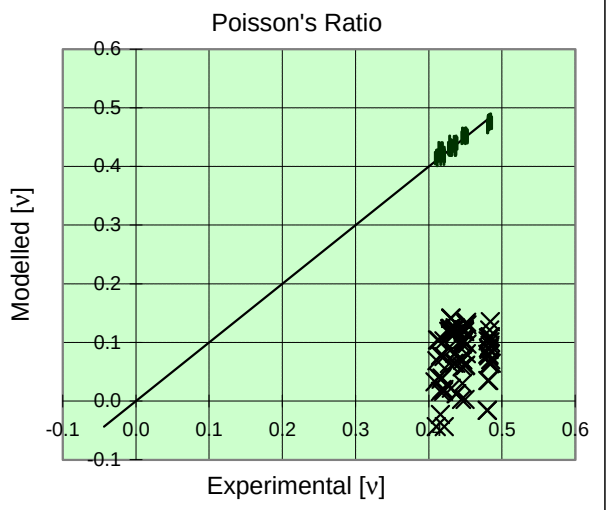


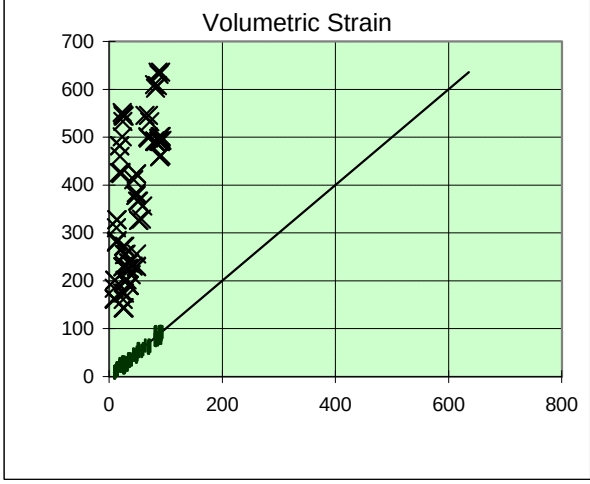


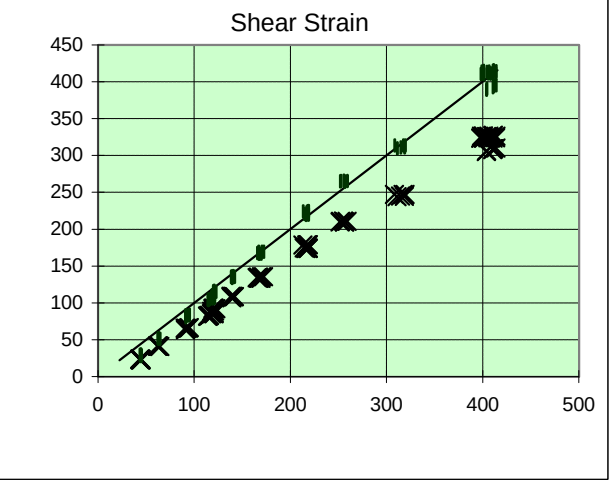
Error Analysis ***Data based on Soft Limestone (CCD)*** ***Dirty Data: 2%***

Experimental Data	Sample Size: 96	p*= 80 kPa @ w = 3.5%		p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 1,015 MPa	υ_e = 0.46
Modelled Data	**kq** k_1 = 891,391 k_2 = 0.1809 r^2= 0.469	**Uzan** k_3 = 1,019,788 k_4 = -0.0173 k_5 = 0.1958 r^2= 0.746	**Boyce** Ga = 325,457 kPa Ka = 303,002 kPa n = 0.6267 r^2= 0.671	**Mayhew** Ga = 260,409 kPa Ka = 6,305,270 kPa n = 0.6408 β = -0.8562 m = 0.5890 $r^2\varepsilon_v$= 0.880 $r^2\varepsilon_s$= 0.949
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa and	q_1= 4 kPa	q_2= 54 kPa
	kq Mr_c= 774 MPa	**Uzan** Mr_c= 935 MPa	**Boyce** ε_{vc}=44 ε_{sc}= 18 Mr_c= 1125 MPa υ_c= **-0.39**	**Mayhew** ε_{vc}=4 ε_{sc}= 22 Mr_c= 2068 MPa υ_c= 0.36



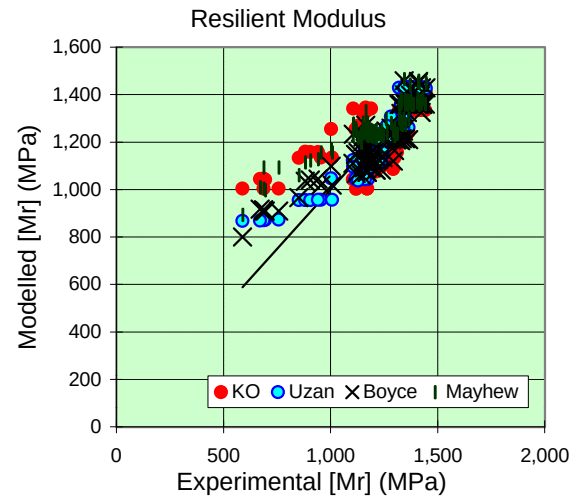


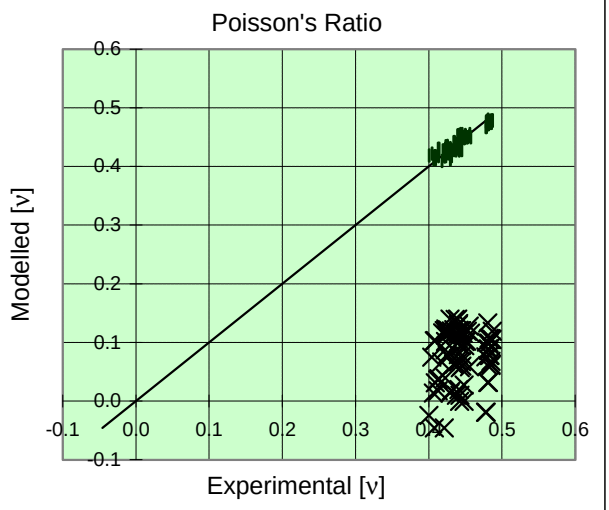


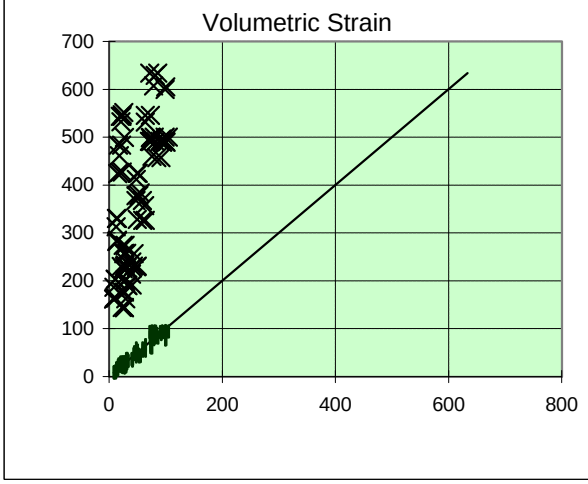


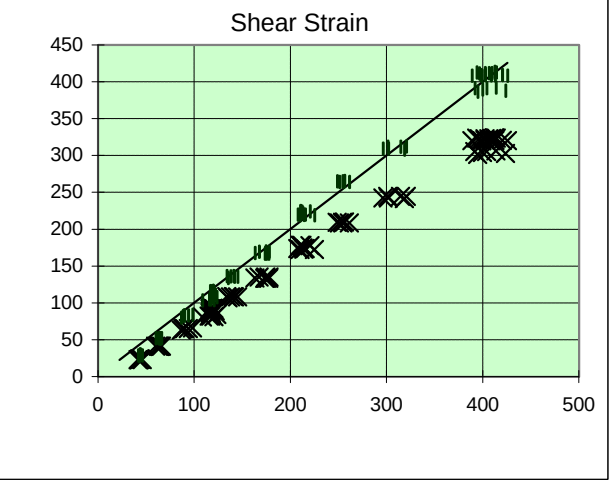
Error Analysis ***Data based on Soft Limestone (CCD)*** ***Dirty Data: 5%***

Experimental Data	Sample Size: 96	p*= 80 kPa @ w = 3.5%		p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 1,018 MPa	υ_e = 0.46
Modelled Data	**kq** k_1 = 890,505 k_2 = 0.1837 r^2= 0.468	**Uzan** k_3 = 1,022,523 k_4 = -0.0125 k_5 = 0.1939 r^2= 0.725	**Boyce** Ga = 325,661 kPa Ka = 298,969 kPa n = 0.6183 r^2= 0.658	**Mayhew** Ga = 259,969 kPa Ka = 6,307,738 kPa n = 0.6344 β = -0.8782 m = 0.5859 $r^2\varepsilon_v$= 0.816 $r^2\varepsilon_s$= 0.941
Characteristic Values	At p_1= 6 kPa		p_2 = 15 kPa and	q_1= 4 kPa q_2= 54 kPa
	kq Mr_c= 772 MPa	**Uzan** Mr_c= 930 MPa	**Boyce** ε_{vc}=45 ε_{sc}= 18 Mr_c= 1106 MPa υ_c= **-0.39**	**Mayhew** ε_{vc}=4 ε_{sc}= 22 Mr_c= 2040 MPa υ_c= 0.36





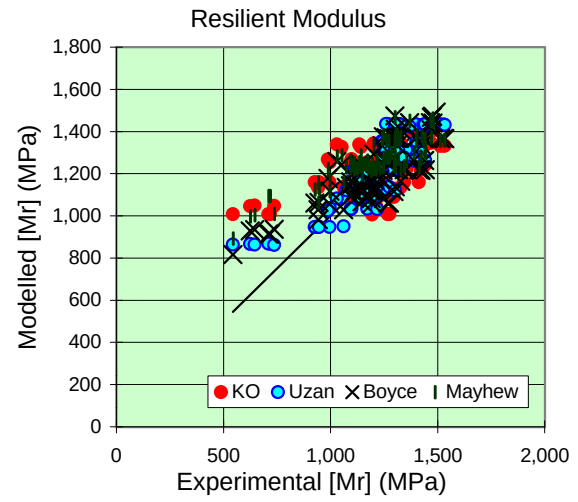


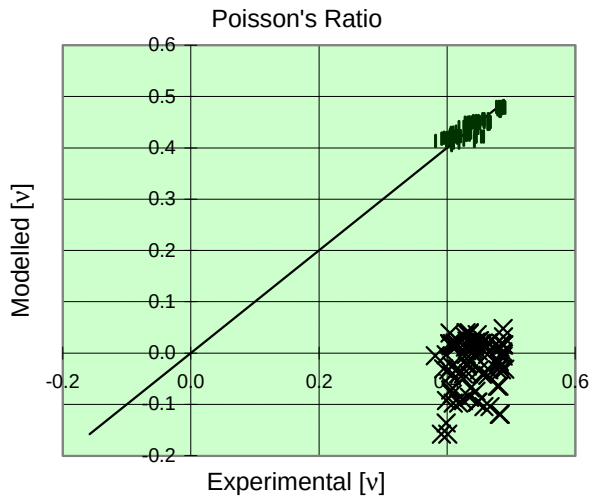


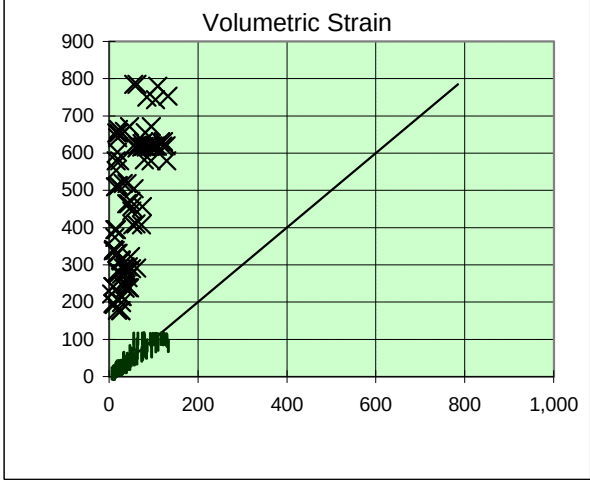
Error Analysis	***Data based on Soft Limestone (CCD)***			***Dirty Data: 10%***
Experimental Data	Sample Size: 96	p*= 80 kPa @	w = 3.5%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 1,015 MPa	υ_e = 0.46

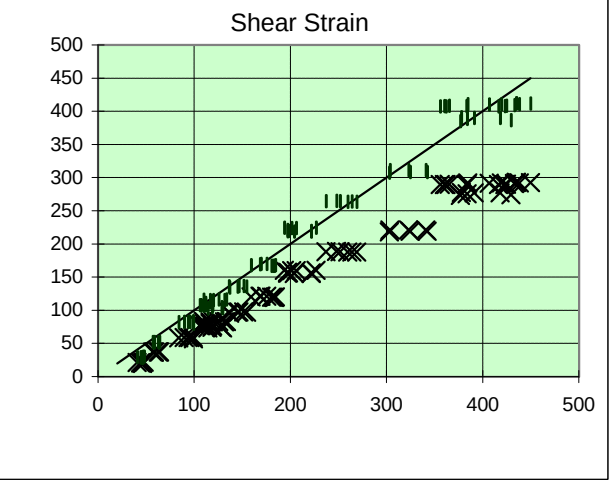
Modelled Data	**kq**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 896,224	k_3 = 1,020,959	Ga = 363,557 kPa	Ga = 259,662 kPa
	k_2 = 0.1801	k_4 = -0.0260	Ka = 252,455 kPa	Ka = 7,618,144 kPa
		k_5 = 0.2042	n = 0.6264	n = 0.6311
				β = -1.1868
				m = 0.6179
	r^2= 0.435	r^2= 0.654	r^2= 0.580	$r^2\varepsilon_v$= 0.708 $r^2\varepsilon_s$= 0.897

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kq	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}=54 ε_{sc}= 16	ε_{vc}=3 ε_{sc}= 22
	Mr_c= 779 MPa	Mr_c= 946 MPa	Mr_c= 1041 MPa	Mr_c= 2043 MPa
			υ_c= **-0.49**	υ_c= 0.38

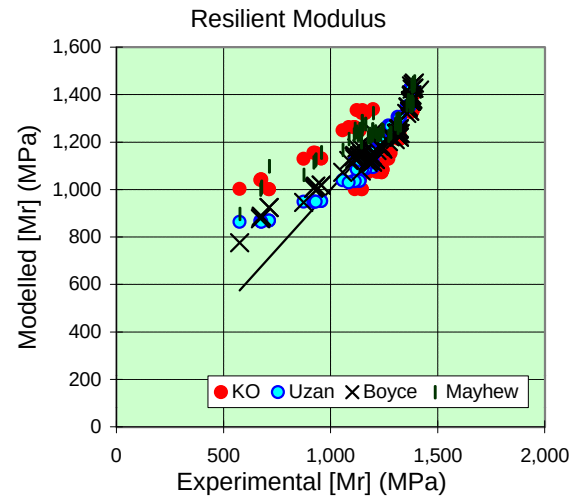


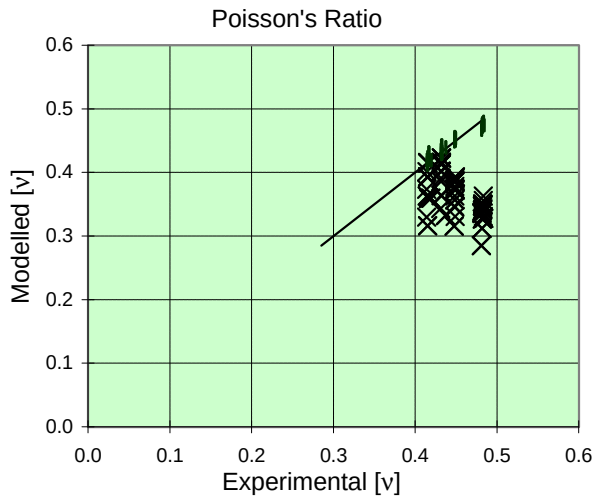


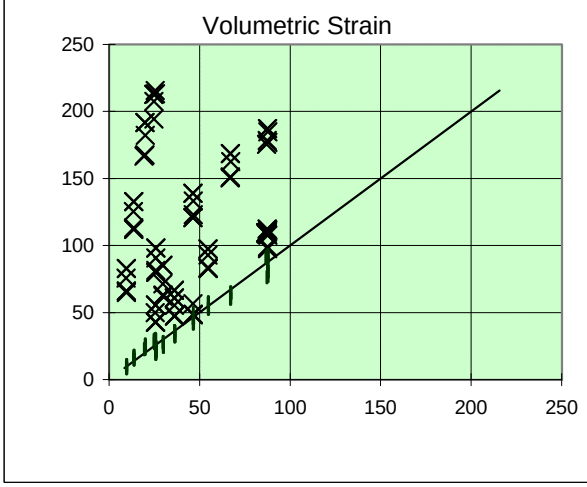


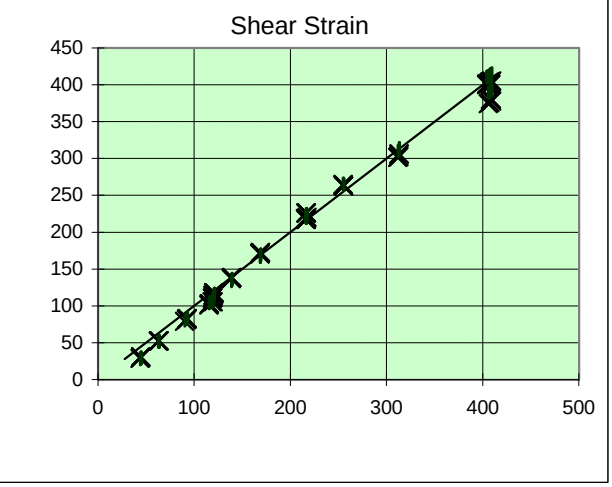


Error Analysis	***Data based on Soft Limestone (CCD)***			***Dirty Data: 0%***
Experimental Data	Sample Size: 96	p*= 80 kPa @ w = 3.5%		p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 1,014 MPa	υ_e = 0.46
Modelled Data	**kq**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 889,858 k_2 = 0.1819	k_3 = 1,018,387 k_4 = -0.0186 k_5 = 0.1979	Ga = 254,843 kPa Ka = 719,935 kPa n = 0.5986	Ga = 260,388 kPa Ka = 6,206,351 kPa n = 0.6404 β = -0.8257 m = 0.5919
	r^2= 0.468	r^2= 0.749	r^2= 0.728	$r^2\varepsilon_v$= 0.891 $r^2\varepsilon_s$= 0.952
Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kq	**Uzan**	**Boyce**	**Mayhew**
	Mr_c= 772 MPa	Mr_c= 934 MPa	ε_{vc}=18 ε_{sc}= 24 Mr_c= 1429 MPa υ_c= 0.04	ε_{vc}=4 ε_{sc}= 22 Mr_c= 2066 MPa υ_c= 0.36





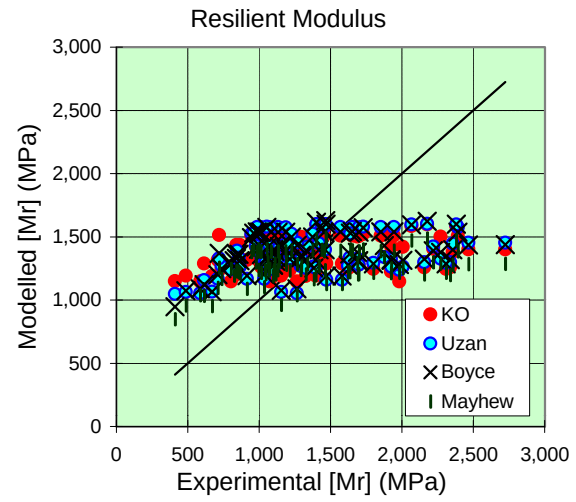


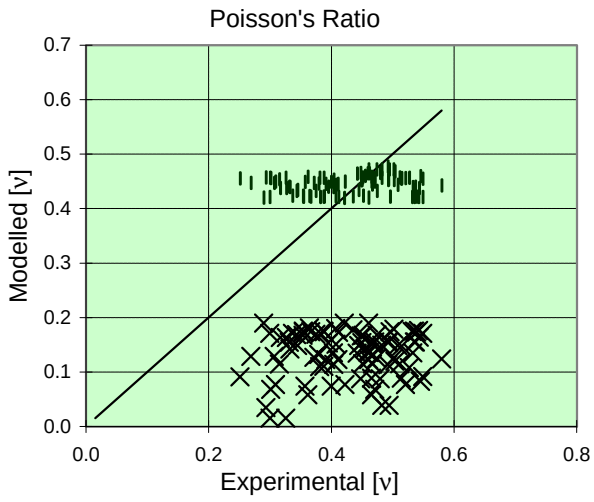


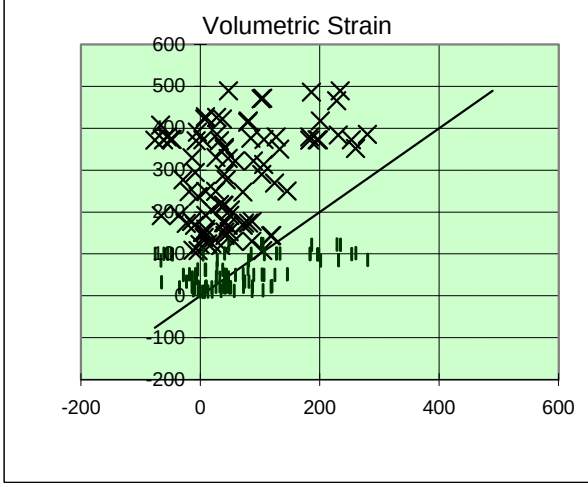
Error Analysis	***Data based on Soft Limestone (CCD)***			***Dirty Data: 50%***
Experimental Data	Sample Size: 96	p*= 80 kPa @	w = 3.5%	p_a = 100 kPa
	Characteristic Values at q_2 = 54 kPa		Mr_e= 1,205 MPa	υ_e = 0.44

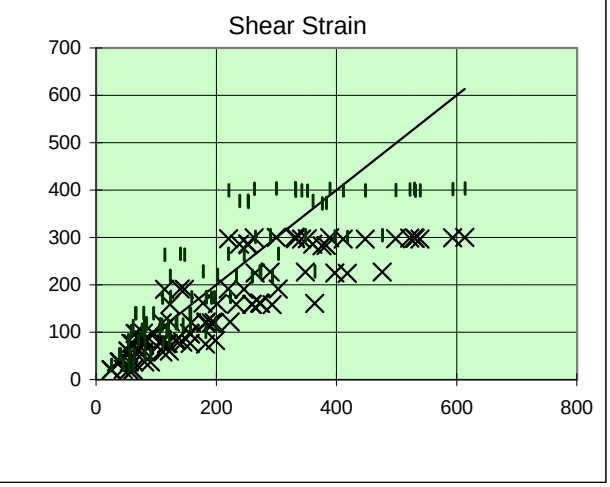
Modelled Data	**kq**	**Uzan**	**Boyce**	**Mayhew**
	k_1 = 1,023,802	k_3 = 1,195,121	Ga = 363,174 kPa	Ga = 251,656 kPa
	k_2 = 0.1753	k_4 = 0.0476	Ka = 403,969 kPa	Ka = 5,991,392 kPa
		k_5 = 0.1239	n = 0.6483	n = 0.5844
				β = -0.2364
				m = 1.2010
	r^2= 0.319	r^2= 0.331	r^2= 0.337	$r^2\varepsilon_v$= 0.351 $r^2\varepsilon_s$= 0.645

Characteristic Values	At p_1= 6 kPa	p_2 = 15 kPa	and q_1= 4 kPa	q_2= 54 kPa
	kq	**Uzan**	**Boyce**	**Mayhew**
			ε_{vc}=33 ε_{sc}= 15	ε_{vc}=1 ε_{sc}= 25
	Mr_c= 893 MPa	Mr_c= 1013 MPa	Mr_c= 1430 MPa	Mr_c= 1918 MPa
			υ_c= **-0.33**	υ_c= 0.45









APPENDIX H MECHANISTIC PAVEMENT DESIGN

Appendix H.1 MECHANISTIC PAVEMENT DESIGN ANALYSES

Mechanistic Pavement Analysis Pavement life as a function of the Variation in the Base Characteristics

Pavement Structure - Under Construction (UC):

Surface	50 mm	Bituminous prime coat to protect the granular base						**Unit Weight: 23**
		Mr_i=2,100 MPa	**n_i= 0.40**					**Suction: 0**
		Peak Deflection on the Surface		ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
			δ_p (mm)=	0.587	0.741	2.855	NS	2.914
		Strain - Bottom of the Base Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 49 mm	ElsymD	266	308	-463		1.582E+06
			ElsymS	273	273	-464		2.673E+06
			FenlapK	1560	1560	-2160		1.286E+03
			FenlapB	NS	NS	NS		
	50		FenlapM	1670	1670	-2290		**9.535E+02**
DUT - MIG	300 mm	Unbound Granular Base	Test programme: 2			Lab.: DUT		MIG ***8***
		Char.: **Mr_i=198 MPa**	**n_i= 0.23**					**Unit Weight: 22**
		k q: **k_1= 1,738**	**k_2= 0.5555**					**Suction: 0**
		Boyce: **Ka= 1,664**	**Ga= 27,374**		**n= 0.4091**			
		Mayhew: **Ka= 4,936**	**Ga= 14,953**		**n= 0.3597**		**m= -0.5928**	**b= -0.8421**
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
		Depth= 200 mm	ElsymD	133	1	-11	14.6	1.085E+46
			ElsymS	201	-11	-11	11.4	4.635E+36
			FenlapK	166	-14	-15	11.6	1.302E+37
			FenlapB	NS	NS	NS	NS	
	350		FenlapM	84	-21	-23	12.7	2.825E+40
All - MIG	300 mm	Unbound Granular Subbase	Test programme: 1			Lab.: All		MIG ***4***
		Char.: **Mr_i=235 MPa**	**n_i= 0.28**					**Unit Weight: 22**
		k q: **k_1= 1,333**	**k_2= 0.6716**					**Suction: 0**
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
		Depth= 500 mm	ElsymD	41	-4	-7	19.2	1.676E+59
			ElsymS	52	-8	-8	15.3	1.016E+48
			FenlapK	83	6	6	16.0	8.088E+49
			FenlapB	NS	NS	NS	NS	
	650		FenlapM	62	6	6	19.6	3.595E+60
All - SFB	1000 mm	Selected Soil Subgrade	Test programme: 1			Lab.: All		SFB ***1***
		Char.: **Mr_i=160 MPa**	**n_i= 0.41**					**Unit Weight: 16**
		Loach: **C= 31,846**	**D= 0.7333**	**q_i =**	**1.71**	***p +**	**26**	**Suction: 3**
		Strain - Top of the Selected Subgrade		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 651 mm	ElsymD	-53	-71	131		4.457E+14
			ElsymS	-80	-80	164		3.348E+13
			FenlapK	-7	-7	35		1.858E+21
			FenlapB	NS	NS	NS	NS	
	1650		FenlapM	-4	-4	28		2.005E+22
All - LOC	Infinite	In-Situ Soil Subgrade Foundation	Test programme: 1			Lab.: All		LOC ***2***
		Char.: **Mr_i=34 MPa**	**n_i= 0.54**	**=0.45**				**Unit Weight: 22**
		Brown: **A= 21,858**	**B= 0.4820**	**q_i =**	**0.001**	***p +**	**86**	**Suction: 32**
		Strain - Top of the Subgrade Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 1651 mm	ElsymD	-37	-39	61		2.790E+18
			ElsymS	-39	-39	62		2.209E+18
			FenlapK	-12	-12	29		1.345E+22
			FenlapB	NS	NS	NS	NS	
	2650		FenlapM	-12	-12	28		2.362E+22
							Minimum Design Loading:	**9.535E+02**

Pavement Structure - In-Service (IS):

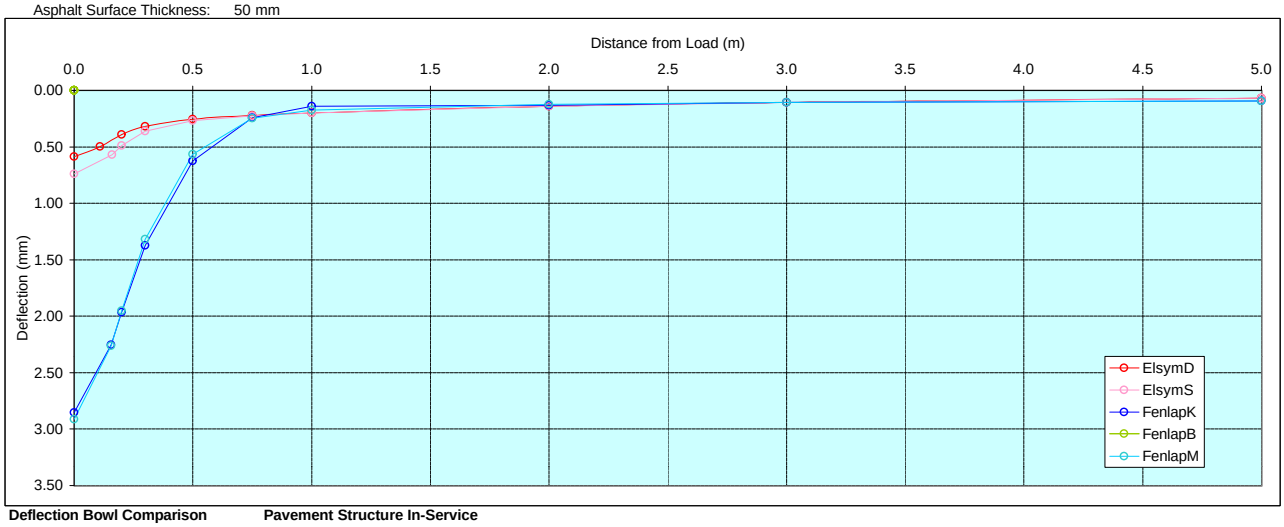
Surface	100 mm	Asphalt Surface and Base Layer						**Unit Weight: 23**
		Mr_i=2,100 MPa	**n_i= 0.40**					**Suction: 0**
		Peak Deflection on the Surface		ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
			δ_p (mm)=	0.461	0.567	1.778	1.127	1.482
		Strain - Bottom of the Base Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 99 mm	ElsymD	179	256	-332		3.586E+06
			ElsymS	290	290	-444		2.073E+06
			FenlapK	913	913	-1230		**1.347E+04**
			FenlapB	732	732	-965		3.551E+04
	100		FenlapM	883	883	-1180		1.560E+04
DUT - MIG	300 mm	Unbound Granular Base	Test programme: 2			Lab.: DUT		MIG ***8***
		Char.: **Mr_i=198 MPa**	**n_i= 0.23**					**Unit Weight: 22**
		k q: **k_1= 1,738**	**k_2= 0.5555**					**Suction: 0**
		Boyce: **Ka= 1,664**	**Ga= 27,374**		**n= 0.4091**			
		Mayhew: **Ka= 4,936**	**Ga= 14,953**		**n= 0.3597**		**m= -0.5928**	**b= -0.8421**
		Stress - Centre of the Base Layer		σ_1 *(kPa)*	σ_2 *(kPa)*	σ_3 *(kPa)*	FOS	ESA
		Depth= 250 mm	ElsymD	86	-1	-8	17.4	1.302E+54
			ElsymS	123	-9	-9	13.3	1.508E+42
			FenlapK	69	1	1	20.4	7.148E+62
			FenlapB	47	-16	-17	16.9	4.438E+52
	400		FenlapM	45	-9	-9	20.3	2.994E+62
All - MIG	300 mm	Unbound Granular Subbase	Test programme: 1			Lab.: All		MIG ***4***
		Char.: **Mr_i=235 MPa**	**n_i= 0.28**					**Unit Weight: 22**
		k q: **k_1= 1,333**	**k_2= 0.6716**					**Suction: 0**
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
		Depth= 550 mm	ElsymD	32	-5	-7	21.6	2.461E+66
			ElsymS	39	-7	-7	18.1	1.009E+56
			FenlapK	44	6	6	25.4	1.883E+77
			FenlapB	31	7	7	36.2	9.526E+108
	700		FenlapM	32	5	5	32.7	4.432E+98
All - SFB	1000 mm	Selected Soil Subgrade	Test programme: 1			Lab.: All		SFB ***1***
		Char.: **Mr_i=160 MPa**	**n_i= 0.41**					**Unit Weight: 16**
		Loach: **C= 31,846**	**D= 0.7333**	**q_i =**	**1.71**	***p +**	**26**	**Suction: 3**
		Strain - Top of the Selected Subgrade		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 701 mm	ElsymD	-47	-60	110		3.405E+15
			ElsymS	-66	-66	132		4.015E+14
			FenlapK	-1	-1	19		1.552E+24
			FenlapB	1	1	14		7.269E+25
	1700		FenlapM	1	1	15		2.589E+25
All - LOC	Infinite	In-Situ Soil Subgrade Foundation	Test programme: 1			Lab.: All		LOC ***2***
		Char.: **Mr_i=34 MPa**	**n_i= 0.54**	**=0.45**				**Unit Weight: 22**
		Brown: **A= 21,858**	**B= 0.4820**	**q_i =**	**0.001**	***p +**	**86**	**Suction: 32**
		Strain - Top of the Subgrade Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 1701 mm	ElsymD	-34	-36	56		8.136E+18
			ElsymS	-36	-36	57		5.718E+18
			FenlapK	-11	-11	26		5.815E+22
			FenlapB	-10	-10	24		1.337E+23
	2700		FenlapM	-10	-10	24		1.275E+23
							Minimum Design Loading:	**1.347E+04**

Pavement Structure - In-Service (IS):

Surface	150 mm	Asphalt Surface and Base Layer						**Unit Weight: 23**
		Mr_i=2,100 MPa	**n_i= 0.40**					**Suction: 0**
		Peak Deflection on the Surface		ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
			δ_p (mm)=	0.394	0.465	1.232	0.811	0.924
		Strain - Bottom of the Base Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 149 mm	ElsymD	121	185	-229		1.498E+07
			ElsymS	222	222	-332		6.706E+06
			FenlapK	534	534	-707		**1.416E+05**
			FenlapB	383	383	-522		6.084E+05
	0		FenlapM	479	479	-633		2.281E+05
DUT - MIG	300 mm	Unbound Granular Base	Test programme: 2			Lab.: DUT		MIG ***8***
		Char.: **Mr_i=198 MPa**	**n_i= 0.23**					**Unit Weight: 22**
		k q: **k_1= 1,738**	**k_2= 0.5555**					**Suction: 0**
		Boyce: **Ka= 1,664**	**Ga= 27,374**		**n= 0.4091**			
		Mayhew: **Ka= 4,936**	**Ga= 14,953**		**n= 0.3597**		**m= -0.5928**	**b= -0.8421**
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
		Depth= 300 mm	ElsymD	61	-2	-6	20.4	8.174E+62
			ElsymS	82	-7	-7	15.9	6.199E+49
			FenlapK	36	2	2	33.3	3.691E+100
			FenlapB	49	-17	-17	16.0	9.286E+49
	450		FenlapM	28	-6	-6	28.0	1.333E+85
All - MIG	300 mm	Unbound Granular Subbase	Test programme: 1			Lab.: All		MIG ***4***
		Char.: **Mr_i=235 MPa**	**n_i= 0.28**					**Unit Weight: 22**
		k q: **k_1= 1,333**	**k_2= 0.6716**					**Suction: 0**
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
		Depth= 600 mm	ElsymD	25	-5	-6	25.0	2.108E+76
			ElsymS	29	-6	-6	21.6	1.760E+66
			FenlapK	26	5	5	39.4	1.534E+118
			FenlapB	28	5	5	36.0	1.902E+108
	750		FenlapM	21	4	4	46.8	6.104E+139
All - SFB	1000 mm	Selected Soil Subgrade	Test programme: 1			Lab.: All		SFB ***1***
		Char.: **Mr_i=160 MPa**	**n_i= 0.41**					**Unit Weight: 16**
		Loach: **C= 31,846**	**D= 0.7333**	**q_i =**	**1.71**	***p +**	**26**	**Suction: 3**
		Strain - Top of the Selected Subgrade		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 751 mm	ElsymD	-41	-50	91		2.804E+16
			ElsymS	-54	-54	107		4.678E+15
			FenlapK	3	3	11		1.498E+27
			FenlapB	1	1	12		3.610E+26
	1750		FenlapM	3	3	10		4.293E+27
All - LOC	Infinite	In-Situ Soil Subgrade Foundation	Test programme: 1			Lab.: All		LOC ***2***
		Char.: **Mr_i=34 MPa**	**n_i= 0.54**	**=0.45**				**Unit Weight: 22**
		Brown: **A= 21,858**	**B= 0.4820**	**q_i =**	**0.001**	***p +**	**86**	**Suction: 32**
		Strain - Top of the Subgrade Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 1751 mm	ElsymD	-31	-33	72		4.429E+17
			ElsymS	-33	-33	75		2.749E+17
			FenlapK	-10	-10	23		2.672E+23
			FenlapB	-10	-10	22		3.457E+23
	2750		FenlapM	-9	-9	21		5.582E+23
							Minimum Design Loading:	**1.416E+05**

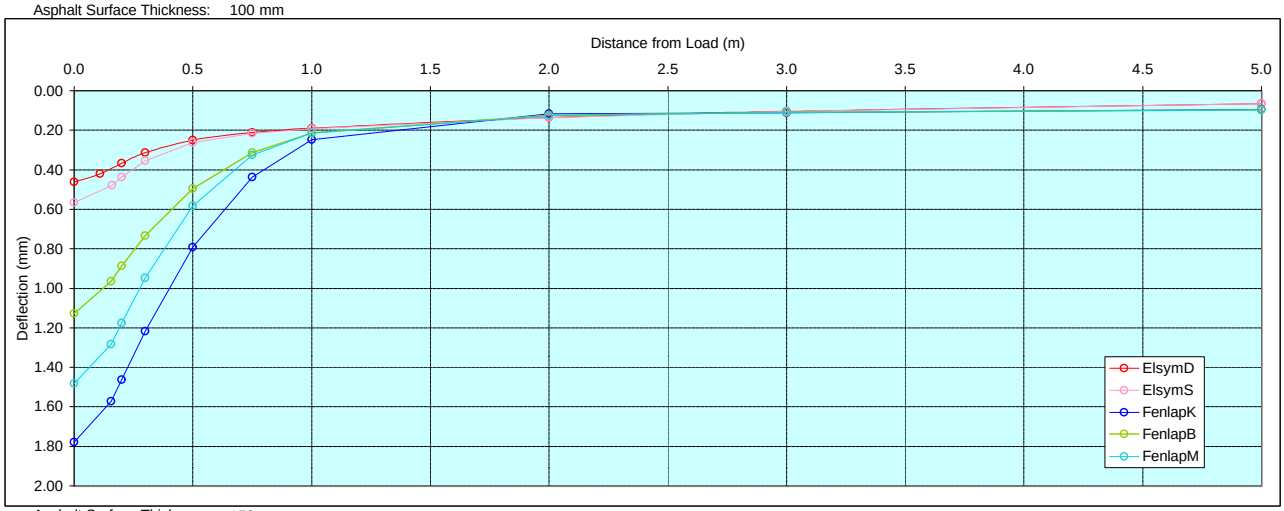
Deflection Bowl Comparison **Pavement Structure Under Construction**

Asphalt Surface Thickness: 50 mm

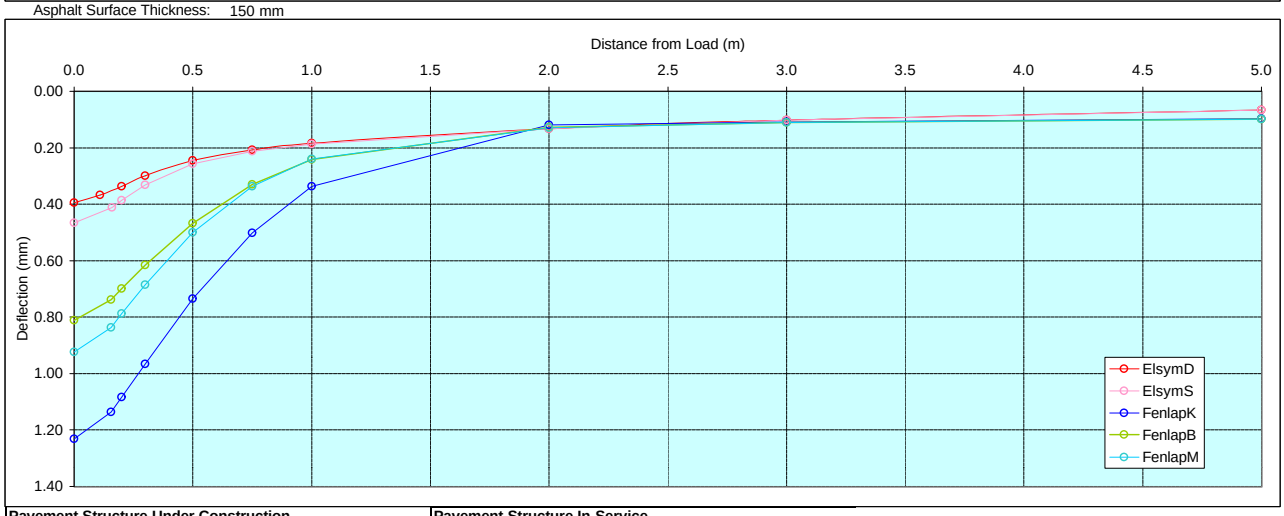


Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Asphalt Surface Thickness: 150 mm



Pavement Structure Under Construction

Asphalt: 50 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.587	0.00	0.741	0.00	2.855	#####	#####	0.00	2.914
0.11	0.496	0.16	0.568	0.16	2.255	#####	#####	0.16	2.262
0.20	0.389	0.20	0.487	0.20	1.964	#####	#####	0.20	1.951
0.30	0.319	0.30	0.363	0.30	1.374	#####	#####	0.30	1.320
0.50	0.257	0.50	0.269	0.50	0.624	#####	#####	0.50	0.567
0.75	0.222	0.75	0.226	0.75	0.242	#####	#####	0.75	0.245
1.00	0.198	1.00	0.201	1.00	0.142	#####	#####	1.00	0.173
2.00	0.141	2.00	0.141	2.00	0.132	#####	#####	2.00	0.125
3.00	0.107	3.00	0.107	3.00	0.108	#####	#####	3.00	0.108
5.00	0.067	5.00	0.066	5.00	0.093	#####	#####	5.00	0.094

Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.461	0.00	0.567	0.00	1.778	0.00	1.127	0.00	1.482
0.11	0.421	0.16	0.479	0.16	1.573	0.16	0.965	0.16	1.282
0.20	0.367	0.20	0.437	0.20	1.464	0.20	0.887	0.20	1.177
0.30	0.313	0.30	0.354	0.30	1.218	0.30	0.733	0.30	0.948
0.50	0.249	0.50	0.262	0.50	0.791	0.50	0.496	0.50	0.584
0.75	0.212	0.75	0.216	0.75	0.438	0.75	0.313	0.75	0.327
1.00	0.189	1.00	0.192	1.00	0.248	1.00	0.214	1.00	0.214
2.00	0.136	2.00	0.137	2.00	0.117	2.00	0.125	2.00	0.126
3.00	0.104	3.00	0.105	3.00	0.111	3.00	0.110	3.00	0.110
5.00	0.066	5.00	0.066	5.00	0.095	5.00	0.096	5.00	0.096

Mechanistic Pavement Analysis Pavement life as a function of the Variation in the Base Characteristics

Pavement Structure - Under Construction (UC):

Surface — 50 mm — Bituminous prime coat to protect the granular base — **Unit Weight: 23**
Mr$_i$=2,100 MPa **n$_i$= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.565	0.708	1.967	NS	NS

Strain - Bottom of the Base Layer — Depth= 49 mm — 50

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	248	285	-437		2.221E+06
ElsymS	248	248	-431		4.086E+06
FenlapK	885	885	-1280		**1.545E+04**
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

LNEC - MIG — 300 mm — Unbound Granular Base — Test programme: 2 — Lab.: LNEC — MIG ***5***
Char.: **Mr$_i$=218 MPa** **n$_i$= 0.22** **Unit Weight: 22**
k q: **k$_1$= 1,745** **k$_2$= 0.7339** **Suction: 0**
Boyce: **Ka= 16,683** **Ga= 2,769** **n= 0.1161**
Mayhew: **Ka= NS** **Ga= NS** **n= NS** **m= NS** **b= NS**

Stress - Centre of the Base Layer — Depth= 200 mm — 350

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	134	1	-11	14.7	1.245E+46
ElsymS	203	-10	-10	11.5	5.934E+36
FenlapK	163	-38	-39	9.3	2.571E+30
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

All - MIG — 300 mm — Unbound Granular Subbase — Test programme: 1 — Lab.: All — MIG ***4***
Char.: **Mr$_i$=235 MPa** **n$_i$= 0.28** **Unit Weight: 22**
k q: **k$_1$= 1,333** **k$_2$= 0.6716** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 500 mm — 650

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	40	-5	-7	19.1	1.484E+59
ElsymS	51	-8	-8	15.3	8.771E+47
FenlapK	80	6	6	16.3	9.140E+50
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

All - SFB — 1000 mm — Selected Soil Subgrade — Test programme: 1 — Lab.: All — SFB ***1***
Char.: **Mr$_i$=160 MPa** **n$_i$= 0.41** **Unit Weight: 16**
Loach: **C= 31,846** **D= 0.7333** **q$_i$ = 1.71 *p + 26** **Suction: 3**

Strain - Top of the Selected Subgrade — Depth= 651 mm — 1650

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-53	-71	129		5.223E+14
ElsymS	-79	-79	162		3.964E+13
FenlapK	-7	-7	34		2.270E+21
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

All - LOC — Infinite — In-Situ Soil Subgrade Foundation — Test programme: 1 — Lab.: All — LOC ***2***
Char.: **Mr$_i$=34 MPa** **n$_i$= 0.54** **=0.45** **Unit Weight: 22**
Brown: **A= 21,858** **B= 0.4820** **q$_i$ = 0.001 *p + 86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1651 mm — 2650

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-37	-39	61		3.118E+18
ElsymS	-38	-38	62		2.486E+18
FenlapK	-12	-12	29		1.575E+22
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

Minimum Design Loading: 1.545E+04

Pavement Structure - In-Service (IS):

Surface — 100 mm — Asphalt Surface and Base Layer — **Unit Weight: 23**
Mr$_i$=2,100 MPa **n$_i$= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.449	0.549	1.401	NS	NS

Strain - Bottom of the Base Layer — Depth= 99 mm — 100

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	172	243	-320		4.451E+06
ElsymS	274	274	-426		2.635E+06
FenlapK	746	746	-1020		**3.268E+04**
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

LNEC - MIG — 300 mm — Unbound Granular Base — Test programme: 2 — Lab.: LNEC — MIG ***5***
Char.: **Mr$_i$=218 MPa** **n$_i$= 0.22** **Unit Weight: 22**
k q: **k$_1$= 1,745** **k$_2$= 0.7339** **Suction: 0**
Boyce: **Ka= 16,683** **Ga= 2,769** **n= 0.1161**
Mayhew: **Ka= NS** **Ga= NS** **n= NS** **m= NS** **b= NS**

Stress - Centre of the Base Layer — Depth= 250 mm — 400

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	87	-1	-8	17.3	5.428E+53
ElsymS	126	-10	-10	13.2	7.060E+41
FenlapK	81	-9	-9	15.6	9.244E+48
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

All - MIG — 300 mm — Unbound Granular Subbase — Test programme: 1 — Lab.: All — MIG ***4***
Char.: **Mr$_i$=235 MPa** **n$_i$= 0.28** **Unit Weight: 22**
k q: **k$_1$= 1,333** **k$_2$= 0.6716** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 550 mm — 700

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	32	-5	-7	21.6	1.511E+66
ElsymS	38	-8	-8	18.0	5.418E+55
FenlapK	48	6	6	23.7	3.786E+72
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

All - SFB — 1000 mm — Selected Soil Subgrade — Test programme: 1 — Lab.: All — SFB ***1***
Char.: **Mr$_i$=160 MPa** **n$_i$= 0.41** **Unit Weight: 16**
Loach: **C= 31,846** **D= 0.7333** **q$_i$ = 1.71 *p + 26** **Suction: 3**

Strain - Top of the Selected Subgrade — Depth= 701 mm — 1700

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-47	-60	109		3.862E+15
ElsymS	-65	-65	131		4.536E+14
FenlapK	-2	-2	21		5.894E+23
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

All - LOC — Infinite — In-Situ Soil Subgrade Foundation — Test programme: 1 — Lab.: All — LOC ***2***
Char.: **Mr$_i$=34 MPa** **n$_i$= 0.54** **=0.45** **Unit Weight: 22**
Brown: **A= 21,858** **B= 0.4820** **q$_i$ = 0.001 *p + 86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1701 mm — 2700

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-34	-35	55		9.135E+18
ElsymS	-35	-35	57		6.476E+18
FenlapK	-11	-11	26		5.561E+22
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

Minimum Design Loading: 3.268E+04

Pavement Structure - In-Service (IS):

Surface — 150 mm — Asphalt Surface and Base Layer — **Unit Weight: 23**
Mr$_i$=2,100 MPa **n$_i$= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.385	0.455	1.029	NS	NS

Strain - Bottom of the Base Layer — Depth= 149 mm — 0

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	116	177	-223		1.784E+07
ElsymS	213	213	-322		8.010E+06
FenlapK	477	477	-637		**2.324E+05**
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

LNEC - MIG — 300 mm — Unbound Granular Base — Test programme: 2 — Lab.: LNEC — MIG ***5***
Char.: **Mr$_i$=218 MPa** **n$_i$= 0.22** **Unit Weight: 22**
k q: **k$_1$= 1,745** **k$_2$= 0.7339** **Suction: 0**
Boyce: **Ka= 16,683** **Ga= 2,769** **n= 0.1161**
Mayhew: **Ka= NS** **Ga= NS** **n= NS** **m= NS** **b= NS**

Stress - Centre of the Base Layer — Depth= 300 mm — 450

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	62	-2	-7	20.1	1.067E+62
ElsymS	84	-8	-8	15.7	9.669E+48
FenlapK	44	-2	-2	25.3	1.290E+77
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

All - MIG — 300 mm — Unbound Granular Subbase — Test programme: 1 — Lab.: All — MIG ***4***
Char.: **Mr$_i$=235 MPa** **n$_i$= 0.28** **Unit Weight: 22**
k q: **k$_1$= 1,333** **k$_2$= 0.6716** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 600 mm — 750

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	25	-5	-6	24.9	7.340E+75
ElsymS	29	-7	-7	21.4	5.076E+65
FenlapK	29	5	5	35.1	6.100E+105
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

All - SFB — 1000 mm — Selected Soil Subgrade — Test programme: 1 — Lab.: All — SFB ***1***
Char.: **Mr$_i$=160 MPa** **n$_i$= 0.41** **Unit Weight: 16**
Loach: **C= 31,846** **D= 0.7333** **q$_i$ = 1.71 *p + 26** **Suction: 3**

Strain - Top of the Selected Subgrade — Depth= 751 mm — 1750

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-41	-50	91		3.039E+16
ElsymS	-54	-54	106		5.044E+15
FenlapK	2	2	12		2.479E+26
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

All - LOC — Infinite — In-Situ Soil Subgrade Foundation — Test programme: 1 — Lab.: All — LOC ***2***
Char.: **Mr$_i$=34 MPa** **n$_i$= 0.54** **=0.45** **Unit Weight: 22**
Brown: **A= 21,858** **B= 0.4820** **q$_i$ = 0.001 *p + 86** **Suction: 32**

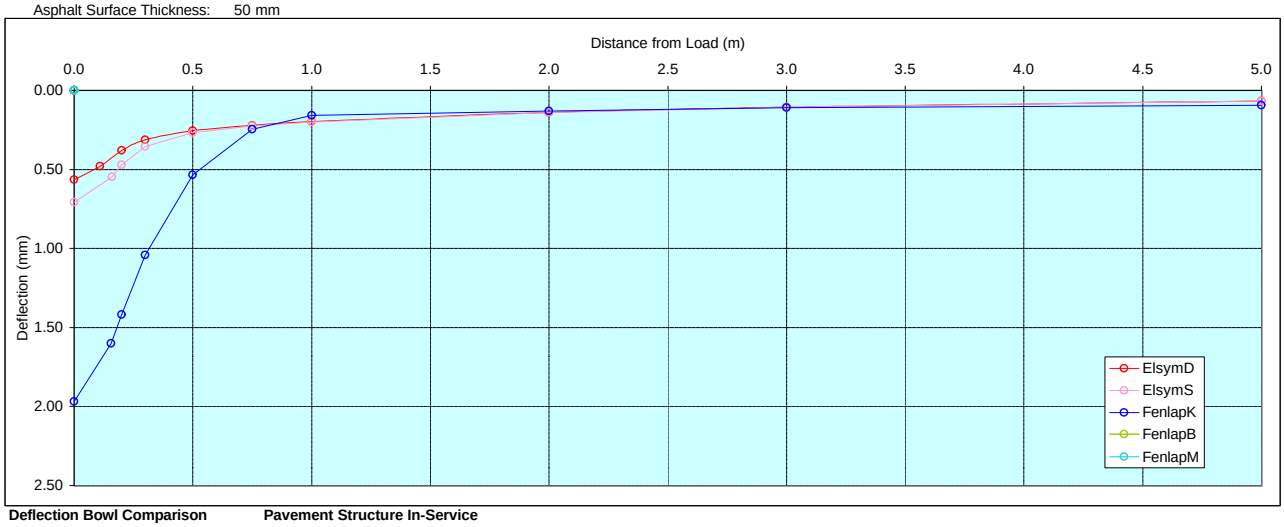
Strain - Top of the Subgrade Layer — Depth= 1751 mm — 2750

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-31	-32	71		4.963E+17
ElsymS	-33	-33	74		3.104E+17
FenlapK	-10	-10	23		2.077E+23
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

Minimum Design Loading: 2.324E+05

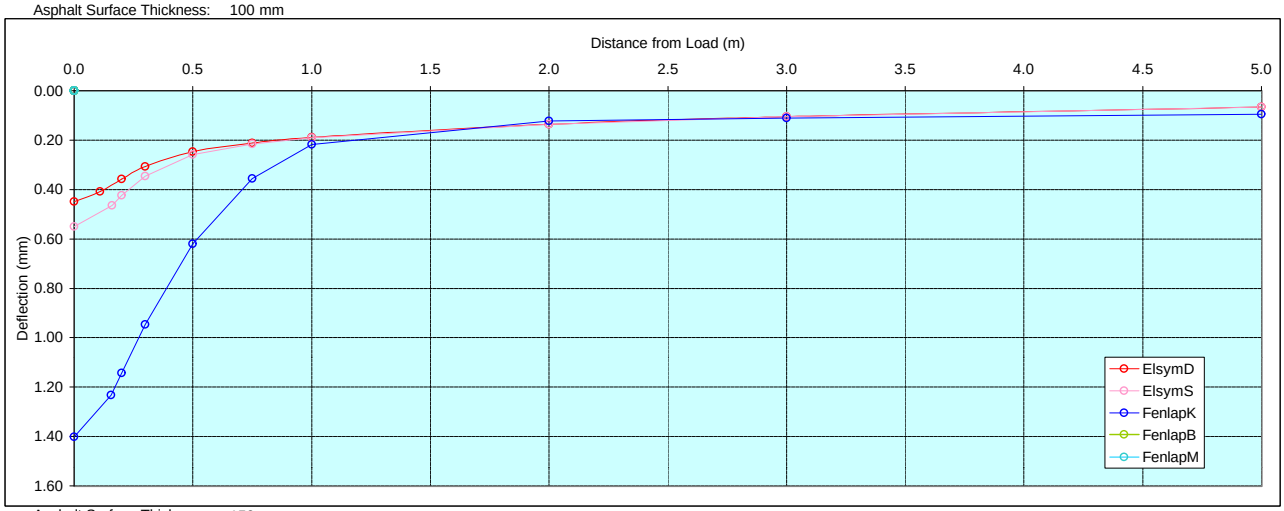
Deflection Bowl Comparison **Pavement Structure Under Construction**

Asphalt Surface Thickness: 50 mm

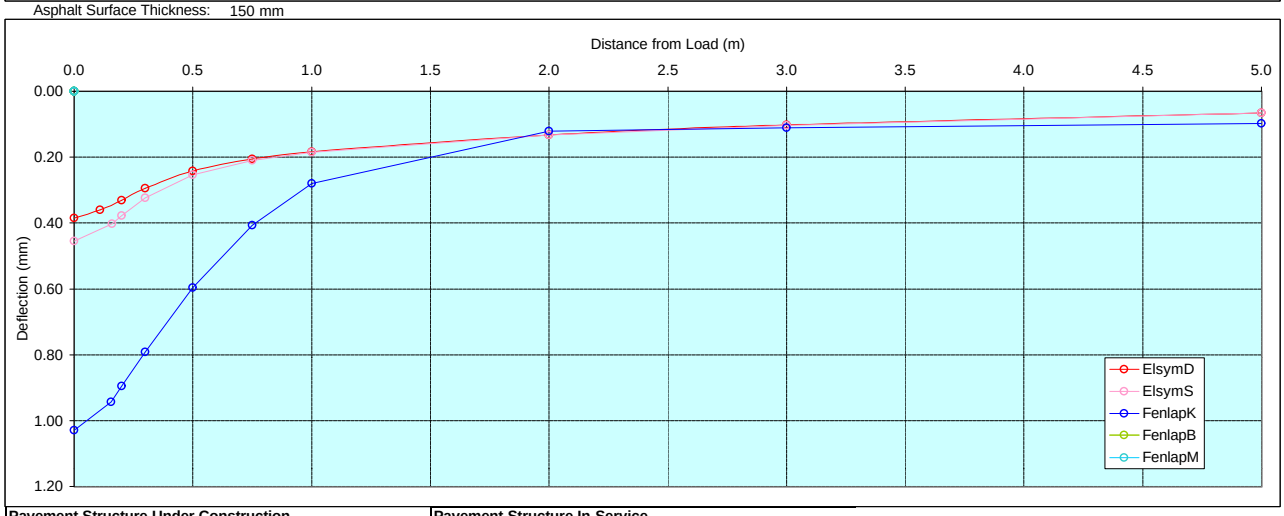


Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Asphalt Surface Thickness: 150 mm



Pavement Structure Under Construction

Asphalt: 50 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.565	0.00	0.708	0.00	1.967	#####	#####	#####	#####
0.11	0.479	0.16	0.547	0.16	1.602	#####	#####	#####	#####
0.20	0.380	0.20	0.471	0.20	1.418	#####	#####	#####	#####
0.30	0.314	0.30	0.355	0.30	1.041	#####	#####	#####	#####
0.50	0.256	0.50	0.267	0.50	0.535	#####	#####	#####	#####
0.75	0.221	0.75	0.226	0.75	0.247	#####	#####	#####	#####
1.00	0.198	1.00	0.200	1.00	0.157	#####	#####	#####	#####
2.00	0.141	2.00	0.141	2.00	0.131	#####	#####	#####	#####
3.00	0.107	3.00	0.107	3.00	0.108	#####	#####	#####	#####
5.00	0.067	5.00	0.066	5.00	0.093	#####	#####	#####	#####

Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.449	0.00	0.549	0.00	1.401	#####	#####	#####	#####
0.11	0.409	0.16	0.465	0.16	1.232	#####	#####	#####	#####
0.20	0.358	0.20	0.425	0.20	1.143	#####	#####	#####	#####
0.30	0.307	0.30	0.346	0.30	0.947	#####	#####	#####	#####
0.50	0.247	0.50	0.259	0.50	0.619	#####	#####	#####	#####
0.75	0.211	0.75	0.216	0.75	0.356	#####	#####	#####	#####
1.00	0.189	1.00	0.191	1.00	0.218	#####	#####	#####	#####
2.00	0.136	2.00	0.137	2.00	0.122	#####	#####	#####	#####
3.00	0.104	3.00	0.104	3.00	0.111	#####	#####	#####	#####
5.00	0.066	5.00	0.066	5.00	0.095	#####	#####	#####	#####

Mechanistic Pavement Analysis Pavement life as a function of the Variation in the Base Characteristics

Pavement Structure - Under Construction (UC):

Surface	50 mm	Bituminous prime coat to protect the granular base						**Unit Weight: 23**	
		Mr_i=2,100 MPa	**n_i= 0.40**					**Suction: 0**	
		Peak Deflection on the Surface		ElsymD	ElsymS	FenlapK	FenlapB	FenlapM	
			δ_p (mm)=	0.562	0.708	5.065	NS	7.492	
		Strain - Bottom of the Base Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA	
		Depth= 49 mm	ElsymD	279	324	-484		1.262E+06	
			ElsymS	291	291	-490		2.036E+06	
			FenlapK	2710	2710	-3650		1.141E+02	
			FenlapB	NS	NS	NS			
	50		FenlapM	3840	3840	-5130		**2.473E+01**	
UNOT - MIG	300 mm	Unbound Granular Base	Test programme: 2			Lab.: UNOT		MIG *6*	
		Char.: **Mr_i=218 MPa**	**n_i= 0.37**					**Unit Weight: 22**	
		k q: **k_1= 2,004**	**k_2= 0.2430**					**Suction: 0**	
		Boyce: **Ka= 12,055**	**Ga= 108,161**	**n= 0.6201**					
		Mayhew: **Ka= 5,469**	**Ga= 8,477**	**n= 0.4367**		**m= 1.9558**		**b= 0.4739**	
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA	
		Depth= 200 mm	ElsymD	146	20	5	17.6	3.650E+54	
			ElsymS	223	15	15	13.6	1.227E+43	
			FenlapK	126	21	21	19.4	1.066E+60	
			FenlapB	NS	NS	NS	NS		
	350		FenlapM	59	42	42	97.3	8.695E+286	
All - MIG	300 mm	Unbound Granular Subbase	Test programme: 1			Lab.: All		MIG *4*	
		Char.: **Mr_i=235 MPa**	**n_i= 0.28**					**Unit Weight: 22**	
		k q: **k_1= 1,333**	**k_2= 0.6716**					**Suction: 0**	
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA	
		Depth= 500 mm	ElsymD	43	-6	-9	17.8	1.791E+55	
			ElsymS	55	-10	-10	14.1	3.295E+44	
			FenlapK	70	4	4	17.1	1.752E+53	
			FenlapB	NS	NS	NS	NS		
	650		FenlapM	48	6	6	23.5	5.454E+71	
All - SFB	1000 mm	Selected Soil Subgrade	Test programme: 1			Lab.: All		SFB *1*	
		Char.: **Mr_i=160 MPa**	**n_i= 0.41**					**Unit Weight: 16**	
		Loach: **C= 31,846**	**D= 0.7333**	**q_i =**	**1.71**	***p +**	**26**	**Suction: 3**	
		Strain - Top of the Selected Subgrade		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA	
		Depth= 651 mm	ElsymD	-57	-77	137		2.646E+14	
			ElsymS	-86	-86	173		1.853E+13	
			FenlapK	-6	-6	30		1.150E+22	
			FenlapB	NS	NS	NS			
	1650		FenlapM	-3	-3	22		3.839E+23	
All - LOC	Infinite	In-Situ Soil Subgrade Foundation	Test programme: 1			Lab.: All		LOC *2*	
		Char.: **Mr_i=34 MPa**	**n_i= 0.54**	**=0.45**				**Unit Weight: 22**	
		Brown: **A= 21,858**	**B= 0.4820**	**q_i =**	**0.001**	***p +**	**86**	**Suction: 32**	
		Strain - Top of the Subgrade Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA	
		Depth= 1651 mm	ElsymD	-37	-39	61		2.811E+18	
			ElsymS	-39	-39	63		2.180E+18	
			FenlapK	-12	-12	29		1.345E+22	
			FenlapB	NS	NS	NS			
	2650		FenlapM	-12	-12	26		4.662E+22	
								Minimum Design Loading:	**2.473E+01**

Pavement Structure - In-Service (IS):

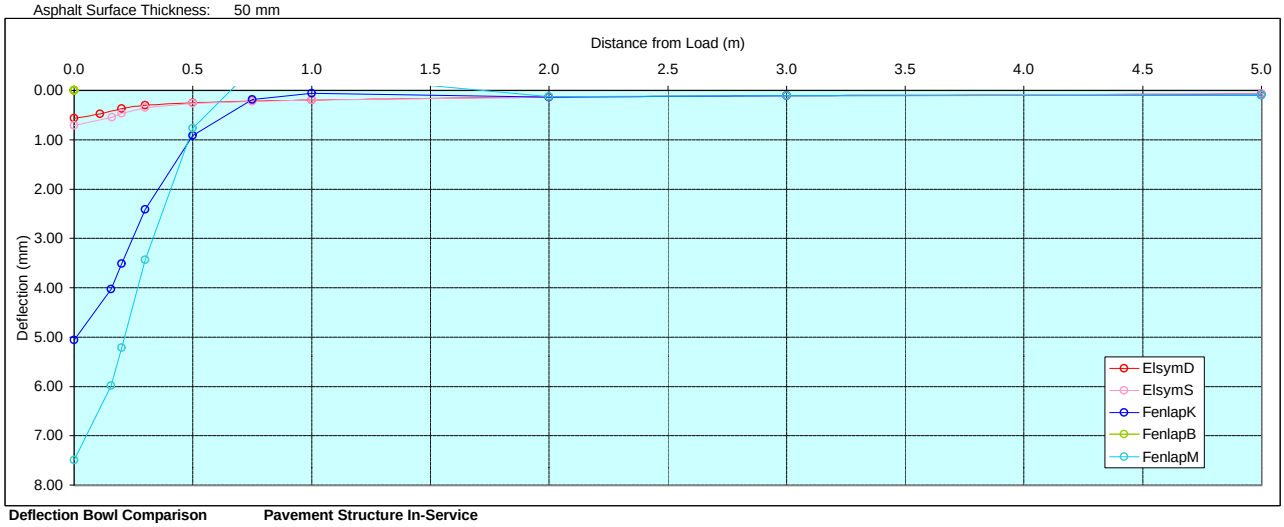
Surface	100 mm	Asphalt Surface and Base Layer						**Unit Weight: 23**	
		Mr_i=2,100 MPa	**n_i= 0.40**					**Suction: 0**	
		Peak Deflection on the Surface		ElsymD	ElsymS	FenlapK	FenlapB	FenlapM	
			δ_p (mm)=	0.449	0.552	2.400	NS	2.373	
		Strain - Bottom of the Base Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA	
		Depth= 99 mm	ElsymD	184	261	-340		3.255E+06	
			ElsymS	296	296	-455		1.881E+06	
			FenlapK	1120	1120	-1490		5.499E+03	
			FenlapB	NS	NS	NS			
	100		FenlapM	1220	1220	-1620		**3.779E+03**	
UNOT - MIG	300 mm	Unbound Granular Base	Test programme: 2			Lab.: UNOT		MIG *6*	
		Char.: **Mr_i=218 MPa**	**n_i= 0.37**					**Unit Weight: 22**	
		k q: **k_1= 2,004**	**k_2= 0.2430**					**Suction: 0**	
		Boyce: **Ka= 12,055**	**Ga= 108,161**	**n= 0.6201**					
		Mayhew: **Ka= 5,469**	**Ga= 8,477**	**n= 0.4367**		**m= 1.9558**		**b= 0.4739**	
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA	
		Depth= 250 mm	ElsymD	93	12	4	20.9	2.303E+64	
			ElsymS	136	8	8	15.8	3.521E+49	
			FenlapK	49	15	15	38.8	2.242E+116	
			FenlapB	NS	NS	NS	NS		
	400		FenlapM	33	26	26	177.1		
All - MIG	300 mm	Unbound Granular Subbase	Test programme: 1			Lab.: All		MIG *4*	
		Char.: **Mr_i=235 MPa**	**n_i= 0.28**					**Unit Weight: 22**	
		k q: **k_1= 1,333**	**k_2= 0.6716**					**Suction: 0**	
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA	
		Depth= 550 mm	ElsymD	34	-6	-8	20.1	1.006E+62	
			ElsymS	42	-9	-9	16.7	1.077E+52	
			FenlapK	35	5	5	30.2	2.857E+91	
			FenlapB	NS	NS	NS	NS		
	700		FenlapM	28	6	6	37.8	4.719E+113	
All - SFB	1000 mm	Selected Soil Subgrade	Test programme: 1			Lab.: All		SFB *1*	
		Char.: **Mr_i=160 MPa**	**n_i= 0.41**					**Unit Weight: 16**	
		Loach: **C= 31,846**	**D= 0.7333**	**q_i =**	**1.71**	***p +**	**26**	**Suction: 3**	
		Strain - Top of the Selected Subgrade		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA	
		Depth= 701 mm	ElsymD	-51	-65	116		1.778E+15	
			ElsymS	-71	-71	141		1.950E+14	
			FenlapK	1	1	15		3.522E+25	
			FenlapB	NS	NS	NS			
	1700		FenlapM	3	3	11		1.498E+27	
All - LOC	Infinite	In-Situ Soil Subgrade Foundation	Test programme: 1			Lab.: All		LOC *2*	
		Char.: **Mr_i=34 MPa**	**n_i= 0.54**	**=0.45**				**Unit Weight: 22**	
		Brown: **A= 21,858**	**B= 0.4820**	**q_i =**	**0.001**	***p +**	**86**	**Suction: 32**	
		Strain - Top of the Subgrade Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA	
		Depth= 1701 mm	ElsymD	-34	-36	56		7.225E+18	
			ElsymS	-36	-36	58		4.957E+18	
			FenlapK	-11	-11	25		7.981E+22	
			FenlapB	NS	NS	NS			
	2700		FenlapM	-11	-11	26		5.815E+22	
								Minimum Design Loading:	**3.779E+03**

Pavement Structure - In-Service (IS):

Surface	150 mm	Asphalt Surface and Base Layer						**Unit Weight: 23**	
		Mr_i=2,100 MPa	**n_i= 0.40**					**Suction: 0**	
		Peak Deflection on the Surface		ElsymD	ElsymS	FenlapK	FenlapB	FenlapM	
			δ_p (mm)=	0.387	0.457	1.502	NS	1.345	
		Strain - Bottom of the Base Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA	
		Depth= 149 mm	ElsymD	123	187	-233		1.399E+07	
			ElsymS	225	225	-338		6.260E+06	
			FenlapK	599	599	-789		8.557E+04	
			FenlapB	NS	NS	NS			
	0		FenlapM	611	611	-804		**7.844E+04**	
UNOT - MIG	300 mm	Unbound Granular Base	Test programme: 2			Lab.: UNOT		MIG *6*	
		Char.: **Mr_i=218 MPa**	**n_i= 0.37**					**Unit Weight: 22**	
		k q: **k_1= 2,004**	**k_2= 0.2430**					**Suction: 0**	
		Boyce: **Ka= 12,055**	**Ga= 108,161**	**n= 0.6201**					
		Mayhew: **Ka= 5,469**	**Ga= 8,477**	**n= 0.4367**		**m= 1.9558**		**b= 0.4739**	
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA	
		Depth= 300 mm	ElsymD	66	7	3	24.3	1.252E+74	
			ElsymS	89	4	4	18.8	1.230E+58	
			FenlapK	27	10	10	64.9	4.400E+192	
			FenlapB	NS	NS	NS	NS		
	450		FenlapM	22	18	18	256.8		
All - MIG	300 mm	Unbound Granular Subbase	Test programme: 1			Lab.: All		MIG *4*	
		Char.: **Mr_i=235 MPa**	**n_i= 0.28**					**Unit Weight: 22**	
		k q: **k_1= 1,333**	**k_2= 0.6716**					**Suction: 0**	
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA	
		Depth= 600 mm	ElsymD	27	-6	-7	23.4	3.267E+71	
			ElsymS	32	-7	-7	20.1	6.977E+61	
			FenlapK	21	4	4	47.7	3.576E+142	
			FenlapB	NS	NS	NS	NS		
	750		FenlapM	19	5	5	52.9	3.591E+157	
All - SFB	1000 mm	Selected Soil Subgrade	Test programme: 1			Lab.: All		SFB *1*	
		Char.: **Mr_i=160 MPa**	**n_i= 0.41**					**Unit Weight: 16**	
		Loach: **C= 31,846**	**D= 0.7333**	**q_i =**	**1.71**	***p +**	**26**	**Suction: 3**	
		Strain - Top of the Selected Subgrade		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA	
		Depth= 751 mm	ElsymD	-44	-54	97		1.421E+16	
			ElsymS	-58	-58	114		2.259E+15	
			FenlapK	4	4	8		6.902E+28	
			FenlapB	NS	NS	NS			
	1750		FenlapM	5	5	6		6.767E+29	
All - LOC	Infinite	In-Situ Soil Subgrade Foundation	Test programme: 1			Lab.: All		LOC *2*	
		Char.: **Mr_i=34 MPa**	**n_i= 0.54**	**=0.45**				**Unit Weight: 22**	
		Brown: **A= 21,858**	**B= 0.4820**	**q_i =**	**0.001**	***p +**	**86**	**Suction: 32**	
		Strain - Top of the Subgrade Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA	
		Depth= 1751 mm	ElsymD	-32	-33	73		3.750E+17	
			ElsymS	-34	-34	76		2.277E+17	
			FenlapK	-10	-10	22		3.839E+23	
			FenlapB	NS	NS	NS			
	2750		FenlapM	-10	-10	23		2.077E+23	
								Minimum Design Loading:	**7.844E+04**

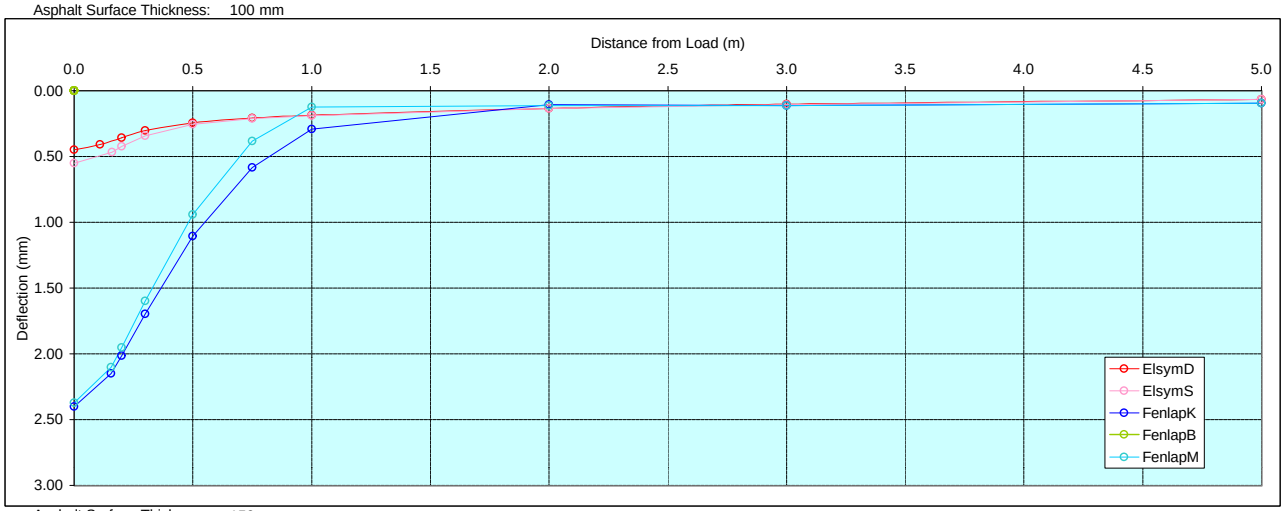
Deflection Bowl Comparison **Pavement Structure Under Construction**

Asphalt Surface Thickness: 50 mm

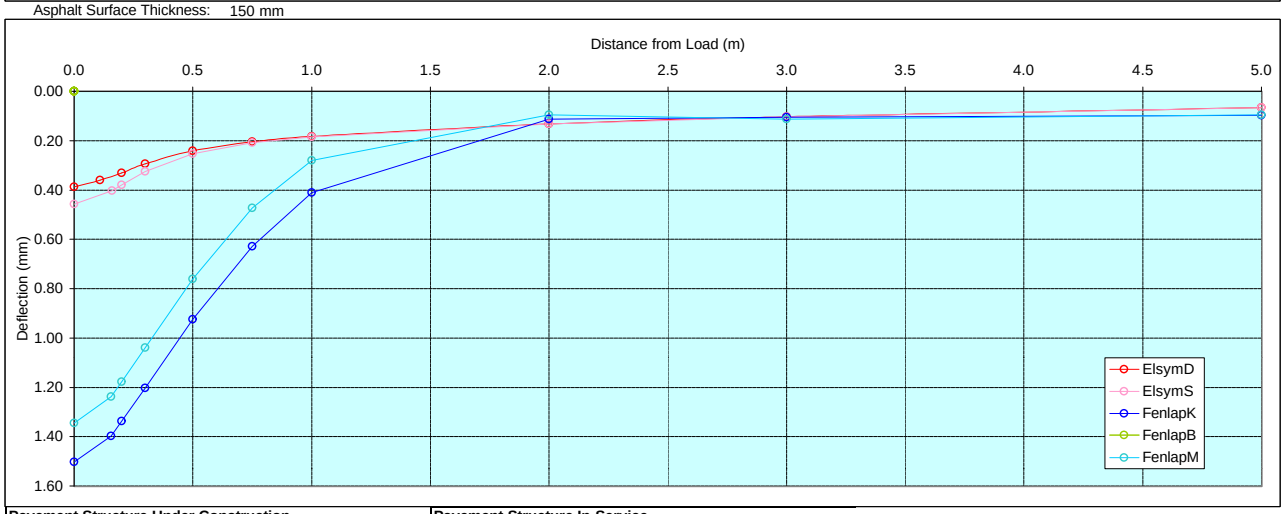


Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Asphalt Surface Thickness: 150 mm



Pavement Structure Under Construction

Asphalt: 50 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.562	0.00	0.708	0.00	5.065	#####	#####	0.00	7.492
0.11	0.474	0.16	0.541	0.16	4.030	#####	#####	0.16	5.989
0.20	0.372	0.20	0.464	0.20	3.518	#####	#####	0.20	5.216
0.30	0.306	0.30	0.347	0.30	2.414	#####	#####	0.30	3.434
0.50	0.250	0.50	0.260	0.50	0.917	#####	#####	0.50	0.767
0.75	0.217	0.75	0.222	0.75	0.188	#####	#####	0.75	#####
1.00	0.195	1.00	0.197	1.00	0.062	#####	#####	1.00	#####
2.00	0.140	2.00	0.140	2.00	0.139	#####	#####	2.00	0.129
3.00	0.106	3.00	0.106	3.00	0.107	#####	#####	3.00	0.110
5.00	0.067	5.00	0.066	5.00	0.093	#####	#####	5.00	0.093

Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.449	0.00	0.552	0.00	2.400	#####	#####	0.00	2.373
0.11	0.409	0.16	0.466	0.16	2.150	#####	#####	0.16	2.102
0.20	0.356	0.20	0.424	0.20	2.015	#####	#####	0.20	1.954
0.30	0.304	0.30	0.343	0.30	1.696	#####	#####	0.30	1.600
0.50	0.244	0.50	0.256	0.50	1.106	#####	#####	0.50	0.940
0.75	0.209	0.75	0.213	0.75	0.583	#####	#####	0.75	0.382
1.00	0.187	1.00	0.189	1.00	0.291	#####	#####	1.00	0.123
2.00	0.135	2.00	0.136	2.00	0.106	#####	#####	2.00	0.113
3.00	0.104	3.00	0.104	3.00	0.112	#####	#####	3.00	0.114
5.00	0.066	5.00	0.066	5.00	0.094	#####	#####	5.00	0.096

Mechanistic Pavement Analysis Pavement life as a function of the Variation in the Base Characteristics

Pavement Structure - Under Construction (UC):

Surface — 50 mm — 50

Bituminous prime coat to protect the granular base — **Unit Weight: 23**
Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.539	0.673	4.207	NS	NS

Strain - Bottom of the Base Layer — Depth= 49 mm

	ε_x(με)	ε_x(με)	ε_z(με)		ESA
ElsymD	248	285	-440		2.211E+06
ElsymS	248	248	-434		4.064E+06
FenlapK	2360	2360	-3190		**2.092E+02**
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

LRSB - MIG — 300 mm — 350

Unbound Granular Base — Test programme: 2 — Lab.: LRSB — MIG ***7***
Char.: **Mr_i=245 MPa** **n_i= 0.34** **Unit Weight: 22**
k-q: **k_1= 2,202** **k_2= 0.3140** **Suction: 0**
Boyce: **Ka= 6,557** **Ga= 74,140** **n= 0.5499**
Mayhew: **Ka= 7,871** **Ga= 16,497** **n= 0.4718** **m= 0.5095** **b= 0.0966**

Stress - Centre of the Base Layer — Depth= 200 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	144	14	0	16.5	3.892E+51
ElsymS	218	7	7	12.9	1.052E+41
FenlapK	142	12	12	16.3	7.799E+50
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

All - MIG — 300 mm — 650

Unbound Granular Subbase — Test programme: 1 — Lab.: All — MIG ***4***
Char.: **Mr_i=235 MPa** **n_i= 0.28** **Unit Weight: 22**
k-q: **k_1= 1,333** **k_2= 0.6716** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 500 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	41	-6	-9	18.3	4.001E+56
ElsymS	53	-10	-10	14.5	4.702E+45
FenlapK	76	5	4	16.5	2.233E+51
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

All - SFB — 1000 mm — 1650

Selected Soil Subgrade — Test programme: 1 — Lab.: All — SFB ***1***
Char.: **Mr_i=160 MPa** **n_i= 0.41** **Unit Weight: 16**
Loach: **C= 31,846** **D= 0.7333** **q_f = 1.71 *p + 26** **Suction: 3**

Strain - Top of the Selected Subgrade — Depth= 651 mm

	ε_x(με)	ε_x(με)	ε_z(με)		ESA
ElsymD	-55	-74	132		4.050E+14
ElsymS	-83	-83	166		2.975E+13
FenlapK	-6	-6	32		5.242E+21
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

All - LOC — Infinite — 2650

In-Situ Soil Subgrade Foundation — Test programme: 1 — Lab.: All — LOC ***2***
Char.: **Mr_i=34 MPa** **n_i= 0.54** **=0.45** **Unit Weight: 22**
Brown: **A= 21,858** **B= 0.4820** **q_f = 0.001 *p + 86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1651 mm

	ε_x(με)	ε_x(με)	ε_z(με)		ESA
ElsymD	-37	-38	60		3.333E+18
ElsymS	-38	-38	61		2.628E+18
FenlapK	-12	-12	29		1.293E+22
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

Minimum Design Loading: 2.092E+02

Pavement Structure - In-Service (IS):

Surface — 100 mm — 100

Asphalt Surface and Base Layer — **Unit Weight: 23**
Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.436	0.533	2.152	NS	NS

Strain - Bottom of the Base Layer — Depth= 99 mm

	ε_x(με)	ε_x(με)	ε_z(με)		ESA
ElsymD	172	241	-320		4.607E+06
ElsymS	271	271	-424		2.756E+06
FenlapK	1050	1050	-1410		**7.298E+03**
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

LRSB - MIG — 300 mm — 400

Unbound Granular Base — Test programme: 2 — Lab.: LRSB — MIG ***7***
Char.: **Mr_i=245 MPa** **n_i= 0.34** **Unit Weight: 22**
k-q: **k_1= 2,202** **k_2= 0.3140** **Suction: 0**
Boyce: **Ka= 6,557** **Ga= 74,140** **n= 0.5499**
Mayhew: **Ka= 7,871** **Ga= 16,497** **n= 0.4718** **m= 0.5095** **b= 0.0966**

Stress - Centre of the Base Layer — Depth= 250 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	93	8	-1	19.4	7.419E+59
ElsymS	135	2	2	14.7	2.015E+46
FenlapK	56	12	12	31.3	4.945E+94
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

All - MIG — 300 mm — 700

Unbound Granular Subbase — Test programme: 1 — Lab.: All — MIG ***4***
Char.: **Mr_i=235 MPa** **n_i= 0.28** **Unit Weight: 22**
k-q: **k_1= 1,333** **k_2= 0.6716** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 550 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	33	-6	-8	20.6	2.068E+63
ElsymS	40	-9	-9	17.1	1.260E+53
FenlapK	38	6	6	28.1	1.826E+85
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

All - SFB — 1000 mm — 1700

Selected Soil Subgrade — Test programme: 1 — Lab.: All — SFB ***1***
Char.: **Mr_i=160 MPa** **n_i= 0.41** **Unit Weight: 16**
Loach: **C= 31,846** **D= 0.7333** **q_f = 1.71 *p + 26** **Suction: 3**

Strain - Top of the Selected Subgrade — Depth= 701 mm

	ε_x(με)	ε_x(με)	ε_z(με)		ESA
ElsymD	-49	-63	112		2.740E+15
ElsymS	-69	-69	135		3.078E+14
FenlapK	0	0	16		1.004E+25
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

All - LOC — Infinite — 2700

In-Situ Soil Subgrade Foundation — Test programme: 1 — Lab.: All — LOC ***2***
Char.: **Mr_i=34 MPa** **n_i= 0.54** **=0.45** **Unit Weight: 22**
Brown: **A= 21,858** **B= 0.4820** **q_f = 0.001 *p + 86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1701 mm

	ε_x(με)	ε_x(με)	ε_z(με)		ESA
ElsymD	-34	-35	55		9.004E+18
ElsymS	-35	-35	57		6.321E+18
FenlapK	-11	-11	25		6.961E+22
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

Minimum Design Loading: 7.298E+03

Pavement Structure - In-Service (IS):

Surface — 150 mm — 0

Asphalt Surface and Base Layer — **Unit Weight: 23**
Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.377	0.445	1.386	NS	NS

Strain - Bottom of the Base Layer — Depth= 149 mm

	ε_x(με)	ε_x(με)	ε_z(με)		ESA
ElsymD	116	176	-222		1.851E+07
ElsymS	211	211	-321		8.331E+06
FenlapK	577	577	-761		**1.008E+05**
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

LRSB - MIG — 300 mm — 450

Unbound Granular Base — Test programme: 2 — Lab.: LRSB — MIG ***7***
Char.: **Mr_i=245 MPa** **n_i= 0.34** **Unit Weight: 22**
k-q: **k_1= 2,202** **k_2= 0.3140** **Suction: 0**
Boyce: **Ka= 6,557** **Ga= 74,140** **n= 0.5499**
Mayhew: **Ka= 7,871** **Ga= 16,497** **n= 0.4718** **m= 0.5095** **b= 0.0966**

Stress - Centre of the Base Layer — Depth= 300 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	65	4	-1	22.3	1.943E+68
ElsymS	89	-1	-1	17.2	4.141E+53
FenlapK	30	8	8	51.9	5.403E+154
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

All - MIG — 300 mm — 750

Unbound Granular Subbase — Test programme: 1 — Lab.: All — MIG ***4***
Char.: **Mr_i=235 MPa** **n_i= 0.28** **Unit Weight: 22**
k-q: **k_1= 1,333** **k_2= 0.6716** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 600 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	26	-6	-7	23.8	4.682E+72
ElsymS	30	-7	-7	20.4	5.452E+62
FenlapK	23	5	5	44.1	1.062E+132
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

All - SFB — 1000 mm — 1750

Selected Soil Subgrade — Test programme: 1 — Lab.: All — SFB ***1***
Char.: **Mr_i=160 MPa** **n_i= 0.41** **Unit Weight: 16**
Loach: **C= 31,846** **D= 0.7333** **q_f = 1.71 *p + 26** **Suction: 3**

Strain - Top of the Selected Subgrade — Depth= 751 mm

	ε_x(με)	ε_x(με)	ε_z(με)		ESA
ElsymD	-43	-52	94		2.098E+16
ElsymS	-56	-56	110		3.334E+15
FenlapK	3	3	9		1.521E+28
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

All - LOC — Infinite — 2750

In-Situ Soil Subgrade Foundation — Test programme: 1 — Lab.: All — LOC ***2***
Char.: **Mr_i=34 MPa** **n_i= 0.54** **=0.45** **Unit Weight: 22**
Brown: **A= 21,858** **B= 0.4820** **q_f = 0.001 *p + 86** **Suction: 32**

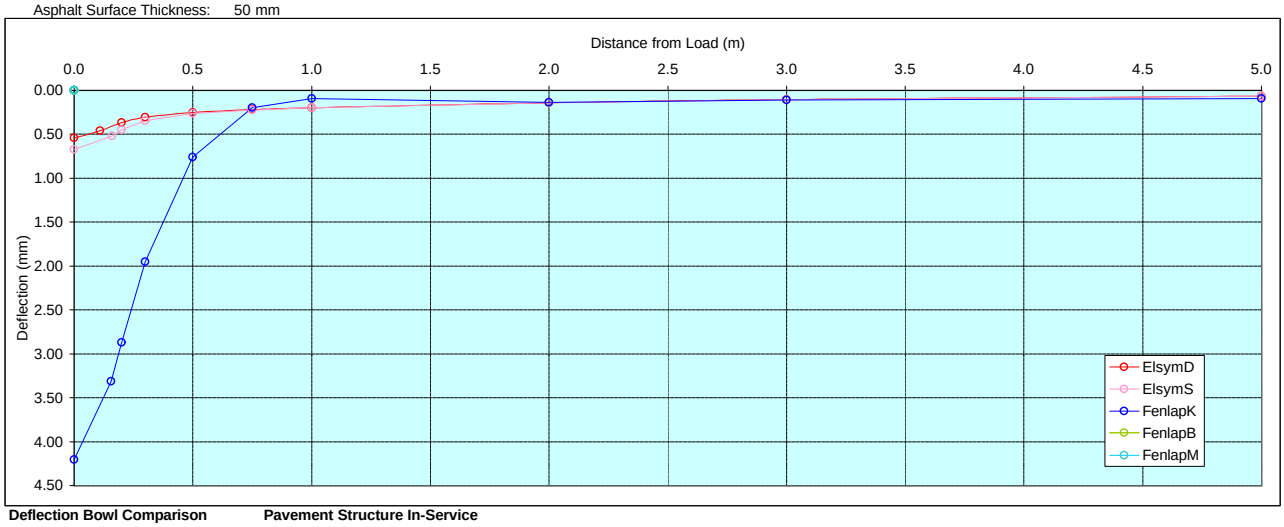
Strain - Top of the Subgrade Layer — Depth= 1751 mm

	ε_x(με)	ε_x(με)	ε_z(με)		ESA
ElsymD	-31	-32	71		4.752E+17
ElsymS	-33	-33	74		2.941E+17
FenlapK	-10	-10	22		3.282E+23
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

Minimum Design Loading: 1.008E+05

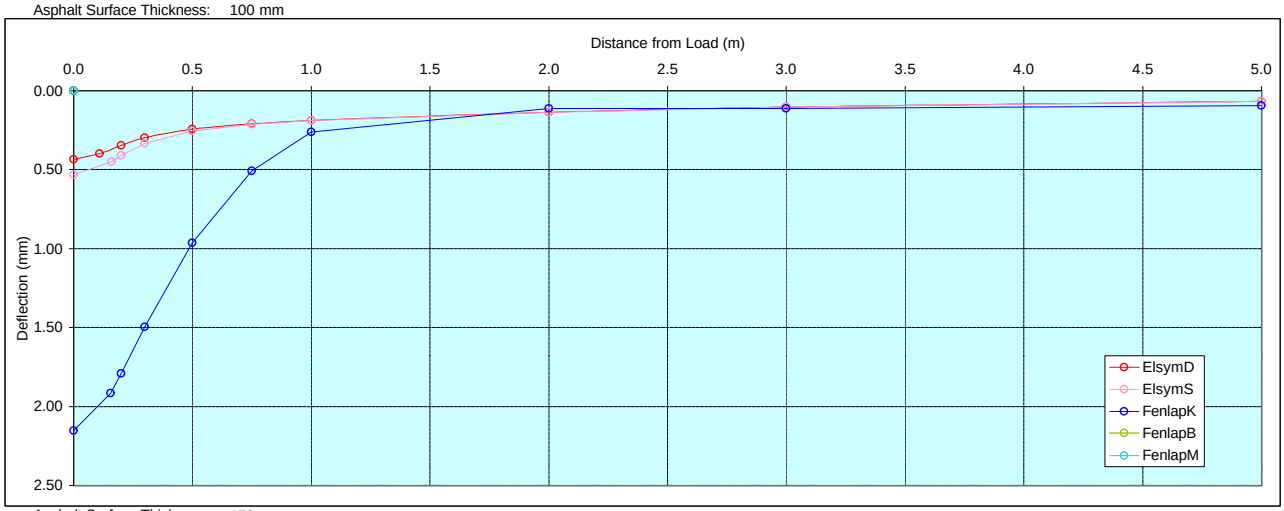
Deflection Bowl Comparison **Pavement Structure Under Construction**

Asphalt Surface Thickness: 50 mm

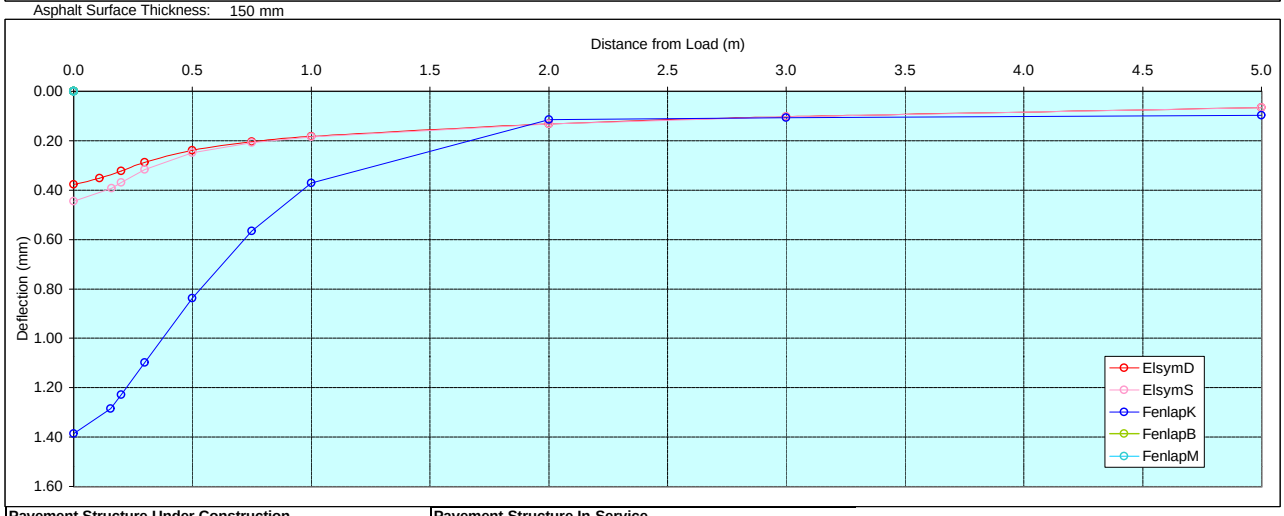


Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Asphalt Surface Thickness: 150 mm



Pavement Structure Under Construction

Asphalt: 50 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.539	0.00	0.673	0.00	4.207	#####	#####	#####	#####
0.11	0.458	0.16	0.521	0.16	3.311	#####	#####	#####	#####
0.20	0.365	0.20	0.450	0.20	2.873	#####	#####	#####	#####
0.30	0.304	0.30	0.342	0.30	1.953	#####	#####	#####	#####
0.50	0.251	0.50	0.261	0.50	0.758	#####	#####	#####	#####
0.75	0.218	0.75	0.222	0.75	0.196	#####	#####	#####	#####
1.00	0.195	1.00	0.198	1.00	0.095	#####	#####	#####	#####
2.00	0.140	2.00	0.140	2.00	0.135	#####	#####	#####	#####
3.00	0.106	3.00	0.106	3.00	0.108	#####	#####	#####	#####
5.00	0.067	5.00	0.066	5.00	0.093	#####	#####	#####	#####

Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.436	0.00	0.533	0.00	2.152	#####	#####	#####	#####
0.11	0.397	0.16	0.451	0.16	1.916	#####	#####	#####	#####
0.20	0.348	0.20	0.412	0.20	1.790	#####	#####	#####	#####
0.30	0.300	0.30	0.336	0.30	1.495	#####	#####	#####	#####
0.50	0.243	0.50	0.254	0.50	0.964	#####	#####	#####	#####
0.75	0.209	0.75	0.213	0.75	0.509	#####	#####	#####	#####
1.00	0.187	1.00	0.190	1.00	0.263	#####	#####	#####	#####
2.00	0.135	2.00	0.136	2.00	0.112	#####	#####	#####	#####
3.00	0.104	3.00	0.104	3.00	0.112	#####	#####	#####	#####
5.00	0.066	5.00	0.066	5.00	0.095	#####	#####	#####	#####

Mechanistic Pavement Analysis Pavement life as a function of the Variation in the Subgrade Characteristics

Pavement Structure - Under Construction (UC):

Surface — 50 mm — 50

Bituminous prime coat to protect the granular base — **Unit Weight: 23**

Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.740	0.728	1.681	1.009	3.663

Strain - Bottom of the Base Layer — Depth= 49 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	62	64	-185		1.533E+09
ElsymS	32	32	-154		3.078E+10
FenlapK	767	767	-1120		2.894E+04
FenlapB	138	138	-436		5.353E+07
FenlapM	1720	1720	-2490		**8.378E+02**

LRSB - CCT — 300 mm — 350

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCT ***10***

Char.: **Mr_i=774 MPa** **n_i= 0.40** **Unit Weight: 23**

k q: **k_1= 5,475** **k_2= 0.4772** **Suction: 0**

Boyce: **Ka= 3,459** **Ga= 33,395** **n= 0.3478**

Mayhew: **Ka= 3,067** **Ga= 23,853** **n= 0.1411** **m= 0.5969** **b= -0.7012**

Stress - Centre of the Base Layer — Depth= 200 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	144	-7	-19	13.0	2.442E+41
ElsymS	208	-13	-13	11.2	7.725E+35
FenlapK	84	-53	-54	7.7	7.065E+25
FenlapB	1200	339	-13	16.3	7.471E+50
FenlapM	126	123	-5	976.0	

DUT - MIG — 300 mm — 650

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 500 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	15	-25	-28	13.1	4.670E+41
ElsymS	18	-29	-29	11.2	1.078E+36
FenlapK	59	2	2	18.0	6.817E+55
FenlapB	44	1	1	21.9	1.689E+67
FenlapM	16	4	2	62.0	1.504E+184

LNEC - LOC — 1000 mm — 1650

Selected Soil Subgrade — Test programme: 2 — Lab.: LNEC — LOC ***3***

Char.: **Mr_i=8 MPa** **n_i= 0.53** **=0.45** **Unit Weight: 22**

Loach: **C= 165** **D= 1.3682** **q_f =** **0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-158	-188	130		5.086E+14
ElsymS	-193	-193	140		2.186E+14
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

All - LOC — Infinite — 2650

In-Situ Soil Subgrade Foundation — Test programme: 1 — Lab.: All — LOC ***2***

Char.: **Mr_i=34 MPa** **n_i= 0.54** **=0.45** **Unit Weight: 22**

Brown: **A= 21,858** **B= 0.4820** **q_f =** **0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-33	-33	185		8.748E+12
ElsymS	-24	-24	147		1.199E+14
FenlapK	0	0	0		8.821E+52
FenlapB	0	0	0		2.596E+56
FenlapM	0	0	0		8.980E+55

Minimum Design Loading: 8.378E+02

Pavement Structure - In-Service (IS):

Surface — 100 mm — 100

Asphalt Surface and Base Layer — **Unit Weight: 23**

Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.655	0.653	1.317	1.098	1.588

Strain - Bottom of the Base Layer — Depth= 99 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	80	104	-186		1.875E+08
ElsymS	108	108	-226		1.594E+08
FenlapK	754	754	-1030		3.119E+04
FenlapB	563	563	-889		1.123E+05
FenlapM	911	911	-1220		**1.360E+04**

LRSB - CCT — 300 mm — 400

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCT ***10***

Char.: **Mr_i=774 MPa** **n_i= 0.40** **Unit Weight: 23**

k q: **k_1= 5,475** **k_2= 0.4772** **Suction: 0**

Boyce: **Ka= 3,459** **Ga= 33,395** **n= 0.3478**

Mayhew: **Ka= 3,067** **Ga= 23,853** **n= 0.1411** **m= 0.5969** **b= -0.7012**

Stress - Centre of the Base Layer — Depth= 250 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	94	-24	-33	11.8	5.851E+37
ElsymS	138	-33	-33	9.9	1.897E+32
FenlapK	75	-4	-4	17.6	4.378E+54
FenlapB	75	47	-124	63.7	1.122E+189
FenlapM	31	-4	-4	29.4	9.598E+88

DUT - MIG — 300 mm — 700

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 550 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	12	-22	-24	15.6	5.270E+48
ElsymS	13	-24	-24	14.0	1.852E+44
FenlapK	43	3	3	23.5	7.167E+71
FenlapB	15	3	3	59.8	3.622E+177
FenlapM	29	4	4	32.6	2.137E+98

LNEC - LOC — 1000 mm — 1700

Selected Soil Subgrade — Test programme: 2 — Lab.: LNEC — LOC ***3***

Char.: **Mr_i=8 MPa** **n_i= 0.53** **=0.45** **Unit Weight: 22**

Loach: **C= 165** **D= 1.3682** **q_f =** **0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-134	-156	109		3.626E+15
ElsymS	-154	-154	113		2.376E+15
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

All - LOC — Infinite — 2700

In-Situ Soil Subgrade Foundation — Test programme: 1 — Lab.: All — LOC ***2***

Char.: **Mr_i=34 MPa** **n_i= 0.54** **=0.45** **Unit Weight: 22**

Brown: **A= 21,858** **B= 0.4820** **q_f =** **0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-29	-30	165		3.167E+13
ElsymS	-21	-21	136		3.001E+14
FenlapK	0	0	0		1.451E+54
FenlapB	0	0	0		2.636E+55
FenlapM	0	0	0		1.819E+55

Minimum Design Loading: 1.360E+04

Pavement Structure - In-Service (IS):

Surface — 150 mm — 0

Asphalt Surface and Base Layer — **Unit Weight: 23**

Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.591	0.597	0.927	0.760	0.946

Strain - Bottom of the Base Layer — Depth= 149 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	62	90	-142		3.434E+08
ElsymS	108	108	-201		1.594E+08
FenlapK	469	469	-626		2.502E+05
FenlapB	356	356	-481		8.384E+05
FenlapM	488	488	-645		2.102E+05

LRSB - CCT — 300 mm — 450

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCT ***10***

Char.: **Mr_i=774 MPa** **n_i= 0.40** **Unit Weight: 23**

k q: **k_1= 5,475** **k_2= 0.4772** **Suction: 0**

Boyce: **Ka= 3,459** **Ga= 33,395** **n= 0.3478**

Mayhew: **Ka= 3,067** **Ga= 23,853** **n= 0.1411** **m= 0.5969** **b= -0.7012**

Stress - Centre of the Base Layer — Depth= 300 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	66	-31	-38	11.2	8.470E+35
ElsymS	94	-38	-38	9.5	1.424E+31
FenlapK	43	2	2	28.8	1.940E+87
FenlapB	16	12	-5	232.6	#NUM!
FenlapM	25	-4	-4	32.4	5.023E+97

DUT - MIG — 300 mm — 750

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 600 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	9	-20	-21	18.3	5.149E+56
ElsymS	10	-21	-21	17.3	5.692E+53
FenlapK	28	3	3	33.5	7.802E+100
FenlapB	18	4	4	52.9	3.336E+157
FenlapM	20	3	3	44.4	7.074E+132

LNEC - LOC — 1000 mm — 1750

Selected Soil Subgrade — Test programme: 2 — Lab.: LNEC — LOC ***3***

Char.: **Mr_i=8 MPa** **n_i= 0.53** **=0.45** **Unit Weight: 22**

Loach: **C= 165** **D= 1.3682** **q_f =** **0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-115	-131	93		2.163E+16
ElsymS	-126	-126	94		1.983E+16
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

All - LOC — Infinite — 2750

In-Situ Soil Subgrade Foundation — Test programme: 1 — Lab.: All — LOC ***2***

Char.: **Mr_i=34 MPa** **n_i= 0.54** **=0.45** **Unit Weight: 22**

Brown: **A= 21,858** **B= 0.4820** **q_f =** **0.001** ***p +** **86** **Suction: 32**

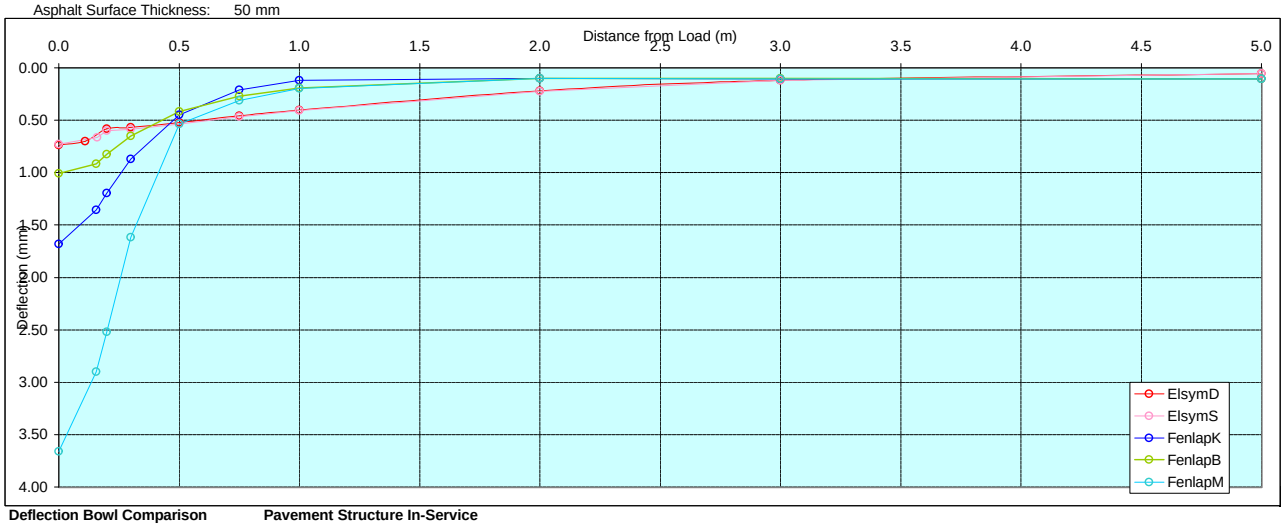
Strain - Top of the Subgrade Layer — Depth= 1751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-26	-27	69		7.570E+17
ElsymS	-20	-20	55		9.624E+18
FenlapK	0	0	0		5.031E+55
FenlapB	0	0	0		5.688E+53
FenlapM	0	0	0		2.499E+56

Minimum Design Loading: #NUM!

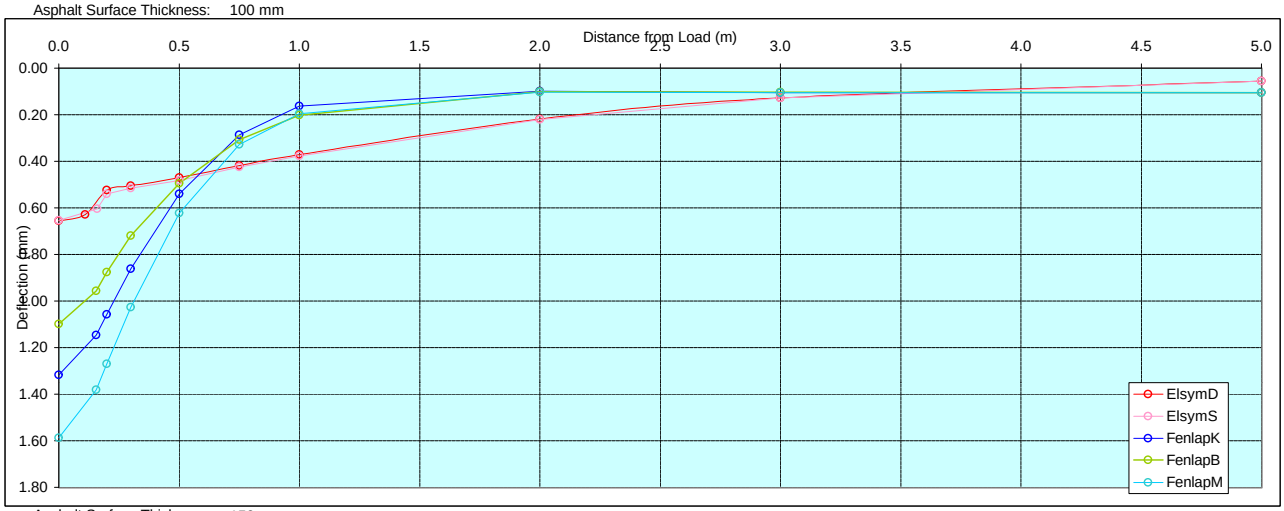
Deflection Bowl Comparison **Pavement Structure Under Construction**

Asphalt Surface Thickness: 50 mm

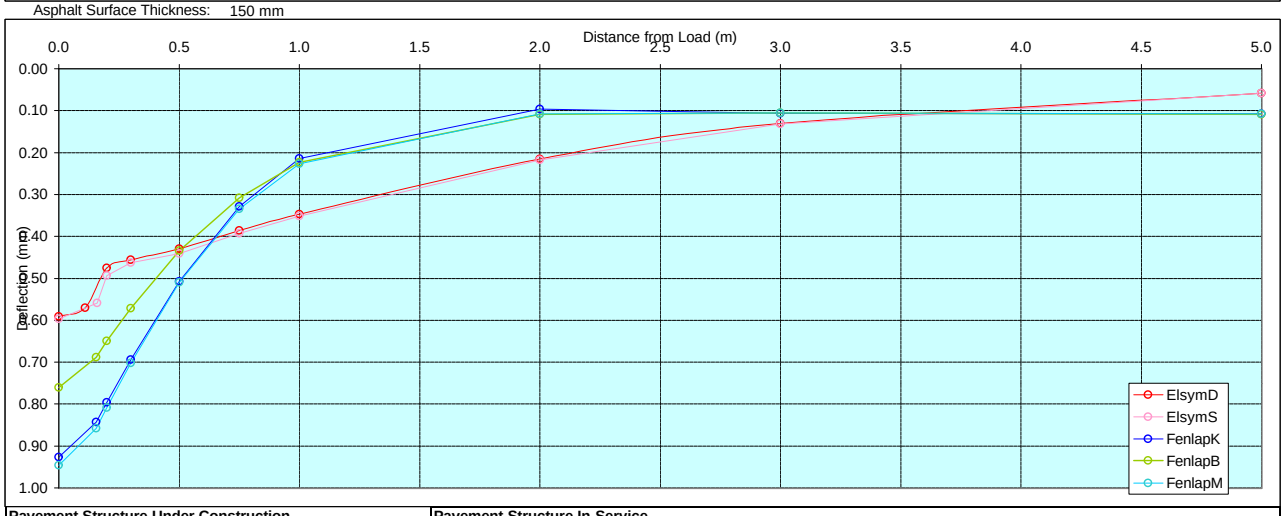


Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Asphalt Surface Thickness: 150 mm



Pavement Structure Under Construction

Asphalt: 50 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.740	0.00	0.728	0.00	1.681	0.00	1.009	0.00	3.663
0.11	0.702	0.16	0.663	0.16	1.356	0.16	0.918	0.16	2.902
0.20	0.584	0.20	0.602	0.20	1.195	0.20	0.825	0.20	2.518
0.30	0.568	0.30	0.586	0.30	0.873	0.30	0.649	0.30	1.617
0.50	0.521	0.50	0.536	0.50	0.449	0.50	0.417	0.50	0.535
0.75	0.459	0.75	0.468	0.75	0.209	0.75	0.271	0.75	0.313
1.00	0.402	1.00	0.408	1.00	0.120	1.00	0.192	1.00	0.198
2.00	0.222	2.00	0.224	2.00	0.102	2.00	0.101	2.00	0.103
3.00	0.121	3.00	0.121	3.00	0.103	3.00	0.103	3.00	0.104
5.00	0.054	5.00	0.054	5.00	0.104	5.00	0.104	5.00	0.105

Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.655	0.00	0.653	0.00	1.317	0.00	1.098	0.00	1.588
0.11	0.629	0.16	0.605	0.16	1.147	0.16	0.957	0.16	1.381
0.20	0.523	0.20	0.541	0.20	1.057	0.20	0.876	0.20	1.271
0.30	0.504	0.30	0.516	0.30	0.861	0.30	0.719	0.30	1.026
0.50	0.469	0.50	0.482	0.50	0.539	0.50	0.495	0.50	0.623
0.75	0.418	0.75	0.426	0.75	0.288	0.75	0.308	0.75	0.328
1.00	0.372	1.00	0.377	1.00	0.162	1.00	0.203	1.00	0.195
2.00	0.220	2.00	0.221	2.00	0.098	2.00	0.102	2.00	0.104
3.00	0.127	3.00	0.128	3.00	0.106	3.00	0.104	3.00	0.105
5.00	0.057	5.00	0.057	5.00	0.106	5.00	0.106	5.00	0.106

Asphalt: 150 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.591	0.00	0.597	0.00	0.927	0.00	0.760	0.00	0.946
0.11	0.570	0.16	0.559	0.16	0.843	0.16	0.688	0.16	0.858
0.20	0.476	0.20	0.494	0.20	0.796	0.20	0.650	0.20	0.809
0.30	0.456	0.30	0.462	0.30	0.695	0.30	0.571	0.30	0.702
0.50	0.430	0.50	0.441	0.50	0.508	0.50	0.434	0.50	0.510
0.75	0.386	0.75	0.393	0.75	0.329	0.75	0.309	0.75	0.334
1.00	0.347	1.00	0.352	1.00	0.214	1.00	0.224	1.00	0.227
2.00	0.216	2.00	0.218	2.00	0.096	2.00	0.109	2.00	0.108
3.00	0.131	3.00	0.132	3.00	0.106	3.00	0.106	3.00	0.106
5.00	0.059	5.00	0.059	5.00	0.107	5.00	0.108	5.00	0.108

Mechanistic Pavement Analysis Pavement life as a function of the Variation in the Subgrade Characteristics

Pavement Structure - Under Construction (UC):

Surface — 50 mm — 50

Bituminous prime coat to protect the granular base — **Unit Weight: 23**
Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.590	0.617	1.696	NS	NS

Strain - Bottom of the Base Layer — Depth= 49 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	68	71	-193		1.009E+09
ElsymS	37	37	-160		1.736E+10
FenlapK	844	844	-1210		**1.902E+04**
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

LRSB - CCT — 300 mm — 350

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCT ***10***
Char.: **Mr_i=774 MPa** **n_i= 0.40** **Unit Weight: 23**
k q: **k_1= 5,475** **k_2= 0.4772** **Suction: 0**
Boyce: **Ka= 3,459** **Ga= 33,395** **n= 0.3478**
Mayhew: **Ka= 3,067** **Ga= 23,853** **n= 0.1411** **m= 0.5969** **b= -0.7012**

Stress - Centre of the Base Layer — Depth= 200 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	145	-3	-16	13.5	5.024E+42
ElsymS	210	-10	-10	11.4	3.955E+36
FenlapK	112	-7	-9	14.2	6.170E+44
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

DUT - MIG — 300 mm — 650

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***
Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**
k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 500 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	18	-20	-22	15.6	5.646E+48
ElsymS	21	-24	-24	12.7	3.322E+40
FenlapK	60	1	1	17.5	1.754E+54
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

UNOT - LOC — 1000 mm — 1650

Selected Soil Subgrade — Test programme: 2 — Lab.: UNOT — LOC ***4***
Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** **Unit Weight: 22**
Loach: **C= 438** **D= 1.5781** **q_f =** **0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-126	-153	121		1.107E+15
ElsymS	-164	-164	137		2.713E+14
FenlapK	0	0	0		
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

All - LOC — Infinite — 2650

In-Situ Soil Subgrade Foundation — Test programme: 1 — Lab.: All — LOC ***2***
Char.: **Mr_i=34 MPa** **n_i= 0.54** **=0.45** **Unit Weight: 22**
Brown: **A= 21,858** **B= 0.4820** **q_f =** **0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-42	-43	117		1.693E+15
ElsymS	-35	-35	99		1.148E+16
FenlapK	0	0	0		
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

Minimum Design Loading: 1.902E+04

Pavement Structure - In-Service (IS):

Surface — 100 mm — 100

Asphalt Surface and Base Layer — **Unit Weight: 23**
Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.526	0.551	1.316	1.294	1.468

Strain - Bottom of the Base Layer — Depth= 99 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	83	106	-190		1.675E+08
ElsymS	109	109	-228		1.506E+08
FenlapK	753	753	-1030		3.137E+04
FenlapB	870	870	-1180		1.665E+04
FenlapM	871	871	-1160		**1.657E+04**

LRSB - CCT — 300 mm — 400

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCT ***10***
Char.: **Mr_i=774 MPa** **n_i= 0.40** **Unit Weight: 23**
k q: **k_1= 5,475** **k_2= 0.4772** **Suction: 0**
Boyce: **Ka= 3,459** **Ga= 33,395** **n= 0.3478**
Mayhew: **Ka= 3,067** **Ga= 23,853** **n= 0.1411** **m= 0.5969** **b= -0.7012**

Stress - Centre of the Base Layer — Depth= 250 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	95	-19	-28	12.6	1.633E+40
ElsymS	139	-29	-29	10.3	3.049E+33
FenlapK	76	-4	-4	17.7	1.062E+55
FenlapB	29	-13	-17	22.1	6.117E+67
FenlapM	32	-17	-17	18.7	6.704E+57

DUT - MIG — 300 mm — 700

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***
Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**
k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 550 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	14	-18	-19	18.2	3.136E+56
ElsymS	16	-21	-21	15.6	7.173E+48
FenlapK	43	3	3	23.3	1.996E+71
FenlapB	17	6	6	70.6	1.624E+209
FenlapM	29	4	4	33.1	5.217E+99

UNOT - LOC — 1000 mm — 1700

Selected Soil Subgrade — Test programme: 2 — Lab.: UNOT — LOC ***4***
Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** **Unit Weight: 22**
Loach: **C= 438** **D= 1.5781** **q_f =** **0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-108	-127	102		7.838E+15
ElsymS	-132	-132	111		2.884E+15
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

All - LOC — Infinite — 2700

In-Situ Soil Subgrade Foundation — Test programme: 1 — Lab.: All — LOC ***2***
Char.: **Mr_i=34 MPa** **n_i= 0.54** **=0.45** **Unit Weight: 22**
Brown: **A= 21,858** **B= 0.4820** **q_f =** **0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-38	-39	105		5.623E+15
ElsymS	-31	-31	89		3.904E+16
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: 1.657E+04

Pavement Structure - In-Service (IS):

Surface — 150 mm — 0

Asphalt Surface and Base Layer — **Unit Weight: 23**
Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.478	0.501	0.926	0.829	0.926

Strain - Bottom of the Base Layer — Depth= 149 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	63	91	-144		3.296E+08
ElsymS	108	108	-201		1.581E+08
FenlapK	468	468	-626		2.526E+05
FenlapB	439	439	-585		3.344E+05
FenlapM	471	471	-625		**2.456E+05**

LRSB - CCT — 300 mm — 450

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCT ***10***
Char.: **Mr_i=774 MPa** **n_i= 0.40** **Unit Weight: 23**
k q: **k_1= 5,475** **k_2= 0.4772** **Suction: 0**
Boyce: **Ka= 3,459** **Ga= 33,395** **n= 0.3478**
Mayhew: **Ka= 3,067** **Ga= 23,853** **n= 0.1411** **m= 0.5969** **b= -0.7012**

Stress - Centre of the Base Layer — Depth= 300 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	67	-26	-33	12.3	1.549E+39
ElsymS	95	-34	-34	10.1	5.887E+32
FenlapK	43	2	2	28.8	2.224E+87
FenlapB	21	-2	-5	40.8	2.690E+122
FenlapM	30	-11	-11	22.9	1.745E+70

DUT - MIG — 300 mm — 750

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***
Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**
k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 600 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	11	-16	-17	21.3	2.107E+65
ElsymS	13	-17	-17	19.0	4.821E+58
FenlapK	28	3	3	33.4	4.251E+100
FenlapB	16	4	4	62.0	1.020E+184
FenlapM	21	3	3	42.9	2.130E+128

UNOT - LOC — 1000 mm — 1750

Selected Soil Subgrade — Test programme: 2 — Lab.: UNOT — LOC ***4***
Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** **Unit Weight: 22**
Loach: **C= 438** **D= 1.5781** **q_f =** **0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-93	-108	87		4.655E+16
ElsymS	-109	-109	92		2.453E+16
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

All - LOC — Infinite — 2750

In-Situ Soil Subgrade Foundation — Test programme: 1 — Lab.: All — LOC ***2***
Char.: **Mr_i=34 MPa** **n_i= 0.54** **=0.45** **Unit Weight: 22**
Brown: **A= 21,858** **B= 0.4820** **q_f =** **0.001** ***p +** **86** **Suction: 32**

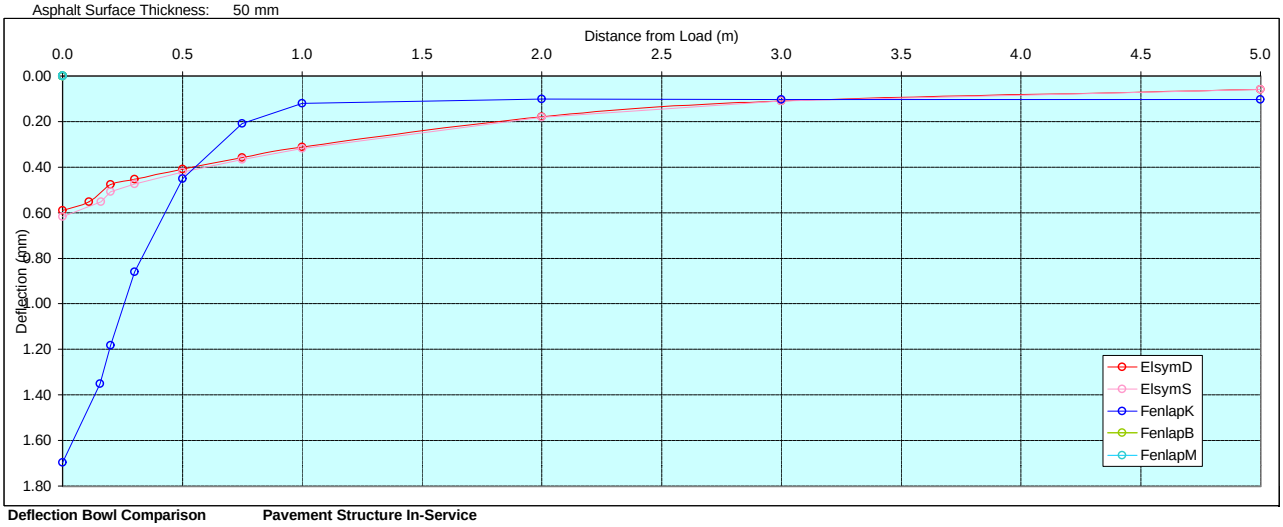
Strain - Top of the Subgrade Layer — Depth= 1751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-34	-35	82		9.497E+16
ElsymS	-28	-28	69		6.726E+17
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: 2.456E+05

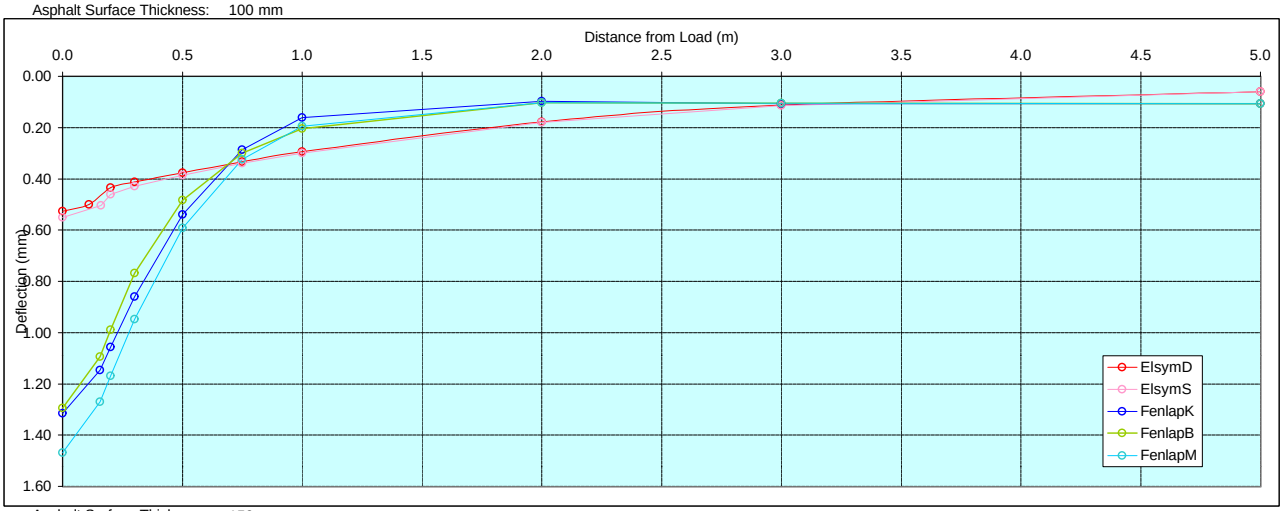
Deflection Bowl Comparison **Pavement Structure Under Construction**

Asphalt Surface Thickness: 50 mm

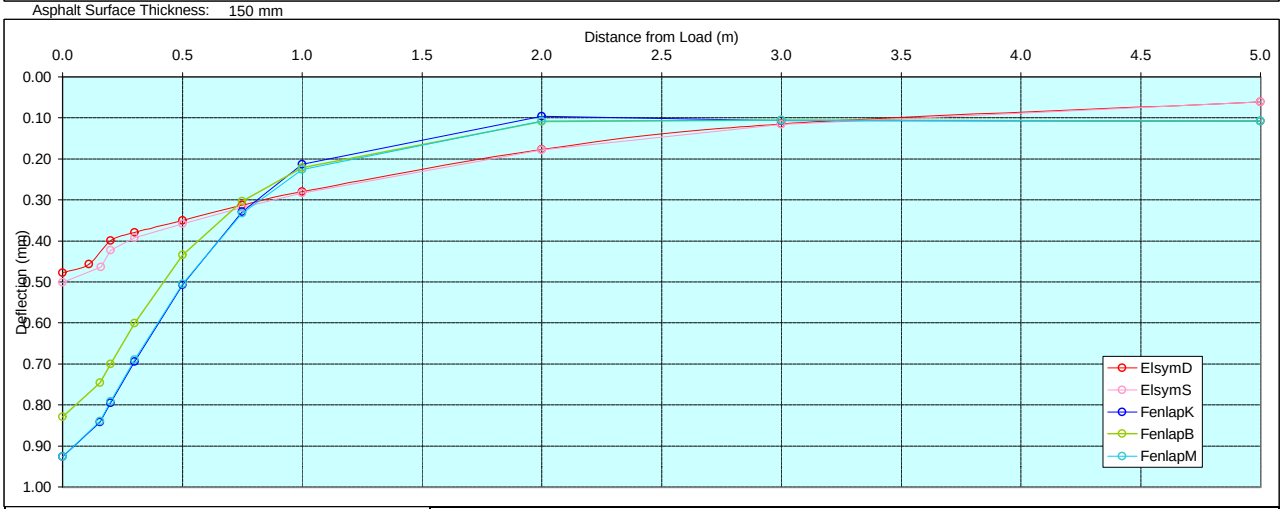


Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Asphalt Surface Thickness: 150 mm



Pavement Structure Under Construction

Asphalt: 50 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.590	0.00	0.617	0.00	1.696	#####	#####	#####	#####
0.11	0.553	0.16	0.553	0.16	1.350	#####	#####	#####	#####
0.20	0.477	0.20	0.509	0.20	1.182	#####	#####	#####	#####
0.30	0.454	0.30	0.474	0.30	0.860	#####	#####	#####	#####
0.50	0.410	0.50	0.422	0.50	0.451	#####	#####	#####	#####
0.75	0.358	0.75	0.366	0.75	0.209	#####	#####	#####	#####
1.00	0.312	1.00	0.317	1.00	0.120	#####	#####	#####	#####
2.00	0.179	2.00	0.181	2.00	0.101	#####	#####	#####	#####
3.00	0.110	3.00	0.110	3.00	0.103	#####	#####	#####	#####
5.00	0.059	5.00	0.059	5.00	0.104	#####	#####	#####	#####

Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.526	0.00	0.551	0.00	1.316	0.00	1.294	0.00	1.468
0.11	0.500	0.16	0.503	0.16	1.146	0.16	1.094	0.16	1.271
0.20	0.434	0.20	0.461	0.20	1.056	0.20	0.989	0.20	1.169
0.30	0.412	0.30	0.429	0.30	0.861	0.30	0.768	0.30	0.947
0.50	0.376	0.50	0.387	0.50	0.539	0.50	0.484	0.50	0.592
0.75	0.333	0.75	0.340	0.75	0.287	0.75	0.300	0.75	0.323
1.00	0.295	1.00	0.299	1.00	0.162	1.00	0.204	1.00	0.194
2.00	0.179	2.00	0.180	2.00	0.098	2.00	0.104	2.00	0.104
3.00	0.113	3.00	0.113	3.00	0.106	3.00	0.105	3.00	0.105
5.00	0.060	5.00	0.060	5.00	0.106	5.00	0.106	5.00	0.106

Asphalt: 150 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.478	0.00	0.501	0.00	0.926	0.00	0.829	0.00	0.926
0.11	0.457	0.16	0.463	0.16	0.842	0.16	0.746	0.16	0.840
0.20	0.399	0.20	0.423	0.20	0.795	0.20	0.700	0.20	0.792
0.30	0.379	0.30	0.392	0.30	0.694	0.30	0.601	0.30	0.690
0.50	0.350	0.50	0.359	0.50	0.507	0.50	0.435	0.50	0.504
0.75	0.313	0.75	0.319	0.75	0.329	0.75	0.304	0.75	0.332
1.00	0.280	1.00	0.284	1.00	0.214	1.00	0.221	1.00	0.226
2.00	0.177	2.00	0.178	2.00	0.096	2.00	0.109	2.00	0.108
3.00	0.115	3.00	0.115	3.00	0.106	3.00	0.105	3.00	0.106
5.00	0.061	5.00	0.061	5.00	0.107	5.00	0.108	5.00	0.108

Mechanistic Pavement Analysis Pavement life as a function of the Variation in the Subgrade Characteristics

Pavement Structure - Under Construction (UC):

Surface	50 mm	Bituminous prime coat to protect the granular base						**Unit Weight: 23**	
		Mr_i=2,100 MPa	**n_i= 0.40**					**Suction: 0**	
		Peak Deflection on the Surface		ElsymD	ElsymS	FenlapK	FenlapB	FenlapM	
			δ_p (mm)=	0.590	0.619	1.676	NS	NS	
		Strain - Bottom of the Base Layer		ε_x(με)	ε_y(με)	ε_z(με)		ESA	
		Depth= 49 mm	ElsymD	68	71	-193		1.013E+09	
			ElsymS	37	37	-160		1.734E+10	
			FenlapK	837	837	-1230		1.973E+04	
			FenlapB	NS	NS	NS			
	50		FenlapM	NS	NS	NS			
LRSB - CCT	300 mm	Unbound Granular Base	Test programme: 3			Lab.: LRSB		CCT ***10***	
		Char.: **Mr_i=774 MPa**	**n_i= 0.40**					**Unit Weight: 23**	
		k q: **k_1= 5,475**	**k_2= 0.4772**					**Suction: 0**	
		Boyce: **Ka= 3,459**	**Ga= 33,395**	**n= 0.3478**					
		Mayhew: **Ka= 3,067**	**Ga= 23,853**	**n= 0.1411**		**m= 0.5969**		**b= -0.7012**	
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA	
		Depth= 200 mm	ElsymD	145	-3	-15	13.6	8.347E+42	
			ElsymS	210	-9	-9	11.4	5.282E+36	
			FenlapK	150	-86	-88	5.7	7.245E+19	
			FenlapB	NS	NS	NS	NS		
	350		FenlapM	NS	NS	NS	NS		
DUT - MIG	300 mm	Unbound Granular Subbase	Test programme: 2			Lab.: DUT		MIG ***8***	
		Char.: **Mr_i=198 MPa**	**n_i= 0.23**					**Unit Weight: 22**	
		k q: **k_1= 1,738**	**k_2= 0.5555**					**Suction: 0**	
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA	
		Depth= 500 mm	ElsymD	18	-20	-22	15.7	1.619E+49	
			ElsymS	22	-24	-24	12.9	8.175E+40	
			FenlapK	59	2	2	18.1	9.686E+55	
			FenlapB	NS	NS	NS	NS		
	650		FenlapM	NS	NS	NS	NS		
DUT - LOC	1000 mm	Selected Soil Subgrade	Test programme: 2			Lab.: DUT		LOC ***6***	
		Char.: **Mr_i=23 MPa**	**n_i= 0.42**					**Unit Weight: 22**	
		Loach: **C= 388**	**D= 1.8972**	**q_f = 0.001**		***p +** **86**		**Suction: 32**	
		Strain - Top of the Selected Subgrade		ε_x(με)	ε_y(με)	ε_z(με)		ESA	
		Depth= 651 mm	ElsymD	-124	-151	120		1.195E+15	
			ElsymS	-161	-161	136		2.829E+14	
			FenlapK	0	0	0		#NUM!	
			FenlapB	NS	NS	NS		#VALUE!	
	1650		FenlapM	NS	NS	NS		#VALUE!	
All - LOC	Infinite	In-Situ Soil Subgrade Foundation	Test programme: 1			Lab.: All		LOC ***2***	
		Char.: **Mr_i=34 MPa**	**n_i= 0.54**	**=0.45**				**Unit Weight: 22**	
		Brown: **A= 21,858**	**B= 0.4820**	**q_f = 0.001**		***p +** **86**		**Suction: 32**	
		Strain - Top of the Subgrade Layer		ε_x(με)	ε_y(με)	ε_z(με)		ESA	
		Depth= 1651 mm	ElsymD	-41	-42	125		7.698E+14	
			ElsymS	-34	-34	108		4.159E+15	
			FenlapK	0	0	0			
			FenlapB	NS	NS	NS			
	2650		FenlapM	NS	NS	NS			
								Minimum Design Loading:	**#NUM!**

Pavement Structure - In-Service (IS):

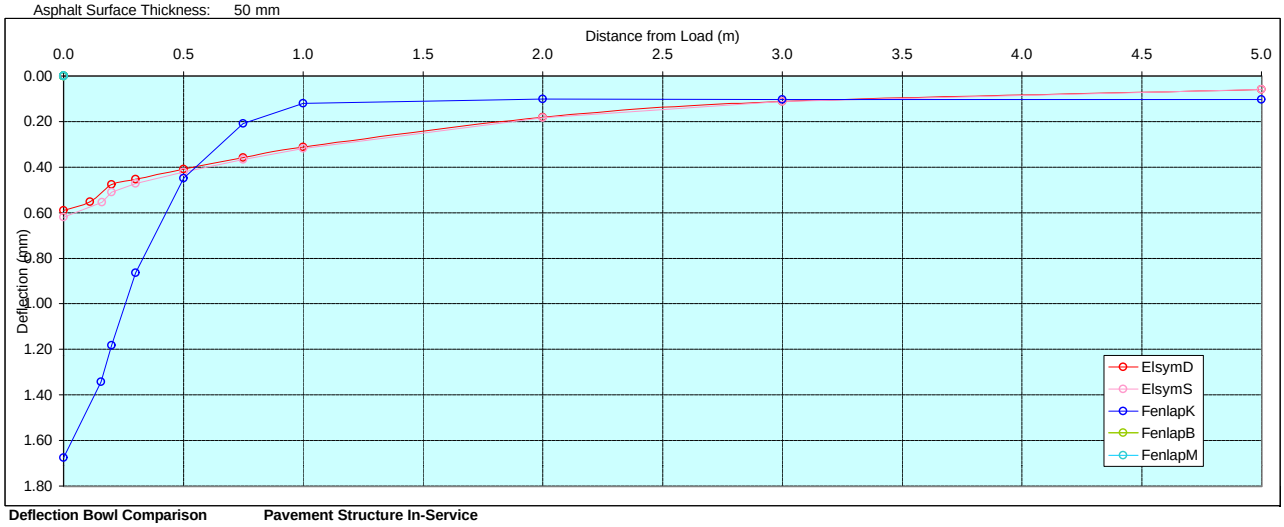
Surface	100 mm	Asphalt Surface and Base Layer						**Unit Weight: 23**	
		Mr_i=2,100 MPa	**n_i= 0.40**					**Suction: 0**	
		Peak Deflection on the Surface		ElsymD	ElsymS	FenlapK	FenlapB	FenlapM	
			δ_p (mm)=	0.526	0.553	1.315	1.160	1.497	
		Strain - Bottom of the Base Layer		ε_x(με)	ε_y(με)	ε_z(με)		ESA	
		Depth= 99 mm	ElsymD	82	106	-190		1.682E+08	
			ElsymS	109	109	-228		1.513E+08	
			FenlapK	752	752	-1030		3.155E+04	
			FenlapB	752	752	-991		3.155E+04	
	100		FenlapM	857	857	-1150		**1.779E+04**	
LRSB - CCT	300 mm	Unbound Granular Base	Test programme: 3			Lab.: LRSB		CCT ***10***	
		Char.: **Mr_i=774 MPa**	**n_i= 0.40**					**Unit Weight: 23**	
		k q: **k_1= 5,475**	**k_2= 0.4772**					**Suction: 0**	
		Boyce: **Ka= 3,459**	**Ga= 33,395**	**n= 0.3478**					
		Mayhew: **Ka= 3,067**	**Ga= 23,853**	**n= 0.1411**		**m= 0.5969**		**b= -0.7012**	
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA	
		Depth= 250 mm	ElsymD	95	-18	-28	12.7	2.845E+40	
			ElsymS	139	-28	-28	10.4	4.292E+33	
			FenlapK	76	-4	-4	17.7	6.982E+54	
			FenlapB	-31	-47	-146	7.0	5.972E+23	
	400		FenlapM	41	-13	-14	18.8	1.380E+58	
DUT - MIG	300 mm	Unbound Granular Subbase	Test programme: 2			Lab.: DUT		MIG ***8***	
		Char.: **Mr_i=198 MPa**	**n_i= 0.23**					**Unit Weight: 22**	
		k q: **k_1= 1,738**	**k_2= 0.5555**					**Suction: 0**	
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA	
		Depth= 550 mm	ElsymD	14	-17	-19	18.4	8.831E+56	
			ElsymS	17	-20	-20	15.7	1.688E+49	
			FenlapK	43	3	3	23.3	1.599E+71	
			FenlapB	22	4	4	43.1	1.275E+129	
	700		FenlapM	30	4	4	32.5	1.084E+98	
DUT - LOC	1000 mm	Selected Soil Subgrade	Test programme: 2			Lab.: DUT		LOC ***6***	
		Char.: **Mr_i=23 MPa**	**n_i= 0.42**					**Unit Weight: 22**	
		Loach: **C= 388**	**D= 1.8972**	**q_f = 0.001**		***p +** **86**		**Suction: 32**	
		Strain - Top of the Selected Subgrade		ε_x(με)	ε_y(με)	ε_z(με)		ESA	
		Depth= 701 mm	ElsymD	-106	-126	101		8.481E+15	
			ElsymS	-130	-130	111		3.006E+15	
			FenlapK	0	0	0			
			FenlapB	0	0	0			
	1700		FenlapM	0	0	0			
All - LOC	Infinite	In-Situ Soil Subgrade Foundation	Test programme: 1			Lab.: All		LOC ***2***	
		Char.: **Mr_i=34 MPa**	**n_i= 0.54**	**=0.45**				**Unit Weight: 22**	
		Brown: **A= 21,858**	**B= 0.4820**	**q_f = 0.001**		***p +** **86**		**Suction: 32**	
		Strain - Top of the Subgrade Layer		ε_x(με)	ε_y(με)	ε_z(με)		ESA	
		Depth= 1701 mm	ElsymD	-37	-38	113		2.525E+15	
			ElsymS	-31	-31	97		1.349E+16	
			FenlapK	0	0	0			
			FenlapB	0	0	0			
	2700		FenlapM	0	0	0			
								Minimum Design Loading:	**1.779E+04**

Pavement Structure - In-Service (IS):

Surface	150 mm	Asphalt Surface and Base Layer						**Unit Weight: 23**	
		Mr_i=2,100 MPa	**n_i= 0.40**					**Suction: 0**	
		Peak Deflection on the Surface		ElsymD	ElsymS	FenlapK	FenlapB	FenlapM	
			δ_p (mm)=	1.325	0.503	0.926	0.696	0.936	
		Strain - Bottom of the Base Layer		ε_x(με)	ε_y(με)	ε_z(με)		ESA	
		Depth= 149 mm	ElsymD	57	85	-136		4.447E+08	
			ElsymS	108	108	-201		1.588E+08	
			FenlapK	468	468	-626		2.526E+05	
			FenlapB	346	346	-470		9.500E+05	
	0		FenlapM	481	481	-637		**2.240E+05**	
LRSB - CCT	300 mm	Unbound Granular Base	Test programme: 3			Lab.: LRSB		CCT ***10***	
		Char.: **Mr_i=774 MPa**	**n_i= 0.40**					**Unit Weight: 23**	
		k q: **k_1= 5,475**	**k_2= 0.4772**					**Suction: 0**	
		Boyce: **Ka= 3,459**	**Ga= 33,395**	**n= 0.3478**					
		Mayhew: **Ka= 3,067**	**Ga= 23,853**	**n= 0.1411**		**m= 0.5969**		**b= -0.7012**	
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA	
		Depth= 300 mm	ElsymD	66	-31	-38	11.2	1.112E+36	
			ElsymS	95	-34	-34	10.1	8.517E+32	
			FenlapK	43	2	2	28.8	1.965E+87	
			FenlapB	79	-30	-44	11.1	4.335E+35	
	450		FenlapM	33	-7	-7	25.0	1.437E+76	
DUT - MIG	300 mm	Unbound Granular Subbase	Test programme: 2			Lab.: DUT		MIG ***8***	
		Char.: **Mr_i=198 MPa**	**n_i= 0.23**					**Unit Weight: 22**	
		k q: **k_1= 1,738**	**k_2= 0.5555**					**Suction: 0**	
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA	
		Depth= 600 mm	ElsymD	10	-22	-23	16.6	5.661E+51	
			ElsymS	13	-17	-17	19.1	1.038E+59	
			FenlapK	28	3	3	33.3	2.085E+100	
			FenlapB	24	3	3	38.6	6.737E+115	
	750		FenlapM	20	3	3	43.1	7.483E+128	
DUT - LOC	1000 mm	Selected Soil Subgrade	Test programme: 2			Lab.: DUT		LOC ***6***	
		Char.: **Mr_i=23 MPa**	**n_i= 0.42**					**Unit Weight: 22**	
		Loach: **C= 388**	**D= 1.8972**	**q_f = 0.001**		***p +** **86**		**Suction: 32**	
		Strain - Top of the Selected Subgrade		ε_x(με)	ε_y(με)	ε_z(με)		ESA	
		Depth= 751 mm	ElsymD	-123	-138	97		1.376E+16	
			ElsymS	-107	-107	92		2.531E+16	
			FenlapK	0	0	0			
			FenlapB	0	0	0			
	1750		FenlapM	0	0	0			
All - LOC	Infinite	In-Situ Soil Subgrade Foundation	Test programme: 1			Lab.: All		LOC ***2***	
		Char.: **Mr_i=34 MPa**	**n_i= 0.54**	**=0.45**				**Unit Weight: 22**	
		Brown: **A= 21,858**	**B= 0.4820**	**q_f = 0.001**		***p +** **86**		**Suction: 32**	
		Strain - Top of the Subgrade Layer		ε_x(με)	ε_y(με)	ε_z(με)		ESA	
		Depth= 1751 mm	ElsymD	-124	-125	279		7.783E+10	
			ElsymS	-28	-28	68		7.723E+17	
			FenlapK	0	0	0			
			FenlapB	0	0	0			
	2750		FenlapM	0	0	0			
								Minimum Design Loading:	**2.240E+05**

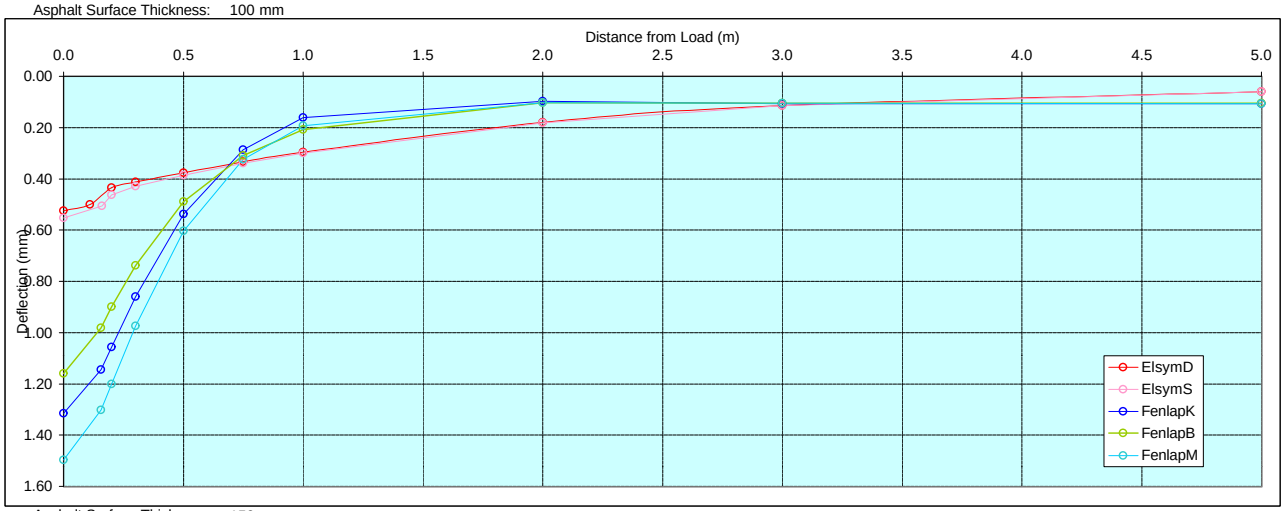
Deflection Bowl Comparison **Pavement Structure Under Construction**

Asphalt Surface Thickness: 50 mm

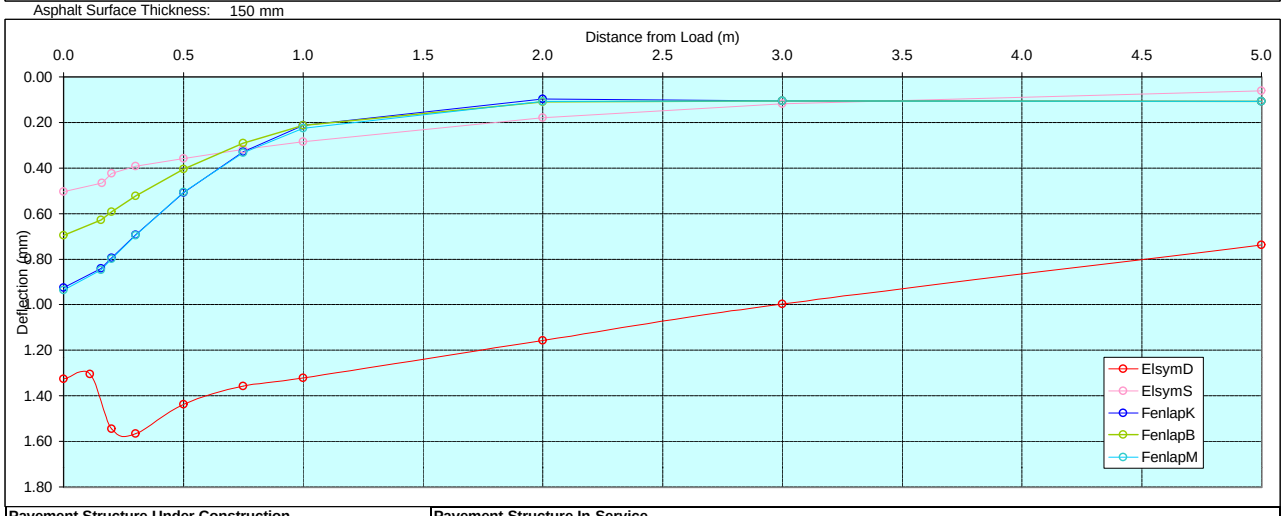


Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Asphalt Surface Thickness: 150 mm



Pavement Structure Under Construction

Asphalt: 50 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.590	0.00	0.619	0.00	1.676	#####	#####	#####	#####
0.11	0.553	0.16	0.555	0.16	1.343	#####	#####	#####	#####
0.20	0.477	0.20	0.510	0.20	1.182	#####	#####	#####	#####
0.30	0.453	0.30	0.473	0.30	0.865	#####	#####	#####	#####
0.50	0.409	0.50	0.422	0.50	0.450	#####	#####	#####	#####
0.75	0.358	0.75	0.366	0.75	0.209	#####	#####	#####	#####
1.00	0.313	1.00	0.318	1.00	0.120	#####	#####	#####	#####
2.00	0.181	2.00	0.183	2.00	0.101	#####	#####	#####	#####
3.00	0.112	3.00	0.113	3.00	0.103	#####	#####	#####	#####
5.00	0.060	5.00	0.060	5.00	0.104	#####	#####	#####	#####

Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.526	0.00	0.553	0.00	1.315	0.00	1.160	0.00	1.497
0.11	0.500	0.16	0.506	0.16	1.145	0.16	0.982	0.16	1.302
0.20	0.435	0.20	0.463	0.20	1.056	0.20	0.899	0.20	1.200
0.30	0.412	0.30	0.428	0.30	0.860	0.30	0.738	0.30	0.975
0.50	0.376	0.50	0.387	0.50	0.539	0.50	0.490	0.50	0.603
0.75	0.334	0.75	0.340	0.75	0.287	0.75	0.309	0.75	0.324
1.00	0.296	1.00	0.300	1.00	0.162	1.00	0.208	1.00	0.194
2.00	0.180	2.00	0.182	2.00	0.098	2.00	0.102	2.00	0.104
3.00	0.115	3.00	0.115	3.00	0.106	3.00	0.104	3.00	0.105
5.00	0.061	5.00	0.061	5.00	0.106	5.00	0.106	5.00	0.106

Asphalt: 150 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	1.325	0.00	0.503	0.00	0.926	0.00	0.696	0.00	0.936
0.11	1.304	0.16	0.466	0.16	0.842	0.16	0.629	0.16	0.848
0.20	1.545	0.20	0.425	0.20	0.795	0.20	0.592	0.20	0.800
0.30	1.567	0.30	0.392	0.30	0.694	0.30	0.523	0.30	0.696
0.50	1.437	0.50	0.359	0.50	0.507	0.50	0.406	0.50	0.506
0.75	1.358	0.75	0.319	0.75	0.329	0.75	0.292	0.75	0.333
1.00	1.322	1.00	0.284	1.00	0.214	1.00	0.214	1.00	0.226
2.00	1.157	2.00	0.180	2.00	0.096	2.00	0.109	2.00	0.108
3.00	0.997	3.00	0.117	3.00	0.106	3.00	0.106	3.00	0.106
5.00	0.739	5.00	0.062	5.00	0.107	5.00	0.108	5.00	0.108

Mechanistic Pavement Analysis Pavement life as a function of the Variation in the Subgrade Characteristics

Pavement Structure - Under Construction (UC):

Surface — 50 mm — 50

Bituminous prime coat to protect the granular base — **Unit Weight: 23**
Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.500	0.547	1.735	NS	1.561

Strain - Bottom of the Base Layer — Depth= 49 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	72	75	-200		7.550E+08
ElsymS	42	42	-166		1.029E+10
FenlapK	906	906	-1270		**1.394E+04**
FenlapB	NS	NS	NS		
FenlapM	525	525	-802		1.526E+05

LRSB - CCT — 300 mm — 350

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCT ***10***
Char.: **Mr_i=774 MPa** **n_i= 0.40** **Unit Weight: 23**
k q: **k_1= 5,475** **k_2= 0.4772** **Suction: 0**
Boyce: **Ka= 3,459** **Ga= 33,395** **n= 0.3478**
Mayhew: **Ka= 3,067** **Ga= 23,853** **n= 0.1411** **m= 0.5969** **b= -0.7012**

Stress - Centre of the Base Layer — Depth= 200 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	147	0	-13	14.0	1.570E+44
ElsymS	212	-6	-6	11.7	2.753E+37
FenlapK	35	-29	-38	13.1	3.283E+41
FenlapB	NS	NS	NS	NS	
FenlapM	-2	-17	-35	40.4	1.677E+121

DUT - MIG — 300 mm — 650

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***
Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**
k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 500 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	22	-15	-17	17.9	2.621E+55
ElsymS	26	-19	-19	14.5	3.927E+45
FenlapK	56	4	4	19.5	1.556E+60
FenlapB	NS	NS	NS	NS	
FenlapM	39	2	1	24.0	1.863E+73

LRCF - LOC — 1000 mm — 1650

Selected Soil Subgrade — Test programme: 2 — Lab.: LRCF — LOC ***5***
Char.: **Mr_i=48 MPa** **n_i= 0.74** **=0.45** **Unit Weight: 22**
Loach: **C= 641** **D= 1.7567** **q_f =** **0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-97	-119	116		1.831E+15
ElsymS	-129	-129	135		3.078E+14
FenlapK	0	0	0		
FenlapB	NS	NS	NS		
FenlapM	0	0	0		

All - LOC — Infinite — 2650

In-Situ Soil Subgrade Foundation — Test programme: 1 — Lab.: All — LOC ***2***
Char.: **Mr_i=34 MPa** **n_i= 0.54** **=0.45** **Unit Weight: 22**
Brown: **A= 21,858** **B= 0.4820** **q_f =** **0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-43	-45	92		2.677E+16
ElsymS	-40	-40	84		7.326E+16
FenlapK	0	0	0		
FenlapB	NS	NS	NS		
FenlapM	0	0	0		

Minimum Design Loading: **1.394E+04**

Pavement Structure - In-Service (IS):

Surface — 100 mm — 100

Asphalt Surface and Base Layer — **Unit Weight: 23**
Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.446	0.489	1.315	0.939	1.560

Strain - Bottom of the Base Layer — Depth= 99 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	84	108	-192		1.556E+08
ElsymS	110	110	-230		1.424E+08
FenlapK	752	752	-1030		3.155E+04
FenlapB	494	494	-682		1.993E+05
FenlapM	871	871	-1170		**1.657E+04**

LRSB - CCT — 300 mm — 400

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCT ***10***
Char.: **Mr_i=774 MPa** **n_i= 0.40** **Unit Weight: 23**
k q: **k_1= 5,475** **k_2= 0.4772** **Suction: 0**
Boyce: **Ka= 3,459** **Ga= 33,395** **n= 0.3478**
Mayhew: **Ka= 3,067** **Ga= 23,853** **n= 0.1411** **m= 0.5969** **b= -0.7012**

Stress - Centre of the Base Layer — Depth= 250 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	97	-14	-24	13.5	5.346E+42
ElsymS	142	-24	-24	10.8	7.756E+34
FenlapK	76	-4	-4	17.7	7.138E+54
FenlapB	28	13	-28	73.9	7.268E+218
FenlapM	24	-2	-5	38.2	6.747E+114

DUT - MIG — 300 mm — 700

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***
Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**
k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 550 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	17	-13	-15	20.7	4.144E+63
ElsymS	20	-16	-16	17.3	7.336E+53
FenlapK	43	3	3	23.3	1.599E+71
FenlapB	29	2	2	31.2	1.821E+94
FenlapM	29	3	3	32.1	1.096E+97

LRCF - LOC — 1000 mm — 1700

Selected Soil Subgrade — Test programme: 2 — Lab.: LRCF — LOC ***5***
Char.: **Mr_i=48 MPa** **n_i= 0.74** **=0.45** **Unit Weight: 22**
Loach: **C= 641** **D= 1.7567** **q_f =** **0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-84	-100	98		1.313E+16
ElsymS	-106	-106	111		3.069E+15
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

All - LOC — Infinite — 2700

In-Situ Soil Subgrade Foundation — Test programme: 1 — Lab.: All — LOC ***2***
Char.: **Mr_i=34 MPa** **n_i= 0.54** **=0.45** **Unit Weight: 22**
Brown: **A= 21,858** **B= 0.4820** **q_f =** **0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-39	-40	83		8.439E+16
ElsymS	-36	-36	75		2.570E+17
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: **1.657E+04**

Pavement Structure - In-Service (IS):

Surface — 150 mm — 0

Asphalt Surface and Base Layer — **Unit Weight: 23**
Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.407	0.444	0.926	0.812	0.948

Strain - Bottom of the Base Layer — Depth= 149 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	63	91	-144		3.255E+08
ElsymS	108	108	-202		1.581E+08
FenlapK	468	468	-626		2.526E+05
FenlapB	422	422	-594		3.977E+05
FenlapM	484	484	-641		**2.180E+05**

LRSB - CCT — 300 mm — 450

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCT ***10***
Char.: **Mr_i=774 MPa** **n_i= 0.40** **Unit Weight: 23**
k q: **k_1= 5,475** **k_2= 0.4772** **Suction: 0**
Boyce: **Ka= 3,459** **Ga= 33,395** **n= 0.3478**
Mayhew: **Ka= 3,067** **Ga= 23,853** **n= 0.1411** **m= 0.5969** **b= -0.7012**

Stress - Centre of the Base Layer — Depth= 300 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	69	-21	-28	13.4	2.728E+42
ElsymS	97	-30	-30	10.7	4.059E+34
FenlapK	43	2	2	28.8	1.965E+87
FenlapB	94	13	11	21.1	8.203E+64
FenlapM	26	-5	-5	31.4	1.014E+95

DUT - MIG — 300 mm — 750

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***
Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**
k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 600 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	14	-12	-13	23.9	1.214E+73
ElsymS	16	-14	-14	20.7	5.589E+63
FenlapK	28	3	3	33.3	2.085E+100
FenlapB	17	1	1	45.9	1.916E+137
FenlapM	20	3	3	44.2	1.447E+132

LRCF - LOC — 1000 mm — 1750

Selected Soil Subgrade — Test programme: 2 — Lab.: LRCF — LOC ***5***
Char.: **Mr_i=48 MPa** **n_i= 0.74** **=0.45** **Unit Weight: 22**
Loach: **C= 641** **D= 1.7567** **q_f =** **0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-73	-85	83		7.998E+16
ElsymS	-88	-88	92		2.562E+16
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

All - LOC — Infinite — 2750

In-Situ Soil Subgrade Foundation — Test programme: 1 — Lab.: All — LOC ***2***
Char.: **Mr_i=34 MPa** **n_i= 0.54** **=0.45** **Unit Weight: 22**
Brown: **A= 21,858** **B= 0.4820** **q_f =** **0.001** ***p +** **86** **Suction: 32**

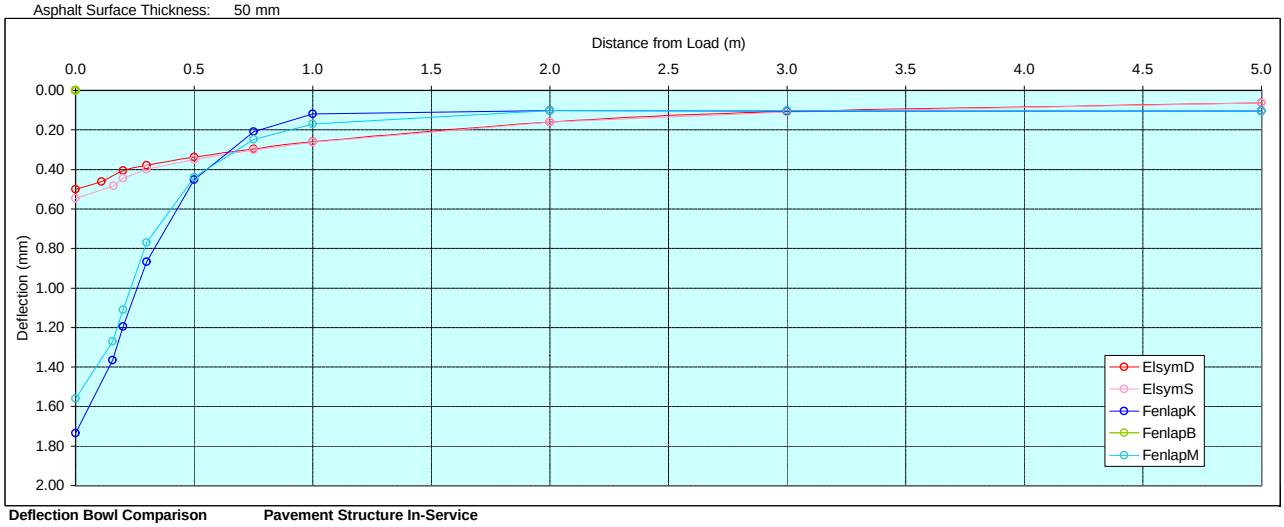
Strain - Top of the Subgrade Layer — Depth= 1751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-36	-37	83		8.846E+16
ElsymS	-32	-32	75		2.590E+17
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: **2.180E+05**

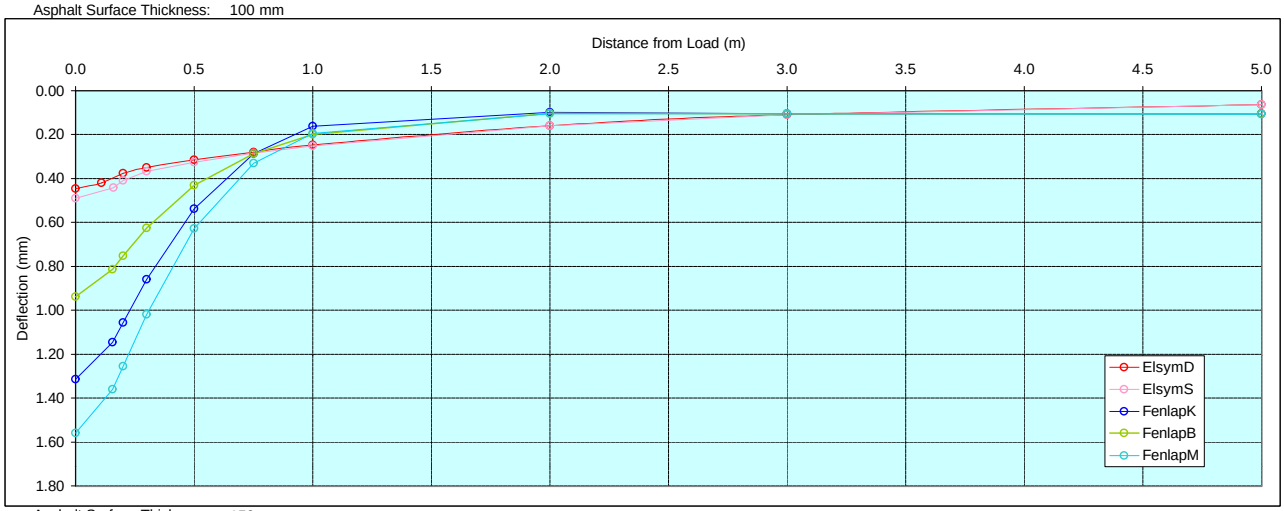
Deflection Bowl Comparison **Pavement Structure Under Construction**

Asphalt Surface Thickness: 50 mm

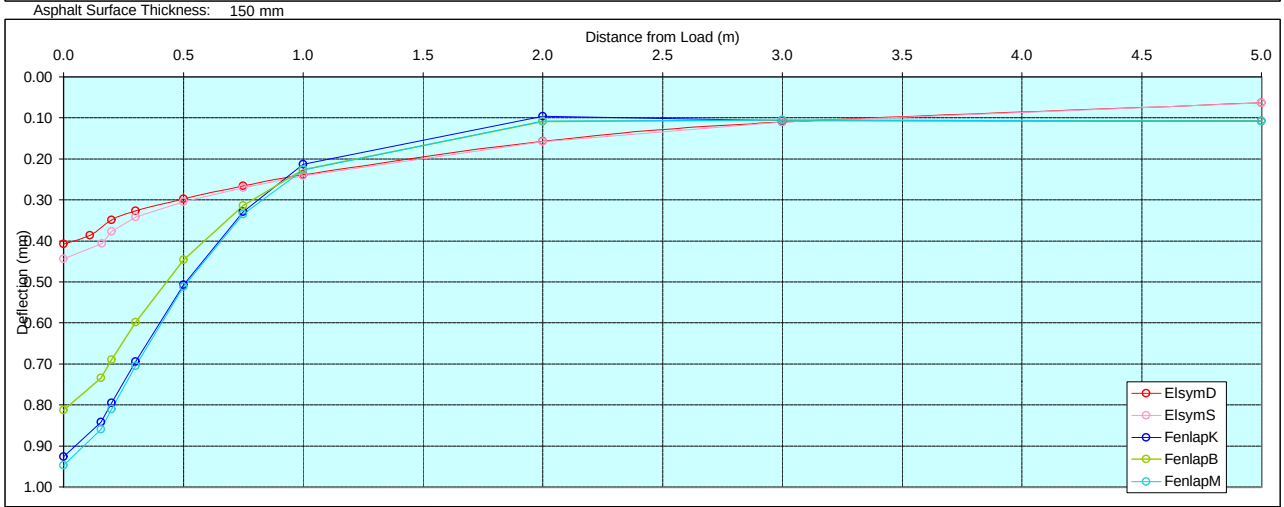


Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Asphalt Surface Thickness: 150 mm



Pavement Structure Under Construction

Asphalt: 50 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.500	0.00	0.547	0.00	1.735	#####	#####	0.00	1.561
0.11	0.463	0.16	0.484	0.16	1.365	#####	#####	0.16	1.272
0.20	0.406	0.20	0.444	0.20	1.196	#####	#####	0.20	1.110
0.30	0.378	0.30	0.398	0.30	0.868	#####	#####	0.30	0.770
0.50	0.339	0.50	0.349	0.50	0.452	#####	#####	0.50	0.440
0.75	0.296	0.75	0.302	0.75	0.209	#####	#####	0.75	0.249
1.00	0.259	1.00	0.263	1.00	0.119	#####	#####	1.00	0.170
2.00	0.160	2.00	0.161	2.00	0.101	#####	#####	2.00	0.102
3.00	0.108	3.00	0.108	3.00	0.103	#####	#####	3.00	0.103
5.00	0.062	5.00	0.062	5.00	0.104	#####	#####	5.00	0.104

Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.446	0.00	0.489	0.00	1.315	0.00	0.939	0.00	1.560
0.11	0.421	0.16	0.442	0.16	1.145	0.16	0.814	0.16	1.360
0.20	0.376	0.20	0.408	0.20	1.056	0.20	0.752	0.20	1.255
0.30	0.350	0.30	0.368	0.30	0.860	0.30	0.625	0.30	1.020
0.50	0.316	0.50	0.325	0.50	0.539	0.50	0.431	0.50	0.627
0.75	0.280	0.75	0.285	0.75	0.287	0.75	0.287	0.75	0.331
1.00	0.248	1.00	0.252	1.00	0.162	1.00	0.200	1.00	0.196
2.00	0.159	2.00	0.160	2.00	0.098	2.00	0.104	2.00	0.104
3.00	0.109	3.00	0.109	3.00	0.106	3.00	0.105	3.00	0.105
5.00	0.063	5.00	0.063	5.00	0.106	5.00	0.106	5.00	0.106

Asphalt: 150 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.407	0.00	0.444	0.00	0.926	0.00	0.812	0.00	0.948
0.11	0.387	0.16	0.407	0.16	0.842	0.16	0.734	0.16	0.860
0.20	0.349	0.20	0.377	0.20	0.795	0.20	0.690	0.20	0.811
0.30	0.327	0.30	0.342	0.30	0.694	0.30	0.598	0.30	0.705
0.50	0.297	0.50	0.305	0.50	0.507	0.50	0.447	0.50	0.511
0.75	0.266	0.75	0.271	0.75	0.329	0.75	0.314	0.75	0.335
1.00	0.238	1.00	0.242	1.00	0.214	1.00	0.226	1.00	0.227
2.00	0.157	2.00	0.158	2.00	0.096	2.00	0.109	2.00	0.108
3.00	0.110	3.00	0.110	3.00	0.106	3.00	0.105	3.00	0.106
5.00	0.063	5.00	0.063	5.00	0.107	5.00	0.108	5.00	0.108

Mechanistic Pavement Analysis Pavement life as a function of the Range of values in the Subgrade Characteristics for a Single Result

Pavement Structure - Under Construction (UC):

Surface — 50 mm — Bituminous prime coat to protect the granular base — **Unit Weight: 23**
Mr=2,100 MPa **n=0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.515	0.616	1.828	1.430	2.324

Strain - Bottom of the Base Layer — Depth= 49 mm — 50

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	137	149	-282		3.858E+07
ElsymS	107	107	-249		1.647E+08
FenlapK	770	770	-1120		2.844E+04
FenlapB	61	61	-191		1.978E+09
FenlapM	1140	1140	-1610		**5.088E+03**

LRSB - CCD — 300 mm — Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD *9*
Char.: **Mr=409 MPa** **n=0.26** **Unit Weight: 24**
k q: **k_1= 2,456** **k_2= 0.7461** **Suction: 0**
Boyce: **Ka= 1,471** **Ga= 8,632** **n= 0.1864**
Mayhew: **Ka= 3,426** **Ga= 57,548** **n= 0.1152** **m= 1.0650** **b= -0.2732**

Stress - Centre of the Base Layer — Depth= 200 mm — 350

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	138	-1	-13	14.2	5.016E+44
ElsymS	204	-12	-12	11.3	1.655E+36
FenlapK	93	-55	-57	7.5	2.149E+25
FenlapB	264	80	-180	20.3	4.078E+62
FenlapM	59	-55	-68	7.2	2.924E+24

DUT - MIG — 300 mm — Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG *8*
Char.: **Mr=198 MPa** **n=0.23** **Unit Weight: 22**
k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 500 mm — 650

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	34	-5	-8	20.4	6.807E+62
ElsymS	43	-9	-9	16.4	1.452E+51
FenlapK	63	3	3	17.7	7.967E+54
FenlapB	74	-3	-4	14.4	2.054E+45
FenlapM	40	6	6	27.7	1.190E+84

LNEC - LOC — 1000 mm — Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC *7*
Char.: **Mr=161 MPa** **n=0.33** **Unit Weight: 22**
Loach: **C= 3,659** **D= 1.6219** **q_f = 0.001 *p + 86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 651 mm — 1650

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-46	-60	124		8.440E+14
ElsymS	-66	-66	153		7.753E+13
FenlapK	0	0	0		8.039E+88
FenlapB	0	0	0		6.834E+90
FenlapM	0	0	0		

UNOT - LOC — Infinite — In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC *4*
Char.: **Mr=22 MPa** **n=0.68** **=0.45** **Unit Weight: 22**
Brown: **A= 17,512** **B= 0.5781** **q_f = 0.001 *p + 86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1651 mm — 2650

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-42	-43	51		2.076E+19
ElsymS	-44	-44	54		1.209E+19
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: 5.088E+03

Pavement Structure - In-Service (IS):

Surface — 100 mm — Asphalt Surface and Base Layer — **Unit Weight: 23**
Mr=2,100 MPa **n=0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.437	0.762	1.346	1.170	1.359

Strain - Bottom of the Base Layer — Depth= 99 mm — 100

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	122	164	-243		2.545E+07
ElsymS	183	183	-312		1.564E+07
FenlapK	681	681	-938		4.875E+04
FenlapB	638	638	-899		6.489E+04
FenlapM	786	786	-1050		**2.599E+04**

LRSB - CCD — 300 mm — Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD *9*
Char.: **Mr=409 MPa** **n=0.26** **Unit Weight: 24**
k q: **k_1= 2,456** **k_2= 0.7461** **Suction: 0**
Boyce: **Ka= 1,471** **Ga= 8,632** **n= 0.1864**
Mayhew: **Ka= 3,426** **Ga= 57,548** **n= 0.1152** **m= 1.0650** **b= -0.2732**

Stress - Centre of the Base Layer — Depth= 250 mm — 400

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	92	-6	-15	15.6	5.063E+48
ElsymS	98	-57	-57	7.3	5.942E+24
FenlapK	66	-16	-16	14.8	4.161E+46
FenlapB	2	-23	-62	24.1	4.687E+73
FenlapM	19	-17	-17	22.6	2.304E+69

DUT - MIG — 300 mm — Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG *8*
Char.: **Mr=198 MPa** **n=0.23** **Unit Weight: 22**
k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 550 mm — 700

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	27	-6	-7	23.0	1.818E+70
ElsymS	17	1	1	47.5	5.145E+141
FenlapK	42	3	3	23.8	7.524E+72
FenlapB	36	3	3	26.5	4.116E+80
FenlapM	28	3	3	33.3	3.595E+100

LNEC - LOC — 1000 mm — Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC *7*
Char.: **Mr=161 MPa** **n=0.33** **Unit Weight: 22**
Loach: **C= 3,659** **D= 1.6219** **q_f = 0.001 *p + 86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 701 mm — 1700

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-42	-52	104		6.138E+15
ElsymS	-9	-9	664		3.702E+06
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

UNOT - LOC — Infinite — In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC *4*
Char.: **Mr=22 MPa** **n=0.68** **=0.45** **Unit Weight: 22**
Brown: **A= 17,512** **B= 0.5781** **q_f = 0.001 *p + 86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1701 mm — 2700

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-38	-39	46		6.492E+19
ElsymS	-40	-40	50		2.655E+19
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: 2.599E+04

Pavement Structure - In-Service (IS):

Surface — 150 mm — Asphalt Surface and Base Layer — **Unit Weight: 23**
Mr=2,100 MPa **n=0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.390	1.374	0.997	0.925	0.893

Strain - Bottom of the Base Layer — Depth= 149 mm — 0

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	86	128	-177		7.369E+07
ElsymS	516	516	-696		**1.646E+05**
FenlapK	453	453	-607		2.914E+05
FenlapB	469	469	-654		2.502E+05
FenlapM	429	429	-572		3.700E+05

LRSB - CCD — 300 mm — Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD *9*
Char.: **Mr=409 MPa** **n=0.26** **Unit Weight: 24**
k q: **k_1= 2,456** **k_2= 0.7461** **Suction: 0**
Boyce: **Ka= 1,471** **Ga= 8,632** **n= 0.1864**
Mayhew: **Ka= 3,426** **Ga= 57,548** **n= 0.1152** **m= 1.0650** **b= -0.2732**

Stress - Centre of the Base Layer — Depth= 300 mm — 450

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	66	-9	-14	17.2	2.347E+53
ElsymS	31	6	6	44.7	6.129E+133
FenlapK	41	-6	-6	23.4	2.730E+71
FenlapB	58	-64	-71	6.0	7.867E+20
FenlapM	34	-15	-15	19.3	3.883E+59

DUT - MIG — 300 mm — Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG *8*
Char.: **Mr=198 MPa** **n=0.23** **Unit Weight: 22**
k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 600 mm — 750

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	22	-5	-6	26.2	5.450E+79
ElsymS	22	6	6	50.7	1.303E+151
FenlapK	28	3	3	33.8	6.537E+101
FenlapB	13	6	5	106.7	
FenlapM	22	3	3	40.4	1.228E+121

LNEC - LOC — 1000 mm — Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC *7*
Char.: **Mr=161 MPa** **n=0.33** **Unit Weight: 22**
Loach: **C= 3,659** **D= 1.6219** **q_f = 0.001 *p + 86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 751 mm — 1750

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-38	-45	88		4.133E+16
ElsymS	-17	-17	86		5.461E+16
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

UNOT - LOC — Infinite — In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC *4*
Char.: **Mr=22 MPa** **n=0.68** **=0.45** **Unit Weight: 22**
Brown: **A= 17,512** **B= 0.5781** **q_f = 0.001 *p + 86** **Suction: 32**

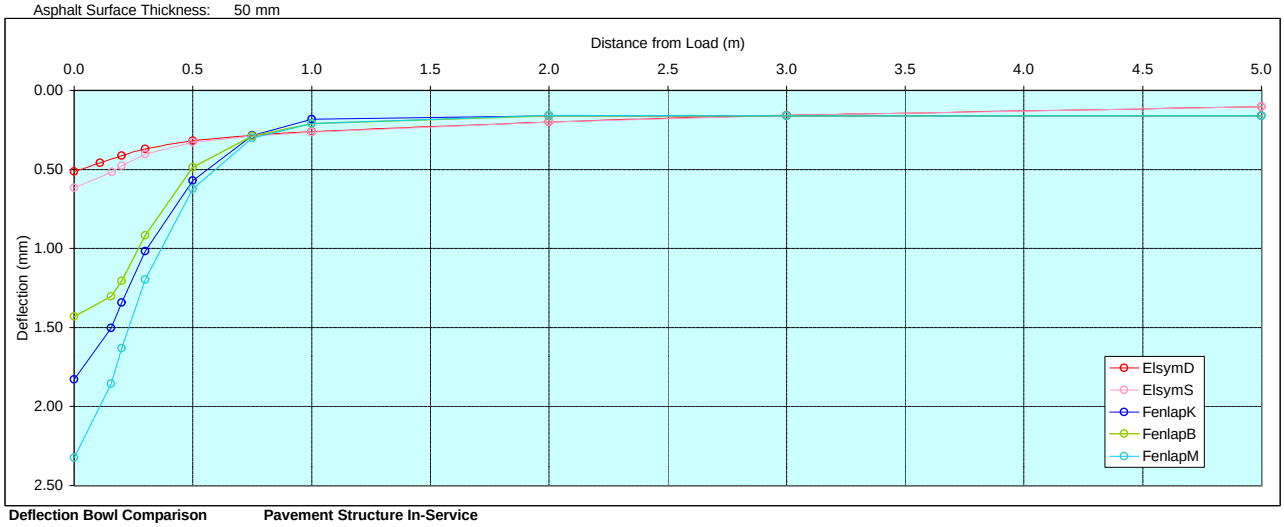
Strain - Top of the Subgrade Layer — Depth= 1751 mm — 2750

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-35	-36	80		1.273E+17
ElsymS	-47	-47	112		2.740E+15
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: 1.646E+05

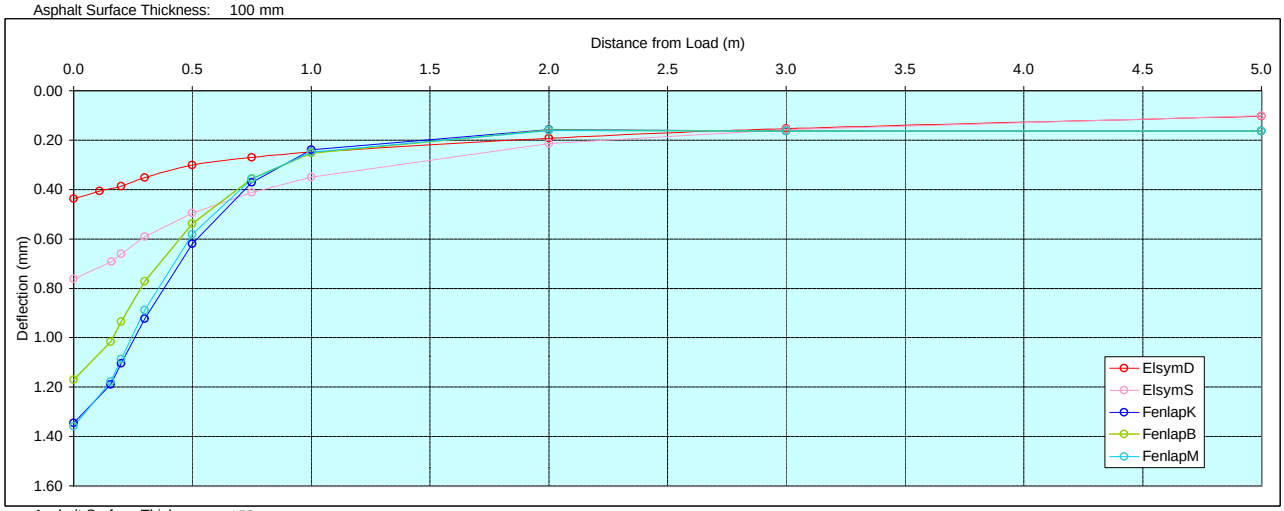
Deflection Bowl Comparison **Pavement Structure Under Construction**

Asphalt Surface Thickness: 50 mm

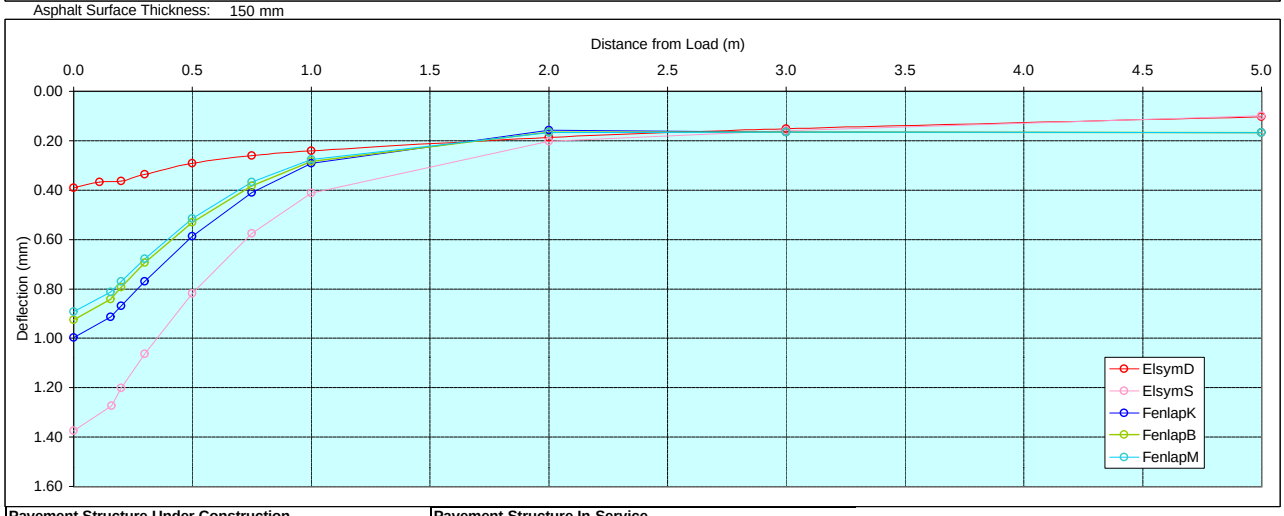


Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Asphalt Surface Thickness: 150 mm



Pavement Structure Under Construction

Asphalt: 50 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.515	0.00	0.616	0.00	1.828	0.00	1.430	0.00	2.324
0.11	0.458	0.16	0.516	0.16	1.503	0.16	1.303	0.16	1.857
0.20	0.414	0.20	0.478	0.20	1.343	0.20	1.206	0.20	1.632
0.30	0.369	0.30	0.403	0.30	1.019	0.30	0.919	0.30	1.196
0.50	0.318	0.50	0.329	0.50	0.570	0.50	0.486	0.50	0.624
0.75	0.285	0.75	0.290	0.75	0.286	0.75	0.289	0.75	0.299
1.00	0.262	1.00	0.264	1.00	0.184	1.00	0.208	1.00	0.209
2.00	0.199	2.00	0.200	2.00	0.162	2.00	0.160	2.00	0.158
3.00	0.158	3.00	0.158	3.00	0.160	3.00	0.160	3.00	0.160
5.00	0.104	5.00	0.104	5.00	0.161	5.00	0.160	5.00	0.161

Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.437	0.00	0.762	0.00	1.346	0.00	1.170	0.00	1.359
0.11	0.406	0.16	0.692	0.16	1.189	0.16	1.016	0.16	1.179
0.20	0.388	0.20	0.661	0.20	1.105	0.20	0.935	0.20	1.086
0.30	0.352	0.30	0.592	0.30	0.924	0.30	0.772	0.30	0.889
0.50	0.302	0.50	0.495	0.50	0.619	0.50	0.538	0.50	0.581
0.75	0.271	0.75	0.412	0.75	0.371	0.75	0.356	0.75	0.357
1.00	0.249	1.00	0.349	1.00	0.239	1.00	0.252	1.00	0.249
2.00	0.192	2.00	0.214	2.00	0.157	2.00	0.160	2.00	0.161
3.00	0.154	3.00	0.158	3.00	0.164	3.00	0.163	3.00	0.163
5.00	0.104	5.00	0.100	5.00	0.164	5.00	0.164	5.00	0.164

Mechanistic Pavement Analysis Pavement life as a function of the Range of values in the Subgrade Characteristics for a Single Result

Pavement Structure - Under Construction (UC):

Surface — 50 mm

Bituminous prime coat to protect the granular base — **Unit Weight: 23**
Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.489	0.580	1.779	1.398	1.943

Strain - Bottom of the Base Layer — Depth= 49 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	121	130	-262		6.909E+07
ElsymS	90	90	-228		3.502E+08
FenlapK	770	770	-1110		2.844E+04
FenlapB	105	105	-299		1.775E+08
FenlapM	993	993	-1420		**9.322E+03**

LRSB - CCD — 300 mm — 350

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD *9*
Char.: **Mr_i=491 MPa** **n_i= 0.32** **Unit Weight: 24**
k q: **k_1= 2,787** **k_2= 0.7269** **Suction: 0**
Boyce: **Ka= 2,060** **Ga= 9,736** **n= 0.2079**
Mayhew: **Ka= 4,556** **Ga= 65,971** **n= 0.1585** **m= 1.0460** **b= -0.2604**

Stress - Centre of the Base Layer — Depth= 200 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	143	4	-9	14.8	2.652E+46
ElsymS	210	-5	-5	11.8	6.766E+37
FenlapK	76	-63	-67	6.4	9.932E+21
FenlapB	38	13	-106	49.7	2.428E+148
FenlapM	45	-24	-30	13.9	9.455E+43

DUT - MIG — 300 mm — 650

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG *8*
Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**
k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 500 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	33	-6	-8	20.5	1.678E+63
ElsymS	42	-9	-9	16.5	3.333E+51
FenlapK	61	3	3	18.1	1.118E+56
FenlapB	48	4	4	22.2	9.860E+67
FenlapM	53	1	1	19.1	1.085E+59

LNEC - LOC — 1000 mm — 1650

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC *7*
Char.: **Mr_i=161 MPa** **n_i= 0.33** **Unit Weight: 22**
Loach: **C= 3,659** **D= 1.6219** **q_f = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-46	-59	121		1.118E+15
ElsymS	-66	-66	149		1.059E+14
FenlapK	0	0	0		6.834E+90
FenlapB	0	0	0		
FenlapM	0	0	0		

UNOT - LOC — Infinite — 2650

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC *4*
Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** **Unit Weight: 22**
Brown: **A= 17,512** **B= 0.5781** **q_f = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-41	-43	51		2.441E+19
ElsymS	-44	-44	53		1.404E+19
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: 9.322E+03

Pavement Structure - In-Service (IS):

Surface — 100 mm

Asphalt Surface and Base Layer — **Unit Weight: 23**
Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.422	0.727	1.306	1.015	1.572

Strain - Bottom of the Base Layer — Depth= 99 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	112	149	-230		3.813E+07
ElsymS	161	161	-286		2.760E+07
FenlapK	669	669	-922		5.270E+04
FenlapB	427	427	-654		3.776E+05
FenlapM	853	853	-1150		**1.815E+04**

LRSB - CCD — 300 mm — 400

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD *9*
Char.: **Mr_i=491 MPa** **n_i= 0.32** **Unit Weight: 24**
k q: **k_1= 2,787** **k_2= 0.7269** **Suction: 0**
Boyce: **Ka= 2,060** **Ga= 9,736** **n= 0.2079**
Mayhew: **Ka= 4,556** **Ga= 65,971** **n= 0.1585** **m= 1.0460** **b= -0.2604**

Stress - Centre of the Base Layer — Depth= 250 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	95	-4	-13	15.8	3.070E+49
ElsymS	103	-59	-59	7.2	2.062E+24
FenlapK	64	-15	-15	15.2	4.916E+47
FenlapB	66	-108	-109	2.4	2.488E+10
FenlapM	37	8	8	41.4	1.487E+124

DUT - MIG — 300 mm — 700

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG *8*
Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**
k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 550 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	27	-6	-7	23.2	6.977E+70
ElsymS	16	1	1	50.9	6.670E+151
FenlapK	42	3	3	24.0	2.555E+73
FenlapB	37	2	2	25.6	7.100E+77
FenlapM	22	3	3	39.9	3.431E+119

LNEC - LOC — 1000 mm — 1700

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC *7*
Char.: **Mr_i=161 MPa** **n_i= 0.33** **Unit Weight: 22**
Loach: **C= 3,659** **D= 1.6219** **q_f = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-42	-52	102		7.926E+15
ElsymS	-8	-8	620		8.110E+06
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

UNOT - LOC — Infinite — 2700

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC *4*
Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** **Unit Weight: 22**
Brown: **A= 17,512** **B= 0.5781** **q_f = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-38	-39	46		7.423E+19
ElsymS	-39	-39	49		3.697E+19
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: 1.815E+04

Pavement Structure - In-Service (IS):

Surface — 150 mm

Asphalt Surface and Base Layer — **Unit Weight: 23**
Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.380	0.437	0.968	0.832	0.928

Strain - Bottom of the Base Layer — Depth= 149 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	80	119	-168		1.040E+08
ElsymS	140	140	-238		4.963E+07
FenlapK	446	446	-599		3.120E+05
FenlapB	339	339	-468		1.039E+06
FenlapM	460	460	-608		**2.724E+05**

LRSB - CCD — 300 mm — 450

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD *9*
Char.: **Mr_i=491 MPa** **n_i= 0.32** **Unit Weight: 24**
k q: **k_1= 2,787** **k_2= 0.7269** **Suction: 0**
Boyce: **Ka= 2,060** **Ga= 9,736** **n= 0.2079**
Mayhew: **Ka= 4,556** **Ga= 65,971** **n= 0.1585** **m= 1.0460** **b= -0.2604**

Stress - Centre of the Base Layer — Depth= 300 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	68	-8	-14	17.1	1.353E+53
ElsymS	95	-16	-16	13.2	5.318E+41
FenlapK	41	-5	-5	23.7	2.422E+72
FenlapB	30	15	-48	76.2	2.655E+225
FenlapM	22	-2	-2	40.7	7.438E+121

DUT - MIG — 300 mm — 750

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG *8*
Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**
k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 600 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	22	-6	-7	26.4	2.605E+80
ElsymS	26	-7	-7	22.4	5.829E+68
FenlapK	28	3	3	33.7	4.170E+101
FenlapB	28	2	2	31.8	1.495E+96
FenlapM	18	3	3	50.9	6.566E+151

LNEC - LOC — 1000 mm — 1750

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC *7*
Char.: **Mr_i=161 MPa** **n_i= 0.33** **Unit Weight: 22**
Loach: **C= 3,659** **D= 1.6219** **q_f = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-37	-45	87		5.234E+16
ElsymS	-49	-49	102		8.107E+15
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

UNOT - LOC — Infinite — 2750

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC *4*
Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** **Unit Weight: 22**
Brown: **A= 17,512** **B= 0.5781** **q_f = 0.001** ***p +** **86** **Suction: 32**

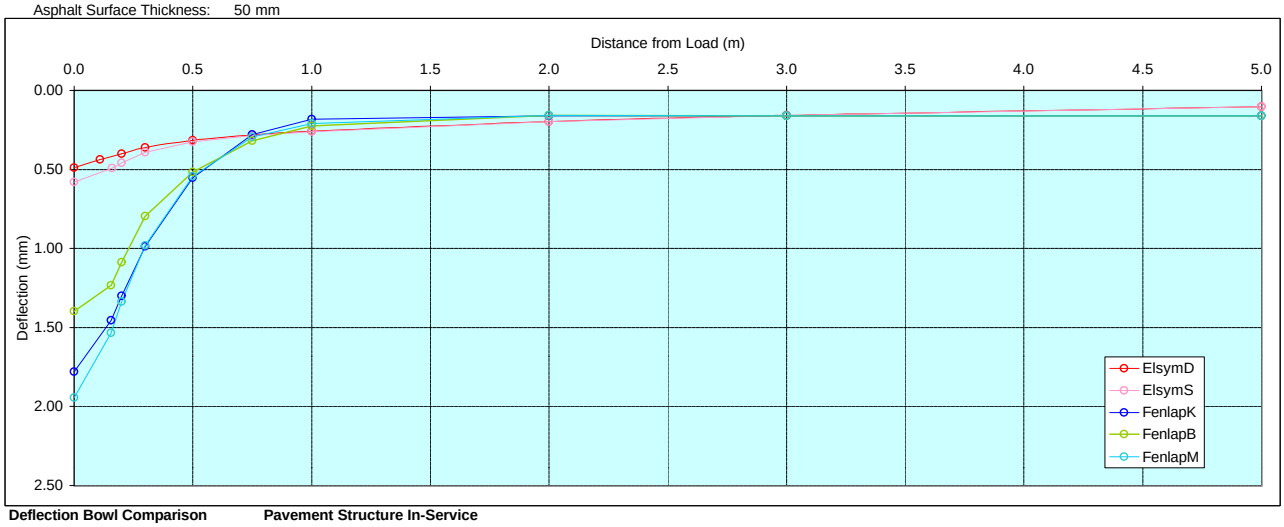
Strain - Top of the Subgrade Layer — Depth= 1751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-35	-36	79		1.447E+17
ElsymS	-37	-37	85		6.734E+16
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: 2.724E+05

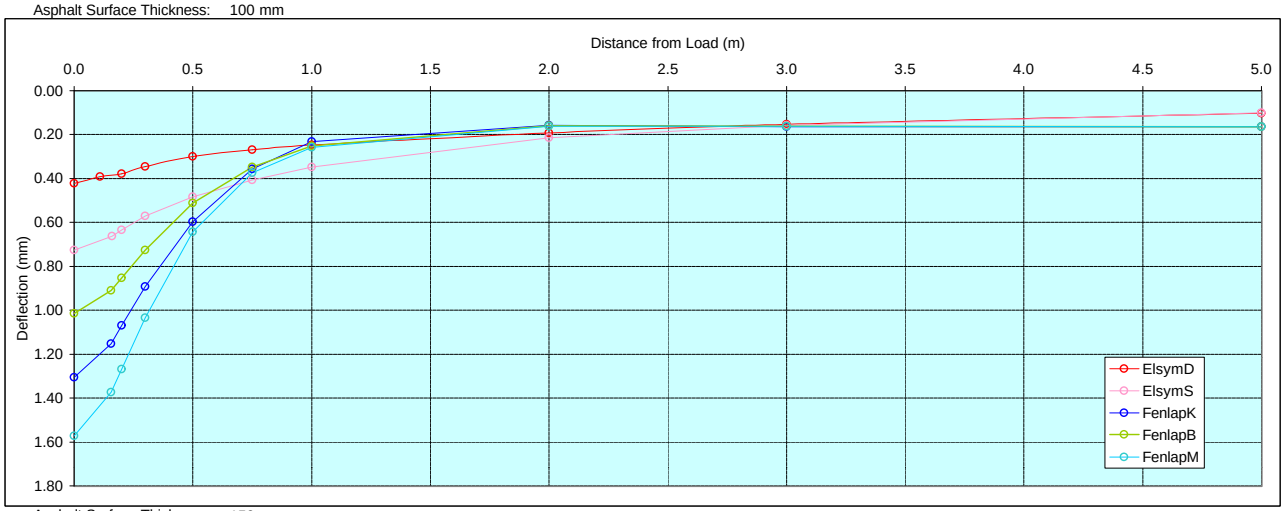
Deflection Bowl Comparison **Pavement Structure Under Construction**

Asphalt Surface Thickness: 50 mm

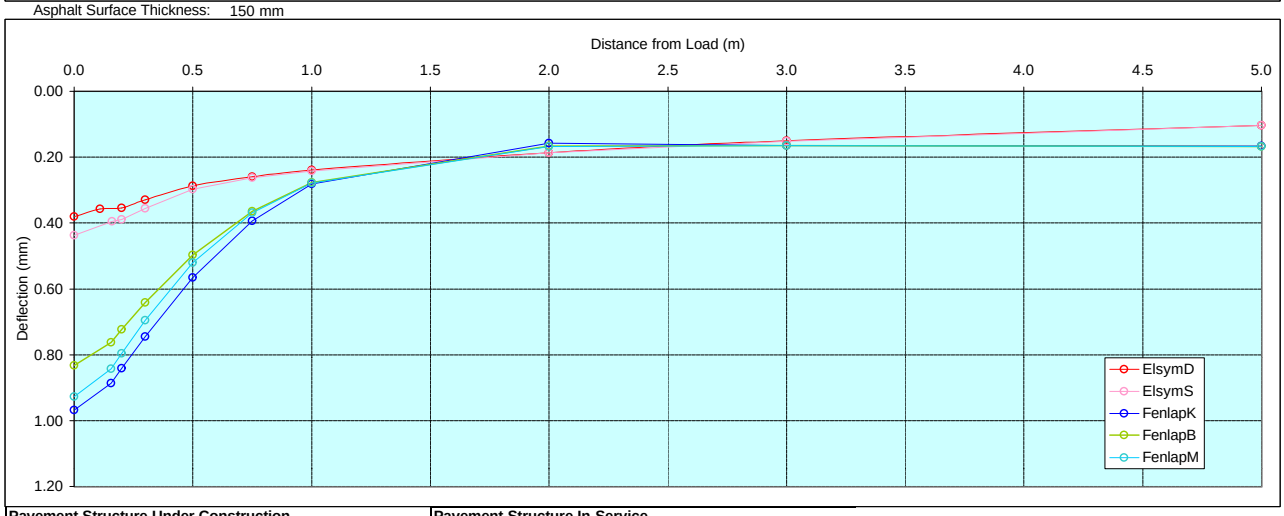


Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Asphalt Surface Thickness: 150 mm



Pavement Structure Under Construction

Asphalt: 50 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.489	0.00	0.580	0.00	1.779	0.00	1.398	0.00	1.943
0.11	0.438	0.16	0.492	0.16	1.455	0.16	1.232	0.16	1.533
0.20	0.402	0.20	0.459	0.20	1.300	0.20	1.086	0.20	1.338
0.30	0.363	0.30	0.393	0.30	0.987	0.30	0.795	0.30	0.981
0.50	0.315	0.50	0.325	0.50	0.554	0.50	0.517	0.50	0.545
0.75	0.283	0.75	0.287	0.75	0.281	0.75	0.319	0.75	0.295
1.00	0.260	1.00	0.262	1.00	0.182	1.00	0.224	1.00	0.211
2.00	0.198	2.00	0.199	2.00	0.161	2.00	0.159	2.00	0.158
3.00	0.157	3.00	0.158	3.00	0.160	3.00	0.161	3.00	0.160
5.00	0.104	5.00	0.104	5.00	0.161	5.00	0.161	5.00	0.161

Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.422	0.00	0.727	0.00	1.306	0.00	1.015	0.00	1.572
0.11	0.393	0.16	0.662	0.16	1.152	0.16	0.910	0.16	1.374
0.20	0.378	0.20	0.635	0.20	1.070	0.20	0.852	0.20	1.269
0.30	0.345	0.30	0.572	0.30	0.892	0.30	0.726	0.30	1.034
0.50	0.299	0.50	0.484	0.50	0.596	0.50	0.513	0.50	0.643
0.75	0.269	0.75	0.407	0.75	0.358	0.75	0.348	0.75	0.374
1.00	0.248	1.00	0.348	1.00	0.232	1.00	0.252	1.00	0.258
2.00	0.192	2.00	0.215	2.00	0.157	2.00	0.160	2.00	0.162
3.00	0.154	3.00	0.158	3.00	0.164	3.00	0.163	3.00	0.162
5.00	0.103	5.00	0.100	5.00	0.164	5.00	0.164	5.00	0.164

Mechanistic Pavement Analysis Pavement life as a function of the Range of values in the Subgrade Characteristics for a Single Result

Pavement Structure - Under Construction (UC):

Surface — 50 mm — 50

Bituminous prime coat to protect the granular base — **Unit Weight: 23**

Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.425	0.491	1.748	NS	NS

Strain - Bottom of the Base Layer — Depth= 49 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	86	94	-224		2.918E+08
ElsymS	61	61	-194		1.912E+09
FenlapK	834	834	-1180		**2.004E+04**
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

LRSB - CCD — 300 mm — 350

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr_i=817 MPa** **n_i= 0.48** **Unit Weight: 24**

k q: **k_1= 5,820** **k_2= 0.5508** **Suction: 0**

Boyce: **Ka= 12,739** **Ga= 25,802** **n= 0.3848**

Mayhew: **Ka= 12,097** **Ga= 103,681** **n= 0.3142** **m= 0.9777** **b= -0.2147**

Stress - Centre of the Base Layer — Depth= 200 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	158	18	3	16.4	1.745E+51
ElsymS	228	16	16	13.6	8.931E+42
FenlapK	13	-60	-65	5.1	2.090E+18
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

DUT - MIG — 300 mm — 650

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 500 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	29	-6	-8	21.8	8.266E+66
ElsymS	37	-9	-9	17.7	6.873E+54
FenlapK	49	3	3	21.2	1.251E+65
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

LNEC - LOC — 1000 mm — 1650

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr_i=161 MPa** **n_i= 0.33** **Unit Weight: 22**

Loach: **C= 3,659** **D= 1.6219** **q_i = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-44	-55	109		3.550E+15
ElsymS	-61	-61	133		3.779E+14
FenlapK	0	0	0		
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

UNOT - LOC — Infinite — 2650

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q_i = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-40	-41	48		4.101E+19
ElsymS	-42	-42	51		2.276E+19
FenlapK	0	0	0		
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

Minimum Design Loading: 2.004E+04

Pavement Structure - In-Service (IS):

Surface — 100 mm — 100

Asphalt Surface and Base Layer — **Unit Weight: 23**

Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.385	0.632	1.233	1.043	1.066

Strain - Bottom of the Base Layer — Depth= 99 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	89	114	-201		1.223E+08
ElsymS	109	109	-228		1.506E+08
FenlapK	669	669	-922		5.270E+04
FenlapB	735	735	-1000		3.488E+04
FenlapM	521	521	-729		1.578E+05

LRSB - CCD — 300 mm — 400

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr_i=817 MPa** **n_i= 0.48** **Unit Weight: 24**

k q: **k_1= 5,820** **k_2= 0.5508** **Suction: 0**

Boyce: **Ka= 12,739** **Ga= 25,802** **n= 0.3848**

Mayhew: **Ka= 12,097** **Ga= 103,681** **n= 0.3142** **m= 0.9777** **b= -0.2147**

Stress - Centre of the Base Layer — Depth= 250 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	106	2	-9	16.4	1.515E+51
ElsymS	122	-59	-59	7.3	4.346E+24
FenlapK	70	-10	-11	16.1	2.021E+50
FenlapB	-2	-9	-32	111.0	#NUM!
FenlapM	56	-84	-85	3.8	3.181E+14

DUT - MIG — 300 mm — 700

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 550 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	24	-6	-7	24.7	2.765E+75
ElsymS	13	1	1	63.6	6.224E+188
FenlapK	41	3	3	24.1	4.027E+73
FenlapB	28	3	3	33.6	1.787E+101
FenlapM	26	2	2	33.5	7.989E+100

LNEC - LOC — 1000 mm — 1700

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr_i=161 MPa** **n_i= 0.33** **Unit Weight: 22**

Loach: **C= 3,659** **D= 1.6219** **q_i = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-39	-48	93		2.312E+16
ElsymS	-4	-4	501		9.334E+07
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

UNOT - LOC — Infinite — 2700

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q_i = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-36	-38	44		1.129E+20
ElsymS	-35	-35	45		1.011E+20
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: #NUM!

Pavement Structure - In-Service (IS):

Surface — 150 mm — 0

Asphalt Surface and Base Layer — **Unit Weight: 23**

Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.354	0.402	1.170	0.688	0.864

Strain - Bottom of the Base Layer — Depth= 149 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	64	93	-147		3.018E+08
ElsymS	109	109	-205		1.494E+08
FenlapK	511	511	-678		**1.718E+05**
FenlapB	277	277	-285		2.520E+06
FenlapM	467	467	-621		2.550E+05

LRSB - CCD — 300 mm — 450

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr_i=817 MPa** **n_i= 0.48** **Unit Weight: 24**

k q: **k_1= 5,820** **k_2= 0.5508** **Suction: 0**

Boyce: **Ka= 12,739** **Ga= 25,802** **n= 0.3848**

Mayhew: **Ka= 12,097** **Ga= 103,681** **n= 0.3142** **m= 0.9777** **b= -0.2147**

Stress - Centre of the Base Layer — Depth= 300 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	75	-8	-15	16.5	2.663E+51
ElsymS	107	-15	-15	12.9	1.179E+41
FenlapK	35	4	4	36.4	2.795E+109
FenlapB	-82	-108	-129	-33.1	
FenlapM	28	1	1	38.6	7.312E+115

DUT - MIG — 300 mm — 750

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 600 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	20	-5	-6	28.3	8.041E+85
ElsymS	23	-7	-7	23.9	1.324E+73
FenlapK	23	3	3	40.2	3.845E+120
FenlapB	20	6	6	57.5	8.214E+170
FenlapM	15	2	2	55.1	8.244E+163

LNEC - LOC — 1000 mm — 1750

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr_i=161 MPa** **n_i= 0.33** **Unit Weight: 22**

Loach: **C= 3,659** **D= 1.6219** **q_i = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-35	-42	79		1.472E+17
ElsymS	-45	-45	93		2.320E+16
FenlapK	5	5	2		1.230E+36
FenlapB	0	0	0		
FenlapM	0	0	0		

UNOT - LOC — Infinite — 2750

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q_i = 0.001** ***p +** **86** **Suction: 32**

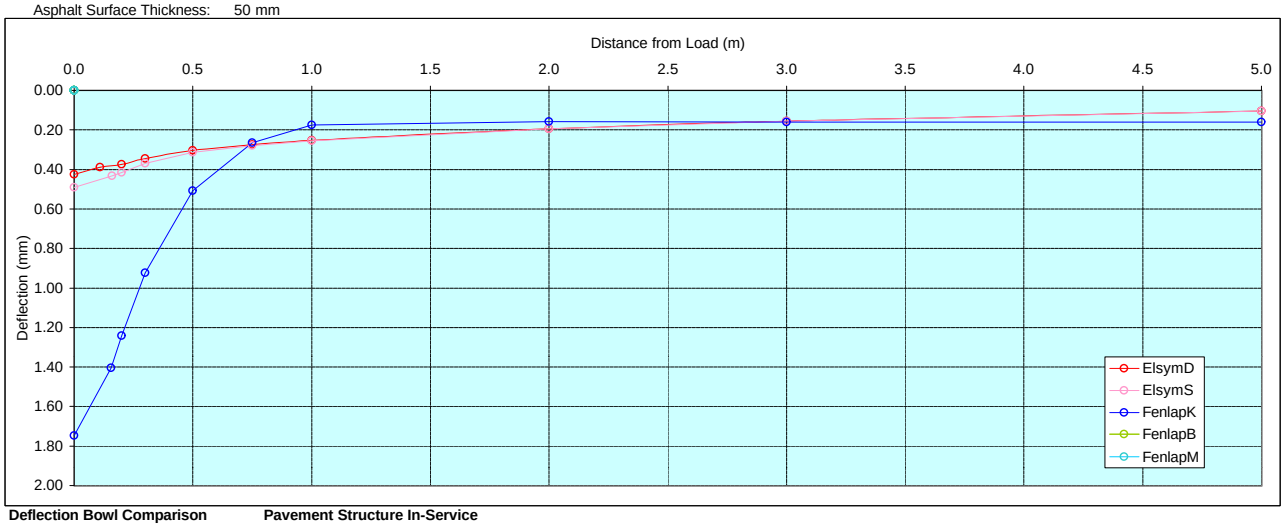
Strain - Top of the Subgrade Layer — Depth= 1751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-34	-35	76		2.170E+17
ElsymS	-36	-36	82		1.037E+17
FenlapK	-11	-11	26		5.815E+22
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: 1.718E+05

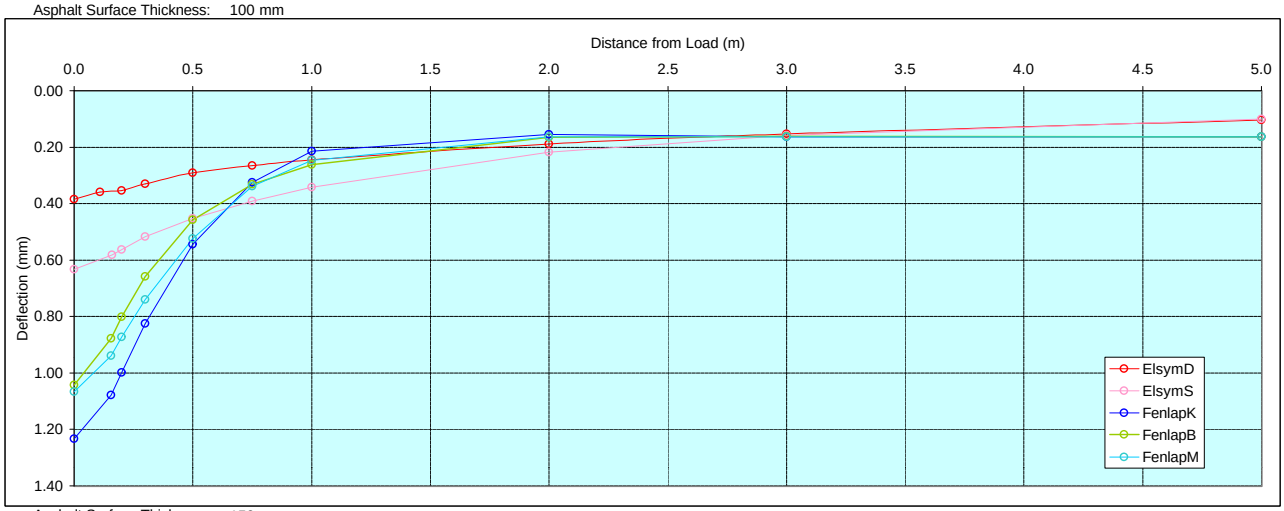
Deflection Bowl Comparison **Pavement Structure Under Construction**

Asphalt Surface Thickness: 50 mm

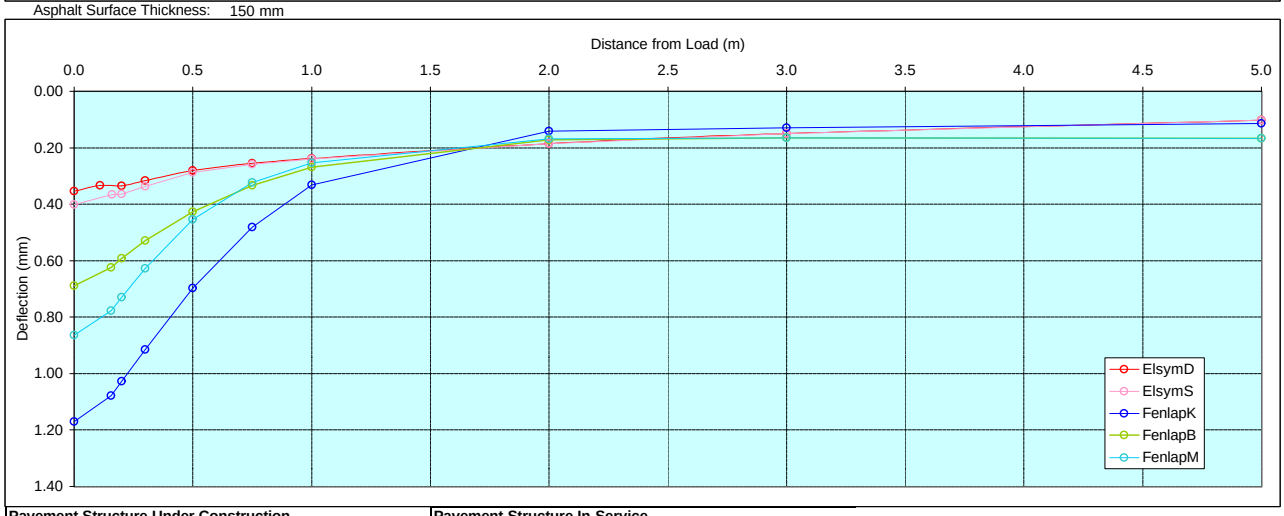


Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Asphalt Surface Thickness: 150 mm



Pavement Structure Under Construction

Asphalt: 50 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.425	0.00	0.491	0.00	1.748	#####	#####	#####	#####
0.11	0.390	0.16	0.432	0.16	1.404	#####	#####	#####	#####
0.20	0.373	0.20	0.414	0.20	1.241	#####	#####	#####	#####
0.30	0.345	0.30	0.370	0.30	0.922	#####	#####	#####	#####
0.50	0.305	0.50	0.313	0.50	0.509	#####	#####	#####	#####
0.75	0.276	0.75	0.280	0.75	0.265	#####	#####	#####	#####
1.00	0.254	1.00	0.256	1.00	0.176	#####	#####	#####	#####
2.00	0.194	2.00	0.195	2.00	0.158	#####	#####	#####	#####
3.00	0.155	3.00	0.155	3.00	0.160	#####	#####	#####	#####
5.00	0.103	5.00	0.103	5.00	0.160	#####	#####	#####	#####

Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.385	0.00	0.632	0.00	1.233	0.00	1.043	0.00	1.066
0.11	0.359	0.16	0.582	0.16	1.079	0.16	0.877	0.16	0.938
0.20	0.354	0.20	0.562	0.20	0.999	0.20	0.801	0.20	0.873
0.30	0.330	0.30	0.517	0.30	0.826	0.30	0.659	0.30	0.739
0.50	0.291	0.50	0.452	0.50	0.545	0.50	0.458	0.50	0.524
0.75	0.265	0.75	0.392	0.75	0.326	0.75	0.331	0.75	0.339
1.00	0.245	1.00	0.342	1.00	0.215	1.00	0.262	1.00	0.247
2.00	0.190	2.00	0.218	2.00	0.155	2.00	0.165	2.00	0.163
3.00	0.153	3.00	0.158	3.00	0.164	3.00	0.161	3.00	0.163
5.00	0.103	5.00	0.100	5.00	0.164	5.00	0.164	5.00	0.164

Mechanistic Pavement Analysis Pavement life as a function of the Range of values in the Subgrade Characteristics for a Single Result

Pavement Structure - Under Construction (UC):

Surface — 50 mm — Bituminous prime coat to protect the granular base — **Unit Weight: 23** — **M_r=2,100 MPa** **n_i= 0.40** — **Suction: 0**

Peak Deflection on the Surface

	δ_p (mm)=	ElsymD 0.409	ElsymS 0.468	FenlapK 1.789	FenlapB NS	FenlapM NS

Strain - Bottom of the Base Layer — Depth= 49 mm — 50

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	62	65	-189		1.478E+09
ElsymS	35	35	-159		2.170E+10
FenlapK	883	883	-1250		**1.560E+04**
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

LRSB - CCD — 300 mm — Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD *9*

Char.: **M_r=992 MPa** **n_i= 0.64** **=0.45** — **Unit Weight: 24**

k q: **k_1= 6,291** **k_2= 0.5234** — **Suction: 0**

Boyce: **Ka= 15,462** **Ga= 29,405** **n= 0.4088**

Mayhew: **Ka= 14,835** **Ga= 113,162** **n= 0.3480** **m= 0.9628** **b= -0.2048**

Stress - Centre of the Base Layer — Depth= 200 mm — 350

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	155	12	-2	15.5	4.184E+48
ElsymS	221	8	8	12.9	1.010E+41
FenlapK	39	-36	-41	10.9	1.039E+35
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

DUT - MIG — 300 mm — Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG *8*

Char.: **M_r=198 MPa** **n_i= 0.23** — **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** — **Suction: 0**

Stress - Centre of the Base Layer — Depth= 500 mm — 650

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	27	-6	-7	23.1	4.388E+70
ElsymS	34	-8	-8	18.8	1.786E+58
FenlapK	51	1	1	19.6	2.636E+60
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

LNEC - LOC — 1000 mm — Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC *7*

Char.: **M_r=161 MPa** **n_i= 0.33** — **Unit Weight: 22**

Loach: **C= 3,659** **D= 1.6219** **q_f = 0.001** ***p +** **86** — **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 651 mm — 1650

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-41	-52	103		6.932E+15
ElsymS	-57	-57	125		7.986E+14
FenlapK	0	0	0		
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

UNOT - LOC — Infinite — In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC *4*

Char.: **M_r=22 MPa** **n_i= 0.68** **=0.45** — **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q_f = 0.001** ***p +** **86** — **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1651 mm — 2650

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-39	-40	48		4.929E+19
ElsymS	-41	-41	50		2.735E+19
FenlapK	0	0	0		
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

Minimum Design Loading: 1.560E+04

Pavement Structure - In-Service (IS):

Surface — 100 mm — Asphalt Surface and Base Layer — **Unit Weight: 23** — **M_r=2,100 MPa** **n_i= 0.40** — **Suction: 0**

Peak Deflection on the Surface

	δ_p (mm)=	ElsymD 0.372	ElsymS 0.601	FenlapK 1.254	FenlapB 0.882	FenlapM 0.988

Strain - Bottom of the Base Layer — Depth= 99 mm — 100

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	73	92	-179		3.133E+08
ElsymS	83	83	-196		5.047E+08
FenlapK	680	680	-936		**4.906E+04**
FenlapB	491	491	-721		2.047E+05
FenlapM	477	477	-675		2.324E+05

LRSB - CCD — 300 mm — Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD *9*

Char.: **M_r=992 MPa** **n_i= 0.64** **=0.45** — **Unit Weight: 24**

k q: **k_1= 6,291** **k_2= 0.5234** — **Suction: 0**

Boyce: **Ka= 15,462** **Ga= 29,405** **n= 0.4088**

Mayhew: **Ka= 14,835** **Ga= 113,162** **n= 0.3480** **m= 0.9628** **b= -0.2048**

Stress - Centre of the Base Layer — Depth= 250 mm — 400

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	105	-4	-15	15.2	3.553E+47
ElsymS	123	-62	-62	7.0	7.819E+23
FenlapK	72	-10	-10	16.0	1.069E+50
FenlapB	58	-57	-62	6.9	3.794E+23
FenlapM	58	-90	-90	3.5	2.720E+13

DUT - MIG — 300 mm — Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG *8*

Char.: **M_r=198 MPa** **n_i= 0.23** — **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** — **Suction: 0**

Stress - Centre of the Base Layer — Depth= 550 mm — 700

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	22	-5	-7	26.3	9.755E+79
ElsymS	12	1	1	68.6	1.689E+203
FenlapK	41	3	3	24.1	3.329E+73
FenlapB	28	4	4	35.4	3.941E+106
FenlapM	25	2	2	34.0	3.942E+102

LNEC - LOC — 1000 mm — Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC *7*

Char.: **M_r=161 MPa** **n_i= 0.33** — **Unit Weight: 22**

Loach: **C= 3,659** **D= 1.6219** **q_f = 0.001** ***p +** **86** — **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 701 mm — 1700

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-37	-45	87		4.760E+16
ElsymS	-4	-4	468		2.074E+08
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

UNOT - LOC — Infinite — In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC *4*

Char.: **M_r=22 MPa** **n_i= 0.68** **=0.45** — **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q_f = 0.001** ***p +** **86** — **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1701 mm — 2700

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-36	-37	44		1.381E+20
ElsymS	-34	-34	44		1.388E+20
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: 4.906E+04

Pavement Structure - In-Service (IS):

Surface — 150 mm — Asphalt Surface and Base Layer — **Unit Weight: 23** — **M_r=2,100 MPa** **n_i= 0.40** — **Suction: 0**

Peak Deflection on the Surface

	δ_p (mm)=	ElsymD 0.344	ElsymS 0.389	FenlapK 0.920	FenlapB 0.866	FenlapM 0.814

Strain - Bottom of the Base Layer — Depth= 149 mm — 0

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	54	78	-132		6.690E+08
ElsymS	90	90	-183		3.413E+08
FenlapK	441	441	-592		3.278E+05
FenlapB	606	606	-803		8.132E+04
FenlapM	453	453	-604		2.914E+05

LRSB - CCD — 300 mm — Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD *9*

Char.: **M_r=992 MPa** **n_i= 0.64** **=0.45** — **Unit Weight: 24**

k q: **k_1= 6,291** **k_2= 0.5234** — **Suction: 0**

Boyce: **Ka= 15,462** **Ga= 29,405** **n= 0.4088**

Mayhew: **Ka= 14,835** **Ga= 113,162** **n= 0.3480** **m= 0.9628** **b= -0.2048**

Stress - Centre of the Base Layer — Depth= 300 mm — 450

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	75	-13	-20	15.0	1.650E+47
ElsymS	107	-22	-22	11.8	5.626E+37
FenlapK	43	-1	-1	25.9	5.704E+78
FenlapB	42	-135	-138	-0.1	**1.074E+03**
FenlapM	30	1	1	36.7	2.235E+110

DUT - MIG — 300 mm — Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG *8*

Char.: **M_r=198 MPa** **n_i= 0.23** — **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** — **Suction: 0**

Stress - Centre of the Base Layer — Depth= 600 mm — 750

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	18	-5	-6	30.1	9.875E+90
ElsymS	22	-6	-6	25.5	3.690E+77
FenlapK	28	3	3	33.5	1.031E+101
FenlapB	21	5	5	48.5	4.054E+144
FenlapM	16	2	2	52.9	3.893E+157

LNEC - LOC — 1000 mm — Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC *7*

Char.: **M_r=161 MPa** **n_i= 0.33** — **Unit Weight: 22**

Loach: **C= 3,659** **D= 1.6219** **q_f = 0.001** ***p +** **86** — **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 751 mm — 1750

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-33	-39	74		2.987E+17
ElsymS	-42	-42	87		4.906E+16
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

UNOT - LOC — Infinite — In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC *4*

Char.: **M_r=22 MPa** **n_i= 0.68** **=0.45** — **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q_f = 0.001** ***p +** **86** — **Suction: 32**

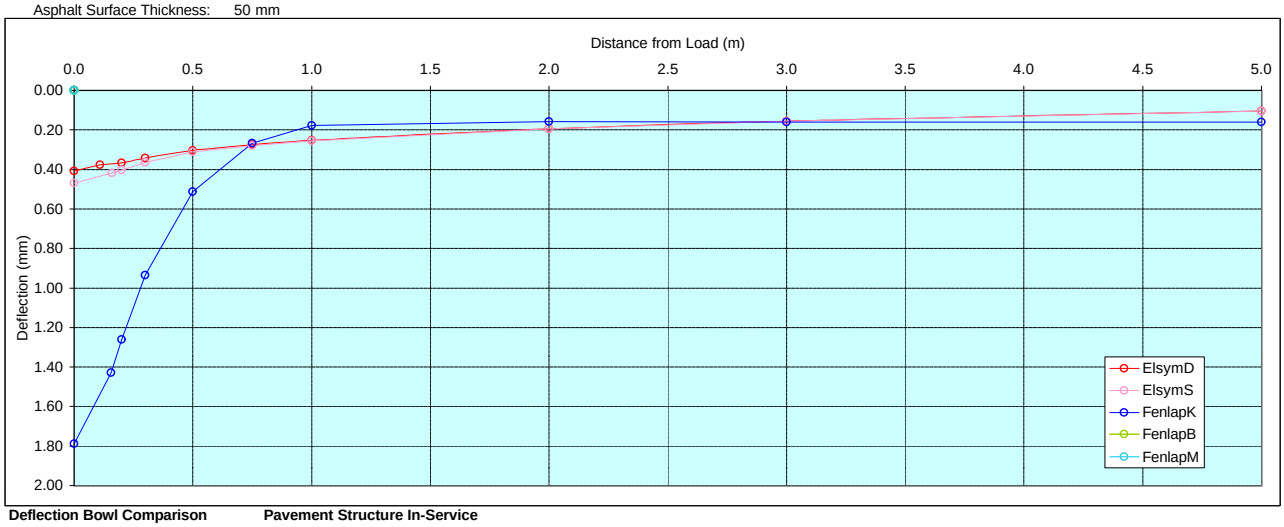
Strain - Top of the Subgrade Layer — Depth= 1751 mm — 2750

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-33	-34	75		2.690E+17
ElsymS	-35	-35	80		1.310E+17
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: 1.074E+03

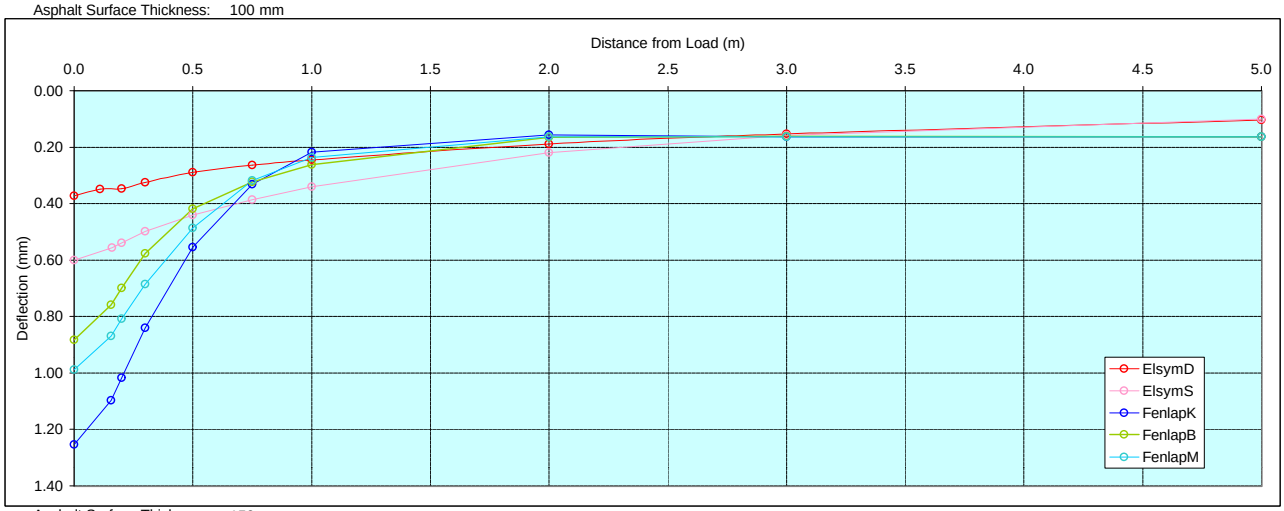
Deflection Bowl Comparison **Pavement Structure Under Construction**

Asphalt Surface Thickness: 50 mm

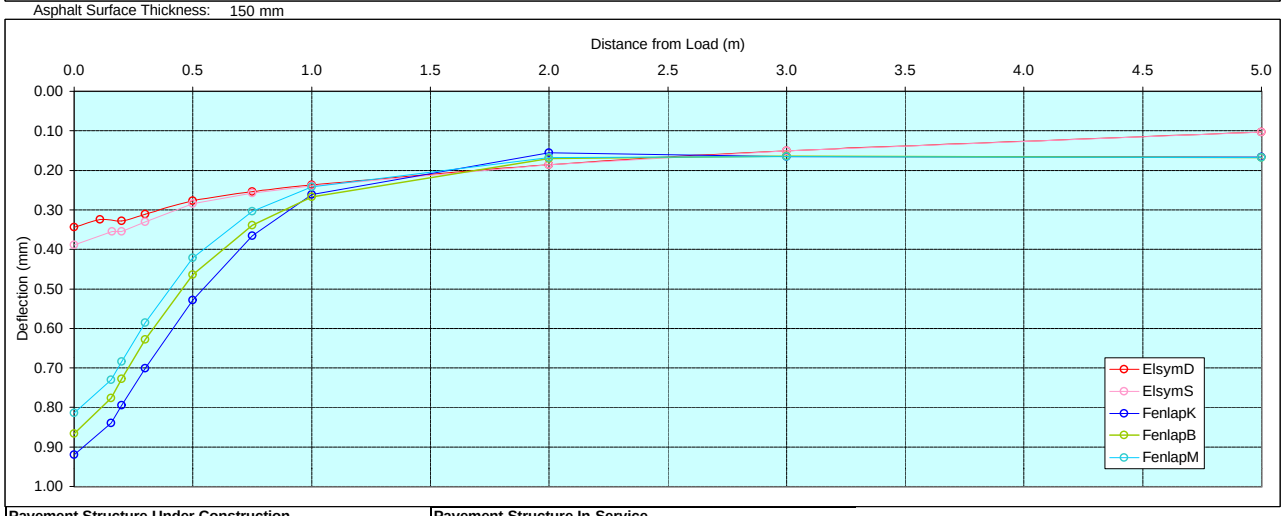


Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Asphalt Surface Thickness: 150 mm



Pavement Structure Under Construction

Asphalt: 50 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.409	0.00	0.468	0.00	1.789	#####	#####	#####	#####
0.11	0.378	0.16	0.417	0.16	1.430	#####	#####	#####	#####
0.20	0.367	0.20	0.404	0.20	1.262	#####	#####	#####	#####
0.30	0.342	0.30	0.365	0.30	0.935	#####	#####	#####	#####
0.50	0.304	0.50	0.312	0.50	0.514	#####	#####	#####	#####
0.75	0.275	0.75	0.279	0.75	0.268	#####	#####	#####	#####
1.00	0.254	1.00	0.256	1.00	0.178	#####	#####	#####	#####
2.00	0.194	2.00	0.195	2.00	0.159	#####	#####	#####	#####
3.00	0.155	3.00	0.155	3.00	0.160	#####	#####	#####	#####
5.00	0.103	5.00	0.103	5.00	0.161	#####	#####	#####	#####

Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.372	0.00	0.601	0.00	1.254	0.00	0.882	0.00	0.988
0.11	0.349	0.16	0.556	0.16	1.098	0.16	0.758	0.16	0.870
0.20	0.347	0.20	0.539	0.20	1.017	0.20	0.699	0.20	0.809
0.30	0.325	0.30	0.499	0.30	0.841	0.30	0.577	0.30	0.685
0.50	0.290	0.50	0.441	0.50	0.554	0.50	0.418	0.50	0.486
0.75	0.264	0.75	0.386	0.75	0.331	0.75	0.324	0.75	0.317
1.00	0.245	1.00	0.340	1.00	0.218	1.00	0.261	1.00	0.236
2.00	0.190	2.00	0.219	2.00	0.156	2.00	0.165	2.00	0.163
3.00	0.152	3.00	0.159	3.00	0.164	3.00	0.162	3.00	0.163
5.00	0.103	5.00	0.100	5.00	0.164	5.00	0.164	5.00	0.164

Mechanistic Pavement Analysis Pavement life as a function of the Range of values in the Subgrade Characteristics for a Single Result

Pavement Structure - Under Construction (UC):

Surface — 50 mm — 50

Bituminous prime coat to protect the granular base — **Unit Weight: 23**

Mr_i=2,100 MPa **n_i= 0.40** — **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.383	0.434	2.367	NS	NS

Strain - Bottom of the Base Layer — Depth= 49 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	38	38	-157		1.532E+10
ElsymS	13	13	-130		1.556E+12
FenlapK	1460	1460	-2030		**1.719E+03**
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

LRSB - CCD — 300 mm — 350

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr_i=1,348 MPa** **n_i= 0.69** **=0.45** — **Unit Weight: 24**

k q: **k_1= 11,233** **k_2= 0.2365** — **Suction: 0**

Boyce: **Ka= 119,983** **Ga= 143,246** **n= 0.7055**

Mayhew: **Ka= 68,018** **Ga= 171,420** **n= 0.6108** **m= 0.8475** **b= -0.1276**

Stress - Centre of the Base Layer — Depth= 200 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	154	9	-4	15.0	1.586E+47
ElsymS	218	5	5	12.7	2.260E+40
FenlapK	170	-5	-6	12.6	1.634E+40
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

DUT - MIG — 300 mm — 650

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr_i=198 MPa** **n_i= 0.23** — **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** — **Suction: 0**

Stress - Centre of the Base Layer — Depth= 500 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	24	-5	-6	25.1	4.428E+76
ElsymS	30	-7	-7	20.7	5.503E+63
FenlapK	72	1	1	15.7	1.250E+49
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

LNEC - LOC — 1000 mm — 1650

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr_i=161 MPa** **n_i= 0.33** — **Unit Weight: 22**

Loach: **C= 3,659** **D= 1.6219** **q_f = 0.001** ***p +** **86** — **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-38	-47	94		1.938E+16
ElsymS	-52	-52	113		2.499E+15
FenlapK	0	0	0		2.641E+84
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

UNOT - LOC — Infinite — 2650

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** — **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q_f = 0.001** ***p +** **86** — **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-38	-39	46		6.771E+19
ElsymS	-40	-40	49		3.758E+19
FenlapK	0	0	0		
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

Minimum Design Loading: 1.719E+03

Pavement Structure - In-Service (IS):

Surface — 100 mm — 100

Asphalt Surface and Base Layer — **Unit Weight: 23**

Mr_i=2,100 MPa **n_i= 0.40** — **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.354	0.557	1.434	NS	0.640

Strain - Bottom of the Base Layer — Depth= 99 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	54	67	-155		1.251E+09
ElsymS	54	54	-161		3.339E+09
FenlapK	827	827	-1120		**2.079E+04**
FenlapB	NS	NS	NS		
FenlapM	483	483	-657		2.200E+05

LRSB - CCD — 300 mm — 400

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr_i=1,348 MPa** **n_i= 0.69** **=0.45** — **Unit Weight: 24**

k q: **k_1= 11,233** **k_2= 0.2365** — **Suction: 0**

Boyce: **Ka= 119,983** **Ga= 143,246** **n= 0.7055**

Mayhew: **Ka= 68,018** **Ga= 171,420** **n= 0.6108** **m= 0.8475** **b= -0.1276**

Stress - Centre of the Base Layer — Depth= 250 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	106	-8	-19	14.2	6.662E+44
ElsymS	128	-63	-63	7.0	7.197E+23
FenlapK	77	10	9	22.7	4.623E+69
FenlapB	NS	NS	NS	NS	
FenlapM	27	-85	-86	2.5	4.338E+10

DUT - MIG — 300 mm — 700

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr_i=198 MPa** **n_i= 0.23** — **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** — **Suction: 0**

Stress - Centre of the Base Layer — Depth= 550 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	20	-5	-6	28.8	1.720E+87
ElsymS	10	1	1	77.8	1.254E+230
FenlapK	44	3	3	22.9	1.066E+70
FenlapB	NS	NS	NS	NS	
FenlapM	26	2	2	34.0	3.403E+102

LNEC - LOC — 1000 mm — 1700

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr_i=161 MPa** **n_i= 0.33** — **Unit Weight: 22**

Loach: **C= 3,659** **D= 1.6219** **q_f = 0.001** ***p +** **86** — **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-34	-41	80		1.354E+17
ElsymS	-2	-2	416		7.842E+08
FenlapK	0	0	0		
FenlapB	NS	NS	NS		
FenlapM	0	0	0		

UNOT - LOC — Infinite — 2700

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** — **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q_f = 0.001** ***p +** **86** — **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-35	-36	42		1.861E+20
ElsymS	-32	-32	42		2.335E+20
FenlapK	0	0	0		
FenlapB	NS	NS	NS		
FenlapM	0	0	0		

Minimum Design Loading: 2.079E+04

Pavement Structure - In-Service (IS):

Surface — 150 mm — 0

Asphalt Surface and Base Layer — **Unit Weight: 23**

Mr_i=2,100 MPa **n_i= 0.40** — **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.330	0.370	0.995	0.412	0.559

Strain - Bottom of the Base Layer — Depth= 149 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	41	59	-116		2.251E+09
ElsymS	68	68	-158		1.200E+09
FenlapK	487	487	-649		**2.121E+05**
FenlapB	258	258	-311		3.442E+06
FenlapM	338	338	-466		1.053E+06

LRSB - CCD — 300 mm — 450

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr_i=1,348 MPa** **n_i= 0.69** **=0.45** — **Unit Weight: 24**

k q: **k_1= 11,233** **k_2= 0.2365** — **Suction: 0**

Boyce: **Ka= 119,983** **Ga= 143,246** **n= 0.7055**

Mayhew: **Ka= 68,018** **Ga= 171,420** **n= 0.6108** **m= 0.8475** **b= -0.1276**

Stress - Centre of the Base Layer — Depth= 300 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	77	-17	-25	13.8	2.974E+43
ElsymS	109	-28	-28	10.9	1.072E+35
FenlapK	42	9	9	36.4	2.962E+109
FenlapB	-62	-68	-108	-52.8	
FenlapM	43	3	3	29.5	1.840E+89

DUT - MIG — 300 mm — 750

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr_i=198 MPa** **n_i= 0.23** — **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** — **Suction: 0**

Stress - Centre of the Base Layer — Depth= 600 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	17	-4	-5	32.9	1.764E+99
ElsymS	19	-6	-6	27.9	6.657E+84
FenlapK	28	3	3	33.0	3.321E+99
FenlapB	22	3	3	41.0	8.458E+122
FenlapM	21	2	2	40.3	7.871E+120

LNEC - LOC — 1000 mm — 1750

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr_i=161 MPa** **n_i= 0.33** — **Unit Weight: 22**

Loach: **C= 3,659** **D= 1.6219** **q_f = 0.001** ***p +** **86** — **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-31	-36	68		8.288E+17
ElsymS	-39	-39	79		1.455E+17
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

UNOT - LOC — Infinite — 2750

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** — **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q_f = 0.001** ***p +** **86** — **Suction: 32**

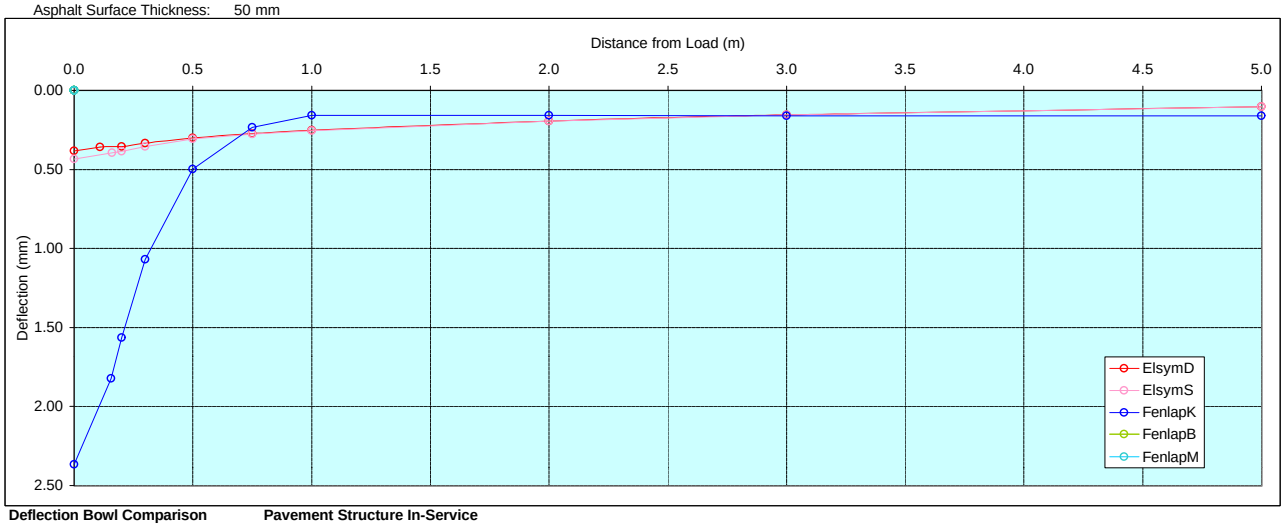
Strain - Top of the Subgrade Layer — Depth= 1751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-32	-33	73		3.628E+17
ElsymS	-34	-34	78		1.809E+17
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: 2.121E+05

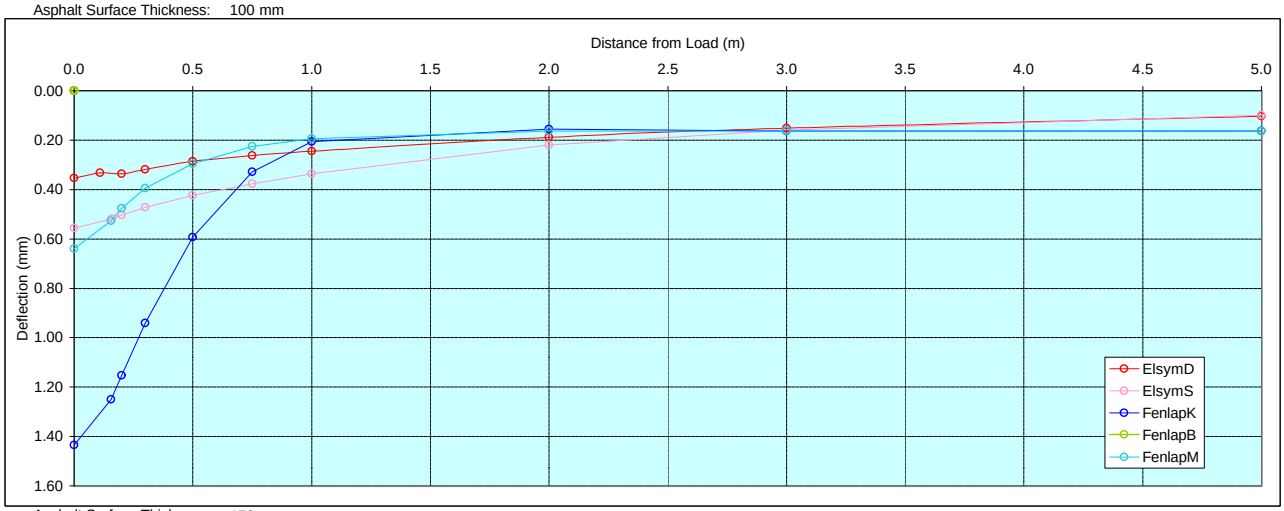
Deflection Bowl Comparison **Pavement Structure Under Construction**

Asphalt Surface Thickness: 50 mm

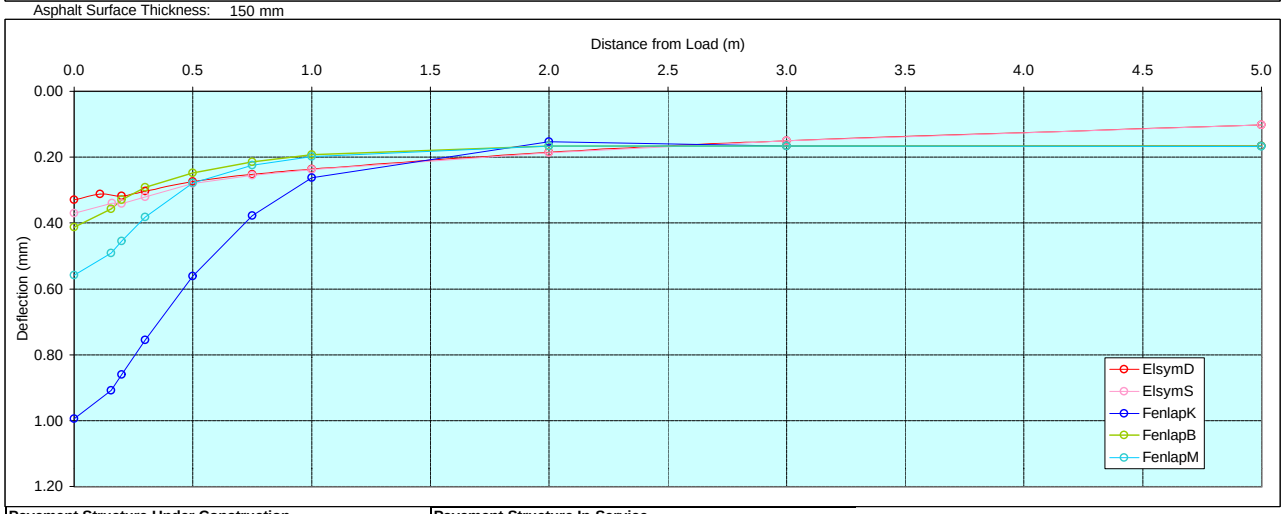


Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Asphalt Surface Thickness: 150 mm



Pavement Structure Under Construction

Asphalt: 50 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.383	0.00	0.434	0.00	2.367	#####	#####	#####	#####
0.11	0.359	0.16	0.394	0.16	1.822	#####	#####	#####	#####
0.20	0.356	0.20	0.387	0.20	1.564	#####	#####	#####	#####
0.30	0.335	0.30	0.355	0.30	1.068	#####	#####	#####	#####
0.50	0.300	0.50	0.307	0.50	0.498	#####	#####	#####	#####
0.75	0.273	0.75	0.277	0.75	0.233	#####	#####	#####	#####
1.00	0.252	1.00	0.254	1.00	0.158	#####	#####	#####	#####
2.00	0.193	2.00	0.194	2.00	0.159	#####	#####	#####	#####
3.00	0.154	3.00	0.154	3.00	0.160	#####	#####	#####	#####
5.00	0.103	5.00	0.103	5.00	0.161	#####	#####	#####	#####

Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.354	0.00	0.557	0.00	1.434	#####	#####	0.00	0.640
0.11	0.333	0.16	0.520	0.16	1.250	#####	#####	0.16	0.526
0.20	0.336	0.20	0.504	0.20	1.153	#####	#####	0.20	0.476
0.30	0.318	0.30	0.472	0.30	0.940	#####	#####	0.30	0.395
0.50	0.286	0.50	0.424	0.50	0.592	#####	#####	0.50	0.296
0.75	0.262	0.75	0.376	0.75	0.329	#####	#####	0.75	0.225
1.00	0.244	1.00	0.335	1.00	0.206	#####	#####	1.00	0.194
2.00	0.189	2.00	0.220	2.00	0.156	#####	#####	2.00	0.163
3.00	0.152	3.00	0.160	3.00	0.164	#####	#####	3.00	0.163
5.00	0.103	5.00	0.100	5.00	0.164	#####	#####	5.00	0.164

Mechanistic Pavement Analysis Pavement life as a function of the Range of values in the Subgrade Characteristics for a Single Result

Pavement Structure - Under Construction (UC):

Surface — 50 mm — 50

Bituminous prime coat to protect the granular base — **Unit Weight: 23**

Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.477	0.545	1.984	0.691	NS

Strain - Bottom of the Base Layer — Depth= 49 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	83	90	-219		3.426E+08
ElsymS	58	58	-190		2.432E+09
FenlapK	1270	1270	-1750		3.169E+03
FenlapB	-2270	-2270	3030		
FenlapM	NS	NS	NS		

LRSB - CCD — 300 mm — 350

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr_i=817 MPa** **n_i= 0.48** **Unit Weight: 24**

k q: **k_1= 5,820** **k_2= 0.5508** **Suction: 0**

Boyce: **Ka= 12,739** **Ga= 25,802** **n= 0.3848**

Mayhew: **Ka= 12,097** **Ga= 103,681** **n= 0.3142** **m= 0.9777** **b= -0.2147**

Stress - Centre of the Base Layer — Depth= 200 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	157	15	1	16.0	1.081E+50
ElsymS	226	13	13	13.3	1.492E+42
FenlapK	14	-117	-165	-0.8	**1.268E+01**
FenlapB	9200	7420	1850	80.8	1.032E+239
FenlapM	NS	NS	NS	NS	

DUT - MIG — 300 mm — 650

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 500 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	26	-9	-11	20.4	7.334E+62
ElsymS	32	-13	-13	16.6	4.926E+51
FenlapK	44	-2	-2	19.8	1.550E+61
FenlapB	39	-16	-17	13.9	9.354E+43
FenlapM	NS	NS	NS	NS	

LNEC - LOC — 1000 mm — 1650

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr_i=93 MPa** **n_i= 0.22** **Unit Weight: 22**

Loach: **C= 2,158** **D= 1.3546** **q_i = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-63	-78	109		3.781E+15
ElsymS	-85	-85	131		4.616E+14
FenlapK	0	0	0		2.244E+71
FenlapB	0	0	0		
FenlapM	NS	NS	NS		

UNOT - LOC — Infinite — 2650

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q_i = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-48	-50	50		2.554E+19
ElsymS	-49	-49	52		1.929E+19
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	NS	NS	NS		

Minimum Design Loading: 1.268E+01

Pavement Structure - In-Service (IS):

Surface — 100 mm — 100

Asphalt Surface and Base Layer — **Unit Weight: 23**

Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.432	0.665	1.232	0.921	1.291

Strain - Bottom of the Base Layer — Depth= 99 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	88	113	-199		1.291E+08
ElsymS	109	109	-227		1.531E+08
FenlapK	677	677	-931		5.002E+04
FenlapB	248	248	-547		4.093E+06
FenlapM	852	852	-1140		**1.825E+04**

LRSB - CCD — 300 mm — 400

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr_i=817 MPa** **n_i= 0.48** **Unit Weight: 24**

k q: **k_1= 5,820** **k_2= 0.5508** **Suction: 0**

Boyce: **Ka= 12,739** **Ga= 25,802** **n= 0.3848**

Mayhew: **Ka= 12,097** **Ga= 103,681** **n= 0.3142** **m= 0.9777** **b= -0.2147**

Stress - Centre of the Base Layer — Depth= 250 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	104	-2	-13	15.6	8.018E+48
ElsymS	121	-61	-61	7.1	1.330E+24
FenlapK	70	-26	-27	12.0	2.473E+38
FenlapB	446	140	51	19.1	7.776E+58
FenlapM	50	-6	-6	20.9	2.150E+64

DUT - MIG — 300 mm — 700

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 550 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	21	-9	-10	23.3	1.398E+71
ElsymS	12	1	1	66.0	4.404E+195
FenlapK	40	3	3	24.5	5.731E+74
FenlapB	34	3	3	27.7	1.219E+84
FenlapM	24	3	3	37.6	1.220E+113

LNEC - LOC — 1000 mm — 1700

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr_i=93 MPa** **n_i= 0.22** **Unit Weight: 22**

Loach: **C= 2,158** **D= 1.3546** **q_i = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-56	-67	92		2.438E+16
ElsymS	-13	-13	467		2.125E+08
FenlapK	0	0	0		5.306E+78
FenlapB	0	0	0		1.283E+77
FenlapM	0	0	0		

UNOT - LOC — Infinite — 2700

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q_i = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-44	-46	46		7.295E+19
ElsymS	-41	-41	48		4.446E+19
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: 1.825E+04

Pavement Structure - In-Service (IS):

Surface — 150 mm — 0

Asphalt Surface and Base Layer — **Unit Weight: 23**

Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.397	0.450	0.907	0.838	0.886

Strain - Bottom of the Base Layer — Depth= 149 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	64	93	-146		3.063E+08
ElsymS	109	109	-205		1.500E+08
FenlapK	437	437	-587		**3.412E+05**
FenlapB	320	320	-397		1.338E+06
FenlapM	415	415	-555		4.279E+05

LRSB - CCD — 300 mm — 450

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr_i=817 MPa** **n_i= 0.48** **Unit Weight: 24**

k q: **k_1= 5,820** **k_2= 0.5508** **Suction: 0**

Boyce: **Ka= 12,739** **Ga= 25,802** **n= 0.3848**

Mayhew: **Ka= 12,097** **Ga= 103,681** **n= 0.3142** **m= 0.9777** **b= -0.2147**

Stress - Centre of the Base Layer — Depth= 300 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	74	-12	-19	15.4	2.068E+48
ElsymS	105	-19	-19	12.2	1.088E+39
FenlapK	43	-3	-3	24.7	2.163E+75
FenlapB	78	47	-167	60.3	1.289E+179
FenlapM	23	0	0	43.4	7.337E+129

DUT - MIG — 300 mm — 750

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 600 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	17	-8	-9	26.7	1.681E+81
ElsymS	20	-10	-10	22.7	3.795E+69
FenlapK	28	3	3	33.5	9.227E+100
FenlapB	22	2	2	39.2	5.252E+117
FenlapM	17	2	2	48.6	1.386E+145

LNEC - LOC — 1000 mm — 1750

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr_i=93 MPa** **n_i= 0.22** **Unit Weight: 22**

Loach: **C= 2,158** **D= 1.3546** **q_i = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-49	-58	79		1.502E+17
ElsymS	-62	-62	91		2.886E+16
FenlapK	0	0	0		2.137E+85
FenlapB	0	0	0		
FenlapM	0	0	0		

UNOT - LOC — Infinite — 2750

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q_i = 0.001** ***p +** **86** **Suction: 32**

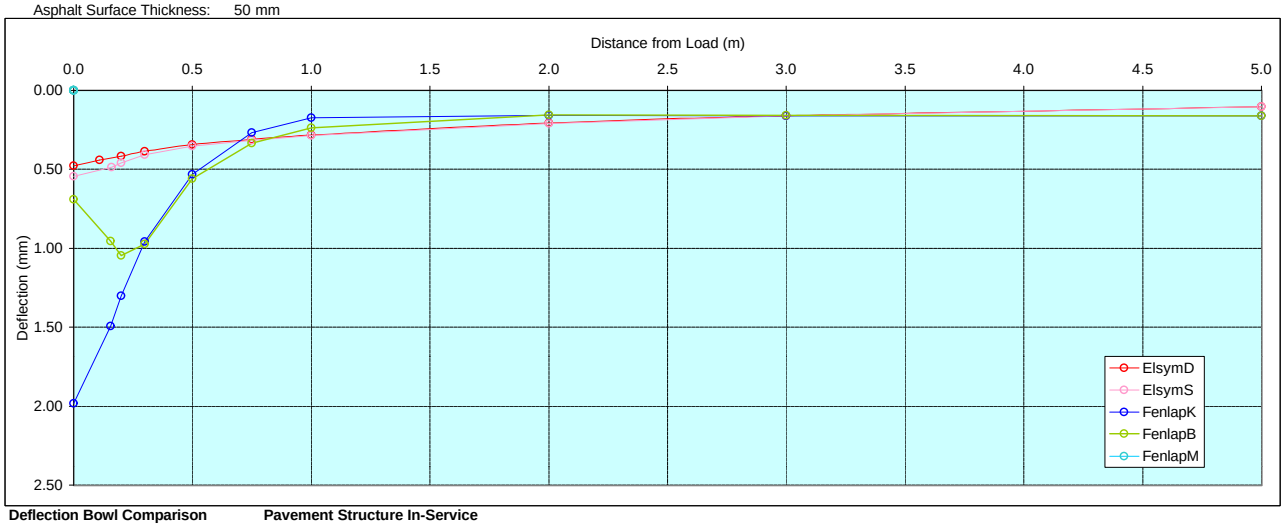
Strain - Top of the Subgrade Layer — Depth= 1751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-41	-42	92		2.647E+16
ElsymS	-41	-41	94		2.101E+16
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: 3.412E+05

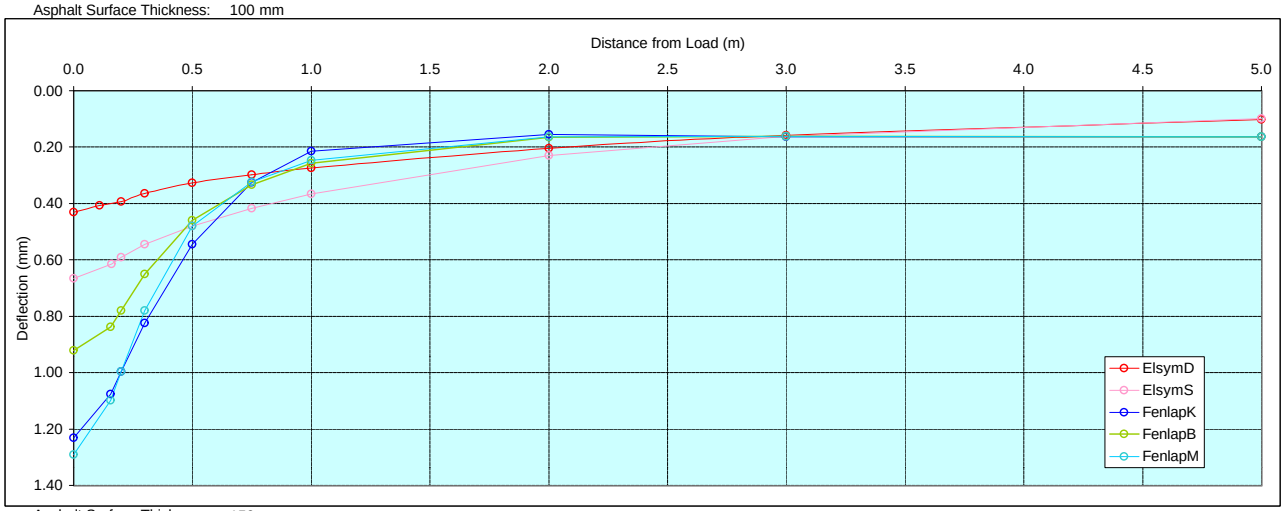
Deflection Bowl Comparison **Pavement Structure Under Construction**

Asphalt Surface Thickness: 50 mm

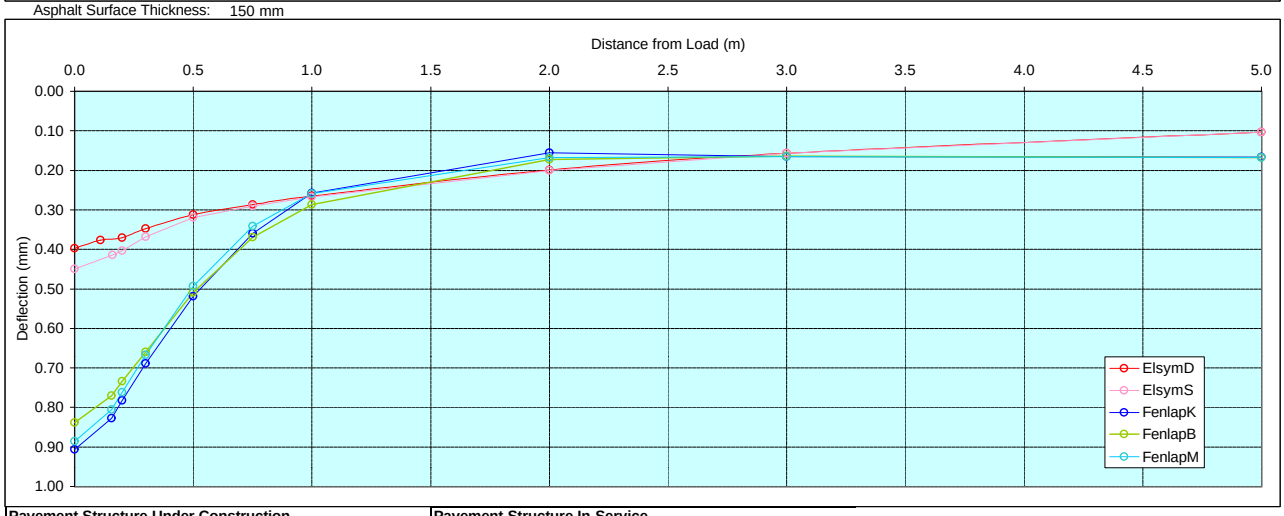


Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Asphalt Surface Thickness: 150 mm



Pavement Structure Under Construction

Asphalt: 50 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.477	0.00	0.545	0.00	1.984	0.00	0.691	####	#####
0.11	0.442	0.16	0.486	0.16	1.493	0.16	0.956	####	#####
0.20	0.416	0.20	0.459	0.20	1.301	0.20	1.047	####	#####
0.30	0.385	0.30	0.409	0.30	0.959	0.30	0.973	####	#####
0.50	0.345	0.50	0.354	0.50	0.532	0.50	0.559	####	#####
0.75	0.311	0.75	0.316	0.75	0.268	0.75	0.336	####	#####
1.00	0.284	1.00	0.287	1.00	0.175	1.00	0.236	####	#####
2.00	0.208	2.00	0.209	2.00	0.158	2.00	0.156	####	#####
3.00	0.160	3.00	0.161	3.00	0.160	3.00	0.159	####	#####
5.00	0.103	5.00	0.103	5.00	0.160	5.00	0.161	####	#####

Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.432	0.00	0.665	0.00	1.232	0.00	0.921	0.00	1.291
0.11	0.407	0.16	0.615	0.16	1.077	0.16	0.838	0.16	1.098
0.20	0.393	0.20	0.591	0.20	0.997	0.20	0.779	0.20	0.997
0.30	0.365	0.30	0.545	0.30	0.825	0.30	0.651	0.30	0.780
0.50	0.327	0.50	0.480	0.50	0.545	0.50	0.460	0.50	0.480
0.75	0.298	0.75	0.418	0.75	0.326	0.75	0.334	0.75	0.324
1.00	0.274	1.00	0.366	1.00	0.215	1.00	0.257	1.00	0.247
2.00	0.204	2.00	0.230	2.00	0.155	2.00	0.165	2.00	0.164
3.00	0.158	3.00	0.162	3.00	0.164	3.00	0.162	3.00	0.162
5.00	0.103	5.00	0.099	5.00	0.164	5.00	0.164	5.00	0.164

Mechanistic Pavement Analysis Pavement life as a function of the Range of values in the Subgrade Characteristics for a Single Result

Pavement Structure - Under Construction (UC):

Surface — 50 mm — 50

Bituminous prime coat to protect the granular base — **Unit Weight: 23**

Mr$_i$=2,100 MPa **n$_i$= 0.40** — **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.467	0.535	1.734	1.265	NS

Strain - Bottom of the Base Layer — Depth= 49 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	84	91	-220		3.315E+08
ElsymS	58	58	-190		2.312E+09
FenlapK	816	816	-1180		2.205E+04
FenlapB	330	330	-686		1.169E+06
FenlapM	NS	NS	NS		

LRSB - CCD — 300 mm — 350

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr$_i$=817 MPa** **n$_i$= 0.48** — **Unit Weight: 24**

k q: **k$_1$= 5,820** **k$_2$= 0.5508** — **Suction: 0**

Boyce: **Ka= 12,739** **Ga= 25,802** **n= 0.3848**

Mayhew: **Ka= 12,097** **Ga= 103,681** **n= 0.3142** **m= 0.9777** **b= -0.2147**

Stress - Centre of the Base Layer — Depth= 200 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	157	16	1	16.1	1.917E+50
ElsymS	227	13	13	13.4	2.098E+42
FenlapK	85	-66	-68	6.3	5.206E+21
FenlapB	112	-195	-202	0.2	**1.020E+04**
FenlapM	NS	NS	NS	NS	

DUT - MIG — 300 mm — 650

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr$_i$=198 MPa** **n$_i$= 0.23** — **Unit Weight: 22**

k q: **k$_1$= 1,738** **k$_2$= 0.5555** — **Suction: 0**

Stress - Centre of the Base Layer — Depth= 500 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	27	-9	-11	20.7	4.866E+63
ElsymS	33	-12	-12	16.8	2.087E+52
FenlapK	58	3	3	18.9	2.037E+58
FenlapB	65	7	7	19.5	1.329E+60
FenlapM	NS	NS	NS	NS	

LNEC - LOC — 1000 mm — 1650

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr$_i$=105 MPa** **n$_i$= 0.26** — **Unit Weight: 22**

Loach: **C= 2,659** **D= 1.4438** **q$_i$ = 0.001 *p + 86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-59	-73	109		3.742E+15
ElsymS	-80	-80	131		4.457E+14
FenlapK	0	0	0		5.034E+75
FenlapB	0	0	0		5.878E+71
FenlapM	NS	NS	NS		

UNOT - LOC — Infinite — 2650

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr$_i$=22 MPa** **n$_i$= 0.68** **=0.45** — **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q$_i$ = 0.001 *p + 86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-46	-48	51		2.012E+19
ElsymS	-48	-48	53		1.457E+19
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	NS	NS	NS		

Minimum Design Loading: 1.020E+04

Pavement Structure - In-Service (IS):

Surface — 100 mm — 100

Asphalt Surface and Base Layer — **Unit Weight: 23**

Mr$_i$=2,100 MPa **n$_i$= 0.40** — **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.422	0.658	1.232	1.182	1.064

Strain - Bottom of the Base Layer — Depth= 99 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	88	113	-200		1.276E+08
ElsymS	109	109	-227		1.525E+08
FenlapK	668	668	-921		**5.305E+04**
FenlapB	444	444	-733		3.182E+05
FenlapM	591	591	-817		9.077E+04

LRSB - CCD — 300 mm — 400

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr$_i$=817 MPa** **n$_i$= 0.48** — **Unit Weight: 24**

k q: **k$_1$= 5,820** **k$_2$= 0.5508** — **Suction: 0**

Boyce: **Ka= 12,739** **Ga= 25,802** **n= 0.3848**

Mayhew: **Ka= 12,097** **Ga= 103,681** **n= 0.3142** **m= 0.9777** **b= -0.2147**

Stress - Centre of the Base Layer — Depth= 250 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	105	-1	-12	15.8	2.234E+49
ElsymS	121	-61	-61	7.2	1.706E+24
FenlapK	71	-13	-13	15.4	1.548E+48
FenlapB	60	42	-60	94.2	7.099E+277
FenlapM	49	-26	-27	13.1	4.403E+41

DUT - MIG — 300 mm — 700

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr$_i$=198 MPa** **n$_i$= 0.23** — **Unit Weight: 22**

k q: **k$_1$= 1,738** **k$_2$= 0.5555** — **Suction: 0**

Stress - Centre of the Base Layer — Depth= 550 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	22	-8	-10	23.6	1.027E+72
ElsymS	12	1	1	65.4	1.013E+194
FenlapK	41	3	3	24.2	7.792E+73
FenlapB	35	4	4	28.8	2.678E+87
FenlapM	29	2	2	31.2	1.821E+94

LNEC - LOC — 1000 mm — 1700

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr$_i$=105 MPa** **n$_i$= 0.26** — **Unit Weight: 22**

Loach: **C= 2,659** **D= 1.4438** **q$_i$ = 0.001 *p + 86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-52	-63	93		2.432E+16
ElsymS	-11	-11	475		1.736E+08
FenlapK	0	0	0		1.727E+88
FenlapB	0	0	0		
FenlapM	0	0	0		

UNOT - LOC — Infinite — 2700

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr$_i$=22 MPa** **n$_i$= 0.68** **=0.45** — **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q$_i$ = 0.001 *p + 86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-43	-44	47		5.687E+19
ElsymS	-40	-40	48		4.111E+19
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: 5.305E+04

Pavement Structure - In-Service (IS):

Surface — 150 mm — 0

Asphalt Surface and Base Layer — **Unit Weight: 23**

Mr$_i$=2,100 MPa **n$_i$= 0.40** — **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.388	0.441	0.907	0.844	0.775

Strain - Bottom of the Base Layer — Depth= 149 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	64	93	-146		3.054E+08
ElsymS	109	109	-205		1.500E+08
FenlapK	436	436	-587		**3.446E+05**
FenlapB	426	426	-582		3.815E+05
FenlapM	433	433	-574		3.552E+05

LRSB - CCD — 300 mm — 450

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr$_i$=817 MPa** **n$_i$= 0.48** — **Unit Weight: 24**

k q: **k$_1$= 5,820** **k$_2$= 0.5508** — **Suction: 0**

Boyce: **Ka= 12,739** **Ga= 25,802** **n= 0.3848**

Mayhew: **Ka= 12,097** **Ga= 103,681** **n= 0.3142** **m= 0.9777** **b= -0.2147**

Stress - Centre of the Base Layer — Depth= 300 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	74	-11	-18	15.6	8.385E+48
ElsymS	105	-19	-19	12.4	2.663E+39
FenlapK	43	0	0	26.8	2.212E+81
FenlapB	52	18	-8	40.1	2.069E+120
FenlapM	29	-9	-9	25.5	6.025E+77

DUT - MIG — 300 mm — 750

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr$_i$=198 MPa** **n$_i$= 0.23** — **Unit Weight: 22**

k q: **k$_1$= 1,738** **k$_2$= 0.5555** — **Suction: 0**

Stress - Centre of the Base Layer — Depth= 600 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	18	-7	-8	27.0	1.503E+82
ElsymS	21	-9	-9	23.0	1.876E+70
FenlapK	28	3	3	33.4	5.018E+100
FenlapB	19	3	3	46.8	4.969E+139
FenlapM	17	2	2	51.5	2.608E+153

LNEC - LOC — 1000 mm — 1750

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr$_i$=105 MPa** **n$_i$= 0.26** — **Unit Weight: 22**

Loach: **C= 2,659** **D= 1.4438** **q$_i$ = 0.001 *p + 86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-46	-55	79		1.513E+17
ElsymS	-58	-58	91		2.776E+16
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

UNOT - LOC — Infinite — 2750

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr$_i$=22 MPa** **n$_i$= 0.68** **=0.45** — **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q$_i$ = 0.001 *p + 86** **Suction: 32**

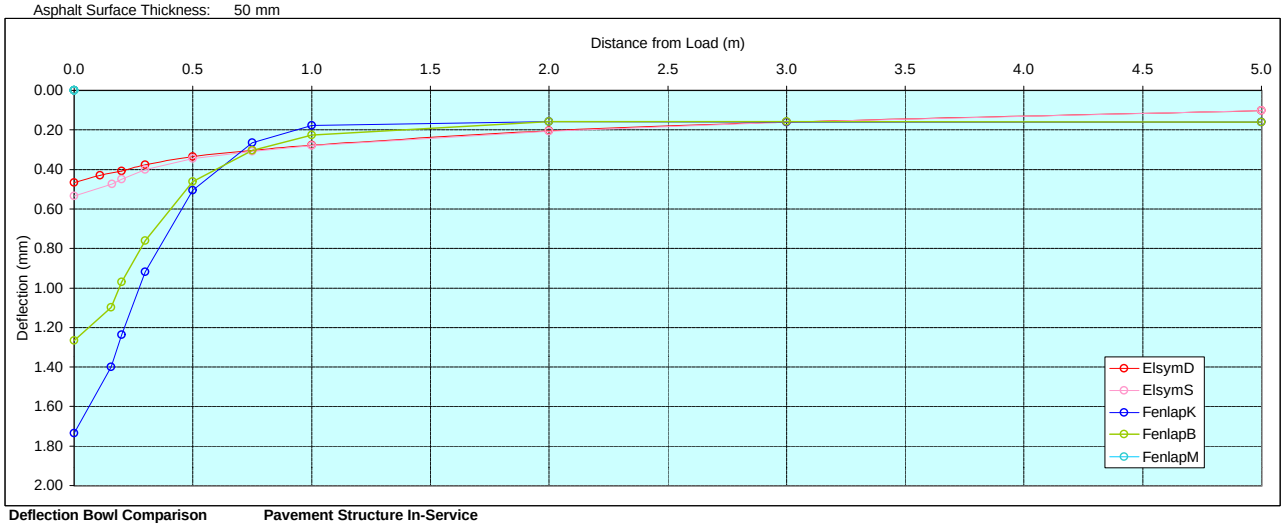
Strain - Top of the Subgrade Layer — Depth= 1751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-39	-40	89		3.935E+16
ElsymS	-40	-40	91		2.779E+16
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: 3.446E+05

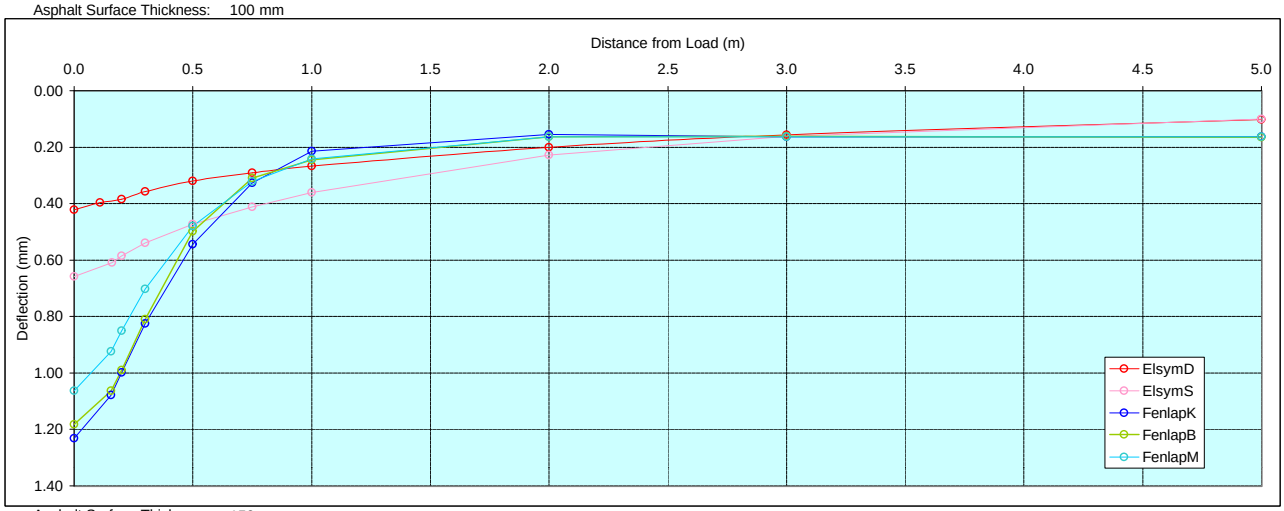
Deflection Bowl Comparison **Pavement Structure Under Construction**

Asphalt Surface Thickness: 50 mm

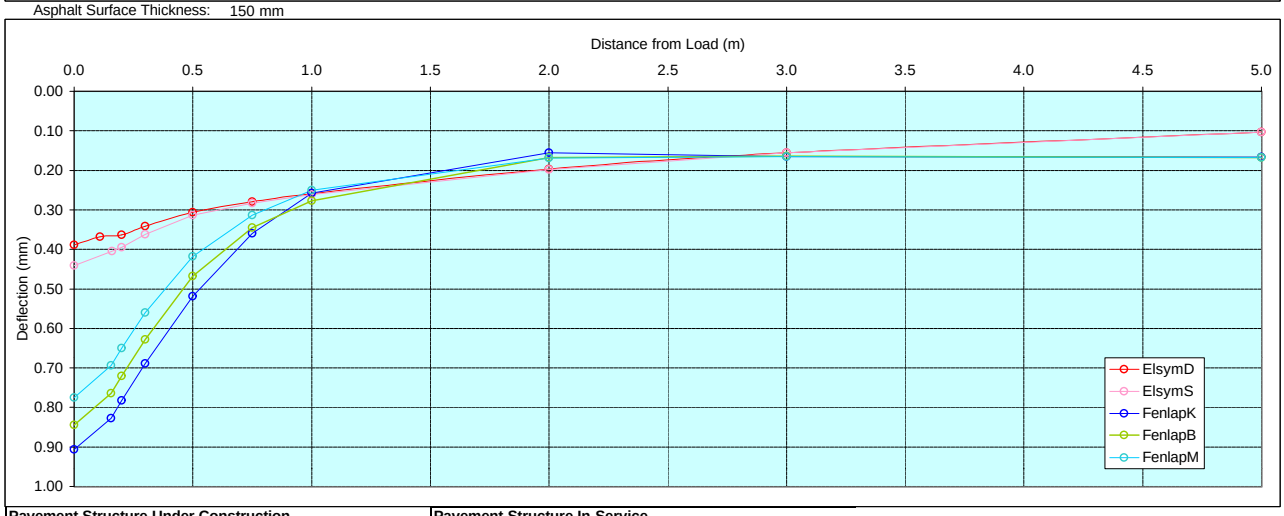


Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Asphalt Surface Thickness: 150 mm



Pavement Structure Under Construction

Asphalt: 50 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.467	0.00	0.535	0.00	1.734	0.00	1.265	####	#####
0.11	0.431	0.16	0.475	0.16	1.400	0.16	1.098	####	#####
0.20	0.407	0.20	0.451	0.20	1.238	0.20	0.969	####	#####
0.30	0.377	0.30	0.401	0.30	0.919	0.30	0.760	####	#####
0.50	0.336	0.50	0.345	0.50	0.506	0.50	0.463	####	#####
0.75	0.304	0.75	0.309	0.75	0.265	0.75	0.304	####	#####
1.00	0.278	1.00	0.281	1.00	0.177	1.00	0.227	####	#####
2.00	0.205	2.00	0.206	2.00	0.158	2.00	0.159	####	#####
3.00	0.159	3.00	0.160	3.00	0.160	3.00	0.159	####	#####
5.00	0.103	5.00	0.103	5.00	0.160	5.00	0.160	####	#####

Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.422	0.00	0.658	0.00	1.232	0.00	1.182	0.00	1.064
0.11	0.397	0.16	0.608	0.16	1.078	0.16	1.063	0.16	0.924
0.20	0.385	0.20	0.585	0.20	0.998	0.20	0.989	0.20	0.851
0.30	0.358	0.30	0.539	0.30	0.825	0.30	0.810	0.30	0.703
0.50	0.320	0.50	0.474	0.50	0.545	0.50	0.498	0.50	0.479
0.75	0.291	0.75	0.412	0.75	0.326	0.75	0.309	0.75	0.321
1.00	0.268	1.00	0.361	1.00	0.215	1.00	0.245	1.00	0.242
2.00	0.201	2.00	0.227	2.00	0.155	2.00	0.164	2.00	0.163
3.00	0.157	3.00	0.161	3.00	0.164	3.00	0.162	3.00	0.163
5.00	0.103	5.00	0.100	5.00	0.164	5.00	0.164	5.00	0.164

Mechanistic Pavement Analysis Pavement life as a function of the Range of values in the Subgrade Characteristics for a Single Result

Pavement Structure - Under Construction (UC):

Surface — 50 mm

Bituminous prime coat to protect the granular base — **Unit Weight: 23**

Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.425	0.491	1.748	NS	NS

Strain - Bottom of the Base Layer — Depth= 49 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	86	94	-224		2.918E+08
ElsymS	61	61	-194		1.912E+09
FenlapK	834	834	-1180		**2.004E+04**
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

LRSB - CCD — 300 mm — 350

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr_i=817 MPa** **n_i= 0.48** **Unit Weight: 24**

k q: **k_1= 5,820** **k_2= 0.5508** **Suction: 0**

Boyce: **Ka= 12,739** **Ga= 25,802** **n= 0.3848**

Mayhew: **Ka= 12,097** **Ga= 103,681** **n= 0.3142** **m= 0.9777** **b= -0.2147**

Stress - Centre of the Base Layer — Depth= 200 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	158	18	3	16.4	1.745E+51
ElsymS	228	16	16	13.6	8.931E+42
FenlapK	13	-60	-65	5.1	2.090E+18
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

DUT - MIG — 300 mm — 650

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 500 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	29	-6	-8	21.8	8.266E+66
ElsymS	37	-9	-9	17.7	6.873E+54
FenlapK	49	3	3	21.2	1.251E+65
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

LNEC - LOC — 1000 mm — 1650

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr_i=161 MPa** **n_i= 0.33** **Unit Weight: 22**

Loach: **C= 3,659** **D= 1.6219** **q_i = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-44	-55	109		3.550E+15
ElsymS	-61	-61	133		3.779E+14
FenlapK	0	0	0		
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

UNOT - LOC — Infinite — 2650

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q_i = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-40	-41	48		4.101E+19
ElsymS	-42	-42	51		2.276E+19
FenlapK	0	0	0		
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

Minimum Design Loading: 2.004E+04

Pavement Structure - In-Service (IS):

Surface — 100 mm

Asphalt Surface and Base Layer — **Unit Weight: 23**

Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.385	0.632	1.233	1.043	1.066

Strain - Bottom of the Base Layer — Depth= 99 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	89	114	-201		1.223E+08
ElsymS	109	109	-228		1.506E+08
FenlapK	669	669	-922		5.270E+04
FenlapB	735	735	-1000		**3.488E+04**
FenlapM	521	521	-729		1.578E+05

LRSB - CCD — 300 mm — 400

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr_i=817 MPa** **n_i= 0.48** **Unit Weight: 24**

k q: **k_1= 5,820** **k_2= 0.5508** **Suction: 0**

Boyce: **Ka= 12,739** **Ga= 25,802** **n= 0.3848**

Mayhew: **Ka= 12,097** **Ga= 103,681** **n= 0.3142** **m= 0.9777** **b= -0.2147**

Stress - Centre of the Base Layer — Depth= 250 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	106	2	-9	16.4	1.515E+51
ElsymS	122	-59	-59	7.3	4.346E+24
FenlapK	70	-10	-11	16.1	2.021E+50
FenlapB	-2	-9	-32	111.0	
FenlapM	56	-84	-85	3.8	3.181E+14

DUT - MIG — 300 mm — 700

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 550 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	24	-6	-7	24.7	2.765E+75
ElsymS	13	1	1	63.6	6.224E+188
FenlapK	41	3	3	24.1	4.027E+73
FenlapB	28	3	3	33.6	1.787E+101
FenlapM	26	2	2	33.5	7.989E+100

LNEC - LOC — 1000 mm — 1700

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr_i=161 MPa** **n_i= 0.33** **Unit Weight: 22**

Loach: **C= 3,659** **D= 1.6219** **q_i = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-39	-48	93		2.312E+16
ElsymS	-4	-4	501		9.334E+07
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

UNOT - LOC — Infinite — 2700

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q_i = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-36	-38	44		1.129E+20
ElsymS	-35	-35	45		1.011E+20
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: 3.488E+04

Pavement Structure - In-Service (IS):

Surface — 150 mm

Asphalt Surface and Base Layer — **Unit Weight: 23**

Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.354	0.402	1.170	0.688	0.864

Strain - Bottom of the Base Layer — Depth= 149 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	64	93	-147		3.018E+08
ElsymS	109	109	-205		1.494E+08
FenlapK	511	511	-678		**1.718E+05**
FenlapB	277	277	-285		2.520E+06
FenlapM	467	467	-621		2.550E+05

LRSB - CCD — 300 mm — 450

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr_i=817 MPa** **n_i= 0.48** **Unit Weight: 24**

k q: **k_1= 5,820** **k_2= 0.5508** **Suction: 0**

Boyce: **Ka= 12,739** **Ga= 25,802** **n= 0.3848**

Mayhew: **Ka= 12,097** **Ga= 103,681** **n= 0.3142** **m= 0.9777** **b= -0.2147**

Stress - Centre of the Base Layer — Depth= 300 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	75	-8	-15	16.5	2.663E+51
ElsymS	107	-15	-15	12.9	1.179E+41
FenlapK	35	4	4	36.4	2.795E+109
FenlapB	-82	-108	-129	-33.1	
FenlapM	28	1	1	38.6	7.312E+115

DUT - MIG — 300 mm — 750

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 600 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	20	-5	-6	28.3	8.041E+85
ElsymS	23	-7	-7	23.9	1.324E+73
FenlapK	23	3	3	40.2	3.845E+120
FenlapB	20	6	6	57.5	8.214E+170
FenlapM	15	2	2	55.1	8.244E+163

LNEC - LOC — 1000 mm — 1750

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr_i=161 MPa** **n_i= 0.33** **Unit Weight: 22**

Loach: **C= 3,659** **D= 1.6219** **q_i = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-35	-42	79		1.472E+17
ElsymS	-45	-45	93		2.320E+16
FenlapK	5	5	2		1.230E+36
FenlapB	0	0	0		
FenlapM	0	0	0		

UNOT - LOC — Infinite — 2750

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q_i = 0.001** ***p +** **86** **Suction: 32**

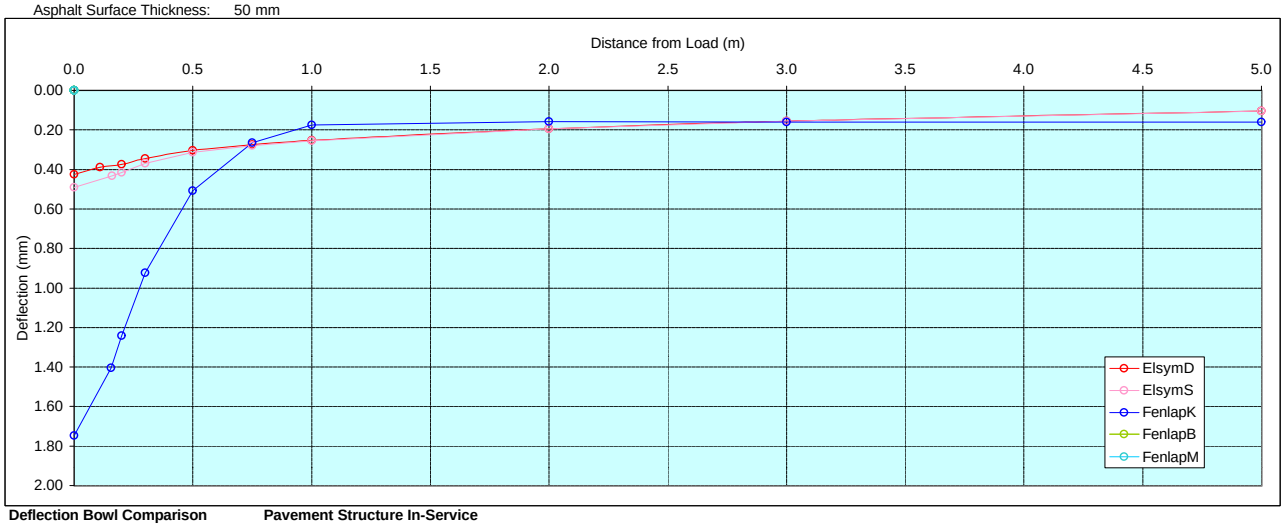
Strain - Top of the Subgrade Layer — Depth= 1751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-34	-35	76		2.170E+17
ElsymS	-36	-36	82		1.037E+17
FenlapK	-11	-11	26		5.815E+22
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: 1.718E+05

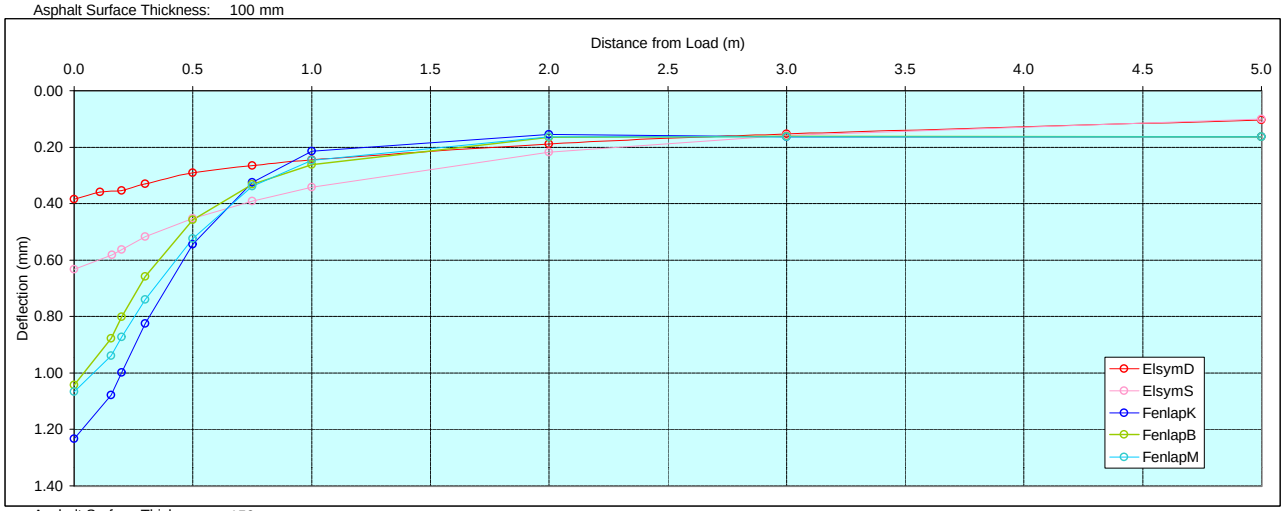
Deflection Bowl Comparison **Pavement Structure Under Construction**

Asphalt Surface Thickness: 50 mm

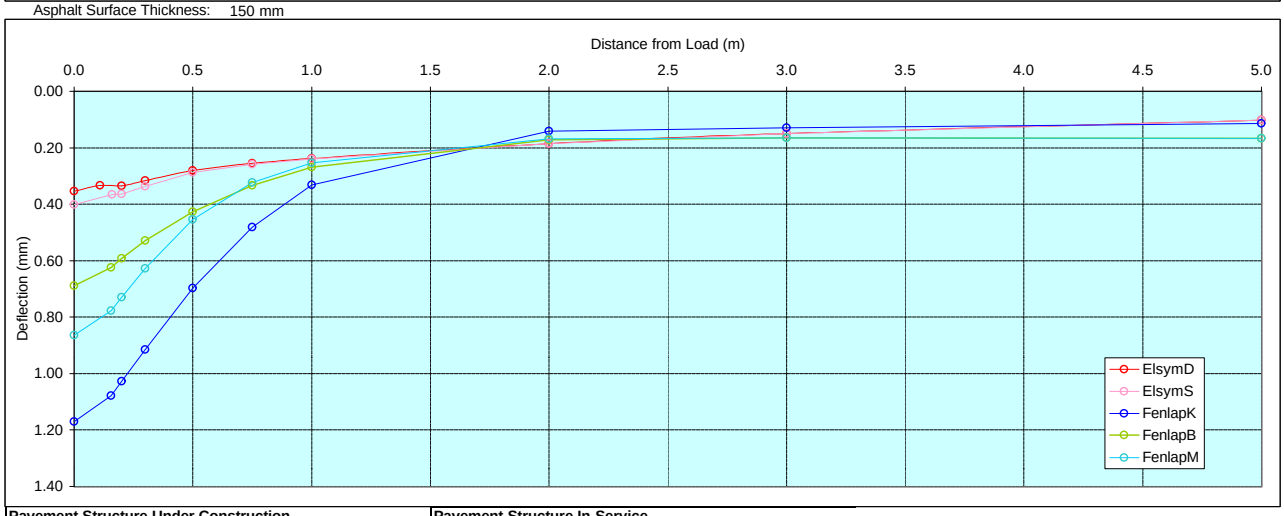


Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Asphalt Surface Thickness: 150 mm



Pavement Structure Under Construction

Asphalt: 50 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.425	0.00	0.491	0.00	1.748	#####	#####	#####	#####
0.11	0.390	0.16	0.432	0.16	1.404	#####	#####	#####	#####
0.20	0.373	0.20	0.414	0.20	1.241	#####	#####	#####	#####
0.30	0.345	0.30	0.370	0.30	0.922	#####	#####	#####	#####
0.50	0.305	0.50	0.313	0.50	0.509	#####	#####	#####	#####
0.75	0.276	0.75	0.280	0.75	0.265	#####	#####	#####	#####
1.00	0.254	1.00	0.256	1.00	0.176	#####	#####	#####	#####
2.00	0.194	2.00	0.195	2.00	0.158	#####	#####	#####	#####
3.00	0.155	3.00	0.155	3.00	0.160	#####	#####	#####	#####
5.00	0.103	5.00	0.103	5.00	0.160	#####	#####	#####	#####

Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.385	0.00	0.632	0.00	1.233	0.00	1.043	0.00	1.066
0.11	0.359	0.16	0.582	0.16	1.079	0.16	0.877	0.16	0.938
0.20	0.354	0.20	0.562	0.20	0.999	0.20	0.801	0.20	0.873
0.30	0.330	0.30	0.517	0.30	0.826	0.30	0.659	0.30	0.739
0.50	0.291	0.50	0.452	0.50	0.545	0.50	0.458	0.50	0.524
0.75	0.265	0.75	0.392	0.75	0.326	0.75	0.331	0.75	0.339
1.00	0.245	1.00	0.342	1.00	0.215	1.00	0.262	1.00	0.247
2.00	0.190	2.00	0.218	2.00	0.155	2.00	0.165	2.00	0.163
3.00	0.153	3.00	0.158	3.00	0.164	3.00	0.161	3.00	0.163
5.00	0.103	5.00	0.100	5.00	0.164	5.00	0.164	5.00	0.164

Mechanistic Pavement Analysis Pavement life as a function of the Range of values in the Subgrade Characteristics for a Single Result

Pavement Structure - Under Construction (UC):

Surface — 50 mm — 50

Bituminous prime coat to protect the granular base — **Unit Weight: 23**

Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.406	0.469	1.745	NS	NS

Strain - Bottom of the Base Layer

Depth= 49 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	88	95	-225		2.745E+08
ElsymS	62	62	-196		1.752E+09
FenlapK	835	835	-1190		**1.994E+04**
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

LRSB - CCD — 300 mm — 350

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr_i=817 MPa** **n_i= 0.48** **Unit Weight: 24**

k q: **k_1= 5,820** **k_2= 0.5508** **Suction: 0**

Boyce: **Ka= 12,739** **Ga= 25,802** **n= 0.3848**

Mayhew: **Ka= 12,097** **Ga= 103,681** **n= 0.3142** **m= 0.9777** **b= -0.2147**

Stress - Centre of the Base Layer

Depth= 200 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	159	19	4	16.6	4.816E+51
ElsymS	229	17	17	13.7	1.766E+43
FenlapK	33	-26	-32	14.1	3.907E+44
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

DUT - MIG — 300 mm — 650

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer

Depth= 500 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	31	-5	-7	22.3	2.063E+68
ElsymS	38	-7	-7	18.0	8.246E+55
FenlapK	53	2	2	19.3	4.537E+59
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

LNEC - LOC — 1000 mm — 1650

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr_i=200 MPa** **n_i= 0.37** **Unit Weight: 22**

Loach: **C= 4,290** **D= 1.7343** **q_f = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade

Depth= 651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-37	-47	111		3.165E+15
ElsymS	-52	-52	135		3.267E+14
FenlapK	0	0	0		
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

UNOT - LOC — Infinite — 2650

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q_f = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Subgrade Layer

Depth= 1651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-36	-37	48		4.199E+19
ElsymS	-39	-39	51		2.021E+19
FenlapK	0	0	0		
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

Minimum Design Loading: 1.994E+04

Pavement Structure - In-Service (IS):

Surface — 100 mm — 100

Asphalt Surface and Base Layer — **Unit Weight: 23**

Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.367	0.620	1.232	NS	1.066

Strain - Bottom of the Base Layer

Depth= 99 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	89	115	-202		1.200E+08
ElsymS	109	109	-228		1.500E+08
FenlapK	669	669	-922		**5.270E+04**
FenlapB	NS	NS	NS		
FenlapM	522	522	-730		1.565E+05

LRSB - CCD — 300 mm — 400

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr_i=817 MPa** **n_i= 0.48** **Unit Weight: 24**

k q: **k_1= 5,820** **k_2= 0.5508** **Suction: 0**

Boyce: **Ka= 12,739** **Ga= 25,802** **n= 0.3848**

Mayhew: **Ka= 12,097** **Ga= 103,681** **n= 0.3142** **m= 0.9777** **b= -0.2147**

Stress - Centre of the Base Layer

Depth= 250 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	106	3	-8	16.7	1.146E+52
ElsymS	122	-59	-59	7.4	6.605E+24
FenlapK	71	-12	-12	15.6	7.353E+48
FenlapB	NS	NS	NS	NS	
FenlapM	56	-84	-85	3.8	3.585E+14

DUT - MIG — 300 mm — 700

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer

Depth= 550 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	25	-5	-6	25.2	8.294E+76
ElsymS	13	2	2	62.8	2.495E+186
FenlapK	41	3	3	24.1	2.983E+73
FenlapB	NS	NS	NS	NS	
FenlapM	26	2	2	33.5	8.944E+100

LNEC - LOC — 1000 mm — 1700

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr_i=200 MPa** **n_i= 0.37** **Unit Weight: 22**

Loach: **C= 4,290** **D= 1.7343** **q_f = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade

Depth= 701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-33	-41	94		2.085E+16
ElsymS	-2	-2	514		6.959E+07
FenlapK	0	0	0		
FenlapB	NS	NS	NS		
FenlapM	0	0	0		

UNOT - LOC — Infinite — 2700

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q_f = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Subgrade Layer

Depth= 1701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-33	-34	44		1.144E+20
ElsymS	-32	-32	44		1.095E+20
FenlapK	0	0	0		
FenlapB	NS	NS	NS		
FenlapM	0	0	0		

Minimum Design Loading: 5.270E+04

Pavement Structure - In-Service (IS):

Surface — 150 mm — 0

Asphalt Surface and Base Layer — **Unit Weight: 23**

Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.338	0.383	0.907	0.868	0.739

Strain - Bottom of the Base Layer

Depth= 149 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	64	93	-147		3.001E+08
ElsymS	109	109	-205		1.494E+08
FenlapK	437	437	-587		**3.412E+05**
FenlapB	299	299	-433		1.802E+06
FenlapM	346	346	-466		9.500E+05

LRSB - CCD — 300 mm — 450

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr_i=817 MPa** **n_i= 0.48** **Unit Weight: 24**

k q: **k_1= 5,820** **k_2= 0.5508** **Suction: 0**

Boyce: **Ka= 12,739** **Ga= 25,802** **n= 0.3848**

Mayhew: **Ka= 12,097** **Ga= 103,681** **n= 0.3142** **m= 0.9777** **b= -0.2147**

Stress - Centre of the Base Layer

Depth= 300 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	76	-6	-14	16.9	4.588E+52
ElsymS	108	-13	-13	13.2	8.015E+41
FenlapK	43	-1	-1	25.9	7.408E+78
FenlapB	91	72	3	116.0	
FenlapM	31	-56	-56	6.5	1.931E+22

DUT - MIG — 300 mm — 750

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer

Depth= 600 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	21	-4	-5	28.9	3.247E+87
ElsymS	25	-6	-6	24.4	2.358E+74
FenlapK	28	3	3	33.4	5.018E+100
FenlapB	14	9	9	154.3	
FenlapM	18	2	2	46.7	2.600E+139

LNEC - LOC — 1000 mm — 1750

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr_i=200 MPa** **n_i= 0.37** **Unit Weight: 22**

Loach: **C= 4,290** **D= 1.7343** **q_f = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade

Depth= 751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-30	-36	80		1.346E+17
ElsymS	-39	-39	94		1.998E+16
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

UNOT - LOC — Infinite — 2750

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q_f = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Subgrade Layer

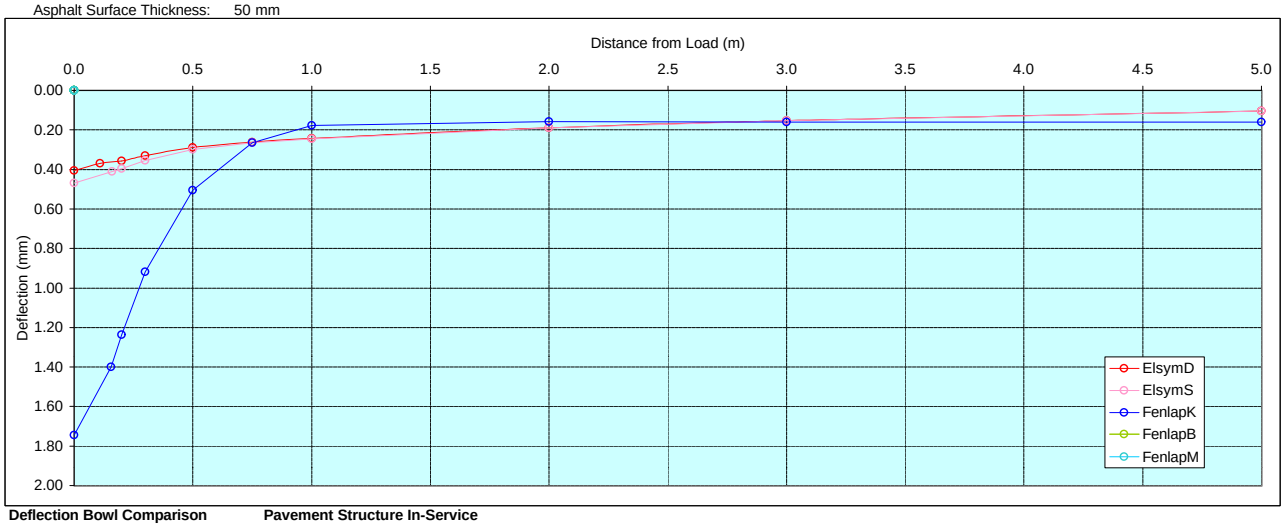
Depth= 1751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-30	-31	70		6.286E+17
ElsymS	-33	-33	75		2.520E+17
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: 3.412E+05

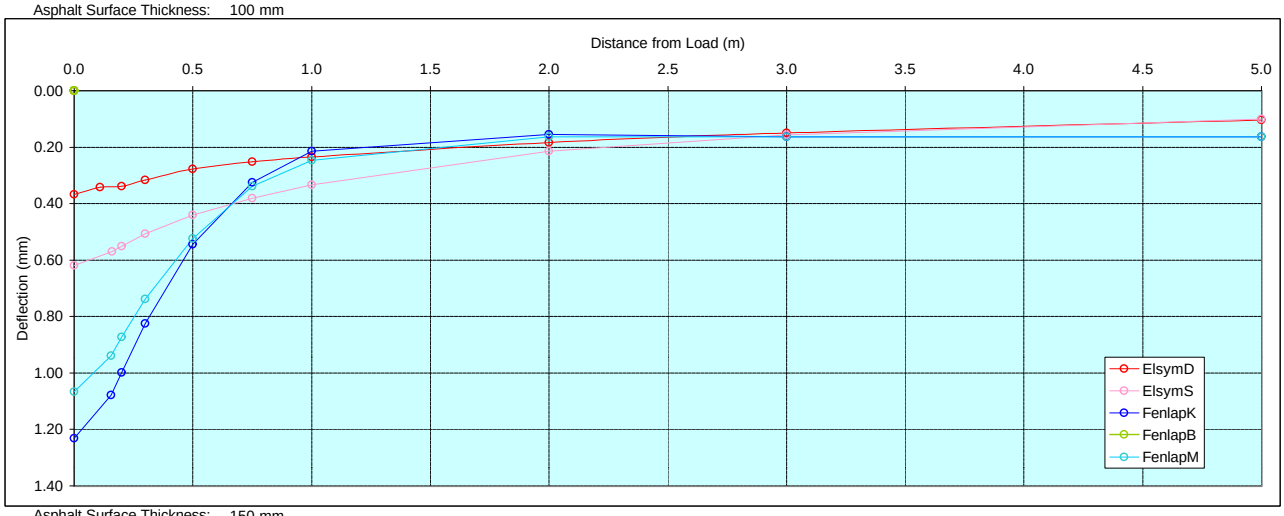
Deflection Bowl Comparison **Pavement Structure Under Construction**

Asphalt Surface Thickness: 50 mm

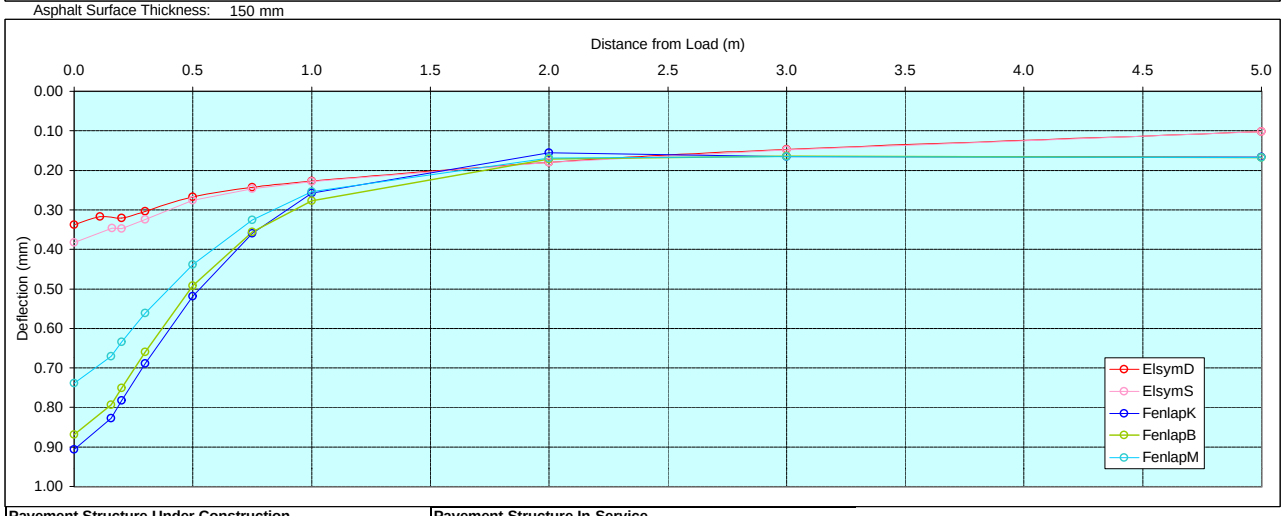


Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Asphalt Surface Thickness: 150 mm



Pavement Structure Under Construction

Asphalt: 50 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.406	0.00	0.469	0.00	1.745	#####	#####	#####	#####
0.11	0.370	0.16	0.411	0.16	1.400	#####	#####	#####	#####
0.20	0.357	0.20	0.397	0.20	1.237	#####	#####	#####	#####
0.30	0.331	0.30	0.355	0.30	0.918	#####	#####	#####	#####
0.50	0.290	0.50	0.299	0.50	0.506	#####	#####	#####	#####
0.75	0.262	0.75	0.266	0.75	0.265	#####	#####	#####	#####
1.00	0.242	1.00	0.245	1.00	0.177	#####	#####	#####	#####
2.00	0.189	2.00	0.190	2.00	0.158	#####	#####	#####	#####
3.00	0.153	3.00	0.153	3.00	0.160	#####	#####	#####	#####
5.00	0.104	5.00	0.104	5.00	0.160	#####	#####	#####	#####

Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.367	0.00	0.620	0.00	1.232	#####	#####	0.00	1.066
0.11	0.342	0.16	0.570	0.16	1.078	#####	#####	0.16	0.938
0.20	0.339	0.20	0.551	0.20	0.998	#####	#####	0.20	0.873
0.30	0.316	0.30	0.506	0.30	0.825	#####	#####	0.30	0.739
0.50	0.278	0.50	0.441	0.50	0.545	#####	#####	0.50	0.524
0.75	0.252	0.75	0.381	0.75	0.326	#####	#####	0.75	0.339
1.00	0.234	1.00	0.333	1.00	0.215	#####	#####	1.00	0.247
2.00	0.184	2.00	0.214	2.00	0.155	#####	#####	2.00	0.163
3.00	0.150	3.00	0.157	3.00	0.164	#####	#####	3.00	0.163
5.00	0.103	5.00	0.100	5.00	0.164	#####	#####	5.00	0.164

Mechanistic Pavement Analysis Pavement life as a function of the Range of values in the Subgrade Characteristics for a Single Result

Pavement Structure - Under Construction (UC):

Surface — 50 mm

Bituminous prime coat to protect the granular base — **Unit Weight: 23**

Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.397	0.459	1.755	NS	NS

Strain - Bottom of the Base Layer — Depth= 49 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	88	96	-226		2.673E+08
ElsymS	63	63	-196		1.695E+09
FenlapK	851	851	-1220		**1.834E+04**
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

LRSB - CCD — 300 mm — 350

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr_i=817 MPa** **n_i= 0.48** **Unit Weight: 24**

k q: **k_1= 5,820** **k_2= 0.5508** **Suction: 0**

Boyce: **Ka= 12,739** **Ga= 25,802** **n= 0.3848**

Mayhew: **Ka= 12,097** **Ga= 103,681** **n= 0.3142** **m= 0.9777** **b= -0.2147**

Stress - Centre of the Base Layer — Depth= 200 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	159	19	4	16.6	5.480E+51
ElsymS	229	17	17	13.7	2.080E+43
FenlapK	63	-52	-54	7.7	5.036E+25
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

DUT - MIG — 300 mm — 650

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 500 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	31	-4	-6	22.3	2.285E+68
ElsymS	39	-7	-7	18.0	6.792E+55
FenlapK	58	3	3	18.9	2.818E+58
FenlapB	NS	NS	NS	NS	
FenlapM	NS	NS	NS	NS	

LNEC - LOC — 1000 mm — 1650

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr_i=229 MPa** **n_i= 0.50** **Unit Weight: 22**

Loach: **C= 6,304** **D= 2.0930** **q_i = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-36	-46	114		2.282E+15
ElsymS	-51	-51	139		2.316E+14
FenlapK	0	0	0		
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

UNOT - LOC — Infinite — 2650

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q_i = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1651 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-32	-34	66		1.133E+18
ElsymS	-36	-36	71		4.868E+17
FenlapK	0	0	0		
FenlapB	NS	NS	NS		
FenlapM	NS	NS	NS		

Minimum Design Loading: 1.834E+04

Pavement Structure - In-Service (IS):

Surface — 100 mm

Asphalt Surface and Base Layer — **Unit Weight: 23**

Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.359	0.612	1.232	0.903	1.120

Strain - Bottom of the Base Layer — Depth= 99 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	89	115	-202		1.191E+08
ElsymS	109	109	-228		1.488E+08
FenlapK	668	668	-921		**5.305E+04**
FenlapB	515	515	-693		1.660E+05
FenlapM	635	635	-872		6.625E+04

LRSB - CCD — 300 mm — 400

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr_i=817 MPa** **n_i= 0.48** **Unit Weight: 24**

k q: **k_1= 5,820** **k_2= 0.5508** **Suction: 0**

Boyce: **Ka= 12,739** **Ga= 25,802** **n= 0.3848**

Mayhew: **Ka= 12,097** **Ga= 103,681** **n= 0.3142** **m= 0.9777** **b= -0.2147**

Stress - Centre of the Base Layer — Depth= 250 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	107	3	-8	16.8	2.123E+52
ElsymS	122	-58	-58	7.4	7.610E+24
FenlapK	71	-11	-11	16.0	8.563E+49
FenlapB	44	17	-122	48.3	1.945E+144
FenlapM	55	-15	-16	16.1	1.488E+50

DUT - MIG — 300 mm — 700

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 550 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	26	-4	-6	25.3	1.048E+77
ElsymS	13	2	2	61.9	5.953E+183
FenlapK	41	3	3	24.0	2.824E+73
FenlapB	26	3	3	35.6	1.386E+107
FenlapM	29	2	2	30.8	1.752E+93

LNEC - LOC — 1000 mm — 1700

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr_i=229 MPa** **n_i= 0.50** **Unit Weight: 22**

Loach: **C= 6,304** **D= 2.0930** **q_i = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-32	-40	96		1.557E+16
ElsymS	-5	-5	528		5.114E+07
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

UNOT - LOC — Infinite — 2700

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q_i = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Subgrade Layer — Depth= 1701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-30	-31	60		3.196E+18
ElsymS	-30	-30	60		3.625E+18
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: 5.305E+04

Pavement Structure - In-Service (IS):

Surface — 150 mm

Asphalt Surface and Base Layer — **Unit Weight: 23**

Mr_i=2,100 MPa **n_i= 0.40** **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.330	0.372	0.907	0.674	0.764

Strain - Bottom of the Base Layer — Depth= 149 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	64	93	-147		2.993E+08
ElsymS	109	109	-205		1.494E+08
FenlapK	437	437	-587		**3.412E+05**
FenlapB	346	346	-481		9.500E+05
FenlapM	394	394	-527		5.374E+05

LRSB - CCD — 300 mm — 450

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr_i=817 MPa** **n_i= 0.48** **Unit Weight: 24**

k q: **k_1= 5,820** **k_2= 0.5508** **Suction: 0**

Boyce: **Ka= 12,739** **Ga= 25,802** **n= 0.3848**

Mayhew: **Ka= 12,097** **Ga= 103,681** **n= 0.3142** **m= 0.9777** **b= -0.2147**

Stress - Centre of the Base Layer — Depth= 300 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	76	-5	-13	17.1	1.274E+53
ElsymS	108	-13	-13	13.3	1.678E+42
FenlapK	43	-1	-1	26.0	1.151E+79
FenlapB	70	-102	-109	3.0	9.941E+11
FenlapM	36	-10	-10	21.8	1.082E+67

DUT - MIG — 300 mm — 750

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr_i=198 MPa** **n_i= 0.23** **Unit Weight: 22**

k q: **k_1= 1,738** **k_2= 0.5555** **Suction: 0**

Stress - Centre of the Base Layer — Depth= 600 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	21	-4	-5	28.9	4.857E+87
ElsymS	25	-5	-5	24.3	2.128E+74
FenlapK	28	3	3	33.4	5.018E+100
FenlapB	20	2	2	43.6	2.639E+130
FenlapM	19	2	2	44.8	8.386E+133

LNEC - LOC — 1000 mm — 1750

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr_i=229 MPa** **n_i= 0.50** **Unit Weight: 22**

Loach: **C= 6,304** **D= 2.0930** **q_i = 0.001** ***p +** **86** **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-29	-35	81		1.046E+17
ElsymS	-38	-38	96		1.499E+16
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

UNOT - LOC — Infinite — 2750

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr_i=22 MPa** **n_i= 0.68** **=0.45** **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q_i = 0.001** ***p +** **86** **Suction: 32**

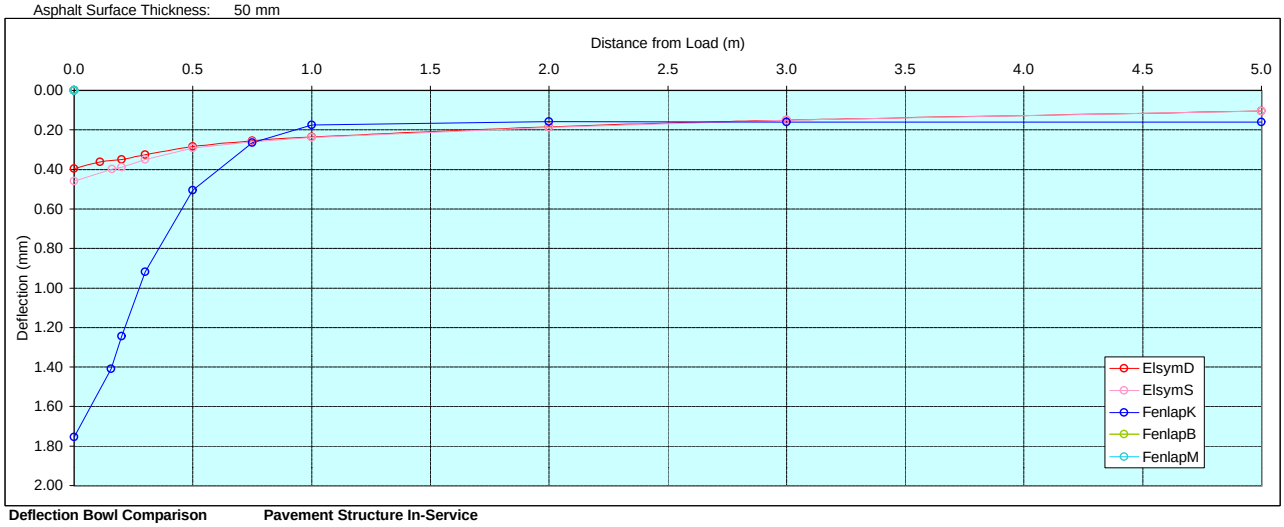
Strain - Top of the Subgrade Layer — Depth= 1751 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-27	-28	63		1.891E+18
ElsymS	-30	-30	69		6.518E+17
FenlapK	0	0	0		
FenlapB	0	0	0		
FenlapM	0	0	0		

Minimum Design Loading: 3.412E+05

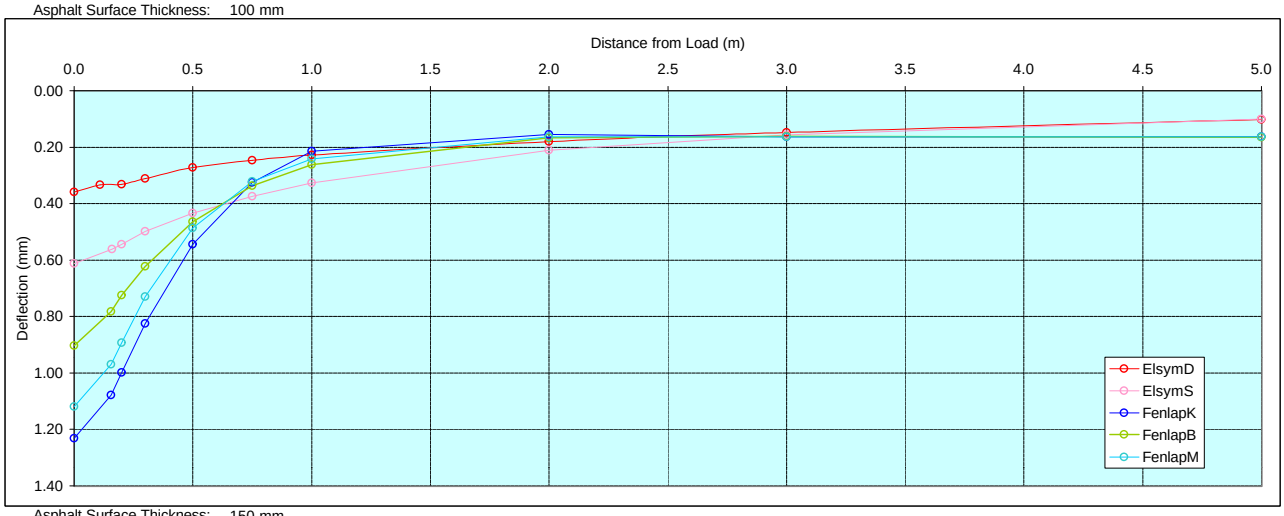
Deflection Bowl Comparison **Pavement Structure Under Construction**

Asphalt Surface Thickness: 50 mm

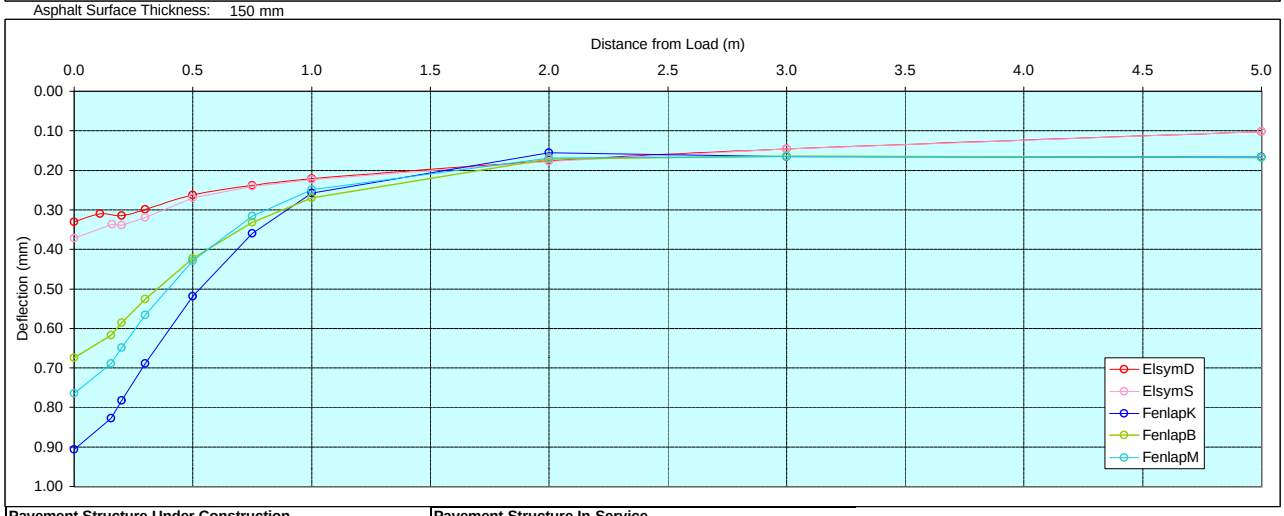


Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Asphalt Surface Thickness: 150 mm



Pavement Structure Under Construction

Asphalt: 50 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.397	0.00	0.459	0.00	1.755	#####	#####	#####	#####
0.11	0.361	0.16	0.400	0.16	1.409	#####	#####	#####	#####
0.20	0.350	0.20	0.388	0.20	1.244	#####	#####	#####	#####
0.30	0.325	0.30	0.349	0.30	0.920	#####	#####	#####	#####
0.50	0.283	0.50	0.292	0.50	0.506	#####	#####	#####	#####
0.75	0.256	0.75	0.259	0.75	0.265	#####	#####	#####	#####
1.00	0.237	1.00	0.239	1.00	0.176	#####	#####	#####	#####
2.00	0.186	2.00	0.187	2.00	0.158	#####	#####	#####	#####
3.00	0.151	3.00	0.152	3.00	0.160	#####	#####	#####	#####
5.00	0.104	5.00	0.104	5.00	0.160	#####	#####	#####	#####

Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.359	0.00	0.612	0.00	1.232	0.00	0.903	0.00	1.120
0.11	0.333	0.16	0.562	0.16	1.079	0.16	0.782	0.16	0.970
0.20	0.332	0.20	0.544	0.20	0.998	0.20	0.725	0.20	0.893
0.30	0.311	0.30	0.499	0.30	0.825	0.30	0.623	0.30	0.729
0.50	0.272	0.50	0.434	0.50	0.545	0.50	0.465	0.50	0.486
0.75	0.246	0.75	0.374	0.75	0.326	0.75	0.337	0.75	0.321
1.00	0.229	1.00	0.327	1.00	0.215	1.00	0.263	1.00	0.242
2.00	0.181	2.00	0.211	2.00	0.155	2.00	0.166	2.00	0.163
3.00	0.148	3.00	0.156	3.00	0.164	3.00	0.162	3.00	0.163
5.00	0.103	5.00	0.100	5.00	0.164	5.00	0.165	5.00	0.164

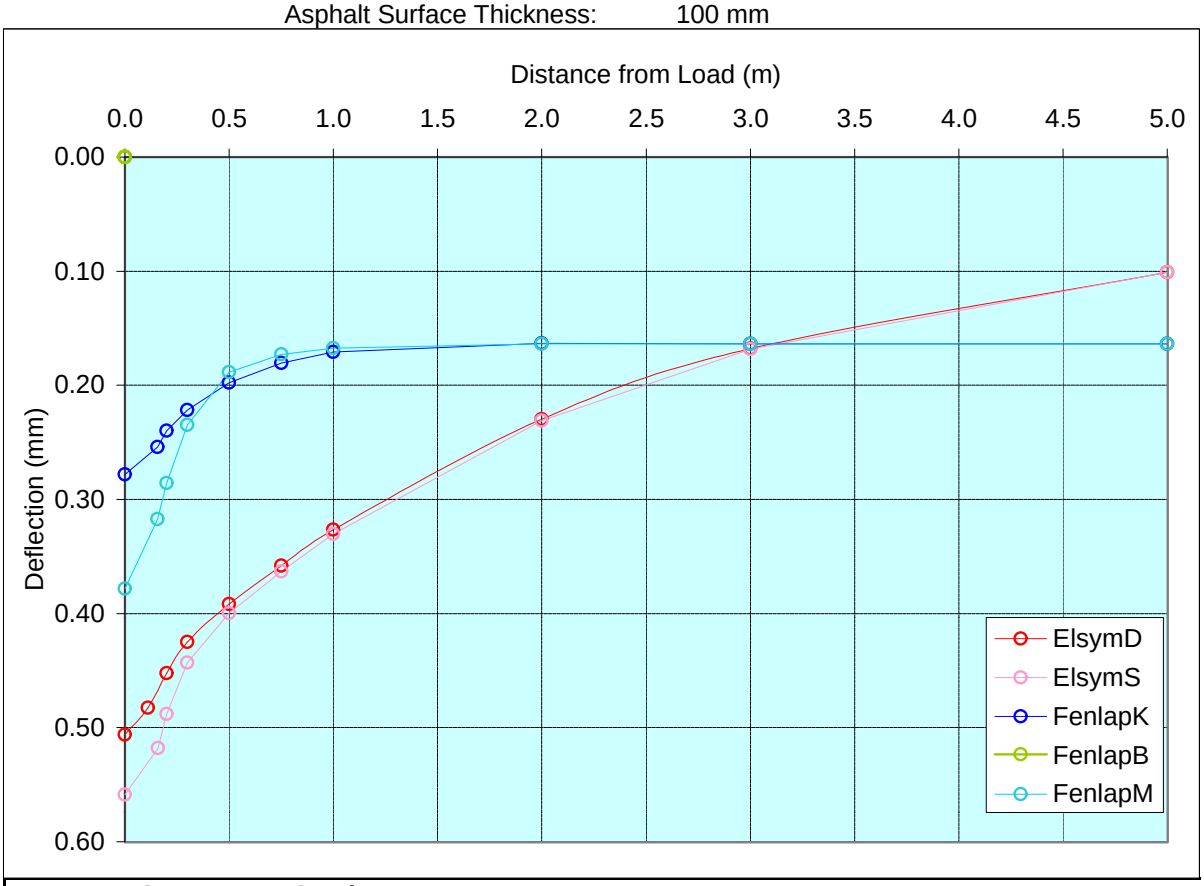
Mechanistic Pavement Analysis

Pavement Structure - In-Service (IS):

Surface	**100 mm**	Asphalt Surface and Base Layer						**Unit Weight: 23**
		Mr_i= 2,100 MPa	**n_i= 0.40**					**Suction: 0**
		Peak Deflection on the Surface		ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
			δ_p (mm)=	0.506	0.559	0.278	NS	0.378
		Strain - Bottom of the Base Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 99 mm	ElsymD	41	64	-110		1.563E+09
			ElsymS	87	87	-203		4.066E+08
			FenlapK	47	47	-155		5.809E+09
			FenlapB	NS	NS	NS		
	100		FenlapM	222	222	-362		6.653E+06
LRSB - CCD	**300 mm**	Unbound Granular Base	Test programme: 3			Lab.: LRSB		CCD ***9***
		Char.: **Mr_i= 1,014 MPa**	**n_i= 0.46**					**Unit Weight: 24**
		k q: **k_1= 889,858**	**k_2= 0.1819**					**Suction: 0**
		Boyce: **Ka= 719,935**	**Ga= 254,843**		**n= 0.5986**			
		Mayhew: **Ka= 260,388**	**Ga= 6,206,351**		**n= 0.6404**		**m= 0.5919**	**b= -0.8257**
		Stress - Centre of the Base Layer		σ_1 *(kPa)*	σ_2 *(kPa)*	σ_3 *(kPa)*	FOS	ESA
		Depth= 250 mm	ElsymD	15	-13	-14	28.3	5.460E+85
			ElsymS	148	-23	-23	10.8	7.942E+34
			FenlapK	82	-199	-201	-0.8	**1.152E+01**
			FenlapB	NS	NS	NS	NS	
	400		FenlapM	105	-22	-24	11.8	4.099E+37
DUT - MIG	**300 mm**	Unbound Granular Subbase	Test programme: 2			Lab.: DUT		MIG ***8***
		Char.: **Mr_i= 198 MPa**	**n_i= 0.23**					**Unit Weight: 22**
		k q: **k_1= 1,738**	**k_2= 0.5555**					**Suction: 0**
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
		Depth= 550 mm	ElsymD	9	-19	-21	19.4	1.030E+60
			ElsymS	18	-15	-15	18.5	2.615E+57
			FenlapK	31	2	2	29.3	6.948E+88
			FenlapB	NS	NS	NS	NS	
	700		FenlapM	42	1	1	22.6	1.616E+69
LNEC - LOC	**1000 mm**	Selected Soil Subgrade	Test programme: 3			Lab.: LNEC		LOC ***7***
		Char.: **Mr_i= 45 MPa**	**n_i= 0.33**					**Unit Weight: 22**
		Loach: **C= 107,125**	**D= 1.7216**		**q_f = 0.001**	***p +**	**86**	**Suction: 32**
		Strain - Top of the Selected Subgrade		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 701 mm	ElsymD	-55	-60	138		2.475E+14
			ElsymS	-99	-99	102		8.199E+15
			FenlapK	0	0	0		
			FenlapB	NS	NS	NS		
	1700		FenlapM	0	0	0		
UNOT - LOC	**Infinite**	In-Situ Soil Subgrade Foundation	Test programme: 2			Lab.: UNOT		LOC ***4***
		Char.: **Mr_i= 22 MPa**	**n_i= 0.68**	**=0.45**				**Unit Weight: 22**
		Brown: **A= 17,512**	**B= 0.5781**		**q_f = 0.001**	***p +**	**86**	**Suction: 32**
		Strain - Top of the Subgrade Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 1701 mm	ElsymD	-49	-50	87		4.938E+16
			ElsymS	-46	-46	84		7.813E+16
			FenlapK	0	0	0		
			FenlapB	NS	NS	NS		
	2700		FenlapM	0	0	0		
							Minimum Design Loading:	**1.152E+01**

Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.506	0.00	0.559	0.00	0.278	#VALUE!	#VALUE!	0.00	0.378
0.11	0.483	0.16	0.518	0.16	0.254	#VALUE!	#VALUE!	0.16	0.317
0.20	0.453	0.20	0.488	0.20	0.240	#VALUE!	#VALUE!	0.20	0.286
0.30	0.425	0.30	0.443	0.30	0.222	#VALUE!	#VALUE!	0.30	0.235
0.50	0.392	0.50	0.400	0.50	0.198	#VALUE!	#VALUE!	0.50	0.188
0.75	0.358	0.75	0.363	0.75	0.181	#VALUE!	#VALUE!	0.75	0.173
1.00	0.327	1.00	0.330	1.00	0.171	#VALUE!	#VALUE!	1.00	0.168
2.00	0.230	2.00	0.231	2.00	0.163	#VALUE!	#VALUE!	2.00	0.164
3.00	0.168	3.00	0.168	3.00	0.164	#VALUE!	#VALUE!	3.00	0.164
5.00	0.101	5.00	0.101	5.00	0.164	#VALUE!	#VALUE!	5.00	0.164

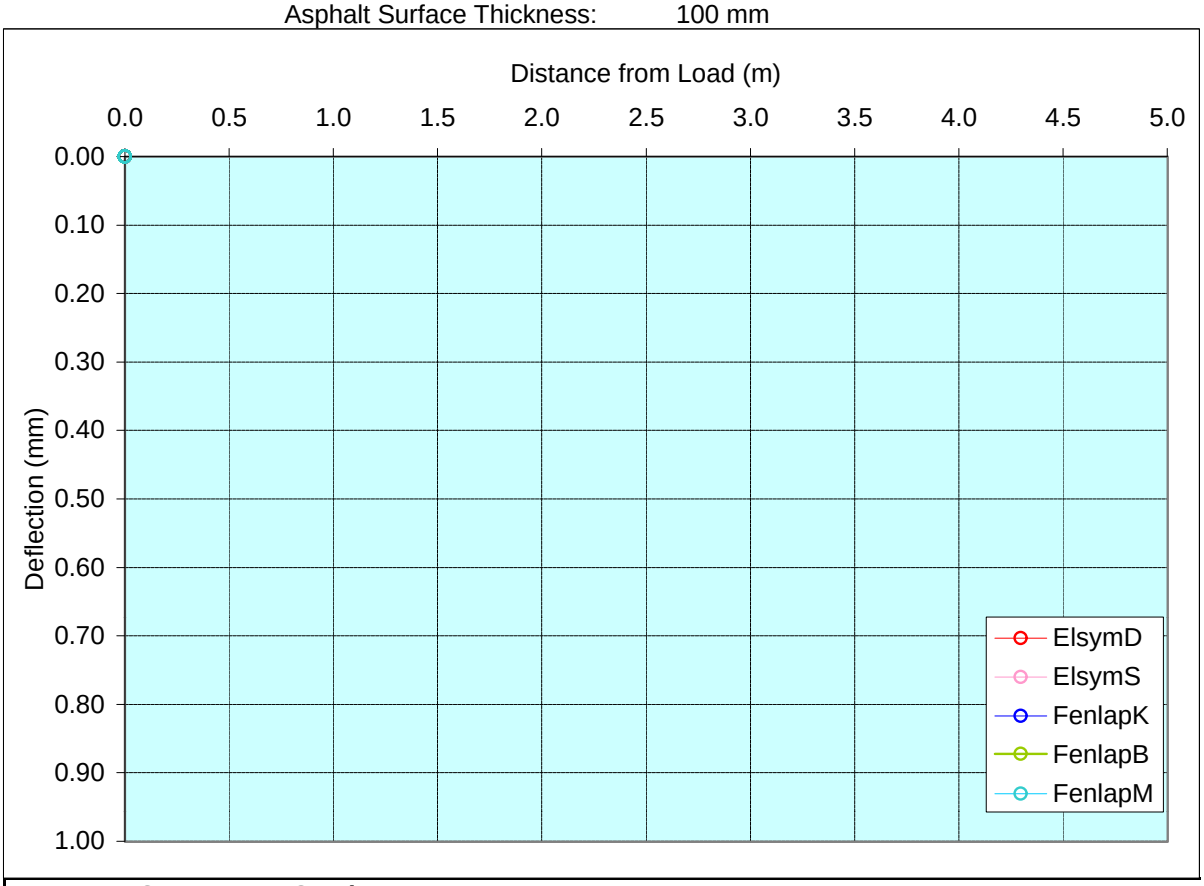
Mechanistic Pavement Analysis

Pavement Structure - In-Service (IS):

Surface	**100 mm**	Asphalt Surface and Base Layer						**Unit Weight: 23**
		Mr_i= 2,100 MPa	**n_i= 0.40**					**Suction: 0**
		Peak Deflection on the Surface		ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
			δ_p (mm)=	#######	#######	#######	NS	#######
		Strain - Bottom of the Base Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 99 mm	ElsymD	#######	#######	#######		#VALUE!
			ElsymS	#######	#######	#######		#VALUE!
			FenlapK	#######	#######	#######		#VALUE!
			FenlapB	NS	NS	NS		#NUM!
	100		FenlapM	#######	#######	#######		#VALUE!
LRSB - CCD	**300 mm**	Unbound Granular Base		Test programme: 3		Lab.: LRSB		CCD ***9***
		Char.: **Mr_i= 1,015 MPa**	**n_i= 0.46**					**Unit Weight: 24**
		k q: **k_1= 891,391**	**k_2= 0.1809**					**Suction: 0**
		Boyce: **Ka= 303,002**	**Ga= 325,457**		**n= 0.6267**			
		Mayhew: **Ka= 260,409**	**Ga= 6,305,270**		**n= 0.6408**		**m= 0.5890**	**b= -0.8562**
		Stress - Centre of the Base Layer		σ_1 *(kPa)*	σ_2 *(kPa)*	σ_3 *(kPa)*	FOS	ESA
		Depth= 250 mm	ElsymD	#######	#######	#######	#######	#VALUE!
			ElsymS	#######	#######	#######	#######	#VALUE!
			FenlapK	#######	#######	#######	#######	#VALUE!
			FenlapB	NS	NS	NS	NS	#VALUE!
	400		FenlapM	#######	#######	#######	#######	#VALUE!
DUT - MIG	**300 mm**	Unbound Granular Subbase		Test programme: 2		Lab.: DUT		MIG ***8***
		Char.: **Mr_i= 198 MPa**	**n_i= 0.23**					**Unit Weight: 22**
		k q: **k_1= 1,738**	**k_2= 0.5555**					**Suction: 0**
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
		Depth= 550 mm	ElsymD	#######	#######	#######	#######	#VALUE!
			ElsymS	#######	#######	#######	#######	#VALUE!
			FenlapK	#######	#######	#######	#######	#VALUE!
			FenlapB	NS	NS	NS	NS	#VALUE!
	700		FenlapM	#######	#######	#######	#######	#VALUE!
LNEC - LOC	**1000 mm**	Selected Soil Subgrade		Test programme: 3		Lab.: LNEC		LOC ***7***
		Char.: **Mr_i= 45 MPa**	**n_i= 0.33**					**Unit Weight: 22**
		Loach: **C= 107,125**	**D= 1.7216**		**q_f = 0.001**	***p +**	**86**	**Suction: 32**
		Strain - Top of the Selected Subgrade		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 701 mm	ElsymD	#######	#######	#######		#VALUE!
			ElsymS	#######	#######	#######		#VALUE!
			FenlapK	#######	#######	#######		#VALUE!
			FenlapB	NS	NS	NS		#VALUE!
	1700		FenlapM	#######	#######	#######		#VALUE!
UNOT - LOC	**Infinite**	In-Situ Soil Subgrade Foundation		Test programme: 2		Lab.: UNOT		LOC ***4***
		Char.: **Mr_i= 22 MPa**	**n_i= 0.68**	**=0.45**				**Unit Weight: 22**
		Brown: **A= 17,512**	**B= 0.5781**		**q_f = 0.001**	***p +**	**86**	**Suction: 32**
		Strain - Top of the Subgrade Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 1701 mm	ElsymD	#######	#######	#######		#VALUE!
			ElsymS	#######	#######	#######		#VALUE!
			FenlapK	#######	#######	#######		#VALUE!
			FenlapB	NS	NS	NS		#VALUE!
	2700		FenlapM	#######	#######	#######		#VALUE!
							Minimum Design Loading:	**#VALUE!**

Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!

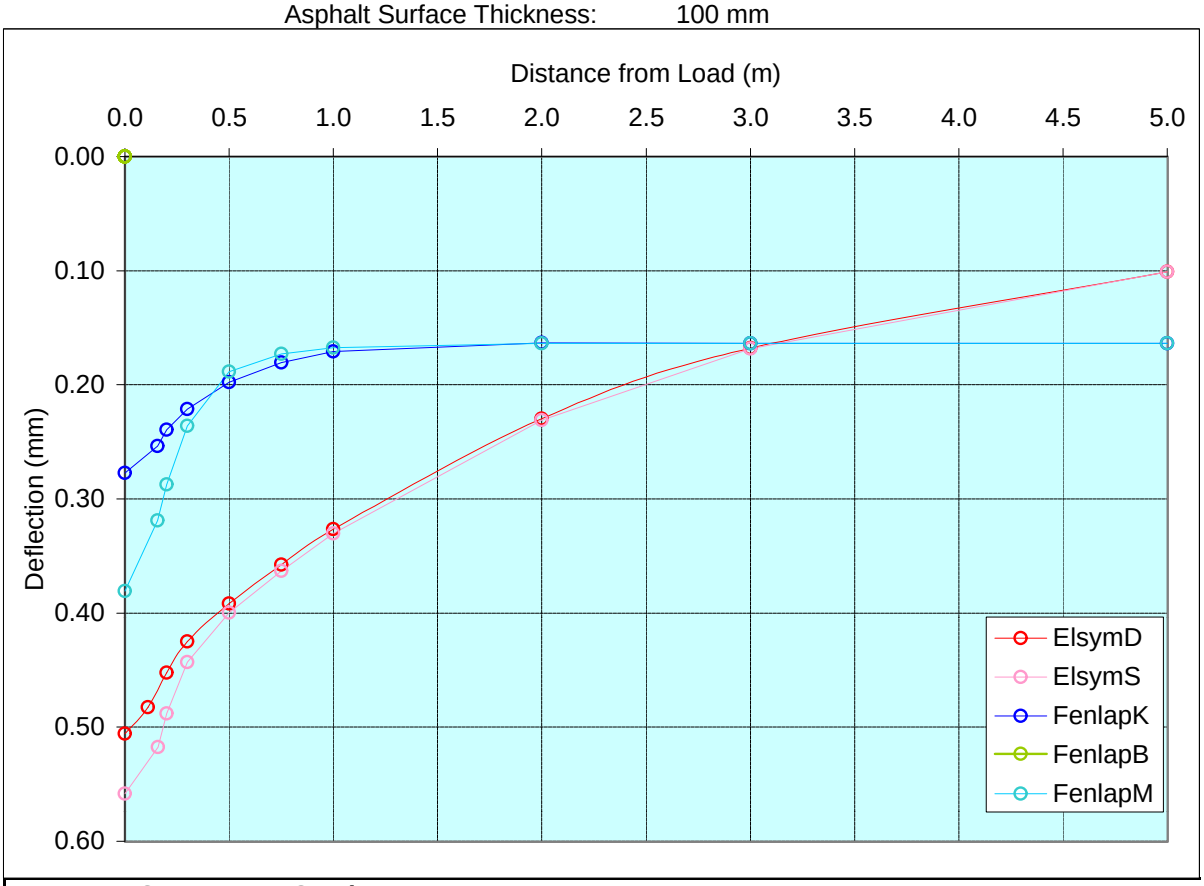
Mechanistic Pavement Analysis

Pavement Structure - In-Service (IS):

Surface	**100 mm**	Asphalt Surface and Base Layer						**Unit Weight: 23**
		Mr_i= 2,100 MPa	**n_i= 0.40**					**Suction: 0**
		Peak Deflection on the Surface		ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
			δ_p (mm)=	0.506	0.559	0.277	NS	0.381
		Strain - Bottom of the Base Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 99 mm	ElsymD	41	64	-110		1.586E+09
			ElsymS	87	87	-203		4.128E+08
			FenlapK	47	47	-154		6.201E+09
			FenlapB	NS	NS	NS		
	100		FenlapM	226	226	-367		6.152E+06
LRSB - CCD	**300 mm**	Unbound Granular Base	Test programme: 3			Lab.: LRSB		CCD ***9***
		Char.: **Mr_i= 1,018 MPa**	**n_i= 0.46**					**Unit Weight: 24**
		k q: **k_1= 890,505**	**k_2= 0.1837**					**Suction: 0**
		Boyce: **Ka= 298,969**	**Ga= 325,661**	**n= 0.6183**				
		Mayhew: **Ka= 259,969**	**Ga= 6,307,738**	**n= 0.6344**		**m= 0.5859**		**b= -0.8782**
		Stress - Centre of the Base Layer		σ_1 *(kPa)*	σ_2 *(kPa)*	σ_3 *(kPa)*	FOS	ESA
		Depth= 250 mm	ElsymD	15	-13	-14	28.3	7.128E+85
			ElsymS	148	-24	-24	10.8	7.588E+34
			FenlapK	82	-200	-202	-0.8	**9.567E+00**
			FenlapB	NS	NS	NS	NS	
	400		FenlapM	103	-22	-23	11.9	1.110E+38
DUT - MIG	**300 mm**	Unbound Granular Subbase	Test programme: 2			Lab.: DUT		MIG ***8***
		Char.: **Mr_i= 198 MPa**	**n_i= 0.23**					**Unit Weight: 22**
		k q: **k_1= 1,738**	**k_2= 0.5555**					**Suction: 0**
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
		Depth= 550 mm	ElsymD	9	-19	-21	19.5	1.205E+60
			ElsymS	18	-15	-15	18.6	3.032E+57
			FenlapK	31	2	2	29.3	7.568E+88
			FenlapB	NS	NS	NS	NS	
	700		FenlapM	42	2	2	22.6	2.344E+69
LNEC - LOC	**1000 mm**	Selected Soil Subgrade	Test programme: 3			Lab.: LNEC		LOC ***7***
		Char.: **Mr_i= 45 MPa**	**n_i= 0.33**					**Unit Weight: 22**
		Loach: **C= 107,125**	**D= 1.7216**	**q_f = 0.001**	***p +**	**86**		**Suction: 32**
		Strain - Top of the Selected Subgrade		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 701 mm	ElsymD	-55	-60	138		2.496E+14
			ElsymS	-99	-99	102		8.292E+15
			FenlapK	0	0	0		
			FenlapB	NS	NS	NS		
	1700		FenlapM	0	0	0		
UNOT - LOC	**Infinite**	In-Situ Soil Subgrade Foundation	Test programme: 2			Lab.: UNOT		LOC ***4***
		Char.: **Mr_i= 22 MPa**	**n_i= 0.68**	**=0.45**				**Unit Weight: 22**
		Brown: **A= 17,512**	**B= 0.5781**	**q_f = 0.001**	***p +**	**86**		**Suction: 32**
		Strain - Top of the Subgrade Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 1701 mm	ElsymD	-49	-50	87		4.964E+16
			ElsymS	-46	-46	84		7.845E+16
			FenlapK	0	0	0		
			FenlapB	NS	NS	NS		
	2700		FenlapM	0	0	0		
							Minimum Design Loading:	**9.567E+00**

Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.506	0.00	0.559	0.00	0.277	#VALUE!	#VALUE!	0.00	0.381
0.11	0.483	0.16	0.518	0.16	0.254	#VALUE!	#VALUE!	0.16	0.319
0.20	0.452	0.20	0.488	0.20	0.240	#VALUE!	#VALUE!	0.20	0.287
0.30	0.425	0.30	0.443	0.30	0.221	#VALUE!	#VALUE!	0.30	0.236
0.50	0.392	0.50	0.400	0.50	0.198	#VALUE!	#VALUE!	0.50	0.189
0.75	0.358	0.75	0.363	0.75	0.180	#VALUE!	#VALUE!	0.75	0.173
1.00	0.327	1.00	0.330	1.00	0.171	#VALUE!	#VALUE!	1.00	0.168
2.00	0.230	2.00	0.231	2.00	0.163	#VALUE!	#VALUE!	2.00	0.164
3.00	0.168	3.00	0.168	3.00	0.164	#VALUE!	#VALUE!	3.00	0.164
5.00	0.101	5.00	0.101	5.00	0.164	#VALUE!	#VALUE!	5.00	0.164

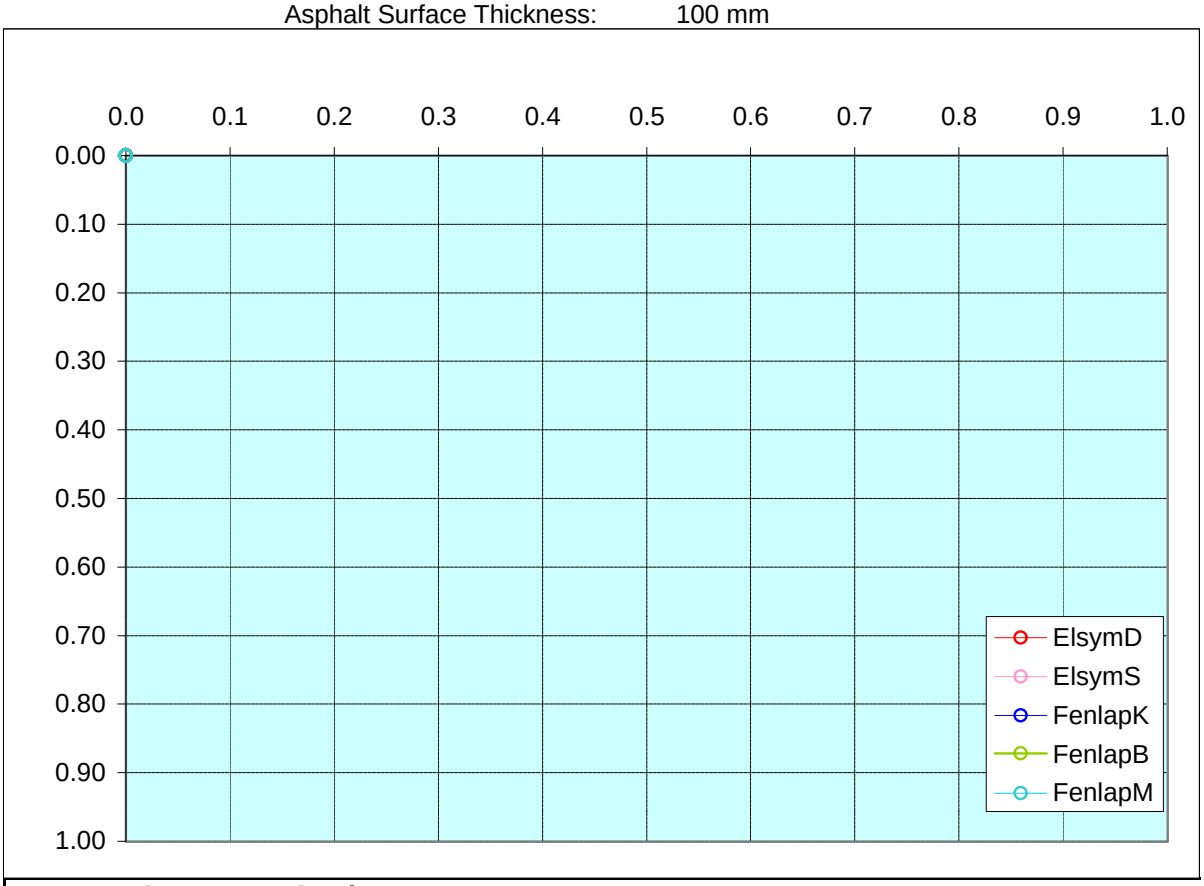
Mechanistic Pavement Analysis

Pavement Structure - In-Service (IS):

Surface	**100 mm**	Asphalt Surface and Base Layer						**Unit Weight: 23**
		Mr_i= 2,100 MPa	**n_i= 0.40**					**Suction: 0**
		Peak Deflection on the Surface		ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
			δ_p (mm)=	#######	#######	#######	NS	#######
		Strain - Bottom of the Base Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 99 mm	ElsymD	#######	#######	#######		#VALUE!
			ElsymS	#######	#######	#######		#VALUE!
			FenlapK	#######	#######	#######		#VALUE!
			FenlapB	NS	NS	NS		#NUM!
	100		FenlapM	#######	#######	#######		#VALUE!
LRSB - CCD	**300 mm**	Unbound Granular Base		Test programme: 3		Lab.: LRSB		CCD ***9***
		Char.: **Mr_i= 1,015 MPa**	**n_i= 0.46**					**Unit Weight: 24**
		k q: **k_1= 896,224**	**k_2= 0.1801**					**Suction: 0**
		Boyce: **Ka= 252,455**	**Ga= 363,557**		**n= 0.6264**			
		Mayhew: **Ka= 259,662**	**Ga= 7,618,144**		**n= 0.6311**		**m= 0.6179**	**b= -1.1868**
		Stress - Centre of the Base Layer		σ_1 *(kPa)*	σ_2 *(kPa)*	σ_3 *(kPa)*	FOS	ESA
		Depth= 250 mm	ElsymD	#######	#######	#######	#######	#VALUE!
			ElsymS	#######	#######	#######	#######	#VALUE!
			FenlapK	#######	#######	#######	#######	#VALUE!
			FenlapB	NS	NS	NS	NS	#VALUE!
	400		FenlapM	#######	#######	#######	#######	#VALUE!
DUT - MIG	**300 mm**	Unbound Granular Subbase		Test programme: 2		Lab.: DUT		MIG ***8***
		Char.: **Mr_i= 198 MPa**	**n_i= 0.23**					**Unit Weight: 22**
		k q: **k_1= 1,738**	**k_2= 0.5555**					**Suction: 0**
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
		Depth= 550 mm	ElsymD	#######	#######	#######	#######	#VALUE!
			ElsymS	#######	#######	#######	#######	#VALUE!
			FenlapK	#######	#######	#######	#######	#VALUE!
			FenlapB	NS	NS	NS	NS	#VALUE!
	700		FenlapM	#######	#######	#######	#######	#VALUE!
LNEC - LOC	**1000 mm**	Selected Soil Subgrade		Test programme: 3		Lab.: LNEC		LOC ***7***
		Char.: **Mr_i= 45 MPa**	**n_i= 0.33**					**Unit Weight: 22**
		Loach: **C= 107,125**	**D= 1.7216**		**q_f = 0.001**	***p +**	**86**	**Suction: 32**
		Strain - Top of the Selected Subgrade		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 701 mm	ElsymD	#######	#######	#######		#VALUE!
			ElsymS	#######	#######	#######		#VALUE!
			FenlapK	#######	#######	#######		#VALUE!
			FenlapB	NS	NS	NS		#VALUE!
	1700		FenlapM	#######	#######	#######		#VALUE!
UNOT - LOC	**Infinite**	In-Situ Soil Subgrade Foundation		Test programme: 2		Lab.: UNOT		LOC ***4***
		Char.: **Mr_i= 22 MPa**	**n_i= 0.68**	**=0.45**				**Unit Weight: 22**
		Brown: **A= 17,512**	**B= 0.5781**		**q_f = 0.001**	***p +**	**86**	**Suction: 32**
		Strain - Top of the Subgrade Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 1701 mm	ElsymD	#######	#######	#######		#VALUE!
			ElsymS	#######	#######	#######		#VALUE!
			FenlapK	#######	#######	#######		#VALUE!
			FenlapB	NS	NS	NS		#VALUE!
	2700		FenlapM	#######	#######	#######		#VALUE!
							Minimum Design Loading:	**#VALUE!**

Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!

Mechanistic Pavement Analysis

Pavement Structure - In-Service (IS):

Surface — 100 mm — 100

Asphalt Surface and Base Layer — **Unit Weight: 23**

Mr$_i$= 2,100 MPa **n$_i$= 0.40** — **Suction: 0**

Peak Deflection on the Surface

	ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
δ_p (mm)=	0.506	0.559	0.278	NS	0.378

Strain - Bottom of the Base Layer — Depth= 99 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	41	64	-110		1.563E+09
ElsymS	87	87	-203		4.045E+08
FenlapK	47	47	-155		5.809E+09
FenlapB	NS	NS	NS		
FenlapM	222	222	-362		6.653E+06

LRSB - CCD — 300 mm — 400

Unbound Granular Base — Test programme: 3 — Lab.: LRSB — CCD ***9***

Char.: **Mr$_i$= 1,014 MPa** **n$_i$= 0.46** — **Unit Weight: 24**

k q: **k$_1$= 889,858** **k$_2$= 0.1819** — **Suction: 0**

Boyce: **Ka= 719,935** **Ga= 254,843** **n= 0.5986**

Mayhew: **Ka= 260,388** **Ga= 6,206,351** **n= 0.6404** **m= 0.5919** **b= -0.8257**

Stress - Centre of the Base Layer — Depth= 250 mm

	σ_1 *(kPa)*	σ_2 *(kPa)*	σ_3 *(kPa)*	FOS	ESA
ElsymD	15	-13	-14	28.3	5.460E+85
ElsymS	148	-23	-23	10.8	8.064E+34
FenlapK	82	-199	-201	-0.8	**1.152E+01**
FenlapB	NS	NS	NS	NS	
FenlapM	105	-22	-24	11.8	4.099E+37

DUT - MIG — 300 mm — 700

Unbound Granular Subbase — Test programme: 2 — Lab.: DUT — MIG ***8***

Char.: **Mr$_i$= 198 MPa** **n$_i$= 0.23** — **Unit Weight: 22**

k q: **k$_1$= 1,738** **k$_2$= 0.5555** — **Suction: 0**

Stress - Centre of the Base Layer — Depth= 550 mm

	σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
ElsymD	9	-19	-21	19.4	1.030E+60
ElsymS	18	-15	-15	18.5	2.556E+57
FenlapK	31	2	2	29.3	6.948E+88
FenlapB	NS	NS	NS	NS	
FenlapM	42	1	1	22.6	1.616E+69

LNEC - LOC — 1000 mm — 1700

Selected Soil Subgrade — Test programme: 3 — Lab.: LNEC — LOC ***7***

Char.: **Mr$_i$= 45 MPa** **n$_i$= 0.33** — **Unit Weight: 22**

Loach: **C= 107,125** **D= 1.7216** **q$_f$ = 0.001 *p + 86** — **Suction: 32**

Strain - Top of the Selected Subgrade — Depth= 701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-55	-60	138		2.475E+14
ElsymS	-99	-99	102		8.107E+15
FenlapK	0	0	0		
FenlapB	NS	NS	NS		
FenlapM	0	0	0		

UNOT - LOC — Infinite — 2700

In-Situ Soil Subgrade Foundation — Test programme: 2 — Lab.: UNOT — LOC ***4***

Char.: **Mr$_i$= 22 MPa** **n$_i$= 0.68** **=0.45** — **Unit Weight: 22**

Brown: **A= 17,512** **B= 0.5781** **q$_f$ = 0.001 *p + 86** — **Suction: 32**

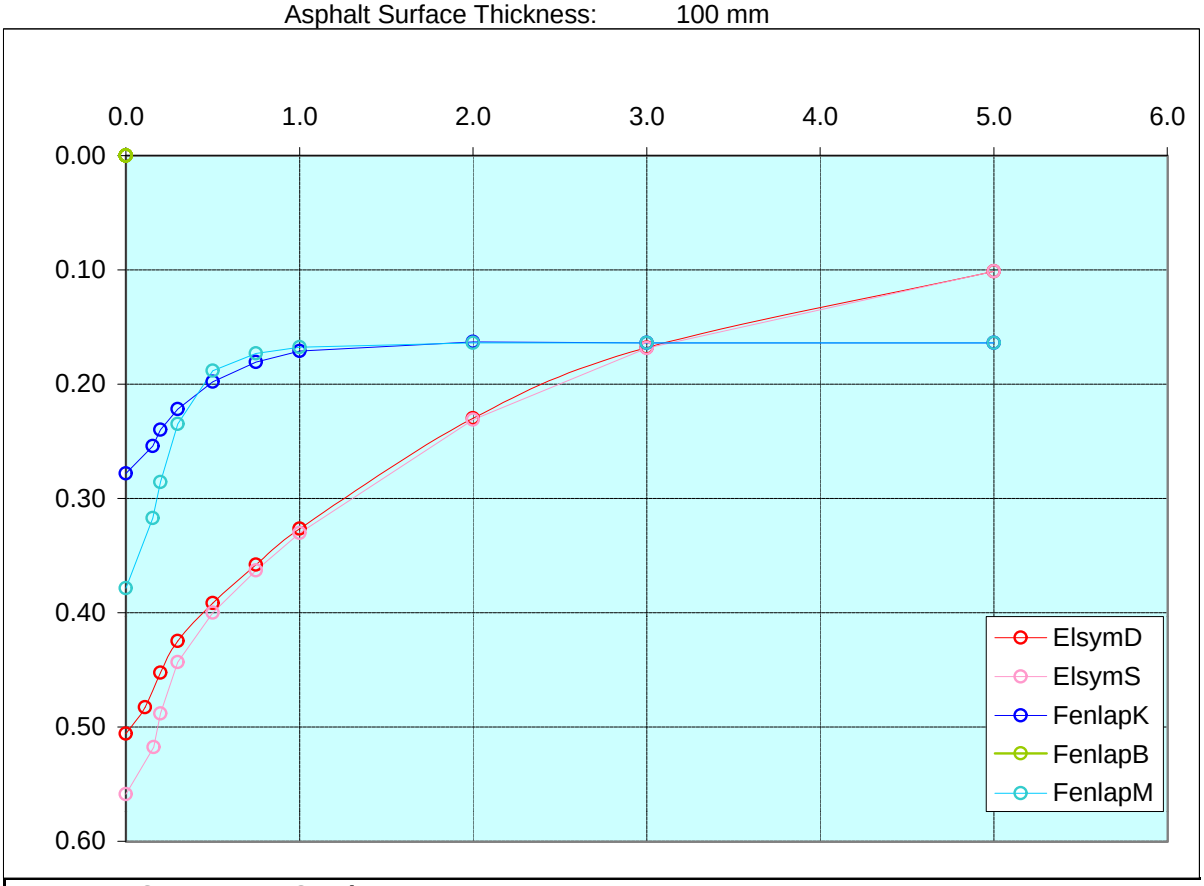
Strain - Top of the Subgrade Layer — Depth= 1701 mm

	ε_x(με)	ε_y(με)	ε_z(με)		ESA
ElsymD	-49	-50	87		4.938E+16
ElsymS	-46	-46	84		7.813E+16
FenlapK	0	0	0		
FenlapB	NS	NS	NS		
FenlapM	0	0	0		

Minimum Design Loading: 1.152E+01

Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.506	0.00	0.559	0.00	0.278	#VALUE!	#VALUE!	0.00	0.378
0.11	0.483	0.16	0.518	0.16	0.254	#VALUE!	#VALUE!	0.16	0.317
0.20	0.453	0.20	0.488	0.20	0.240	#VALUE!	#VALUE!	0.20	0.286
0.30	0.425	0.30	0.443	0.30	0.222	#VALUE!	#VALUE!	0.30	0.235
0.50	0.392	0.50	0.400	0.50	0.198	#VALUE!	#VALUE!	0.50	0.188
0.75	0.358	0.75	0.363	0.75	0.181	#VALUE!	#VALUE!	0.75	0.173
1.00	0.327	1.00	0.330	1.00	0.171	#VALUE!	#VALUE!	1.00	0.168
2.00	0.230	2.00	0.231	2.00	0.163	#VALUE!	#VALUE!	2.00	0.164
3.00	0.168	3.00	0.168	3.00	0.164	#VALUE!	#VALUE!	3.00	0.164
5.00	0.101	5.00	0.101	5.00	0.164	#VALUE!	#VALUE!	5.00	0.164

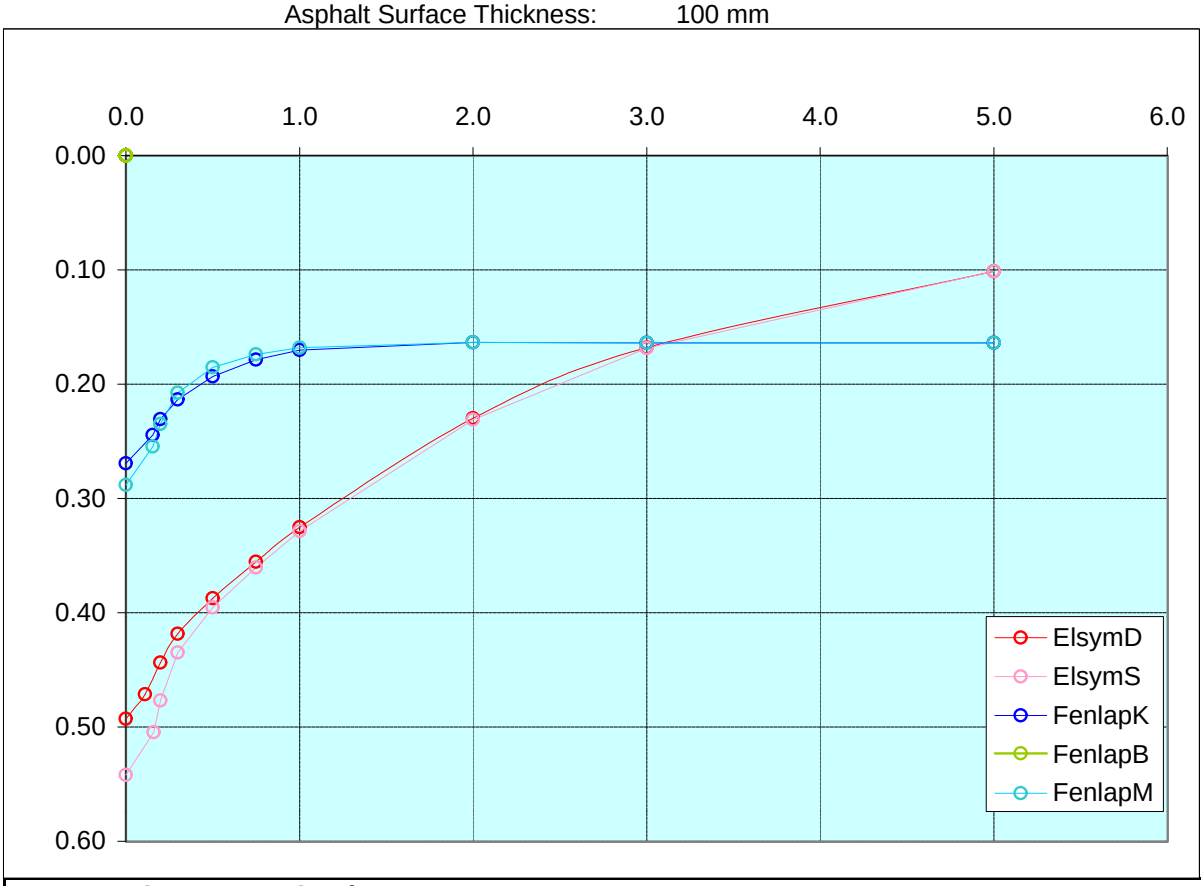
Mechanistic Pavement Analysis

Pavement Structure - In-Service (IS):

Surface	**100 mm**	Asphalt Surface and Base Layer						**Unit Weight: 23**
		Mr_i= 2,100 MPa	**n_i= 0.40**					**Suction: 0**
		Peak Deflection on the Surface		ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
			δ_p (mm)=	0.493	0.542	0.269	NS	0.288
		Strain - Bottom of the Base Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 99 mm	ElsymD	35	54	-95		3.290E+09
			ElsymS	68	68	-180		1.194E+09
			FenlapK	49	49	-157		5.206E+09
			FenlapB	NS	NS	NS		
	100		FenlapM	72	72	-197		**9.516E+08**
LRSB - CCD	**300 mm**	Unbound Granular Base		Test programme: 3		Lab.: LRSB		CCD ***9***
		Char.: **Mr_i= 1,205 MPa**	**n_i= 0.44**					**Unit Weight: 24**
		k q: **k_1= 1,023,802**	**k_2= 0.1753**					**Suction: 0**
		Boyce: **Ka= 403,969**	**Ga= 363,174**	**n= 0.6483**				
		Mayhew: **Ka= 251,656**	**Ga= 5,991,392**	**n= 0.5844**		**m= 1.2010**		**b= -0.2364**
		Stress - Centre of the Base Layer		σ_1 *(kPa)*	σ_2 *(kPa)*	σ_3 *(kPa)*	FOS	ESA
		Depth= 250 mm	ElsymD	14	-12	-14	30.0	5.557E+90
			ElsymS	147	-28	-28	10.3	2.125E+33
			FenlapK	125	-44	-46	8.7	7.016E+28
			FenlapB	NS	NS	NS	NS	
	400		FenlapM	37	-21	-26	16.1	1.694E+50
DUT - MIG	**300 mm**	Unbound Granular Subbase		Test programme: 2		Lab.: DUT		MIG ***8***
		Char.: **Mr_i= 198 MPa**	**n_i= 0.23**					**Unit Weight: 22**
		k q: **k_1= 1,738**	**k_2= 0.5555**					**Suction: 0**
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
		Depth= 550 mm	ElsymD	8	-18	-20	20.6	3.465E+63
			ElsymS	17	-15	-15	19.8	1.203E+61
			FenlapK	32	2	2	28.2	4.346E+85
			FenlapB	NS	NS	NS	NS	
	700		FenlapM	38	2	2	24.7	3.146E+75
LNEC - LOC	**1000 mm**	Selected Soil Subgrade		Test programme: 3		Lab.: LNEC		LOC ***7***
		Char.: **Mr_i= 45 MPa**	**n_i= 0.33**					**Unit Weight: 22**
		Loach: **C= 107,125**	**D= 1.7216**		**q_f =**	**0.001**	***p +**	**86** **Suction: 32**
		Strain - Top of the Selected Subgrade		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 701 mm	ElsymD	-53	-58	133		3.747E+14
			ElsymS	-93	-93	96		1.625E+16
			FenlapK	0	0	0		
			FenlapB	NS	NS	NS		
	1700		FenlapM	0	0	0		
UNOT - LOC	**Infinite**	In-Situ Soil Subgrade Foundation		Test programme: 2		Lab.: UNOT		LOC ***4***
		Char.: **Mr_i= 22 MPa**	**n_i= 0.68**	**=0.45**				**Unit Weight: 22**
		Brown: **A= 17,512**	**B= 0.5781**		**q_f =**	**0.001**	***p +**	**86** **Suction: 32**
		Strain - Top of the Subgrade Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 1701 mm	ElsymD	-48	-49	86		5.949E+16
			ElsymS	-45	-45	82		9.577E+16
			FenlapK	0	0	0		
			FenlapB	NS	NS	NS		
	2700		FenlapM	0	0	0		
							Minimum Design Loading:	**9.516E+08**

Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.493	0.00	0.542	0.00	0.269	#VALUE!	#VALUE!	0.00	0.288
0.11	0.471	0.16	0.505	0.16	0.245	#VALUE!	#VALUE!	0.16	0.255
0.20	0.444	0.20	0.477	0.20	0.231	#VALUE!	#VALUE!	0.20	0.235
0.30	0.418	0.30	0.435	0.30	0.213	#VALUE!	#VALUE!	0.30	0.208
0.50	0.388	0.50	0.395	0.50	0.193	#VALUE!	#VALUE!	0.50	0.185
0.75	0.356	0.75	0.360	0.75	0.179	#VALUE!	#VALUE!	0.75	0.174
1.00	0.325	1.00	0.329	1.00	0.170	#VALUE!	#VALUE!	1.00	0.168
2.00	0.230	2.00	0.231	2.00	0.163	#VALUE!	#VALUE!	2.00	0.164
3.00	0.168	3.00	0.169	3.00	0.164	#VALUE!	#VALUE!	3.00	0.164
5.00	0.101	5.00	0.101	5.00	0.164	#VALUE!	#VALUE!	5.00	0.164

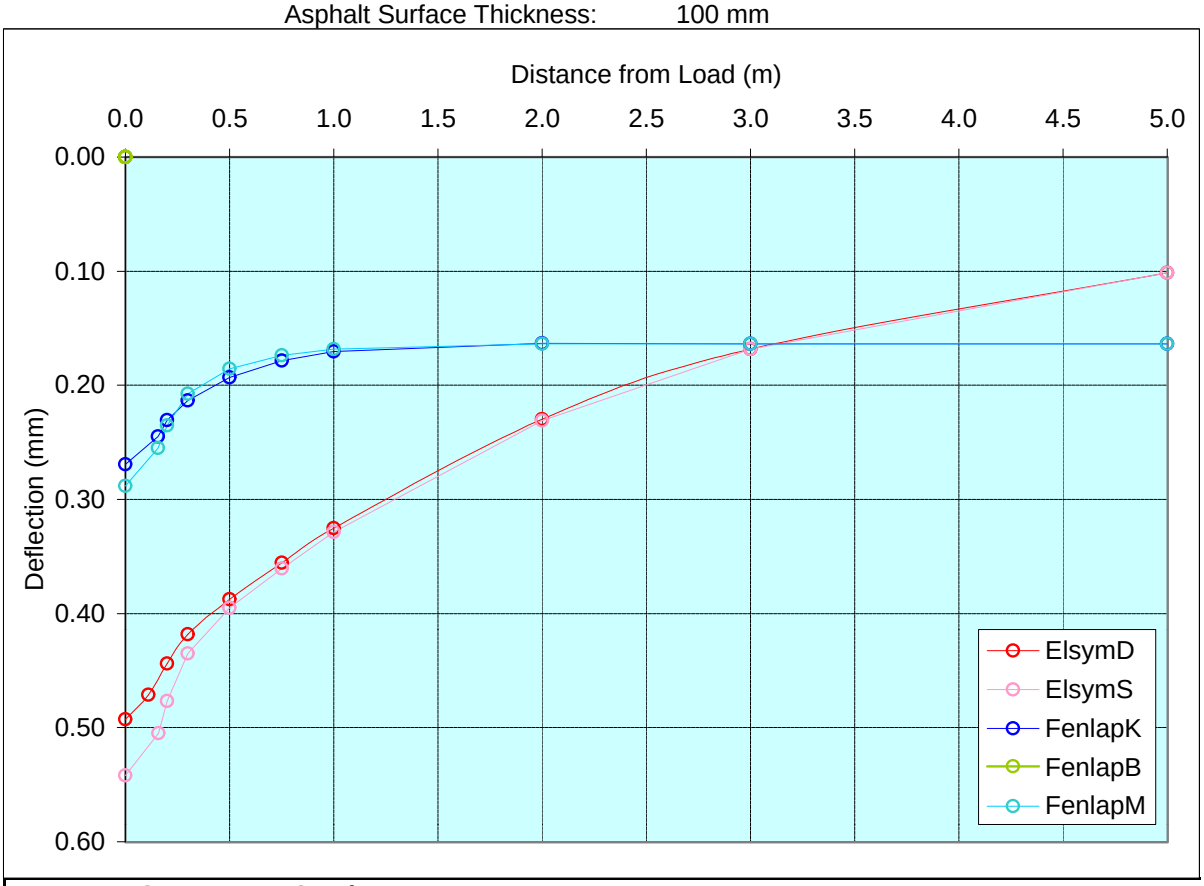
Mechanistic Pavement Analysis

Pavement Structure - In-Service (IS):

Surface	**100 mm**	Asphalt Surface and Base Layer						**Unit Weight: 23**
		Mr_i= 2,100 MPa	**n_i= 0.40**					**Suction: 0**
		Peak Deflection on the Surface		ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
			δ_p (mm)=	0.493	0.542	0.269	NS	0.288
		Strain - Bottom of the Base Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 99 mm	ElsymD	35	54	-95		3.290E+09
			ElsymS	68	68	-180		1.194E+09
			FenlapK	49	49	-157		5.206E+09
			FenlapB	NS	NS	NS		
	100		FenlapM	72	72	-197		**9.516E+08**
LRSB - CCD	**300 mm**	Unbound Granular Base		Test programme: 3		Lab.: LRSB		CCD ***9***
		Char.: **Mr_i= 1,014 MPa**	**n_i= 0.46**					**Unit Weight: 24**
		k q: **k_1= 889,858**	**k_2= 0.1819**					**Suction: 0**
		Boyce: **Ka= 719,935**	**Ga= 254,843**		**n= 0.5986**			
		Mayhew: **Ka= 260,388**	**Ga= 6,206,351**		**n= 0.6404**		**m= 0.5919**	**b= -0.8257**
		Stress - Centre of the Base Layer		σ_1 *(kPa)*	σ_2 *(kPa)*	σ_3 *(kPa)*	FOS	ESA
		Depth= 250 mm	ElsymD	14	-12	-14	30.0	5.557E+90
			ElsymS	147	-28	-28	10.3	2.125E+33
			FenlapK	125	-44	-46	8.7	7.016E+28
			FenlapB	NS	NS	NS	NS	
	400		FenlapM	37	-21	-26	16.1	1.694E+50
DUT - MIG	**300 mm**	Unbound Granular Subbase		Test programme: 2		Lab.: DUT		MIG ***8***
		Char.: **Mr_i= 198 MPa**	**n_i= 0.23**					**Unit Weight: 22**
		k q: **k_1= 1,738**	**k_2= 0.5555**					**Suction: 0**
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
		Depth= 550 mm	ElsymD	8	-18	-20	20.6	3.465E+63
			ElsymS	17	-15	-15	19.8	1.203E+61
			FenlapK	32	2	2	28.2	4.346E+85
			FenlapB	NS	NS	NS	NS	
	700		FenlapM	38	2	2	24.7	3.146E+75
LNEC - LOC	**1000 mm**	Selected Soil Subgrade		Test programme: 3		Lab.: LNEC		LOC ***7***
		Char.: **Mr_i= 45 MPa**	**n_i= 0.33**					**Unit Weight: 22**
		Loach: **C= 107,125**	**D= 1.7216**		**q_f = 0.001**	***p +**	**86**	**Suction: 32**
		Strain - Top of the Selected Subgrade		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 701 mm	ElsymD	-53	-58	133		3.747E+14
			ElsymS	-93	-93	96		1.625E+16
			FenlapK	0	0	0		
			FenlapB	NS	NS	NS		
	1700		FenlapM	0	0	0		
UNOT - LOC	**Infinite**	In-Situ Soil Subgrade Foundation		Test programme: 2		Lab.: UNOT		LOC ***4***
		Char.: **Mr_i= 22 MPa**	**n_i= 0.68**	**=0.45**				**Unit Weight: 22**
		Brown: **A= 17,512**	**B= 0.5781**		**q_f = 0.001**	***p +**	**86**	**Suction: 32**
		Strain - Top of the Subgrade Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 1701 mm	ElsymD	-48	-49	86		5.949E+16
			ElsymS	-45	-45	82		9.577E+16
			FenlapK	0	0	0		
			FenlapB	NS	NS	NS		
	2700		FenlapM	0	0	0		
							Minimum Design Loading:	**9.516E+08**

Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.493	0.00	0.542	0.00	0.269	#VALUE!	#VALUE!	0.00	0.288
0.11	0.471	0.16	0.505	0.16	0.245	#VALUE!	#VALUE!	0.16	0.255
0.20	0.444	0.20	0.477	0.20	0.231	#VALUE!	#VALUE!	0.20	0.235
0.30	0.418	0.30	0.435	0.30	0.213	#VALUE!	#VALUE!	0.30	0.208
0.50	0.388	0.50	0.395	0.50	0.193	#VALUE!	#VALUE!	0.50	0.185
0.75	0.356	0.75	0.360	0.75	0.179	#VALUE!	#VALUE!	0.75	0.174
1.00	0.325	1.00	0.329	1.00	0.170	#VALUE!	#VALUE!	1.00	0.168
2.00	0.230	2.00	0.231	2.00	0.163	#VALUE!	#VALUE!	2.00	0.164
3.00	0.168	3.00	0.169	3.00	0.164	#VALUE!	#VALUE!	3.00	0.164
5.00	0.101	5.00	0.101	5.00	0.164	#VALUE!	#VALUE!	5.00	0.164

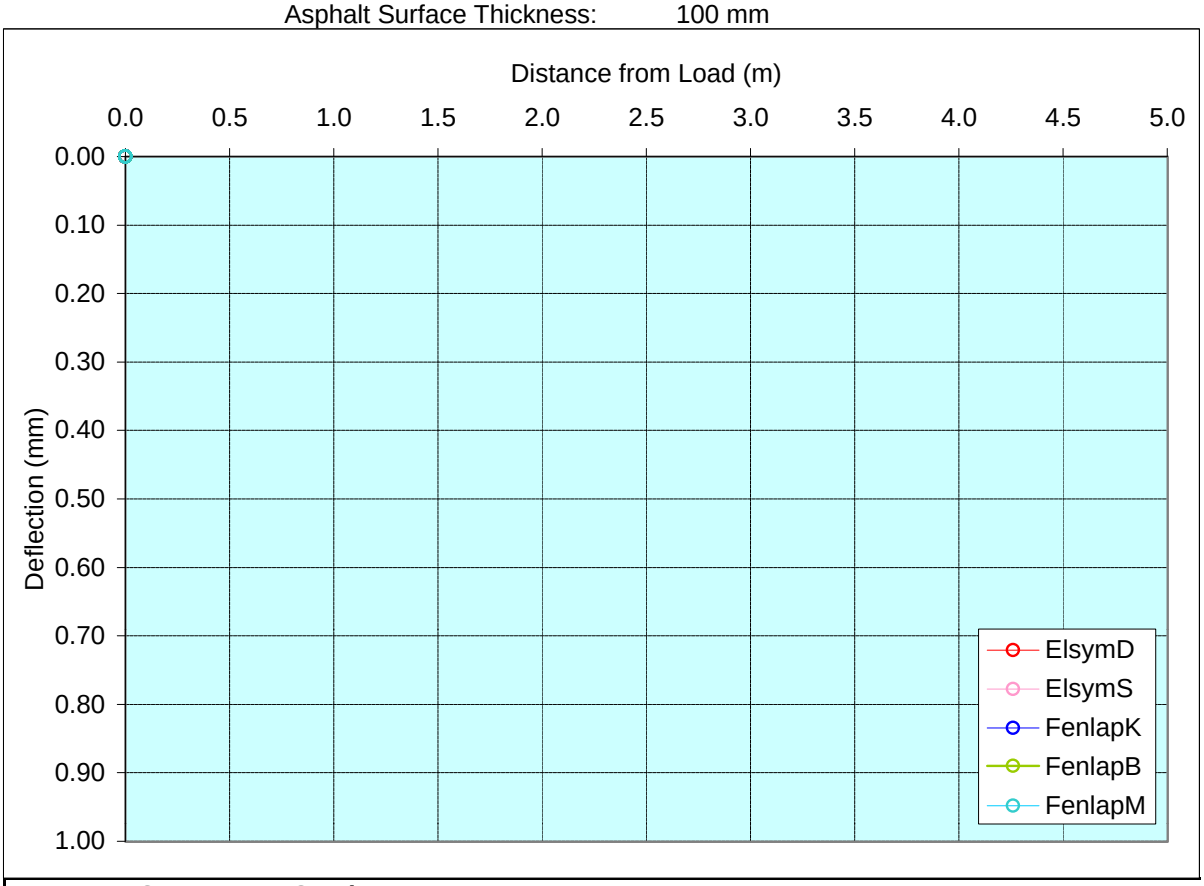
Mechanistic Pavement Analysis

Pavement Structure - In-Service (IS):

Surface	**100 mm**	Asphalt Surface and Base Layer						**Unit Weight: 23**
		Mr_i= 2,100 MPa	**n_i= 0.40**					**Suction: 0**
		Peak Deflection on the Surface		ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
			δ_p (mm)=	#######	#######	#######	NS	#######
		Strain - Bottom of the Base Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 99 mm	ElsymD	#######	#######	#######		#VALUE!
			ElsymS	#######	#######	#######		#VALUE!
			FenlapK	#######	#######	#######		#VALUE!
			FenlapB	NS	NS	NS		#NUM!
	100		FenlapM	#######	#######	#######		#VALUE!
LRSB - CCD	**300 mm**	Unbound Granular Base		Test programme: 3		Lab.: LRSB		CCD ***9***
		Char.: **Mr_i= 1,014 MPa**	**n_i= 0.46**					**Unit Weight: 24**
		k q: **k_1= 889,858**	**k_2= 0.1819**					**Suction: 0**
		Boyce: **Ka= 719,935**	**Ga= 254,843**		**n= 0.5986**			
		Mayhew: **Ka= 260,388**	**Ga= 6,206,351**		**n= 0.6404**		**m= 0.5919**	**b= -0.8257**
		Stress - Centre of the Base Layer		σ_1 *(kPa)*	σ_2 *(kPa)*	σ_3 *(kPa)*	FOS	ESA
		Depth= 250 mm	ElsymD	#######	#######	#######	#######	#VALUE!
			ElsymS	#######	#######	#######	#######	#VALUE!
			FenlapK	#######	#######	#######	#######	#VALUE!
			FenlapB	NS	NS	NS	NS	#VALUE!
	400		FenlapM	#######	#######	#######	#######	#VALUE!
DUT - MIG	**300 mm**	Unbound Granular Subbase		Test programme: 2		Lab.: DUT		MIG ***8***
		Char.: **Mr_i= 198 MPa**	**n_i= 0.23**					**Unit Weight: 22**
		k q: **k_1= 1,738**	**k_2= 0.5555**					**Suction: 0**
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
		Depth= 550 mm	ElsymD	#######	#######	#######	#######	#VALUE!
			ElsymS	#######	#######	#######	#######	#VALUE!
			FenlapK	#######	#######	#######	#######	#VALUE!
			FenlapB	NS	NS	NS	NS	#VALUE!
	700		FenlapM	#######	#######	#######	#######	#VALUE!
LNEC - LOC	**1000 mm**	Selected Soil Subgrade		Test programme: 3		Lab.: LNEC		LOC ***7***
		Char.: **Mr_i= 45 MPa**	**n_i= 0.33**					**Unit Weight: 22**
		Loach: **C= 107,386**	**D= 1.7253**		**q_f = 0.001**	***p +**	**86**	**Suction: 32**
		Strain - Top of the Selected Subgrade		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 701 mm	ElsymD	#######	#######	#######		#VALUE!
			ElsymS	#######	#######	#######		#VALUE!
			FenlapK	#######	#######	#######		#VALUE!
			FenlapB	NS	NS	NS		#VALUE!
	1700		FenlapM	#######	#######	#######		#VALUE!
UNOT - LOC	**Infinite**	In-Situ Soil Subgrade Foundation		Test programme: 2		Lab.: UNOT		LOC ***4***
		Char.: **Mr_i= 22 MPa**	**n_i= 0.68**	**=0.45**				**Unit Weight: 22**
		Brown: **A= 17,512**	**B= 0.5781**		**q_f = 0.001**	***p +**	**86**	**Suction: 32**
		Strain - Top of the Subgrade Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 1701 mm	ElsymD	#######	#######	#######		#VALUE!
			ElsymS	#######	#######	#######		#VALUE!
			FenlapK	#######	#######	#######		#VALUE!
			FenlapB	NS	NS	NS		#VALUE!
	2700		FenlapM	#######	#######	#######		#VALUE!
							Minimum Design Loading:	**#VALUE!**

Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!

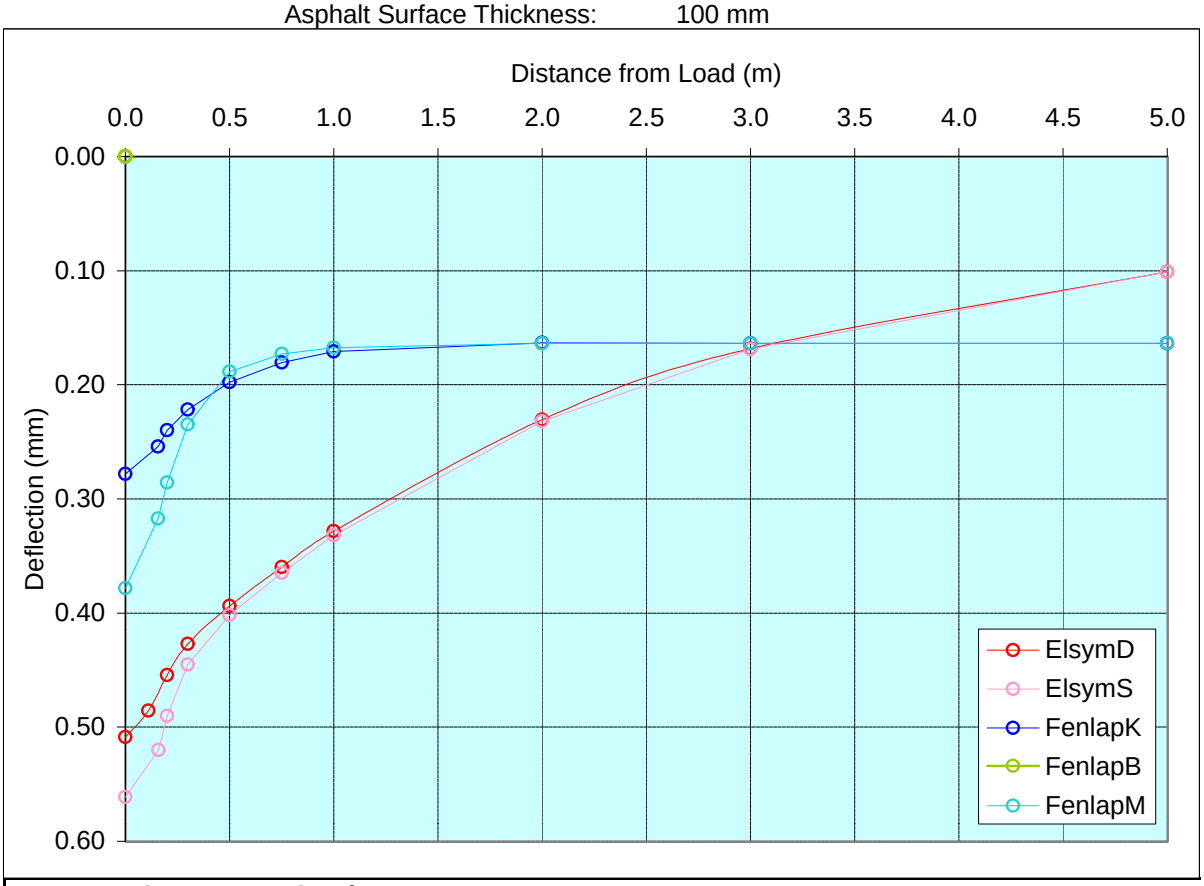
Mechanistic Pavement Analysis

Pavement Structure - In-Service (IS):

Surface	**100 mm**	Asphalt Surface and Base Layer						**Unit Weight: 23**
		Mr_i= 2,100 MPa	**n_i= 0.40**					**Suction: 0**
		Peak Deflection on the Surface		ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
			δ_p (mm)=	0.509	0.561	0.278	NS	0.378
		Strain - Bottom of the Base Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 99 mm	ElsymD	41	64	-110		1.557E+09
			ElsymS	87	87	-203		4.078E+08
			FenlapK	47	47	-155		5.809E+09
			FenlapB	NS	NS	NS		
	100		FenlapM	222	222	-362		6.653E+06
LRSB - CCD	**300 mm**	Unbound Granular Base	Test programme: 3			Lab.: LRSB		CCD ***9***
		Char.: **Mr_i= 1,014 MPa**	**n_i= 0.46**					**Unit Weight: 24**
		k q: **k_1= 889,858**	**k_2= 0.1819**					**Suction: 0**
		Boyce: **Ka= 719,935**	**Ga= 254,843**		**n= 0.5986**			
		Mayhew: **Ka= 260,388**	**Ga= 6,206,351**		**n= 0.6404**		**m= 0.5919**	**b= -0.8257**
		Stress - Centre of the Base Layer		σ_1 *(kPa)*	σ_2 *(kPa)*	σ_3 *(kPa)*	FOS	ESA
		Depth= 250 mm	ElsymD	15	-13	-15	28.2	2.806E+85
			ElsymS	148	-24	-24	10.8	6.980E+34
			FenlapK	82	-199	-201	-0.8	**1.152E+01**
			FenlapB	NS	NS	NS	NS	
	400		FenlapM	105	-22	-24	11.8	4.099E+37
DUT - MIG	**300 mm**	Unbound Granular Subbase	Test programme: 2			Lab.: DUT		MIG ***8***
		Char.: **Mr_i= 198 MPa**	**n_i= 0.23**					**Unit Weight: 22**
		k q: **k_1= 1,738**	**k_2= 0.5555**					**Suction: 0**
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
		Depth= 550 mm	ElsymD	9	-19	-21	19.3	3.216E+59
			ElsymS	18	-16	-16	18.5	1.774E+57
			FenlapK	31	2	2	29.3	6.948E+88
			FenlapB	NS	NS	NS	NS	
	700		FenlapM	42	1	1	22.6	1.616E+69
LNEC - LOC	**1000 mm**	Selected Soil Subgrade	Test programme: 3			Lab.: LNEC		LOC ***7***
		Char.: **Mr_i= 44 MPa**	**n_i= 0.33**					**Unit Weight: 22**
		Loach: **C= 106,109**	**D= 1.7127**		**q_f = 0.001**	***p +**	**86**	**Suction: 32**
		Strain - Top of the Selected Subgrade		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 701 mm	ElsymD	-56	-60	140		2.116E+14
			ElsymS	-100	-100	102		8.199E+15
			FenlapK	0	0	0		
			FenlapB	NS	NS	NS		
	1700		FenlapM	0	0	0		
UNOT - LOC	**Infinite**	In-Situ Soil Subgrade Foundation	Test programme: 2			Lab.: UNOT		LOC ***4***
		Char.: **Mr_i= 22 MPa**	**n_i= 0.68**	**=0.45**				**Unit Weight: 22**
		Brown: **A= 17,512**	**B= 0.5781**		**q_f = 0.001**	***p +**	**86**	**Suction: 32**
		Strain - Top of the Subgrade Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 1701 mm	ElsymD	-49	-50	88		4.287E+16
			ElsymS	-46	-46	84		6.900E+16
			FenlapK	0	0	0		
			FenlapB	NS	NS	NS		
	2700		FenlapM	0	0	0		
							Minimum Design Loading:	**1.152E+01**

Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.509	0.00	0.561	0.00	0.278	#VALUE!	#VALUE!	0.00	0.378
0.11	0.486	0.16	0.520	0.16	0.254	#VALUE!	#VALUE!	0.16	0.317
0.20	0.455	0.20	0.490	0.20	0.240	#VALUE!	#VALUE!	0.20	0.286
0.30	0.427	0.30	0.445	0.30	0.222	#VALUE!	#VALUE!	0.30	0.235
0.50	0.394	0.50	0.402	0.50	0.198	#VALUE!	#VALUE!	0.50	0.188
0.75	0.360	0.75	0.365	0.75	0.181	#VALUE!	#VALUE!	0.75	0.173
1.00	0.328	1.00	0.332	1.00	0.171	#VALUE!	#VALUE!	1.00	0.168
2.00	0.231	2.00	0.232	2.00	0.163	#VALUE!	#VALUE!	2.00	0.164
3.00	0.168	3.00	0.169	3.00	0.164	#VALUE!	#VALUE!	3.00	0.164
5.00	0.101	5.00	0.101	5.00	0.164	#VALUE!	#VALUE!	5.00	0.164

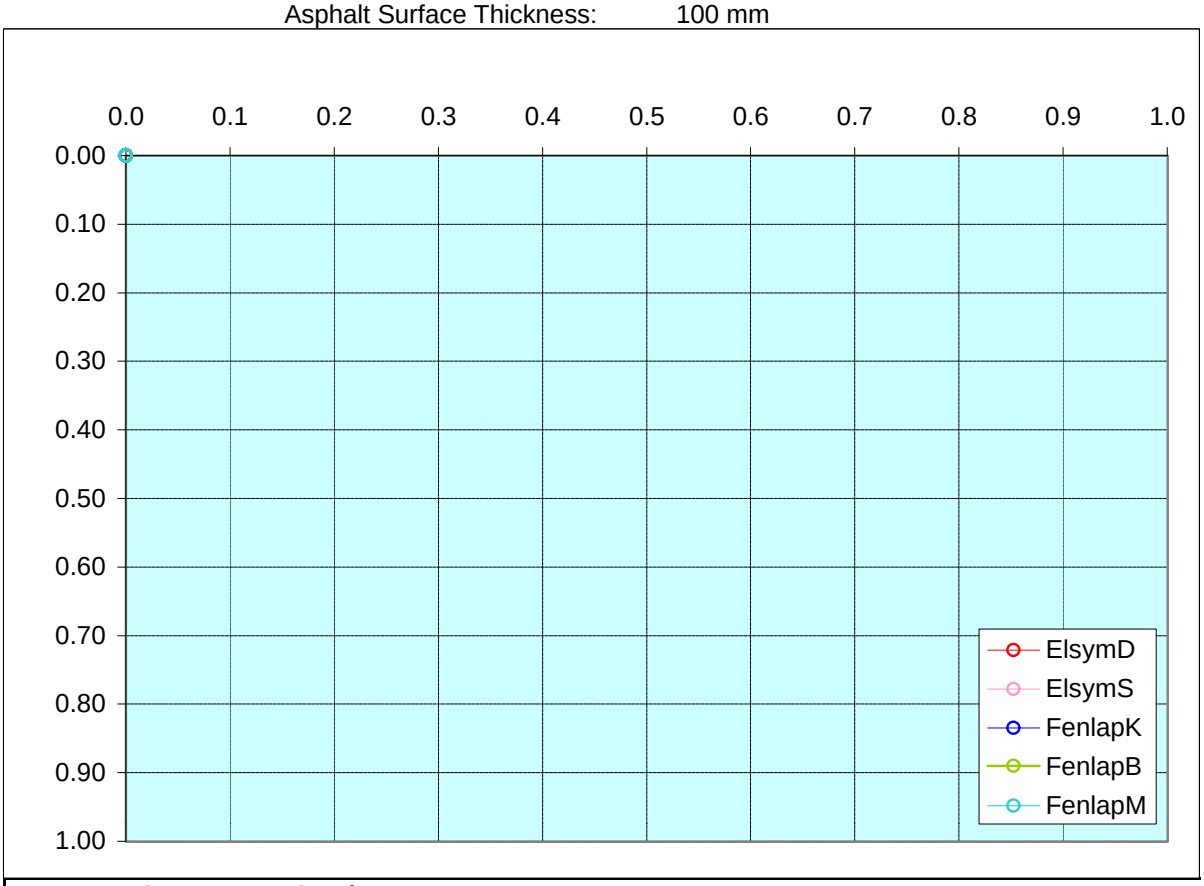
Mechanistic Pavement Analysis

Pavement Structure - In-Service (IS):

Surface	**100 mm**	Asphalt Surface and Base Layer						**Unit Weight: 23**
		Mr_i= 2,100 MPa	**n_i= 0.40**					**Suction: 0**
		Peak Deflection on the Surface		ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
			δ_p (mm)=	#######	#######	#######	NS	#######
		Strain - Bottom of the Base Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 99 mm	ElsymD	#######	#######	#######		#VALUE!
			ElsymS	#######	#######	#######		#VALUE!
			FenlapK	#######	#######	#######		#VALUE!
			FenlapB	NS	NS	NS		#NUM!
	100		FenlapM	#######	#######	#######		#VALUE!
LRSB - CCD	**300 mm**	Unbound Granular Base		Test programme: 3		Lab.: LRSB		CCD ***9***
		Char.: **Mr_i= 1,014 MPa**	**n_i= 0.46**					**Unit Weight: 24**
		k q: **k_1= 889,858**	**k_2= 0.1819**					**Suction: 0**
		Boyce: **Ka= 719,935**	**Ga= 254,843**		**n= 0.5986**			
		Mayhew: **Ka= 260,388**	**Ga= 6,206,351**		**n= 0.6404**		**m= 0.5919**	**b= -0.8257**
		Stress - Centre of the Base Layer		σ_1 *(kPa)*	σ_2 *(kPa)*	σ_3 *(kPa)*	FOS	ESA
		Depth= 250 mm	ElsymD	#######	#######	#######	#######	#VALUE!
			ElsymS	#######	#######	#######	#######	#VALUE!
			FenlapK	#######	#######	#######	#######	#VALUE!
			FenlapB	NS	NS	NS	NS	#VALUE!
	400		FenlapM	#######	#######	#######	#######	#VALUE!
DUT - MIG	**300 mm**	Unbound Granular Subbase		Test programme: 2		Lab.: DUT		MIG ***8***
		Char.: **Mr_i= 198 MPa**	**n_i= 0.23**					**Unit Weight: 22**
		k q: **k_1= 1,738**	**k_2= 0.5555**					**Suction: 0**
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
		Depth= 550 mm	ElsymD	#######	#######	#######	#######	#VALUE!
			ElsymS	#######	#######	#######	#######	#VALUE!
			FenlapK	#######	#######	#######	#######	#VALUE!
			FenlapB	NS	NS	NS	NS	#VALUE!
	700		FenlapM	#######	#######	#######	#######	#VALUE!
LNEC - LOC	**1000 mm**	Selected Soil Subgrade		Test programme: 3		Lab.: LNEC		LOC ***7***
		Char.: **Mr_i= 45 MPa**	**n_i= 0.33**					**Unit Weight: 22**
		Loach: **C= 109,034**	**D= 1.7209**		**q_f = 0.001**	***p +**	**86**	**Suction: 32**
		Strain - Top of the Selected Subgrade		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 701 mm	ElsymD	#######	#######	#######		#VALUE!
			ElsymS	#######	#######	#######		#VALUE!
			FenlapK	#######	#######	#######		#VALUE!
			FenlapB	NS	NS	NS		#VALUE!
	1700		FenlapM	#######	#######	#######		#VALUE!
UNOT - LOC	**Infinite**	In-Situ Soil Subgrade Foundation		Test programme: 2		Lab.: UNOT		LOC ***4***
		Char.: **Mr_i= 22 MPa**	**n_i= 0.68**	**=0.45**				**Unit Weight: 22**
		Brown: **A= 17,512**	**B= 0.5781**		**q_f = 0.001**	***p +**	**86**	**Suction: 32**
		Strain - Top of the Subgrade Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 1701 mm	ElsymD	#######	#######	#######		#VALUE!
			ElsymS	#######	#######	#######		#VALUE!
			FenlapK	#######	#######	#######		#VALUE!
			FenlapB	NS	NS	NS		#VALUE!
	2700		FenlapM	#######	#######	#######		#VALUE!
							Minimum Design Loading:	**#VALUE!**

Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!

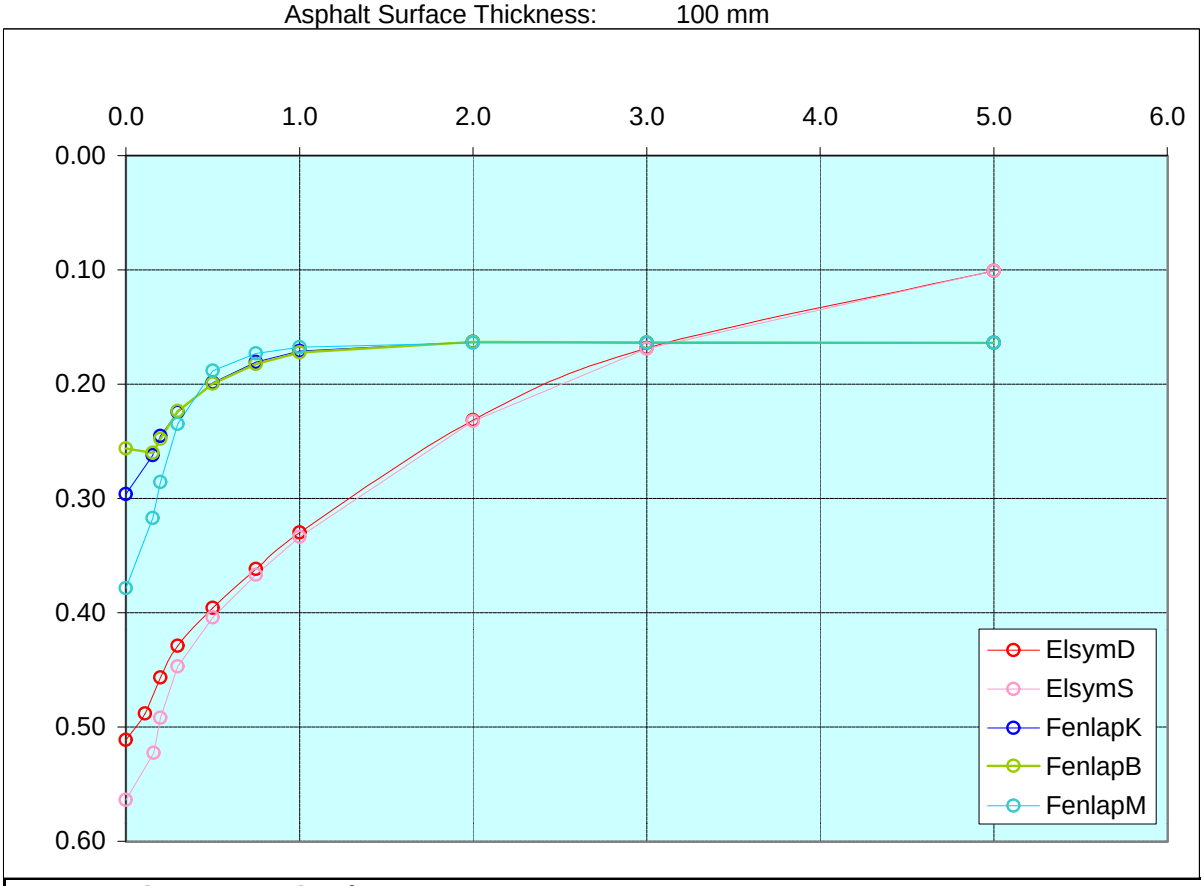
Mechanistic Pavement Analysis

Pavement Structure - In-Service (IS):

Surface	**100 mm**	Asphalt Surface and Base Layer						**Unit Weight: 23**
		Mr_i= 2,100 MPa	**n_i= 0.40**					**Suction: 0**
		Peak Deflection on the Surface		ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
			δ_p (mm)=	0.512	0.564	0.296	0.256	0.378
		Strain - Bottom of the Base Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 99 mm	ElsymD	41	64	-110		1.549E+09
			ElsymS	87	87	-203		4.090E+08
			FenlapK	66	66	-128		1.406E+09
			FenlapB	411	411	-872		**4.465E+05**
	100		FenlapM	222	222	-362		6.653E+06
LRSB - CCD	**300 mm**	Unbound Granular Base	Test programme: 3			Lab.: LRSB		CCD ***9***
		Char.: **Mr_i= 1,014 MPa**	**n_i= 0.46**					**Unit Weight: 24**
		k q: **k_1= 889,858**	**k_2= 0.1819**					**Suction: 0**
		Boyce: **Ka= 719,935**	**Ga= 254,843**		**n= 0.5986**			
		Mayhew: **Ka= 260,388**	**Ga= 6,206,351**		**n= 0.6404**		**m= 0.5919**	**b= -0.8257**
		Stress - Centre of the Base Layer		σ_1 *(kPa)*	σ_2 *(kPa)*	σ_3 *(kPa)*	FOS	ESA
		Depth= 250 mm	ElsymD	15	-13	-15	28.0	1.325E+85
			ElsymS	148	-24	-24	10.8	6.142E+34
			FenlapK	63	-61	-62	6.5	1.597E+22
			FenlapB	1440	794	159	31.0	4.967E+93
	400		FenlapM	105	-22	-24	11.8	4.099E+37
DUT - MIG	**300 mm**	Unbound Granular Subbase	Test programme: 2			Lab.: DUT		MIG ***8***
		Char.: **Mr_i= 198 MPa**	**n_i= 0.23**					**Unit Weight: 22**
		k q: **k_1= 1,738**	**k_2= 0.5555**					**Suction: 0**
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
		Depth= 550 mm	ElsymD	9	-19	-22	19.1	9.562E+58
			ElsymS	18	-16	-16	18.4	1.170E+57
			FenlapK	30	3	3	31.4	7.894E+94
			FenlapB	40	-3	-3	20.3	4.033E+62
	700		FenlapM	42	1	1	22.6	1.616E+69
LNEC - LOC	**1000 mm**	Selected Soil Subgrade	Test programme: 3			Lab.: LNEC		LOC ***7***
		Char.: **Mr_i= 43 MPa**	**n_i= 0.33**					**Unit Weight: 22**
		Loach: **C= 103,241**	**D= 1.5266**		**q_f = 0.001**	***p +**	**86**	**Suction: 32**
		Strain - Top of the Selected Subgrade		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 701 mm	ElsymD	-56	-61	142		1.798E+14
			ElsymS	-101	-101	102		8.107E+15
			FenlapK	0	0	0		
			FenlapB	0	0	0		
	1700		FenlapM	0	0	0		
UNOT - LOC	**Infinite**	In-Situ Soil Subgrade Foundation	Test programme: 2			Lab.: UNOT		LOC ***4***
		Char.: **Mr_i= 22 MPa**	**n_i= 0.68**	**=0.45**				**Unit Weight: 22**
		Brown: **A= 17,512**	**B= 0.5781**		**q_f = 0.001**	***p +**	**86**	**Suction: 32**
		Strain - Top of the Subgrade Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 1701 mm	ElsymD	-49	-51	89		3.708E+16
			ElsymS	-46	-46	85		6.070E+16
			FenlapK	0	0	0		
			FenlapB	0	0	0		
	2700		FenlapM	0	0	0		
							Minimum Design Loading:	**4.465E+05**

Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.512	0.00	0.564	0.00	0.296	0.00	0.256	0.00	0.378
0.11	0.488	0.16	0.523	0.16	0.262	0.16	0.260	0.16	0.317
0.20	0.457	0.20	0.492	0.20	0.245	0.20	0.248	0.20	0.286
0.30	0.429	0.30	0.447	0.30	0.224	0.30	0.224	0.30	0.235
0.50	0.396	0.50	0.404	0.50	0.199	0.50	0.200	0.50	0.188
0.75	0.362	0.75	0.367	0.75	0.181	0.75	0.182	0.75	0.173
1.00	0.330	1.00	0.334	1.00	0.171	1.00	0.172	1.00	0.168
2.00	0.231	2.00	0.233	2.00	0.163	2.00	0.163	2.00	0.164
3.00	0.169	3.00	0.169	3.00	0.164	3.00	0.164	3.00	0.164
5.00	0.101	5.00	0.101	5.00	0.164	5.00	0.164	5.00	0.164

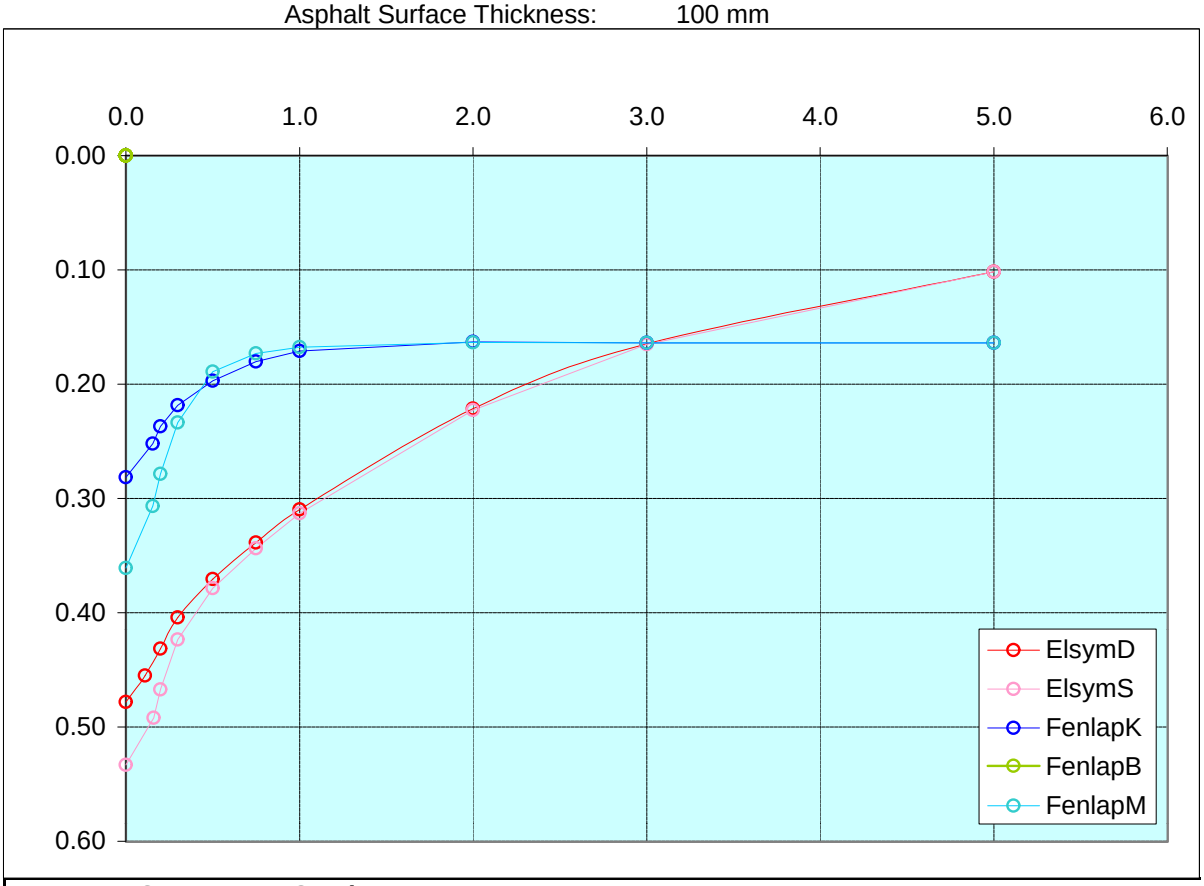
Mechanistic Pavement Analysis

Pavement Structure - In-Service (IS):

Surface	**100 mm**	Asphalt Surface and Base Layer						**Unit Weight: 23**
		Mr_i= 2,100 MPa	**n_i= 0.40**					**Suction: 0**
		Peak Deflection on the Surface		ElsymD	ElsymS	FenlapK	FenlapB	FenlapM
			δ_p (mm)=	0.478	0.533	0.282	NS	0.361
		Strain - Bottom of the Base Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 99 mm	ElsymD	41	63	-109		1.642E+09
			ElsymS	88	88	-204		3.941E+08
			FenlapK	75	75	-176		7.855E+08
			FenlapB	NS	NS	NS		
	100		FenlapM	184	184	-315		**1.516E+07**
LRSB - CCD	**300 mm**	Unbound Granular Base	Test programme: 3			Lab.: LRSB		CCD ***9***
		Char.: **Mr_i= 1,014 MPa**	**n_i= 0.46**					**Unit Weight: 24**
		k q: **k_1= 889,858**	**k_2= 0.1819**					**Suction: 0**
		Boyce: **Ka= 719,935**	**Ga= 254,843**		**n= 0.5986**			
		Mayhew: **Ka= 260,388**	**Ga= 6,206,351**		**n= 0.6404**		**m= 0.5919**	**b= -0.8257**
		Stress - Centre of the Base Layer		σ_1 *(kPa)*	σ_2 *(kPa)*	σ_3 *(kPa)*	FOS	ESA
		Depth= 250 mm	ElsymD	17	-12	-13	29.4	8.711E+88
			ElsymS	149	-22	-22	11.0	3.213E+35
			FenlapK	73	-49	-50	8.1	1.052E+27
			FenlapB	NS	NS	NS	NS	
	400		FenlapM	108	-27	-27	11.0	1.995E+35
DUT - MIG	**300 mm**	Unbound Granular Subbase	Test programme: 2			Lab.: DUT		MIG ***8***
		Char.: **Mr_i= 198 MPa**	**n_i= 0.23**					**Unit Weight: 22**
		k q: **k_1= 1,738**	**k_2= 0.5555**					**Suction: 0**
		Stress - Centre of the Base Layer		σ_1(kPa)	σ_2(kPa)	σ_3(kPa)	FOS	ESA
		Depth= 550 mm	ElsymD	10	-16	-18	21.4	4.789E+65
			ElsymS	20	-14	-14	19.2	1.831E+59
			FenlapK	30	2	2	29.5	2.852E+89
			FenlapB	NS	NS	NS	NS	
	700		FenlapM	42	1	1	22.1	6.742E+67
LNEC - LOC	**1000 mm**	Selected Soil Subgrade	Test programme: 3			Lab.: LNEC		LOC ***7***
		Char.: **Mr_i= 57 MPa**	**n_i= 0.33**					**Unit Weight: 22**
		Loach: **C= 129,789**	**D= 1.9736**		**q_f = 0.001**	***p +**	**86**	**Suction: 32**
		Strain - Top of the Selected Subgrade		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 701 mm	ElsymD	-50	-54	119		1.302E+15
			ElsymS	-91	-91	102		8.386E+15
			FenlapK	0	0	0		
			FenlapB	NS	NS	NS		
	1700		FenlapM	0	0	0		
UNOT - LOC	**Infinite**	In-Situ Soil Subgrade Foundation	Test programme: 2			Lab.: UNOT		LOC ***4***
		Char.: **Mr_i= 22 MPa**	**n_i= 0.68**	**=0.45**				**Unit Weight: 22**
		Brown: **A= 17,512**	**B= 0.5781**		**q_f = 0.001**	***p +**	**86**	**Suction: 32**
		Strain - Top of the Subgrade Layer		$\varepsilon_x(\mu\varepsilon)$	$\varepsilon_y(\mu\varepsilon)$	$\varepsilon_z(\mu\varepsilon)$		ESA
		Depth= 1701 mm	ElsymD	-48	-49	76		2.157E+17
			ElsymS	-46	-46	75		2.826E+17
			FenlapK	0	0	0		
			FenlapB	NS	NS	NS		
	2700		FenlapM	0	0	0		
							Minimum Design Loading:	**1.516E+07**

Deflection Bowl Comparison **Pavement Structure In-Service**

Asphalt Surface Thickness: 100 mm



Pavement Structure In-Service

Asphalt: 100 mm

ElsymD		ElsymS		FenlapK		FenlapB		FenlapM	
x	y	x	y	x	y	x	y	x	y
0.00	0.478	0.00	0.533	0.00	0.282	#VALUE!	#VALUE!	0.00	0.361
0.11	0.455	0.16	0.492	0.16	0.252	#VALUE!	#VALUE!	0.16	0.307
0.20	0.432	0.20	0.467	0.20	0.237	#VALUE!	#VALUE!	0.20	0.279
0.30	0.404	0.30	0.423	0.30	0.219	#VALUE!	#VALUE!	0.30	0.234
0.50	0.371	0.50	0.379	0.50	0.197	#VALUE!	#VALUE!	0.50	0.189
0.75	0.339	0.75	0.344	0.75	0.180	#VALUE!	#VALUE!	0.75	0.173
1.00	0.310	1.00	0.313	1.00	0.171	#VALUE!	#VALUE!	1.00	0.168
2.00	0.221	2.00	0.223	2.00	0.163	#VALUE!	#VALUE!	2.00	0.164
3.00	0.165	3.00	0.165	3.00	0.164	#VALUE!	#VALUE!	3.00	0.164
5.00	0.102	5.00	0.102	5.00	0.164	#VALUE!	#VALUE!	5.00	0.164

Appendix H.2 PAVEMENT LIFE ESTIMATIONS

Comparison of Pavement Life (ESA) due to different Data from Different Laboratories

Pavement life as a function of the Variation in the Base Characteristics

Base Mr_i = *198 MPa* n_i = *0.23* ***MIG - DUT***

Surface Details		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
50 mm	2100 MPa	1.58E+06	1.09E+46	1.68E+59	4.46E+14	2.79E+18	ELSYM-D	1.58E+06
		2.67E+06	4.64E+36	1.02E+48	3.35E+13	2.21E+18	ELSYM-S	2.67E+06
		1.29E+03	1.30E+37	8.09E+49	1.86E+21	1.34E+22	FENLAP-K	0.00E+06
							FENLAP-B	No Solution
		9.53E+02	2.83E+40	3.59E+60	2.01E+22	2.36E+22	FENLAP-M	0.00E+06
100 mm	2100 MPa	3.59E+06	1.30E+54	2.46E+66	3.40E+15	8.14E+18	ELSYM-D	3.59E+06
		2.07E+06	1.51E+42	1.01E+56	4.01E+14	5.72E+18	ELSYM-S	2.07E+06
		1.35E+04	7.15E+62	1.88E+77	1.55E+24	5.81E+22	FENLAP-K	0.01E+06
		3.55E+04	4.44E+52	9.53E+108	7.27E+25	1.34E+23	FENLAP-B	0.04E+06
		1.56E+04	2.99E+62	4.43E+98	2.59E+25	1.27E+23	FENLAP-M	0.02E+06
150 mm	2100 MPa	1.50E+07	8.17E+62	2.11E+76	2.80E+16	4.43E+17	ELSYM-D	14.98E+06
		6.71E+06	6.20E+49	1.76E+66	4.68E+15	2.75E+17	ELSYM-S	6.71E+06
		1.42E+05	3.69E+100	1.53E+118	1.50E+27	2.67E+23	FENLAP-K	0.14E+06
		6.08E+05	9.29E+49	1.90E+108	3.61E+26	3.46E+23	FENLAP-B	0.61E+06
		2.28E+05	1.33E+85	6.10E+139	4.29E+27	5.58E+23	FENLAP-M	0.23E+06

Base Mr_i = *218 MPa* n_i = *0.22* ***MIG - LNEC***

Surface		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
50 mm	2100 MPa	2.22E+06	1.25E+46	1.48E+59	5.22E+14	3.12E+18	ELSYM-D	2.22E+06
		4.09E+06	5.93E+36	8.77E+47	3.96E+13	2.49E+18	ELSYM-S	4.09E+06
		1.54E+04	2.57E+30	9.14E+50	2.27E+21	1.58E+22	FENLAP-K	0.02E+06
							FENLAP-B	No Solution
							FENLAP-M	No Solution
100 mm	2100 MPa	4.45E+06	5.43E+53	1.51E+66	3.86E+15	9.14E+18	ELSYM-D	4.45E+06
		2.63E+06	7.06E+41	5.42E+55	4.54E+14	6.48E+18	ELSYM-S	2.63E+06
		3.27E+04	9.24E+48	3.79E+72	5.89E+23	5.56E+22	FENLAP-K	0.03E+06
							FENLAP-B	No Solution
							FENLAP-M	No Solution
150 mm	2100 MPa	1.78E+07	1.07E+62	7.34E+75	3.04E+16	4.96E+17	ELSYM-D	17.84E+06
		8.01E+06	9.67E+48	5.08E+65	5.04E+15	3.10E+17	ELSYM-S	8.01E+06
		2.32E+05	1.29E+77	6.10E+105	2.48E+26	2.08E+23	FENLAP-K	0.23E+06
							FENLAP-B	No Solution
							FENLAP-M	No Solution

Base Mr_i = *218 MPa* n_i = *0.37* ***MIG - UNOT***

Surface		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
50 mm	2100 MPa	1.26E+06	3.65E+54	1.79E+55	2.65E+14	2.81E+18	ELSYM-D	1.26E+06
		2.04E+06	1.23E+43	3.29E+44	1.85E+13	2.18E+18	ELSYM-S	2.04E+06
		1.14E+02	1.07E+60	1.75E+53	1.15E+22	1.34E+22	FENLAP-K	0.00E+06
							FENLAP-B	No Solution
		2.47E+01	8.70E+286	5.45E+71	3.84E+23	4.66E+22	FENLAP-M	0.00E+06
100 mm	2100 MPa	3.25E+06	2.30E+64	1.01E+62	1.78E+15	7.23E+18	ELSYM-D	3.25E+06
		1.88E+06	3.52E+49	1.08E+52	1.95E+14	4.96E+18	ELSYM-S	1.88E+06
		5.50E+03	2.24E+116	2.86E+91	3.52E+25	7.98E+22	FENLAP-K	0.01E+06
							FENLAP-B	No Solution
		3.78E+03		4.72E+113	1.50E+27	5.81E+22	FENLAP-M	0.00E+06
150 mm	2100 MPa	1.40E+07	1.25E+74	3.27E+71	1.42E+16	3.75E+17	ELSYM-D	13.99E+06
		6.26E+06	1.23E+58	6.98E+61	2.26E+15	2.28E+17	ELSYM-S	6.26E+06
		8.56E+04	4.40E+192	3.58E+142	6.90E+28	3.84E+23	FENLAP-K	0.09E+06
							FENLAP-B	No Solution
		2.28E+05	1.33E+85	6.10E+139	4.29E+27	5.58E+23	FENLAP-M	0.23E+06

Base Mr_i = *245 MPa* n_i = *0.34* ***MIG - LRSB***

Surface		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
50 mm	2100 MPa	2.21E+06	3.89E+51	4.00E+56	4.05E+14	3.33E+18	ELSYM-D	2.21E+06
		4.06E+06	1.05E+41	4.70E+45	2.98E+13	2.63E+18	ELSYM-S	4.06E+06
		2.09E+02	7.80E+50	2.23E+51	5.24E+21	1.29E+22	FENLAP-K	0.00E+06
							FENLAP-B	No Solution
							FENLAP-M	No Solution
100 mm	2100 MPa	4.61E+06	7.42E+59	2.07E+63	2.74E+15	9.00E+18	ELSYM-D	4.61E+06
		2.76E+06	2.01E+46	1.26E+53	3.08E+14	6.32E+18	ELSYM-S	2.76E+06
		7.30E+03	4.95E+94	1.83E+85	1.00E+25	6.96E+22	FENLAP-K	0.01E+06
							FENLAP-B	No Solution
							FENLAP-M	No Solution
150 mm	2100 MPa	1.85E+07	1.94E+68	4.68E+72	2.10E+16	4.75E+17	ELSYM-D	18.51E+06
		8.33E+06	4.14E+53	5.45E+62	3.33E+15	2.94E+17	ELSYM-S	8.33E+06
		1.01E+05	5.40E+154	1.06E+132	1.52E+28	3.28E+23	FENLAP-K	0.10E+06
							FENLAP-B	No Solution
							FENLAP-M	No Solution

Comparison of Pavement Life (ESA) due to different Data from Different Laboratories

Pavement life as a function of the Variation in the Subgrade Characteristics

Subgrade Mr_i = *8 MPa* n_i = *0.53* ***LOC - LNEC***

Surface Details		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
50 mm	2100 MPa	1.53E+09	2.44E+41	4.67E+41	5.09E+14	8.75E+12	ELSYM-D	1,533.40E+06
		3.08E+10	7.73E+35	1.08E+36	2.19E+14	1.20E+14	ELSYM-S	30,778.67E+06
		2.89E+04	7.06E+25	6.82E+55		8.82E+52	FENLAP-K	0.03E+06
		5.35E+07	7.47E+50	1.69E+67		2.60E+56	FENLAP-B	53.53E+06
		8.38E+02		1.50E+184		8.98E+55	FENLAP-M	0.00E+06
100 mm	2100 MPa	1.87E+08	5.85E+37	5.27E+48	3.63E+15	3.17E+13	ELSYM-D	187.46E+06
		1.59E+08	1.90E+32	1.85E+44	2.38E+15	3.00E+14	ELSYM-S	159.43E+06
		3.12E+04	4.38E+54	7.17E+71		1.45E+54	FENLAP-K	0.03E+06
		1.12E+05	1.12E+189	3.62E+177		2.64E+55	FENLAP-B	0.11E+06
		1.36E+04	9.60E+88	2.14E+98		1.82E+55	FENLAP-M	0.01E+06
150 mm	2100 MPa	3.43E+08	8.47E+35	5.15E+56	2.16E+16	7.57E+17	ELSYM-D	343.42E+06
		1.59E+08	1.42E+31	5.69E+53	1.98E+16	9.62E+18	ELSYM-S	159.43E+06
		2.50E+05	1.94E+87	7.80E+100		5.03E+55	FENLAP-K	0.25E+06
		8.38E+05	#NUM!	3.34E+157		5.69E+53	FENLAP-B	0.84E+06
		2.10E+05	5.02E+97	7.07E+132		2.50E+56	FENLAP-M	0.21E+06

Subgrade Mr_i = *22 MPa* n_i = *0.68* ***LOC - UNOT***

Surface		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
50 mm	2100 MPa	1.01E+09	5.02E+42	5.65E+48	1.11E+15	1.69E+15	ELSYM-D	1,009.01E+06
		1.74E+10	3.95E+36	3.32E+40	2.71E+14	1.15E+16	ELSYM-S	17,360.59E+06
		1.90E+04	6.17E+44	1.75E+54			FENLAP-K	0.02E+06
							FENLAP-B	No Solution
							FENLAP-M	No Solution
100 mm	2100 MPa	1.67E+08	1.63E+40	3.14E+56	7.84E+15	5.62E+15	ELSYM-D	167.47E+06
		1.51E+08	3.05E+33	7.17E+48	2.88E+15	3.90E+16	ELSYM-S	150.64E+06
		3.14E+04	1.06E+55	2.00E+71			FENLAP-K	0.03E+06
		1.66E+04	6.12E+67	1.62E+209			FENLAP-B	0.02E+06
		1.66E+04	6.70E+57	5.22E+99			FENLAP-M	0.02E+06
150 mm	2100 MPa	3.30E+08	1.55E+39	2.11E+65	4.65E+16	9.50E+16	ELSYM-D	329.60E+06
		1.58E+08	5.89E+32	4.82E+58	2.45E+16	6.73E+17	ELSYM-S	158.14E+06
		2.53E+05	2.22E+87	4.25E+100			FENLAP-K	0.25E+06
		3.34E+05	2.69E+122	1.02E+184			FENLAP-B	0.33E+06
		2.46E+05	1.75E+70	2.13E+128			FENLAP-M	0.25E+06

Subgrade Mr_i = *23 MPa* n_i = *0.42* ***LOC - DUT***

Surface		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
50 mm	2100 MPa	1.01E+09	8.35E+42	1.62E+49	1.19E+15	7.70E+14	ELSYM-D	1,013.40E+06
		1.73E+10	5.28E+36	8.18E+40	2.83E+14	4.16E+15	ELSYM-S	17,339.99E+06
		1.97E+04	7.25E+19	9.69E+55	#NUM!		FENLAP-K	0.02E+06
					#VALUE!		FENLAP-B	No Solution
					#VALUE!		FENLAP-M	No Solution
100 mm	2100 MPa	1.68E+08	2.85E+40	8.83E+56	8.48E+15	2.52E+15	ELSYM-D	168.16E+06
		1.51E+08	4.29E+33	1.69E+49	3.01E+15	1.35E+16	ELSYM-S	151.25E+06
		3.16E+04	6.98E+54	1.60E+71			FENLAP-K	0.03E+06
		3.16E+04	5.97E+23	1.28E+129			FENLAP-B	0.03E+06
		1.78E+04	1.38E+58	1.08E+98			FENLAP-M	0.02E+06
150 mm	2100 MPa	4.45E+08	1.11E+36	5.66E+51	1.38E+16	7.78E+10	ELSYM-D	444.72E+06
		1.59E+08	8.52E+32	1.04E+59	2.53E+16	7.72E+17	ELSYM-S	158.78E+06
		2.53E+05	1.96E+87	2.09E+100			FENLAP-K	0.25E+06
		9.50E+05	4.33E+35	6.74E+115			FENLAP-B	0.95E+06
		2.24E+05	1.44E+76	7.48E+128			FENLAP-M	0.22E+06

Subgrade Mr_i = *48 MPa* n_i = *0.74* ***LOC - LRCF***

Surface		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
50 mm	2100 MPa	7.55E+08	1.57E+44	2.62E+55	1.83E+15	2.68E+16	ELSYM-D	754.97E+06
		1.03E+10	2.75E+37	3.93E+45	3.08E+14	7.33E+16	ELSYM-S	10,287.05E+06
		1.39E+04	3.28E+41	1.56E+60			FENLAP-K	0.01E+06
							FENLAP-B	No Solution
		1.53E+05	1.68E+121	1.86E+73			FENLAP-M	0.15E+06
100 mm	2100 MPa	1.56E+08	5.35E+42	4.14E+63	1.31E+16	8.44E+16	ELSYM-D	155.59E+06
		1.42E+08	7.76E+34	7.34E+53	3.07E+15	2.57E+17	ELSYM-S	142.44E+06
		3.16E+04	7.14E+54	1.60E+71			FENLAP-K	0.03E+06
		1.99E+05	7.27E+218	1.82E+94			FENLAP-B	0.20E+06
		1.66E+04	6.75E+114	1.10E+97			FENLAP-M	0.02E+06
150 mm	2100 MPa	3.26E+08	2.73E+42	1.21E+73	8.00E+16	8.85E+16	ELSYM-D	325.51E+06
		1.58E+08	4.06E+34	5.59E+63	2.56E+16	2.59E+17	ELSYM-S	158.14E+06
		2.53E+05	1.96E+87	2.09E+100			FENLAP-K	0.25E+06
		3.98E+05	8.20E+64	1.92E+137			FENLAP-B	0.40E+06
		2.18E+05	1.01E+95	1.45E+132			FENLAP-M	0.22E+06

Comparison of Pavement Life (ESA) due to different Data from the Same Laboratory

Pavement life as a function of the Range of values in the Base Characteristics for a Single Result

Base Mr_i = *409 MPa* n_i =*0.26* ***10%***

Surface Details		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
50 mm	2100 MPa	3.86E+07	5.02E+44	6.81E+62	8.44E+14	2.08E+19	ELSYM-D	38.58E+06
		1.65E+08	1.66E+36	1.45E+51	7.75E+13	1.21E+19	ELSYM-S	164.74E+06
		2.84E+04	2.15E+25	7.97E+54	8.04E+88		FENLAP-K	0.03E+06
		1.98E+09	4.08E+62	2.05E+45	6.83E+90		FENLAP-B	1,977.76E+06
		5.09E+03	2.92E+24	1.19E+84			FENLAP-M	0.01E+06
100 mm	2100 MPa	2.54E+07	5.06E+48	1.82E+70	6.14E+15	6.49E+19	ELSYM-D	25.45E+06
		1.56E+07	5.94E+24	5.15E+141	3.70E+06	2.65E+19	ELSYM-S	15.64E+06
		4.87E+04	4.16E+46	7.52E+72			FENLAP-K	0.05E+06
		6.49E+04	4.69E+73	4.12E+80			FENLAP-B	0.06E+06
		2.60E+04	2.30E+69	3.60E+100			FENLAP-M	0.03E+06
150 mm	2100 MPa	7.37E+07	2.35E+53	5.45E+79	4.13E+16	1.27E+17	ELSYM-D	73.69E+06
		1.65E+05	6.13E+133	1.30E+151	5.46E+16	2.74E+15	ELSYM-S	0.16E+06
		2.91E+05	2.73E+71	6.54E+101			FENLAP-K	0.29E+06
		2.50E+05	7.87E+20				FENLAP-B	0.25E+06
		3.70E+05	3.88E+59	1.23E+121			FENLAP-M	0.37E+06

Base Mr_i = *491 MPa* n_i =*0.32* ***25%***

Surface		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
50 mm	2100 MPa	6.91E+07	2.65E+46	1.68E+63	1.12E+15	2.44E+19	ELSYM-D	69.09E+06
		3.50E+08	6.77E+37	3.33E+51	1.06E+14	1.40E+19	ELSYM-S	350.17E+06
		2.84E+04	9.93E+21	1.12E+56	6.83E+90		FENLAP-K	0.03E+06
		1.77E+08	2.43E+148	9.86E+67			FENLAP-B	177.49E+06
		9.32E+03	9.45E+43	1.08E+59			FENLAP-M	0.01E+06
100 mm	2100 MPa	3.81E+07	3.07E+49	6.98E+70	7.93E+15	7.42E+19	ELSYM-D	38.13E+06
		2.76E+07	2.06E+24	6.67E+151	8.11E+06	3.70E+19	ELSYM-S	27.60E+06
		5.27E+04	4.92E+47	2.55E+73			FENLAP-K	0.05E+06
		3.78E+05	2.49E+10	7.10E+77			FENLAP-B	0.38E+06
		1.82E+04	1.49E+124	3.43E+119			FENLAP-M	0.02E+06
150 mm	2100 MPa	1.04E+08	1.35E+53	2.60E+80	5.23E+16	1.45E+17	ELSYM-D	104.03E+06
		4.96E+07	5.32E+41	5.83E+68	8.11E+15	6.73E+16	ELSYM-S	49.63E+06
		3.12E+05	2.42E+72	4.17E+101			FENLAP-K	0.31E+06
		1.04E+06	2.65E+225	1.50E+96			FENLAP-B	1.04E+06
		2.72E+05	7.44E+121	6.57E+151			FENLAP-M	0.27E+06

Base Mr_i = *817 MPa* n_i =*0.48* ***Avg.***

Surface		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
50 mm	2100 MPa	2.92E+08	1.74E+51	8.27E+66	3.55E+15	4.10E+19	ELSYM-D	291.77E+06
		1.91E+09	8.93E+42	6.87E+54	3.78E+14	2.28E+19	ELSYM-S	1,911.86E+06
		2.00E+04	2.09E+18	1.25E+65			FENLAP-K	0.02E+06
							FENLAP-B	No Solution
							FENLAP-M	No Solution
100 mm	2100 MPa	1.22E+08	1.52E+51	2.77E+75	2.31E+16	1.13E+20	ELSYM-D	122.33E+06
		1.51E+08	4.35E+24	6.22E+188	9.33E+07	1.01E+20	ELSYM-S	150.64E+06
		5.27E+04	2.02E+50	4.03E+73			FENLAP-K	0.05E+06
		3.49E+04	#NUM!	1.79E+101			FENLAP-B	0.03E+06
		1.58E+05	3.18E+14	7.99E+100			FENLAP-M	0.16E+06
150 mm	2100 MPa	3.02E+08	2.66E+51	8.04E+85	1.47E+17	2.17E+17	ELSYM-D	301.80E+06
		1.49E+08	1.18E+41	1.32E+73	2.32E+16	1.04E+17	ELSYM-S	149.44E+06
		1.72E+05	2.79E+109	3.85E+120	1.23E+36	5.81E+22	FENLAP-K	0.17E+06
		2.52E+06		8.21E+170			FENLAP-B	2.52E+06
		2.55E+05	7.31E+115	8.24E+163			FENLAP-M	0.25E+06

Base Mr_i = *992 MPa* n_i =*0.64* ***75%***

Surface		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
50 mm	2100 MPa	1.48E+09	4.18E+48	4.39E+70	6.93E+15	4.93E+19	ELSYM-D	1,478.11E+06
		2.17E+10	1.01E+41	1.79E+58	7.99E+14	2.73E+19	ELSYM-S	21,695.63E+06
		1.56E+04	1.04E+35	2.64E+60			FENLAP-K	0.02E+06
							FENLAP-B	No Solution
							FENLAP-M	No Solution
100 mm	2100 MPa	3.13E+08	3.55E+47	9.76E+79	4.76E+16	1.38E+20	ELSYM-D	313.31E+06
		5.05E+08	7.82E+23	1.69E+203	2.07E+08	1.39E+20	ELSYM-S	504.66E+06
		4.91E+04	1.07E+50	3.33E+73			FENLAP-K	0.05E+06
		2.05E+05	3.79E+23	3.94E+106			FENLAP-B	0.20E+06
		2.32E+05	2.72E+13	3.94E+102			FENLAP-M	0.23E+06
150 mm	2100 MPa	6.69E+08	1.65E+47	9.88E+90	2.99E+17	2.69E+17	ELSYM-D	668.98E+06
		3.41E+08	5.63E+37	3.69E+77	4.91E+16	1.31E+17	ELSYM-S	341.26E+06
		3.28E+05	5.70E+78	1.03E+101			FENLAP-K	0.33E+06
		8.13E+04	1.07E+03	4.05E+144			FENLAP-B	0.08E+06
		2.91E+05	2.23E+110	3.89E+157			FENLAP-M	0.29E+06

Base Mr_i = *1,348 MPa* n_i =*0.69* ***90%***

Surface		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
50 mm	2100 MPa	1.53E+10	1.59E+47	4.43E+76	1.94E+16	6.77E+19	ELSYM-D	15,316.50E+06
		1.56E+12	2.26E+40	5.50E+63	2.50E+15	3.76E+19	ELSYM-S	1,556,093.26E+06
		1.72E+03	1.63E+40	1.25E+49	2.64E+84		FENLAP-K	0.00E+06
							FENLAP-B	No Solution
							FENLAP-M	No Solution
100 mm	2100 MPa	1.25E+09	6.66E+44	1.72E+87	1.35E+17	1.86E+20	ELSYM-D	1,251.05E+06
		3.34E+09	7.20E+23	1.25E+230	7.84E+08	2.34E+20	ELSYM-S	3,338.82E+06
		2.08E+04	4.62E+69	1.07E+70			FENLAP-K	0.02E+06
							FENLAP-B	No Solution
		2.20E+05	4.34E+10	3.40E+102			FENLAP-M	0.22E+06
150 mm	2100 MPa	2.25E+09	2.97E+43	1.76E+99	8.29E+17	3.63E+17	ELSYM-D	2,250.68E+06
		1.20E+09	1.07E+35	6.66E+84	1.46E+17	1.81E+17	ELSYM-S	1,200.16E+06
		2.12E+05	2.96E+109	3.32E+99			FENLAP-K	0.21E+06
		3.44E+06		8.46E+122			FENLAP-B	3.44E+06
		1.05E+06	1.84E+89	7.87E+120			FENLAP-M	1.05E+06

Comparison of Pavement Life (ESA) due to different Data from the Same Laboratory

Pavement life as a function of the Range of values in the Subgrade Characteristics for a Single Result

Subgrade Mr_i = *93 MPa* n_i *=0.22* ***10%***

Surface Details		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
50 mm	2100 MPa	3.43E+08	1.08E+50	7.33E+62	3.78E+15	2.55E+19	ELSYM-D	342.59E+06
		2.43E+09	1.49E+42	4.93E+51	4.62E+14	1.93E+19	ELSYM-S	2,431.93E+06
		3.17E+03	1.27E+01	1.55E+61	2.24E+71		FENLAP-K	0.00E+06
			1.03E+239	9.35E+43			FENLAP-B	No Solution
							FENLAP-M	No Solution
100 mm	2100 MPa	1.29E+08	8.02E+48	1.40E+71	2.44E+16	7.29E+19	ELSYM-D	129.12E+06
		1.53E+08	1.33E+24	4.40E+195	2.13E+08	4.45E+19	ELSYM-S	153.09E+06
		5.00E+04	2.47E+38	5.73E+74	5.31E+78		FENLAP-K	0.05E+06
		4.09E+06	7.78E+58	1.22E+84	1.28E+77		FENLAP-B	4.09E+06
		1.82E+04	2.15E+64	1.22E+113			FENLAP-M	0.02E+06
150 mm	2100 MPa	3.06E+08	2.07E+48	1.68E+81	1.50E+17	2.65E+16	ELSYM-D	306.25E+06
		1.50E+08	1.09E+39	3.79E+69	2.89E+16	2.10E+16	ELSYM-S	150.04E+06
		3.41E+05	2.16E+75	9.23E+100	2.14E+85		FENLAP-K	0.34E+06
		1.34E+06	1.29E+179	5.25E+117			FENLAP-B	1.34E+06
		4.28E+05	7.34E+129	1.39E+145			FENLAP-M	0.43E+06

Subgrade Mr_i = *105 MPa* n_i *=0.26* ***25%***

Surface		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
50 mm	2100 MPa	3.32E+08	1.92E+50	4.87E+63	3.74E+15	2.01E+19	ELSYM-D	331.51E+06
		2.31E+09	2.10E+42	2.09E+52	4.46E+14	1.46E+19	ELSYM-S	2,312.08E+06
		2.21E+04	5.21E+21	2.04E+58	5.03E+75		FENLAP-K	0.02E+06
		1.17E+06	1.02E+04	1.33E+60	5.88E+71		FENLAP-B	1.17E+06
							FENLAP-M	No Solution
100 mm	2100 MPa	1.28E+08	2.23E+49	1.03E+72	2.43E+16	5.69E+19	ELSYM-D	127.63E+06
		1.52E+08	1.71E+24	1.01E+194	1.74E+08	4.11E+19	ELSYM-S	152.48E+06
		5.30E+04	1.55E+48	7.79E+73	1.73E+88		FENLAP-K	0.05E+06
		3.18E+05	7.10E+277	2.68E+87			FENLAP-B	0.32E+06
		9.08E+04	4.40E+41	1.82E+94			FENLAP-M	0.09E+06
150 mm	2100 MPa	3.05E+08	8.39E+48	1.50E+82	1.51E+17	3.93E+16	ELSYM-D	305.39E+06
		1.50E+08	2.66E+39	1.88E+70	2.78E+16	2.78E+16	ELSYM-S	150.04E+06
		3.45E+05	2.21E+81	5.02E+100			FENLAP-K	0.34E+06
		3.82E+05	2.07E+120	4.97E+139			FENLAP-B	0.38E+06
		3.55E+05	6.03E+77	2.61E+153			FENLAP-M	0.36E+06

Subgrade Mr_i = *161 MPa* n_i *=0.33* ***Avg.***

Surface		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
50 mm	2100 MPa	2.92E+08	1.74E+51	8.27E+66	3.55E+15	4.10E+19	ELSYM-D	291.77E+06
		1.91E+09	8.93E+42	6.87E+54	3.78E+14	2.28E+19	ELSYM-S	1,911.86E+06
		2.00E+04	2.09E+18	1.25E+65			FENLAP-K	0.02E+06
							FENLAP-B	No Solution
							FENLAP-M	No Solution
100 mm	2100 MPa	1.22E+08	1.52E+51	2.77E+75	2.31E+16	1.13E+20	ELSYM-D	122.33E+06
		1.51E+08	4.35E+24	6.22E+188	9.33E+07	1.01E+20	ELSYM-S	150.64E+06
		5.27E+04	2.02E+50	4.03E+73			FENLAP-K	0.05E+06
		3.49E+04		1.79E+101			FENLAP-B	0.03E+06
		1.58E+05	3.18E+14	7.99E+100			FENLAP-M	0.16E+06
150 mm	2100 MPa	3.02E+08	2.66E+51	8.04E+85	1.47E+17	2.17E+17	ELSYM-D	301.80E+06
		1.49E+08	1.18E+41	1.32E+73	2.32E+16	1.04E+17	ELSYM-S	149.44E+06
		1.72E+05	2.79E+109	3.85E+120	1.23E+36	5.81E+22	FENLAP-K	0.17E+06
		2.52E+06		8.21E+170			FENLAP-B	2.52E+06
		2.55E+05	7.31E+115	8.24E+163			FENLAP-M	0.25E+06

Subgrade Mr_i = *200 MPa* n_i *=0.37* ***75%***

Surface		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
50 mm	2100 MPa	2.75E+08	4.82E+51	2.06E+68	3.17E+15	4.20E+19	ELSYM-D	274.54E+06
		1.75E+09	1.77E+43	8.25E+55	3.27E+14	2.02E+19	ELSYM-S	1,751.76E+06
		1.99E+04	3.91E+44	4.54E+59			FENLAP-K	0.02E+06
							FENLAP-B	No Solution
							FENLAP-M	No Solution
100 mm	2100 MPa	1.20E+08	1.15E+52	8.29E+76	2.09E+16	1.14E+20	ELSYM-D	120.01E+06
		1.50E+08	6.61E+24	2.49E+186	6.96E+07	1.09E+20	ELSYM-S	150.04E+06
		5.27E+04	7.35E+48	2.98E+73			FENLAP-K	0.05E+06
							FENLAP-B	No Solution
		1.56E+05	3.58E+14	8.94E+100			FENLAP-M	0.16E+06
150 mm	2100 MPa	3.00E+08	4.59E+52	3.25E+87	1.35E+17	6.29E+17	ELSYM-D	300.10E+06
		1.49E+08	8.01E+41	2.36E+74	2.00E+16	2.52E+17	ELSYM-S	149.44E+06
		3.41E+05	7.41E+78	5.02E+100			FENLAP-K	0.34E+06
		1.80E+06					FENLAP-B	1.80E+06
		9.50E+05	1.93E+22	2.60E+139			FENLAP-M	0.95E+06

Subgrade Mr_i = *229 MPa* n_i *=0.50* ***90%***

Surface		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
50 mm	2100 MPa	2.67E+08	5.48E+51	2.29E+68	2.28E+15	1.13E+18	ELSYM-D	267.31E+06
		1.69E+09	2.08E+43	6.79E+55	2.32E+14	4.87E+17	ELSYM-S	1,694.95E+06
		1.83E+04	5.04E+25	2.82E+58			FENLAP-K	0.02E+06
							FENLAP-B	No Solution
							FENLAP-M	No Solution
100 mm	2100 MPa	1.19E+08	2.12E+52	1.05E+77	1.56E+16	3.20E+18	ELSYM-D	119.09E+06
		1.49E+08	7.61E+24	5.95E+183	5.11E+07	3.62E+18	ELSYM-S	148.84E+06
		5.30E+04	8.56E+49	2.82E+73			FENLAP-K	0.05E+06
		1.66E+05	1.95E+144	1.39E+107			FENLAP-B	0.17E+06
		6.62E+04	1.49E+50	1.75E+93			FENLAP-M	0.07E+06
150 mm	2100 MPa	2.99E+08	1.27E+53	4.86E+87	1.05E+17	1.89E+18	ELSYM-D	299.26E+06
		1.49E+08	1.68E+42	2.13E+74	1.50E+16	6.52E+17	ELSYM-S	149.44E+06
		3.41E+05	1.15E+79	5.02E+100			FENLAP-K	0.34E+06
		9.50E+05	9.94E+11	2.64E+130			FENLAP-B	0.95E+06
		5.37E+05	1.08E+67	8.39E+133			FENLAP-M	0.54E+06

Pavement life as a function of the Range of values in the Base Characteristics when a Random Error is Introduced into the Strain Measurements

Base Mr_i = *1,014 MPa* n_i = *0.46* *0%* ***CCD - LRPC***

Surface Details		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
100 mm	2100 MPa	1.56E+09	5.46E+85	1.03E+60	2.48E+14	4.94E+16	ELSYM-D	1,563.07E+06
		4.07E+08	7.94E+34	2.62E+57	8.20E+15	7.81E+16	ELSYM-S	406.56E+06
		5.81E+09	1.15E+01	6.95E+88			FENLAP-K	5,809.38E+06
							FENLAP-B	No Solution
		6.65E+06	4.10E+37	1.62E+69			FENLAP-M	6.65E+06

Base Mr_i = *1,018 MPa* n_i = *0.46* *5%* ***CCD - LRPC***

Surface Details		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
100 mm	2100 MPa	1.59E+09	7.13E+85	1.20E+60	2.50E+14	4.96E+16	ELSYM-D	1,585.79E+06
		4.13E+08	7.59E+34	3.03E+57	8.29E+15	7.85E+16	ELSYM-S	412.77E+06
		6.20E+09	9.57E+00	7.57E+88			FENLAP-K	6,201.12E+06
							FENLAP-B	No Solution
		6.15E+06	1.11E+38	2.34E+69			FENLAP-M	6.15E+06

Base Mr_i = *1,014 MPa* n_i = *0.46* *30%* ***CCD - LRPC***

Surface Details		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
100 mm	2100 MPa	1.56E+09	5.46E+85	1.03E+60	2.48E+14	4.94E+16	ELSYM-D	1,563.07E+06
		4.05E+08	8.06E+34	2.56E+57	8.11E+15	7.81E+16	ELSYM-S	404.51E+06
		5.81E+09	1.15E+01	6.95E+88			FENLAP-K	5,809.38E+06
							FENLAP-B	No Solution
		6.65E+06	4.10E+37	1.62E+69			FENLAP-M	6.65E+06

Base Mr_i = *1,205 MPa* n_i = *0.44* *50%* ***CCD - LRPC***

Surface Details		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
100 mm	2100 MPa	3.29E+09	5.56E+90	3.46E+63	3.75E+14	5.95E+16	ELSYM-D	3,290.25E+06
		1.19E+09	2.12E+33	1.20E+61	1.63E+16	9.58E+16	ELSYM-S	1,193.98E+06
		5.21E+09	7.02E+28	4.35E+85			FENLAP-K	5,206.04E+06
							FENLAP-B	No Solution
		9.52E+08	1.69E+50	3.15E+75			FENLAP-M	951.59E+06

Pavement life as a function of the Range of values in the Subbase Characteristics when a Randon Error is Introduced into the Strain Measurements

Subgrade *Mr_i = 45 MPa* *n_i = 0.33* *0%* ***LOC - LNEC***

Surface Details		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
100 mm	2100 MPa	3.29E+09	5.56E+90	3.46E+63	3.75E+14	5.95E+16	ELSYM-D	3,290.25E+06
		1.19E+09	2.12E+33	1.20E+61	1.63E+16	9.58E+16	ELSYM-S	1,193.98E+06
		5.21E+09	7.02E+28	4.35E+85			FENLAP-K	5,206.04E+06
							FENLAP-B	No Solution
		9.52E+08	1.69E+50	3.15E+75			FENLAP-M	951.59E+06

Subgrade *Mr_i = 44 MPa* *n_i = 0.33* *5%* ***LOC - LNEC***

Surface Details		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
100 mm	2100 MPa	1.56E+09	2.81E+85	3.22E+59	2.12E+14	4.29E+16	ELSYM-D	1,556.66E+06
		4.08E+08	6.98E+34	1.77E+57	8.20E+15	6.90E+16	ELSYM-S	407.79E+06
		5.81E+09	1.15E+01	6.95E+88			FENLAP-K	5,809.38E+06
							FENLAP-B	No Solution
		6.65E+06	4.10E+37	1.62E+69			FENLAP-M	6.65E+06

Subgrade *Mr_i = 43 MPa* *n_i = 0.33* *30%* ***LOC - LNEC***

Surface Details		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
100 mm	2100 MPa	1.55E+09	1.32E+85	9.56E+58	1.80E+14	3.71E+16	ELSYM-D	1,549.21E+06
		4.09E+08	6.14E+34	1.17E+57	8.11E+15	6.07E+16	ELSYM-S	409.03E+06
		1.41E+09	1.60E+22	7.89E+94			FENLAP-K	1,406.26E+06
		4.46E+05	4.97E+93	4.03E+62			FENLAP-B	0.45E+06
		6.65E+06	4.10E+37	1.62E+69			FENLAP-M	6.65E+06

Subgrade *Mr_i = 57 MPa* *n_i = 0.33* *50%* ***LOC - LNEC***

Surface Details		Surface ESA	Base ESA	Subbase ESA	SSG ESA	SG ESA	Analysis Method	Minimum ESA
100 mm	2100 MPa	1.64E+09	8.71E+88	4.79E+65	1.30E+15	2.16E+17	ELSYM-D	1,641.53E+06
		3.94E+08	3.21E+35	1.83E+59	8.39E+15	2.83E+17	ELSYM-S	394.08E+06
		7.86E+08	1.05E+27	2.85E+89			FENLAP-K	785.54E+06
							FENLAP-B	No Solution
		1.52E+07	2.00E+35	6.74E+67			FENLAP-M	15.16E+06