Weak Tectonics:

the Ambiguous Role of Materiality in the Work of Contemporary Japanese Architects SANAA

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Abstract

As the overlap of real and virtual spaces takes place more and more frequently in our daily lives, it could be said that our sensibility towards embodied physical space is being affected by our experience of the virtual world. This raises the question of how architecture should respond to these changes. It seems there is a confrontation between the necessarily material dimension of architecture and the increasingly immaterial nature of the information age. A new strand of Japanese architects is pushing the limits of the dematerialisation of architecture, which has been called, by some critics, "weak architecture". Some of the distinctive features of this weak architecture are simplicity, transparency and formal austerity, as well as a peculiar ambiguity in the expression of materiality.

Through a detailed case-study of the work of SANAA – an internationally significant and prize-winning firm of architects whose works seem to exemplify this kind of weak architecture – the thesis investigates the meaning of the term "weak" in the context of architecture, and the role that materiality plays in realising such weakness, focusing primarily on three key material features that have been identified in their work: transparency, thinness, and whiteness.

The project draws on Gianni Vattimo's theory of weak thought, Gilles Deleuze's concept of smooth space, the concept of liminality, and the idea of weakness in Taoist philosophy, to develop a new framework in which three themes of SANAA's weak architecture are developed:

1. Diagram architecture

2. Architecture as landscape

3. Smooth architecture

A more comprehensive understanding of the distinctive role of materiality in SANAA's work has been established through the new theoretical framework and the case analysis of the Rolex Learning Centre and Louvre-Lens Museum. Materiality turns out to be a vital tool in the creation of ambiguous boundaries in three key areas: between conceptual and physical manifestations of architecture; between the building and its landscape setting; and between spaces and the functions they accommodate. To consolidate those meanings, the notion of "weak tectonics" is proposed. The ambiguity of "weak tectonics" leads to, among other things, a degree of uncertainty in visual perception which encourages active bodily exploration of space. The space becomes a liminal space between the real and the virtual. The meaning that SANAA's architecture tries to convey by means of "weak tectonics" might ultimately be a reflection of the ambiguity and paradoxes of contemporary society.

Keywords:

weak architecture, weak tectonics, SANAA, materiality, virtual and real, ambiguity

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Introduction

1.1 Research background and question

In the Euro-centric architectural movement Modernism in the 1920s, the machine was regarded as the symbol of functionalism. Many avant-garde architects of the time advocated the concept of architecture-as-machine. One hundred years later, many things have changed. One great change is the sense of detachment from location and the infinite extent of time and space resulting from the homogeneous network of connections emerging in the information age. As the overlap of real and virtual spaces takes place more and more frequently in our daily lives, the question arises as to how architecture should respond to these changes. It seems there is a confrontation between the necessarily material dimension of architecture and the increasingly immaterial nature of the information age. In the book *Liquid Modernity* (2000), Zygmunt Bauman examines how we have moved away from a “heavy” and “solid”, hardware-focused modernity to a “light” and “liquid”, software-based modernity. The prevalence of lightness reflects the change from the industrial age to the information and media society. Clothes, food, industrial products, and transportation – all aspects of life are pursuing “lightness”. As Italo Calvino claims, “lightness” is an auspicious symbol for the new millennium. Similarly, architecture seems unable to resist the pull towards lightness. The immaterial nature of society is being absorbed and reflected in architecture. Could the dematerialisation of architecture be seen as a response to the change of the information age? Is light and immaterial architecture the unity of real world and virtual world?

A new strand of Japanese architects is pushing the limits of the dematerialisation of architecture. Critics have reiterated over the years that the simplicity, transparency, and formal austerity are the most distinctive features of the works of the new generation of Japanese architects. Japanese architects have made great contributions

to the world's architectural landscape. Among the winners of the Pritzker Architecture Prize, there are six Japanese architects on the list, three of whom won the prize after 2010, and whose work could be seen representing the light and dematerialized architecture. This new strand of Japanese architects has already attracted much attention around the world.

Harvard Graduate School of Design offered a series of lectures entitled "A New Innocence: Emerging Trends in Japanese Architecture", focusing on the work of this strand of Japanese architects. Speakers included Sou Fujimoto, Junya Ishigami, Kazuyo Sejima + Ryue Nishizawa and Toyo Ito. Dean Mohsen Mostafavi described:

> This group represents one of the most significant informal collectives in architecture and design today. Their dedication to the simplicity and pleasures of everyday architecture and their engagement with location and interior distinguish their work from that of many of their contemporaries. They approach their task with a freshness and delight which in many respects is reminiscent of the innocence of a child's eye; however, in their case this innocence is deliberate and highly artificial.

From Junya Ishigami's pavilion in Venice Biennale in 2008 to SANAA's[1] and Sou Fujimoto's Serpentine Gallery Pavilion in London in 2009 and 2013, respectively, people seem to be responding to these Japanese architectures outside Japan. Unlike the first two generations of Japanese architects whose work appears rational, and tends to be more monumental and expressive, the new generation of architects pursues an ultimate weightlessness, thinness and transparency in architecture, achieving a

[1] SANAA stands for "Sejima And Nishizawa Architects Associates," the office of the partnership of Kazuyo Sejima and Ryue Nishizawa.

special spatial quality with the new material and technology. Besides showing distinct material expressions, these architects are more interested in exploring the possibility of spatial quality; they are concerned about the designing of atmosphere and sensibility; about a complex relationship system between buildings and human body; between buildings and environment. They have a very tolerant attitude to the urban development and changes of the information age, and put their own observation into practice, thinking about the human concern. They acquire their particular characters and often highly sensuous qualities not by means of strong iconographic forms or solid and permanent facades but through a perceptual field of intangibles, evoked by virtue of their special attention to materiality, tectonic precision, and spatial articulation. A new architectural sensibility has emerged.

To conclude this strand of architecture, the Japanese architect and researcher Kazuhiro Hirao presents a diagram "Japanese avant-garde architect – phenomenalism – nature" as a hypothesis, comparing it to the diagram created 100 years ago as "Modern avant-garde architect – functionalism – machine", to remark that the Japanese avant-garde architects' new diagram indicates the future prospect of architecture in the twenty-first century. The term "Phenomenalism" implies a human-centred pursuit of buildings, which emphasises the perception and sensual experience of people. In many cases, the design and construction of architecture was treated as some industrial product which is irrelevant to a human's life. The architecture of our time has become an art of the image. Instead of experiencing our being in the world, we behold our gaze from outside as spectators of images projected on the surface of the retina. The over-emphasis on the intellectual and conceptual dimensions of architecture further contributes to a disappearance of the physical, sensual and embodied essence of architecture. Buildings are constructed as the shelter and receptacle for what we do – how they might affect our senses and spirit is often a secondary consideration. However, arguably, much of the richness of architecture

comes from the multifaceted way our senses respond to it, from the way it catches our imaginations, and from its emotional impact on us. It is realised more and more that the material form of architecture is not the ultimate aim of design. Architectural space is not a mere lifeless frame for our activities, as it guides and stimulates our actions and moods. Architecture holds the power to inspire and transform our day-to-day existence. In a time where images are highly produced and dispersed, space relies more and more on the events that happened in it. The field relationship between human and space becomes important. Therefore, the focus of a design should be on human rather than on material and form alone, which encourages architects to think about the relationship between human and architecture.

Rather than designing according to abstract demands of states, society, or city, these Japanese architects seem to care more about the individual's body, feelings, experiences, and needs. They give more attention to the role-changing process of architecture from the physicality of a building to the building as a background of atmosphere, or as a setting for activities and interactions of life. However, this transformation cannot be realised without the careful consideration of material. It could be argued that it is the dematerialisation of architecture that makes this transformation happen.

SANAA is the winner of the Pritzker Prize of 2010, which is a typical representative of this group of architects. Dematerialisation is a distinct characteristic of SANAA's architectural work. SANAA was founded in 1995 by Kazuyo Sejima (1956-) and Ryue Nishizawa (1966-). Although they were educated and worked in Japan, these two architects have gained reputation worldwide. They are now one of Japan's most prominent, internationally renowned architects. Their projects outside Japan include de Kunstlinie Theatre & Culture Centre in Almere, Netherlands, the Toledo Glass Pavilion in Ohio, the USA, Zollverein School of Design in Essen, Germany, the New Museum of Contemporary Art in New York, Novartis Office Building in Basel,

Switzerland, Serpentine Gallery Pavilion in London, UK, the Rolex Learning Centre at the EPFL in Lausanne, Switzerland, and Louvre-Lens in Lens, France. All these projects imply that SANAA's architecture extends beyond their own culture and achieves a common aesthetic experience of different cultures. As their projects increase, they have drawn more attention from the public, architects and critics, as well as clients all over the world. Their work has been extensively published in books and leading journals, and exhibited in galleries and museums. Moreover, they have been invited to lecture at venues all over the world. Both Sejima and Nishizawa have held distinguished teaching positions at prominent universities.

Some important publications on SANAA's work include the following*: Kazuyo Sejima + Ryue Nishizawa: SANAA*, edited by Yuko Hasegawa in 2006, is the first monograph about SANAA in English, which records their projects from 1987 to 2006. *Houses: Kazuyo Sejima + Ryue Nishizawa: SANAA*, focuses on what might actually be a more important aspect of their portfolio – houses. The ideas of blankness, simplicity, immateriality, translucency, or weightlessness, are often to the fore in the exposition the book does offer up, in three contrasting essays by Guzmán, Luis Fernández-Galiano and Yuko Hasegawa. Another book, *The SANAA Studios 2006-2008: Learning from Japan: Single Story Urbanism*, is an outcome of a teaching experience of SANAA at the School of Architecture at Princeton between 2006 and 2008. The SANAA studio explored Japan's contemporary society as a context for architecture and considered its particular perspective on space, both personal and public space. As an overall thematic it asks: What can we learn from SANAA? It tries to frame SANAA's compassionate search for new architectures within a larger societal context. There are also several articles reporting SANAA's new projects in many important architectural journals. However, these articles are more introductory and descriptive in nature. The lack of in-depth analysis and criticism is unbalanced

compared with their large number of projects, which may also lead to some misunderstandings of their work.

Meanwhile, SANAA seldom talks or writes about their architecture. The two partners always use ambiguous words to illustrate their work in interviews or lectures. They do not make great claims or theories for their design, no more than describing them. They explained that they do not want to create a theory first and then interpret or prove that theory by making architecture. Each project is different, so it is very difficult to speak about a kind of theoretical approach that runs through all the projects. For them "the process of designing the project for a building is in itself a way of thinking about architecture" (Cecilia and Levene, 2004, p. 18). This reticence is part of the reason for the lack of in-depth analysis of their work; more importantly, it is difficult to analyse what is concealed in the simplicity of SANAA's architecture because they are too simple to show any information other than a white or transparent surface. Three conspicuous material features have been identified in SANAA's work – whiteness, transparency, and thinness – which are elaborated on in Chapter 1. The fact that they do not explain their architecture does not mean that there is nothing behind its simple appearance. The material condition of their buildings and the spatial intentions are seldom considered interrelated with each other. Much attention was paid only to the appearance of their material expressions, which can easily lead to a misunderstanding of their building as a mere pursuit of geometric, formal, or even aesthetic qualities. As Juhani Pallasmaa claims, "True qualities of architecture are not geometric and formal, intellectual or even aesthetic, as they are existential, embodied and emotional experiences, and they arise from the individual's existential encounter with the material work" (Pallasmaa, 2014, p. 82). Therefore, the material work should not be only considered as an art of image; rather, the "existential, embodied and emotional experiences" should also be taken as an important perspective to study material. Thus, this research project studies material from the spatial perspective

rather than focusing on material alone. To combine the two issues, the concept of "weak architecture" might be a useful tool through which to understand SANAA's work.

Compared to those conventional architectures which ignore the environment and tend to show their own image, some works of this strand of architects are called "weak architecture" by critics and some architects themselves, to show a weaker position of building compared with concerns regarding environment and human. However, there are multiple meanings embodied in this concept. Some critics use the term "weak architecture" to refer to the material condition of the building, some use it to describe the function arrangement of the building, and others interpret it as subjective experience by referring to some philosophical concepts. Therefore, since its meaning is not only confined in the physical aspect of architecture, the concept of "weak architecture" could be seen as a bridge to connect material strategy and spatial intentions. Sejima uses the word "weak" to describe the overall enclosure of the spatial-structural units of a building. She emphasises the relations between the units, which offer the possibilities for the linking of human actions (Sejima and Nishizawa, 1999, pp. 118-119). Cristina Diaz Moreno and Efren Garcia Grinda claim that there is a new notion of weakness in SANAA's architecture: the architecture no longer proposes itself as the central theme, instead, people and their actions are predominant (Cecilia and Levene, 2004). Taking SANAA's weak architecture as an example, the thesis aims to find out: What is the role of materiality in their weak architecture? To be more specific, how does SANAA use material strategy to produce architecture that has distinct characteristics compared to other contemporary architecture? Is their work a celebration of materiality, or a denial of it? Or something in between – more subtle, more complex, more ambiguous? These questions are related to two fundamental issues, weak architecture and material strategy, which can be broken down into a series of sub-questions:

1 How does SANAA transform our sense of the physical space through the unconventional selection and juxtaposition of materials? How do they challenge the boundary of the real and virtual space with the perception of material?

2 What role does material play in weakening the boundaries between building and environment?

3 How does SANAA redefine the boundaries between privacy and publicity, and the function of space, through the formal and material strategies of weak architecture?

4 How do all these strategies of boundaries relate to the concept of weak architecture? To what extent do these characteristics explain weak architecture? Or does weak architecture explain these characteristics? What are the other definitions of weak architecture in SANAA's design?

1.2 Methodology

To address the above questions, the research sets out a series of tasks. Firstly, the concept of "weak architecture" needs to be clarified. Secondly, the material characteristics, spatial and social qualities of SANAA's architecture need to be identified. Thirdly, the link between materiality and the definitions of SANAA's weak architecture needs to be built up in order to understand the role of materiality in realising the weakness of their buildings. To discuss these questions, the thesis integrally applies a spectrum of research techniques, including interpretive historical and theoretical research, typological and diagrammatic analysis, interviews and luminance readings.

To use the concept of "weak architecture" as a tool to explore SANAA's architecture, the first step is to investigate the existing understandings of this concept. A few notions of "weak architecture" are proposed by Japanese architects, who developed both the literal weakness in architecture focusing on the structure and material and a broader sense of "weak architecture", including the poetic sense in space and the building's relationship with environment and people. The variety issues of weak architecture are then developed into three themes – diagram architecture, architecture as landscape, and smooth architecture – to discuss SANAA's weak architecture. The architect, historian and philosopher Ignasi de Sola-Morales also introduced the idea of "weak architecture", in which he projects Gianni Vattimo's idea of "weak ontology" on the reality of architecture. This leads to a philosophical investigation of weak architecture. Besides, the concepts embodied in various interpretations of weak architecture imply a meaning of ambiguity and weakness, which demands a further philosophical investigation. Therefore, the philosophical concepts related to weakness and ambiguity are explored, including Vattimo's concept of weak thought, Deleuze's concept of smooth space, and the concept of liminality. These concepts are later applied in the analysis of the two case studies. What is more, due to the Japanese background of SANAA, the ideas of weakness and ambiguity in Eastern philosophy are also introduced. The aim is to build up a theoretical framework in order to achieve a better understanding of weak architecture.

Case studies are used to identify the material characteristics, spatial and social qualities of SANAA's architecture. The first stage is to collect critiques and writings on and by SANAA, and the second stage is to assess these views (question, test, and support or oppose them) through examining their architectural work at a more detailed level.

To address the material, spatial and social issues, the literature review of SANAA's work is conducted under these categories separately. The review on material is

categorised as whiteness, transparency and thinness, which are the most frequently mentioned material strategies in the comments on SANAA's work. The spatial issues are also grouped by the most frequently discussed questions such as atmosphere, unconventional programme and the building's interaction with environment. The classification of each side – the tangible material reality and the intangible spatial intention – supports the later analysis on the interaction of these two aspects of issues. Rather than trying to find a random relationship within a broad scope, the bridges between the two sides are built based on the confined classification of each issue.

The literature review on SANAA's work is mainly based on English publications introduced in last section, which is also a limitation of this study: There should be a large number of material on SANAA in Japanese. However these documents are not included in this study due to the language limitation.

The second step is to assess these views by examining SANAA's design process and the built projects. Not all of the cases can be investigated in person and on-site; some of the cases can only be read through documents.

The first aspect is to conduct a general review of SANAA's project, which is based on typological analysis emerged from the study of their design process. The design process and methods are examined because they are unconventional comparing to other architect offices and they also result in SANAA's unconventional built outcomes. Diagrams and physical models are the main tools in SANAA's design process. The typological and diagrammatic analysis are conducted based on SANAA's notions of Trail/Grid/Island/Homogeneous/Zones. One limitation of this typological analysis is that the five types come from the reading of only one case – the new Mercedes-Benz Museum, due to the lack of published documents that record their design process. However, these types seem could cover most of SANAA's work, which proved to be a valid tool to conduct an overall review of their work.

The second aspect is to conduct a more detailed reading on the two main cases – Rolex Learning Centre and Louvre-Lens Museum. There are a few reasons to choose these two cases. Firstly, the two projects are relatively recent (Rolex Learning Centre was completed in 2009 and Louvre-Lens Museum was completed in 2013) and with large scale, which could be seen as a summary of the architects' thinking over the years. Secondly, they have typical SANAA's material expressions and also lay particular emphasis on certain material strategies: Rolex Learning Centre is a good example to study whiteness since it is different from the whiteness in early modern architecture, while Louvre-Lens Museum is suitable to study transparency and reflection due to its extensive usage of glass and aluminium panels in both interior and exterior. Besides their material strategies, the unusual spatial qualities in the two cases stand out comparing to SANAA's other smaller scale projects. Therefore, they provide ideal examples to study the relationship between material strategies and spatial intentions. Another practical reason is that both cases are located in Europe, which is more accessible and convenient than Japan for a study based in UK.

To assess the reviewed issues in the two cases, on the one hand, three themes of SANAA's weak architecture are first pointed out according to the literature review on weak architecture and the characteristics of the two cases – diagram architecture, architecture as landscape, and smooth architecture. The issue of spatial intentions is clarified in the three themes. On the other hand, the three main material strategies that have been identified through the literature review on SANAA's work are investigated through a detailed analysis of the two cases in each theme of weak architecture. The concept of tectonics is used to study the role of materiality in realising these spatial intentions. Unlike the conventional subject of tectonic – which is the structure and enclosure of a building – the definition of tectonics in this study is broadened according to Kenneth Frampton's three values, the *tactile*, the *tectonic*, and the *telluric*. The three values include topography and phenomenological perspective,

which match with the Japanese architects' interpretations of weak architecture. Therefore a three-part tectonic model is used to discuss the role of materiality in SANAA's weak architecture: the joining of material; the joining of the building and the site; and the joining of space or functions. In order to study the visual perception referencing psychologist Margaret Livingstone's two visual systems, luminance mapping is undertaken in the two cases to achieve a better understanding of their luminous environment. The luminance values are recorded by using Photolux, a luminance mapping software which measures in cd/m^2. The luminance mapping is done from photographs which were taken on site. Although the luminance values could be slightly influenced by different conditions in which the photos were taken – different time or weather condition, the degree of accuracy is enough the show the flatness of the space in the two cases.

The third aspect is to interview the engineer of the two cases, in order to understand the technical issues of construction regarding the subject of transparency, whiteness, and thinness. Bollinger + Grohmann is the engineer of the two cases, they have been working with SANAA since 2004. Implementing the purist constructional elements of the building characterised by a weightless appearance is always a major design challenge for the engineers. There was a chance to interview Professor Manfred Grohmann, who shares the construction challenges behind the simple surfaces of the projects. All the construction information related the realisation of simplicity is selected and included in the introduction of the two cases. Another limitation of this study is that it is difficult to get access to the design team, therefore no interviews could be conducted with the SANAA office. However, the architects' pursuits of lightness of structure and the atmosphere of the space are conveyed through the interview with the engineer. Considering the architects' reticence in talking about their design theories, it could be argued that their actual buildings may offer the best material to study the materiality.

1.3 Structure

According to the research methodology, a four-part-layout is applied to the structure of the thesis. Part 1 is the literature review on SANAA's work and the related theoretical study. Chapter 1 discusses the existing reviews and critiques on SANAA's architectural work. Two aspects are identified in their work: the materiality features, and the formal and spatial purposes behind the surfaces. Although often discussed separately, a close connection between the two is revealed through the review of critiques. There seems to be a complexity, ambiguity, and looseness concealed in the simplicity of SANAA's architecture. This raises two questions: what does ambiguity mean in SANAA's work, and what is the role of materiality in the realisation of spatial and formal intentions? In particular, the notion of 'weak architecture' seems could describe the strand of Japanese architecture that SANAA's work represents. The following investigation begins with the meaning of weak architecture.

At the beginning of Chapter 2, various interpretations of 'weak architecture' are reviewed, including several Japanese architects' concepts of 'weak architecture', and Spanish architect and historian Ignasi de Sola-Morales' understanding of 'weak architecture'. Sola-Morales' ideas on weak architecture are derived from Italian philosopher Gianni Vattimo's theory of 'weak thought'. In order to have a better understanding of weak architecture, Vattimo's concept of weak thought and other relevant philosophical concepts on weakness and ambiguity are discussed, including Deleuze's concept of smooth space and the concept of liminality. Because of Japanese architects' preference for weak architecture, weakness and ambiguity in the Eastern philosophy and Japanese culture are also investigated. In this chapter, a theoretical framework is built to give the thesis a solid foundation from which to explore SANAA's weak architecture.

Part II, which includes Chapter 3 and Chapter 4, introduces SANAA and the two main cases of the study. Since the Japanese architects have a clear apprenticeship network, Chapter 3 firstly situates SANAA in the genealogy of Japanese architects, to achieve an understanding of what they inherited from the previous generation and what influence they have on the next generation. The social and economic situation of Japan at the time when SANAA started to develop is also discussed.

Secondly, different from other collaborative architects, Sejima and Nishizawa also run their own practice individually; they have different personalities and preferences in the design, so the working mode of the three associates is investigated. In the introduction of their design method, the main focus is on the analysis of 'diagram' because of Toyo Ito's critique of "diagram architecture" on Sejima's work, and also the evidence that large amounts of diagrams and models are produced in their design process, which might radically affect their design results.

Chapter 4 introduces the two main cases of this study – Rolex Learning Centre and Louvre-Lens Museum – which have material and tectonic expressions that are typical of SANAA. In each case, the context of the project, the space layout, and the construction details are introduced. Although the expressions of materiality are very simple, the complex construction secrets behind these simple surfaces are revealed. At the same time, certain spatial and formal intentions begin to emerge in the analysis of the cases, which show a close relationship with the material and tectonic strategies. This leads to a brief survey on different issues in weak architecture to be discussed in Chapter 5.

Part III is the theoretical discussion on the relationship between material and weak architecture. Different interpretations of weak architecture reviewed in Chapter 2 covered three issues: the dematerialisation of weak architecture, the place in weak architecture, and the programme in weak architecture. Based on the introduction of

the two cases in Chapter 4 and the theoretical framework constructed in Chapter 2, Chapter 5 develops these three aspects into three themes of weak architecture: diagram architecture, architecture as landscape, and smooth architecture. According to the three themes, the last two chapters investigate the role of materiality in SANAA's weak architecture.

Chapter 6 investigates the three themes of weak architecture in depth through the analysis of the two cases. In the first three sections of Chapter 6, the role of material is discussed following the investigation of formal and spatial issues of each theme. Based on the analysis of these themes, the ambiguous visual perception appears to be a key issue in the material's performance. Therefore the last section of this chapter (6.4), haptic space, focuses on the visual perception of the material in the two cases, which leads to the critical discourse focusing on material in the last chapter.

By conducting a theoretical investigation, Chapter 7 concludes the role of materiality in the realisation of the ambiguous nature of weak architecture based on the analysis of the cases.

The last part, Chapter 8, is the conclusion and directions for future work. A more comprehensive understanding of weak architecture and the role of material in realising the weakness are set out. Furthermore, future research on the visual perception and social interaction in the "augmented weak architecture" is suggested.

Part I Literature review of SANAA's work

Chapter 1 Literature reviews of SANAA's work

Introduction

Many critics have expressed the difficulty of exploring SANAA's work. For example, architects Cristina Díaz Moreno and Efren Garcia Grinda once wrote, "In one's attempt to understand and explore the SANAA universe, one is surprised to find that the flight is over at the very instant of take-off; apparently there is nothing to explore; there is nothing to understand" (Cecilia and Levene, 2004, p. 27). However, among the limited discussions and criticisms of SANAA's architectural work, materiality seems to be an inevitable and main topic, because it is an obvious identifiable trait within their architecture.

Critics have reiterated over the years that simplicity, transparency and formal austerity are the most distinctive features of SANAA's work. However, the formal, spatial and social meanings behind this abstraction remain obscure. Even if some critics have touched upon these issues, they have not related them to the physical condition and materiality of their building. Therefore, we should not lay our eyes only on the surface of these buildings: these material strategies and physical conditions are not just material, in fact, they are part of the approaches that are in the service of the buildings' formal expression and the user's real experience. The research on material from formal and spatial perspectives, and vice versa, is thus crucial.

To explore this issue, two aspects need to be identified first: what the materiality feature of SANAA's work is, and what the formal and spatial purposes behind these surfaces are, which are reviewed in sections 1.1 and 1.2, respectively. Section 1.3 identifies some unresolved issues in the existing studies. Based on these discussions,

the author assesses how the architects achieve the formal and spatial targets through these material strategies in later chapters.

1.1 Physical condition of SANAA's work

According to the chief curator of the 21st Century Museum of Contemporary Art Yuko Hasegawa, Sejima's intuitive ideas always emerge from her anarchic physicality, so she has a signature style of physical sensibility.

At a time when postmodern buildings – which often have curved forms, decorative elements, bright colours, and features often borrowed from earlier periods – are going up everywhere around the world, SANAA has always chosen architecture without ornament. A group of critics share the idea that simplicity and immateriality are the characteristics of SANAA's work. For instance, Stan Allen comments, "Sejima and Nishizawa's pioneering buildings have created an architecture that marries aesthetic simplicity with technical complexity, defining a new architectural language which plays with light and perception" (Idenburg, 2010b, p. 72). In "Ocean of Air", the authors demonstrate that "Sejima and Nishizawa's architecture joyfully and unselfconsciously embraces simplicity as a synonym for precision – precision when resolving the internal contradictions of a situation" (Cecilia and Levene, 2004, p. 27). In a conversation with Sejima in 1996, Koji Taki commented that her work is remarkably fresh. As he observed, one group of people experiences a kind of shock at the straightforward way in which Sejima expresses the system, and they are left wondering whether this kind of bluntness is really acceptable at all. The other group of critics only focuses on the aesthetic aspect of her work, commenting on its "light", "metallic", or "transparency" features. However, both groups would agree that her work delivers a strong sense of the contemporary (Sejima and Levene, 1996).

The sense of the contemporary is inherited from Mies van der Rohe. Many critics have related SANAA's work to that of Mies'. Stan Allen views SANAA's work as a reprise of Mies van der Rohe's "almost nothing," the building as object fades away, to become a blank screen for an ephemeral play of light, shadow, and translucency (Sejima, 1996, pp. 74-107). Commenting on Sejima's 'House in a Plum Grove', Toyo Ito writes,

> When I first saw this residence, I immediately thought it to be the ultimate expression of Miesian space that Sejima had long been in pursuit of. It is a fact that her architecture always follows the premise of 'less is more'. To the extent possible, the details were made pure and it appeared as if the non-material abstract space itself was the very concept she sought in her architecture (Ito, 2004, p.4).

The House in a Plum Grove for instance is rigorous in achieving reduction, where the plan becomes a diagram. The blackness on a plan, the representation of the invisible structure, is almost reduced to a non-existent minimum – a line. The line of a wall is then translated into a steel-plate construction of 16 mm thickness. Guzman points out that SANAA creates an architecture defined by visual lightness, "an echo" of Mies' Farnsworth House in the middle of the American forest (Rubio, 2007, p. 167). From these comments, it seems that there is similarity between these two architects' work. Does SANAA adopt a similar material strategy to Mies? What is the distinction between the material expressions in their architecture? These issues are investigated by comparing the cases of both architects in Chapter 6.

Toyo Ito coins the term "diagram architecture" to characterise what he saw as a new sensibility in the work of Sejima. The strength of Sejima's architecture, he noted, derived from her extreme reduction of the building to a special kind of diagram, constructing it as far as possible as she represented it. He writes in the article

“Diagram Architecture”: “If there is one way that best describes the spirit of her structures, it would be to say that it is ‘diagram architecture’. In other words, that according to her, a building is ultimately the equivalent of the diagram of the space used to abstractedly describe the mundane activities presupposed by the structure”. Ito claimed that the elemental expressions of material and colour, expressed in the original design drawings or models, are not in any way changed when brought into being as the walls and supports of the finished structure (Ito, 1996, pp. 18-24). In this ascription, architecture itself becomes joined to its diagram – a diagram of spatial function transformed transparently into built spatial function with hardly a hiccup. The wall, which technologically takes on all the weight of this translation, thus carries the freight of the line. According to Ito, the process from a diagram to a three-dimensional building depends on two aspects: on the one hand an individualised artistic intent based on self-willed expression; on the other hand, mere commonplace habits that have become the established archetype. Ito criticised “the fact that almost all architecture has emerged from the confines of these two antagonistic, completely opposite poles is virtually incomprehensible. Most architects have no serious doubts when faced with the contradiction that architecture has nurtured within itself” (Ito, 1996, pp. 18-24). However the concept of ‘architecture’ as something to be confronted simply does not hold true for Sejima – and therein lies her novelty.

Cultural background is another issue when it comes to the simplicity of SANAA’s architecture. Japanese architecture is traditionally and historically very light and transparent, differing from the weightiness of traditional European architecture. Guzman claims that SANAA’s architecture subtly and unconsciously applies features of traditional Japanese architecture, which has an aesthetic of simplicity, modesty, purity, lightness and sophisticated austerity (Rubio, 2007, pp. 167-173). Heneghan and Guedes argue that SANAA’s architecture is possibly a stylistic flavour derived from the spatial ambiguity and translucent *shoji* screens of Japan’s traditional houses

(Heneghan and Guedes, 2006, pp. 78-84). The architects themselves claim that they do not think of their architecture as evolving directly from Japanese culture. However, they do assert that Japanese tradition has all kinds of influences on them. What are the unconscious effects of Japanese culture on these architects?

Mohsen Mostafavi claims that the emphasis on the fragility, lightness and seeming disappearance of architecture is itself part of a deep commitment to the material and physical condition of architecture, which is the reason why SANAA are not so invested in beginning their architectural projects with ideas related to future user's experience of the building but rather with 'its mass and physicality' (Sejima et al., 2011, p. 247). Is it true that SANAA put the building's mass and physicality before the consideration of the user's experience? This point is revisited in section 1.3.2 when the connection between the two is discussed.

Simplicity and immateriality are also broken down by critics in a more detailed way, focusing on what kind of material features provides the impression of simplicity. Whiteness, transparency, and thinness are three main themes that are most frequently mentioned when commenting on SANAA's work.

1.1.1 Whiteness

Catching a glimpse of SANAA's architecture, one will get an impression that whiteness is quite dominant in their work. However, nowhere in SANAA's writings or statements is there any explanation of the reason why their architecture is white. Critics have only made some general comments on whiteness.

Luis Fernandez-Galiano states that Sejima is known for the "monochrome homotopias" (Rubio, 2007, p. 176). Juan Antonio Cortes points out that the use of uniformly

distributed lighting and white colour is a strategy to create homogeneity and remove hierarchy in their work (Sejima et al., 2008). The role that whiteness plays in the abolition of hierarchies is confirmed by Sejima herself. When asked about the role of the almost complete monochromatic reduction in the definition of the abstract character of their work, Sejima said, "We want people to recognize the relationship between parts without a dominant finish. Too much emphasis on secondary levels is distracting" (Cecilia and Levene, 2004, p. 17). To avoid dark end spaces, they use white colours to make the end space as bright as the entrance. "White is very important. It diffuses the light, which is also related to freedom and free spatial relations" (Cecilia and Levene, 2004, p. 19).

How does whiteness create homogeneity of space? According to Sejima, whiteness diffuses the light, which implies a connection to visual perception. There is a connection between whiteness and visuality that we can trace back to the early modern architecture. The whitewash wall phenomenon has been a peculiar and ubiquitous characteristic in the early days of modern architecture and further extends into contemporary architectural practice. The whiteness, along with the International Style, drew many criticisms in architectural history. According to the architectural theorist and historian Mark Wigley, the white wall is intended to radically transform the status of a building by transforming the condition of visuality itself (Wigley, 1995, p. 2). He points out that Le Corbusier's arguments about whitewash are arguments about visuality that reconfigure traditional assumptions about sensuality and space. The overly sensual decorative interior and facades block the fantasy of a body behind them and even the sense of a discrete body in front of them. Wigley wrote,

> The body of the building and the body of the observer disappear into the sensuous excesses of decoration. To look at decoration is to be absorbed by it. Vision itself is swallowed by the sensuous surface. The white surface liberates the eye by reconstituting

> the idea of a body hidden behind it, recovering a sense of space that has been lost (Wigley, 1995, p. 7).

If whiteness has a great influence on visuality as claimed by Wigley, is this the reason that SANAA uses whiteness? Is it because that the architecture of SANAA is about space rather than building itself; they want the walls left empty to permit free use of the space? From this perspective, the thesis explores how whiteness affects the visual perception of space, creating homogeneity, or any other effects of the space.

1.1.2 Transparency

Transparency is another main feature that contributes to the simplicity and immateriality of SANAA's architecture. Compared to whiteness, transparency is a more popular topic among criticisms of SANAA's architecture.

Since the beginning of the twentieth century transparency has been a critical concept in the theorisation of modern architecture. In the 1920s it was conceived by the architectural avant-garde as an operation performed by the object itself: through transparency the aesthetic, technological and social operations of architecture were not only revealed, but also brought into a new and dynamic relationship with one another. Today, architects are looking toward new methods that reflect a more pluralist and informational time. The designers and creators of our modern world push the limits of what a building can be. In addition to the aesthetics and spatial effect of glass architecture, glass technologies have led to significant structural innovations and energy efficiencies, which make glass a visually and practically accepted material in modern architecture. SANAA's work is a representative of transparent architecture.

Transparency in SANAA's work is always not only about the mere ability to see. The first question that critics raised is the atmosphere that transparent material produces. In "Inorganic Architecture", Mohsen Mostafavi claims that the fascination with transparency is evident in many of SANAA's projects, but their work transcends visual transparency. He writes, 'Their sense of lightness has as much to do with the sheer weight of building – their haptic qualities of lightness – as their perceptual qualities' (Sejima et al., 2011, p. 247). Federico Soriano argues that the results have been described as atmospheric, probably influenced by underexposed photographs, the continuity of whites from paper to print, or the use of curved, obloid geometries that blur outlines and insinuate ether. He claims that the real experience of their buildings does not match the printed image. "These architects work with specifics, the material, not the ethereal. Even when they work with transparency, it is not to create an atmosphere but matter. Or its absence. The effects occur on the physical surfaces of the object" (Sejima et al., 2015, p. 385). Indeed, the architects work with material rather than the atmosphere; however, since the material can produce an atmosphere, which could be a reason for the consideration of material choice, the two should not be considered separately. Through the field study of certain cases, the thesis is able to testify if the real experience of their buildings matches the printed images.

The second issue that emerges in the criticisms concerning transparency is its effect on boundary, including the boundary inside the building and the one between the interior and the exterior. Jayne Merkel remarks that SANAA's work "is characterised by a persistent preoccupation with the rethinking of boundaries, their removal, blurring, and clarification. Their concern with transparency has created both a subtle phenomenal translucency and a highly effective process of diagrammatic reduction" (Merkel, 2008, pp. 98-101).

The consideration of the boundary does not only concern the transparency of material, but also the reflection. The use of glass in many of SANAA's buildings is not solely

for transparency – they go even further in producing a layering of reflection on the inside as well as the outside. In a conversation with Jacques Herzog, Sejima said, "Recently, I am interested in non-transparency using glass…Actually, I am interested in reflection rather than just the transparency in the glass" (Sejima and Nishizawa, 1999, p. 4). Sometimes they also emphasise the physical opaqueness of the glass walls. Kristine Guzman states that transparency is perhaps the word that best defines SANAA's works, since they frequently resort to that which is extremely light, or to an interplay of reflections that often obscures orientation with a building (Rubio, 2007, p. 169). All of this offers a more intense experience of space. The reflection is unlike the transparency that creates total continuity between the interior and the exterior. As architectural historian Beatriz Colomina comments on SANAA's transparency,

> The whole point is not transparency but blur…The clearest of glass now used to undermine clarity. The effect of this architecture is not unmediated transparency but rather a vision that is more blurry, veiled, nebulous, vaporous, as if in a snow storm or a dense fog, more infinite. This architecture is much lighter than Mies, Johnson or even the Eames. It is as if the architecture wants to disappear, to evaporate (Sejima et al., 2015, p.395).

What does transparency and reflection blur? How does the transparency change the relationship between the spaces in the building, and that between the interior and the exterior if it is not just a total continuity? The latter is actually about the relationship between the architecture and its environment, which is discussed in section 6.2, Architecture as landscape and section 7.3.2, Saturation.

The third issue concerning transparency is about the spatial organisation or spatial strategy. Kristine Guzman remarks that transparency in SANAA's work not only refers to the effect obtained by the use of transparent material, but also planning and structural

strategies. Eve Blau's article 'Tensions in Transparency" focuses on different understandings of transparency in SANAA's work. She argues that transparency is not only physical attributes but also the concept generating their building and the phenomenological experience of their space, forms, and materials (Blau, 2008, pp. 29-37). Similar views are found in Alberto Montesinos' article; "their use of transparency has been depicted not only as a functional or visual resource, but also as projective relationship, as a mode of "flexibility" detached from simple games of reflections and blurriness, or from the mere ability to see."[2]

Sejima explains that the concept of transparency is about clarity and a diversity of relations. On the one hand, she wants to make some of the differences between the spaces, between the volumes, more visible, which she regards as transparency (Sejima et al., 2015, p. 17). On the other hand, transparency means relationship. Sejima explained,

> Mainly we think about borders. A reflection is not a real wall, but it signals a different space. The meaning of transparency is to create a diversity of relations. It is not necessary to always see through. Transparency also means clarity, not only visual, but also conceptual. There are so many relations (Rubio, 2007, p. 17).

Then, what is the underlying meaning of transparency as a spatial strategy, which is interpreted by Kristine Guzman as "planning method", by Alberto Montesinos as "projective relationship", or by Sejima's own explanation as making the difference between the spaces more visible and to create a diversity of relations?

[2] Sejima: "What I mean by transparency is a bit different from being able to see. For me, information society is mainly about not seeing." In EL Croquis 99. p.14.

1.1.3 Thinness

In addition to whiteness and transparency, the output of these two architects has also generally been associated with the quality of thinness. SANAA creatively appropriates many of Modernism's architectural and spatial devices and takes them to their technical limits: paper-thin structural steel walls, disproportionately slender pillars, laminated glass panels of the largest possible dimensions without resorting to frames or bracing. Three points of view on thinness could be summarised as following:

Firstly, the effect that is associated with thinness: lightness, immaterial and virtual appearance. Juan Antonio Cortes writes, "The apparent lightness of the architecture designed by SANAA is not the result of the use of light materials, but the dimensional reduction of the constituent components in a building, which is aimed at ensuring the most extreme relationship possible between their dimensions (extreme thinness and slenderness). This maintains the surface or linear nature of the elements that shape the space" (Sejima et al., 2008, p. 49). The lightness and thinness of the building components have come to supplant our conventional associations of traditional building components. Architect Luis Fernandez-Galiano comments that SANAA's architecture lies in its limits, where "it effortlessly inhabits the borders of encounter, which slim down implausibly, becoming nearly virtual; …Their construction at the limit is essentially architecture in the negative, achieved through a stripping-down: buildings strive to divest themselves of thickness, dispense with inertia, rid themselves of density. The process generates objects with an immaterial appearance" (Rubio, 2007, p.175). Does this "nearly virtual" and immaterial appearance have something to do with the virtual space in the information society? According to the architects, "in order to think about the information society there seems to be a relationship to the idea of dimension or the effect of the mass or the volume on us". They imply that thinness has something to do with the immaterial, the virtual, or

lightness, which are the characteristics of the information society (Sejima and Levene, 1996, p. 16).

Secondly, similar to whiteness, thinness eliminates the hierarchies. The wall and columns are reduced to their minimum, to eliminate the hierarchy that exists between structure and partition. Moreno and Grinda (Cecilia and Levene, 2004) describe that the dissolution of the structure has spread to almost every vertical component of the building; practically everything is structure, with little thickness and a visual presence throughout the building. The tension between the actual bearer elements and the partitions is dissolved. Juan Antonio Cortes (Sejima et al., 2008) called referred to the slender columns as the "neutralisation of structure". He remarks that making the columns as thin as possible leads to a multiplication of the number of columns and, at the same time, their neutralisation through the suppression of their corporeality and their perceptive disappearance by making them almost invisible. What difference does it make to the spatial perception when the corporeality of structure is suppressed?

Thirdly, thinness requires more construction techniques to reach the technical limits. In the article "How thin is thin?" Mark Wigley compared SANAA's thinness with the post-war polemical thinness of Felix Candela's reinforced shells, Jean Prouve's metal sheets, and Frei Otto's plastic membranes. These successive generations of designers have been trying to "doing more with less" as Buckminster Fuller described the central task for design. According to Wigley (Sejima et al., 2015), unlike those thin buildings which take the form of structural diagrams, and with the material having very few internal secrets, SANAA's thinness requires the most sophisticated structural engineering precisely in order for the engineering not to show. They do the most to give the appearance of the least. To be 'thin' requires some change in the usual constraints of budget, technology, material, regulation and convention. Paradoxically, thinness always requires more of something. He suggested an interesting metaphor comparing the building to a ballet dancer with internal effort and

tensing of highly trained muscles to hold a seemingly effortless pose. What is the reason behind the pursuing of thinness if it requires more of something? What are the constructional secrets drawn on to realise such thinness in their building?

To sum up, whiteness, transparency, and thinness are the obvious material expressions and strategies that we can observe in SANAA's architectural work. The architects and critics all imply that the simplicity and immateriality conveyed by SANAA's architecture are not only handled as if they were physical characteristics, they also reflect some spatial intentions. However, the existing studies on what is behind these physical characteristics are considerably general and limited. Moreover, the cultural reference associated with these works fails to convey any underlying principles apart from the aesthetic resemblance to the physical condition of traditional Japanese architecture.

1.2 Spatial and formal intention of SANAA's work

Apart from the physical condition of SANAA's buildings, many critics have also touched upon the issue that their buildings are the product of an elaborated artifice of perception rather than merely a tangible structural reality. Following the review of the literature on SANAA's work from the perspective of materiality in the last section, this section focuses on the spatial and formal intentions of the architects.

1.2.1 Atmosphere

In the article "Artists of the Floating World", Hugh Campbell (2008, pp. 92-95) points out that there is a shared spatial language between the atmosphere of SANAA building and that of Niedermayr's photographs. Niedermayr is best known for his serial images

of snowy Alpine landscapes sparsely populated by brightly clad skiers and climbers. These figures are tiny in scale but remain visible against the vast expanses of whiteness in which they appear to float. Niedermayr appears to have found an interior landscape with something of the same character and effect in SANAA's buildings. Like those tiny figures traversing the Alps, people appear to float in the whiteness and transparency of a SANAA building. Moreno and Grinda also emphasise the atmosphere produced by SANAA's buildings. They claim that the architecture's physical presence has retreated to the background. Their work shows interests in the way atmospheres are produced. "The air, and a design that reflects its properties, becomes the architect's main focus" (Cecilia and Levene, 2004, p. 31). Another scholar, Alberto Montesinos, directly points out that SANAA's building is a certain atmosphere contained by physical reality. He claims,

> The objective of SANAA's methodology is neither whiteness, nor lightness nor transparency, and it is neither the subversion of the programme, nor the interaction with the site. For SANAA, the act of building means creating a certain atmosphere contained by physical reality, a frame that defines the sensorial expression of seeing. Thus, the product of SANAA is the spatial phenomenology, the precise and exquisite synthesis of all the parameters addressed in the project, the holistic materialization of a particular way of inhabiting space (Montesinos, 2013).

Although it is doubtful of his idea that SANAA's objective is "neither the subversion of the programme, nor the interaction with the site"[3], it could be agreed that there is "a certain atmosphere", and a "sensorial expression of seeing" in SANAA's work, which is explored in the case study in Chapters 6 and 7.

[3] This is discussed in the Theme 2 Architecture as landscape and Theme 3 Smooth architecture, respectively.

Atmosphere is something between the subject and the object, so it involves the viewer at the same time: the experience of locating the body in relation to space. Therefore, it is easy to understand why the organisational systems of local relationship and the experience of depth and orientation are predominant in SANAA's work.

1.2.2 Subversion of conventional programme

SANAA takes the individual's experience as a key factor in the design process. Yuko Hasegawa asserts that Sejima 'focuses on the "temporal sequence": actions and events caused by living in that building. When the movements of the people inside the building are visible from without, the sequence of events becomes a part of its external appearance' (Hasegawa, 2006, p. 9). She comments that Sejima's architecture is designed with a minimal constructive order and system so as to foster unexpected movements (Hasegawa, 2006, p. 12). However, Alberto Montesinos holds the opposite opinion. He claims that the obsession with control and simplicity restricts the ability of architecture to respond and adapt to multiple sociological and performative requirements. Then, what is the relationship between "minimal constructive order and system" and "unexpected movement"? Is the simplicity a restriction or promotion for the "temporal sequence"? It is necessary to have a look at how the architects consider the activities and events caused by living in the building first.

Japanese architect Jun Aoki asserts that Sejima conceives the human actions that take place within a building as things only imperfectly defined (Sejima and Nishizawa, 1999, p. 6); this is probably why she always questions the conventional consideration of programmes.

Guzman points out that SANAA's houses are capable of transforming a person's way of life, or the relationships between its inhabitants. For instance, through their house design, they question the concepts of intimacy, new family structure, or the demarcation of public and private space. They create "prototypes" that are outside the conventional concepts of home (Rubio, 2007, p. 173).

At the conference series: A New Innocence: Emerging Trends in Japanese Architecture in 2011, Preston Scott Cohen also pointed out that SANAA's transparent buildings are like experiments to test people's behaviour:

> Many theorists have remarked that they set up experiments in which the raw programme of the building is configured with an unusual relationship between, through and within spaces using layers of reflection and transparency, and experiment that lets us in the end see what people do in these spaces. In this way dozens of types of spatial relationships and experiences are being created, tested and the outcomes are unpredictable.[4]

In the early period of her career, Sejima started to become concerned about the social factors in the design: "I do deal with social issues. I take my first cues from society, but from there on, I devote my energy to developing my own ideas and discoveries…I look at architecture as a vehicle that enables us to get a better grasp of society or culture…I believe that architecture performs a function of which it and only it alone is capable. This function is closely entwined with the way people lead their daily lives" (Sejima and Levene, 1996, p. 12). The concern for people's daily lives has led Sejima to doubt the conventional function and programme for architectural design. At the

[4] Preston Scott Cohen on Harvard GSD lecture series, "A New Innocence: Emerging Trends in Japanese Architecture", Cambridge, 2011.

beginning of Sejima's practice, the focus was merely on the aspect of function. "People's activity" or "people's movement" were frequently used terms in her early writings. She wanted to interrupt the sort of planning which presumes the discontinuity of people's movement. She tried to create a single spatial-structural unit and then let the whole develop from precise relations between several of these. "In this sense," Sejima writes, "the resulting overall enclosure is weak, so that the spatial character shifts towards a correspondence with the linking of human actions" (Sejima and Nishizawa, 1999, pp. 118-119). From the quotation we can see that Sejima emphasises the relations between the spatial-structural units rather than the overall enclosure. She uses the word "weak" to describe the overall enclosure; this is further discussed in section 1.3.1.

Consequently, the physical organisation of spaces is based on the individual's actions and relationships. On being asked about what generates a project, Sejima mentioned two aspects, "For us, thinking about how to organise the programme actually means working on the question of how to organise some of the invisible phenomenology or experience." However, at the same time, Sejima also explained, "I am more interested in the mass of architecture; its physicality and how it appears in various circumstances" (Sejima and Levene, 1996, p. 13). Emphasising physicality of building and experience of users at the same time, are there any connections between an individual's experience and the strategy of material organisation?

1.2.3 Interaction with the environment

The review in section 1.1.2 has shown that the reflection and transparency can make a difference on the relationship between the building and environment. Then, what is SANAA's strategy towards the relationship between the architecture and its environment given the ubiquitous transparency and reflection in their work? Guzman

(Rubio, 2007) states that SANAA has an almost sacred respect for nature – be it in urban areas with limited plots or on sites in the middle of forests. Mohsen Mostafavi (Sejima et al., 2011) comments that one characteristic of the architects' projects is the integration of landscape and nature within buildings. It could be said that separation or isolation are not the attitudes of SANAA's buildings towards the environment.

Juan Antonio Cortes demonstrates that in contrast to the spatial discontinuity produced by the walls in a conventional building, or the horizontal continuity made possible in the space in modern free plan architecture, in some of SANAA's projects, there is a variable feeling of spatial continuity and discontinuity, which is achieved by the arrangement of the walls or through a more active participation of the observer who occupies and moves through it (Sejima et al., 2008). The "variable feeling of spatial continuity and discontinuity" implies an ambiguous relationship on the boundary.

In the article "Camouflage", Julian Worrall points out that a more productive way of understanding SANAA's architecture is as a sustained exploration of the dissolution of boundaries. The building loses its figural outline, becoming an environment in itself. However, the presence of the buildings paradoxically gathers potency by their own disappearance, which can be seen as forms of camouflage. The essence of the camouflage is not an oneness with the world, but a doubling of it. He writes, "Rather than the wholesale dissolution of distinctions and identities in the name of "environment" or "potentials", their work can be seen as covertly introducing and reaffirming certain enduring values of the architectural imagination: artifice, coherence, clarity. This adroit combination of the radical with the sober is where Sejima's and Nishizawa's true power and significance lies" (Worrall, 2009, pp. 30-31). Whether in military or biological contexts, the camouflage is closely related to the colour or texture of the surface material. Therefore, the presence and

disappearance of SANAA's buildings should also depend on the materials used to produce the surface.

1.3 The gap

1.3.1 The ambiguity of ambiguity

In section 1.1.1, Whiteness, Sejima says that whiteness *diffuses* the light. In section 1.1.2, Transparency, Colomina comments that "the whole point is not transparency but *blur*". In section 1.2.2 Cohen states that SANAA's buildings are like experiments to test people's behaviour; therefore, the outcomes of the spatial relationship and experiences are *unpredictable*. *Diffuse*, *blur*, and *unpredictable* – these three words suggest that an ambiguity exists in SANAA's work. Even though the building itself appears simple and precise, what it produces is a kind of ambiguity. What does this ambiguity mean?

There are already some discourses about ambiguity in SANAA's architecture, which can be categorised into three issues. Firstly, the ambiguity is about the materiality itself. In the article "Translucency", Heneghan and Guedes point out that, in the case of a group of architects such as Ito, Sejima, and Herzog & de Meuron, their architecture appears "provisional and transient rather than definite and durable, with enormous precision deployed in a search for vagueness" (Heneghan and Guedes, 2006, pp. 78-84). They ascribe the increasing ambiguity of architecture to two possible understandings: on the one hand, the architectural response has coincided with techniques of environmental control through layering; on the other hand, it is a stylistic flavour derived from the contemporary Japanese architecture of Ando and Ito, which is itself derived from the spatial ambiguity and translucent *shoji* screens of Japan's traditional houses. Preston Scott Cohen remarked that SANAA's architecture

both becomes conspicuous and disappears at the same time, because the formal attributes seem to be exceedingly present and absent at the same time.[5]

The second meaning of ambiguity is about the spatial continuity and discontinuity between the building and its environment, which was discussed in section 1.2.3, Interaction with the environment.

The third meaning of ambiguity concerns how people use the space. Florian Idenburg writes, "SANAA's work is transparent only to a degree. Upon further exploration, their buildings only give minor cues, dispersed in a field of ambivalence. This deliberate ambiguity turns each individual into a creator" (Idenburg, 2010b, p. 79). This ambiguity of individual's behaviour is interpreted by Sejima herself as flexibility. However, this flexibility is different from the conventional understanding of it as adaptability. In architecture adaptability means the degree to which a space that has been created is adaptable to the needs of users. The usual solution is to change space in response to human activity; i.e. to make walls movable, or to create a frame, allow for freedom of arrangement within the frame, thus creating rooms as required. Sejima, however, takes an entirely different approach. She thought this so-called flexibility assumes a fixed separation of primary structure and secondary partitions. No matter how far any concept is pushed, within such a system there must be things that are overlooked. She would like to imagine the possibility of a division which is not like that. Sejima explains, "In other words a way of thinking which includes a bit more software. Or perhaps a way of thinking where even though there is a change in use, if viewed from a certain angle, there seems to be no change" (Sejima and Nishizawa, 1999, pp. 118-119). In another interview, she makes her understanding of flexibility

[5] Preston Scott Cohen on Harvard GSD lecture series, "A New Innocence: Emerging Trends in Japanese Architecture", Cambridge, 2011.

more explicit, “My idea about flexibility is not literal flexibility, but more a type of flexibility which can be understood by the individual through that individual’s experience” (SEJIMA, 2000, p. 17). For her, flexibility is not created by movable partitions, but through the different experiences of individuals.

Besides the three meanings set out above, “ambiguity” has also been related to another term – “weakness”. The Japanese architects interpret ambiguity in architecture as weak architecture from different perspectives. According to Kengo Kuma, weak architecture means that the material work of the building can evoke embodied, emotional experiences. He claims that weak relates to the idea of breaking materials into particles. The strategy that Kuma uses on material may be different from that of SANAA’s, but both of them use material to create atmosphere instead of making formal statements. Another Japanese architect, Sou Fujimoto, develops formal languages to explore themes of ambiguity and “in-betweenness”. He uses terms like “weak architecture” and “soft order” to refer to weak orders and relationships in a building which is ambiguous, and full of uncertainties. Similar to SANAA’s projects, his buildings mix order and disorder to finely calibrate the relationship between the individual and the group, adapting to the need of the users through a kind of vagueness. These Japanese architects’ interpretations of “weak architecture” are discussed in detail in the next chapter.

Cristina Diaz Moreno and Efren Garcia Grinda also claim that there is a new notion of weakness in SANAA’s architecture. According to them, the architecture designed by SANAA no longer proposes itself as the central theme and relinquished this role to facilitate the predominance in it of objects, people and their actions (Cecilia and Levene, 2004).

Jun Aoki notes that the reason Sejima is not an architect in the classical sense is that she has embraced a contradiction which orthodox architects never face: On the one

hand, the architect must take full responsibility for and decide every part and aspect of a building. The controlled space will place restrictions on people's actions. On the other hand, Sejima believes that she must not indulge her own whims; no one must get the sense that the space has compelled him or her. The architect must remain transparent. These two nearly contradictory demands would seem almost impossible to reconcile (Sejima and Nishizawa, 1999, p. 6). The latter is also a way to express a kind of weakness in architecture.

If SANAA's work has some common features of ambiguity as do Kengo Kuma's and Sou Fujimoto's weak architecture, along with criticisms about weakness in SANAA's work, it would be reasonable to call SANAA's architecture "weak architecture" as well. Although the discussions of ambiguity and weakness can occasionally be found in the existing criticisms on their projects, they are mostly general and lacking in essential argument. In addition, exhaustive studies on ambiguity and weakness from a material perspective are rare. Therefore, this study explores the meaning of weakness in SANAA's architecture through the role of materiality.

1.3.2 The lack of connection between material and spatial intention

From the above reviews on SANAA's work, we can see that most of the criticisms focus on materiality, or spatial and social issues, separately. Even though some reviews have implied that there are more complex reasons behind the simple appearance, these critiques only generally touched upon this point, rather than thoroughly exploring exactly how the materialisation of the space affects the atmosphere, the building's relations with the environment, and the perception or movement of body in the space.

The existing critiques provide some evidence that there could be a close connection between the material strategy and the spatial intentions.

In “SANAA’s dirty realism”, Stan Allen (Idenburg, 2010b) claims the connection between material and their social performance. He writes that although SANAA’s delicate and white buildings often appear in photographs and publications as resolutely abstract, detached from the messy contingencies of life, the architects are not satisfied with an architecture that begins and ends in refined details and sophisticated material choices. He argues that their materials are chosen not for and permanence but for a multiplicity of effects and variability over time; are not chosen for their semiotic references, but for their optical and social performance. buildings acquire an experiential quickness related more to media and communication than to essential tectonic values.

On a constructive level, Guzman points out that by eliminating the usual structural elements such as columns and transferring their supporting functions to those other indispensable elements in design, the architects generate open spaces or create a diversity of relations through elements that visually or conceptually connect spaces (Rubio, 2007, p. 169). This is suggesting that the thinness of structural elements is possibly related to the aim of creating a diversity of relations.

Focusing on the design process, Jun Aoki comments that Sejima uses a method of adjustment instead of the subjectivity of the architect to deal with the architectural form and the programmes. According to Jun Aoki, “for the time being, the method we are using is premised on the extremely modern idea of matching the content of the building (the floor plan or structural plan), the human actions that take place within, and the architectural form.” Ordinarily, one begins with “the human actions that take place within”, develops “the content of the building” as a way of giving order to those actions, and eventually arrives at “the architectural form”. However, for Sejima, the

three things are dealt with simultaneously and on the same plane. She does not judge the correctness of any one thing separately. She only considers the correctness of a way of dealing with three things in combination. There are an infinite number of possible combinations in each project to choose from, which ideally can suggest an architectural form of some freshness (Sejima and Nishizawa, 1999, p. 6). The combination of the three things demonstrates that there should be a close connection between the physical condition, the programme, and the human actions.

Another issue could be pointed out is that the material strategy and spatial intention are not consistent from the beginning of Sejima's career. Sejima explains,

> When I had just started, I was most interested in making some kind of relationship between what I call action and its field. I am now trying to think about many kinds of boundary at once, and not only physical ones such as between rooms or spaces, between inside and outside. But think I have always been interested in how to make the plan, which also means how to make the boundary" (Idenburg, 2010b).

The concern for an individual's action and relationship – for the invisible phenomenology or experience – has remained the same, while the material and structural features of their buildings have gone through a change from complexity to simplicity and dematerialisation. Does this change imply there is a connection between the spatial intention and the material strategy: Is it the ambiguity of perception, programme or spatial relationship that results in the building's material feature becoming extreme white, transparent, and thin? What is the role of materiality in the realisation of these spatial and formal intentions?

Conclusion

Whiteness, thinness, and transparency are three features that can be identified in SANAA's work. They are not only treated as physical attributes of SANAA's work; more importantly, they contain certain atmospheres and define the spatial phenomenology. There is a complexity, ambiguity, and looseness concealed in the simplicity of SANAA's architecture. However, these concealed features have not been fully explored in the existing studies. In this thesis, the concern for whiteness, transparency and thinness is about both the physical reality and the realm of spatial perception, emotion, and effects. The research aims to find out the meanings of complexity, ambiguity, and looseness, and their relationship with the physical attributes. To understand and define the meanings of these characteristics, it would be useful to borrow some philosophical concepts to interpret and analyse the partners' architectural philosophy. The next chapter reviews Gianni Vattimo's weak thought, Deleuze's idea of smooth space, and the concept of weakness and ambiguity in Eastern philosophy to build up a theoretical framework, in order to achieve a better understanding of SANAA's weak architecture.

Chapter 2 A theoretical framework

Introduction

As introduced in Chapter 1, there are various ambiguities in the previously published critical commentaries on SANAA's architectural work. In particular, much of the analysis centres on the notion of 'weak architecture', which could be a useful concept with which to understand SANAA's architecture.

As Juhani Pallasmaa claims, the Western architecture seeks a powerful image and impact, which is influenced by the power and domination characteristics of the Western culture. In contrast, the Eastern culture tends toward weakness in its philosophy. For example, Japanese culture puts significant emphasis on the ephemeral, which is symbolised by the briefly blooming cherry tree. In the Japanese tradition, fluidity is the expression of the general instability of the universe, of the transient nature of beings and things. They have an affinity with the virtual world and its and ephemeral entities. Tradition and the demands of contemporary society may be the reasons we find a large number of buildings showing a new openness and a new transparency in this country. A few notions of "weak architecture" proposed by Japanese architects have been mentioned in the previous chapter. Unlike the literal lightness or weakness in architecture focusing only on the structure and material, the contemporary Japanese architects developed the lightweight architecture to reflect a broader sense of "weak architecture", which includes the poetic sense in space, and its relationship with environment, and with people. They are all concerned with real sensory interaction instead of conceptual manifestations. Besides the Japanese architects' interpretations of weak architecture, the architect, historian and philosopher Ignasi de Sola-Morales also introduced the notion of "weak architecture", in which he projects Gianni Vattimo's idea of "weak ontology" on the reality of architecture. As Pallasmaa wrote,

> According to Vattimo, we can speak of a "weak" or "fragile" architecture, or more precisely, of an architecture of weak structure and image, as opposed to an architecture of strong structure and image. Whereas the latter desires to impress us through an outstanding singular image and a consistent articulation of form, the architecture of weak image is contextual and responsive; it is concerned with sensory interaction instead of idealized and conceptual manifestations (Pallasmaa, 2011, p. 133).

This chapter discusses these interpretations of weak architecture in depth, and refers to some philosophical concepts: Gianni Vattimo's theory of 'weak thought', Gilles Deleuze's concept of smooth space, and the concept of liminality, to explore their potential architectural significance.

2.1 Preliminary survey on weak architecture

2.1.1 Several Japanese architects' interpretation of weak architecture

As mentioned in the previous chapter, several Japanese architects promoted the notion of weakness in architecture, among whom Kengo Kuma and Sou Fujimoto directly use the term "weak architecture". Others such as Toyo Ito, SANAA, or Junya Ishigami, although not mentioning the term directly in their statements, they all pursue a kind of weakness in architecture in their design philosophies and architectural work. The first issue is about the relationship between building and its environment, particularly regarding the state of the boundary of inside and outside, which is discussed based on Kengo Kuma's weak architecture and Junya Ishigami's idea on architecture and nature; the second issue concerns the relationship between buildings and human – the uninterpreted programme and spatial organisation of the architecture, which is based on Sou Fujimoto's interpretation of weak architecture.

The third issue is about the physical condition of buildings, which is discussed in Toyo Ito's "blurring architecture".

Kengo Kuma's interpretation of on weak architecture

Western architecture emerged from a philosophy of confrontation with nature and the impulse to conquer it while the Japanese concept of space reaches out to embrace and to achieve unity and harmony with it. Kengo Kuma is one of the most typical representative Japanese architects who respect this traditional Eastern attitude toward the relationship between building and environment. He found an appreciation for traditional Japanese craft and architecture, which have the sensibilities to develop and inform his selection of material, and how he choreographs space. His work is characterised by the harmonious, embodying a sense of vulnerability. He tries to discover the potential of architecture to act as an experience or phenomenon rather than as an object. Instead of focusing on the form or its sculptural properties of a building, Kuma is interested in the sensations of inhabiting space. Therefore, his work is labelled by critics as weak architecture, and he himself also expressed an understanding of weak architecture. He states, "I prefer an ambiguous, unreliable condition, in which the substance is scattered all over the place. I don't want to make particulate architecture but create a particulate condition….More than, and prior to defining a style, what I desire is to create a certain type of place and a certain type of condition that can be experienced by the human body" (Bognár, 2009, p. 12). He believes that weak architecture is not an architecture that is structurally weak, but an architecture which is anti-monumental.

Kuma declared that his ultimate aim is to 'erase' architecture, because he believes that a building should become one with its surroundings, that architecture is subservient to

nature. Therefore, the relation to the site is more important compared to the form of architecture. The nature informs how he uses material, how he locates his buildings, and what sensations they evoke. The essence of his weak architecture is to ensure harmony between a building and its environment. Of course, such gestures are not new – the key issue is what strategy he uses to make the buildings become constructive parts of their surroundings.

Figure 2-1 Kengo Kuma: Great (Bamboo) Wall (left side), Museum of Ando Hiroshige (right side) (Source: http://inhabitat.com/great-bamboo-wall/, http://www.flickriver.com/photos/tags/hiroshigeandomuseum/interesting/)

Rather than fragmenting form, Kuma fragments material. He claims, "wanting to make architecture weak and make the structure recede into its surroundings was, in effect, a challenge with respect to materials. First, I needed to weaken the materials that I was working with" (Bognár, 2009, p. 10). Believing materials only begin to show their true nature when challenging them at the limits of their capabilities, he puts forth the theory of particlization and pixilation of materials: "Particlization meant undermining the monolithic object like appearance of a building and rendering it less definitive or solid so that it becomes permeable, ephemeral, and appears to have less bodily substance, almost as if it were a phenomenon" (Bognár, 2009, p. 29). He also uses transparent material to dissolve the building in the environment, to achieve not

merely visual continuity, but the integration of the building and its environment. Using particles as the medium, he unites the environment effectively with the people inside.

Based on Kuma's interpretation of weak architecture, it could be clarified that the experiential atmosphere is a quality that weak architecture possesses. The conventional architecture is usually expected to seek clarity rather than ephemerality, a finiteness rather than deliberate vagueness. But weak architecture tends to seek this vagueness. Architecture should be no longer just an object; rather, it should be a boundary condition that makes humans become involved in the space. Space in weak architecture must be seen in connection with a human being, with persons who act in motion or in positions.

Sou Fujimoto's interpretation of weak architecture

The term "weak architecture" also appears in the statements of another Japanese architect, Sou Fujimoto. Different from Kuma's interpretation, the meaning of his weak architecture is concerned with the organisation of functions. Sou Fujimoto is a pioneer in both the fields of theory and practice in Japanese contemporary architecture. His theory is rooted in his sensitivity to the relationship between space and human behaviour. Humans and events become the key issues of his weak architecture, in which the building transforms from the static object to an interactive space that can stimulate all kinds of behaviours. For him, people are primitive because we have an animal-like body and instincts, so he adopts a philosophy towards architecture that returns to a primordial, intuitive moment in the process of design, free of constraints and open for possibilities.

As mentioned in the last chapter, Fujimoto's understanding of weak architecture refers to weak orders and relationships. He claims that weak architecture is "not making architecture from an overall order but from the relationships between each of the parts, and as a result, an order can be made that incorporates uncertainty or disorder". Toyo Ito points out that, in Fujimoto's project, the whole is integrated by loose relationships, avoiding axis or grid (Fujimoto, 2008, p. 9). So, what are these loose orders?

This concept of 'weak order' is manifested in Fujimoto's organisation of function in his design. His project does not have a specific organisation or programme; rather, it seems to adapt to the need of the users through a kind of vagueness. He states that the design strategy should change from the building itself to people and events which have a variety of possibilities. He tried to provide more choices for people in a space, rather than enforce a static function on them. He believes that function is not to be designated; rather, a design should allow the relationships to emerge. By creating a framework for different things to happen therein, there will be a flexibility and adaptability in the building, which gives architecture a fourth dimension where time becomes a key element. Fujimoto compared the relationship between people and architecture to that of the Japanese garment *kimono* and the body. Different from the three-dimensional cutting method, the *kimono* is planar, and does not follow the shape of the body. However, the *kimono* can adapt to any changes caused by the body movements. Similarly, in the architectural space, the user is encouraged to discover the space and find uses for the space not typically programmed into the design. These orders and relationships are ambiguous, full of uncertainties. The in-betweenness that he proposed, with its inherent quality of ambiguity, is fundamental to Fujimoto's thought process.

For example, one of Fujimoto's projects, House Na, takes radical steps towards redefining the relationship of the human and the space. Instead of using walls to create

boundaries between programmes and spaces, he uses numerous platforms denoting free programmes, which describes a “nomadic” condition. The inhabitation is more about imaginative and unanticipated purposes rather than what the designer explicitly intended in a space. Another example of House N explores possibilities of creating in-between spaces of interaction within the dwelling. The house is a layering of boxes imposing liminal space within each other. Three boxes form a system of semi-permeable spaces which creates a confused situation of inside and outside. These projects explore different strategies to let the user explore novel programme organisation and spatial conditions.

Figure 2-2 Sou Fujimoto: House Na (left side), House N (right side) (Source: http://inhabitat.com/sou-fujimotos-glassy-house-na-blurs-the-distinction-between-indoor-and-outdoor-space/house-na-3/, http://www.archdaily.com/7484/house-n-sou-fujimoto/5010075c28ba0d4222000573-house-n-sou-fujimoto-image)

As reviewed in section 1.2.2, SANAA also questions the conventional consideration of programmes. These Japanese architects view buildings as events and not simply as inert objects. The stereotyped notions of functions or lifestyle no longer play the decisive role they once did. Many of the fixed concepts have no validity in today’s rapidly changing society. These architects are sceptical of conventional prototypes of human relationships, and express their observation and reaction of the realistic

diversity in their work. They create a more personal, non-doctrinaire realm focusing on reality, and create programmes based on realistic research of how the building will be used. Their buildings are capable of transforming a person's way of life, or the relationships between its inhabitants.

Toyo Ito's concept of blurring architecture

Although not using the term "weak architecture", Toyo Ito, who is one of the earliest explorers of new architecture in the information age, could be regarded as the beginning of this strand of architects who promote weak architecture. Instead of "weak architecture", Ito used the term "blurring architecture" to express his ideas. Different from the "Metabolism" predecessor, Ito captured the characteristics of the information society: the electric network has blurred the boundaries between the real and virtual worlds and has hence changed the state of existence of space. Realising that the technological climate of the 1970s was different from that of early modernism, Ito explored architecture's inchoate relationship with the technologies of information and media. For him, fluidity is among the main characteristics of the information age. The world we inhabit is defined by flows rather than by static structures. Besides the traditional flows of air and water, invisible flows of electrons have become increasingly important with the development and widespread use of computers. The digital media constitutes a new reality, often labelled "virtual," in which we are compelled to live. Bearing in mind these technologies' ephemeral nature, his approach to an info-architecture was more absorptive than assertive. Ron Witte summarises that Ito has modified architecture's relationship to technology by sliding hard toward soft, absolute toward potential, and material toward ambiance (Witte and Kobayashi, 2002).

Ito proposes the electronic modernism in his article "blurring architecture". For him, "blurring" has to do with a deeper questioning of the meaning of architectural boundaries. He would like to construct an architecture based on the world as a phenomenon of changing scenes, absorbing the experience of society and reflecting its multiple dimensions in his architecture. According to Ito, there are two bodies. On the one hand, our material bodies are a primitive mechanism, taking in air and water and circulating them; it is the body as a living experience. On the other hand, there is another kind of body that consists of circulating electronic information – the body that is connected to the rest of the world through various forms of media. Ito claims that body as living experience is insufficient to satisfy us, so we always carry within us another body which is trying to break out of the former. "Today, we are being forced to think about how to architecturally combine these two different bodies and how to find an appropriate space for the emerging third body. This is why I have been completely focused on the idea of lightness in architecture" (Gannon, 2002, p. 65). Ito believes that the "emerging third body" demands an invisible different city. He asks himself a question: "Can I as an architect provide this invisible other city with a visible image?" (Ito and Schneider, 1999, pp. 50-59) Trying to bridge the gap between the city to which the biological body adapts and the other invisible city produced by the electronic network, Ito uses the word "floating".[6] He proposes "blurring architecture" to describe the other, invisible architecture, an image of a kind of soft architecture which has not yet taken on any definite shape. He believes that the

[6] According to Ito, through further development of computer and network technology, the boundary between outside and inside in relation to the body becomes blurred. The display on the monitor screen is information from the outside, but also a projection from the inside. Ito writes, "The computer network as electronic fluid lets our bodies return into the cosmos of the primitive fluid as 'that other kind of water'. With the concept of 'floating', the body perceived up to now as living experience and the body in networked society face the external world in the same manner" (Ito et al., 1999, pp. 50-59).

invisible city is certainly less localised than the space in the beginning of modernism, and is thus a space which is even more homogeneous and transparent, and at the same time a floating space. Ito claims three elements of blurring architecture should be present:

1. An architecture with soft boundaries which can react in response to the natural environment.

2. Architecture transforming the programme in a room.

3. Architecture striving for transparency and homogeneity, but also making possible special features of the location (Ito and Schneider, 1999, pp. 50-59).

Ito's thinking on architecture in the information society has had an effect on many younger architects, including Sejima. In one interview, Sejima emphasised her concern about the relationship between information society and architecture. She thinks that, today, almost half of our daily lives are occupied by information society, and although it is invisible, architecture must have some sort of relationship with such a society. There are some qualities of architecture that she believes relate to the information society, such as the idea of thinness, and the reflective quality of glass (SEJIMA, 2000, p. 14). Does SANAA's architecture indicate one possible direction that architecture develops in the information age? Has SANAA's weak architecture realised Ito's blurring architecture, providing an appropriate space for the "emerging third body"?

Junya Ishigami's concept of "extreme design"

Although not being labelled as "weak architecture", the ideas and architectural work of another young Japanese architect, Junya Ishigami, are worth mentioning when discussing the meanings of weak architecture. Ishigami worked in the SANAA office for a few years, inheriting some architectural ideas from Sejima and Nishizawa. His architecture is famous for extreme thinness and transparency, which are even beyond that of SANAA. He argues that the landscape element plays an equivalent role in the generation of a space as buildings do, and the landscape of ambiguous architecture could be seen as a natural phenomenon, which he called "extreme nature".

According to Ishigami, the conventional dual thinking about architecture and landscape indicates that the man-made buildings are conceived on a different level from the natural environment, therefore neither designing from plant or nature themes, nor laying down rigid artificial constructs as in a formal European-style geometric garden which is only an attempt to cover architecture's nature of anti-nature (Ishigami, 2010). Instead, Ishigami claims that he could create a kind of architecture that is almost like a leisurely, boundless flow. He studies how landscape relates to lifestyle and vice versa, which is a new style of living, in an environment where garden and house are one. He believes that if we give equal concern to natural space and architectural space in the design, the plants could present an environment of nearly the same scale and equal value as built structures, so as to generate something more essential in architecture. He states,

> I am seeking ways to design so that nature comes close enough to be indistinguishable from architecture – the idea being to give equal care and attention to creating architectural and natural spaces. Blurring such boundaries allows us to live in undivided proximity with everything else in the environment – a new, more inclusive vision of architecture that transcends rigid concepts of the city (Ishigami, 2008, p. 101).

For Ishigami, architecture could be regarded not as a separator between exterior and interior, but as an entity that brings its internal infinitely close to its external (but never allowing the two to assimilate); that integrates its external as a new part of its internal. This approach is different from Kuma's weak architecture. If Kuma's weak architecture makes the building an integral part of the environment, Ishigami tries to bring nature into buildings to generate space. One may ask whether this is architectural design or landscape design. Making this distinction infinitely vague is at least a way of pursuing previously unexplored architectural possibilities.

Figure 2-3 Junya Ishigami: Venice Biennale (left side), KAIT Workshop (right side) (Source: http://we-make-money-not-art.com/venice_biennale_of_architectur_3/, http://www.archdaily.com/66661/66661)

Ishigami also has some radical thinking on material and construction of buildings. His two books *Small image*[7] and *Another scale of architecture*[8] discuss architecture in a way that not everyone accepted. He draws inspiration from the way nature appears to man and aspires to an architecture that floats, is infinite, is transparent and has hardly

[7] Ishigami, Junya. (2008), *Small Images.* INAX Shuppansya

[8] Ishigami, Junya. (2010), *Another Scale of Architecture.* Seigensha Art Publishing

any substance. For example he thinks about the possibilities of a detailed structure resembling dandelion seeds floating in the air, on the same scale as a delicate current of air; He imagines architecture on the scale of the sky which involves making a variety of long, thin atmospheric structures; He considers architecture at a cloud-like scale, incorporating the flow of air as part of the structure, and as elements contributing to the makeup of buildings. All these ideas are attempts to come up with a new scale of architecture and new approaches to architecture arising between natural phenomena and manmade constructions. He wants his buildings to appeal through their new spatiality and environmental richness.

What is more, his artistic approach to his practice has helped to redefine the ever closer boundaries between art and architecture, which made him one of the most controversial architects. The critic Taro Igarashi (Ishigami, 2008, p. 109) stated, "Junya Ishigami engages in what might be called extreme design, pushing the furthest reaches of built form and transforming it into something that is no longer even 'architecture'." However, he seeks out the limits of the possible, both human and technical, in search of a new criterion for human activities. He reduces spatial boundaries to the thinnest and lightest conditions possible, exploring a variety of new possibilities in architecture. His work balances poetics and technical engineering.

Indeed, Ishigami's creations reflect very strong experimental qualities, but he stresses that these are all architectures. He believes that architecture should develop into the environment rather than just being a shelter. This environment is architecture that contains nature. He imagines spaces that inhabit a realm between architecture and landscape, which has the potential to become a new environment. This could be understood as another potential that weak architecture should have: it lies in the liminal space between architecture and art, between architecture and the environment. The environment is not something viewed as scenery; it is felt. Weak architecture seeks not to isolate spaces from the landscape but rather to inspire the user to feel the

whole ambiguous landscape. Therefore the weak architecture is “extreme nature”; that is, weak architecture itself becomes the landscape.

Besides the Japanese architects’ interpretations of weak architecture introduced above, the idea of “weak architecture” was first developed by Ignasi de Sola-Morales in the mid-1980s. The next section explores Sola-Morales’ understanding of weakness in architecture.

2.1.2 Ignasi de Sola-Morales’s concept of weak architecture

Ignasi de Sola-Morales’s essay “Weak Architecture” was part of the book *Differences* published in 1996. The essay collection proposes the existence of a group of architects who are not creating architecture of a single narrative, but instead are producing an architecture that responds to the plurality from our existence, a weak architecture. Sola-Morales asserts:

> In the field of aesthetics, literary, pictorial and architectonic experience can no longer be founded on the basis of a system: not a closed, economic system such as that of the classical age […] the present-day artistic universe is perceived from experiences that are produced at discrete points, diverse, heterogeneous to the highest degree, and consequently our approximation to the aesthetic at every turn the possibility that it might ultimately be transformed definitively into a central experience (Rubió, 1997, p. 58, 60).

Sola-Morales was the first to bring Vattimo’s concept of Weak Ontology into the architectural discourse. He asked the question: “what role is accorded to architecture in the aesthetic system of contemporary weak thought?” (Rubió, 1997, p. 57). He claimed that aesthetics could not be based on a closed model; on the contrary,

aesthetics had to consist of different heterogeneous elements. Instead of proposing a formal strategy for weak architecture, Sola-Morales' proposal is a "diagonal cut, slanting, not exactly as a generational section but as an attempt to detect in apparently quite diverse situations a constant that seems to uniquely illuminate the present juncture" (Rubió, 1997, p. 57). Its purpose is to trace a weak line of thought through the diverse terrain of architectural experience, which may lead a reader to interpret architecture in a way that is personal. Sola-Morales explicitly denies the possibility that his writing will develop into a formal strategy for weak architecture. Instead of offering totalising suggestions for our condition of groundlessness, he leaves us with an ambiguous definition of weakness that can be interpreted in multiple ways.

Sola-Morales specifies four currents of thought identified in the writing: the archaeological, the temporal, the decorative, and the monumental.

The *archaeological* is an analogy used to describe the superimposed reading of reality, which "can no longer be regarded as a unitary whole, but appears instead as the overlapping of different layers" (Rubió, 1997, p. 65). As Sola-Morales recognises, the notion of the archaeological introduces the idea that the reality does not form a closed sphere but a system of interweaving languages. This way of thinking seems to imply a very direct translation into architectonic form. He points out that the experience of postmodernism architecture is the experience of superimposition. Assuming the fragments themselves are meaningful, much of postmodernist work developed into a cut and paste of historical form. This is the mistake that Sola-Morales attempts to avoid, as he writes, "Nobody can be so naive as to imagine that, for archaeology, the system of knowledge of the past can be constituted by a simple accumulation of the objects uncovered by excavation" (Rubió, 1997, p. 65). Since the fragmentary meanings of the archaeological are assembled only with the present, the momentary experience can only occur within the present. Therefore, an aesthetic experience is rooted in the *temporal* event.

For Sola-Morales, the event deals explicitly with notions of time, in a plural way similar to that of Weak Ontology. He argues that art and literature throughout the modern period conceived of plural time, but for the first generation of modern architects, time/space was defined as a continuity more than as a fragment or juxtaposition. He emphasises that the weak architecture transforms the aesthetic experience of the artwork and architecture into the event. The diversity of times becomes central in what Sola-Morales has chosen to call weak architecture. As he writes,

> Temporality does not present itself as a system but as an aleatory instant that, responding above all to chance, is produced in an unforeseeable place and moment. In certain works of contemporary art, in dance, in music, in installation, the experience of the temporal as event, occurring once and then gone forever, ably explicates a notion of temporality that finds in the event its fullest form of expression (Rubió, 1997, p. 67).

Weak architecture is contingent upon subjective time, rather than classical time or objective time. The experience that is subjective and objective at the same time leads to the Deleuzean notion of fold, referring to the "folds of a single reality" that are constituted by the objective and subjective. As Sola-Morales writes, "reality emerges as a continuum in which the time of the subject and the time of external objects go round together on the same looped tape, with the encounter of objective and subjective only occurring when this continuous reality folds over in a disruption of its own continuity" (Rubió, 1997, p. 57).

Decorative is another characteristic of Sola-Morales's weak architecture. Rather than advocating that architects become decorators, he means to propose a different use of the word: the decorative is the inessential. He argues that if architecture is to be a

study of the concrete, then all of matter is inessential by virtue of the nonexistence of the essential. The elimination of strong universal values in architecture leaves the architecture as an inessential element of the concrete that forms our experiences, that enhances and embellishes reality. It refers to the need for form to act beyond purely functional ambitions and allow for differences of interpretation. The decoration that Sola-Morales speaks of is "not in the sense of vulgarity, of triviality, of the repetition of established stereotypes, but as a discreet folding back to a perhaps secondary function, a pulling back to a function that projects beyond the hypothetical ground of things" (Rubió, 1997, p. 70).

This leads to the last characteristic of weak architecture that Sola-Morales proposes: the notion of *monumentality*, which refers to the recollection of architecture after it has been experienced. Traditionally, monuments are built as grand signifiers to historical events. Sola-Morales challenges the traditional idea of monument as a representation of the absolute. In contrast to the meaning of Also Rossi's term 'monument' to signify permanence, the notion of monument that Sola-Morales has sought to put forward is bound up with the "lingering resonance of poetry after it has been heard, with the recollection of architecture after it has been seen" (Rubió, 1997, p. 71). The monumentality of weakness refers back to the subject. It lies not in a form that can be seen but within a personal recollection.

Sola-Morales concludes his essay as follows: "this is the strength of weakness; that strength which art and architecture are capable of producing precisely when they adopt a posture that is not aggressive and dominating, but tangential and weak" (Rubió, 1997, p. 70).

The archaeological, the temporal, the decorative, and the monumental are all built upon the recognition that weak architecture emerges from subjective experience. What weak architecture calls for is the recognition that architectural experience

should not be created under any projected ideas of inhabitation; it should be created within experience itself, within the immediate. It embraces the strength of architecture in the complexity of the human experience, which cannot be contained within rational concepts. Sola-Morales' these ideas on weak architecture are derived from Gianni Vattimo's theory of "weak thought". The later section of this thesis introduces Vattimo's concept of weak thought, and other relevant philosophical concepts on weakness and ambiguity, in order to construct a better understanding of weak architecture.

2.1.3 From tectonic to "weak tectonic"

Having done the preliminary survey on the concept of weak architecture, it is necessary to focus on the main topic of this research – *materiality in weak architecture*. One common feature of the Japanese architects' weak architecture is that material plays an important role in realising their spatial intention. At least since the mid-nineteenth century, discussion of the role of materiality in architecture has been dominated by the concept of "tectonics".

The architectural debates on concepts such as "style" and "beauty" in Germany at that time introduced the term "tectonics" into modern architectural discourse. German archaeologist Karl Bötticher's notion of tectonics is built up with a distinction between ontology and representation. He introduces the dual notions of *Kernform* (core-form) and *Kunstform* (art-form). In his view, the core-form referred to the structural system, which does not have the capacity to express both itself and its cultural context, while the art-form is the subsequent expression that respected both the underlying core-form and the outside world (Frampton, 1995, p. 4).

This idea of dual-purpose architectural structure and form carried through to Semper's terms *structural-technical* and *structural-symbolic*, which are closely related to Bötticher's *Kernform* and *Kunstform.* The notion of *Kunstform* was later adapted by Semper to the idea of Bekleidung, which means "dressing" the fabric of a structure. Semper's Bekleidung theory emphasises 'joining'. He extrapolates the basic unit of the textile – the knot – to apply to all built form. However, the array of matter that may be joined could range from a building's transition to its site to material connection details. In his book *The Four Elements of Architecture* (Semper, 1989), Semper divides the building into four fundamental elements based on material processes: the hearth (related to metallurgy and ceramics), the earthwork (related to masonry), the framework (related to carpentry), and the screen wall (related to textiles). He classes the building crafts into two fundamental procedures: the tectonic of the lightweight frame and the stereotomics of the earthwork (Frampton, 1995, p. 5). The former is all about joints, while the latter is more of a continuous mass. Semper narrowed his definition of tectonics to the third of the four technical arts – carpentry. For Semper, the ultimate element of architecture is the joint. In his opinion, it is out of the transitions between building elements that the beauty of architecture emerges.

Eduard Sekler's position to tectonics emphasizes the division of the structure and the construction. He defines the tectonic in his article "Structure, Construction, Tectonics":

> When a structural concept has found its implementation through construction, the visual result will affect us through certain expressive qualities which clearly have something to do with the play of forces and corresponding arrangement of parts in the building, yet cannot be described in terms of construction and structure alone. For these qualities, which are expressive of a relation of form to force, the term tectonic should be reserved (Sekler, 1965, p. 95).

It is the word “expressive” that makes the tectonic more than a simple element that can be measured. Sekler relates it to some kind of experiential or perceptual notion of the observer. This introduction of human character into the definition makes the tectonics relate more to how the relationship of structure and construction is expressed to those who experience architecture.

Tectonics was defined by Adolf Borbein in 1982 as “the art of joining.” Instead of being mere visual fabrication, tectonic form derives from properties of materials, structural logic and the craft of making. Kenneth Frampton observed that Borbein claimed this meaning would eventually change to an aesthetic category rather than a technological category. Kenneth Frampton reintroduces the term *tectonics* in the discourse of architectural theory in the beginning of the 1990s. Tectonic as described by Frampton in *Studies in Tectonic Culture* (1995) is the joint or the joining through the construction process. Derived from the ancient Greek concept of “tekton” the concept of tectonics describes a particular sensuous relation between space and construction, signifying the experienced quality of architecture (Frampton, 1995). In Frampton’s theory the joint has a prominent place – the joint is a crucial point in the telling of the logic of construction. Frampton studied the way in which architects in the past two centuries had attempted to demonstrate construction in building form. He regarded the understanding of how the pieces of materials are put together in architecture as a “poetic of construction”. He fears that architecture is reduced to scenographic images, relying on appearance as opposed to tactility and physicality. Frampton recognises two separate manifestations of the tectonic: the representational and the ontological. These are parallel with Semper’s notion of ‘symbolic’ and ‘technical’, as well as Bötticher’s terms ‘art-form’ and ‘core-form’.

Reading on Semper’s distinction between the tectonics of the lightweight frame and the stereotomics of the base, Frampton uses the term “tectonic” to refer to the lightweight frame-work as opposed to a heavy, stereotomic mass. The earthwork and

the framework are technical, or ontological, and the hearth and screen wall are more symbolic, or representational (Frampton, 1995, p. 16). Paradoxically, he also notes that this term can be expanded to include stereotomic mass, which refers to a manner of joinery. According to this definition, the meaning of tectonics includes not only the joint of the lightweight frame – the discontinuity, but also the flow of the stereotomics base – the continuity. This debate of continuity and discontinuity – whether it is a seam or joint between two different things, or whether it is a fold in the same thing – probably could be traced back to the etymology of tectonics. Heidegger traces the origin of *techne* in his essay "*Building Dwelling Thinking*":

> The Greek for "bring forth or to produce" is *tikto*. The word *techne*, technique, belongs to the verb's root, *tec*. To the Greeks *techne* means neither art nor handicraft but, rather, to make something appear, whithin what is present, as this or that, in this way or that way. The Greeks conceive of *techne*, producing, in terms of letting appear. *Techne* thus conceived has been concealed in the tectonics of architecture since ancient times. Of late it still remains concealed, and more resolutely, in the technology of power machinery. But the essence of the erecting of buildings cannot be understood adequately in terms either of architecture or engineering construction, nor in terms of a mere combination of the two. The erecting of buildings would not be suitably *even if* we were to think of it in the sense of the original Greek techne as *solely* a letting-appear, which brings forward something produced, as something present, among other things that are already present (Heidegger, 1971).

The tectonic process, therefore, underlies the understanding of creation in general. *Tekton* and *techne* seem to have something in common with *tikto* – 'to bring into the world'. The Greek for fold is *ptych*, the etymology of which is *ptuche*. Is it possible that there are any etymological connections between *techne* and *ptuche* as well? No existing evidence or studies can be found to prove that there are no connections between the two words. If the origins of these words are the same, this could support the understanding of fold or continuity as part of the definition of tectonics, and

further lend support to Frampton's reading of stereotomic base as the meaning of tectonics as well. SANAA's work is easily read as anti-tectonics by critics because of the tension between tectonics in the traditional sense and the denial of it in their work. However, according to this particular definition of tectonics by Frampton, the term 'anti-tectonics' seems to be an oversimplified way to describe SANAA's work. The seamlessness of their work challenges both the notion of tectonics in a traditional sense and the notion of anti-tectonics. Is there a new way to describe SANAA's tectonics?

Different from previous theories on tectonics, Frampton also establishes his argument on the topography dimension, and on the notion of place, including the role of the body on the perception of the environment and architecture. A phenomenological perspective is embedded in Frampton's discussion on the conception and expression of tectonic form. He discusses the power of a body acting within space by becoming conscious of itself. The character of place is determined by its articulation; how does the building stand on the ground? It is determined by the kind of construction – their material and formal constitution. The interaction between site and architecture and between people and architecture is discussed by Frampton using the capacity of topography and perception. According to him, the joint is the centre of attention containing three values, the *tactile*, the *tectonic*, and the *telluric* (Frampton, 1983). The *tactile* relates to the sense of the material, encouraging the active bodily engagement of the user, the *tectonic* is the understanding of structure, and the *telluric* refers to the laws of the earth and the traditional sacred structure. Therefore, based on the "joint" meaning of tectonics and Frampton's topography and phenomenological perspective, unlike the most common subject of tectonic expression – which is the structure and enclosure of a building – the meaning of the term 'tectonics' in this thesis includes how to join a piece of architecture with its site, to join a series of spaces into a building, and to join a series of materials into a space. This does not

change the essential nature of the tectonic idea, which is the artful and meaningful joining of parts, stimulating the mind and the senses.

The tectonic implication of weakness emerges in those Japanese architects' weak architecture. Kengo Kuma's strategy of particlization of materials explores constructive and material conditions in order to nurture perceptual realms that are immaterial or phenomenological, and which emphasise the relationship between the building and the human body. He claims that the space should make people feel comfortable, not just have a nice exterior: "Weak relates to the idea of breaking materials into particles. The concrete building is very strong-too strong for the human body. I think that the human body is very weak and fragile. So people can't feel comfortable in strong places. But if the building itself is as weak as a human body, we feel comfortable" (Belogolovsky, 2009). Juhani Pallasmaa is well-known for forging a new understanding of perception and the experiential in architecture. He observed Kuma's architecture:

> Kuma's buildings give rise to an alert and sensuous feeling that enables us to become actively aware of the subtleties of the seasons, weather, light and human activities. Through repetitious patterns he creates hypnotizingly monotonous surfaces that highlight materiality, and evoke subtle and changing sensations of transparency, reflection and levitation. Instead of making formal statements, he creates atmospheres that condition perceptions and feelings (Pallasmaa, 2008, p. 22).

What Kuma defined as weak architecture is the material work that can evoke the embodied, emotional experiences, which is about the sense of space.

Ito has been singing the praises of "lightness" in architecture for some time, from the literal lightness of his earlier architecture, to the lightness of the Sendai Mediatheque,

which has taken on a metaphoric dimension of the weightlessness of electronic information technology. He imagined something fluid and formless, whose image is not yet fixed. Ito gives his architecture the characteristic of lightness to create a flowing field, a floating space. He claims that the blurring architecture should have soft boundaries to react in response to the natural environment, which implies an ambiguous relationship between the building and the environment. Ito's interest in immateriality and ephemerality of buildings is expressed through the use of translucent and shimmering materials.

In Ishigami's KAIT Workshop (Figure 2-3), a clear relationship between the gravity load and structure behaviour is replaced by an ambiguous relationship between tension columns and loaded columns with similar appearance. Almost none of the columns have identically-proportioned sections or angles. As a result of the columns, some distinguishing spatial characteristics emerged. This is not in accord with the tectonic theories that architectural quality arises both from a clear structural identity, which shows the overall constructional logic of a building, and from well-articulated details which reflect the transfer of loads through the joints (Frampton, 1995). On the contrary, the overall constructional logic of Ishigami's building is ambiguous. At the same time, he pursues architecture arising between natural phenomena and manmade construction by reducing spatial boundaries to the thinnest and lightest condition possible. It cannot therefore be described as tectonics in the traditional sense.

Besides the building material as the joining elements of tectonic, Fujimoto's weak orders could be understood as spatial tectonics. He is concerned about the loose relationships between each part – not the joining of physical elements of the building, but the ambiguous order required to connect different parts of space in a building, to redefine the relationship between the user and the space.

Frampton emphasises that a building is ontological rather than representational in character and that built form is a presence rather than something standing for absence. It is a "thing" rather than a "sign" (Frampton, 1990). However, what the weak architecture does – despite Kengo Kuma's idea of breaking materials into particles, Ito's concept of blurring architecture, Ishigami's idea of "architecture as air", or Fujimoto's weak order – is weakening and blurring the presence of built form, the boundaries of building and its environment, or the overall order of a building. If material is architecture's tectonic reality, their weak architecture is toward the dissolution of architecture's physicality. However, does this weakness, ambiguity, and dissolution lead to scenographic images as Frampton concerned? Do they also emphasise the embodied experience of the building? The traditional term of tectonics seems to be not quite sufficient to describe the role of materiality in weak architecture. Are they suggesting a notion of "weak tectonics"? A three-part tectonic model is used to discuss the role of materiality in SANAA's weak architecture: the joining of materials; the joining of the building and the site; and the joining of space or functions.

2.2 Philosophical concepts of weakness and ambiguity

2.2.1 Vattimo's concept of weak thought

Ignasi de Sola-Morales' notion of weak architecture is based on philosopher Gianni Vattimo's theory of "weak thought". The philosophical movement of Weak Thought has been in development by Vattimo since the late 1970s, as part of a broader philosophical shift from the modern to the postmodern. The basic premise of weak thought is the idea that there is no longer a single and universal foundation for philosophical debate. The term "weak thought" has had the character more of a loose metaphor than of a precisely and unambiguously defined idea, which can be used in

many different fields and contexts, thanks to its relative ambiguity. Vattimo introduced weak thought as an alternative to what he called 'strong thought', the broadly modern approach to philosophy that is characterised by a search for a rational, objective and comprehensive epistemology. Strong thought understands history as a linear, progressive, unidirectional movement. Its instrument is an idea of totality, identified with authenticity as the perfection or full development of the internal essence of a phenomenon. Against a globalising model based on truth, unity, and totality, Vattimo argued for a philosophy that denied any kind of strong, definitive and universal solution. He described that postmodernism represented the crisis of unitary narratives of Modernism: "There isn't only one history; there are several images from the past proposed according to different points of view; and thinking that there is a comprehensive and supreme point of view, is a pure illusion" (Vattimo and Webb, 1992, p. 27).

Vattimo's proposal for weak thought relies on an interpretation of the postmodern condition that opens on to a different way to speak of Being. For Vattimo, the most important aspect of Heidegger's understanding of metaphysics is that it conceives of Being as a stable structure or enduring presence that serves as a ground for beings. In contrast to these "strong" qualities of stability attributed to Being throughout much of the history of philosophy, Vattimo refers to the current understanding of Being as event as a "weakening" of Being (Woodward, 2009, p. 112). Being is understood by weak thought not as presence but as occurrence, not as something that "is", but as something that comes or arrives, occurs or happens, something that is not given directly but only in signs, traces, contexts, cultural traditions, and diverse messages (Zawadzki, 2013, p. 50). For weak thought, Being is always given through various mediations. It "opens up" in the contexts and transmitted traditions of culture, history and speech. The rejection of the "strong" conception of being also implies the rejection of being as "hard" fact or objective reality (Zawadzki, 2013, p. 51). Rather

than in reference to any foundation that can serve as a ground for permanent truth, this kind of thinking is much less ambitious and less certain than the deductive logic appropriate to period when Being was "strong"; that is why Vattimo calls it weak thought (Woodward, 2009, p. 114).

The notion of weakness in Vattimo's philosophy engages with two main concepts: the *plurality* and the *incompleteness* of reality. *Plurality* is epistemological in nature, implying the legitimacy of overlapping and contradictory truths derived from multiple interpretations of events. From this perspective, weakness refers to a situation of epistemological uncertainty and the inability of thought and language to fully capture being. *Incompleteness* is historical in nature, implying the diachronic nature of truth (Vattimo et al., 2010, p. 8). Vattimo outlines a conceptual engagement with the world where beliefs, discoveries, and creation can be firmly enacted, "not derived from the world 'as it is', but from the world viewed as a production of interpretations throughout the history of human culture" (Zabala, 2006, p. 15). Weak thought holds that the world is not simply given to us as pure, uninterpreted, unmediated reality. We must avoid "strong thought" with its blinkered claims to truth, finality, and objectivity and with its concomitant avoidance of historical contingency. The notion of a weak ontology outlines a contemporary condition that is exemplified by a lack of conceptual and perceptual certainty and which calls for an analytical engagement with that uncertainty. Vattimo emphasises the *plurality* and *incompleteness* of all knowledge and therefore the uncertainty of truth. "Weak thought" demands a change both in the object of knowledge and in the subject of the process of knowing.

To understand Weak Ontology's relevance within architectural discourse it is important to understand two fundamental aspects of the philosophy's underpinnings: the intertwined contributions of hermeneutics and nihilism, as well as the specificity of the term *difference*.

Vattimo derives the idea of a weak ontology from his reading of Martin Heidegger and Heidegger's student Hans-Georg Gadamer. Heidegger's and Gadamer's contributions to Weak Ontology are primarily through hermeneutics. They shifted hermeneutics away from text towards a hermeneutic ontology where "Things make themselves understood in their interpretation" (Gadamer, 2004, p. 255). This is because hermeneutics assumes that being itself has an interpretive nature, that being is a trace, a transmission of various historical horizons of experience. According to Vattimo's investigations, Nietzshe and Heidegger have indirectly suggested that in order to be able to speak of Being, we must remember that "ontology" is nothing more than the interpretation of our condition; therefore Being is its "event," and hermeneutics is needed in order to learn to interpret the event of Being (Zabala, 2006, p. 14). Hermeneutic ontology, as understood by Vattimo, takes language as the model of all meaning. Hermeneutics is the theoretical backbone of Weak Ontology by forcing the question of interpretation of all 'truth'. Truth depends on integration with the past, connecting with collective experience and with a defined cultural horizon. Vattimo writes, "if Being is not but is instead handed down, to think being would be only to rethink what has been said and thought thus far" (Vattimo et al., 2012, p. 48). For Vattimo, hermeneutics is not a superficial art of interpretation but rather a description of our way of being. He radically links Being with language, reframing Gadamer's hermeneutics through Nietzsche's statement that "there are no facts only interpretations". For Vattimo, Being is language in that language provides a changing structural metaphor within which we interpret Being (Zawadzki, 2013, p. 56). Vattimo argues for a radical identification of Being and language, such that Being is nothing more than the transmission of linguistic messages through history. Such messages must be constantly interpreted anew, and this process of reception and interpretation of messages is what constitutes the ontological "openings" in which beings are revealed. Being is always an echo from the past that makes the present possible (Woodward, 2009, p. 111).

Heidegger's ideas concerning history are understood through a slippery relationship with the past where the present is in a constant reinterpreted dialogue with the past. Thus, the past is never given as objectively factual. The Heideggerian relationship with history is adopted by Vattimo; he denies the possibility of complete knowledge, which starts to address the nihilism present within Weak Ontology. From Vattimo's understanding, nihilism is another name for the phenomenon of weakening of being. His understanding of language is not tied to text or vocabulary, but instead to the interpretive structure of information, which is a loose structure in constant dialogue with the plurality of the present, and the incompleteness of the past (Zawadzki, 2013, p. 95).

The linguist Ferdinand de Saussure and the anthropologist Claude Levi-Strauss argued that meaning can only be developed through the comparison of difference. Derrida injected temporality in to the structuralist idea of difference, creating his own term *differance*. He argued that the differences upon which meaning is produced are shifting over time and entangled with each other, rather than distinct and fixed, binary oppositions. Vattimo takes up the temporality and instability of Derrida's *differance* but also focuses on Heidegger's use of difference, which does not indicate the comparison between multiple objects but concerns itself with the difference between a thing as it is in itself, and the meaning of a thing. Vattimo adopts this ontic/ontological dichotomy, taking the dichotomy and weakening it by emphasising the temporality of the condition, revealing the constantly shifting dialogue between the 'thing' and its interpretation. The weak framework provides an explanation of the way in which we interpret the world, and also provides the possibility of lessons for understanding architecture. This also applies to the longstanding discrepancy between architectural intention, constructed form, and human engagement.

Architecture is a profession of contradictions and ambiguities; architects imagine real things, they are built, and then their creations are re-imagined by their inhabitants. It

could be said that Vattimo's concept of weakness in philosophy can provide a theoretical framework for understanding architecture's contradictory nature. It can help architecture operate with conviction in a world without certainty. The built environment is intended to remain unchanged; however, the variability of context – both physical and psychological – is constantly projecting difference on to the otherwise stable forms.

Sola-Morales shifts away from Vattimo's concern for hermeneutics to questions of aesthetics as an attempt to solidify the discussion of weakness within the confines of our experience with architecture. Instead of assuming that an architectural experience can be contained within rational concepts, Sola-Morales' concept of weak architecture embraces the strength of architecture in the complexity of human experience. Faced with the impossibility of building from a universal system, architects are confronted with a situation of groundlessness. What weak architecture calls for is the recognition that architecture should not be directed; rather, it should be created only within the experience itself, within the immediate. Weak architecture is a theory about thinking and making architecture that does not explicate a way to think or make.

2.2.2 Deleuze's concept of smooth space

Similar to Vattimo's concept of weak thought, the ontology of Deleuze is anchored by difference, rather than by being. Deleuze and Guattari's theory of smooth space is also related to the becoming and ambiguities.

The very construction of Deleuze's theory of space itself evinces strong spatial characteristics, rather than linear or hierarchical ones, so every concept chosen for discussion in this study will inevitably connect up to each other. Deleuze's theory of space is not built like a tree, but has a rhizomatic nature. Deleuze and Guattari utilise

the metaphor of a rhizome to signify connection. A rhizome can send out new roots and shoots at any point, forming a network. They contrast a rhizome with a tree where branches and twigs are hierarchically organised from the central trunk. Rhizomes, on the other hand, are in constant transformation as relations change through new encounters or ruptures and the course of lines is altered. In their use of the term, the rhizome is a concept that "maps" a process of networked, relational and transversal thought, and a way of being without "tracing" the construction of that map as a fixed entity (Deleuze and Guattari, 1987). A rhizome functions as an assemblage for new affects. The network is a mapping of the forces that move or immobilise bodies, and it is always in a state of becoming. In the smooth space, there are complex webs of forces that have no centralised organisation, no climax or end point, but only continuous variation and rhizomes.

In Deleuze's view, common sense notions of space and time are totalised wholes within which everything can be either spatially or chronologically related with everything else. Deleuze and Guattari contrast their concept of "smooth space" to the more conventional notion of space as a homogeneous whole. They have described the state and the nomad; when the nomad/state opposition is applied to space, the basic principle is that nomad space is 'smooth' and heterogeneous, which is characterised by its fluidity, continuous variation, and plurality of directions, while state space is 'striated' and homogeneous, which is quantitative and fixed. Striated space is identified with sedentary dwelling practices and territorial roots while smooth space is identified with nomadic movement across surfaces. The "nomadic" subject experiences space and time in terms of blocks of space-time that are not necessarily linked into a rational whole of measurable units (Buchanan and Lambert, 2005, p. 159).

Although the smooth and the striated could refer to any models, as those illustrated in *A Thousand Plateaus*, this study tries to find the spatial reference in these models to

consider architecture. If Deleuze is the thinker of nomad, of movement, of difference, of force rather than form, his work may provide a point of mobilisation to destabilise and rethink SANAA's architecture. Can we read SANAA's work as Deleuzian architecture? Based on the differences between smooth space and striated space, the following sections discuss three characteristics of smooth space to explore SANAA's spatial concepts and their relations with material strategies: nomadic movement, nature of becoming, and haptic space. The three characteristics are most related to the issues in SANAA's architectural space. Nomadic movement is about the user's mode of movement in the space; the nature of becoming is concerned with the programme of the building; and haptic space relates to the visual perception of the space.

Mode of movement

Deleuze and Guattari use several models to illustrate smooth space, among which the maritime model uses travel as a way of explaining difference between the smooth and striated. Historically the sea was a smooth space, and it was arguably the first space to encounter the demands of strict striation, as result of marine navigation. The smooth sea was originally navigated through a complex nomadic system based on wind, noise and colours. The archetype of smooth spaces, the sea underwent the gradual striation by the plotting of longitude lines and the function of maps. In the maritime model, the smooth and striated are distinguished by the inverse relation of the point and the line. Deleuze and Guattari explained that where striated space is something between two points, lines or trajectories tend to be subordinated to points: one goes from one point to another. In the smooth space, by contrast, the points are subordinated to the trajectory. They are simply treated as relays between successive lines - so-called lines of flight or deterritorialisation (Deleuze and Guattari, 1987, p. 478). In other words, the smooth and the striated can be understood in terms of travel, and movement.

Striated travel is linear movement from point A to point B, while smooth space involves a meandering movement, in which the movement is not so much about the destination as it is about the journey. With striated space the line is between two points, while within the smooth, the point is between two lines. As Deleuze points out,

> The nomad has a territory; he follows customary paths; he goes from one point to another; he is not ignorant of points (water points, dwelling points, assembly points, etc.) But the question is what in nomad life is a principle and what is only a consequence. To begin with, although the points determine paths, they are strictly subordinated to the paths they determine, the reverse of what happens with the sedentary. The water point is reached only in order to be left behind; every point is relay and exists only as a relay. A path is always between two points, but the in-between has taken on all the consistency and enjoys both an autonomy and a direction of its own. The life of the nomad is the intermezzo. Even the elements of his dwelling are conceived in terms of the trajectory that is forever mobilizing them (Deleuze and Guattari, 1987, p. 380).

According to Deleuze and Guattari, movement in striated space is confined as by gravity to a horizontal plane, and limited by the order of that plane to pre-set paths between fixed and identifiable points. In contrast to a fluid state, the spaces inhabited by sedentary peoples – which are state spaces – are striated with walls, enclosures and roads that exhibit constancy of orientation and metric regularity. Striation imparts the "truth" that "place" is an immobile point and that immobility (dwelling) is always better than "aimless" voyaging, wandering, itinerancy, and of course nomadism.

Unlike the function of the sedentary road, which is to parcel out a closed space to people, assigning each person a share and regulating the communication between shares, the nomadic trajectory does the opposite: it distributes people (or animals) over an open space, one that is indefinite and non-communicating. It is a very special

kind of distribution, one without division into shares, in a space without borders or enclosure (Deleuze and Guattari, 1987, p. 380). Nomad space is "smooth," or open-ended, which is occupied by intensities and events. It is haptic rather than optic, a vectorial space rather than a metrical one. Smooth space is characteristic of sea, steppe, ice and desert. It is occupied by packs and nomads, a texture of "traits" consisting of continuous variation of free action and constantly changing orientation of nomads. It is a condition of occupation which is fluid. The nomad maintains jurisdiction over territory by fluid movement. One can rise up at any point and move to any other. In these spaces orientations, landmarks and linkages are in continuous variation.

Becoming

In ontological terms, the opposition between the striated and the smooth is linked to that between "being" and "becoming" (Franck and Stevens, 2007, p. 115). The smooth space is the space of intensive process and assemblages, as opposed to the striated space of stratified or stable systems. However, we should not stay on the level of products. Although nominally opposed to smooth space, striated space is in such constant interchange with it that it is in fact probably better to speak of an interchange of "smoothing" and "striating" forces. Deleuze and Guattari make clear that smoothness is not something to be expressed and articulated, lest it should be subject to appropriation by the sedentary forces of striation. They also suggest that smooth space never exists as a unified and singular entity but that it always exists in relation to, as well as in opposition to, striated space. The smoothness and striation could be understood as a conceptual pair to rethink space as a complex mixture between nomadic forces and sedentary captures: the pair is constantly being translated, transversed into each other.

As many Deleuzean scholars have noted, Deleuze's philosophy is not concerned with what something is, but what it does, what it might do, how it might affect what other things do and how it might be affected by them. Deleuze and Guattari can be said to have a "process ontology", which means they emphasise "becoming" rather than "being". "Becoming" is an important component of Deleuze's corpus. As Cliff Stagoll states, "becoming is the pure movement evident in changes between particular events. This is not to say that becoming represents a phase between two states,… rather than a product, final or interim, becoming is the very dynamism of change, situated between heterogeneous terms and tending towards no particular goal or end-state" (Parr, 2010, p. 26). Hence, the ontology of Deleuze is anchored by difference, rather than by being. This is difference in itself, not a difference established between two identities.

Another concept that relates to becoming is temporality. According to Deleuze, the role temporality plays in becoming is that there is no distinction between before and after, between past and future in terms of a definable present. This can be related to Henri Bergson's understanding of continuous becoming – the living reality. We constantly draw on the past as continuously actualised, not as represented. The subject described in "weak architecture" is one that is in a perpetual state of incompleteness, or what Bergson refers to as "becoming". According to Bergson, an individual does not precede the physical world but emerges in continual exchange with it. Planners and architects have traditionally regarded space as a passive Euclidian container, in which objects can be placed or located. In this view, space precedes the objects. Deleuze tends to consider space as narrative space of cinema; space as discursive and in constant movement. As Deleuze (1988) suggests, space is produced through matter. Assemblages and individual bodies are constituted along with the space they occupy. Space is active, changing with time, and open to transformation. There is a focus on flows rather than on points of stability. Space is not a stable framework within which

things or subjects exist but is constructed through flows of desire between them. This is one of the characteristics of weak architecture that Sola-Morales suggests: *fold*. According to Deleuze, "folding" is a liminal condition associated with the "becoming." The fold is not a crease or a boundary; rather it involves a focus away from things, elements or points of stability and towards the movements and foldings between them (Franck and Stevens, 2007, p.116). If we are to regard temporal experience as the foundation of space, then space is not a complete and uniform measure of our physical environment, rather it is created in a continual state of becoming.

Folding architecture is related to Deleuze's concept of diagram. Whatever one's preferred definition of diagram, in Deleuze's sense, it is concerned with the dynamic interrelation of relations at the interface between the virtual and the actual. For Deleuze and Guattari, the virtual is the pre-possible, before there is any conceptualisation of alternative possibilities. Between the virtual and the actual there is their concept of emergence. The virtual is what conditions emergence and the actual is what emerges. Emergence implies movement and change, which also relates to their concept of becoming. In architectural design, the virtual is the state before a design is conceived, where anything might be possible. The actual is what is; that which we can perceptually and tangibly grasp. The design scheme is only possible because reality has a virtual dimension.

According to Jean Hillier, these ideas about becoming could lead to the suggestion that strategic spatial planning should not be concerned with setting out all possibilities in advance (Hillier and Abrahams, 2013, p. 55). A plan should always be incomplete so as to be able to respond to the "unforeseen moments in what happens in us and to us that open up onto new histories, new paths in the 'complication' of our ways of being" (Rajchman, 2000, p. 61): These ideas could also be used in architectural design. A Deleuzean-inspired view of design allows unexpected elements to come into play and things to not quite work out as expected.

Haptic space

As reviewed in the previous chapter, whiteness, transparency, and thinness create a kind of atmosphere in SANAA's architectural space, which will make a difference to people's visual perceptions of that space. Interpreting the concept of smooth space, Deleuze and Guattari use haptic space to discuss visuality. According to them, the perception of smooth space is haptic rather than optical. They wrote:

> It seems to us that the smooth is both the object of a close vision par excellence and the element of a haptic space (which may be as much visual or auditory as tactile). The Striated, on the contrary, relates to a more distant vision, and a more optical space—although the eye in turn is not the only organ to have this capacity (Deleuze and Guattari, 1987, p. 493).

So, what is haptic space? And what is "close-range" vision in haptic space?

Deleuze takes the concept of "the haptic" from art historian Alois Riegl's description of "close-range" vision of Egyptian low-relief artwork. Riegl first develops the notion of haptic vision. He concludes that there are three steps in the development of the relation between eye and hand in ancient plastic art. The first is the invention of Egyptian art and bas-relief, in which form and ground are experienced as being on the same plane, requiring a close vision. The second is the vision as normal vision in Greek art. The Greeks distinguished the planes, introducing perspective, a distant viewing. The third step is in the art of the late Roman Empire – the viewer sees from a distance. From this, two types of eye-hand relation can occur: a subordination of the hand to the eye in optical space, and a strict subordination of the eye to the hand in a manual space. Riegl tries to apply this linear transition from the sense of touch to the sense of vision to the modern arts, but what Deleuze – following Riegl – terms haptic

space is a space in which there is no longer a hand-eye subordination in either direction. It implies a type of seeing distinct from the optical, a close-up viewing in which the sense of sight behaves just like the sense of touch, "one of possibilities of seeing". Deleuze develops his point of view through the analysis of paintings.

Deleuze suggests that a new Egypt rises up in British painter Francis Bacon's work. In his book entitled *Francis Bacon: the logic of sensation* (1981), Deleuze develops his theory of sensation by analysing the work of Bacon, applying the meaning of "close-range" vision to his paintings. The concept of "the haptic" plays the central role in Deleuze's theory of sensation. Concerned about Riegl's idea on bas-relief, Deleuze analyses Bacon's paintings according to three elements – material structure, Figure, and contour. Through the contour as membrane, the material structure converts into Figures and Figures into the material structure. The juxtaposition of pure tones arranged gradually on the flat surface produces a properly haptic space, and implies a properly haptic function of the eye. The planar character of the surface creates volumes only through the different colours that are arranged on it. The mode of a plane, Figure and contour – that the form and ground are very close to each other – makes Bacon like the Egyptians who worked in bas-relief. However, Deleuze's ideas about Bacon's painting go beyond Riegl's point of view. Bacon's use of colour and "the action of the hand" help to develop the Deleuzian "haptic" concept. With the haptic, Deleuze argues that space becomes tactile as if the eyes were a hand caressing one surface after another without any sense of the overall configuration or mutual relation of those surfaces. Following the writing of Riegl and the paintings of Bacon, Deleuze delineates a form of haptic visuality that acts as a function of both sight and touch.

In *A Thousand Plateaus* (1987), Deleuze and Guattari distinguish "close-range" vision from long-distance vision; and "tactile," or rather "haptic" space from optical space. According to them, "haptic" is a better word than "tactile" since it does not

establish an opposition between two sense organs but rather invites the assumption that the eye itself may fulfil this non-optical function (Deleuze and Guattari, 1987, p. 493). As they write,

> There is no line separating earth and sky; there is no intermediate distance, no perspective or contour; visibility is limited; and yet there is an extraordinarily fine topology that relies not on points or objects, but rather on haecceities, on sets of relations (winds, undulations of snow or sand, the creaking of the ice, the tactile qualities of both). It is a tactile space, or rather "haptic," a sonorous much more than a visual space (Deleuze and Guattari, 1987, p. 382).

In this pure haptic smooth space of close vision, all orientation, landmarks and the linkages between things are in continuous variation. There is no stable unified set of referents since orientations are never constant, but change according to temporary occupation. The interlinkages themselves are constituted according to an emergent realm of dynamic tactile relationships that have more to do with how a nomad conceives of their territory. Striated space, on the contrary, is defined by the requirements of long-distance vision: Deleuze and Grattari describe this as "constancy of orientation, in variance of distance through an interchange of inertial points of reference, interlinkage by immersion in an ambient milieu, constitution of a central perspective" (Deleuze and Guattari, 1987, p. 494). Unlike Euclidean space, which can be observed, quantified, conceptualised from the exterior, smooth space must be embarked upon in a tactile encounter with sound and colour, it must be conquered via a process of itineration and ambulation which resists the reproduction of a spatial matrix pre-existing the act of traversal. It is thus a space – like that of the desert or polar landscape – occupied by intensities, forces and tactile qualities, with no fixed reference point (Deleuze and Guattari, 1987, p. 479).

Their understanding of the smooth as an element of the haptic space represents a distinction between optical and haptic visuality. This haptic visuality demands an intimate approach rather than a distant occupation when accessing space, which relates to an embodied spectatorship. How does architecture achieve a haptic character? As reviewed above, characteristics such as whiteness, atmosphere, and ambiguity are key words to describe SANAA's architectural work, which creates an unusual visual experience. Does SANAA's architecture demand a "close-range" vision to experience? These questions are discussed through the case study in the later chapters.

2.2.3 Liminality

As reviewed above, the ideas such as "in-betweenness", or the subjective experience in the space, are the key points in the concept of weak architecture. These ideas could be related to another philosophical concept: liminality.

Liminality, from the Latin word for threshold, is an anthropological term for the intermediate stage in rituals of progression from one social status to another. It refers to the transitional stage of a process. Building on ethnographer Arnold van Gennep's understanding of rites of passage[9], anthropologist Victor Turner introduced the concept of "liminal space": a space of transformation between phases of separation and reincorporation. It represents a period of ambiguity, of marginal and transitional state. Separation, the first phase, involves the detachment of the individual from the existing social or cultural structure. The second phase, liminality, is the process of the

[9] Arnold van Gennep's term 'rite of passage' refers to the precarious threshold between a person's previous role in society and his new, evolved existence.

transformation; and in the third phase, one re-enters society with one's new status. Liminal spaces are ambiguous and ambivalent; they slip between public use and private value, between work and home, between commerce and culture. This in-between space should allow active exchanges of ideologies, concepts and methods of working. Turner emphasises that it is important to understand the liminal stage specifically as a stage as opposed to a state. A state is "a relatively fixed or stable condition" while a stage is transitional (Turner, 1967, p. 93). The liminal stage acts as a transition between two relatively fixed states.

In all contexts, liminal refers to an intermediate state or condition; an in-between condition in which the liminal entity has characteristics of what it lies between, but at the same time is separate and distinct from them. In cultural contexts the liminal entity is a person while in architectural contexts it is the space itself, a place where boundaries dissolve a little and we stand on the threshold, getting ourselves ready to move across the limits of what we were into what we are to be. Therefore, two levels of liminal entities are discussed in this thesis – the place with ambiguous boundaries, and the person who experiences the physical and psychological transitions. The former is about the issue of physical boundaries in buildings, and the latter is about the ambiguous social boundaries in space, about the issues of identity and anonymity. These two transitions are intertwined in reality.

Architects define a transitional space as a space located in-between outdoor and indoor environments acting as both buffer space and physical link. This in-between space is connecting and blurring the perception of the occupied space while creating a distinct threshold which is transformative.

In the spaces where they have defined roles, people experience limitations and orders, while at the liminal space, people release themselves from the limitation and forget the existing social boundary. By framing liminal spatial conditions of transformation,

intensity, contrast, escape and risk, there is an ambiguous zone, where identity can be reconfigured. These places are defined and yet not too defined, in which people may experience sudden exposure to new possibilities, freedoms and anonymity. The physical and temporal constrictions further heighten their complexity. “A threshold is a point where the boundary between inside and outside can be opened; space loosens up, and a wide variety of perceptions, movements and social encounters become possible” (Franck and Stevens, 2007, p. 73). Encounters with difference and the unexpected in public space are in themselves adventures or escapes from the everyday which can transform our sense of self (Cohen and Taylor, 1992). In the liminal moment, there are no set rules constricting how one is required to think, act or feel – freedom of thought is prevalent. The social categories and rules are blurred. This freedom of thought and blurring of rules can help us understand how threshold spaces shape playful aspects of social life.

The liminal space is the connection between the inner reality and external reality and the bridge between the subjective experience and objective reality. Just as social liminality brings ambiguity and disorder, the threshold space between private and public space can generate new and unfamiliar perceptions and can frame new relations with the other people who share the space. As Quentin Stevens notes, “because of these in-between, both-and, inside-outside qualities, thresholds are always loose for playful possibilities” (Franck and Stevens, 2007, p. 73). He points out that liminality is akin to play: it frames escape from social convention and the exploration of new possibilities. Cultural anthropologist Johan Huizinga argues that human culture itself bears the character of play, suggesting that play is not only of prime importance to, but also a necessary condition for, enculturalisation. He introduces the idea of ‘magic circle’. All play moves and has its being within a playground marked off beforehand either materially or ideally, deliberately or as a matter of course…this arena, the card-table, the magic circle, the temple, the stage, the screen, the tennis

court, the court of justice, etc., are all in form and function playgrounds – i.e. forbidden spots, isolated, hedged round, hallowed, within which special rules prevail. All are temporary worlds within the ordinary world, dedicated to the performance of an act apart (Huizinga, 1949, p. 10). It is stepping out of "real" life into a temporary sphere of activity. What will the space be like if the concepts of play and magic circle are applied to architecture?

To explore architecture using the concept of liminality requires looking at architecture from building object to person-environment relations. Theories of liminality propose the ephemeral, the hybrid, and the social as conceptual priorities in the design process. SANAA's buildings are taken as a case to examine how the concept of liminal space is presented in individual buildings. SANAA's interest lies in the relation between public and private. This ideological model is pursued by the architects in a form of the 'park', where public and private spheres meet and are loosely linked. Are they a convergence of building types? Do the spaces lose identity? How do we inhabit such space, particularly nowadays as we retreat into our cocoons and condense our contexts into screens, venturing outside through the virtual reality? Instead of happening in the physical space, communication now takes place via cable connections. In a virtual sense, the concept of private and public are changed from that which existed before the information age.

2.3 Weakness and ambiguity in Eastern philosophy

Other than those philosophical concepts on weakness and ambiguity introduced in the previous section, these two key words are actually more frequent topics in Eastern philosophy. As mentioned above, besides Sola-Morales's concept of weak architecture, the other notions of weak architecture are all proposed by Japanese

architects. Is this a result from the influence of the Japanese culture? The roots of the concept of weakness and ambiguity could be found in Taoism and Japanese philosophy and aesthetics.

2.3.1 Weakness in Taoism

The concept of weakness is an important idea in Taoism. Tao Te Ching is a fundamental text for both philosophical and religious Taoism. Many Chinese artists, including poets, painters, calligraphers, and gardeners, have used Tao Te Ching as a source of inspiration. Its influence has also spread widely inside and outside East Asia, including Japan. Originating from Taoist philosophy and rooted in oriental aesthetics – the concept of subject and object unified as one – the integration of physical, mental, emotional, spiritual, environmental and social realms inspired the traditional Chinese and Japanese architecture and urban design, which also has a persistent influence on contemporary Japanese architectural design. Traditional Japanese buildings have never been a dominant object in the environment; rather, they have a characteristic of weakness compared to the traditional Western architecture.

One of the characteristics of the Tao is weak. Lao-Tzu describes how the Tao functions: by the concepts of vacuity and quietude, as well as its weak and tender nature. In concordance with principle of the Tao's deployment[10], the Tao, in order to perform a positive and powerful function, has to show an apparently negative and

[10] Lao-Tzu says: "Reversal is the Tao's principle of movement" (Laozi and Lau, 1989, Ch. 40, p. 61). In fact overturn or opposition, return or retrieval are two essential ways in which the Tao deploys itself: either by the overturning of something into its opposition, or by returning something to its original posture.

weak characteristic. We can find some evidence of weakness in the text of Tao Te Ching.

> Is not the space between heaven and earth like a bellows? While vacuous, it is never exhausted; when active, it produces even more (Laozi and Lau, 1989, Ch. 5, p. 9).
>
> The tender and the weak overcome the hard and the strong (Laozi and Lau, 1989, Ch. 36, p. 53).
>
> The most tender thing in the world can overcome the hardest thing in the world (Laozi and Lau, 1989, Ch. 43, p. 65).

In contrast to our conventional conception, it is the tender and weak that will win over the hard and the strong. This is perhaps one of the most astonishing lessons of Lao-Tzu. Yet this is the characteristic of the Tao, whereby "weakness is the way in which the Tao functions" (Laozi and Lau, 1989, Ch. 40, p. 61). According to Lao-Tzu, this extraordinary characteristic of the Tao has its descriptive basis:

> Human being is tender and weak while living, but hard and still while dead. Grass and trees are tender and fragile when alive, but dried and withered when dead. Thus the hard and the strong are companions of death, whereas the tender and the weak are companions of life. Therefore a weapon that is strong will face destruction; a tree that is stiff will face being broken (Laozi and Lau, 1989, Ch. 76, p.109).

A further descriptive example:

> In the universe there is nothing more tender and weak than water, yet for attacking the hard and the strong, nothing can surpass it, this is because there is noting that can take its place. That the weak overcomes the strong, the tender overcomes the hard, everyone in the world knows it, but no one can put it into practice (Laozi and Lau, 1989, Ch. 78, p. 113).

Water as the most tender and weakest element in the universe can overcome the strongest and hardest thing – but most of us are unable to discern this truth. According to the professor Liu Guoying[11], this is because in most cases we are dominated by hastiness, by the spirit of vanity, and also by the will to dominate. In advocating the principle of tenderness and weakness, he points out that Lao-Tzu is in fact undertaking a critique of domination and violence as well as all forms of heroism. He also brings the famous Taoist concept of *wu-wei* and Heidegger's "*Gelassenheit*" ("letting-to-be") into this context. *Wu-wei* is essentially a principle of non-enforcement and non-contention rather than inaction as is commonly explained or translated. It means: let go the way the Tao goes.

Liu Guoying also makes a connection of this principle of weakness with Gianni Vattimo's call for a transformation of modern thinking into a kind of weak thought. For Vattimo, one of Nietzsche and Heidegger's legacies lies in showing that "the Western metaphysical tradition is the tradition of "violent" thinking. With its predilection for unifying, sovereign and generalizing categories, and with its cult of the arche, it manifests a fundamental insecurity and exaggerated self-importance from which it then reacts into over-defensiveness. All the categories of metaphysics are violent categories: Being and its attributes, the 'first' cause, man as 'responsible', and even the will to power, if that is read metaphysically as affirmation or as the

[11] Liu Guoying, professor in Philosophy, Department of Philosophy, Chinese University of Hong Kong.

assumption of power over the world. They must be ‘weakened’ or relieved of their excess power” (Vattimo et al., 1993, pp. 5-6). Some elements of this ontology of the weak categories are found in the Tao Te Ching.

The influence of Taoism on Japanese culture is long, varied, and continuing. In particular, the characteristic of weakness has influenced the Japanese aesthetics and the idea of traditional architecture. The next section examines the concept of weakness in Japanese philosophy and culture, and its potential architectural significance.

2.3.2 Weakness and ambiguity in Japanese culture

The Japanese architect and theorist Kisho Kurokawa investigates the philosophy of symbiosis that resonates with the weakness in Taoism in his book *The Philosophy of Symbiosis* (1994). The roots of the concept of symbiosis are to be found in traditional Japanese culture. As he writes, “we can identify a strong current of tradition in the history of Japanese culture for seeing people and nature, past and future, the part and the whole, art and science, different cultures, economics and culture as existing in symbiosis” (Kurokawa, 1994, p. 3). He foresees a progression from “the age of the machine” to “the age of life”, which will result in “a symbiosis of nature and human being, of environment and architecture”. This is not a theory of domination, in which the stronger of the two opposing elements rules over the weaker. Rather, it is an attempt to discover common elements and rules without erasing the tensions between the elements. As Kurokawa points out, tolerance, the lack of clear-cut boundaries, and the interpenetration of interior and exterior are unique features of Japanese art, culture and architecture.

Kurokawa suggests that the difference between the Western concept of space and the Japanese concept of space is the difference between spatial confrontation and spatial continuity. The Western architecture is created to conquer nature, while Japanese space seeks to harmonise architecture and nature by enveloping nature in architecture and making the two equal partners. There was always a conscious effort made to allow inner and outer space to inter-penetrate. He claims that the presence of intermediate space makes possible a dynamic and vibrant symbiosis that incorporates opposition (Kurokawa, 1994, p. 121).

Kurokawa also mentions the concept of "Rikyu grey", or the "philosophy of grey", which represents an aesthetic of an ambivalent meaning or multiple meanings. This aesthetic is linked to the art of tea. The Tea-Master Sen no Rikyu[12] gave instructions to practitioners to wear "cotton kimono dyed with ash to a neutral hue". With the master's advocation of simplicity and restraint achieving a widespread support, the colour grey grew very popular among the people. Seeing in Rikyu grey a colourless colour of numerous hues that collide, neutralise and hence cancel each other out, Kurokawa uses it as a purely symbolic term expressing the multiple meanings or ambiguities of Japan's open spaces. Kurokawa claims that his interest in Rikyu grey is because it "epitomizes the confrontation or collision of various contradictory elements and describes a condition in which those elements cancel each other out, thus coexistence and continuity" (Kurokawa, 1994, p. 120). This condition is described by Kurokawa as nonsensuality. Rikyu grey is a medium through which cubic, substantial space of single meaning is rendered into planar, two-dimensional,

[12] Sen no Rikyu (1522-1591), also known simply as Rikyu, is considered the historical figure with the most profound influence on the Japanese "Way of Tea", particularly the tradition of *wabi-cha*. He was also the first to emphasise several key aspects of the ceremony, including rustic simplicity, directness of approach, and honesty of self.

nonsensual space of multiple meaning. Perhaps through the aesthetic of Rikyu grey, Sen no Rikyu was deliberately attempting to create a two-dimensional world temporarily frozen in time and space. In contrast to grey in the West, which is a combination of white and black, Rikyu grey was a combination of four opposing colours: red, blue, yellow and white. The combination of different percentages of each colour will result in slightly different greys. It could be said that Rikyu grey is a manner of becoming. It has similarities with Sou Fujimoto's concept of "in-betweenness", which contains various contradictory elements and achieves coexistence and continuity.

Besides the philosophy of symbiosis and Rikyu grey, there are also Japanese aesthetic thoughts specifically related to weakness and ambiguity. *Wabi-sabi* and *Aware* are two important aspects of the traditional Japanese aesthetics, which co-infiltrated literature and art in the long process of Japanese historical development.

Wabi-sabi is the quintessential Japanese aesthetic. As the American artist Leonard Koren notes, "It is a beauty of things imperfect, impermanent, and incomplete. It is a beauty of things modest and humble. It is a beauty of things unconventional" (Koren, 1994, p. 7). The term "*wabi*", the straightforward expression of a thing's inherent nature, refers to the aesthetic of "rustic simplicity" which was actively celebrated in tearooms from the sixteenth century onwards. The term "*sabi*" is closely associated with the aesthetics of the *wabi* tearoom, and dates back to the eighth century, when it originally meant desolate. In the hands of the tea masters, however, it acquired the additional meaning of "grown old", and became a conscious aesthetic appreciation of the visible effects of time on materiality. *Wabi-Sabi* tends to get rid of all that is unnecessary; therefore simplicity is at the core of all things *wabi-sabi*.

Literally "the pathos of things", and also translated as "an empathy toward things", or "a sensitivity to ephemera", *mono no aware* is a Japanese term for the awareness

of impermanence, or transience of things, and both a transient gentle sadness at their passing as well as a longer, deeper gentle sadness about this state being the reality of life. *Mono no aware* implies a "sensibility", the awareness of and responsiveness toward an inanimate object or living thing, or an emotional response in another person. Through the years it became known as a refined sensitivity toward the sorrowful and transient nature of beauty. Cherry blossoms are the prototypical *mono no aware* objects. They explode in beauty after winter's doldrums, trumpeting life for only a few days before they die (Shimoda, n.d.).

Through the understanding of *mono no aware*, we can understand why the Japanese architects have the aesthetic intention of small and weak. This is also a projection of their sensitive personality. The new generation of Japanese architects' design philosophies such as "expressing temporary", "erasing architecture", or "return to simplicity", shared some similar characteristics with *wabi-sabi* and *aware.* It could thus be argued that the Japanese aesthetic has an internal cultural effect on the Japanese architects.

Conclusion

The notion of "weak architecture" has been used by critics to describe some Japanese architects' work, and is also proposed by Japanese architects themselves to express their design philosophy. Kengo Kuma adopts the strategy of particlization of materials to weaken the building, focusing on the phenomenological embodied experience of the environment. Sou Fujimoto proposes a weak order to create a loose and flexible relationship between space, programme and user. Toyo Ito introduces "blurring architecture" to describe architecture that has transparent, homogenous, and floating characteristic, which responds to the fluid characteristics of the information society. Junya Ishigami explores what might be called extreme design, seeking the limits of

the possibilities in architecture. All of them are pursuing architecture of weak image that is contextual and responsive, giving rise to the intimacy and participation, and full of poetic sense. Focusing on their materiality aspect, the traditional term of tectonics seems insufficient to describe its role in weak architecture. The notion of "weak tectonics" and a three-part model are suggested to investigate the role of materiality in SANAA's work. In a similar way, Ignasi de Sola-Morales' concept of weak architecture embraces the strength of architecture in the complexity of human experience, which cannot be contained within any rational concepts and projected ideas of inhabitation. It is a call to disassociate architecture from a foundation of totality and to accept the relegation of aesthetic practices to a secondary position of weakness. Sola-Morales' conception of weak architecture is based on Gianni Vattimo's ideas of weak thought.

Weak thought outlines a contemporary condition that is exemplified by a lack of conceptual and perceptual certainty and calls for an analytical engagement with that uncertainty. He emphasises the *plurality* and *incompleteness* of all knowledge – and therefore the uncertainty of truth. "Weak thought" demands a change both in the object of knowledge and in the subject of the process of knowing, which provides an explanation of the way in which we interpret the world, and also provides the possibility of lessons for understanding architecture.

Deleuze's concept of smooth space provides a new perspective from which to consider movement, territories, temporality, vision, and the way to experience space. Compared to striated space, smooth space is characterised by fluidity and continuous variation, with no fixed reference point, which implies a kind of ambiguity. Three aspects of smooth space have been discussed: *nomad movement*, the *nature of becoming*, and *haptic space*. These features of smooth space are used to understand the user's way of occupation, programme arrangement, and visual perception in SANAA's architectural space.

Another concept related to ambiguity is liminality, which refers to the transitional stage of a process. In architectural context, liminality could not only be understood as liminal space, a place where physical boundaries dissolve, but also the ambiguous social boundaries, where the social categories and rules are blurred. This ambiguity generates a threshold space between private and public, where are loose for playful possibilities. SANAA's cases could be good examples to interpret liminality in architecture.

All the above theories have offered a broader and deeper understanding of concepts such as weakness, ambiguity, and becoming. The Japanese architects' preference for weak architecture leads to the investigation of the roots of weakness and ambiguity in the Eastern philosophy and Japanese culture. The Tao shows a negative and weak characteristic in order to perform a positive and powerful function. This weakness in Taoism has an influence on Japanese philosophy and aesthetics. Kisho Kurokawa proposes the philosophy of symbiosis which attempts to discover common elements and rules without erasing the opposition between the elements. In terms of aesthetics, the concept of "Rikyu grey" represents an aesthetic of an ambivalent or multiple meanings. *Wabi-sabi* and *mono no aware* suggest an intention of impermanence, modesty, weakness, and simplicity. Considering the new generation of Japanese architects' design philosophies such as "expressing temporary", "erasing architecture", or "return to simplicity", it could be inferred that the weakness and ambiguity in the Eastern philosophy have an internal cultural effect on the Japanese architects. There could be a connection between the weak architecture and the Eastern philosophy.

This theoretical framework suggests philosophical, cultural, and spatial dimensions, and gives the study a solid foundation from which to explore SANAA's architecture. Conversely, how can SANAA's architectural work be used to understand these ideas? These issues are investigated in the following case studies. The next section Part II

first introduces the architects SANAA, and their two projects which are the main case studies of the thesis.

Part II Case study

Chapter 3 Background of and Introduction to SANAA

Introduction

Compared to other globally recognised architects, SANAA seems to have its particularities. Firstly, they have a distinct cultural background. The Japanese architects have a clear apprenticeship network: the influence from the older generation architects on the next one is much stronger compared to the cases in other countries. Therefore the easiest way to make sense of the stylistic and philosophical diversity of contemporary Japanese architecture is to draw a family tree. The relationship between master and apprentice generally remains respectful and also the exchange occurs over time. There are ongoing streams of ideas, passing on knowledge and influence from one generation to the next. To understand SANAA's architecture, it is best clarified by tracing their historical lineages. Meanwhile, certain characteristics of the traditional Japanese architecture have more or less impact on the contemporary Japanese architects. How does the traditional Japanese architecture affect SANAA's ideas? Also, what is the influence of the economic environment in Japan during the "Bubble Era" on Sejima when she started her own practice?

Secondly, SANAA is not an individual architect; instead, it is a collaboration of two architects. Different from other collaborative architects, Sejima and Nishizawa also run their own practices individually. What is the working mode of the three associates? Do the two architects have different personalities and design preferences? How do the characteristics of their separate work contribute to their collaborative projects?

Thirdly, in contrast to Toyo Ito's criticism of "diagram architecture" relating to Sejima's work, other critics hold different points of view to describe these architects' design processes. Large amount of diagrams and models in the design process reflect

an unconventional approach to producing ideas. These pieces of evidence are analysed to see what their starting point is, what kind of working mechanism they have adopted, and what difference it makes to the design results. If ‘diagram’ plays such an important role in SANAA’s design process, what is the difference between the way it is used in the work of SANAA and other architects?

This chapter conducts a nuanced examination of SANAA focusing on the above three aspects, trying to understand questions such as where their ideology come from, how the traditional Japanese architecture influences them, how the two architects collaborate, and how their working system operates.

3.1 Genealogy

3.1.1 SANAA in the genealogy of Japanese architects

Across the development of Japanese architecture, the master-apprentice systems have played important roles in shaping the leading figures in the field. Drawing on the traditions and material assembly of Japanese tradition, alongside the precepts of Western Modernism, various Japanese lineages have adapted and developed both the Japanese and Western traditions, developing and evolving themes across successive generations of teachers and students, studios and employees. The diagram drawn by architecture critic and historian Taro Igarashi (Figure 3-1) outlines a genealogy of key Japanese architects, shaping the development of Japanese architecture, which is in dialogue with international developments. When Bruno Taut and Walter Gropius visited Japan and praised the Ise Shrine and Katsura Detached Palace as exemplifications of the norms of modern architecture, the Japanese were fascinated by the Modern Movement and tried to keep up with its Western advocates. Modern architecture was introduced into Japan in 1950s by the first generation that had clearly

been influenced by the later work of the “masters” of the Modern Movement, Kunio Maekawa, Junzo Sakakura and Kenzo Tange; this generation was followed by that of Kisho Kurakawa, Fumihiko Maki and Kiyonori Kikutake, the rebels of the sixties who gave rise to the Metabolist Movement. The third generation (Hiroshi Hara, Toyo Ito, Tadao Ando) was characterised by an awareness of the end of the great ideologies of the modern and a poetic revival of merely formal aspects of modernity. The fourth generation, to which Sejima belongs, has been influenced by the new context of technology and the media, and is distinguished by its experimental research into personal styles of expression.

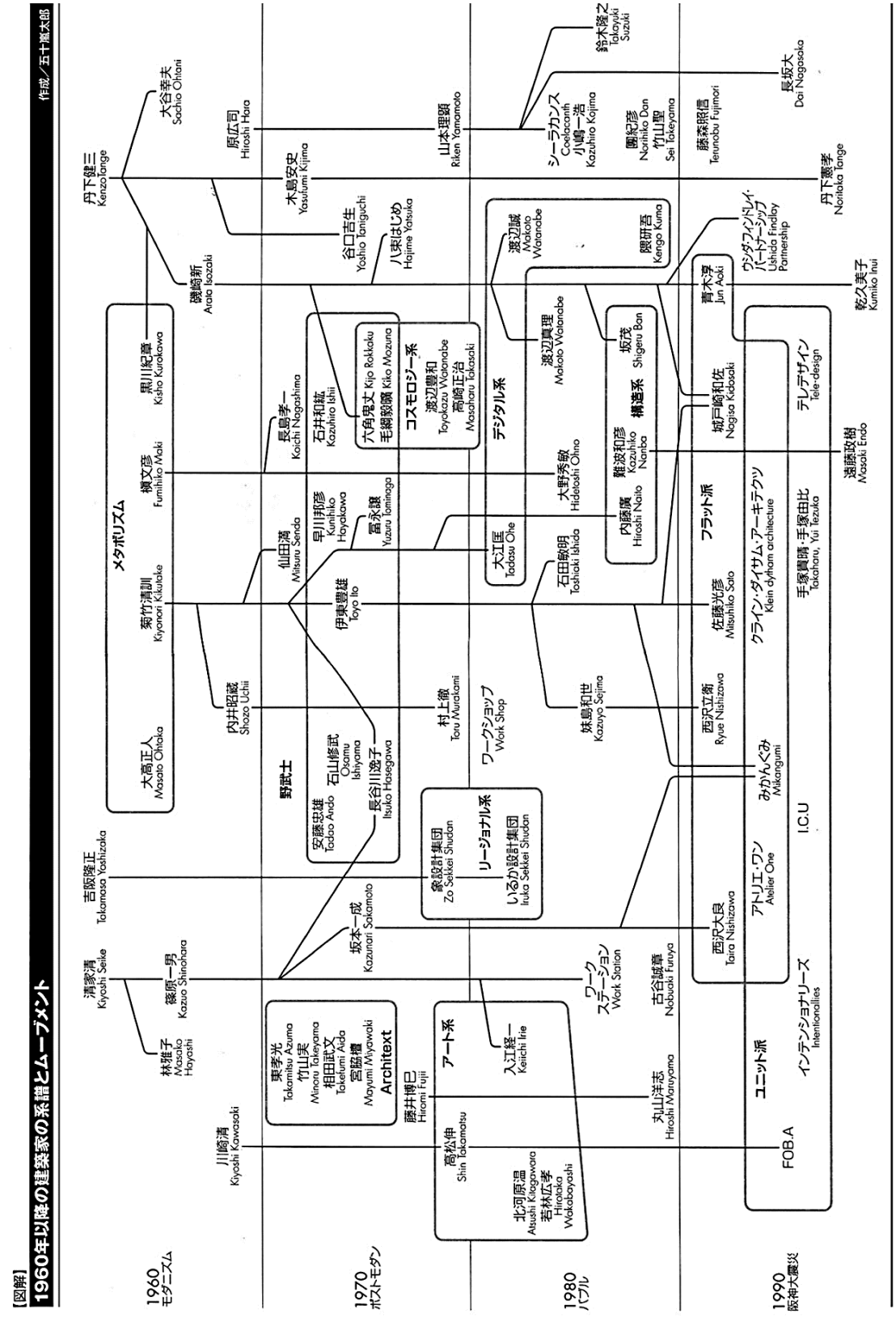


Figure 3-1 Genealogy of key Japanese architects (Source: https://www.flickr.com/photos/biggerw/3308397283)

Sejima belongs to the linage of Kiyonori Kikutake and Toyo Ito. Kikutake established his own firm in the 1950s in Tokyo. Eight years after completing his studies he construction of his own home, the *Sky House* in Tokyo, a building that defined his career and made him famous. Arguing that the components most likely to change should be designed for ease of replacement, he distributed the service space around an open living space in this house. Kikutake argued that architects needed to understand more keenly their role in society, and to address the underlying sociological and psychological unease of contemporary citizens before determining how and what to build. He advocated beginning a design not with a preconceived programme, but with questions about how one relates to, and lives among, one's surroundings. Kikutake became a figurehead of the Metabolist Movement. According to Mark Mulligan, Kikutake was not attracted to the idea of completeness in architecture; he had both an intellectual and aesthetic preference for incomplete, open-ended, and even unstable architectural form. In this sense, he introduced to Japanese modern architecture a new sensibility, which is different from the controlled compositional approach of the previous generation (Mulligan, 2015). This idea is developed later in SANAA's work.

One of Kikutake's enduring legacies has been to inspire later generations of architects to continue an intensive line of structural research in relation to human spatial perception. This lineage of mentorship – from Kikutake through Toyo Ito, Itsuko Hasegawa, Kazuyo Sejima, and Ryue Nishizawa to Junya Ishigami – has produced numerous innovative structural and architectural expressions.

Between 1965 and 1969, Toyo Ito worked in Kikutake's office. Ito is an architect highly regarded in the global architecture community for his unconventional projects such as the Tama Art University Library in Tokyo, Sendai Mediatheque in Miyagi and Tod's Omotesando Building; and also lauded for his writing and lectures, particularly for his thoughts on *Blurring Architecture* where he questions the common conception of architecture as a solid element and considers its distortion into "ambiguous

boundaries" capable of responding and changing according to its environment. In his early studies, Ito explored the relation between new technologies and urban living, responded to the Japanese city where boundaries between interior and exterior space, and between public and private space were becoming increasingly blurred. This led to significant interest in the skin and surface of his buildings. Ito states that architects would be better off using their energies to embrace the building's only real permanent feature: perpetual change. It is important to him that his architecture is capable of "mastering the now", which is very similar to that approach taken by Zen master, for whom living in the moment carries a special significance. Ito would like to construct an architecture based on the world as a phenomenon of changing scenes. This often translates in his work as a fascination with qualities of light and a palette of materials that mediate or emit light. He thought that the relationship between people and their environment should be permeable toward the city but controllable, like an osmotic membrane, which could be embodied in the form of vague spaces covered with transient, permeable membranes. He designed architecture with sheaths of materials like aluminium, which enveloped the spaces as clothes envelop the body. One characteristic of Ito's architecture is lightness, creating a flowing field. Ito has promoted many younger architects, including Kazuyo Sejima, who inherited the lightness and ephemerality of his architecture: Yet these younger generation architects have not merely followed the same concepts established by their teachers, but developed them further with their own understandings.

The 1970s and particularly the 1980s were times of great economic prosperity and galloping urbanisation in Japan. By the 1980s, however, there was a return of seemingly unconstrained economic prosperity. This was particularly true after 1985 as a result of the dramatic increase in the value of the *yen* and government stimulation of the domestic economy. Overheated land speculation and commercial development generated huge quantities of bizarre architecture throughout the 1980s, indulging

young talent and providing opportunities for them to realise their extreme ideas. When the prosperous and flamboyantly excessive era of Japan's Bubble economy was way to one of the longest recessions in the country's history, it is not surprising that new realities of the post-Bubble Era, while setting limitations on construction, in new priorities and created the necessity for a new kind of architecture. These new realities pressured the Japanese architects to change course. Many of them shifted the focus of their work toward simpler, less decorative architecture.

Sejima worked in Ito's studio between 1981 and 1987, during the accelerated cycles construction, obsolescence, destruction, and reconstruction that defined architectural practice in the years before the Bubble burst. She set up her own practice at the height of the Bubble. During the Bubble period, the architectural scene in Japan provides a relatively unique platform for discussions, tolerance and practice among architects, allowing them to pursue their philosophical interests with relative freedom and encouraging the formulation of architectural proposals that accord with those ways of thinking. Economic prosperity and technological progress in both design and construction techniques allowed the architects a fuller range of individual expression. Iconoclastic design motifs became a way for younger architects to secure professional acceptance. In the 1980s, Ito and Sejima became interested in the urban culture of young girls. They produced a series of works known as "Pao", investigating the ultralight structures to house "urban nomads", which are both celebrations and critiques of the contemporary urban condition. Conceived as transitional objects, the mobile fabrications exhibited a sense of ephemerality. In this project, Sejima started to challenge the way in which Ito's Pao tried to seal off of the individual from urban surroundings, and subsequently set up her own practice. In her first two projects Platform I and Platform II, the architectural form seems to emerge from Ito's Pao. However, Sejima's idea in this series of project is fundamentally different from Ito's notion of architecture as a thing to wrap people up in. Instead, she wanted to create "a

place without any fixed orientation, one that was more open" (Sejima and Levene, 1996, p. 10). Realising that the form of the Platform projects had become more and more complex, Sejima started to think about how ideas of simple volume and mixed use of space could interact. In the next project following Platform, she implemented such ideas in Saishunkan Seyaku Women's Dormitory and started to make her name known in Japan.

Sejima said, "I was lucky to start just at a time when everybody was open to commissioning young architects, because the established architects were busy doing big public buildings" (Obrist, 2012, p. 25). The social situation offers architects an opportunity to realise unusual concepts, to experiment with material and forms, and to implement new ideas for space. Sejima's generation faced the challenges of a drastically changed economy and confronted them by finding new means of creativity through down-to-earth innovations in design. The Japanese city yearned for a more restrained architectural language. Sejima, alongside Nishizawa – and building upon work of Toyo Ito and his investigations into the relation between building and city – searching for an architectural language of their own.

3.1.2 Historical connection

The contemporary Japanese architecture is a good example of the combination of native and modernist approaches. The traditional architecture has both formal and aesthetic influence on the consciousness of the contemporary Japanese architects. Critics often relate these contemporary Japanese architectures to the traditional building. However, SANAA does not see their work in any kind of Japanese tradition: "We may be influenced by Japanese architecture subconsciously, but we don't think ourselves as particularly Japanese architects" (Glancey, 2009). Despite the architects' denial, SANAA's projects show that influences from both Western modernism and

Japanese tradition are incorporated in their strategies of material assemblage and spatial composition.

Relating their work to traditional Japanese architecture, Sejima and Nishizawa make explicit two aspects: *structure* and *diversity*. On the one hand, a very clear structure means light, transparency, and the ability to see the organisation. In the traditional Japanese architecture, everything is clarified and defined. On the other hand, the sliding screens can sometimes close to darken the space, and sometimes disappear to create a continuity between the outside and the inside space, which creates a diversity in the building (Sejima et al., 2008, p. 11). In recent work, SANAA starts to pay more attention to the relationship between the building and environment, which they relate to the *engawa* in the traditional Japanese house. They have covered in-between spaces of the inside and outside below the eaves, what they call the concept of "canopy". In these "canopy" projects, the floor and the canopy are the primary devices to define place. The horizontal planes entice flows of movement, which amplifies the experience of the transition from outside to inside in order to integrate these two areas as much as possible. This transitional space is the important feature of the traditional Japanese house: the *engawa* verandah. The *engawa* runs around the house as a projecting platform under the eaves. Unlike the terrace in Western architecture in which it serves as an exterior corridor, it is intermediating between inside and outside. The boundaries of both inside and outside are defined by thin, paper-covered sliding panels which are easily removable. The emphasis of horizontal planes and the flexibility of sliding panels create variable interface with the garden and nature. According to Kisho Kurokawa, the intermediate space makes a discontinuous continuum possible, so that a plurality of opposing elements can continue in a dynamic relationship. The nature of intermediate space is its ambiguity and multivalence. As described in the *In Praise of Shadow,* in the traditional Japanese architecture, what first strikes the eye is the massive roof of tile and the heavy

darkness that hangs beneath the eaves. The eaves create deep and spacious shadows, which is the beauty of a Japanese room (Tanizaki, 1977).

Besides the architects themselves, critics also relate the traditional Japanese architecture to the architectural form in the post-Bubble period. Thomas Daniell claims that these post-Bubble period architectures tend toward simplicity, flatness, insubstantiality, and even banality (Daniell, 2008, p. 21). Forms are reduced to the absolute minimum; surfaces are translucent or bleached of colour; structure appears disturbingly inadequate; materiality is ignored or contradicted. He identifies the minimalist tendencies into two main streams: the *visceral* and the *ephemeral*. The visceral is concerned with structure, tectonics, and expressions of constructional rationality. The ephemeral has no interest in the physical, corporeal properties of a building; instead it attempts to abstract architecture to purely visual, perceptual effects. He categorises SANAA's work as the ephemeral work. Comparing this to a more conventional minimalist approach that attempts to burn away the unnecessary, a building to its tectonic or functional core, the ephemeral work instead eviscerates very core. The huge popularity of the ephemeral work is perhaps best explained by the Japanese appreciation of beauty because of its transience. According to Daniell, the ephemeral beauty of this approach owes much to the buildings and concepts of Toyo and can arguably be traced back to the delicate refinement of the traditional teahouse. He claims, "This historical connection is most obvious in the essentially two-dimensional quality of the architecture" (Daniell, 2008).

The two-dimensionality in the traditional Japanese architecture has been analysed by Kisho Kurokawa, who describes how the traditional spatial elements of a design such as ceilings, alcoves and walls are each autonomous – that is, they are on the independent planes of a two-dimensional world. The heterogeneous elements deny any direct three-dimensional relationship. This is one technique of encouraging the sense of two-dimensionality (Kurokawa, 1994, p. 127). Kurokawa explains that at

the very basis of Japanese aesthetic consciousness – be it painting, music, drama, or even in buildings and cities – lies this two-dimensionality or frontality. It is a quality of timeless nonsensuality, a nonsensuality produced by the reduction of three-dimensionality to a planar world.

The two-dimensionality also affects the contemporary Japanese art. 'Superflat' is a term that the Japanese painter Takashi Murakami[13] coined to describe the artworks of his studio, in which the lack of depth found in traditional Japanese painting is brought together with a similar lack of depth in early *manga*, forming a visual product which is characterised by a lack of perspective, an extreme planarity, and an interest in particular kinds of movement, expressed graphically. He states,

> There is no camera eye. No profundity. No hierarchical structure. No hidden feelings and thoughts. And even in some cases, no human involved. But instead, there are numerous eyes staring and focused on everything. There are networks. Movements. And surprisingly, true 'freedom' (Igarashi, 2000, pp. 98-101).

He defines an aesthetic that is not just two-dimensional, but which emphasises instead of depth. Architectural critic Taro Igarashi borrows the term 'superflat' from Murakami, and describes the work of architects such as Toyo Ito, Kazuyo Sejima, Jun Aoki and Kengo Kuma as 'superflat'. One of the defining characteristics of *manga* superflat architecture is seeking to eliminate the three-dimensional depth. Igarashi states, "This type of architecture is especially distinguished by its focus on the expressive possibilities of the building's skin, as opposed to its volume - the

[13] Takashi Murakami (1963-) is one of the most thoughtful and thought-provoking Japanese artists of the 1990s.

of what might be called the ‘2.5 dimensional’ - and in the reconsideration of architectural hierarchy, both in terms of the building’s programme and in terms of the organization of architectural firms” (Igarashi, 2000, pp. 98-101). Emphasising a building’s skin rather than its volume is an obvious interpretation of ‘superflat’, but how to understand the building’s programme and organisation of architectural firms by ‘superflat’? This question is discussed in the introduction of SANAA’s office in the next section, and their programme strategy in later chapters.

Besides the two-dimensionality, there are other characteristics of the traditional Japanese architecture that influence the contemporary architects in the post-Bubble period. Botond Bognar claims that the architecture of the 1980s in Japan can be characterised by an important shift of emphasis from the previously dominant industrial technology or “hardware”, toward a highly sophisticated electronic and communication technology or “software”. The Bubble era designs manifested an increased fascination with the sensual in architecture (Bognar, 2013). Traces of the sensual can be found in the traditional Japanese architecture: such as thinness and ephemerality, in-between and ambiguity. Japan acted as a key Western image of thinness in the early years of modern architecture. The aesthetic predisposition toward thinness is connected to the nation’s scarcity of natural resources. The aesthetic elegance, precision in craft, and functional pragmatism characterise works from Japan. The aesthetics of thinness and ephemerality have long been central to traditional Japanese architecture, which has surface-oriented qualities, with spaces lightly defined by moving paper walls and tatami mats. The creative process is connected to deeply embedded traditions and philosophies that define space and time as precious commodities. As a result, Japanese design embodies a heightened awareness about the ephemerality of existence and the significance of the present moment, seeking to enhance the viewer’s multisensory experience. The transient and ephemeral nature is then transferred and developed in the contemporary Japanese design. Many of them are in a temporary

state of “in-between” where presence and absence, reality and fiction are present simultaneously, evoking the image of elusive phenomena of clouds, twilight, or shadows, and acquiring a certain ephemeral or virtual quality. As Pierluigi Nicolin summarised, the fact that Sejima belongs to a particular tradition should not be seen as a form of historicism or the mere definition of a background. On the contrary, it would be possible to look within this very tradition for the presuppositions of a philosophy that accepts the present as an inevitable condition of existence. Living in the present by removing the possibility of a dialectical temporality from our horizon also leads to a certain acceptance of society in its current form (Nicolin, 1998).

Therefore it could be said that the Japanese tradition has offered SANAA some inspiration of architectural form, structure, and aesthetic direction, which tends toward simplicity, flatness, and insubstantiality. SANAA also learned the ephemeral beauty from their teacher Toyo Ito’s blurring architecture, which is a reflection on the world as a phenomenon of changing scenes. Taking these principles and influences as a starting point, SANAA has developed their own approaches to explore buildings.

3.2 Introduction to SANAA

3.2.1 Three associates

Sejima and Nishizawa have a very enjoyable cooperation with the three offices working together: the collaborative office SANAA, the Sejima office, and Nishizawa office. A decade younger than Sejima, Nishizawa briefly interned with Ito before becoming one of Sejima’s first employees. When he made the decision to go solo in 1995, Sejima tried to dissuade him with an offer of partnership. At that time Sejima had just received an invitation to take part in a competition for the expansion of the Museum of Contemporary Art in Sydney. They entered the competition together and

won, which is how they started to work as a team. They reached a compromise: they formed SANAA in 1995, Sejima retained her original practice, and Nishizawa established his own office in 1997.

There is a close relationship between the three offices. All three entities are housed in the same single-storey warehouse building in Tatsumi, where they share a loosely divided large open space that looks out onto Tokyo Harbour (Figure 3-2). The plan of SANAA's office (Figure 3-3) was drawn by the editor of *ArchiCreation* Zheng Shixin, after he visited SANAA's office. Sejima and Nishizawa take each side of the large open space, and have left the middle part as SANAA's. The warehouse is about 17 x 41 metres – essentially, one linear stretch of work stations. It is partitioned only by free-standing shelving which is filled with books and magazines. There is an aisle between the book shelves that leads towards the back of the studio, where there is a corner for model making and a small meeting area fronted by large sliding glass doors, offering a very good view of the harbour outside. The interior benefits from natural daylight. A floating deck off the back leads straight out on to the Tokyo bay, offering an escape from the urban mass of the city.

Like the spatial logic of their architecture, the organisation of SANAA's practice is also a non-hierarchical structure, and is predicated on combining independence with interconnection. The open layout of the work space facilitates and encourages easy communication. They believe it is important for the people who work here to be connected to the projects that do not relate directly to them. Instead of too much division and organisation, they like the feeling of mixture and adventure in the space. This kind of thing that happens in the studio reflects their idea of how to organise space in their architectural projects. This is what Taro Igarashi means by 'superflat' in terms of the organisation of SANAA's firm.

Some people would think that the interconnection of three associates is a complicated way to create buildings, but Sejima and Nishizawa think that it is one of the nicest ways of working. The basic principle is that projects for Japan, small housing projects, and interior design projects, would be done separately. SANAA was established basically to enter international competitions, so that is essentially for foreign projects or very big projects in Japan. The two architects do not want to disengage from each other nor lose their independence. Sometimes it depends on the clients' wishes: the clients may ask for it not to be Sejima or Nishizawa, but rather SANAA, even in their domestic projects. Sometimes the opposite happens. However, even in their individual projects, they act as each other's critic in the design process. There is a strong relationship between the three offices, therefore the research process and the way of presentation are intensely related.

Despite the increasing number of invited projects, SANAA does not intend to expand their office. The office has grown constantly since the 1990s but they have always tried to keep the size at a maximum of about 50 people in order to stay alert and maintain their interest in what they do. The employees work very hard to 3.00am or 4.00am almost every day.

The two partners do not make great claims or theories for their design. As Kwinter Sanford observed, "Nearly every query is met with a statement of simple physical description, a deliberate withdrawal from speculation, a game of cat and mouse" (Idenburg, 2010b, p. 81). However, it is hard to use clear language to explain intuition in the design process and the ambiguous condition in the buildings. In Koji Taki's conversation with Sejima, she said, "perhaps I am being too brief in trying to summarize my own approach. There are other less obvious elements in the design process which I try to expose, but which I myself haven't completely understood" (Sejima and Levene, 1996, p. 23). The difficulty of explaining SANAA's work may be due to certain particular characteristics of building itself, or the deliberately loose

control given by the architects. These issues are investigated in the case studies in later chapters.

Figure 3-2 SANAA's office (Source: https://www.flickr.com/photos/niltonsuenaga/with/4889742720/)

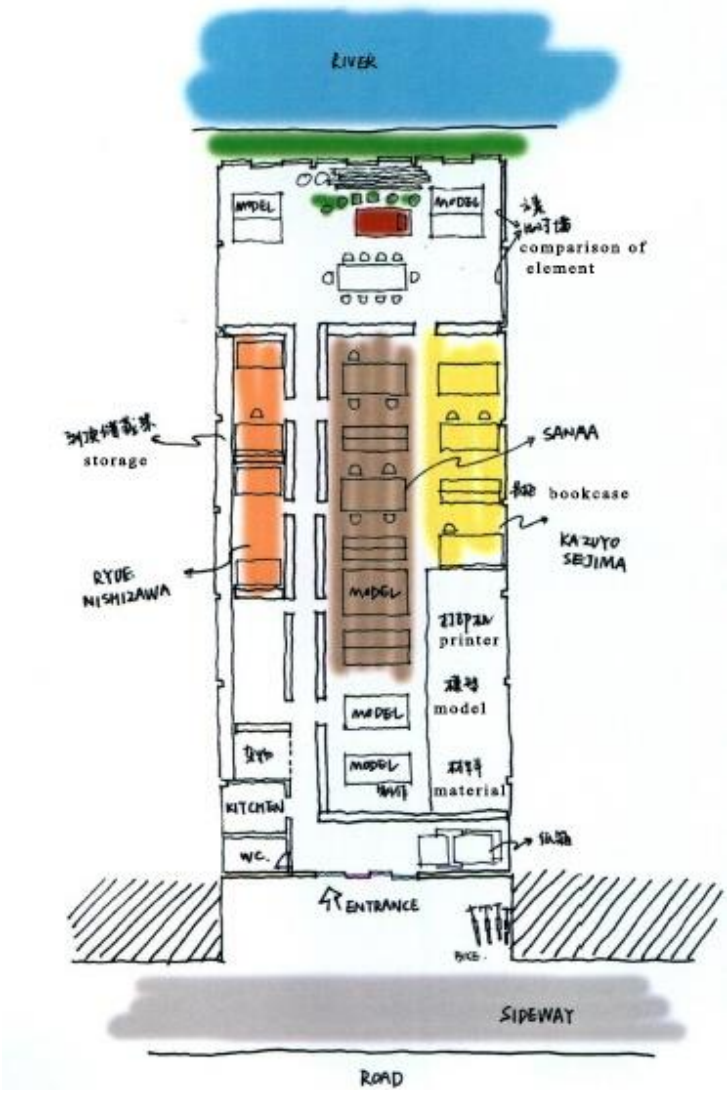


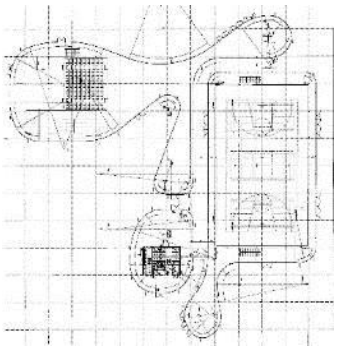
Figure 3-3 Plan of SANAA's office (Source: *Archicreation*, 09/2012, No. 153, p. 108, edited by author)

3.2.2 Two architects

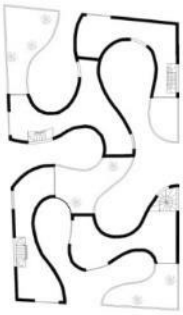
Since the architects have established this particular form of collaboration, this combination has constructed three personalities in their projects. If comparing some of the two architects' separate projects – without going into much detail – we will find that sometimes it is difficult to recognise which of the two architects designed them.

However, we can still be aware of some personal preferences and different conceptions of form expressed in their individual works.

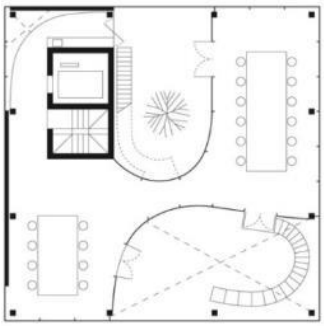
Sejima tends to use more organic forms such as sinuous and serpentine shapes, which started from the Onishi Civic Centre (2005) (Figure 3-4). Three parts of the building have strange, rounded spoon-like forms, reflecting Sejima's intuitive reading of the context. Subsequently, this kind of sinuous shape constantly appears in Sejima's individual projects. Okurayama Apartment (2008) adopts the organic form to generate an equal relationship between the building and the garden, rather than the conventional organisation of a building as the dominant part on the site. In another Sejima project, Office in Shibaura (2012), although the outline of the building is a square, the shape of each floor's plan is organic. In the Dentist Office (2006), a series of warped circumferences are linked by tangents, which has similar spatial effects to those of the Villa in the forest (1992-1994), defined geometrically by two non-concentric circumferences. In the Dentist Office, the link points of these warped circumferences form some forks, which are quite unusual in a building plan: you can neither use them as normal rooms, nor as space for cupboards as other architects would transform them to. However, these unusual shapes are the characteristics that distinguish Sejima from other architects, and which one cannot find in Nishizawa's individual work.



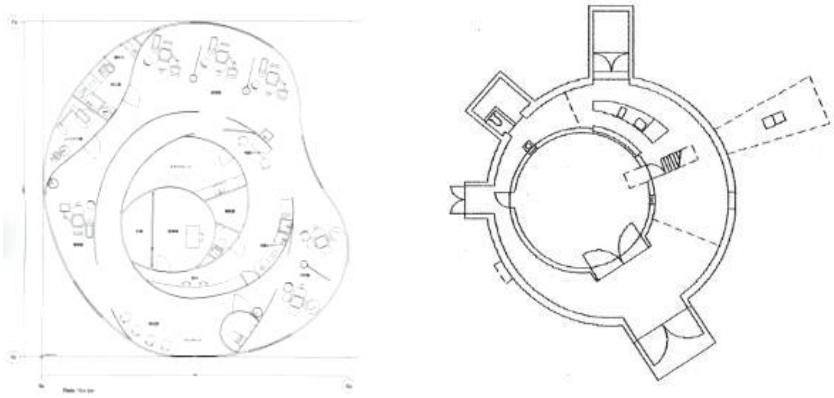
a. Onishi Civic Centre



b. Okurayama Apartment



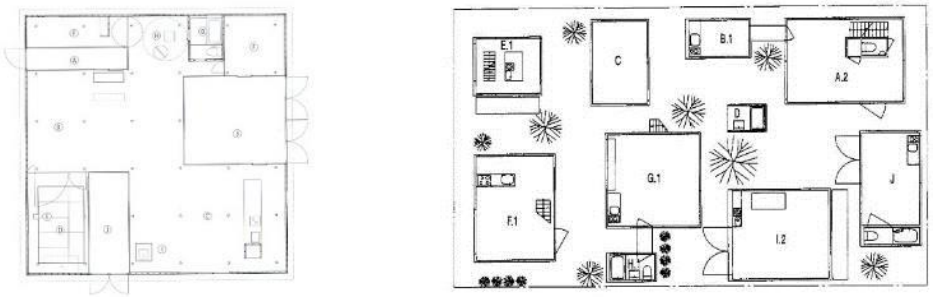
c. Office in Shibaura



d. Dentist Office **e. Villa in the forest**

Figure 3-4 Sejima's projects with organic shape plan (Source: a. *El Croquis 139*, p. 224. b, c, e. drawn by author. d. *El Croquis 139*, p. 238.)

In contrast, in the early stages, Nishizawa tends to design based on the orthogonal grid. Either dividing space with orthogonal walls or breaking the building into a series of cubes, Nishizawa plays with these volumes in a strictly logical system. One of the representative works in Nishizawa's early projects is the Weekend House (1998) (Figure 3-5), which can best illustrate Nishizawa's logical system. The plan of the Weekend House is based on a grid of 2.4 x 2.4 m. The three courtyards are also based on the module system: one side of each courtyard is the length of two grids, the other side of each courtyard is 1/2, 1, and 2 times of the grid respectively.



a. Weekend House b. Moriyama House

Figure 3-5 Nishizawa's projects with orthogonal grid (Source:
a, https://uk.pinterest.com/pin/391250286351948872/,
b, http://openbuildings.com/buildings/moriyama-house-profile-39113)

The Moriyama House (2005) (Figure 3-5) designed by Ryue Nishizawa separates the typical functions of a home into separate rooms within an exterior landscape, engaging the day-to-day use of the house by the resident, with the use of the surrounding city by its inhabitants. These volumes are independent from one another and are scattered across the site, creating a series of connected individual gardens. Both the blocks and the gardens are well proportioned and arranged in a rigid framework, which is completely different from Sejima's organic form in terms of spatial logic.

According to their original preference of the form, it seems reasonable to suggest that Sejima is more sensitive and poetic, while Nishizawa is more logical. According to Yuko Hasegawa, Sejima's intuitive ideas always emerge from her anarchic physicality, unshackled by conventional notions, while Nishizawa's anarchic vision lies in his standardised, systematic worldview and is easier to understand within a logical framework. Therefore his vision appears less exceptional than Sejima's (Hasegawa, 2006). It could be said that Hasegawa's opinions are partly right, which

can be supported by evidence that is found in their collaborative projects and individual works. For example, the globular outlines so characteristic of SANAA can be found in Sejima's works, while in Nishizawa's office, they are reduced to the outline of inner courtyards. Looking at the plans of Okurayama Apartment or Onishi Civic Centre, one tends to conjecture that these could be Sejima's work rather than Nishizawa's. It is not surprising if someone mistakes Nishizawa's work for that of other architects. Sejima's approach starts from her inner self while Nishizawa's ideas have no existential perspectives.

However, their individual characteristics cannot be simply concluded like this. The architects expressed different opinions. Sejima said, "Some older Japanese architects completely misunderstand us. They think I am a very emotional architect and that Nishizawa is very logical…I generally start to think in a direct way and he tries to be more emotional. I think that he is more poetic than me" (Cecilia and Levene, 2004, p. 5). Nishizawa also comments on Sejima: "She is very realistic, not a dreamer. All she thinks about are real things."

Nishizawa's poetry is revealed completely in the tear-drop form of Teshima Art Museum (2010) (Figure 3-6), a private museum built on Japan's Naoshima Island. It is a simple 200 mm thick concrete shell embracing a large single room. Light is the only physical element existing beside the art. Two oval openings in the shell allow the air, sounds, and light of the world outside into this organic space where nature and architecture seem intimately interconnected. Inside one finds ever-flowing fountains and an ambiance that changes from hour to hour and season to season, revealing countless appearances as time passes. This is architecture of simple forms capable of producing complex phenomenological effects. In this project, Nishizawa's usual logical framework is replaced by pure poetry.

Figure 3-6 Ryue Nishizawa: Teshima Art Museum (Source: http://www.designboom.com/architecture/ryue-nishizawa-teshima-art-museum/)

It is not realistic and reasonable to make a clear cut distinction between the two architects, because their design process is a mixed progress. Even for their individual projects, they listen to each other's criticisms. Therefore, it is not strange that when the theme of SANAA projects turned to "canopy" in recent years, both of the architects' separate work follow this theme as well. Unlike his previous orthogonal grid or boxes, the form of Nishizawa's canopy tends toward various organic forms. It is hard to say whether this is a result of a gradual revealing of his poetic characteristic, or the result of Sejima's influence.

Inevitably, the collaborative work of Sejima and Nishizawa shows characteristics of both architects. For example, the plan of Glass Pavilion at the Toledo Museum (2006) has a rectangular layout and the curved surface cell, which seems like a combination of Sejima's free curve lines as in the plan of Dentist Office, and Nishizawa's rigid grid. In the 21st Century Museum of Contemporary Art in Kanazawa (2004), when the grid and cubes seem so strong in the project, the critics say it "lacks Sejima's signature style of physical sensibility" and does not have a mysterious feel of passion behind the abstraction (Sejima and Nishizawa, 2004, pp. 32-39). When they completed the Rolex Learning Centre in 2009, they changed the main concept of their design from "park" to "canopy", which will provide a more intimate relationship

between interior and exterior. Canopy emphasises the horizontal extension of the roof, providing an in-between space that is neither an interior nor an exterior space. Beside this, canopy becomes an important design language in their recent work (2009-2014), forming a way to organise the plan and section. As mentioned before, this form has been adopted by all the three associates.

As Federico Soriano comments, Sejima and Nishizawa have different approaches to projects, but the differences arise from the type of corrections they make to them, from the moment when in one case, there is a conversation about the project, and in the other, it is commented on. Each architect begins on his or her own project independently, and then they meet to discuss it. This is a conversation process in which proposals are rejected, or influenced. If it is an individual project, the conversation does not continue; it ends in a comment. If it is a collaborative project, the differences end up being negotiated. Either accepting or rejecting each other's different opinions, the SANAA projects take both architects' ideas or weaken them by negotiation; therefore the SANAA projects are more moderate than their individual projects. In the next section, SANAA's design method is investigated through a couple of cases, to see how the architects collaborate with each other and develop each project.

3.3 Design method

3.3.1 Experimenting

Commenting on SANAA's process from the drawing to actual building, Toyo Ito claims that the transition from diagram architecture to reality is an extremely brief and direct process (Sejima and Levene, 1996). Federico Soriano claims a contrary view to Ito's diagram architecture. Instead of immediacy or clarity, he proposes 'precisionism'

or ‘refinationism’ as the terms that best describe these architects’ design process. He suggests that career trajectories as long-term strategies are no longer marked by a studio’s design methodology, but rather a working system, the mechanical tactics of the production process (Sejima et al., 2015).

For the first issue – precisionism or refinationism – Soriano argues that the fact that there seems to be an immediate relationship between the first diagram of the spaces and the construction itself does not imply that there has been a direct translation. The brutal immediacy which could erase the design process is fictitious. On the contrary, the process is thorough, precise and repetitive and eliminates all unnecessary gestures in order to arrive at a refinement that finally coincides with what was drawn initially. It is like the writing process, the simplest and most concise phrase begins with the longest sentence. It needs to have some more added or some more taken out, to end up with a result that is more concise.

Based on the variety and quantity of the diagram and physical model, it could be argued that experimenting is the method for SANAA to study spatial organisation and forms. Taking Okurayama Apartments in Yokohama (2008) (Figure 3-7) as an example, there are 18 diagrams in the preliminary study. This project consists of nine units, each about 50 m^2 on a 450 m^2 site. Approximately two people will occupy each unit of the apartments. They sought to create a layered and stacked series of homes, and each unit should interact with the surroundings on all sides. The diagrams show the preliminary study of translating the programme to spatial organisation. The key theme is to make the garden and rooms intermingle with each other comfortably, so the diagrams are experimenting with different relationships between the garden and units: for example, all units in the middle surrounded by gardens; all units on the edges enclosing the garden; the units are divided by grid, each with a small garden; the units are like islands, arranged randomly on the site; the units and gardens are

equally shaped by curved lines. In the final scheme, the grid disappears. There are no hierarchies between the rooms and the gardens.

A similar experimenting method could be found in the case of New Mercedes-Benz Museum (2002) (Figure 3-8). The diagrams show five different approaches to translate the programme to spatial organisation: trail, grid wall, islands, homogeneous, and zones. These approaches can be read as prototypes that SANAA uses to organise the space; this is discussed in detail in the next section. These diagrams could be read as SANAA's studies of one of the three-part tectonic model – tectonics of joining of space or functions.

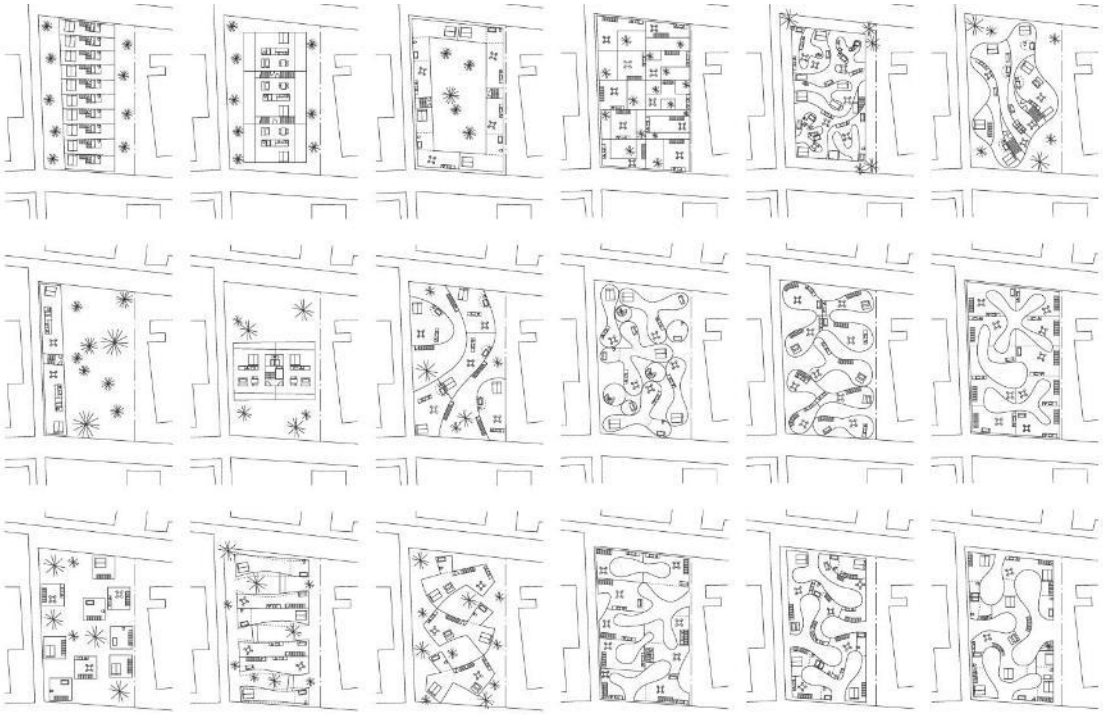


Figure 3-7 Preliminary study of the Okurayama Apartments Yokohama, Japan. 2006/2008 (Source: *El Croquis 139*, p. 262)

Figure 3-8 Preliminary study of the New Mercedes-Benz Museum (Source: *El Croquis 122,* p. 152)

a. Tsuruoka Cultural Centre (Source: *El Croquis 179-180,* p. 105)

b. 21st Century Museum of Contemporary Art in Kanazawa (Source: *El Croquis 179-180,* p. 10)

c. Dentist Office (Source: https://publicuseofprivatespace.wordpress.com /2012/10/09/modeling-30-minutes-max/)

Figure 3-9 Physical model as an experimental approach

From the above diagrams we can see that the way they develop the project is almost purely experimental. They simply test options and have vague sets of questions for the project. Beside diagram, physical model is another important component of the experimental approach (Figure 3-9). Traditionally, modelling was a mechanism of evaluation rather than of exploration. In the case of SANAA, they rely on the precise feedback offered by a simple and extremely refined design process based on the iteration of physical models. The architects explained,

> In our research process, we build an enormous amount of models, but of course that is not our ultimate goal. The importance of this method is the effort to create the largest possible number of alternative schemes in order to see the different options from many different angles. We ask everybody in the office, including ourselves, to produce as many options as we can find. That is why, during this research period, the number of drawings and models constantly grows to an enormous amount (Cecilia and Levene, 2004, p. 11) .

According to Marta Alonso Provencio and Jorge Almazan's study on the models in Sejima's design process, the models influence each other by transferring their geometrical characteristics. Most of the models produced are different from the final chosen proposal; yet they are essential for discussion and comparison to make decisions (Provencio and Almazán, 2011). Sejima believes that computers create very flat drawings and automatically decide the level of abstraction. When someone makes a model, they decide what is important and where the emphasis lies in the design. This helps to make the intention clear to them and affects the design process.

Another important issue about SANAA's model is that the models are built and checked as "prototypes" of the real project rather than an abstract representation. Therefore it could be said that their model is not just a spatial model, it is also a

‘tectonic model’: the materiality and construction details are not in any way changed when transformed to the real building. This is elaborated in 6.1 Theme 1 Diagram architecture. This process allows them to predict and evaluate in advance the phenomenological outcome of their projects, preventing a disconnection between the architectonic concept, its representation, and the final materialisation.

The large number of diagrams and models prove that SANAA adopts a theory of process design. The possibility of designing creative protocols is embedded in the process itself. Most energy is invested in processing and editing multiple ideas rather than in the gradual refinement of a single idea. Therefore, the process is far away from the lineal sequence of design that starts with idea of the office leader. Sejima claims that she never conceives a scheme by herself in advance; instead, everyone in the practice decides the direction of the project together (Sejima and Levene, 1996, p. 8).

So, what are the criteria for their choice amongst the endless solutions? According to Sejima, it is sometimes very logical and sometimes very intuitive. They try not to select options for which they can already imagine the outcome. In other words, they try to select the direction with the most possibilities. Taking the Kanazawa museum for example, Sejima and Nishizawa explained how they make decisions from thousands of different options: during the study process they try to create local rules or “regulations” to define the building. They created many models and gradually found that the idea of having a long visual connection that penetrates the building from one side to the other could give a feeling of transparency. So this became one of the “small regulations”, defining the direction of the project. Everyone can do what they like, but they must adhere to this “regulation”; then, at the next meeting, they find more “regulations” (Rubio, 2007). Therefore, it could be argued that the criteria or regulations of their design emerge from the experiments, which has some similarity with John Holland’s model of constrained generating procedures. In his dynamic model, the goal is to discover the so-called “rules of the game” that determine the

laws under which a system can change from one state to another. A few well-defined rules of interaction can generate complex and unanticipated strategies. Holland notes that among complex systems, "one recurring theme is essential to emergence: in each case there is a procedure for freely generating possibilities, coupled to a set of constraints that limit those possibilities" (Holland, 1998, p. 122). It could be said that SANAA's large volume of diagrams and models are the generated possibilities, and those regulations are a set of constraints that limit those possibilities. Furthermore, emergence breaks from the traditional theories by looking not at the end points where a system reaches an equilibrium state, but rather the transitional effects of persistent patterns and system improvement. This explains why SANAA always chooses the direction with most possibilities; they want to keep the working system dynamic and unpredictable.

To conclude, SANAA refines their projects by a mechanism like the emergence model, which incorporates possibilities and constraints that limit those possibilities. However, one question remains unclear: how do the architects generate those possibilities in the first place? The next section focuses on this issue.

3.3.2 Plan-diagram: from programme to form

Holland's emergence model is based on computer modelling which incorporates the analytical rigour of mathematical formulations and the flexibility and greater degree of realism associated with experimentation. Are there any "mathematical formulations" for SANAA to generate possibilities? It makes sense to start investigating the way they generate these possibilities: diagrams.

Eve Blau claims that, for SANAA, the spatial logic is defined by human activity rather than formal typology. Similarly, Toyo Ito notes that Sejima eliminates

customary planning methods through immediate conversion of the initial diagram into building to avoid typological solutions. However, by "typological solutions" Ito refers to the process that is involved from the two-dimensional drawing to the real buildings, before which there should be another step. Talking about the starting point of their design thinking, Nishizawa declares, "I think if anything I would say it is the programme". Sejima clarifies, "It's not possible to go from programme to architecture in one leap. It's not possible to use programme as a generating logic for architecture. We do make esquisse studies based on programme and use that to make small decisions. So we respect the programme, but that's not enough – we can't turn that into architecture". Nishizawa also says, "It is possible to make so many different plans, different options out of the same programmatic requirements. We can generate thousands of options" (SEJIMA, 2000, p. 18). So, how does SANAA convert the programmes to the diagrams, and then to the plans? Is there really no formal typology in SANAA's work as Blau claims? It is necessary to clarify the roles that diagram plays in the design process first.

According to the American architect Paul Nelson, design was a process divided into three stages: "The Nonarchitectural Analysis – abstraction in terms of life; the Architectural Analysis – abstraction in terms of space; The Architectural Synthesis – concretion in terms of architecture" (Garcia, 2010, p. 73). Nelson's second stage was a process where the diagram performed its essential role as the translator of idea into form. The so-called bubble diagrams for example modelled ways of understanding space and ways of moving through space. The bubble diagrams are a sort of semantic mimesis of movement and flows that releases architects from the fear of the unavoidable fixity of architecture. In this way diagrams still work in order to postpone the moment of form.

It is, however, interesting that this escape from architectural form by means of analysis will sometimes become, at a certain point, an architectural form itself.

Professor Hyungmin Pai comments that Ito's observation of diagram architecture is precise in that he is not talking about the mediating function that diagrams have between programme and form. He is rather pointing out that plans, sections and elevations – those traditional modes of architectural representation – are themselves diagrams. Pai asks at what point a diagram becomes a plan. He writes, "Contrary to the notion that the diagram and the plan were distinct phases of the design process, there was a constant analogical continuity between the lines of the diagram and those of the plan…We may conclude that if there is a diagram that can generate form, such a diagram is already form" (Garcia, 2010, p.74). Therefore, if Ito's diagrams mean the plans, sections and elevations rather than programme diagram such as the bubble diagrams, how does SANAA transform the programmes to the form of architecture? Ito argues that Sejima's plan-diagrams[14] do not derive from the programme but "from her own intuitive vision of society"; however Ito did not clarify this process. How does SANAA translate programmes to plan-diagrams? According to Pai,

> If diagram is form, then we must also take notice of its corollary, that form is a diagram. With this proposition of the diagrammatic nature of architectural form, we are inevitably led to the idea of type. For despite the claim that the diagram is untainted by formal preconceptions, that the plan emanates from the programme, it is clear that typology remains a key issue in the diagrammatic process (Garcia, 2010, p. 74).

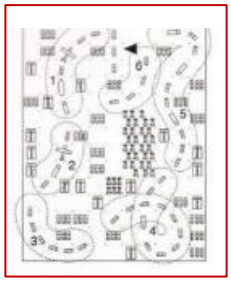
Is there any typology in SANAA's diagrammatic process?

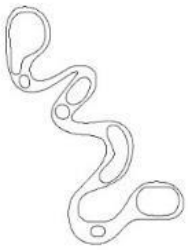
[14] Here the word "plan-diagram" is used to differentiate Ito's diagram as plans, sections, and elevations to programme diagram such as bubble diagrams.

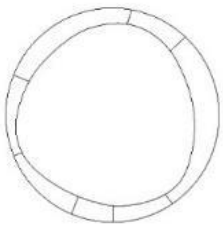
Step 1: Define spatial relationship by typology

If we look at the diagrams of the two cases in section 3.3.1 again, one will discover that these experimenting plan-diagrams are based on certain types of spatial relationship and geometries, which SANAA uses as a tool to translate programmes to the form of the plan. The five diagrams of the preliminary study of the new Mercedes-Benz Museum reflect some basic prototypes that SANAA uses to develop the plan. There are two steps in the development: the first step is defining the relationship between different elements in a space; the second step is using certain geometry to present these relationships. The following are the five prototypes shown in the new Mercedes-Benz Museum diagrams (in red frame), according to which a general review of SANAA's projects and buildings is conducted. All the projects and buildings are represented by diagrams rather than actual plans, because all of them are plan-diagrams, which can show the spatial relationship more clearly and are already very close to the actual plans.

Type 1: Trail







Grace Farms Cultural Centre

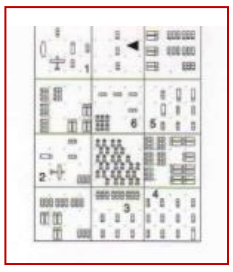
Lumiere Park Cafe

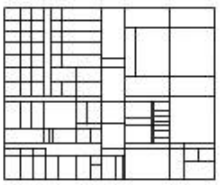
Figure 3-10 Spatial relationship type 1: Trail (Source: Author)

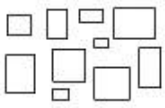
The first type – *trail* (Figure 3-10), defines the space in this trail itself, and also divides the whole space by its trajectory. The trail has freedom to follow the topography of the site, and it also uses the simplest way to organise programmes: a linear arrangement.

The Grace Farms Cultural Centre (Figure 3-10) has a long serpentine roof that floats freely across the site, following the undulating topography. SANAA's intention was to make the architecture become part of the landscape without drawing attention to itself. They hope the users will have a greater enjoyment of the beautiful environment through the spaces and experience created by the building. The perimeter of the Lumiere Park Cafe in Almere, the Netherlands (Figure 3-10), is a circle, and the interior circle has a fluctuating width around the ring, which creates a changing spatial experience. The ring actually is a trail that is in a continuous loop, which contains space in its own volume, and also differentiates the space inside and outside the ring.

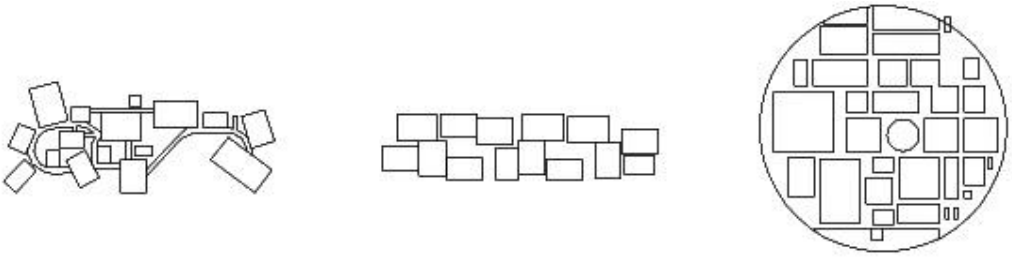
Type 2: Grids







"De Kunstlinie" Theatre and Cultural Centre Moriyama House



Towada Art Centre Shakujii Apartments 21st Century Museum of Contemporary Art

Figure 3-11 Spatial relationship type 2: Grid (Source: Author)

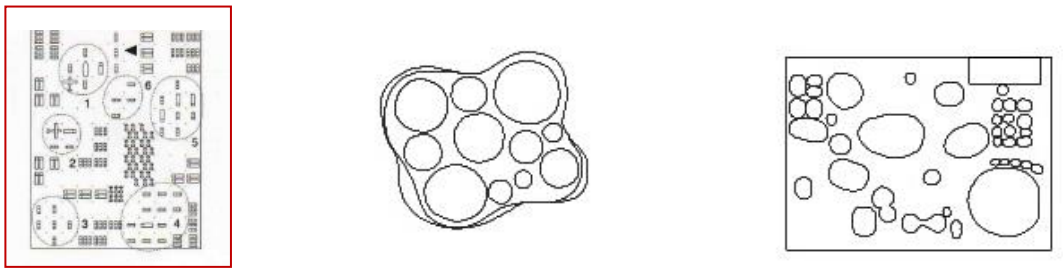
In the second diagram (Figure 3-11), SANAA uses *grid* to divide the space. Each grid has a different approach to displaying the cars. In this type, designated circulation space is eliminated entirely from their plans. Sejima points out, "Sometimes a very rigid grid gives you freedom, although the form is not free" (Sejima and Levene, 1996, p. 17). The grid establishes the equivalences between the components of the work. Sometimes the architects make some changes to the grid, and at other times they break the grid up, separating the rooms and then grouping them. All of these are non-hierarchical arrangements.

The "De Kunstlinie" Theatre and Cultural Centre in Almere, the Netherlands, is a representative project of this type. Its plan is made up of a rectangle subdivided into smaller ones of different sizes. These rectangles and squares are directly attached inside the rectangular perimeter. The idea of the architects is that a rectangle can be a room at one moment but a circulation space at another.

The principle of "separating the rooms" gives rise to a series of projects in which the rooms are released from the envelope, and they become free-standing volumes maintaining a parallel relationship. The Moriyama House develops the separate rooms to a cluster of independent volumes. In Towada Art Centre, the separate volumes have

a free layout but are connected by a linear corridor. More recent projects such as Shakujii Apartments and Nishinoyama House are also a cluster of volumes. Another important project in SANAA's history has been the 21st Century Museum of Contemporary Art in Kanazawa. The cluster of volumes in this case is surrounded by a 4.5 m high circular glass envelope, and the different heights of volumes emerge from the roof. What are between these volumes are corridors with different senses of space, which is a major element in the experience of the museum.

Type 3: Islands



Toyota Aizuma Hall Rolex Learning Centre

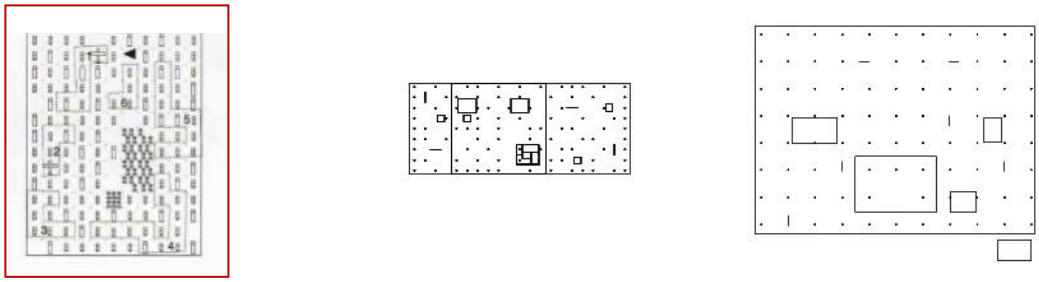
Figure 3-12 Spatial relationship type 3: Islands (Source: Author)

In the third diagram (Figure 3-12), six bubbles are floating in the space. In each bubble, the cars are displayed in one way, while in the place between the bubbles, the relationship of the display zones is arranged in another way. In this type, instead of open plans with shifting planes and grids, SANAA constructs discrete volumes. The individually shaped volumes establish their own organisational logic in terms of physical relationships of size, proportion, and juxtaposition. Nothing exists on its own terms; the identity of any part is contingent on its physical relationship to others.

Therefore the *islands* define the space in itself, and they also define the space between them. In this type, the space is filtered rather than channelled.

This prototype is adopted in many of SANAA's projects. The Toyota Aizuma Hall (Figure 3-12) creates islands for different functions, which also shape the outline of the building. On a much larger scale, the islands are floating in the undulating floor of Rolex Learning Centre, in which the islands are not only the different sizes of ovoid courtyards perforating the rectangular building, but also a cluster of rooms gathered in the big space. As the proportion of the islands varies in each case, the experience in the rest of the space is completely different.

Type 4: Homogeneous



Park Café in Koga Naoshima Ferry Terminal

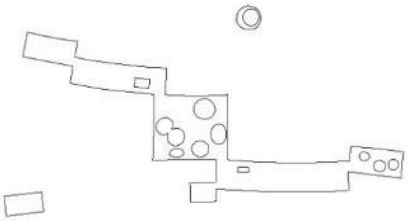
Figure 3-13 Spatial relationship type 4: Homogeneous (Source: Author)

The fourth diagram (Figure 3-13) shows a *homogeneous* way of arranging the cars. Certain areas are enclosed by some irregular shapes, which only add some boundaries between the elements, rather than interrupt the balance between the inside and the outside of the boundary. It is different from the condition of *islands*.

In the Park Café in Koga, the forest-like columns are not mere structures – more importantly, they become a kind of element that generates a dispersed homogeneous space field in the building. Seemingly a random dispersion throughout the space, the disposition of the columns is actually based on a regular grid, and only some of them are omitted at certain points. The tables and chairs are distributed evenly in the "forest", similar to the way the cars are dispersed in the Mercedes-Benz Museum. Four transparent walls enclose a square area as the interior, which could change into the semi-exterior by opening the sliding glass doors in the warm season.

The Naoshima Ferry Terminal in Kochi is also a homogeneous and an open space, which accommodates different functions. Certain area is enclosed according to its specific use by a glass or concrete wall. The concrete boxes stop just before the roof whereas the glass boxes touch it and thereby increase the effect that the roof is suspended in the air and the concrete boxes are floated in the big spaces. Similar to the boundaries in the prototype diagram, these enclosed areas do not interrupt the homogeneous and open state of the whole space; rather, they bring certain changes to the spatiality, which enriches the experience of the space.

Type 5: Zones



Multipurpose Facility in Onishi Yu-Xi Garden Louvre-Lens Museum

Figure 3-14 Spatial relationship type 5: Zones (Source: Author)

In the last diagram (Figure 3-14), six bubbles fill up the whole space. Each bubble defines a *zone*, which are attached to each other. The zones are dominant in the space, making the whole space less homogeneous compared to other types. It is a juxtaposition of different zones, which could be various shapes in different projects.

In the Multipurpose Facility in Onishi, Sejima divides the building into three volumes of curved glass according to the programme that consists of gymnasium, multi-purpose auditorium, and administrative offices. Each volume with a complex shape makes the actual size of it unrecognisable. Further, the volumes are intertwining to create a variety of mix of interior and exterior spaces. In the project of Yu-Xi Garden, Sejima tried to create a space where the entire site becomes one big room

with buildings and garden intermingling; therefore she made three organically shaped roofs sited next to each other. There are many openings which allow free circulations between outside and inside. The Louvre-Lens Museum is another project that uses the juxtaposition of zones or volumes. According to the shape of the site, six similar shaped volumes are attached with each other at the corners to form the whole building.

Comparing the diagrams of these three projects, it is clear that although the logic of spatial organisation is similar, the geometry of the plan is quite different. This is concerned with the second step: geometric transformation.

Step 2: Geometric transformation

These five types discussed above present the possibilities of the definition of space, which are pre-geometric issues. The second step is the geometric transformations, which can develop various forms from each type. An overview of the SANAA work reveals an interesting approach to geometry. As Juan Antonio Cortes points out, SANAA's projects are maintained within the so-called "topological equivalence" between forms that arise from the deformation of the original form (Sejima et al., 2008, p. 39). Buildings with an undulating perimeter are topologically equivalent to those with elementary figures. These deformations preserve what topologists call the "intrinsic qualitative properties" of a spatial configuration. Their basic spatial relationship remains invariable, but the different geometric forms to some extent affect our spatial experience.

Taking Okurayama Apartment as an example again, if we compare the diagram that has the similar spatial organisation as the final scheme with the final plan (Figure 3-15), one will find that the spatial relationship remains the same – there is no

hierarchy between the building and gardens. All the units are evenly distributed in the site, but the geometries of the two plans are quite different. However, as Figure 3-16 shows, the geometry of the final plan transforms from the original one, and it preserves the "intrinsic qualitative properties" of the original form. Therefore there is a topological equivalence between these two diagrams.

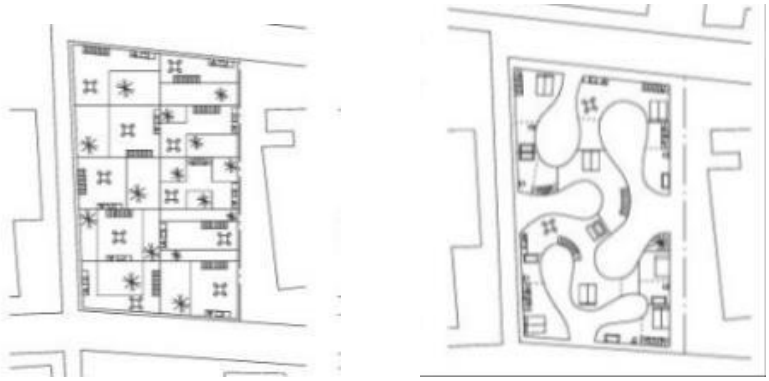


Figure 3-15 Two diagrams of Okurayama Apartment which have a similar spatial relationship (Source: *El Croquis 139*, p. 262)

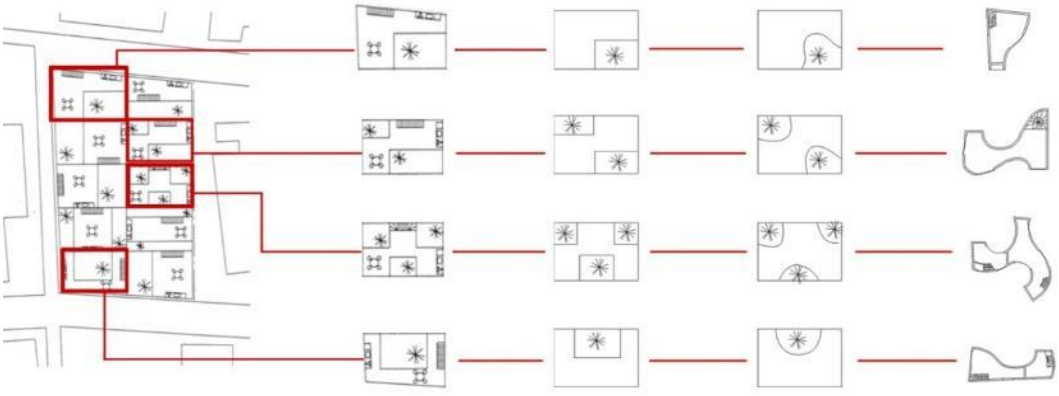


Figure 3-16 Geometric transformation of the plan of Okurayama Apartment: Topological equivalence (Source: Author)

From Sejima's early work to the recent SANAA projects, the geometry of their projects has changed considerably: from the rectangular figures to forms with a free geometry, which are done by hand-drawings. The architects explain that the reason they like hand-drawings is that the abstraction it allows is more personal than that of a computer. However, instead of as a replacement of the previous spatial concept, these free geometries are "topological equivalence" of the basic forms, only they have added new properties to the spatial experience.

Hereto, the reason why SANAA takes the experimenting method is clearer. The two steps from the programme to the plan-diagram do not represent a simple linear process. Instead, each step has multiple options. The number of options, represented in diagrams and models, increases gradually and all of them are retained until the last decision is made. In the process, some options start to capture more attention as the selection criteria becomes clearer by comparison.

That said: why can SANAA use certain prototypes to cover all different kinds of programmes? Japanese architect Jun Aoki writes,

> When programmatic articulations are directly translated into spatial articulations, spatial articulations are apt to become more distinct. However, with Sejima, a perceptible distance is maintained between the architect and the programme. The programme appears vague from that distance. The vagueness is matched by a vagueness of "architectural form". In this way, the shape hitherto based on easily understood geometrical forms such as parallelepipeds and cylinders have suddenly been replaced by soft, unarticulated forms (Sejima and Nishizawa, 1999, pp. 6-7).

In other words, it is not a clear and direct translation from the programme to the architectural form. Aoki's comments suggest that there are two aspects of vagueness:

SANAA's vague understanding of the programme; and the ambiguous architectural form generated from the vague understanding of the programme. It could be argued that because of the vagueness, the spatial articulations and architectural forms could be less distinct; therefore the architects can use some basic prototypes to develop all kinds of projects. The vagueness of the programme and architectural form is further investigated in the case study, which is an important property of SANAA's weak architecture.

Conclusion

Placing SANAA into the genealogy of Japanese architects, it is clear that Sejima's early stage has been deeply influenced by Ito's ideas of blurring architecture and the way he uses material, which reflects the characteristics such as lightness and ephemerality. The economic and social situation of the post-Bubble Era in Japan provided Sejima a special opportunity to realise her unusual concepts and new architectural languages.

From the early stage of paying less attention to the Japanese traditional architecture, to the more recent turn to the more traditional, Sejima and Nishizawa have been inspired by the Japanese traditional architecture on both formal and aesthetic consciousness. The formal influence includes the transparency created by clear structure, diversity created by the sliding screens, and the ambiguity created by the *engawa*. In terms of the aesthetics, the traditional architecture provides SANAA with the ideas such as the two-dimensionality, thinness, simplicity, and insubstantiality.

Taking these principles and influence as a starting point, SANAA has developed their own approaches to explore architecture. Different from other collaborative architects, beside the collaborative firm SANAA, Sejima and Nishizawa also run their individual

practices, and there is a close relationship between the three offices. The close relationship and collaborative approach is reflected in both tangible and intangible ways: the three offices are housed in one single-storey warehouse, which is a non-hierarchical structure; in the design process, the two architects do not disengage from each other nor lose their independence, they act as each other's critics in the individual projects, and have conversations in the collaborative projects. Since the two architects have different personalities and preference in their design, three personalities have been constructed in this combination, in which the names sometimes become unrecognisable among these architects.

The analysis of diagram in the design process gradually reveals that the "repetitive" and "precise" process, as claimed by Soriano, is actually the experiment on the spatial relationship, and the geometric transformation. The former is studied based on some prototypes in the office's working system. Similar to John Holland's model of constrained generating procedures, the architects use the prototypes to generate many possibilities with the help of diagram and physical models, and create regulations to limit those possibilities, in order to reach the final option.

However, although the basic design method, or "working system" as Soriano claims, is consistent in the office, the context and the atmosphere of each project are quite diverse. There are more design philosophies beyond such a working system. Following the step from the programme to the plan-diagram, in the next step – from the plan or model to the real building – material plays an essential role, which is discussed through two cases of SANAA's work. Before going to the discourse on the role of material, the next chapter introduces the two projects first.

Chapter 4 Introduction of two cases

Introduction

In the previous chapter, SANAA's design process from programme to diagram and model is examined, leading to the following questions: how does SANAA transform diagram and model to the real building? What role does material play in this transformation, and in the generating of perception of space in the real building? If Toyo Ito's interpretation of Sejima's diagram architecture is valid, how does SANAA translate the drawing and model to the physical building without changing the expressions of material and colour? And what is the spatial effect of this strategy?

In this chapter, two cases – Rolex Learning Centre and Louvre-Lens Museum – are selected to study the role of materiality in SANAA's weak architecture. Both of the cases are SANAA's large projects overseas, which integrate their multiple prototypes reviewed in the previous chapter. They have very typical SANAA material and tectonic expressions, which can provide solid facts to study their role in realising the architects' ideas. Moreover, both of the cases are relatively recent projects, which could be seen as a summary of the architects' thinking over the years. Another practical reason is that there was a chance to interview the engineer of the two cases, Professor Manfred Grohmann, who reveals valuable construction knowledge hiding beneath the simple surfaces of these projects.

4.1 Case Study 1: Rolex Learning Centre

4.2.1 Context of the project

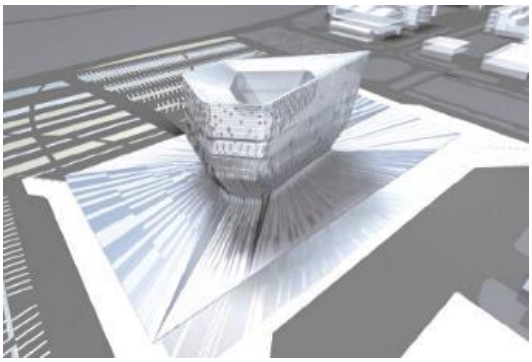
The Rolex Learning Centre is the campus hub and library for the Ecole Polytechnique Federale Lausanne (EPFL), which is Switzerland's French-speaking national

polytechnic university founded in 1969. The building is named after its main sponsor and built at a cost of 110 million Swiss francs. Its main task is to bridge the gap that disconnects the EPFL and its neighbour, University of Lausanne, from the city. It aims to reestablish connections between students and the city, and form a bridge between the academic world and society.

The original central spine of the main campus provided only a circulation corridor, limiting the opportunities for chance encounters beyond students' immediate peer groups. Faculties existed within discrete territories including a series of small libraries — there was no notion of a library as a central meeting point. Critically, therefore, the new Learning Centre would provide a new social heart to the campus for 11,000 EPFL researchers and students. It is designed to promote interdisciplinary exchange among scholars and scientists, and to lure in top international researchers with an attractive environment.

In 2004, the EPFL launched an exclusive competition which eventually settled on 12 architects, chosen from a pool of 182 applicants in 23 countries. Besides the winning team of SANAA, other teams that were invited included Abalos & Herreros, du Besset-Lyon, Diller Scofidio & Renfro, Zaha Hadid, Herzog & de Meuron, Xaveer De Geyter, Jean Nouvel, Mecanoo, OMA, Valerio Olgiati and Livio Vacchini. With the given site in the competition, The EPFL formulated a very ambitious set of programmatic requirements that would usher in the future of learning. The programmatic aspect was loaded with much more than functional requirements: the building "must be significant", needed to "impose itself in the environment like a signal in the landscape", was to "become a hive of activity" and "magnify the school, adding to the reputation of its academic curricula, emphasizing the school's radiance

at national and international levels"[15]. Many results of the competition took these requirements quite literally and developed different types of imposing sculptural volumetrics in crystalline (Hadid, de Geyter), tilted (DiSco, HdM), or arch shapes (OMA). However, the chosen proposal of SANAA is quite the opposite of these sculptural volumes.



Zaha Hadid

Diller Scofidio

Herzog & Demeuron

OMA

Figure 4-1 Proposals for the EPFL Learning Centre (Source: Marie-Françoise Bisbrouck, Architectural Competition for EPFL Library (Ecole Polytechnique Fédérale de Lausanne -- Switzerland): *Viewpoint of Technical Panel* 2006)

[15] MARIE-FRANÇOISE Bisbrouck, Architectural Competition for the EPFL Library (Ecole Polytechnique Fédérale de Lausanne -- Switzerland): *Viewpoint of Technical Panel* 2006.

The topography of the EPFL is relatively flat by Swiss standards. The site of the Learning Centre is a southern extension of the campus towards the provincial road. To the south, Lake Geneva is only 500 metres away. The predominant reaction of architecture in the EPFL masterplan to the landscape is opening the corridors between the long stretched buildings towards the alpine panorama to the east. Most of the buildings are connected by a system of elevated walkways one level above the streets. The Learning Centre is totally opposed to the reaction to the site in the predominant masterplan. SANAA wanted to create an intimate public space, which is a coexistence of different environments in a single space, of dichotomy of openness and privacy. In addition to producing a continuation of the alpine landscape that surrounds the campus, the design arose from the specific aim of encouraging interaction and exchange of ideas among students, breaking down the boundaries between disciplines. Sejima and Nishizawa (Arper, n.d.) explain: "The Rolex Learning Centre has both architectural and topographical characteristics. The experiences within it are so very different. Contrary to the traditional space of a closed room, new relationships are formed here, and we hope that this creates a new type of architectural experience." It was the boundless nature of the one-room space that won SANAA the commission, as president of the EPFL Patrick Aebischer recalls: "this new campus hub exemplifies our vision of a university where traditional boundaries between faculties are broken down, and where the public are inspired and made welcome. The SANAA scheme was something that we had never seen before: a building without doors" (Gregory, 2010, p. 45).

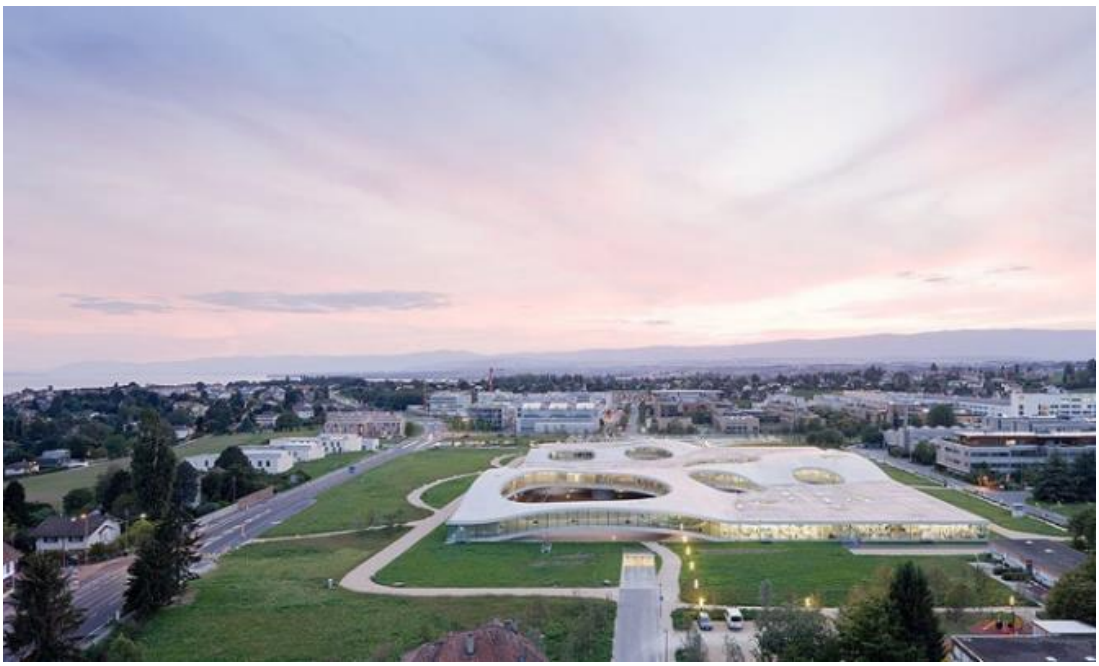


Figure 4-2 Bird's eye view of the Rolex Learning Centre (Source: http://architecturebeta.com/post/2012-08-14/40036038565)

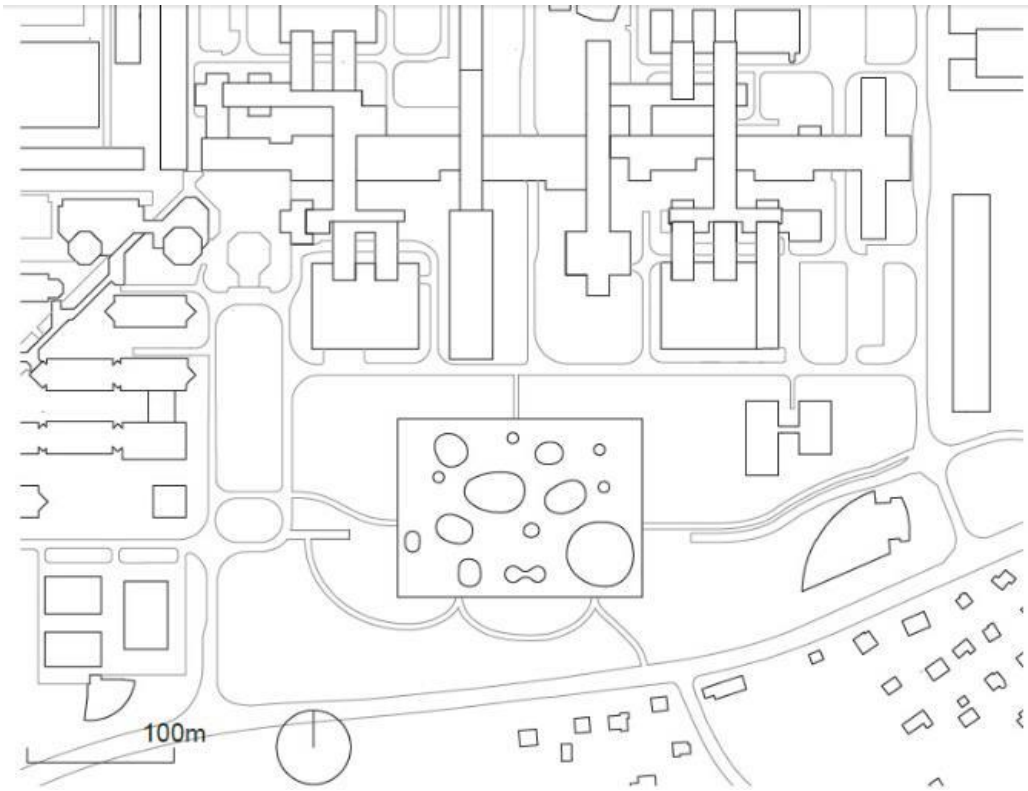


Figure 4-3 Site plan of the Rolex Learning Centre (Source: Daniel Jauslin, *Architecture with Landscape Methods*, p. 24)

Figure 4-4 Plan of the Rolex Learning Centre (Source: Daniel Jauslin, Architecture with Landscape Methods, p. 27)

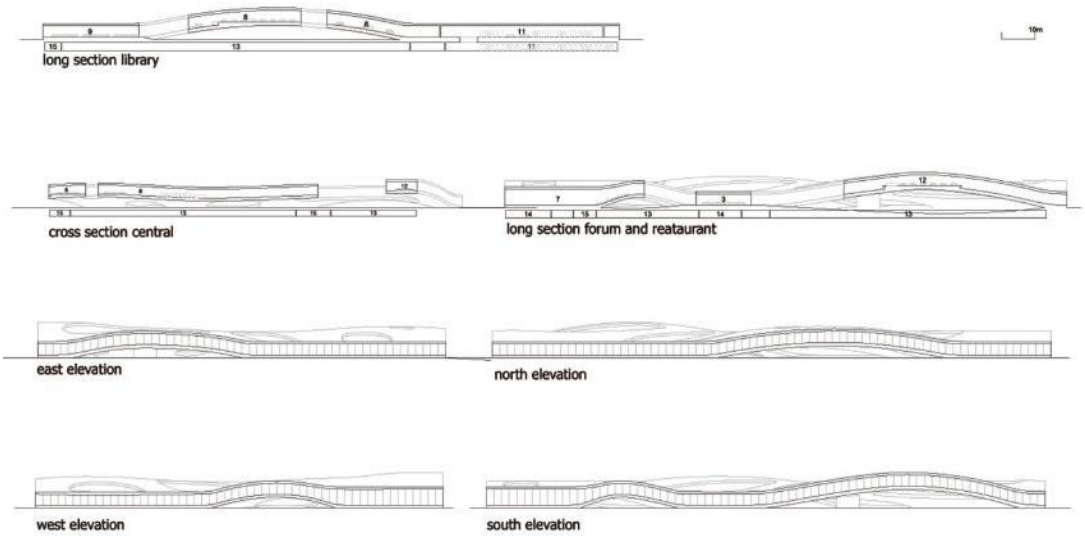


Figure 4-5 Section and elevation of the Rolex Learning Centre (Source: Daniel Jauslin, Architecture with Landscape Methods, p. 26-27)

4.2.2 Space layout

With the dimensions of 121.50 m × 162.50 m, SANAA's proposal for the building consists of only one single large public floor above ground, with the continuity divided by patios and topography deformation. Although the border is clearly dissected by a rectangle, the way to get inside is not directly at the edges. Sejima explains this is because it will raise the problem that the entrance could be near one of the sides but a long way from the rest of the building due to the huge plan, so they made the section undulated. The undulating slab of that single floor is not always touching the ground. It lifts up from the ground at different zones, providing entries for slipping in at every edge of the basic rectangular form, which allows people to enter the main entrance – set more or less in the middle of the plan, walking under the slab from any direction.

On the ground, approaching from any direction, the completely glazed building is an intriguing deformation of a modern ideal. It is the archetypical white Miesian pavilion stretched and rippling over a great distance (Figure 4-6). It reads as a dynamic ribbon in elevation, with its long, low form arcing to create concrete spans that allow views across and through its depth. Once under the shell (Figure 4-7), any orthogonal order disappears. The structure crests and shifts around one as one passes below. The dynamic undulating surface is interspersed with 14 round glass patios with views in all directions. These are organised to subconsciously offer a meandering route from the perimeter through to a central courtyard.

Figure 4-6 Elevation of the Rolex Learning Centre (Source: Author)

Figure 4-7 Space under the shell of the Rolex Learning Centre (Source: Author)

These patios are an essential component in communicating a space that is dividing and connecting all at once. According to their distribution on the hills, each patio has different spatial qualities. Three of them are in flat areas providing light as inner courtyards. Three other patios are fully elevated, providing light to both the upper undulating slab and the space below the shell as well as visual relationships. The remaining eight patios are touching the ground with one side elevated. These patios connect the space of the flat ground under the shell with the continuous slab on top of the shell, which are the main openings for access; but not all of them are used as entries. Two main entries can be defined as the central access points and three or four can be defined for direct access to the library, forum, and restaurant, respectively. The entries can be closed or open by the users depending on the flexible usage of each space.

The internal topography of hills and valleys that comprise the interior space is applied throughout the design of the floor of the building, so that the curving space formed by the plan is also evident in the section of the building. The topography consists of two hills, which fulfil the requirement for a view across the obstacles to the Geneva Lake and Alpine panorama beyond. The architects divide different zones by hills and valleys instead of using walls and floors. By allowing the building to curve in both plan and section, the architects are encouraging interaction between building users, by gently nudging them to the entrances, programmatic functions and circulation routes, rather than by dictating spatial orientation through routes and corridors. In this building, one can feel the continuity, but cannot see the edge of the building. What one sees always depends on one's position at the time.

The particular spatial organisation results in a different way of arranging functions. The programme of the Rolex Learning Centre includes a multi-purpose hall, a library, information gathering, social spaces, spaces of study, offices, restaurants and cafes, which are organised in a seamless network. The first group of programmes are the

central entry zone with a reception area, two restaurants and a bar including the one with the required panoramic view on the higher area. The smaller hill rises as an in-between buffer and noise protection zone for the auditorium. In the central flat area back to the north, a series of services is placed on a quiet north facade. Across the larger hill eastwards, the library is located on top of the hill, which is separated from the services by a patio. More offices are arranged to the east of the library hill, also separated by two patios from other zones. The topography means that non-public programmes are treated as a kind of miniature urbanism. The groups of offices are set as clusters of tiny huts. There are no visual barriers between one area and the next; however the quiet zones are acoustically separated through changes in height. In addition, clusters of glazed or walled rooms make small enclosures for groups to meet or work together in.

Figure 4-8 Interior of the Rolex Learning Centre (Source: Author)

4.2.3 Structure and material

The innovative spatial organisation of the Rolex Learning Centre results in a highly experimental and innovative engineering and construction endeavour. The floor slab is an elaborate and highly complex element that supports the entire structure. In the beginning all the experts agreed that the floor's undulating form imagined by the architects could not be made in concrete unless supplementary supporting elements were added. However this would seriously compromise the impression of lightness and flexibility of this design. The doubts of the experts were indeed true; therefore it is not surprising that the solution came from doubting the fundamental idea of using a shell structure. Instead, another domain of civil engineering – bridge building – was proposed as a solution. It is various structural systems: wooden and steel beams of the roof, the thin columns, and the concrete slab shell of pre-stressed cables.

Finding the right form of the slab shell was the biggest challenge facing the structural designers. Generally the form finding is only influenced by structural reason, mainly gravity. However, because of the unusual concept of the building, which uses the shells as a floor instead as a roof structure, more requirements had to be responded to. A compromise between the user requirements, the architectural design, and the structural limits had to be found during the design process. Depressions and mounds were designed to create zones within the building's limitlessly flowing space. In other areas, level spaces were functionally necessary. Distributing the concave and flat zones was also an issue for the building's load-bearing structure, as well as decisions on where to locate enclosed toilets and stairwells, the glass study cells, inclined lifts for the disabled, serpentine paths and cascades of stairs, which were all relevant to the support structure. These decisions were made together with the architects and engineers in many interdependent design steps.

The support structure consists of two concrete shells, one small and one large, which form most of the floor slab and rest on the underground car park's roof. The engineers dismissed the idea of a purely load-bearing shell structure and designed reinforcement that would support local stress loads, which resulted in a very variable reinforcement layout. Eleven arched load-bearing structures are built into the 80 cm slab at certain points and are not visible from the outside, but are integrated into the shell as local, particularly dense groups of reinforcement bars. The denser the groups of steel reinforcements that the steel fixers had to build into the form work, the more precisely the engineers had to design the geometry and plan the construction process in advance. The shells could also not be homogeneous because of the reinforcement and structural support system they required. The smaller shell sits on four arches, 30-40 metres long, while the larger shell rests on seven arches, 55-90 metres long. The post-tensioning cables hidden in the ground are to the arches what the string is to a bow; they needed to bear enormous horizontal forces. These two flat shells, together with connecting flat surfaces, form an almost 20000 m² rectangle. The shells' very flat curvature – the larger one has a span of 85 m and a curvature L/H ratio of 17.5 – results in unusually high shear force on the abutments. These forces are transferred to the bearing surface, and the underground car park roof. The one-storey-high basement includes parking places, plant rooms, archives and other utility rooms. The basement is closed on the upper side by a concrete slab. This concrete slab serves on one side as the floor of the main level, while on the other side it fulfills the important structural function of serving as the horizontal bearing of the shells and takes up the horizontal bearing loads via post-tensioning cables. The maximum height of the building is limited to 10 m with the height of 4.5 m of the over-ground level and a maximum camber of the shells of 5 m. Although an essential part in creating different spatial quality, the holes in the shells also add another layer of challenge to the structure: The forces are not evenly distributed on the shell because of these holes. In some areas, extreme stresses have to be managed (GROHMANN et al., 2009).

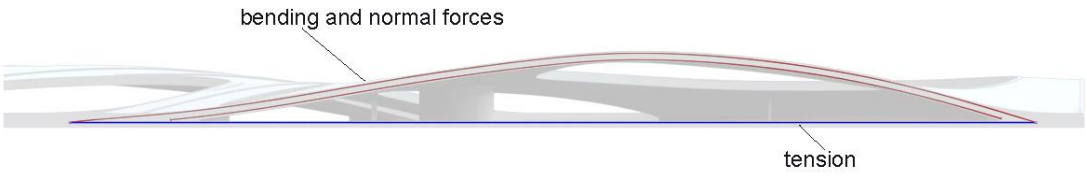


Figure 4-9 Structural concept of the Rolex Learning Centre: post-tensioning cables as horizontal bearing of the shell (Source: Manfred GROHMANN, Klaus BOLLINGER, Agnes WEILANDT, Michael WAGNER. *Form finding of the shell structures of the ROLEX*, 2009)

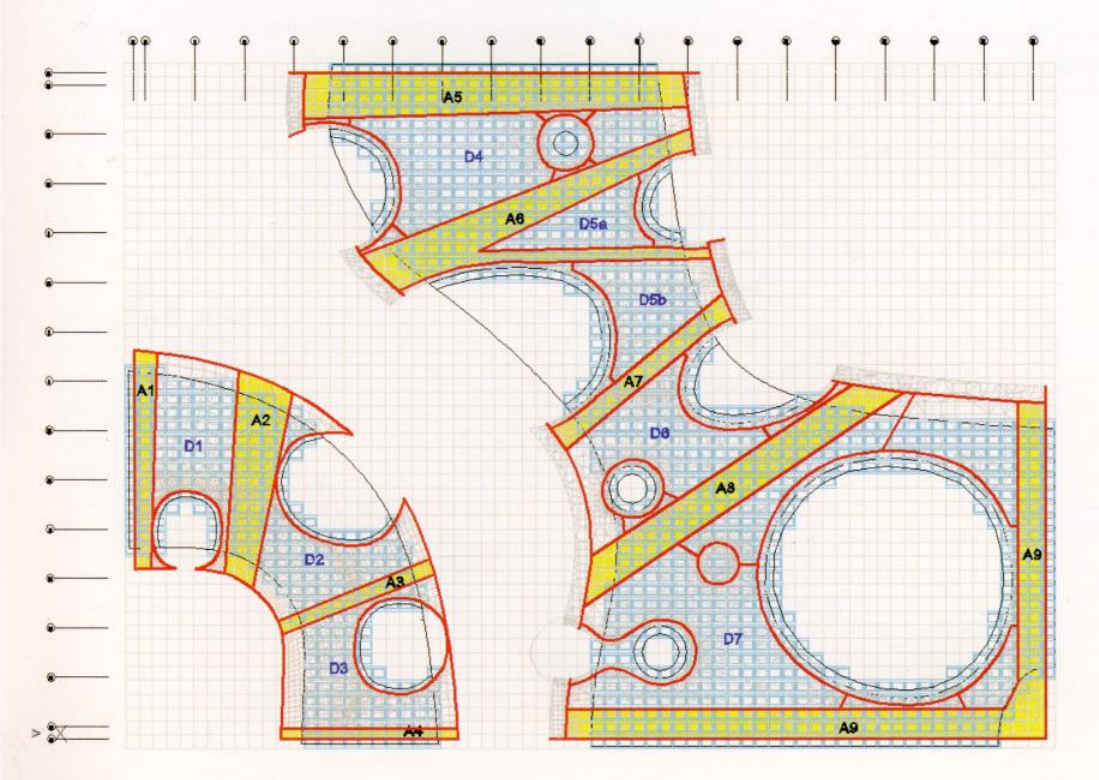


Figure 4-10 Arches and slab areas of the shell of the Rolex Learning Centre (Source: Manfred GROHMANN, Klaus BOLLINGER, Agnes WEILANDT, Michael WAGNER. *Form finding of the shell structures of the ROLEX*, 2009)

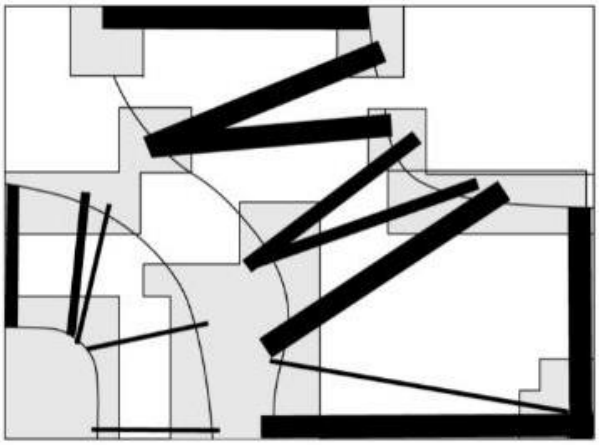


Figure 4-11 Post-tensioning cables (black) taking up horizontal-bearing loads (Source: Daniel Jauslin, *Architecture with Landscape Methods*, p. 31, edited by author)

Figure 4-12 Formwork tables on site; after and before concreting (Source: Agnes WEILANDT, Manfred GROHMANN, Klaus BOLLINGER, Michael WAGNER, *ROLEX LEARNING CENTER in Lausanne: From conceptual design to execution*, 2009)

Even if the idea of the hiding the arches within the concrete seems feasible, the construction was not easy. How should they be built? How will the deformation of the structure affect the other construction elements such as roof and the facades? A great amount of complexity is required to achieve the deceptive simplicity of SANAA's work. The formwork for the concrete shell is a perfect example of this. The complex geometry of the double curves of concrete ends up being constructed with a very low-tech solution. A projection of the model onto a 2.5 m× 2.5 m grid allowed for the placing of the formwork on the construction site, each one designated by individual X and Y coordinates. Almost Ikea-style, the contractors put together pre-cut elements to assemble these tables, which are made out of cheap, utilitarian OSB[16] wood. They label each element in order to place them correctly on the construction site. There is a great deal of planning and calculating in the beginning that enables a low-tech simplicity in the final fabrication of the formwork (WEILANDT et al., 2009).

A special thixotropic concrete was developed to meet the requirement of be liquid enough to be able to be pumped into the particularly dense reinforcements but thick enough to not slide down the steepest slopes. The pouring of the concrete had to be done in one shot in order to ensure a smooth and attractively finished surface. Following the pouring of the smaller shell, the procedure for the principle shell took almost 48 hours, during which 20 trucks made 577 trips and delivered some 4086 m^3 of concrete (Casa et al., 2012).

[16] Oriented strand board (OSB), also known as flakeboard, sterling board and aspenite in British English, is a type of engineered lumber similar to particle board, formed by adding adhesives and then compressing layers of wood strands (flakes) in specific orientations.

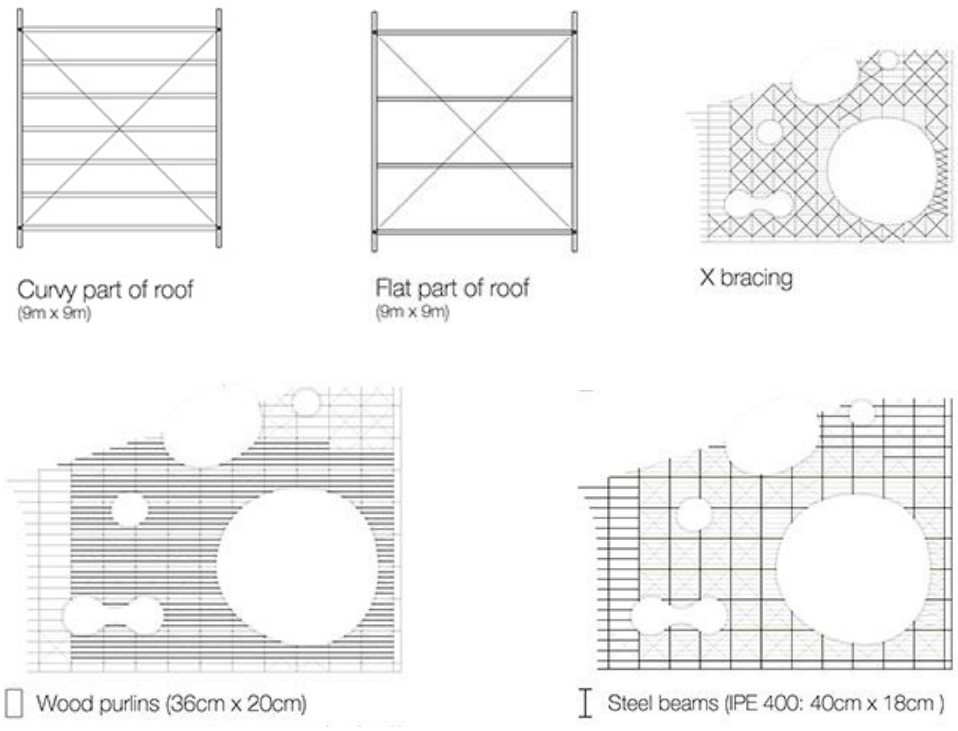


Figure 4-13 Roof structure of the Rolex Learning Centre (Source: http://www.kao-onishi.com/rolex.html)

Parallel with the shells, the roof also has a very particular geometry. It is constructed by a combination of wood and steel. The steel creates an incremental grid that sit on each column. The roof consists of flat and curvy portions. The curvy part is formed by wood, the top and bottom of each wood purlin were milled to obtain the correct curve. There are five purlins between the columns, each 1.5 m apart. The flat part was formed by steel beams. There are clip angles for the connection between the wood and the steel. For every 9 × 9 m square formed by the columns, there is an X bracing, which strengthens the roof immensely (Figure 4-13). However, all these details are hidden under the smooth and white surface of the ceiling. Besides the 127 mm diameter circular columns, the other type is 26 × 26 cm rectangular columns, which are along the patios. They are quite irregular, except that they border the patios with increments of two adjacent columns.

The windows are held in place by jointed frames that protect them from the rest of the building's movement, which is due to seasonal changes and even daily changes in temperature. The facades of the interior courtyards are more difficult to construct because the windows need to follow the curve of the patio as precisely as possible.

Because the architects attach great importance to extreme slenderness, accommodating the building services was another major challenge for engineers. There were no cable ducts leading up to the roof, so large installations in the ceiling were impossible. Instead, the engineers made the shells 20 cm thinner in areas of lower stress, making space for the building services.

Figure 4-14 Construction process of the Rolex Learning Centre (Source: left: https://beautifulrough.files.wordpress.com/2013/01/epfl-rolex-learning-center-08.jpg, right: Agnes WEILANDT, Manfred GROHMANN, Klaus BOLLINGER, Michael WAGNER, *ROLEX LEARNING CENTER in Lausanne: From conceptual design to execution,* 2009)

The achievement of the architectural idea and significant form that the architects envisaged is rather the result of an intensive iterative development process, from design to construction, a process involving close cooperation between architects and engineers. In the very beginning, the engineers think that these are "crazy" ideas presented to them by ambitious architects. The end result is a structurally hybrid and exceptionally complex building, for which many variants were considered and the

best possible design features, structures and construction methods were combined (Schittich and Schmal, 2013).

The final result of this building is simple and abstract. It seems as if all the conventional structural elements such as extra columns or bracings are absorbed into one surface. The dynamic ribbon in elevation and the smooth shell without any orthogonal order make the building diagrammatic, like a concrete sketch. The architects adopt material strategy to sublimate the expression of structure. The following chapters explore the relationship between the material and the diagrammatic feature of the building.

4.2 Case Study 2: Louvre Museum, Lens

4.2.1 Context of the project

The Louvre-Lens project is the result of a call for ideas convened in the year 2005 for the design of a satellite building of the Louvre Museum outside Paris. This initiative was driven by the desire to decentralise the institution. The Louvre had long nurtured the ambition to plant a mission in the provinces, although the decision to decentralise was only taken in May 2003. Once the decision was made, six towns were considered for the exercise. The chosen location of the project was Pas de Calais, in northern France, on the terrains of an old mining site in the city of Lens. The geographic proximity of Nord-Pas de Calais to France's northern neighbours, Belgium and Netherlands, and to the channel tunnel to the UK means that it is a much traversed thoroughfare between several great capitals of European culture. It is hoped that this strategic location will make the museum a success and be a much needed catalyst for the culture of the region.

Lens is a mining town which developed by a constant search for hidden veins deep within the earth. It therefore housed multiple dark wells, around which are working class estates and two slag heaps. In the nineteenth century, the region became an economic powerhouse built on the labouring class, but since the last mine closed in the 1980s it has been left to degenerate. Unemployment remains high and still dominates this region. Daniel Percheron, president of the Nord-Pas de Calais region who led the successful bid to bring the project to Lens, is explicit in wanting to follow Bilbao's "Guggenheim effect" – the outpost museum that changed the fortunes of Basque town, which was also stricken by the collapse of traditional, heavy industries. The new museum in Lens is another of European regional-scaled post-industrial cultural project. In early 2005, the Nord-Pas de Calais region launched an international competition which attracted more than 120 entries from France and elsewhere. The winners were SANAA, in association with the American museum architects Celia Imrey and Tim Culbert, and the French landscape designer Catherine Mosbach. The first stone was laid in December 2009, and by December 2012, the museum was open to the public.

In this case, the museum is expected to extend its mission beyond their traditional role (to conserve and display the city's history or art) towards a more active social involvement within the contemporary city and its communities. It is expected to become a spectacular landmark of the town, a compelling destination for tourists. Besides these expectations, the architects wanted to create a strong connection to the historic context, and to connect local residents, providing a central gathering place. They wished to encourage local residents to drop by and enjoy the site, which features a unique combination of artificial remains and natural beauty. Xavier Dectot (R.B., 2012), the director of the Louvre-Lens says: "If you make another Louvre, the first thing you want is a different kind of public." This public, he explains, is made up of locals who do not have access to culture, and visitors lured by the region's attractions,

although this industrial history may not be a tourism draw. What Sejima finds interesting with museums is that they have a public dimension, and she tries to create a new public space. Sejima said, "of course, museums have an artistic mission: to exhibit art works. That's the basis of any museum. But for those who don't necessarily have access to an artistic culture, going to a museum is a chance for them to discover something. Even if they don't necessarily manage to talk to other people, there's still some kind of communication" (Obrist, 2012, p. 30). The architects wanted to have an open house, open for society, for visitors, as well as for all of the people living in the city. This publicity is different from Ieoh Ming Pei's transformation of the Louvre in 1989, where the glass pyramid that now marks the entrance to the Museum is the centre of a public space, which has become densely used. The space below the pyramid is the organising centre for visits to different parts of the Museum, a radical transformation of its previously highly sequenced form. However, this glass pyramid is more of a public space added in the Museum itself; the entrance hall is buried under the ground, which is still separated from the urban space. The relation of public space and the Museum is taken one step further by the Centre Pompidou: it extends the active public space next to the building into the heart of the building itself, although, in this case, the public space is independent of the galleries, so it plays no role in organising visitors' movement. Likewise, the large public space that the Tate Modern creates on most of the ground floor of the building is better linked to the spaces outside the museum than to the galleries within. In contrast, the new space around the old Reading Room in the British Museum plays a key role in linking galleries to each other. SANAA's intention to design the Museum entrance as "a public space for the city", linked not only the galleries within the building, but also can be traversed to link different urban quarters. The 21st Century Museum of Contemporary Art designed by SANAA, in the historic centre of Kanazawa, Japan, creates a network of corridors independent of the exhibition spaces, so allowing the visitors to explore and choose at will. What SANAA wants to create is part of a city, rather than part of a museum. It is a

fragment, or the highlight of the urban experience. It is also a liminal space to get into the world of art.

Figure 4-15 Bird's eye view of the Louvre-Lens Museum (Source: http://www.designboom.com/architecture/louvre-lens-by-sanaa-imrey-culbert-now-complete/)

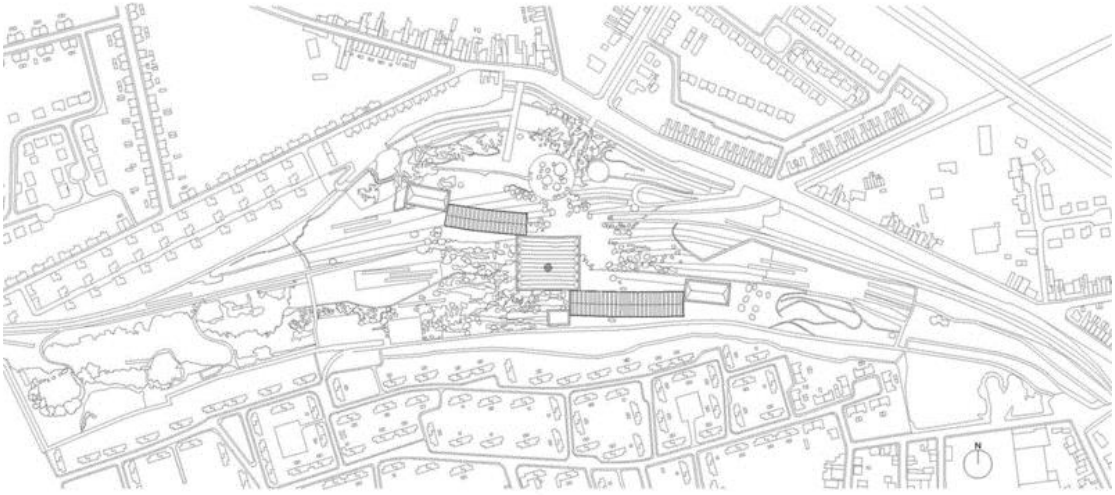


Figure 4-16 Site plan of the Louvre-Lens Museum (Source: *El Croquis 179-180*, p. 46)

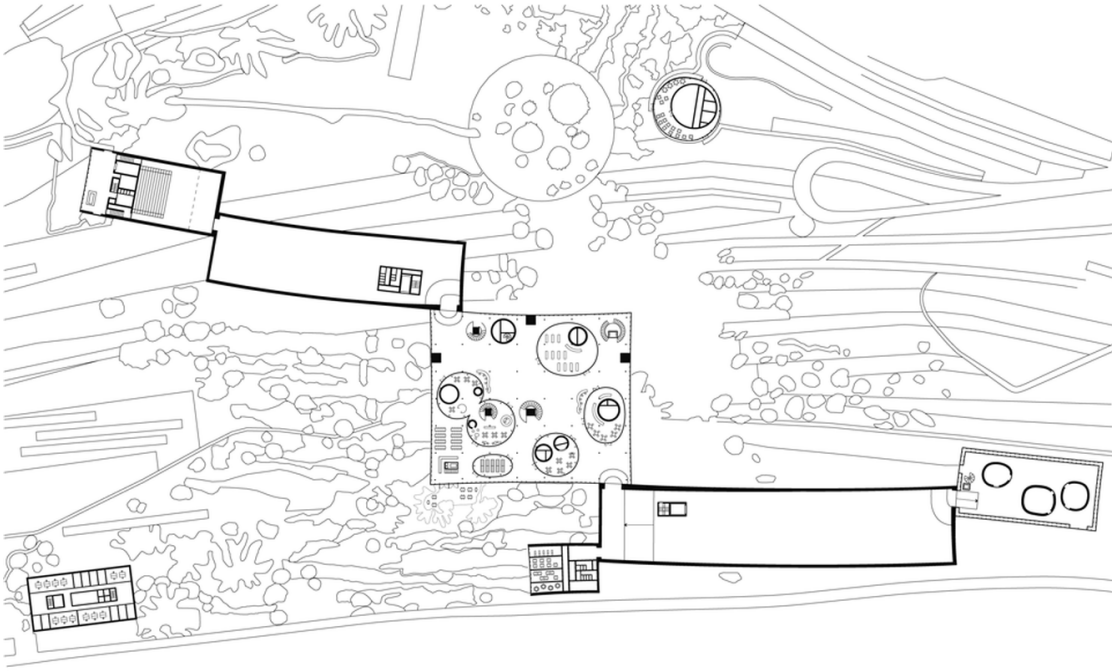


Figure 4-17 Ground floor plan of the Louvre-Lens Museum (Source: http://www.publicspace.org/en/works/h101-parc-du-musee-du-louvre-lens)

The site is a large clearing, bordered by trees and green amid the urban fabric. It is a low-lying region and the site itself is a horizontal slagheap, raised several metres above street level, which is a result of mining. The landscape here is flat and wide but not horizontal. There are several embankments on the site, which are remnants of numerous sets of gently curving railroad tracks that once occupied the site. These tracks, which served freight trains transporting coal, create a fluid landscape.

Unlike the bold shapes of Frank Gehry's Guggenheim Bilbao, or woven hat of Shigeru Ban's Centre Pompidou-Metz, here in Lens they have a much more minimalist, tranquil building. The architects wanted to avoid creating a dominating fortress, opting instead for a low, easily accessible structure that integrates with the site without imposing on it by its presence. They wanted to create a design that would harmonise the Museum with its park-like setting. According to Xavier Dectot, one of the most remarkable aspects of the design is the maximal use of the available space through the creation of a park-museum rather than a museum set in a park.

The grounds are planned as an integral part of the architectural project. They combine several areas for visitors to discover – a formal garden in front of the museum, clearings and walks through and round the edge of the grounds, natural forest groves in the western part. The yet-to-be completed park promises to offer a considered transition between the "built landscape" of the Museum and the mature woodland that characterises much of the site's edge. A network of primary routes and secondary paths extends across the park in white concrete, recalling the geometry of mine shafts and former rail lines for transporting coal. The proportion of hard surface to soft rises as the paths approach the Museum and as it does so the concrete starts to be colonised by an increasing density of incidental features: wobbly rings of moss, amoeba-like form. Sharing a strong graphic character, they counterpoint the sheer, impassive surfaces of the Museum, and also anticipate the free-plan curves inside the transparent parts of the building.

4.2.2 Space layout

SANAA explained that they use the historic landscape as the strategic starting point for the design. To adapt to the gently undulating slopes of the site, the building is segregated in long, narrow and slightly warped volumes that are connected to one another. With the division into five autonomous precincts of similar form through different curve and size, the Museum gains in flexibility, letting it adapt to the terrain and the rhythm of the undulating forms of the landscape. Using curves is a strategy that SANAA took in this project to harmonise with the site and landscape. According to Sejima, they did not start with the intention of using curves for the exterior. But the site is irregular, close to a triangle, and there was not enough space to connect rectangular wings in a straight line. So they curved the whole in order to fit it into the site. They also introduced slight curves to respond to existing lines such as a former railway line and roads. Through their size and layout, the buildings achieve balance with the scale of the site and the shape of the paths and landscape features, evoking its mining history. To deal with the four metres' difference in elevation of the site, they place the architecture on the existing landscape, sloping down with the lay of the land, instead of levelling the site. This idea is later realised in the building, forming the slope of the floor, which influences the experience of the space.

The central area of the five precincts is the transparent entrance hall. To the east of the entrance is the Grande Galerie, which houses a changing collection of exhibits from the Louvre, and the Pavillon de Verre. To the west are the Galerie Exposition Temporaire and Scene, a large auditorium whose programme closely reflects the works on display. Another two independent structures, the administration building to the south and a restaurant to the north, complete the complex while also acting as a connecting link between the Museum, the park and the city.

Figure 4-18 Entrance hall of the Louvre-Lens Museum (Source: Author)

The reception hall (Figure 4-18) is located in the centre of the building, opening up to the users. Its high, glazed walls can be entered from all sides, depending on which part of the garden you arrive from. This area feels as if it belongs to the wider landscape. The boundaries between the lobby and the exterior become indistinct and ambiguous. The building loses its figural outline, becoming an environment in itself. It is intended to be a public space for the residents of Lens, who can pass through here on their way to different parts of the city. The transparent entrance hall is what Sejima creates as a new public space. All the glass bubbles are floating in the lobby area, in which another layer of white or glazed bubble floats inside. The various functions are screened in circular or oval islands in the entrance hall, including reception, bookshop, offices, resources centre, café – even a picnic bubble in the hall which provides an area for the visitors who bring their own lunch. At the centre, a circular staircase leads down to the lower ground floor through which visitors can reach the different facilities such as the media library and the art storage.

The slender beams obscure the light filtering from above. The smooth concrete floor reflects white light which pours through the glazing façade, also mirroring the columns that simply touch the ceiling and the floor. The column and its reflection on the floor and ceiling join together, blurring the point at which they touch. The columns seem to float in the water, and also appear thinner against the bright open background. Some distant ones even dissolve into the bright daylight. The "Dom-ino" system of Le Corbusier was the minimal framework of an architecture, setting free the ground plan and façade design; however, this SANAA building makes the "Dom-ino"'s reinforced concrete slabs and slender columns seem too heavy and thick. Also, the Museum gives minimum information about how it is constructed.

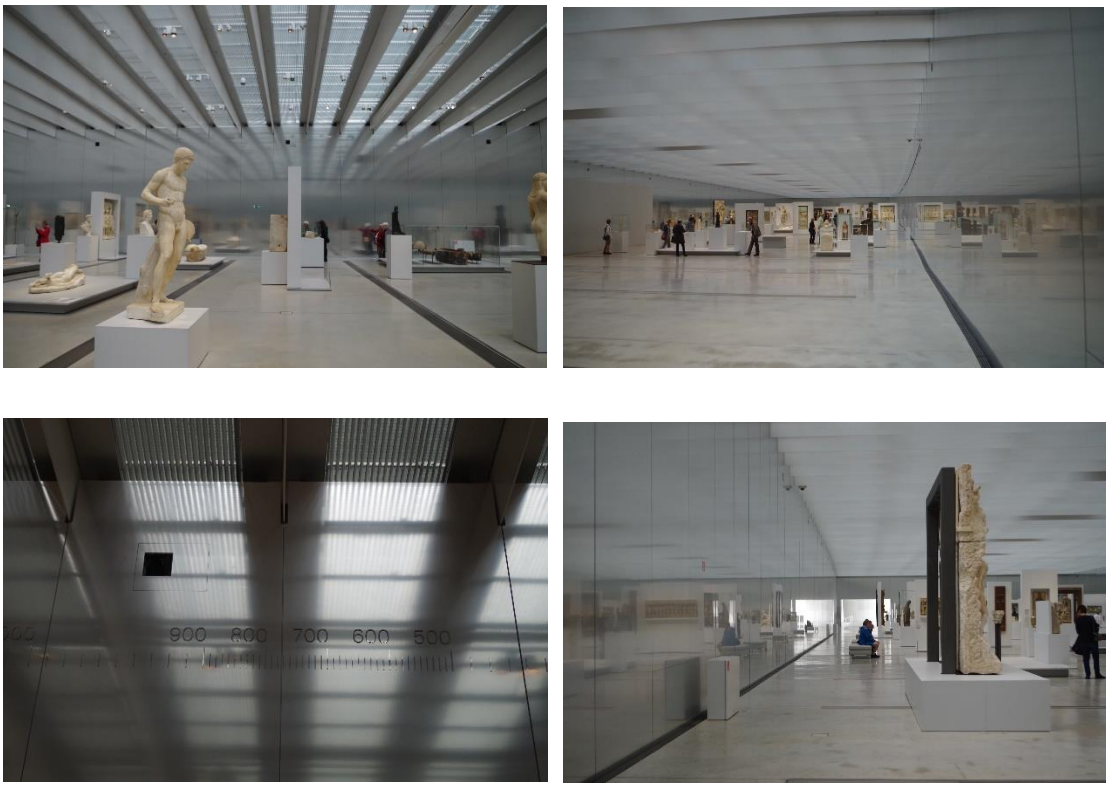


Figure 4-19 Grande Galerie of the Louvre-Lens Museum (Source: Author)

The exhibition spaces are spread out in three independent volumes located on either side of the foyer, and touch at the corners only. All the volumes are slightly curved, creating soft interior spaces that guide visitors from one gallery to the next, distorting the sightlines and establishing a considerable interaction with the art on display. This subtle flexing helps to turn what could have been a shed into a dreamlike space. On the east side, the Grande Galerie (Figure 4-19) extends for 120 m in length, an open space without any partitions to interrupt the gaze of its visitors. There is a line on the wall marking the millennia and the centuries from 3500 BC which continues to the mid-nineteenth century, when the Louvre's collection ends.

At the end of the Grande Galerie lies another glazed space, the Glass Pavilion, where visitors can once again enjoy the views of the surroundings. The purpose of the

exhibitions in the Glass Pavilion is to create a dialogue between works from the Louvre to those from museums in the region.

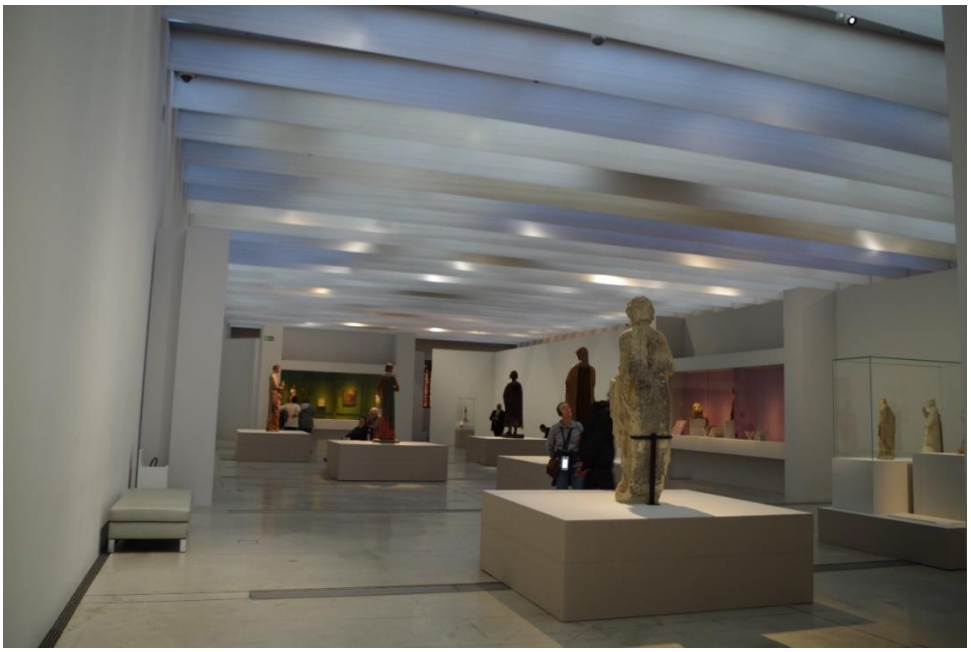


Figure 4-20 Temporary exhibition hall of the Louvre-Lens Museum (Source: Author)

Figure 4-21 Auditorium of the Louvre-Lens Museum (Source: Author)

On the west side is the gallery dedicated to temporary exhibitions, which is slightly shorter at 90 metres long. The temporary exhibition hall is an entirely adequate shed for showing works of art of all periods, materials and sizes. Its scale is broken down by temporary partitions working as a secondary system of compartments linked along a route through wide openings. Lying at the end of this gallery is a large auditorium. The floor of the foyer is the setting for one of the Museum's contemporary artworks, a mosaic by the artist Yayoi Kusama (Figure 4-21).

The Museum is so transparent that it even allows public access "backstage" by making its reserve collections visible. In the basement, archive and storage rooms are opened up to public view (Figure 4-22). There is also a research area to help visitors understand the art better. They have created two groups of display units: tactile tables to help visitors learn more about the artworks, showing them successively how a work enters the Museum, how it is studied and finally how it is presented in the gallery. The second display unit is of films in which the staff of the Louvre and the Louvre-Lens explain their roles. Therefore the Museum does not only present objects from the Louvre collection, it also shows the mechanics of the Louvre itself.

Storage room

Tactile table

Film on the glass

Figure 4-22 Basement of the Louvre-Lens Museum (Source: Author)

4.2.3 Structure and material

Compared to the Rolex Learning Centre, the Louvre-Lens Museum is a much smaller and simpler project; however, SANAA wishes to achieve some spatial atmosphere with the extreme simple expression of the material. According to the engineers Bollinger + Grohmann, it is always a challenge and also fascinating to work with architects who have projects that pursue the limits of constructive feasibility. An advantageous precondition in this case was that the engineers participated as specialist designers for the facade and load-bearing structure from the beginning, at the competition design stage.

The constructions comply with the energy standards of the French HQE (Haute Qualite Environmentale) sustainability label, which at the time of the competition were some of the most advanced in Europe. Accordingly, the architects had to be convinced of the necessity of double glazing which in particular had consequences for the building height. Thin aluminium mullions hold the glass panels in place while slender steel poles placed at ten-metre intervals on a conventional grid hold up the roof. The unusually slender steel support contributes to the high transparency and floating spatial effect in the interior of the glass cube on which the roof appears to be resting without inherent weight; the supports have a height of 6 m, a diameter of 14 cm. A simple carrier grate structure was used, in which the drainage channels and pipes could be installed within the roof structure. Such a skeletal frame does not seem strong enough to sustain a 65 x 56 m roof structure made of a support grid of I beams of minimal overall depth. So how do they manage to realise such structure? Why does it have no diagonal bracing?

Mark Wigley states that thinness requires the most sophisticated structural engineering. As with many of SANAA's works a mystery lurks beneath the seemingly impossible lightness and thinness of the volumes and elements; there are structural secrets in the entrance hall. Having a close look at the plan of the hall (Figure 4-17), one will find that

the walls of the exhibition gallery attached to the glass hall are extremely thick, compared to SANAA's usual thin elements. This is how they solve the major engineering challenge – to design the glazed entrance building with no diagonal bracing. The ceiling of the entry hall was treated like a bridge set between the two solid longitudinal volumes of the galleries at opposite corners of the space. Here the thick reinforced concrete walls that are hidden behind the aluminium cladding perform as buttresses to the fragile central space. The canopy is invisibly attached horizontally by steel connections to the solid walls of the galleries and braced at both of these corner points (Figure 4-23). Concealed behind the aluminium cover of the 40 x 150 mm posts is a highly complex connecting structure that has to respond to the movements between the roof and the glass plane. In order to accommodate this expansion and deformation of the roof support structure in the facade columns, the engineers developed single rotatable discs with spherical bearings at their bases. This detail was then modified later by the contractor (Schittich and Schmal, 2013).

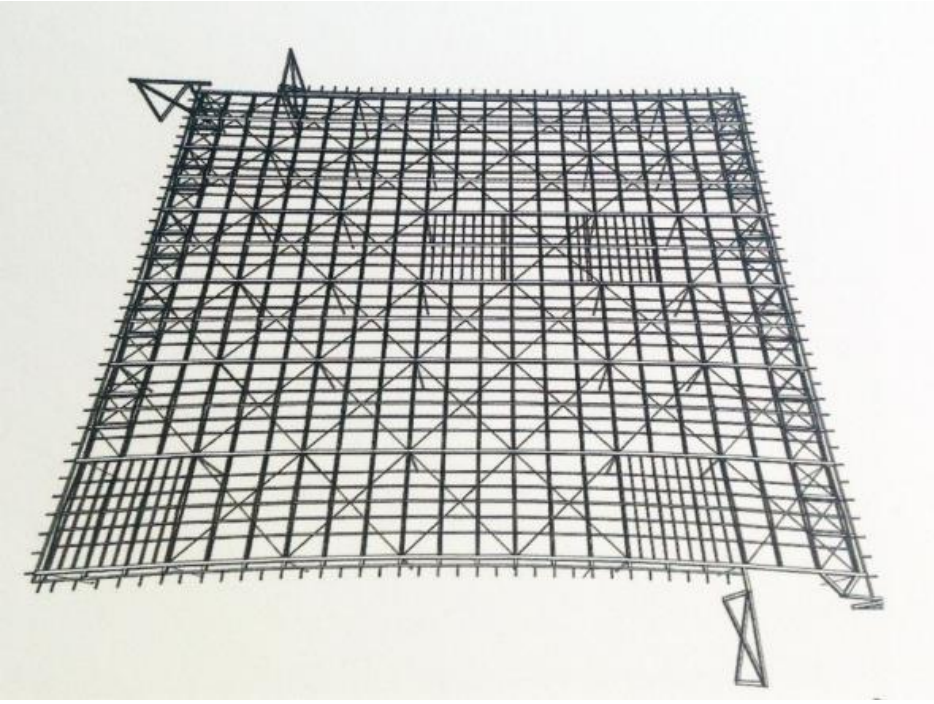


Figure 4-23 Louvre-Lens: Entrance hall canopy construction (Source: Detail engineering 3: Bollinger+Grohmann, p. 57)

According to Sejima, she wanted to create a landscape that resembles the sky – a horizontal space that seems to expand infinitely. She said, "walls and columns are very architectonic. By removing the walls and columns from architecture it approaches a landscape. Needless to say, no columns are required to hold up the sky…To achieve this degree of horizontal expansiveness, the architecture must be liberated from all vertical forces" (Sejima and Nishizawa, 2010, p. 78). Therefore, in the exhibition room, there is no vertical support in the middle of the space. The only vertical support – the wall around the space – is covered with reflective aluminium, creating an effect that the space has some atmosphere of fog. The plinths for the art are all white, as well as the polished concrete screed on the floor, and the steel T-beams. The aluminium walls create a blurry reflection of the whiteness, making the artwork and people appear to float in the atmosphere of mist.

The highly innovative roof construction of the exhibition room consisting of slender steel beams appears unusually lightweight. There were two fundamental prerequisites – the budget and the total thickness of the roof structure of only 25 cm, into which the various functions of light control, glare protection and shading had to be integrated. The specially designed roof beams with a span of 26 m have T profiles of flat-bar steel 60 to 110 cm high, with a web thickness of only 12 mm, and are distributed at 1550 mm intervals; the flange is concealed in the 60-cm-wide opaque roof sections. Glass is laid across the members, giving the impression that the entire roof is a skylight. Skylights fill in the space in between, and louvres regulate the light. The illumination of the exhibition rooms was met with 60% daylight yield through the glazed roof areas.

A combination of daylight and artificial light was guided across the delicate-looking ceiling. The light can vary quickly when the sun disappears behind clouds, which is a challenge the light designers faced. They use LED lighting to support the daylight as

needed, with blinds installed to prevent an excess of incident sunlight, ensuring a uniform level of light. The light colour varies depending on the exhibition and the weather outside. Instead of producing sharp-edged beams for efficient accentuation, the LED makes them a harmonious addition to daylight.

At the eastern end of the project is the only fully glazed exhibition space of the Museum. With the dimensions of approximately 52 x 21 m, incomparably higher thermal requirements were to be met than those required in the foyer in order to ensure constant indoor temperatures for the exhibition. For this reason, this space is enclosed by a naturally ventilated double façade with sun protection venetian blinds between the two layers (Pfanner et al., 2014).

The outer shell of glass and anodised aluminium gives the building a capacity that extraordinarily reflects its environment and melts into it. SANAA (Sejima and Nishizawa, 2010, p. 30) stated, “Our goal was to create a gentle work of architecture that is continuous with the landscape and appears to blend into it.” When looking at it from a distance, it almost seems to disappear into the landscape. The visitor who is approaching the museum has the impression of dealing with a slight clearance in nature rather than a solid museum building. The reflective aluminium surfaces of the Louvre-Lens represented a sophisticated task in terms of material research and sampling. Two thirds of the facades are clad with aluminium sandwich panels, which are made suitable for the slightly convex form of the facades. They were suspended in front of the insulation with a hanging profile system so that no connection elements were visible. A specific reflection factor was required from the corresponding polishing treatment.

These reflective aluminium surfaces blend the building into the environment, making the building no longer a pure and lucid geometry that is considered superior to the landscape. In such experience, the material should not be considered as an isolated

object opposing the viewer. Instead, it requires the engagement of both perceiver and perceived in a dynamic unity. The following chapters discuss how the material plays a role in creating a dynamic and ambiguous relationship between the building and the environment.

Conclusion

Through the introduction of the Rolex Learning Centre and the Louvre-Lens Museum on their context, spatial layout, structure, and material, the basic facts of the two cases are drawn out. Although the expressions of materiality are very simple, the construction to realise such simplicity is quite complex. As Mark Wigley claims that thinness requires the most sophisticated structural engineering, SANAA's simplicity is realised through a close collaboration between the architects and engineers, and considerable variations to reach the best solutions.

Besides the technical aspect of the material, the next issue to be investigated is the material's spatial properties. Why does SANAA tend to adopt such simple expression of material in their buildings? In the introduction of the two cases, the architects expressed some spatial intentions such as using the architectural space to generate certain atmosphere, to create a new publicity, to encourage communications, to provide freedom for the users, to blend building into its environment, or to create landscapes. In order to achieve these aims, the architects rely on not only architectural forms, but also materiality. What role does materiality play in realising these spatial intentions? Are these spatial intentions related to the characteristics of weak architecture? In the following chapters, two issues are investigated. First, what are the main themes or concepts that SANAA's architectural work is trying to pursue or manifest? Secondly, how does each concept relate to their material strategies – whiteness, thinness, and transparency?

Part III Theoretical discussion on relationship between weak architecture and materiality

Chapter 5 Three themes of weak architecture

Introduction

As reviewed in Chapter 2, the existing interpretations of weak architecture have covered various issues of architecture. Toyo Ito's diagram architecture and blurring architecture discuss the physical condition of buildings in the informational age, Kengo Kuma's weak architecture considers "erasing" buildings in the environment, and Sou Fujimoto's weak architecture is concerned with the organisation of functions. Building on these existing understandings of weak architecture, this chapter discusses the notion of "weak architecture" in three aspects: the dematerialisation of weak architecture; the place in weak architecture; and the programme in weak architecture. Based on the introduction of the two cases – the Rolex Learning Centre and the Louvre-Lens Museum in Chapter 4 – and the theoretical framework built in Chapter 2, these three aspects can evolve into three themes of weak architecture: *diagram architecture*, *architecture as landscape*, and *smooth architecture.* The role of materiality in weak architecture is discussed under these three themes in Chapters 6 and 7.

5.1 Dematerialisation of weak architecture

As introduced in the previous chapter, both the Rolex Learning Centre and the Louvre-Lens Museum have a diagrammatic feature, which was called by Toyo Ito as "diagram architecture". Ito also uses "blurring architecture" to describe an invisible architecture which has transparency, homogeneity, and floating character. Both

“diagram architecture” and “blurring architecture” advocate the dematerialisation of architecture. It could be said that weakening the appearance of a building is the most direct and obvious way to express the “weakness” of architecture. However, conventional understandings of buildings are hardly related to weakness, so why do the architects start to pursue a weakness of physical reality in architecture?

The tendency of dematerialisation, purity, universality and objectivity is not only manifested in today’s architecture; it was also present in the rhetoric of architects from previous centuries. In the article “*Diagrams of Diagrams*”, Antony Vidler uses various examples from neoclassicism to Modernism, showing how each successive wave towards a “universalising, essentialising and objectivising of architecture” led to an “ever-increasing and diagrammatic terseness, succinctness and economy of design”, ultimately resulting in the dematerialising transparency of design and building in Modernist and contemporary architecture (Vidler, 2010, p. 54).

These modernising tendencies and qualities, however, raised some criticisms that the Modern architecture concerned to represent space and form abstractly, avoiding the decorative and constructional codes of historical architectures, which is thus “accused of reductivism, of geometrical sterility, and thence of alienation from the human” (Vidler, 2010, p. 57). Critics such as Victor Hugo and Henri Lefebvre both ground their indictments on what they consider the root cause of the “fall” of architecture – representation – which has the key qualities of abstraction, reduction and geometrical simplicity. They complain about the too-easy translation of the new graphic techniques used by the modern architect into built form. Architecture looked too much like the geometry with which it was designed and depicted. Geometry is thus seen as the underlying cause of architectural alienation, the degradation of humanism, and the split between architecture and its “public.” As Vidler wrote, “This apparent identity of the modernist drawing and its object, both informed by a geometrical linearity that tends toward the diagrammatic, has, throughout the modern period, led the charges that the

one is the result of the other, that architecture has too-slavishly followed the conventions of its own representation" (Vidler, 2010, p. 57). Vidler notes that such criticisms have been commonplace throughout the life of modernism. "Diagrammatic architecture" has been a term more of abuse than of praise, signifying an object without depth, cultural or physical, the "modernist box" caricatured by postmodernists (Vidler, 2010, p. 57).

Despite such criticisms, the diagram has held a privileged place in the development of modern architecture as at once responding to the aesthetics of rationalism and the authority of functionalism. For example, Le Corbusier, with an architectural sensibility informed by post-Cubist developments in painting and sculpture, psychology and philosophy, found in 'abstraction' a weapon against the historical styles and a powerful support for an architecture based on form (and its qualities of mass and surface) and space. In this sense, abstraction was registered as a primary aesthetic quality. This was to dissolve all traditional monumentalisms, styles, institutions and habitats in the universal flux of the abstract. The architect's sketch and diagram reduced a project to its essentials; it is at once an analytic representation and a formal analogue to the built structure itself. This kind of feature was proposed by Toyo Ito as "diagram architecture" to describe Sejima's architectural work.

According to architect and theorist Stan Allen, the diagram architecture described by Ito is critical both of the social institutions of architecture and of exaggerated mythologies of personal expression. Ito imagines an architecture in which the process of conversion is minimised. This would be an architecture "that takes pleasure in the immediacy and directness of procedures that often short-circuit conventional design schemas… it is an architecture that travels light, leaving the heavy stuff behind". Allen claims, "A diagram architecture is part of a new sensibility characterized by a disinterest in the allied projects of critique or the production of meaning, preferring instead immediacy, dryness, and the pleasures of the literal" (Allen, 1998, pp. 16-19).

In Allen's opinion, this is the way with which diagram architecture can deal with the complex realities of contemporary living. He points out that, at a time when the dynamism of images and information dominates everyday life, the traditional association of architecture with permanence and durability has become suspect. Some practitioners have proposed a retreat, suggesting that architecture must once again define itself as stable and grounded in contrast to the fluidity of information. Others have proposed that architecture's solidity could (or should) be dissolved into these streams of information (Allen, 1998).

Ito belonged to the latter group. He points out that the spaces Sejima created, those which seem to be as insubstantial as a diagram, are accepted in today's society, in which our lifestyle is constantly and unconsciously being reformed by the infiltration of today's new media (Ito, 1996). Both Allen and Ito believe that the emergence of new information-based technologies has provoked an understandable desire for a lighter and more responsive architecture. According to Allen, setting aside the burden of social institutions and the search for self-expression, diagram architecture faces those complexities of society in a much more straightforward manner – "a loose fit of programme and form, a directed field with which multiple activities unfold, channelled but not constrained by the architectural envelope" (Allen, 1998, pp. 16-19). This "loose fit" needs to trace its way back to Deleuze and Guattari's definitions of the diagram.

It has been Deleuze's concept of the diagram as 'abstract machine…a map of relations between forces' that has been most influential in the spatial design disciplines. For Deleuze the importance of the diagram is that it "specifies" in a particular way the relations between unformed/unorganised matter and unformalised/unfinalised functions (Vidler, 2006). The diagram then, in Deleuze's terms, is a kind of map/machine. It is not a thing in itself, but a description of potential relationship among elements, not only an abstract model of the way things behave in the world but a map of possible worlds. For the Deleuzian diagram, no defining routine practice has

yet crystallised. It is instead creatively engaged in the formation of such a practice, and therefore worked upon without stable interpretation, without predetermined consequences. Vidler also finds a dictionary definition of "diagram" inadequate in its focus on the figurative, line-based qualities of marks and tracings used in diagrams. Instead he extends the definition by adding that "it is the function of these traces that is important… the diagram illustrates a definition, aids in the proof of a proposition, it represents the course of results of any action or process", which are derived from Deleuze's notion of the diagram as an "icon of relationship" (Vidler, 2006, pp.19-27). This meaning of diagram has the potential to analyse the looseness of programmes in architecture.

In Ito's criticism of diagram architecture, he only points out the connection between figurative qualities of diagram and Sejima's architecture; however, according to the previous reviews on SANAA's work, besides the figurative qualities of diagram, their projects possibly have other meanings of diagram relating to the Deleuzian diagram. Both of the meanings are discussed in the two case studies under the theme of "diagram architecture" in the next chapter. Even if SANAA's architecture has a diagrammatic feature, the real building is constructed by material. What is the role of material in the diagram architecture?

5.2 Place in weak architecture

The principles of modernist architecture – independence from nature, and a pursuit of functionalism based on pure, lucid geometries – dominate the world even now, the architecture was considered superior to landscape. A tendency of dissolving distinction between architecture and landscape has been known since the period of modernism. However, the stable objects and literal transparency only allow the gaze of the observer

to penetrate the glassy membrane into the landscape, interpreting landscape as an object of contemplation. This concept was based on the hierarchical separation of subject and object; moreover, it excluded time as one of its components. Is there any way we could escape the dominance of the principle of modernist architecture and acquire the confidence to conceive architecture based on other principles, such as the principle of weakness? No matter Kengo Kuma's weak architecture, or Ishigami's "extreme nature", these Japanese architects do not treat architecture as objects. For them, architecture is *equal* to environment, *subservient* to environment, or even in and of itself *is* environment. Architecture is an integral part of the vast outside environment.

As reviewed in section 2.3 Weakness and ambiguity in Eastern philosophy, from ancient times, the Eastern and Western architectures have different attitudes toward their environment. Western architecture emerged from a philosophy of confrontation with nature and the impulse to conquer it while the Japanese concept of space reaches out to embrace nature and to achieve unity and harmony with it. Japanese architect Kengo Kuma uses the difference between gardening and landscape planning to explain the different attitudes toward the relationship of building and its environment between Eastern and Western architecture. He stated,

> Gardening and landscape planning deal with the same domain but are different disciplines. As the 'scape' in landscape indicates, landscape planning is a scenic art and visual methodology. The planner stands 'outside' the landscape and visually manipulates it. In gardening, on the other hand, no privileged position from which a 'planner' observes and manipulates the scenery exists. The 'gardener' is always inside the garden (Bognár, 2009, p. 24).

The gardener is "inside" in a different sense from the visitor imagined by Le Corbusier, who moves about, along the circulation that is designed by the architect. In

the case of the garden, there is no distance between the gardener and the garden, but rather intimacy. The Western tendency is to look at the world as a series of objects, while the Eastern one tends not to differentiate between subject and object. Western architecture develops from perspective, with the building as an object to be looked at from "without", while Eastern architecture develops from the idea that the building is something to be experienced from "within". The subject and object are joined together as a whole, which is advocated by Taoism philosophy – the concept of subject and object unified as one.

Contrary to the traditional Western philosophy however, many Western architects and critics have been discussing an attitude towards the relationship between architecture and its environment similar to that of Eastern philosophy. James Corner describes how the concept of landscape has started to change from the previous sentimental reproduction of pictured landscapes to a more experiential understanding. Corner proposes to become part of the landscape rather than to possess it as an object, thereby valuing experience over sight. Similar views have also been explored by Elizabeth Meyer who argues for a more equal relationship between architecture and landscape. She proposes hybrid spaces as a continuum between disciplines to avoid a dominance of one discipline over the other, "a site that is between nature and culture, landscape and architecture, man-made and natural that is along the spatial continuum that unites, not the solid line that divides" (Edquist and Bird, 1994, p. 33).

Meyer's continuum between architecture and landscape can be connected with David Leatherbarrow's argument, which claims that topography is the common ground between the two disciplines. Claiming that the way in which the relationship between the two disciplines has been understood – as "different" or "the same" – is no longer convincing, Leatherbarrow proposes that "similarity" is what characterises the relationship between architecture and landscape architecture. "Not really the same, not entirely different, landscape architecture and architecture are quite simply similar

to each other. Topography is the (theme, framework, place) they hold in common. It not only establishes their similarity but also provides them with the ground for their contribution to contemporary culture" (Leatherbarrow, 2004, p. 2). The undulating floor of the Rolex Learning Centre is a good example to discuss the similarity between landscape and architecture, in which the topography plays a vital role to generate the architectural space. The building could be seen as a landscape architecture. Leatherbarrow identifies three ways of understanding the relationship between a building and its site, including "the building as an elaboration of the terrain, an insertion into it or something that works in collaboration with it" (Leatherbarrow, 2004, p. 20). He further proposes "adjectival architecture", in which the noun is not the building but something the building qualifies as: the landscape. He brings primacy to the site and sees architecture as an attribute of it.

Within the framework of phenomenological environmental aesthetics, Arnold Berleant proposes the concept of "participatory landscape", which he originally introduced to describe painting. Participatory landscape addresses the perceiver's bodily perception and engages other senses besides vision, which is based on Merleau-Ponty's philosophy of perception. A "participatory landscape requires that we look into the space, that we enter it, so to speak, and become part of it" (Berleant, 1993, p. 69). According to Berleant, buildings may offer opportunities for participation when they contrast with the usual treatment of architectural structure as visual objects. It is not an isolated object opposing the viewer; instead it is an integral part of the landscape, evoking our active interest and welcoming our approach. A participatory model enables us to understand the environment as a setting of dynamic forces, which engage both perceiver and perceived in a dynamic unity.

In Japanese architecture, there was always a conscious effort made to allow inner and outer space to inter-penetrate. The spaces under the eaves, the verandah, corridors, lattice-work dividers and other such details of building are all examples of such

intermediating zones (Kurokawa, 1994). Traditionally, the Japanese house has been conceived not as a monumental or dominant centre or as an object within its environment, but as an integral part of it. In many respects, the traditional Japanese house was created as an extension of nature. Open space has particular significance in the interior and affects every aspect of Japanese life. But the openness is quite different from the transparency of the glass of early modern architecture, which provides only a visual, but not an effective, physical opening. The Japanese house is physically open as well; people are connected in a real way with the outside, with the garden. The light exterior and interior sliding walls can actually make the spatial boundaries disappear. They focus on the position of the observer, which determines whether a landscape is perceived as a visual composition or as a surrounding multi-sensory environment.

Therefore, in a participatory sense, the border between architecture and surroundings in early modern architecture was not erased no matter how weak and dematerialised that border was. The reason for that lies in their distinctively visual orientation and a desire to define the object as a series of framed images. The question of frame is not only in the visual limitation of our eyesight, but in temporal isolation – a moment when the perception of frame secludes us from the time continuity. On the contrary, the blurring and erasing of border between weak architecture and environment lie in the redirecting the course of action. In this sense, perceiving of an object from an external view becomes irrelevant. In weak architecture, it is necessary to experience the space from within, which is based on the unity of subject and object. As Berleant suggested, a participatory model can enable us to understand the environment as a setting of dynamic forces. The architecture is treated as landscape.

The participatory model relies much on the dematerialisation of buildings. Kengo Kuma proposed “particlization” of material; Junya Ishigami explores the new scales of material, to dematerialise the building, in order to explore the relationship between

the building and the place. As introduced in the case of the Louvre-Lens Museum, the outer shell of glass and anodised aluminium reflects the environment and melts into it. The material makes the building no longer a pure geometry; instead, it requires the engagement of both the viewer and perceived in a dynamic unity. What role does material play in creating the ambiguous relationship between weak architecture and its environment? This question is investigated under the theme of "architecture as landscape" in the next chapter.

5.3 Programme in weak architecture

Besides the physical condition of weak architecture and its relationship with environment, the third issue discussed in weak architecture is programming, which is based on Sou Fujimoto's consideration of what he calls "weak system". As introduced in Chapter 4, the programmes in the Rolex Learning Centre are arranged in a seamless network. The vast undefined areas are used depending on the user's choices. How can we understand this kind of programme in weak architecture?

As Nishizawa said, "we use the function to create the building, but also the building creates the function. It is a very dynamic relation: the building creates the programme, the programme also creates the building. This has to be mutual" (Rubio, 2007, p. 15). The programme in weak architecture is associated with the concept of "becoming", where the space is active and open to changes; therefore a plan should be incomplete so as to be able to respond to all possibilities. The concept of loose and flexible relationships between space, programme and user could be connected to Vattimo's philosophies of "weak thought". The application of weak thought encourages the development of transient autonomous programmatic systems. As reviewed before, Deleuze and Guattari's "process ontology" of the smooth space emphasises

“becoming” rather than “being”. We could use the concept of smooth space to define the becoming nature of programme in weak architecture.

In the loose programme architecture, it could be said that there are two basic conditions to support the becoming nature of the programme: the first condition is the ambiguous spatial boundaries between different areas, which results in the second condition – the user’s free and flexible movement in the space. These two conditions could be related to the ambiguous state of liminal space, and the nomadic movement and flow in smooth space respectively.

The first condition – one of the main strategies to deal with this incompleteness – is to use liminal space to act as a transition between different functions. There are two ways to understand liminal space in weak architecture. The first type of liminal space is the in-between space between two fixed functions with ambiguous boundaries, which exists in the transition from one programme to another. The conditions of boundaries are concerned with material strategies, which are investigated in the following case study. The second type of liminal space is where the space itself has ambiguous identities, in which the social categories and rules are blurred. People may experience sudden encounters with new possibilities and freedoms in this kind of liminal space. As reviewed before, Sejima and Nishizawa question the concepts of intimacy, the demarcation of public and private space. To challenge the conventional consideration of programmes, what the architects do is actually create liminal space to offer freedom for individuals to decide how to occupy the space. This concerns the issue of privatisation of space. In fact, we can also read entering into public life or retreating into our private condition as a liminal process. It means moving back and forth between a controlled setting and a more open and risky setting. The transition between private and public conditions and the movement from alternate activities requires the readjustment of attention and thoughts in a moment of liminality. The psychological transition from a particular mental state and in preparation for the next

is the liminal state of mind. There is an overlap of roles and sensations between the private and public realms. By using various threshold conditions, through visual, auditory and bodily calibrations, individuals can constantly adjust the balance between public exposure and personal perceptions in the liminal spaces.

The second condition – the becoming nature of the programme – is realised by people who use the space, depending on how they move in the space and occupy the space. As introduced in the Rolex Learning Centre, various functions are arranged in a one-room space. The users are encouraged to interact with each other. The spatial orientation is not based on routes and corridors. The users of the building are dynamic and unpredictable. The ambiguous boundaries make the nomadic movement possible. Besides, the undulating surfaces of the Rolex Learning Centre suggest a new form of connectivity and a new aesthetics of smoothness. The smooth space involves a meandering movement, which is more about the journey than about the destination. One can see the flows of people as a complex confluence of flows. Mies' flowing space represents the user's movement, but the space is based on Mies' own experience and thinking. However the nomad space considers the human as a dominant factor from the beginning, including people's psychology, behaviour, emotion, and inter-relationships.

Therefore, built on Fujimoto's interpretation of weak architecture, it could said that one characteristic of weak architecture is that it has no specific organisation or programme; rather, it adapts to the need of the users through a kind of vagueness, which is always in a state of becoming. A liminality could be found in both the physical space and the user's state of mind, which results in a nomad mode of movement and occupation in space. Both of the two conditions are concerned with the ambiguous boundaries between different areas, in which the material plays an important role. The next question is: how do the architects use material to make such space that facilitates this liminality between people and space, and to create condition

for the nomadic movement as in smooth space? This is investigated in the case study in Chapter 6 under the theme of "smooth architecture".

Conclusion

Drawn from the theoretical framework established in Chapter 2 and Japanese architects' existing interpretations on weak architecture, this chapter synthesises various meanings and defines weak architecture in three aspects.

In the first aspect, the *dematerialisation of physical condition* could be defined as the first characteristic of weak architecture. The tendency of dematerialisation of architecture was accused of reductivism, of geometrical sterility, which was blamed by critics on the abstraction and reduction of a building's representation – diagram. Although being criticised, diagrammatic architecture uses abstraction as an aesthetic quality. Toyo Ito coined the term "diagram architecture" to characterise a new sensibility in the work of Sejima. However, based on reviews of SANAA's projects and the concept of the Deleuzian diagram, we could add more meanings to the concept of "diagram architecture" other than Ito's criticism of Sejima's direct translation from diagram to actual building. The role of materiality is discussed under the theme of "diagram architecture".

In the second aspect of weak architecture, the *relationship between weak architecture and environment* is based on Kengo Kuma's interpretation of weak architecture. Declaring his intention to erase architecture in the environment, Kuma adopts the strategy of particlization and pixilation of materials. Focused on the phenomenological embodied experience of landscape, weak architecture does not perceive environment as an object from an external view. Instead, it is an experience or a phenomenon, becoming an integral part of the landscape. Extending Kuma's

understanding of relationship between weak architecture and environment, Ishigami's thinking of the equivalence of natural space and architectural space consider architecture as natural phenomenon, which he called "extreme nature". Despite reflecting very strong experimental qualities, Ishigami's novel ideas push the weakening of architecture to a limit. He seeks out the limits of possible, both human and technical, in search of a new reality for architecture. Both Kuma's and Ishigami's ideas on the building and nature are closely related to the material strategies. What is the role of material in SANAA's work in terms of the relationship between building and environment? This is investigated in the second theme: architecture as landscape.

The third aspect of the weak architecture, *programmes in weak architecture*, is based on Sou Fujimoto's statement of weak architecture. Fujimoto proposes a weak order that concerning the way people use the space. He claims that there should be a loose and flexible relationship between space, programme and user, which could be related to Vattimo's philosophy of "weak thought" and Deleuze and Guattari's "process ontology". The incompleteness of plan could be realised by two supporting conditions: the first is liminal space, which concerns the issue of privatisation of space, and the ambiguity of space. A liminality could be found in both the physical space and the user's state of mind. The second is the nomadic movement in the smooth space. Both conditions are realised by particular material strategies, which are investigated in the theme of "smooth architecture".

All the three aspects give a relatively complete definition of weak architecture. The weak architecture acts in the background instead of as confrontational or dominant spectacle. As concluded in section 2.1.3 From tectonic to "weak tectonic", many issues are indicating the important role of materiality in the weak architecture. In the next two chapters, the role of materiality is investigated according to the three themes of weak architecture, through SANAA's two projects introduced before: the Rolex Learning Centre and the Louvre-Len Museum.

Chapter 6 Case study: the role of materiality in weak architecture

Introduction

Having reviewed various understandings and concepts of weakness and ambiguous boundaries in architecture, this chapter moves to examine a more concrete and physical domain: what is the role of materiality in weak architecture? The dynamic changes in today's society demand that materials become more changeable and elastic. As a result, terms like dematerialisation, ephemerality and instability are frequently employed in the contemporary design process, which seems be an irreversible tendency seen throughout the whole world. As discussed in Chapter 2, the term 'tectonics' seems insufficient to describe the role of materiality in weak architecture. This chapter investigates this issue through SANAA's architectural work. Based on the previous study, three key material characteristics in their work are extracted – whiteness, thinness, and transparency – and be investigated in the three themes of weak architecture: diagram architecture, architecture as landscape, and smooth architecture.

6.1 Theme 1 Diagram architecture

6.1.1 Diagrammatic architecture: Formal diagram

As discussed in SANAA's working method in Chapter 3, their plan-diagram upsets the semiotic distinctions drawn by Charles Sanders Peirce, as the diagram becomes less and less an icon and more and more a blueprint – or, alternatively, the icon increasingly takes on the characteristics of an object. Their diagrams are gradually becoming the plan of buildings. In principle a diagram is not necessarily similar in form to the

organisation it prescribes: a very simple diagram may generate very complex organisations. Normally, between the form of the diagram and the final form of the building, additional information needs to be added. However, SANAA's building could be seen as a diagrammatic architecture, where the architecture inherits the formal characteristics of the diagram. The form of their buildings is similar to the form of their diagram.

However, real building is constructed by materials, so what role does material play in SANAA's diagram architecture? The reason that Ito termed Sejima's building as 'diagram architecture' is not only because of her plan-diagrams – those traditional modes of architectural representation are themselves diagrams – but also because of the material arrangements in Sejima's architecture:

> The freshness of Kazuyo Sejima's architecture lies in the fact that these contradictory, complicated processes are dealt with in the utmost brevity. Even the details of the structure are little more than an arrangements utitlized as part of the diagram itself. The same occurs when it comes to material and colour selection. Material and colour arrangements remain, from the outset, mere symbols used in the superficial and lineal composition of the diagram. The elemental expressions of material and colour, expressed in the original design drawings or models, are not in any way changed when brought into being as the walls and supports of the finished structure. Therefore, the sense of physical relationship to space which one gains from her buildings is not the same with which experienced with what could be called 'former architecture' (Ito, 1996, pp. 18-24).

Ito points out that Sejima had been aiming at the dissolution of the gap between the abstractness as expressed in drawings or models and the substantiality of the actualised "product" (Ito, 2004). How do the architects manage to realise the dissolution of the gap? The primary quality of a diagram is its reductive nature. If SANAA's actualised product inherits the characteristics of the diagram, its material

should have the same reductive nature. In order to maintain the diagrammatic feature in their constructed buildings, the converting of this two-dimensional graphic scheme into the three-dimensional reality requires an elaborate process of constructive refinement, which is shown as their formal and material austerity and the thinness of their component elements.

As is typical with SANAA's presentation drawings, the plan of the Rolex Learning Centre is presented with the appearance of a diagram, with significant graphic qualities. The shapes and forms of the plan give the appearance of a subtly arranged spatial composition. If we remove all the furniture in the plan, leaving only walls and columns, we can see that why the plan is so schematic because what it defines is everything that these architects regard as the substance of architecture (Figure 6-1). This plan is a statement that an element that outlines a space is a plane – or a surface – and hence a line on the plan, and that a column is a linear element and therefore, a point on the plan.

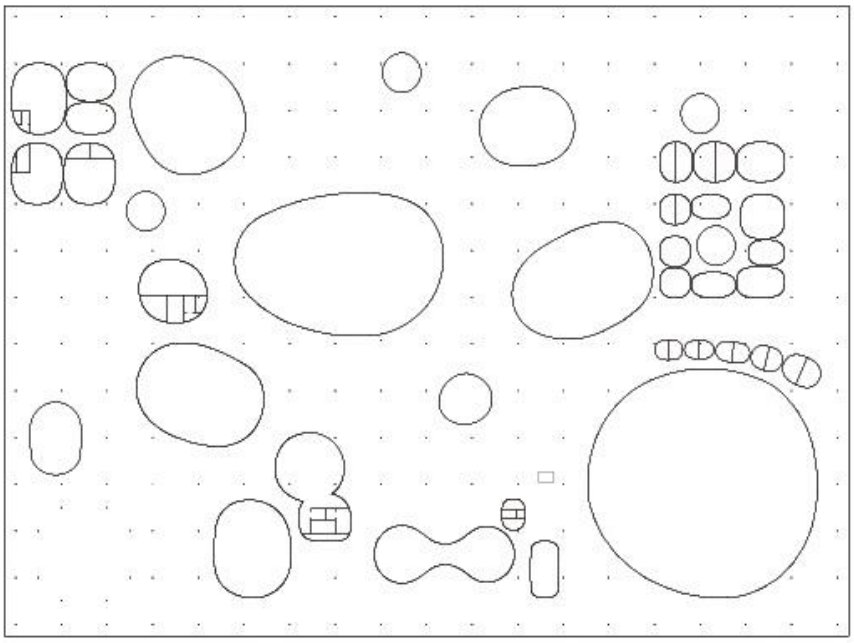


Figure 6-1 Plan of the Rolex Learning Centre, without furniture (Source: Author)

When it comes to the real building, the project's development and construction respect the plan's schematic nature as strictly as possible. Without adding dimensions and providing thickness, the line of the wall is physically and functionally almost entirely immersed within the undulating landscape. On its sides the inner space is closed by a one-storey-high glass façade. The slender tubular steel columns with a diameter of just 127 mm are arranged in the 9 × 9 m grid, which follows the geometry of the shells. Painted a restrained white, the columns create the interior's impression of limitless space.

How do the slender columns manage to support such a big roof? A roof this size resting on slender steel columns was the engineer's challenge, particularly since the architects had generally precluded the use of diagonal struts, generally used for wind bracing. Even with glass walls, the visitor must look closely to find the diagonal struts, which are unobtrusively positioned near the patios. At the architects' request, the number of diagonal struts was kept to a minimum for aesthetic reasons. The architects had specified complicating conditions: the frames were to "disappear" into the floor and ceiling, the interior space seeming to merge seamlessly into external space.

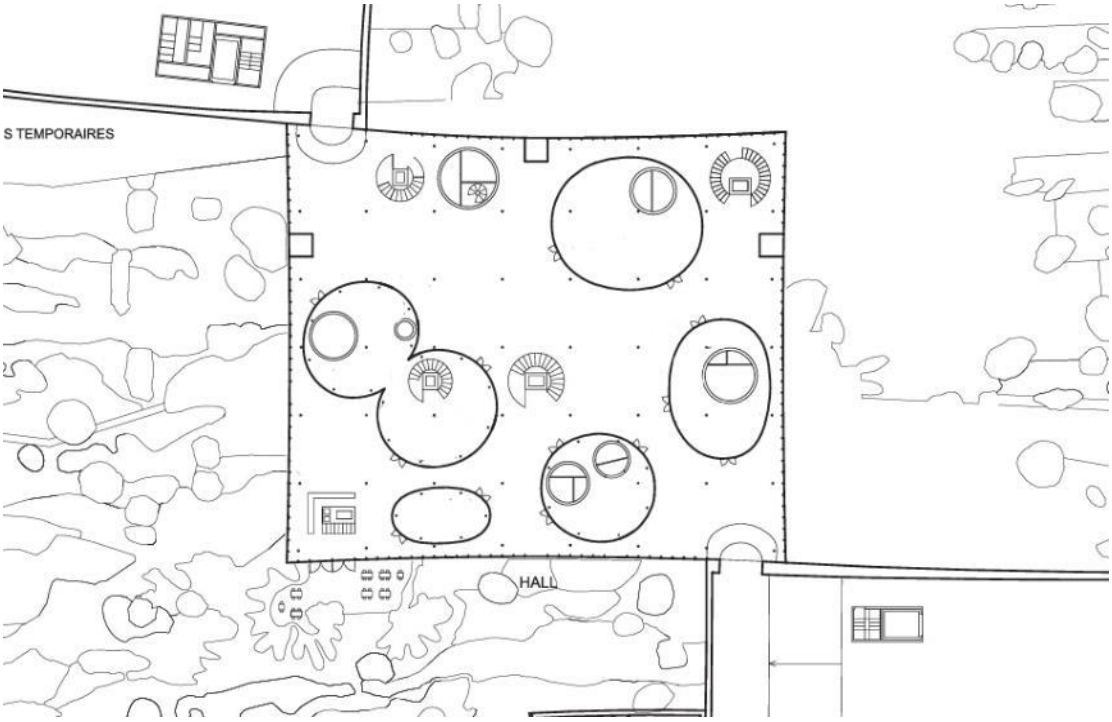


Figure 6-2 Plan of the entrance hall of the Louvre-Lens Museum, without furniture (Source: http://www.designboom.com/architecture/louvre-lens-by-sanaa-imrey-culbert-now-complete/)

In the case of the Louvre-Lens Museum, how are the lines of plan translated to the minimal expression of walls? Similar to the Rolex Learning Centre, the plan of the entrance hall in the Louvre-Lens has a diagrammatic quality – it can almost be seen as a mini version of the Learning Centre plan or part of it (Figure 6-2). To maintain the lines of walls and the points of columns, the architects limited their palette to three primary materials: aluminium, glass, and steel. The glass pavilion is completely open to its surroundings, to either side of the exhibition halls. The aim was to maintain the elegant, purist character of the boxes despite the structural requirements, which meant translating the simplicity and weightlessness of the appearance into dimensions that challenged what was constructively feasible. According to the architects' demands, the constructive elements should be "as small as possible", and the glass cube should be maximum transparent. This building inverts the atmosphere of the old Louvre: the

architects wanted it to seem light and unassuming rather than monumental. They wanted to give people the sense of being connected to the rest of the world rather than trapped amid ornate frames in galleries.

As introduced in section 4.2.3, there are no diagonal bracings in the glazed entrance building; all these details and structural secrets are hidden beneath the smooth surface. As Mark Wigley remarks, SANAA's work is "an anti-tectonic architecture assembled from a minimum number of elements that give a minimum of information about how they are made and how they are connected to other….It is the very image of basic structure – ground + column + roof – yet the thought of structure, of load and resistance, floats away" (Sejima et al., 2015, p. 29). That is the reason Ito comments that Sejima's walls and supports of the finished building are not in any way changed compared to the original design drawings or models. The form of the real building has a diagrammatic characteristic.

From the facts of the above cases – the conversion from diagrammatic plans to walls with hardly any thickness and columns that are impossibly lean – we can see that the thinness of the elements is a strategy that SANAA uses to realise their work. Sejima declared, "The physical thinness is very important for me" (SEJIMA, 2000, p. 13). This is one of the distinguishing features that SANAA's architecture has to be different from the early modernist box. They creatively appropriate many of Modernism's architectural and spatial devices and take them to their technical limits.

Why would SANAA try to create architecture with immaterial appearance? Do these diagrammatic plans define everything that these architects regard as the substance of architecture? Although SANAA certainly gives extensive attention to the graphic composition of their designs and its consistency to the finished buildings, is it solely what they are after?

Contrary to the criticism on "Diagrammatic architecture" that the early modern architectures is dry, inhuman, and lacking of aura[17], it could be argued that SANAA's work is not merely a translation from lines to walls and from dots to columns; there is something far more substantive than this in their buildings. The complexity of SANAA's work is not quantitative – created by the formal elaboration and the multiplication of parts – but qualitative: a minimal number of elements each performing multiple and sometimes contradictory tasks. These are architectures of simple forms capable of producing complex phenomenological effects.

The trick is the added materiality when translating the lines of plan-diagram to actual walls. In the Louvre-Lens Museum, two thirds of the facades are clad with reflective aluminium sandwich panels with the same dimensions as the glass elements in the entrance hall. They diffusely reflect the environment, meaning that a specific reflection factor was required from the corresponding polishing treatment. The exhibition boxes seem dematerialised due to their highly homogeneous, reflective shells. The photos below (Figure 6-3) show how the exhibition gallery looks before hanging the aluminium panels, which offers a totally different visual perception compared to the reflective surfaces.

[17] See 5.1 Dematerialisation of weak architecture.

Figure 6-3 Exhibition gallery of the Louvre-Lens Museum under construction (Source: http://payload367.cargocollective.com/1/18/586410/9644780/IMG_0597_800.jpg, http://payload367.cargocollective.com/1/18/586410/9644780/P1060632_2000_c.JPG)

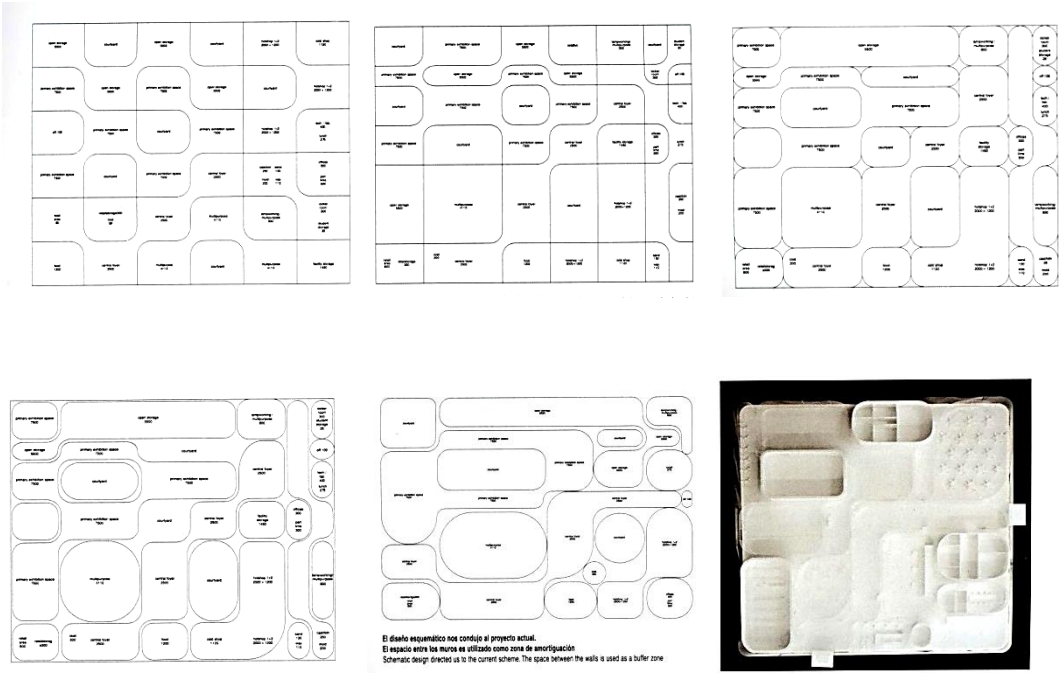
The aluminium is not a neutral object in itself – it has a perceptual effect of visual "resemblance". The mirroring wall is not just simple duplicating or imitating – it is challenging the normal experience and logic of everyday life. 'De-familiarise the familiar' is the perception caused by the reflective material. The reflective effect is constantly changing due to the varied daylight provided by partially glazed roofs. Space and light seem to become more physical, as though combined they infer some atmosphere of fog. This effect is also produced by the thinness of the T profiles of the flat-bar. The architects deemed the initially intended supported construction to be too thick and not delicate enough. The structural engineers consequently developed other variants with the pre-requirement of a support structure that was as minimalist as possible. As introduced before, the specially designed roof beams with a span of 26 m have T profiles of flat-bar steel 60 to 110 cm high, with a web thickness of only 12 mm. One cannot even distinguish the flat-bar from certain angles because of the thinness of the beams.

The entrance hall with its glazed pavilions is a more extravagant contrast to the introverted exhibition halls. The transparent and reflective glass walls sometimes cause distortion of gaze – a more tactile experience of vision. Besides, transparent spatial organisation affects the optical pattern of connection and disconnection. A dynamic succession of perspectives generates the fluid space experienced from the point of view of a body moving along free circulations.

Speaking of SANAA's diagram architecture, another typical example worth a mention is the Toledo Art Museum. Figure 6-4 shows its design process from diagram to plan, and to the model. In the initial diagram, the programme was organised around a simple grid distribution. By using curved lines, they make each space independent and differentiated from each other. In the final plan, each functional space is outlined by one line; hence there are double walls making each room independent. The space between the walls is used as a buffer zone. The extensive use of glass, together with the possible variations of transparency, allows the users to perceive the layers of the diagram. The walls appear as a direct translation from the curve lines to physical material. Although insulated glass is a complexity in itself, it is has the appearance of a monolith. The lower frame element of the glass panel is concealed in the concrete floor, and the upper frame is concealed in the suspended ceiling. The irregular shape of the structure does not match the geometry of the cells, but is also hidden in the ceiling. In consequence, the slender cylindrical steel columns appear in such an unpredictable way that they disappear from the spatial experience.

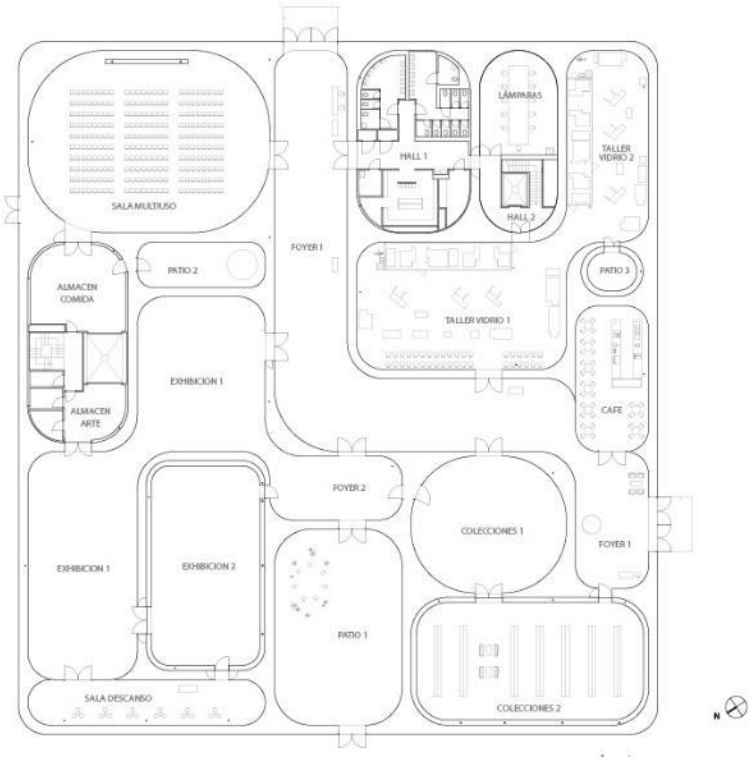
The glass walls are sometimes quite transparent, and sometimes become translucent due to the visual overlap of the curved glass. As Eve Blau points out, at Toledo they deconstruct the poché into a permeable space defined by two plains of glass, revealing "the contradiction between information and experience without resolving it" (Blau, 2008, pp. 29-37). That is to say, the transparency expresses the dichotomy between the visual interconnection and the isolation of the individuals in modern society.

These surfaces deny or confuse the perception of volume through the play of ambiguity, translucency, layering, and reflection.

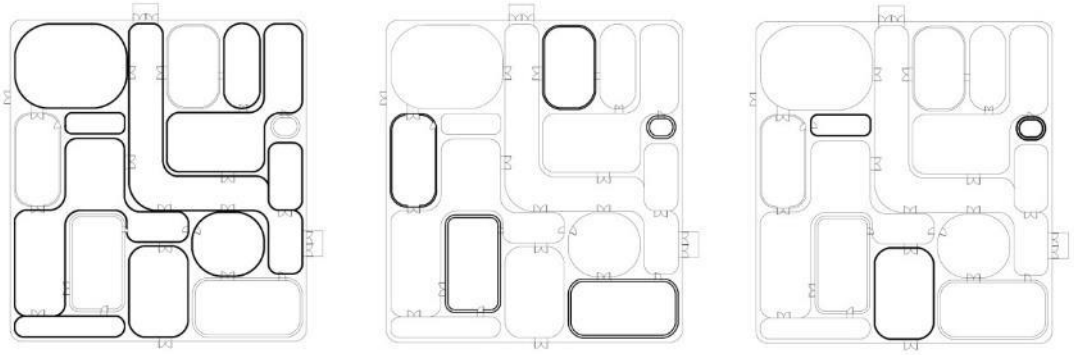


a. Diagrams and model of the Toledo Art Museum (Source: *El Croquis 139*, p. 86)

b. Layers of glass walls in the Toledo Art Museum (Source: http://www.archdaily.co/co/727211/glass-pavillion-en-el-toledo-museum-of-art-sanaa)



c. Plan of the Toledo Art Museum (Source: http://www.archdaily.com/54199/glass-pavilion-at-the-toledo-museum-of-art-sanaa-pritzker-prize-2010)



d. transparent walls **white walls** **courtyards**

Figure 6-4 Toledo Art Museum (Source: Author)

From the above cases we can see that SANAA's seemingly reductionist attitude should not be considered as creating the aesthetic image or style of what is called minimalistic architecture, where no mark or trace of life can be allowed on a reflective, transparent or white wall. Their work is not pure geometric forms like squares and round columns, or optimally functional combinations; rather they develop strategies where materiality appears is subordinated to the simplicity and readability of the diagram. However, the ambiguity and aura it creates are beyond diagram architecture. By reducing depth in material systems, overlapping transparent objects in perceptive sequences, minimising the thickness of opaque elements, and using reflective materials, they create the user an altered state of perception through changes to the normal conditions between the components that define the space. It is a sort of perceptive disturbance that affects the articulation of certain phenomena.

As Alberto Montesinos points out that SANAA's building evokes a certain atmosphere contained by physical reality, their product is indeed a spatial phenomenology and a certain atmosphere created by transparency or whiteness, which should not be treated as mere physical attributes in their work. More importantly, it is about the contradiction and dynamic relationship between objective and subjective modes of cognition. According to Pallasmaa, in the haptic and atmospheric architecture, "tactile sensibility replaces distancing visual imagery through enhanced materiality, nearness, identification, and intimacy" (Böhme et al., 2014, p. 35). Indeed, materiality can make atmosphere explicit – it can draw one's attention and amplify one's sensitivity to a particular atmosphere. We innately sense buildings, feel their material's haptic qualities, see the lights, and sense the temperatures. Materiality plays an important role in generating atmosphere. From the analysis of the cases we can see that the dematerialisation in weak architecture also generates atmosphere and affects the perception of the space. How does it influence our perceptions? What is the difference between the perception of the conventional material and the

dematerialisation? These issues are further discussed in section 6.4 Haptic space, which is the visual perception analysis of the two cases using the concept that Deleuze and Grattari proposed in the description of smooth space.

For the above reasons, it could be argued that Ito's interpretation of diagram architecture should be questioned, for it only describes part of the characteristics of SANAA's architecture. Obviously, the ambiguity of space, the atmosphere and aura created by the materiality cannot be expressed through a diagram. A very clear line expressed in two-dimensional drawings could have a very ambiguous effect with the manifestation of materiality in the three-dimensional world. Therefore, different from the modernism boxes, SANAA's diagram architecture is not "of reductivism, of geometrical sterility, and thence of alienation from the human". On the contrary, with transparent and reflective surfaces melting into variable vagueness, their architecture has offered a rich phenomenological outcome. The reductive space itself is not the aim of their architecture, but rather to employ it filled by the unforced corporeal encounter between the subject and the world.

6.1.2 Architectural diagram：Functional diagram

In Chapter 5, the formal diagram and Deleuze's concept of diagram are differentiated. The previous reviews on SANAA's work show that their diagram architecture not only refers to the figurative qualities of diagram, but also embodies the meaning of the Deleuzian diagram. The previous section 6.1.1 focused on the process from formal diagram – diagram's figurative, line-based qualities of marks and tracing – to building, which results in the diagrammatic nature of the architecture form. This section tries to read the architecture as a built diagram, to see a building as essentially the equivalent of the kind of spatial diagram used to describe the daily activities. In other words,

reversed to the process discussed in the last section, this section focuses on the conversion of a concrete building into a diagram.

Stan Allen clarifies the organisation function of diagram, including both formal and programmatic configurations (Allen, 1998, pp. 16-19). Creating diagrams with the intention of experimenting is the method for SANAA to realise the complexities in forms. Their architecture is easy to judge according to its aesthetic dimension, yet it is in real danger of being interpreted only in terms of aesthetic dimensions, and invites misunderstandings. Allen claims, "For SANAA, a diagram architecture is not so much an architecture produced by diagrams, but rather an architecture that accurately reflects the 'diagrammatic' character of contemporary life" (Idenburg, 2010b, p. 65).

There is a transparent organisation in the Rolex Learning Centre, which invites and encourages the fluctuation of multiple readings of the space, and suggests individual interpretation. The user does not remain observer on the outside, but becomes part of the composition through one's participation in these undulating slopes. According to Sejima, the transparency depends on the comprehension of the person experiencing it. On the other hand, it would be tedious if one could understand it without experiencing it. It is like discovering how to relate to the building through experiencing it (Rubio, 2007). Transparency is a compass to help the user in the process of exploring flexibility and relationship. It allows users to orient themselves in the building while heightening their awareness of their own relationship to things and spaces around them. Each individual user guides a different programme. Each programme reveals a different flexibility. Humans' individual ability invents their own stories. Therefore, we can say that the diagrammatic plan of the Learning Centre retains a capacity to trigger possibilities. Preston Scott Cohen pointed out that SANAA's transparent buildings are like experiments to test people's behaviour, spatial relationships and experiences, and

the outcomes are unpredictable[18]. In a Deleuzian diagram sense, the project retains its virtualities, which become only partially actualised, keeping the possibility to develop ad infinitum.

SANAA has a unique way of relating the society and people to their creations: they simply want to place their architecture and observe what will happen rather than predicting and planning what effect it will have on the surrounding environment. The buildings should be open enough to provide such a place to contain various possible events and actions. Therefore they liberate themselves from conventional architectural language. The architects themselves cannot designate what is the "reality" of the building. The architectural design reveals itself in time and is given its wholeness through the relationship with the people who use the building.

Therefore it could be said that SANAA's buildings behave like a diagram, the meanings of which are not fixed. Multiple functions and actions over time are implicit in the built line diagram. It does not represent an existing situation, but it is instrumental in the projection of new ones. Without the user's creation and participation, the building is not completed. Focusing on the phenomenological participation of the spectator, their space becomes a performance space in which action is promoted as something necessary instead of insisting on the building as a focus of interpretation. Human relations and activities, frictions and encounters are the real focus of SANAA's architecture. Therefore they use the neutral character of the space to house all of this and make its adaptation to any function. The space has abstract qualities and lacks a one-to-one relationship with any particular activity. The fact that SANAA's work has received favourably resonance around the world is the

[18] Preston Scott Cohen on Harvard GSD lecture series "A New Innocence: Emerging Trends in Japanese Architecture", Cambridge, 2011.

evidence of that their designs are effective and lead to valid results. Their design roots in the sensitivity to the relationship between space and human behaviour. Their architecture adapts to the need of the users through a kind of transparency. Similar to Rem Koolhaas's formula, SANAA doses up together a maximum of programme and a minimum of architecture, "where there is nothing, anything is possible. Where there is architecture, nothing else is possible" (Lucan et al., 1991).

Does this architectural diagram have an influence on the material strategies? Rem Koolhaas claims that architecture liberated from the obligation to construct can become, in fact, the diagram of everything. The architecture can become a way of thinking about relationship, proportions, connections and effects (Koolhaas and McGetrick, 2004). However, in SANAA's case, the built architecture as a diagram is not "liberated from the obligation to construct"; on the contrary, it is in fact their consideration of materials and structures that makes their building as diagram. The architects say, "We start with every diagram on paper without thinking about gravity or the dimensions of materials. In these diagrams, the idea seems clear, in the process moving from 2-D diagram to 3-D buildings, we have to bear many things in mind. We try to make this transition very carefully, so as not to lose clarity" (Sejima et al., 2008, p. 47). The "clarity" they are talking about is a diagram as a graphic assemblage that specifies relationships between activity and form, organising the structure and distribution of functions. One important thing for them is to make a structure clear. For them, structure is on the one hand a physical structure, and is on the other hand the way of how to arrange the programme, which they use to produce different types of relations.

In order to "not to lose clarity", the effect of the material should be kept to a minimum. As Juan Antonio Cortes points out, thanks to their formal and material austerity and the thinness of their constituent materials, SANAA's constructed buildings maintained its organisational clarity and the relations between the spaces. All these

diagrammatic conditions explain “why it can be said that their architecture takes the principles of modern architecture – and some aspects of Japan’s architectural tradition as well – to the limit, while at the same time it is an inquiry into the very substance of the contemporary space” (Sejima et al., 2008, p. 57). The role of structure and material determination in the spatial organisation becomes a central theme of SANAA’s architecture. The structure and material are considered closely related to firstly the building’s spatial definition, and secondly the way its space is experienced.

In summary, as a kind of Deleuzian abstract map, SANAA’s architecture escapes the existing typologies. It could be seen as diagram, offering open consequence and possibilities. With a distinct clarity, diagrams of function and space are translated elegantly into building in a minimal aesthetic that goes well beyond the merely functional. The building itself has a clear relationship as shown in the original diagram, thanks to the thinness and transparency of the architectural elements.

6.2 Theme 2 Architecture as landscape

This section focuses on the role of materiality in the second aspect of weak architecture – the relationship between the building and its environment – to examine the conceptual, perceptive and aesthetic potential of architecture to transform into landscape by means of materialisation. Two concepts encompass different aspects of the relationship between architecture and landscape: Firstly, building as landscape on its own, which is based on Leatherbarrow’s “similarity” of architecture and landscape. The analogue develops the capacity that some buildings have to evoke geographical formations present in natural landscapes. The traditions of landscape provide an inspiration for architecture liberated from the constraints of geometric and strong images. This concept is analysed in the case of the Rolex Learning Centre. Secondly,

building dissolves in the landscape, which emphasises architectural physicality, experience of material, and making materiality a part of the natural environment. This concept places the material in the domain of the main framework, relating to the illusion that develops visual effects that set less tangible connections – taking advantage of incorrect perceptions. This concept is investigated mainly in the case of the Louvre-Lens Museum.

6.2.1 Building as landscape on its own

According to Stan Allen, landform building favours programme, process, and affect over formal similarity (Allen and McQuade, 2011, p. 34). It is less interested in the imitation of natural form and more interested in new programmatic possibilities that are opened up by the creation of artificial terrains. Therefore, although the Rolex Learning Centre manifests itself on the formal analogy of landscape in an obvious way, this thesis looks at other aspects as well, such as phenomenological, spatial, temporal, metaphorical and programmatic aspects, to find out what the performative and organisational potential the landscape have when it is applied in architecture.

In some cases, the artificial landscape is related to the site through its shape, such as the Neurosciences Institute in California analysed by Leatherbarrow in his book *Topographical Stories*. In others, it is rather independent of or even opposed to the surroundings: landscape constitutes the inside of the building. It is making its own landscaped interior, bring the experience of landscape to the space of architecture through the reinterpretation of geographical formations in confined spaces. Going beyond mere imitations of "the ground", it draws lessons from the landscape and shapes new strategies that stand in their own right, providing additional tools to architecture. FOA's Yokohama Port Terminal is a typical landform building in this category, which explored new frontiers of architectural form. A complex series of

surfaces gently curve and fold into an inhabitable architectural topography. The Rolex Learning Centre also belongs to the latter category. In this case, SANAA's approach to the nearby built context is rather creating a story than reacting to it. It is almost a work of creating a surreal landscape rather than an actual reaction to the existing landscape, whereas it is an analogy of topography to the further natural context. The building becomes in itself artificial landscapes and contexts, in which the architect's role would seem to inevitably expand beyond designing single objects.

1 Formal analogy

In the case of the Rolex Learning Centre, two hills are laid out on the wide plain of the site, which is cut by a rectangular shape. The orderly world remains outside, while the inner landscape is reconnecting spatially and metaphorically to a wider surrounding nature beyond the campus. Even reconnecting to the wider surrounding nature, SANAA refuses to simply mime the form of the landscapes. Rather, the way the building's users experience and encounter the cultural and geographical landscape outside the building is transplanted within.

Viewed from the main deck of the existing campus, the rolling landscape of the Learning Centre's contoured roof offers a surreal snowscape offset against an ethereal alpine panorama, each complementing the other (Figure 6-5). Viewed from the road on the south of the building, through this layered perspective of polished vaults are views of the landscape and campus beyond, as well as glimpses into and through interstitial exterior and interior spaces that are caught within (Figures 6-6, 7). People float above or beside, cocooned within a calm white world (Figure 6-8). These spanning profiles of flowing concrete compress the horizon and are scale-less. It is

only by the introducing of real life to the building that brings scale and definition to the space.

Figure 6-5 Rolex Learning Centre: View from the existing campus (Source: Author)

Figure 6-6 Rolex Learning Centre: View from the road on the south (Source: Author)

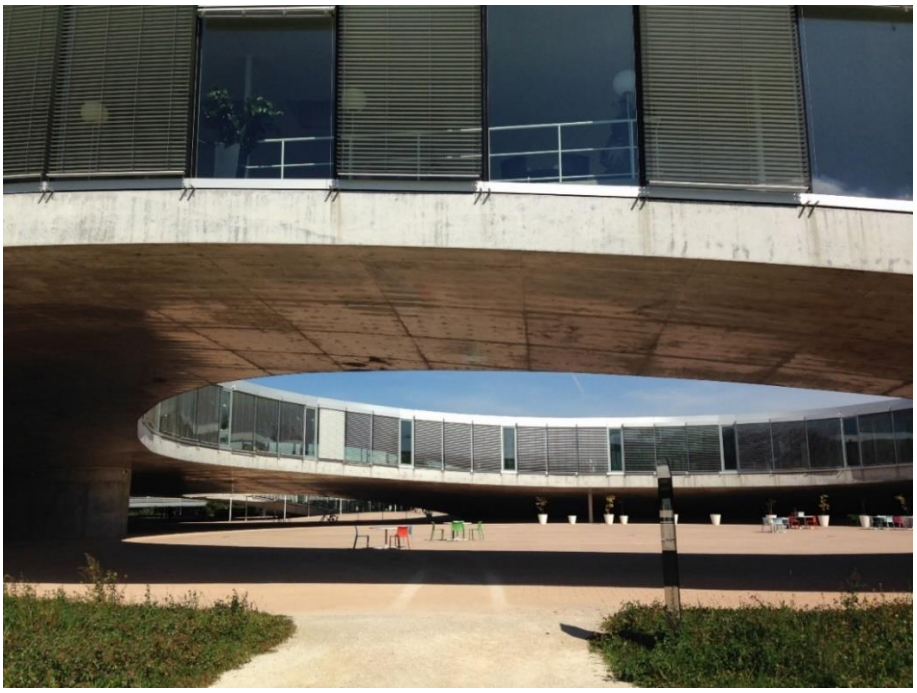


Figure 6-7 Rolex Learning Centre: Polished vaults and views of the landscape and campus (Source: Author)

Figure 6-8 Rolex Learning Centre: Views of interior space through the glass wall (Source: Author)

With an undulating floor and ceiling topography, this giant continuous space can be described as an abstracted landscape or a large playground. The result is not only a completely new building type, but also a flowing spatial landscape. Juan Antonio Cortes points out that the deformation of the building is not on the plan but instead in the section, and does not affect the regular shape of the floor or the ceiling, but rather their flat nature. The changes to the horizontal floor, a basic reference point in architecture, affects the nature of architectural space much more than the shape of the perimeter of that space, or even whether the surrounding walls are vertical or not (Sejima et al., 2008, p. 41).

Evidence shows that formally, SANAA did refer to the natural landscape from all over the world (Figure 6-9). They collected various slopes, applying their form in the Rolex Learning Centre. Sejima pointed out that Lausanne's interesting relationship with the topography inspired them (Figures 6-10, 11).

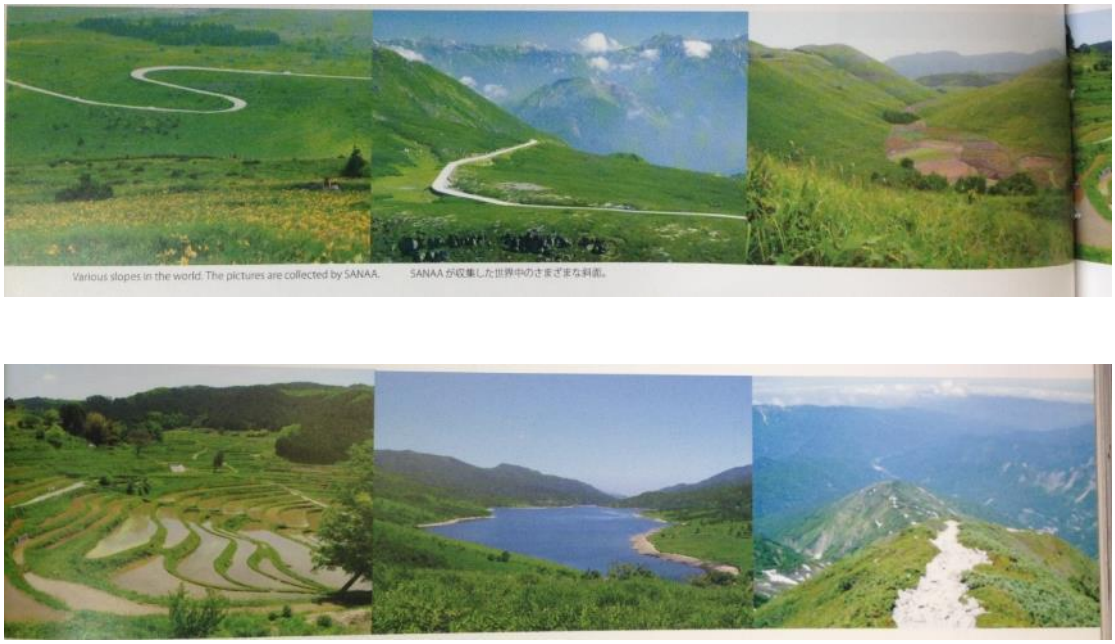


Figure 6-9 Various slopes in the world. The pictures are collected by SANAA (Source: *Japan Architect*, no. 71, p. 28.)

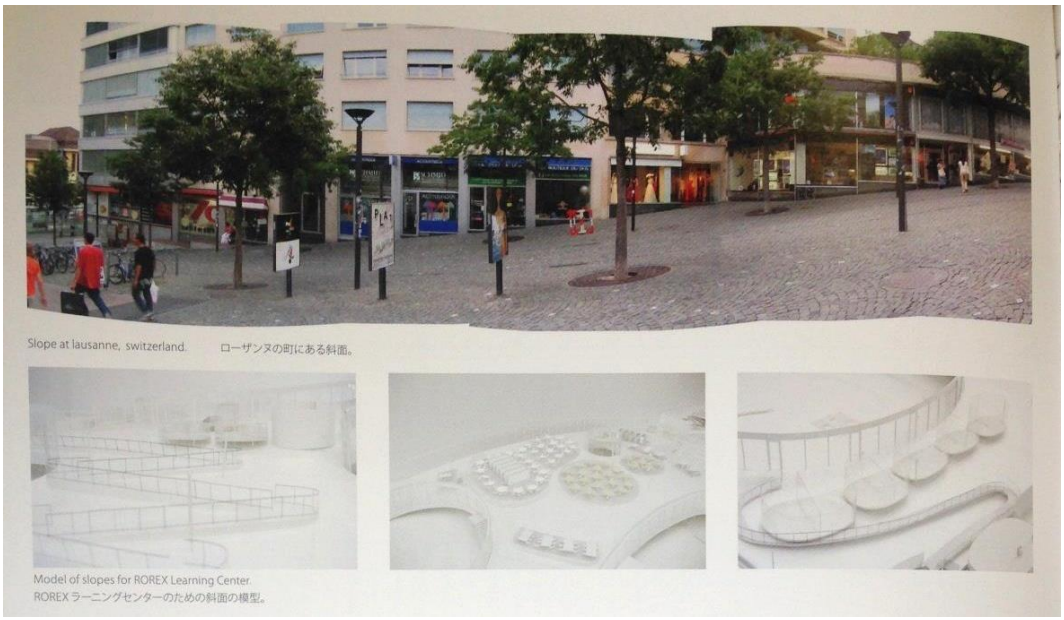


Figure 6-10 Top: Slope at Lausanne, Switzerland. Bottom: Model of slopes for the Rolex Learning Centre (Source: *Japan Architect*, no. 71, p. 30.)

Figure 6-11 Top left: Verification of the comfortableness of the chair and table on a slope at SANAA's atelier. Top right: Slope at Lausanne, Switzerland. Bottom left: Trying wheelchairs at Osanbashi Yokohama (FOA, 2002). Bottom right: Slope of Casa Da Musica (OMA, 2005) (Source: *Japan Architect*, no. 71, p. 31.)

The building leaves behind certain other elements typical to architecture – walls or straight floors – and replaces them by hills, slopes, and other features borrowed from landscape. Many aspects of a landscape design are integrated into the building. The first element referring to landscape is the hills. The curve surface replaces walls as a spatial separator. The quality of a hill as a space divider was used to create a degree of privacy through topography. Sejima explained that this is a vague way of dividing space, which may lead to the creation of an interesting relationships between the divided spaces. In the spatial form analysis of the Learning Centre, Daniel Jauslin defines three different horizons in the building. The views of the landscape of each horizon are analysed referring to his three horizons. The first horizon is the ground level. The second horizon is approximately 60% of the surface inside that is flat and slightly above ground. This horizon plays a very important role for the spatial system since it allows for separation into different functional zones. The third horizon is the highest area of the building (Figure 6-12). Jauslin compared these numerous horizontal viewing relationships to the rich complexity of the spatial system of vistas in the English landscape garden, but he also made an important distinction between the two: in the Learning Centre, the visual relationships are seldom related to landmarks or monuments, but more like in a natural landscape only to topographical features of the designed landscape. Therefore, navigationally speaking, the Learning Centre is simply disorienting. The building remains an exciting maze. The system is hard to pin down on exact locations, as the desire for freedom seems to be dominant.

First horizon Second horizon Third horizon

Figure 6-12 Three horizons of the Rolex Learning Centre (Source: Author)

Besides hills, there are other elements that refer to landscape. In order to solve the functional problems of slopes, the architects learned from the rice terraces on the hill. The round and stepped areas in the library are like different kinds of terrace (Figure 6-13). To solve the accessibility of disabled, handicapped ramps in the shape of serpentine roads and rack railways for wheelchairs are arranged on steep slopes, which are abstract quotes of the alpine world (Figure 6-14). The offices and services are arranged as clusters of tiny huts, which could be seen as villages (Figure 6-15). The composition of elements is not a hierarchically structured spatial enactment but rather a wide open expanse.

Figure 6-13 Landscape elements of the Rolex Learning Centre: Terrace (Source: Author)

Figure 6-14 Landscape elements of the Rolex Learning Centre: Path (Source: Author)

Figure 6-15 Landscape elements of the Rolex Learning Centre: Village (Source: Author)

Formally speaking, what makes the Rolex Learning Centre different from other landscape form buildings? As mentioned at the beginning of this section, FOA's Yokohama Port Terminal (Figure 6-16) is perhaps another most convincing realisation of an architecture invested in the idea of landscape techniques working at the scale of building. The boundary between interior and exterior is fluid and permeable. Similar to the Rolex Learning Centre, this is not a project that depends upon a palette of traditional landscape materials to establish connections with landscape practice; instead the terminal operates almost entirely on the basis of the operative techniques of landscape design and the programmatic effects of continuous topological surfaces. However, different from the Learning Centre, the topological surfaces only constitute the roof of the project (Figure 6-18). Even if the roof provides an open landscape for the users, it is still an outdoor place. It would not be too different from a normal park or landscape in terms of experience of the space. Inside the building, the floor is conventionally flat (Figure 6-17) whereas in the Rolex Learning Centre these shells constitute the floor plate of the interior spaces, which forms the indoor landscape. Common to landscape and architecture, the undulating surfaces promised new form of connectivity, novel programmatic configurations and a

new aesthetics of smoothness. Architecture, which had traditionally been associated with the vertical plane and bounding partitions, dissolves into an extensive, horizontal field of interconnected surfaces. In such larger-scale landform building, landscape effects are brought inside and blur the boundary between inside and outside. In these "vast interiors", nature is identified not with the presence of greenery or biomorphic form but with boundless, expansive space.

Two issues need to be tackled compared to the outdoor landscape: a roof to cover the interior landscape, and the day lighting for the large area. These are normal architectural elements to conventional buildings, and could easily turn the building away from landscape if not treated carefully. To translate these architectural elements into an indoor landscape, materiality plays an important role in the transformation.

Figure 6-16 Yokohama Port Terminal (Source: http://www.archdaily.com/554132/ad-classics-yokohama-international-passenger-terminal-foreign-office-architects-foa)

Figure 6-17 Interior of the Yokohama Port Terminal (Source: http:// haimao.poco.cn)

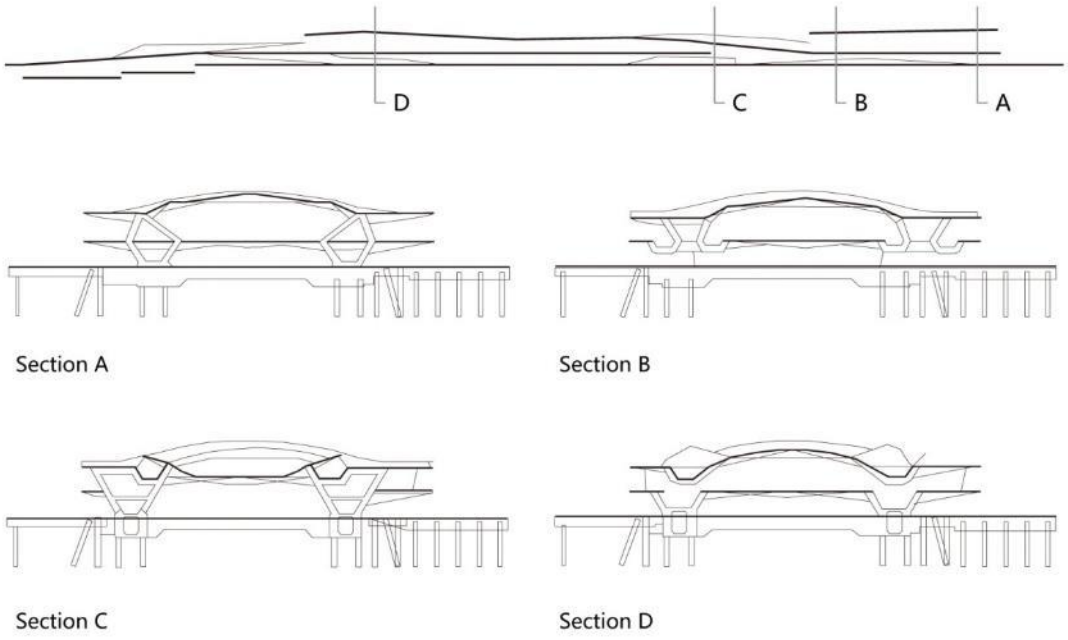


Figure 6-18 Diagram of sections of the Yokohama Port Terminal (Source: Author)

Thinness: Atomisation of structural elements

The first issue of indoor landscape is that the vertical elements are vital to support a roof if it is not a long span structure. In the Rolex Learning Centre, the thinness of columns contributes to the effect of artificial landscape. The thinness of structural elements is summarised by Cristina Diaz Moreno and Efren Garcia Grinda as "Atomisation and dispersal of the structural elements almost throughout the building" (Cecilia and Levene, 2004, p. 27). Alejandro Zaera described this approach to the structure as some form of phenomenal transparency. It is not that these elements are actually transparent or are eliminated to provide flexibility – on the contrary, these elements disappear into something else, either partition or simply the form in which

people experience the space. So the figure of the structure is blurred (SEJIMA, 2000, p. 17).

In terms of the spatial effect of thinness, Mark Wigley points out, “Thinning the building thickens the air. Buildings, objects and people drift away from anything fixed. Thin crisply defined elements are deployed to produce their opposite. This thinness is never discrete or quiet. On the contrary, it acts as an intensifier, an expander, an amplifier. The thinner the elements, the thicker the experience” (Sejima et al., 2015, p. 37). The thinness and whiteness of the columns make them transform into something else disappearing in the white landscape; therefore one is very likely to ignore them rather than to relate them to any conventional architectural elements (Figure 6-19).

Figure 6-19 Rolex Learning Centre: Disappearing of the columns (Source: http://www.archdaily.com/53536/rolex-learning-center-sanaa-by-iwan-baan, edited by author)

Transparency: visual connection

The second issue of the indoor landscape is the daylighting. Covered by the parallel undulating roof, the giant building needs to be punctured by the patios to bring in light, as the building expanse would be too large if uninterrupted. The side effect of these patios is building up a visual connection between the inner landscape and the exterior landscape.

With Lausanne's extraordinary situation on the bank of Lake Geneva, and spectacular views of Mont Blanc beyond, the curved path and slope of the Learning Centre not only enhance the idea of freedom and absence of hierarchy in favour of a natural condition, but also propagate a dynamic view of the landscape connecting sights towards inner and outer views. The spatial dynamic of uphill and downhill inner spaces and the splendid views with bits of natural landscape framed by this artificial world connect the visitor with their surroundings. You cannot help but compare the building to the scenery outside. More than a walled Asian garden, this is reminiscent of the English landscape garden using effects and scenery found in nature to trigger that thrilling and edgy experience of the sublime landscape.

The transparent glass plays a crucial role for the views across the patios. Moreover, the architects insist that the hills should be high enough in order to see across the openings onto the roof (Grohmann, 2008). Therefore, at the elevated points, the visitor finds himself surrounded by a variety of views through inner landscapes, roof landscapes, and the exterior landscape (Figures 6-20~25). Its spatial system is connecting the inner landscape to the surroundings, extending the illusion of a seemingly endless space. In the journey of the building, the moving body constantly comes to terms with different types of ground condition: the flat land, the sloping ramp, and the flights of steps. The body is exposed to a series of changes in visual horizons, as one's position and relationship with the landscape is continually reformulated. This is a non-hierarchical

space that has neither borders nor contours, neither defined layout nor fixed paths. It provides the possibility for creating numerous new spaces and networks of relationships as soon as someone steps into it. The images the person looks at are not distant and framed, but rather intimate and interactive. The object-oriented architectural image is replaced by constantly changeable content; every formal appearance of architecture disappears and it turns into a place with an incessantly changeable capacity. Figures 6-20~25 show different views of the landscape from three horizons. The views of exterior landscapes are represented by red arrows, roof landscapes by blue ones, and inner landscapes by yellow ones.

1. Views of the third horizon

Exterior landscape:

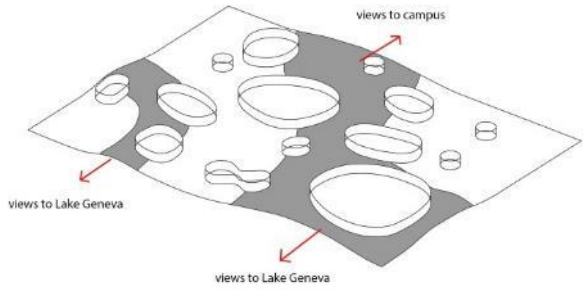


Figure 6-20 Views of the third horizon: Exterior landscape (Source: Author)

Roof landscape:

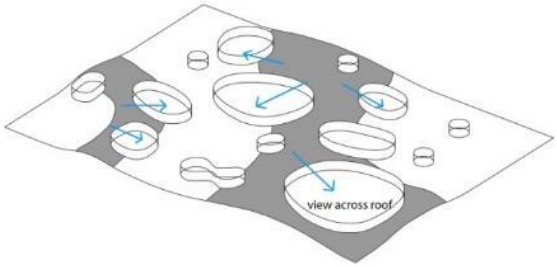


Figure 6-21 Views of the third horizon: Roof landscape (Source: Author)

Inner landscape:

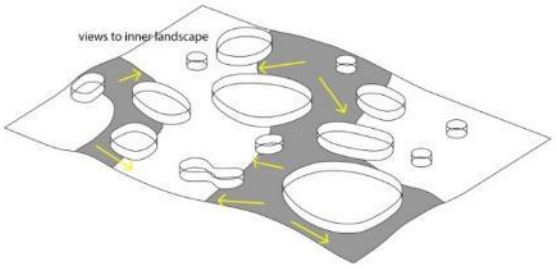


Figure 6-22 Views of the third horizon: Inner landscape (Source: Author)

2. Views of the second horizon

Inner landscape:

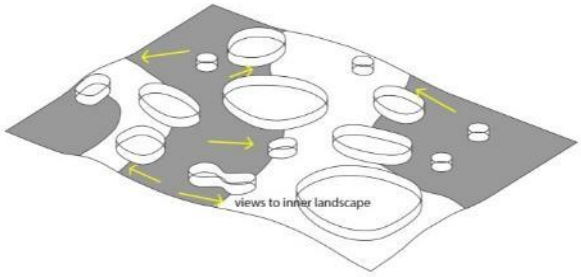


Figure 6-23 Views of the second horizon: Inner landscape (Source: Author)

3. Views of the first horizon

Exterior landscape:

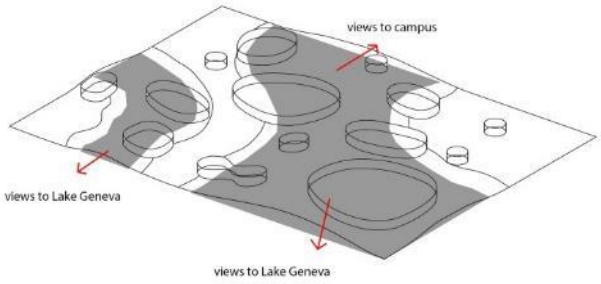
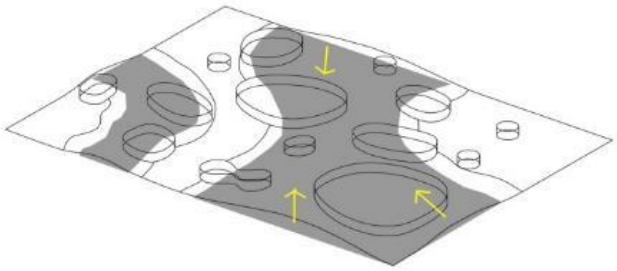


Figure 6-24 Views of the first horizon: Exterior landscape (Source: Author)

Inner landscape:



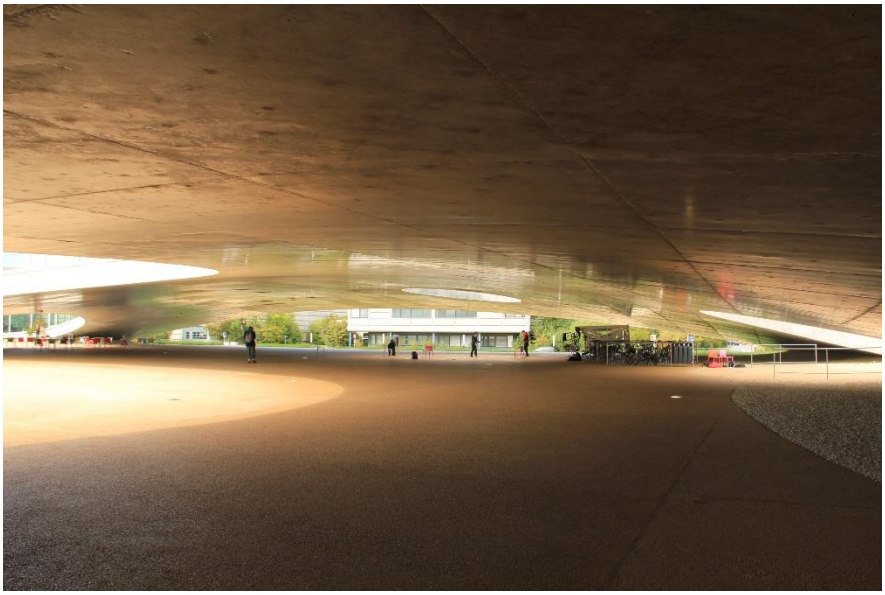


Figure 6-25 Views of the first horizon: Inner landscape (Source: Author)

2 Playground: A social landscape

The artificial landscape of the Rolex Learning Centre is not only about formal analogy of landscape, but also concerns the effects of landscape and the notion of landscape as a potential for connectivity, and for creating difference. The shift here is not only experiential, but social as well. The qualities associated with public urban space – autonomy, freedom of association and assembly – are brought inside the building. Something of the programmatic openness of landscape is reconstituted in a new architectural framework.

Expanded to the scale of the territory, architecture finds new programmatic potentials that landscape offers. Landscapes are bigger than buildings. This is not simply a matter of size: Landscape works on the horizontal axis, and even a small landscape can be expansive, claiming space beyond its limits and transforming a larger ecology (Allen and McQuade, 2011, p. 193). In an open field, any number of informal, unscripted events can happen. Programme and event can never be scripted *per se*; the necessary freedom of the public realm depends not on top-down determinations but on bottom-up, collective formations. This is an effect of scale, but it also has to do with the intricacy of the landscape field.

Nishizawa claims that one of their interests is how to create atmosphere, a landscape for people. He believes that because architecture creates a landscape for people in the city, all the programmes we have now in our everyday lives are very different from the ones in the last century and the ones that will arise in the next century. So they want to find the contemporary scenery, to create buildings in the new society (Sejima et al., 2008, p. 31). It is evident that Nishizawa refers to the landscape as a social landscape rather than a simply formal landscape. They do not create architecture as an object, but as a place for unscripted events.

What kind of landscape does the Rolex Learning Centre provide for the users? As introduced before, the main task of the Learning Centre is to bridge the gap between the EPFL and its neighbour, Uni Lausanne, and the city. The existing central spine of the main campus provided only a circulation corridor – there was no central meeting point or "hive of activity". These introverted and "gated", yet economically viable campuses are currently being criticised for their lack of quality public space and their monoculture. Their typology, it is argued, runs counter to the efforts of many academic institutions to reintegrate themselves into the urban public realm. According to Steffen P. Walz,

> Typically, the campus – from the Latin campus, in English, a flat expanse of land, plain, or field – is the ground on which American university buildings are built, comprising research and teaching facilities, administration buildings, students accommodation, and spaces for leisure activities such as gyms or a stadium. The campus concentrates a university's academic facilities on one site meant to embody its overall mission, thereby compacting all aspects of everyday life into an educational play-ground (Walz, 2010, p. 83).

By compacting a variety of programmes in its vast interior, the Rolex Learning Centre operates as a micro campus – "an educational play-ground" in the existing campus. It can serve as an urban catalyst for surrounding city neighbourhoods, challenging the notion of the "campus" as a discrete, inaccessible urban form.

If the whole building is a micro-educational playground, the boundary of the building could be seen as the "magic circle"[19] of the playground, enclosing a temporary world

[19] See section 2.2.3 Liminal space.

within the ordinary world. However, the reality is more complicated than a clear boundary between the building and its surrounding. Two issues should be drawn out on the Rolex Learning Centre's magic circle. Firstly, the building is gently lifted off the ground, which means one does not enter by passing through a door in a wall but by walking underneath the building; at one point one is outside and at another point one is within the precinct of the building. All of these are very specific architectural decisions, but they are functioning at the scale of the landscape. Therefore the magic circle of the building is not a simple line. For those who pass by underneath the building, the magic circle does not exist on the ground; rather, the playground with the building is above or around them. For those who come to use the building, if they treat the whole area underneath the building as a playground, the boundary of the whole area underneath the building is the magic circle of the playground.

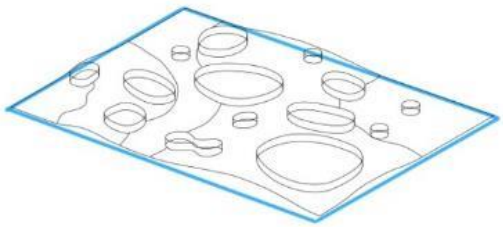


Figure 6-26 Magic circle of the Rolex Learning Centre for the building user (Source: Author)

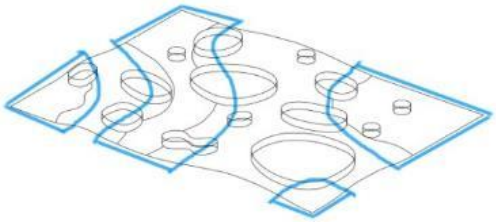


Figure 6-27 Magic circle of the Rolex Learning Centre for the people passing by (Source: Author)

The second issue is that there is an effect of scale where you get interiors that function like exterior spaces. Because of the various programmes, specific topographic and formal conditions, the building is more complicated than a homogeneous play-state. There are zones with specific functions, zones that could be read as liminal spaces, and zones that could be used as playground; therefore many sub-magic circles exist

within the main one. This question of programming and liminal space is further discussed in the next section 6.3, Smooth architecture.

6.2.2 The dissolution of building in the landscape

Because the purpose of the new Learning Centre in the EPFL is to change the existing situation of the campus, the design strategy is to make the building different from the existing campus buildings. Therefore, instead of blending into the environment, the Rolex Learning Centre is conceived as a landscape on its own. However, contrary to the Rolex Learning Centre, many of SANAA's buildings tend to lose their figural outline, becoming a part of the environment. Architect Kristine Guzman points out that the constant infiltration – or penetration – of architecture into nature, and vice versa, is one of the characteristics of SANAA's work (Rubio, 2007, p. 169). At the same time, the boundaries between interior and exterior, and among interior spaces themselves, become indistinct and ambiguous.

Glass is the main material that SANAA uses to blur the boundaries. As Sejima said, she uses glass not only because of its transparency but also the quality of reflection[20]. Translucent and opaque forms of glass are used in variation, as materials with interesting nuances of transparency. They reflect the outer and surrounding environment in many ways, while diminishing the presence of a building itself. Architect and architecture critic Taro Igarashi explained that Sejima revisits the glass spaces of the Modernists, not merely for the sake of transparency, but rather in the playful attempt to generate a variety of phenomena: she plays with subtle variations in semi-transparency, adds geometric patterns, and delivers op-art illusions (Taro, 2006).

[20] See section 1.1 Physical condition of SANAA's work.

Transparency is a major theme for the Louvre-Lens museum. The glass-enclosed entrance hall offers a view of the park and city. Using both the reflection and transparency of polished aluminium and glass, the Louvre-Lens Museum exemplifies the ambiguous relationship of the building with the landscape and the ambiguous status of its interior. It presents itself as the opposite of the museums that claim imposition under an architectural work marked by monumentality, such as the Paris Louvre. It intends to stand out as much by its obliteration within the landscape than by its monumentality. This strategy comes from the site impression of the architects. When they visited the site, they were taken by not only the landscape of Lens but also the quality of the diffused, soft natural light that this northern French region received. Sejima talked about the first impression of Lens is a special type of daylight in the area. The light is diffused, which makes them want to create something that could blend into this environment. "We wanted to make a new kind of public space, a beautiful object that emphasises the diffuse light of the area," says Sejima (Bevan, 2013, pp. 34-40). Materiality plays a major role in realising the architects' intention of blending the building into the environment, helping it succeed, in part, as almost nothing. SANAA has rediscovered the ambiguity and plurality of the meaning of architectural glass. The concept of architectural phenomenology demonstrates a new kind of utilisation of glass to interact with natural light and create a sense of the passing of time. Its reflective surfaces of polished aluminium create a mirror, which comes as a visual continuation of the surrounding landscape. In its reflection both the building itself and the landscape are trapped, leaving the viewer a little bewildered as to where the building begins or ends. Everything there is fluid: the slightly curved lines that draw facades, the distorted reflections of the environment on the reflective aluminium skin that vary in tune with the landscape, the seasons, light conditions and the position of the spectator, creating a play of reflections and allowing the building to dissolve into its surroundings. The building is animated by the colours of the sky and the

greenery. Critics describe that the surface effect of the panels sucks all the gravity out of its substance, its mass evaporating (Jacob, 2013).

The following section takes a close look at the various expressions that the building performs according to the rapidly changing weather in one day. At the corner where the building volumes intersect, they reflect each other so that ghostly volumes flicker across its surface. The museum reflects itself with the crossing volumes, appearing to be caught in the act of vanishing into a state where substance and shape are half atomised. The scene of the corner changes dramatically as the weather changes. Moreover, the slight change of position of the spectator brings the different state of reflection. Figures 6-28~33 recorded the different appearances of the same corner in different weather situations, and also with slight different viewing angles. There are two types of corners – one with two aluminium intersect faces, the other with two different material. In the latter case, the juxtaposition of aluminium and transparent glass further complicates the situation of reflection.

Type 1: Corner with two aluminium intersect faces

In Figure 6-28, the dark clouds were gathering in the sky; however the part of sky reflected on the wall was quite clear, making the wall much brighter than the background. The direct sunlight cast the shadow of the left wall sharply on the right wall, the reflections of each wall into each other are quite blurring as the colour of both wall were pretty close. Figure 6-29 shows an opposite scene, the walls were dull but the sky behind them is blue. No clear shadow cast on the wall, which blurred the distinctions between the two faces. Figure 6-30 was taken at almost the same time as Figure 6-28, except the observation point was closer to the left wall. One feature about the reflection of aluminium walls is that the smaller the angle of sight with the

surface, the clearer mirroring image you will get (Figures 6-32, 33). Therefore, the reflection of the right face on the left one is much clearer than the other way around. Meanwhile, the shadow of the left wall also reflects on itself. The intersection line of the two faces, the real edges of the two walls, the reflection of the two edges, and the shadow outline and its reflection, altogether seven lines cross at one point. At a certain moment, one can hardly distinguish which one is real and which one is virtual. Figure 6-31 recorded a grizzled moment: the polished aluminium exterior reflects and blurs into the clouds.

Figure 6-28 Louvre-Lens Museum: Grey sky and reflection of clear sky on the aluminium walls (Source: Author)

Figure 6-29 Louvre-Lens Museum: Clear sky and reflection of cloudy sky on the aluminium walls (Source: Author)

Figure 6-30 Louvre-Lens Museum: Grey sky and reflection of clear sky on the aluminium walls, the observation point was closer to the left wall (Source: Author)

Figure 6-31 Louvre-Lens Museum: Aluminium exterior reflects and blurs into the clouds (Source: Author)

Figure 6-32 Louvre-Lens Museum: The smaller angle of sight with the surface, the clearer mirroring image one gets (Source: Author)

Figure 6-33 Louvre-Lens Museum: The dissolution of aluminium wall in the landscape (Source: Author)

Type 2: Corner with one glass wall and one aluminium wall

The performance of the corners becomes more complicated when the two intersection walls are different materials: glass and aluminium. The corner in Figures 6-34 and 6-35 shows how the geometry of the plan and the material simultaneously affect the reading of the space. The transparency box and the aluminium box only touch on the corner; therefore the visitor can see through the transparent reception hall, perceiving the space on the other side of the building. The reflection of the glass façade on the aluminium wall is quite blurred, while the glazing wall is like a mirror, reflecting the aluminium wall as if it is a continuous wall cut into the glass volume. However, one can immediately realise that it is only a virtual wall because its image is cut off by the real view behind the glass wall on the other side. Reflection and transparency, twin techniques of disappearance, are the dominant means used here, enabling the interventions to dissolve optically into their surroundings.

Figure 6-34 Louvre-Lens Museum: Corner with one glass wall and one aluminium wall (Source: Author)

Figure 6-35 Louvre-Lens Museum: Corner with one glass wall and one aluminium wall (Source: Author)

Figure 6-36 Louvre-Lens Museum: The building reflects itself with the crossing volumes (Source: Author)

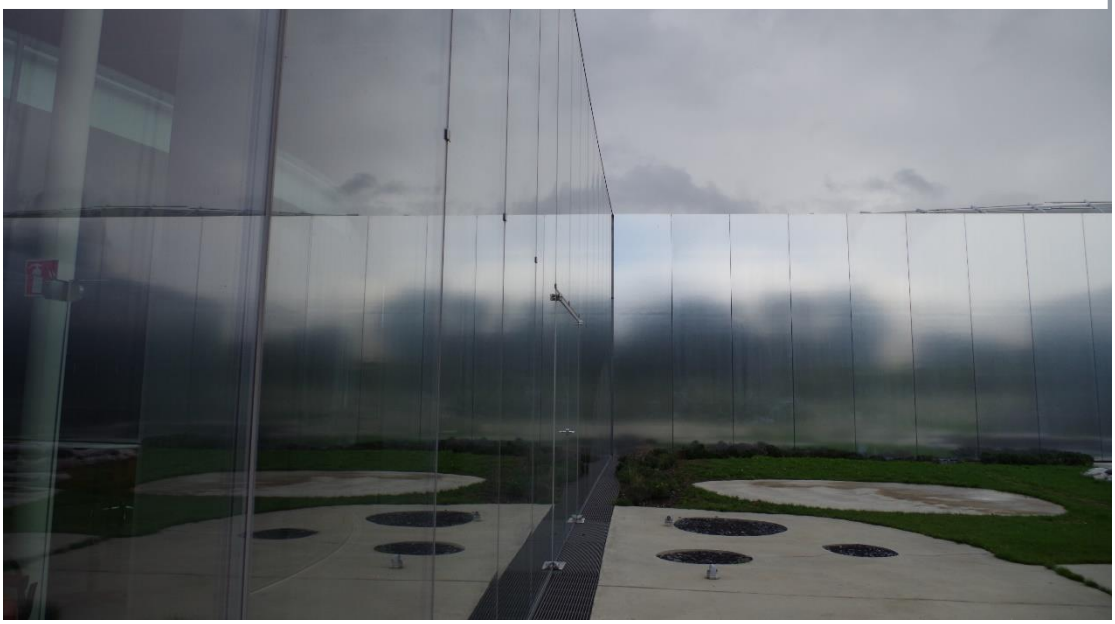


Figure 6-37 Louvre-Lens Museum: The building reflects itself with the crossing volumes (Source: Author)

The reflection of the glazing façade also depends on the angle of sight. Viewing from a small angle, the glazing façade can be treated as a mirror, reflecting everything outside and barely show anything of the inside. One may experience this in a shop window, but when the scale is as large as a building, it can change the perceptual outline of a building. Besides, the subtle curves of the wall will make a difference in the reflection of aluminium and glass, which also affect the perception of the building.

SANAA is interested in architecture being environment, trying to blur the conditions that separate inside from outside or object from environment. They seemingly accept the objectified nature of architecture but attempt to minimise and dissolve it as much as possible. Using aluminium, they covered the building both inside and out to create a subdued and fogged reflection of the landscape on the outside and of the artwork inside.

The aluminium and glass wall, in its lack of both semiotic signification and minimalistic sensuousness, recovers its corporeal performance. It participates in the articulation of the otherwise non-sensible elements of nature into something visible, palpable, touchable and audible. The wall operates as the register of light, as well as of wind and sound, by emptying its literal substantiality to allow the light's corporeal manifestation. And, at this moment of reflection, the surface is filled with the drama of the corporeal manifestation of natural elements. The elements are driven by a desire to establish a flexible relationship with the surrounding environment and site conditions and bring exterior and interior spaces into interaction. The aluminium and glass encourages experiences of illusion and dream. Its simultaneous transparency and opacity, reflection and fusion, presence and absence, transforms its surface into a dream landscape, an experiential collage.

Figure 6-38 shows how the qualities of the ambient landscape saturate the facade of the Rolex Learning Centre so completely that they become the qualities of the building itself. The building allows itself to be absorbed into the atmosphere.

Figure 6-38 Glazing façade of the Rolex Learning Centre (Source: Author)

In the case of the Louvre-Lens Museum, the capacity of materials to receive, reflect, and modulate light is so significant that it determines the building's dimensions and geometries. The ambiguity between the real and the reflected, reality and illusion, generates a form of sensory deception, creating dynamic and complex images as opposed to a static and obvious transparency. The new transparency can be interpreted as the trans-position of exterior reality from the natural to the artificial space of image. The use of reflection or layering of glass is perceived as a solid mass and gives the impression of constantly changeable visual appearance, both the object and the surface of reflection. This is not like the previous, total continuity between the interior and the exterior, typical of the architecture of Mies van der Rohe. The surface in Modernist architecture is usually treated as an abstracted boundary of the volume, and

it has a conceptual and formal rather than sensory essence. The surfaces and the material mass tend to remain mute, as form and volume are given priority; form is vocal, whereas matter remains silent or absent.

However, some scholars reveal a Mies who is not the tidy, orthodox Mies of Giedion, Hitchcock, or Johnson. Todd Gannon writes, "Instead a newly formulated, contemporary Mies whose work is difficult and contradictory – at once honest and deceitful, sober and theatrical – a Mies ruthlessly idealistic yet fully immersed in the contingencies of materiality and perception" (Gannon, 2002, p.20). Mies was concerned primarily with glass's phenomenal qualities. He invested greater energy in pursuing the rich interplay of light reflection made possible by the use of large surfaces of glass, in contrast to the classical play of light and shadow characteristic of mass architecture.

Is there some similarity on the strategy of materiality and perception between SANAA and Mies? We can do a comparison between the Louvre-Lens Museum and Mies' Barcelona Pavilion, to see what their interrelationships of architecture, visual perception, and structure are like. Firstly, both of them reflect an obsession with visual effect. They are examples of precise construction but of ambiguous tectonic expression, the merging of the technical and the phenomenal aspects of glass. After Mies concerned himself with the idea of disappearance, SANAA still asks a similar question. They play on the idea of what is and what is not present, and what can be grasped from their work is always difficult to determine.

Robin Evans (1997) suggests that Mies' interest was not in conceptual relationships but on the optical qualities of the building. In his article, "Mies Van Der Rohe's Paradoxical Symmetries", he suggested that it had no overriding system of order based on axial symmetry. However, the reflections on its polished materials restored a symmetry that was removed from its visible surface. One type of symmetry is along

the horizontal direction with the axis positioned at eye level. The second one is in the form of multiple "reflective" symmetries based on the polished materials. Caroline Constant (1990, pp. 46-54) adopted a similar position: "the meaning of the Barcelona Pavilion is not conveyed through a priori formal logic or the representation of some external reality but is given to sensual and temporal experience", similar to "the experience of a circuit that suggests parallels with those of the English landscape movement". Its underlying order was based on aesthetic rather than scientific criteria. The pavilion aims to epitomise a sense of mystery and wonder rather than offering rational explication. Manfredo Tafuri claims that the condition of fragmentation and disorientation was inherent in the building's mirrored surfaces, labyrinthine path, and its apparent lack of an exit.

Similar to the Louvre-Lens Museum, reflectivity and translucency play crucial roles in the spatial perception of the Barcelona Pavilion. However, they chose different material, compared to SANAA's museum with only aluminium and glass. The pavilion is a montage of independent systems: travertine slab and plaster ceiling, chromium columns and marble partitions, together with various tints of glass, all colliding visually in the polished, reflective surfaces. While physically the pavilion may be constructed of travertine, onyx, glass, steel and stucco, what shapes the experience of the space is the reflections. Perhaps these materials were used as a product of the technology and customs of the time, but it is just as likely that Mies chose these highly polished services due solely to their reflectivity. This principle is most evident in the polished steel columns, which are so slender and reflective that they seem to disappear completely. These polished steel columns may be an inspiration for SANAA's reflective aluminium to make the whole building disappear in the environment. In both cases, the precision of the materials contrasts with their perceptual instability.

Another difference between the two buildings is the perceptions of curve and straight lines. The curve lines of the museum are used to adapt to the terrain and the rhythm of the undulating forms of the landscape. They also respond to existing lines such as former railway line and roads. The curve wall surfaces distort the landscape inside and outside. After centuries of architecture organised by the straight lines of the viewing line, we now have an architecture formed by the kind of soft distortions of the gaze – a more tactile experience of vision. To enter a SANAA project is in a way a subtle softening of the territory. Even the reflections of the trees in the outer layer of the glass have a softness that you can never find in Mies. The curve feature was exemplified by SANAA's installation in the Barcelona Pavilion, which brings their work together and shows the contradiction (Figures 6-39~41). SANAA installed a semi-transparent, imperfect circular-shaped acrylic curtain encasing the travertine wall. What they tried to intensify was this idea of transparency by augmenting the openness of the space through slightly distorting the views. SANAA claims "we imagined an installation design that leaves the existing space of the Barcelona Pavilion undisturbed", and yet a completely new atmosphere was created. This installation is not about its own material presence, but about playfully and subtly distorting our perception of the pavilion. If the Mies Pavilion is already a play of reflections, this installation adds another radically blurring layer of reflection. According to Beatriz Colomina, if Sejima is the inheritor of the Miesian transparency, the latest in a long line of experiments, she is the ultimate Miesian, leaping beyond transparency in all kind of mirage effects.

Figure 6-39 SANAA's installation in the Barcelona Pavilion (Source: https://criticalista.com/2008/11/26/lighten-up-in-the-mies-pavilion/)

Figure 6-40 SANAA's installation in the Barcelona Pavilion (Source: http://miesbcn.com/project/sanaa-intervention/)

Figure 6-41 SANAA's installation in the Barcelona Pavilion (Source: http://miesbcn.com/project/sanaa-intervention/)

From the above cases we can see that Sejima goes for the variation whose effects are more unclear. It is an architecture of deliberately unclear vision. Their projects appear to be more interested in blurring the view and softening the focus than on sustaining the transparency of early avant-garde architecture. Its objective is not for the viewer to discover the inner secret of the building, but to be suspended in the view itself. Physicality of material is perceived on its surface. It is interpreted as an effect to the environment or the environment itself. Blurring as one of the manifestations of atmosphere's ephemerality becomes both the method and the final effect of their architectural appearance.

6.3 Theme 3 Smooth architecture

As introduced in Chapter 5, this section analyses the cases under the third theme of weak architecture – smooth architecture – which will use Deleuze's concept of smooth space to analyse the becoming nature of programme in SANAA's architecture. The architects have translated the idea of smoothness – ambiguous boundaries and nomadic movement – into various forms of slippage or function looseness, which defines the character, the social and formal identity, of the place. As mentioned in section 5.3, there are two conditions that support the becoming nature of the programme. The role of material is discussed according to the two aspects. Section 6.3.1 focuses on the first aspect – ambiguous boundaries of the liminal space, and section 6.3.2 investigates the second aspect – the nomadic movement in the building.

6.3.1 Boundaries of liminal space

The first aspect – ambiguous boundaries – could be understood by using the concept of liminal space. It is important not to shape the use of each space but to arrange them and to generate the transitions between them. Functions slip from one to another. Some slippages may be characterised as unstable boundaries. In other cases two or more forms, actions or meanings may combine to form a hybrid.

As Figure 6-42 shows, in the Rolex Learning Centre, the red area has relatively fixed working states, including functions such as library, office, and study area. The yellow area is more playful, including café, restaurant, and the end part of the slope, which has no specific functions. These two areas are loosely linked by the blue area liminal spaces, mostly the middle section of the slope in this case. The psychological transition from the working status to playful status takes place in this area as well. The vast areas of liminal spaces are incomplete parts that are able to respond to unexpected elements.

Figure 6-42 Sub-magic circles inside the Rolex Learning Centre (Source: Author)

Within the building, the system is complex and relational. The blurring boundaries between the three zones and the ambiguous state of the large areas of liminal spaces mean that the building could be used as a kind of a park or public open space. The elements scattered across the hills and flat areas make the place seem like a huge playground for students and researchers. Science could be seen as a cultivated kind of game. Landscape could be seen here as the architects' proposal for the scientists' playground, which can generate a positive cultural attitude. The open spaces of the building facilitate interaction between the different departments and users of the building, and the glass walls encourage continual visual access between spaces. Vast undefined areas of floor between programmatic elements within the plan allow unprogrammed space for working and engaging with other building users. Furniture demarcates activities — café table, reading desk or informal beanbag — and people begin to cluster, move and re-order the landscape as the day passes into evening. The vast landscape offers the users various ambiguous zones, where people's identities reconfigure as they experience these liminal spaces. It represents a break with reality, yet poses itself as an alternative reality.

The park can also function as a place of learning; thus, is this a new building typology? Can a building change the way one learns? Conventionally, studying will involve hours spent at tiny partitioned carrels hiding from distraction. The architects seem to be triggering a certain process of transformation by creating a new learning environment. What they have achieved is simply an inclusive, accessible and above all inspiring public space where good ideas will surely flourish. A big idea was realised in this building – an educational space should be like a park. It should be open, without walls or boundaries, a continuous landscape of chance encounters and the effortless exchange of ideas. How do the students define solitude in this building? In this undulating landscape you can pull out a book or laptop anywhere and just sit

against a patio or lie back against a hill. The building allows people to discover the right place for whatever it is they feel like doing rather than prescribing where and what that space should be. Privacy is defined by a kind of blur within the hyper-public space. The building aims to dissolve any distinctions between formal and casual spaces, between work and rest. It is at once playful and serious, and in a unique way makes manifest the many contradictions of contemporary life. In this landscape building, an individual can be both participant and observer.

According to Deleuze, though, we need "just a little order to protect us from chaos" (Deleuze and Guattari, 1994, p. 201). There is no completely smooth or striated space. Space is always a mixture of both. The space of the Rolex Learning Centre is partially striated. The architects have to make sense on daily basis of the chaos of uncertainty wavering between rationality and irrationality and attempt to make undecidable decisions to plan. Although the undulating floor seems quite irrational, the supporting system is based on a rather rational grid – a 9 × 9 m grid which follows the geometry of the shells. The 11 patios distributed in the plan, although in an inconspicuous way, help people to guide themselves a little in the vast space.

What is the transitional state between the working area, the playground, and the liminal space? Is it possible for a building to remove division or to blur the state of borders or enclosures? What is the role of material to realise such open space? The following section investigates the material conditions of boundary in the Rolex Learning Centre.

Material transparency: Boundary as connection

Boundaries, by definition (Oxford Living Dictionaries), "mark[s] the limits of an area; a dividing line." However, boundaries could be ambiguous. As Brian Massumi

stresses in *The Politics of Everyday Fear*, boundaries are only produced in the process of passage: boundaries do not so much define the routes of passage; it is movement that defines and constitutes boundaries. These boundaries, consequently, are more porous and less fixed and rigid than is commonly understood, for there is already an incursion by one side of the border on the other.

At the physical level, glass is such a material with a transparent and ambiguous feature. SANAA pays close attention to the connection that transparency could create. A more productive way of understanding their architecture is as a sustained exploration of the dissolution of boundaries, on multiple levels and scales. Sejima explained, "In most cases, questions have arisen from re-thinking various existing methods of division. Of course, it is impossible to remove the use of division in architecture. However, I've been attempting to study what to divide from what" (Sejima and Nishizawa, 1999, pp. 118-119). The uncertainty of "what to divide from what" implies that Sejima treats every parts of the building as a territory, which is constantly in the process of de-territorilisation and re-territorilisation, as in the smooth space.

In the Rolex Learning Centre, each function has a territory. It is the same with the areas with no clear functions. However, every territory indicates itself with different type of boundaries. In this real architectural space, how do these territories interact with while also remaining separate from – each other? First of all, the undulating plane is a spatial divider. The hills divide the open-plan building into several areas, which is discussed later in the spatial transparency.

The programmes distributed in the large plan have different ways to indicate their boundaries. The first way is using terrace (Figure 6-43). The library and restaurant located on the slope area use terrace to solve functional problems of slopes; and also mark territories for their specific functions. The removal of the wall makes these areas

completely exposed in the open-plan. The flows of people, light, sound, and wind move through these territories without any resistance.

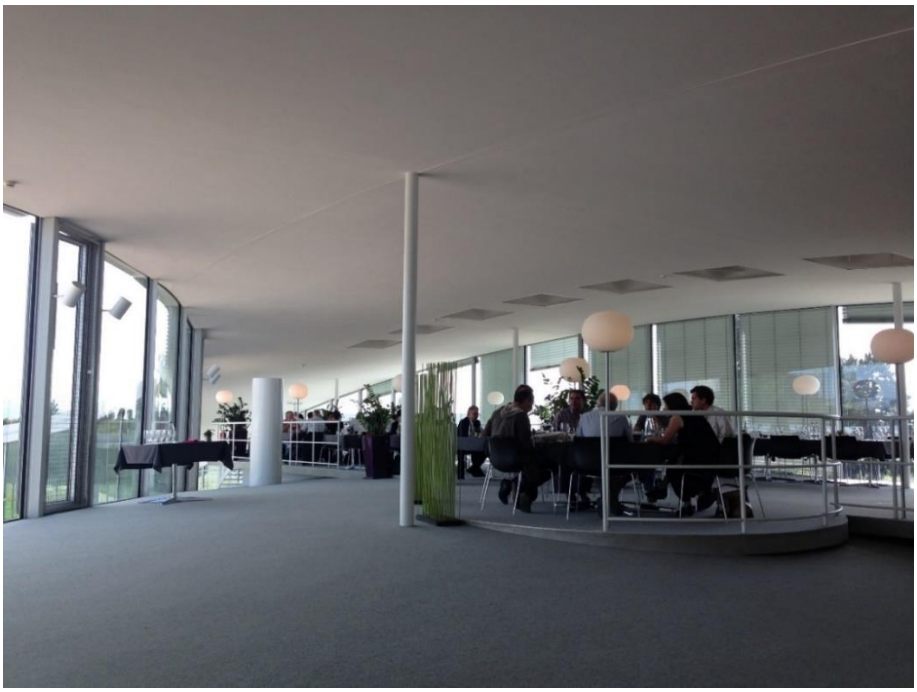


Figure 6-43 First type of boundary: Terrace (Top: Terrace of library. Bottom: Terrace of restaurant) (Source: Author)

The second type of boundary is transparent wall. The bank (Figure 6-44) is enclosed by an irregular round glass wall, which directly touches the ceiling and floor. It is interesting to relate the transparent wall to the SANAA installation at the Barcelona Pavilion (2008). As introduced before, in the Pavilion, SANAA tried to intensify the idea of transparency by augmenting the openness of the space through slightly distorting the views. In doing so they reaffirmed the notion of ceiling and ground planes acting as the vice in which the user stand between. In a similar sense, the wall of the bank intensifies the openness of the space by mixing the scene inside the wall and the reflection of the surroundings, particularly the bright light from the adjacent patios. The wall cuts off the sound flow between this territory and surrounding, but it offers the visual communication and distortion as connections between inside and outside rather than a division.

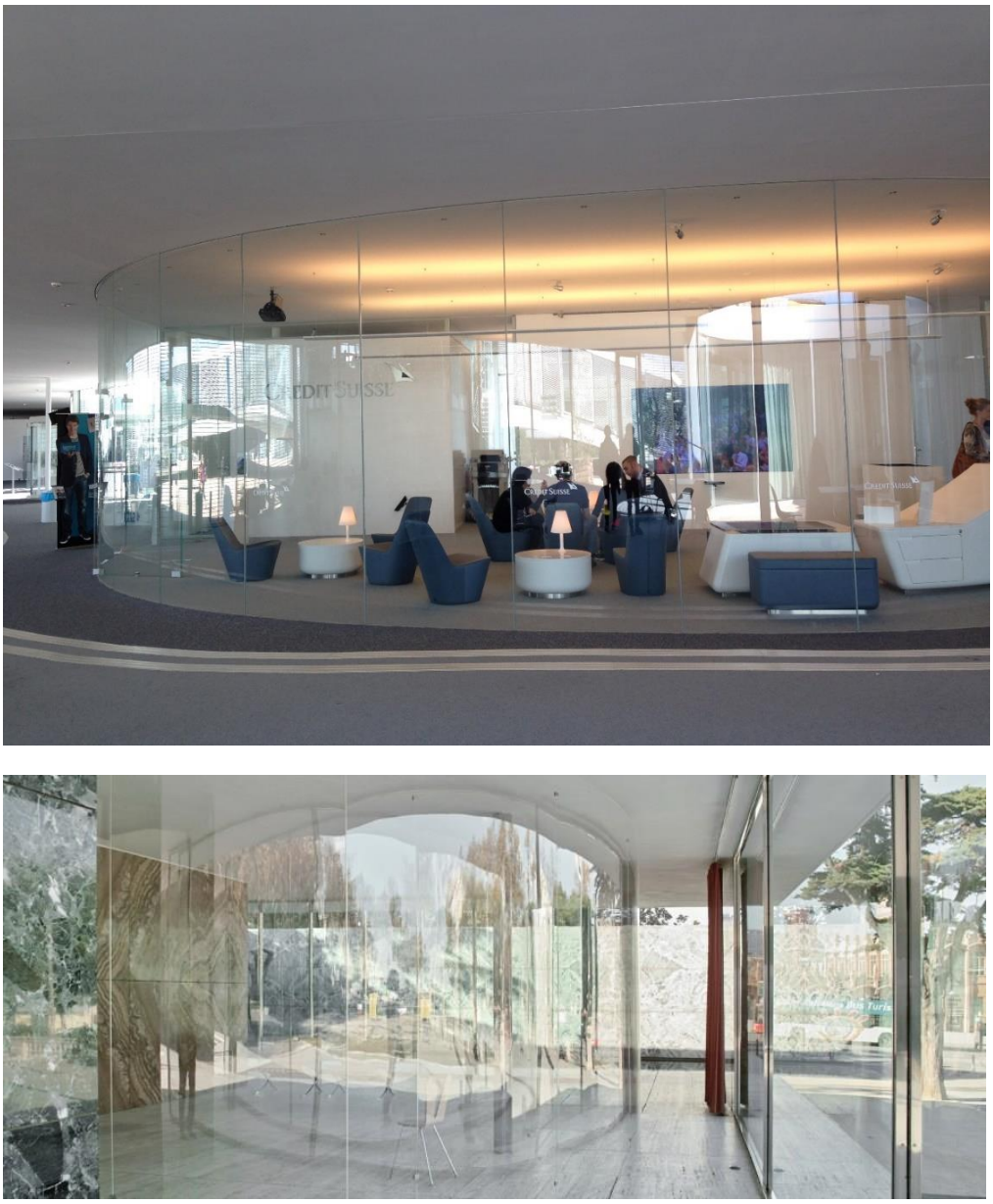


Figure 6-44 Second type of boundary: Transparent wall (Top: bank in the Rolex Learning Centre, source: author. Bottom: SANAA installation at the Barcelona Pavilion, source: http://miesbcn.com/project/sanaa-intervention/)

The third type of boundary is furniture (Figure 6-45). In this situation, no physical boundaries exist between the territory and other spaces. A set of table and chairs implies that this is a point where you can linger for a while in this large and smooth space; however, because the boundary disappears, the users are actually sitting in the open space directly, immersing themselves in the flow of people, sound, light, and wind. These items of furniture could even be slightly moved (the beanbag could be moved wherever you want): like the nomad life, people choose the points they want to temporarily stay in, depending on the acoustic condition, light condition, and views in front of them. These points and territories are not fixed, but can be moved with users' actions.

Figure 6-45 Third type of boundary: Furniture (Source: Author)

6.3.2 Nomadic movement

The second aspect – the way of movement in the space – could refer to the nomadic movement in the smooth space. In the case of the Rolex Learning Centre, the architects stated that people do not move and meet on straight lines but on curved ones, so the circulation paths are of particular importance for understanding this architecture. Early in the studies for Lausanne, the architects looked at an idea for combining several bridges, but finally they turned to hill-like surfaces. Nishizawa explained, "Spatially the bridges were not that interesting, where people are passing under a bridge where the direction up is predefined. But a surface like a hill where the circulation paths for people are unlimited allows a three-dimensional crossing of paths, so that the crossings feel freer" (Sejima and Nishizawa, 2015, p. 10). This hill-like consideration results in the final form of the Learning Centre, where the building consists of only one single large public floor above ground.

Once inside, nothing is guiding the visitor in conventional ways except the writing on the curved glass walls. Those walls inside are exterior walls around clearings in the midst of the space. As nothing is forcing the visitor to follow a certain path, a walk-through would be very subjective. The spatial system is even more forced into curved routes due to the slopes that would not allow straight connections (Figure 6-46). Without corridors, people can freely occupy the space by joining various functions to construct their own routes. Each person can individually adjust distance from others, thereby adjusting the relations of public and private spheres.

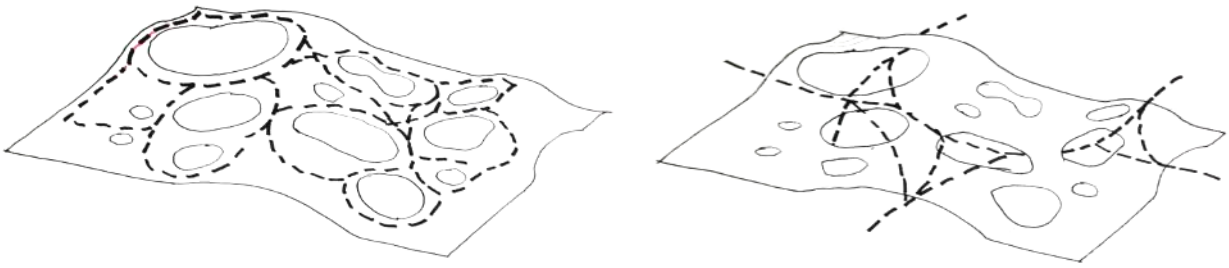


Figure 6-46 Routes of movement in the Rolex Learning Centre (left: routes across undulating floor, right: Routes under undulating floor) (Source: Author)

However, these paths in this building and under the slab are not totally rambling: if we compare them to nomads' paths, there could be a new way to read the relationship between path, points, and boundary in this building.[21] According to Deleuze and Guattari, spaces or territorialities are not pre-existent givens. Rather, they are what results from life processes themselves. The generation of space is part of life and its dynamics (West-Pavlov, 2009, p. 180). The task of the Learning Centre is to bridge the gap between students and the city, and to create a bridge between the academic world and society; therefore the generation of its space could be seen as a part of life of the campus and its dynamics. Territorialisation is a process, and what results never loses its processual quality. It is for this reason that Deleuze and Guattari often avoid the use of the word "territory", preferring instead "territoriality" as noun suggesting a quality rather than the stability and substance of a thing. However, a building has stability – we can see that the building is a territory, the product of a territorialisation of milieus, which coagulates or crystallises out of a flow. In the Learning Centre, the hills of the undulating slab are the results of the processes of the flow of people. Since the direction of the connection flow between the EPFL and the city is in the southeast orientation, the direction of hills follows the flow of the people.

[21] See section 2.2.2 Deleuze's concept of smooth space.

Figure 6-47 Flow of people under the shells of the Rolex Learning Centre (Source: Author)

Similar arrangement of the plan and free movement can also be found in the Louvre-Lens Museum. The central foyer building is a transparent volume that is non-directional. The continued using of white concrete forms the floor, and the doors are located on all four frontages. It serves as a distributional pivot and large public space for the city, spilling outside and blurring the boundaries of the museum itself. Slender white columns and curved glass partitions containing bookshop, restaurant and information centre are the usual SANAA recipe representing a fusion of Miesian transparency and the Corbusian free plan. This recipe could be characterised by a rejection of any form of architectural promenade. They are buildings without circulation, or the circulation is typically dispersed to form an open terrain in which area of functions are located as freestanding enclosures like islands in a sea. The glass bubbles seem to float within the interior of the hall.

Figure 6-48 Central foyer of the Louvre-Lens Museum (Top: Plan of central foyer of the Louvre-Lens Museum, source: http://www.domusweb.it/en/architecture/2013/02/11/a-museum-of-time.html. Bottom: Central foyer of the Louvre-Lens Museum, source: http://www.huftonandcrow.com/projects/gallery/musee-du-louvre-lens/)

In "Architectural topology", Juan Antono Cortes reads SANAA's divisive frontiers as connection rather than division, "Sejima and Nishizawa generally regard limits not as divisive frontiers between inside and outside or between interior spaces, but rather in

the topologically opposite sense, as connections" (Sejima et al., 2008, p. 43). It is these connections that provide the possibilities for de-territorilisation and re-territorilisation, giving the space a potential to foster unexpected movements. Sejima stressed her concern with people's various movements: "In designing, I am also considering what uses people will put the structure to once it has been completed. It is a fact that people perform various movements within a given architectural space" (Sejima and Levene, 1996, p. 7). For Sejima, a plan constitutes a space whose rules can themselves be altered through what happens in it; the role of a plan is not to predict but to remain attentive to the unknown possibilities. The nomadic movement can stimulate the events happening in the space, therefore retaining the possibilities of the unknown.

It should however be pointed out that transparency of the boundary is merely one of the conditions encouraging free movement in the building. It is also the organisation of the space that enables the free movement. As reviewed in section 1.1.2, for SANAA, other than visual transparency, transparency is also about spatial organisation. The concept of the rhizome can be found in the plan of the Rolex Learning Centre, to examine interconnections between spaces and the structure of the building.

Spatial transparency: Rhizome structure of space

As described in section 4.2.2, there are 14 glass patios distributed in the space. The series of holes not only provide masses of light to the inner space but also act as axis points around which the entry paths are woven through the holes between the ground and the undulating slab. The multiple entries seem like the rhizomes sending out their tendrils and runner-shoots which then cross each other at some point, forming a dense

web of allusions and interconnections. People have freedom to choose which one to get in and out, and to take which route to go around or across these patios. A rhizome-building implies that points are connected to an infinitude of other points. The Rolex Learning Centre functions without any interior walls, so any points in the space can be related to anything else in the space. It did achieve what Sejima called transparency – "to make some of the differences between the spaces, between the volumes, more visible". Only when the users have a sense of what is going on in this smooth space can they decide how they will act there.

The rhizome-plan directly affects the distribution of programme. It is important for SANAA not to establish hierarchies, which affects the distribution of programme most. Sejima and Nishizawa claim that they are interested in spatial organisations without beginning or end – non-narrative spaces. In the Rolex Leaning Centre, the functional zones are not expressed through the building up of borders. They are allocated in the building as they would be spread in a city according to various topographical fractures. All of these zones are looped into each other, so chances of encounters and exchanges are possible in this uttermost openness. The approach taken to programme in this building is in a completely different manner than architects are generally used to dealing with: letting the programme emerge from a manipulation of space rather than letting the space be manipulated by the programme.

The nomadic movement also presents in the exhibition hall of the Louvre-Lens Museum, which has a rhizome structure of the plan. The curatorial vision is revolutionary compared with the Louvre's academic display of art by school and country. In reality one experiences the works as a sort of individual incidents in which arbitrary connections are made between foreground and background. The statues all turn their faces towards the visitors; the stands are subtly floated off the smooth concrete floor by means of gaps; the vast hall neutralises differences between works by its volume and uniformity of lighting. The exhibition designer Adrien Gardère

explains that the idea is always to leave everything open, to facilitate a full 360° dialogue between the objects. Therefore they decided not to place any object on the wall, but instead to use the centre of the room. This allows the visitors to spread out and walk around everywhere. The decision to leave everything within the gallery as freestanding, including placing the paintings on plinths rather than hanging them on the walls, allowed SANAA to realise erasing the walls. The works occupy space rather than being fixed to the perimeter wall, and one wanders between them. They become more physical and animate. Other viewers are part of the scene as well: one looks at art and at other people looking at art. In this exhibition hall, there is no centralised organisation, no climax or end point, but only continuous new encounters, altered course of lines, and constant transformation of relations between individuals; between people and art.

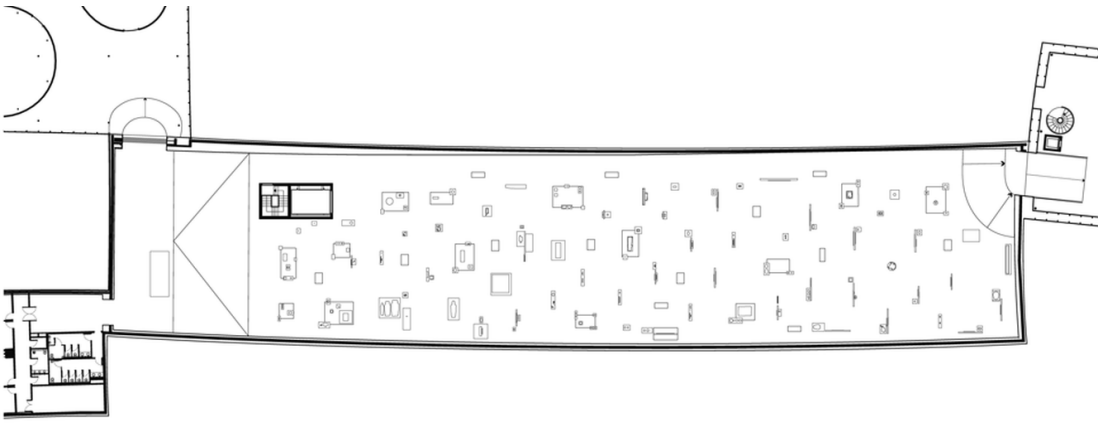


Figure 6-49 Plan of the exhibition hall of the Louvre-Lens Museum (Source: http://www.domusweb.it/en/architecture/2013/02/11/a-museum-of-time.html)

The Rolex Learning Centre and the Louvre-Lens Museum both offer a field of experimentation, where processes are based on communication and involvement of users rather than the top-down imposition of goals and policies, which has a concern for indeterminate essences rather than ordered ones; for emergent properties rather than fixed ones; and for intuition and uncertainty, multiplicity and complexity rather than systematic predictabilities.

6.4 Haptic space

Based on the analysis of the above themes, the ambiguous visual perception appears to be a key issue in SANAA's weak architecture, which could be related to another character of smooth space: the haptic character. Deleuze describes the haptic character of smooth space as: no line separates earth from sky, which are of the same substance; there is neither horizon nor background nor perspective nor limit nor outline or form nor centre; there is no intermediary distance, or all distance is intermediary. Where there is close vision, space is not visual, or rather the eye itself has a haptic, non-optical function (Deleuze and Guattari, 1987, p. 494). In the theme "diagram architecture", a more tactile experience of vision is revealed through the discovery of SANAA's building as a certain atmosphere and spatial phenomenology contained by physical reality. This physical reality is dematerialisation of building rather than conventional material. The second theme "architecture as landscape" reveals the deliberately unclear vision that SANAA's architecture intends to achieve. This section focuses on the visual perception of the haptic space through the cases. How does SANAA transform our sense of the physical space through the unconventional choice of material, surface treatment, and lighting? The thesis attempts to answer these questions with reference to research on the biology of visual systems.

In the book *Vision and Art: The Biology of Seeing*, psychologist Margaret Livingstone explains the biological basis for the fact that colour and luminance can play distinct roles in the perception of art or real life is that colour and luminance are analysed by different parts of the visual system. According to Livingstone, the evolutionarily older large-cell subdivision is responsible for our perception of motion, space, position, depth, figure/ground segregation, and the overall organisation of the visual scene, to which she refers as the "Where" system. The newer small-cell subdivision is responsible for our ability to recognise objects, including faces, in colour and in complex detail, to which she refers as the "What" system. The Where and What systems differ not only in the kind of information they extract about the environment, but also in four fundamental ways in how they process the light signals they receive.

Colour selectivity: the Where system is colour-blind; the What system uses and carries information about colour, and can use colour differences to detect borders.

Contrast sensitivity: the Where system has a very high sensitivity to small differences in brightness; the What system requires larger differences in brightness.

Speed: the Where system is faster and more transient – its responses are of a shorter duration – than the What system.

Acuity: the Where system has a slightly lower acuity than the What system (Livingstone, 2002, p. 38).

The first two are most relevant to my discussion of visual perception in the two cases. The following sections analyse how materiality, surface treatment, and lighting of the cases affect the two visual systems.

Cloudiness and What system

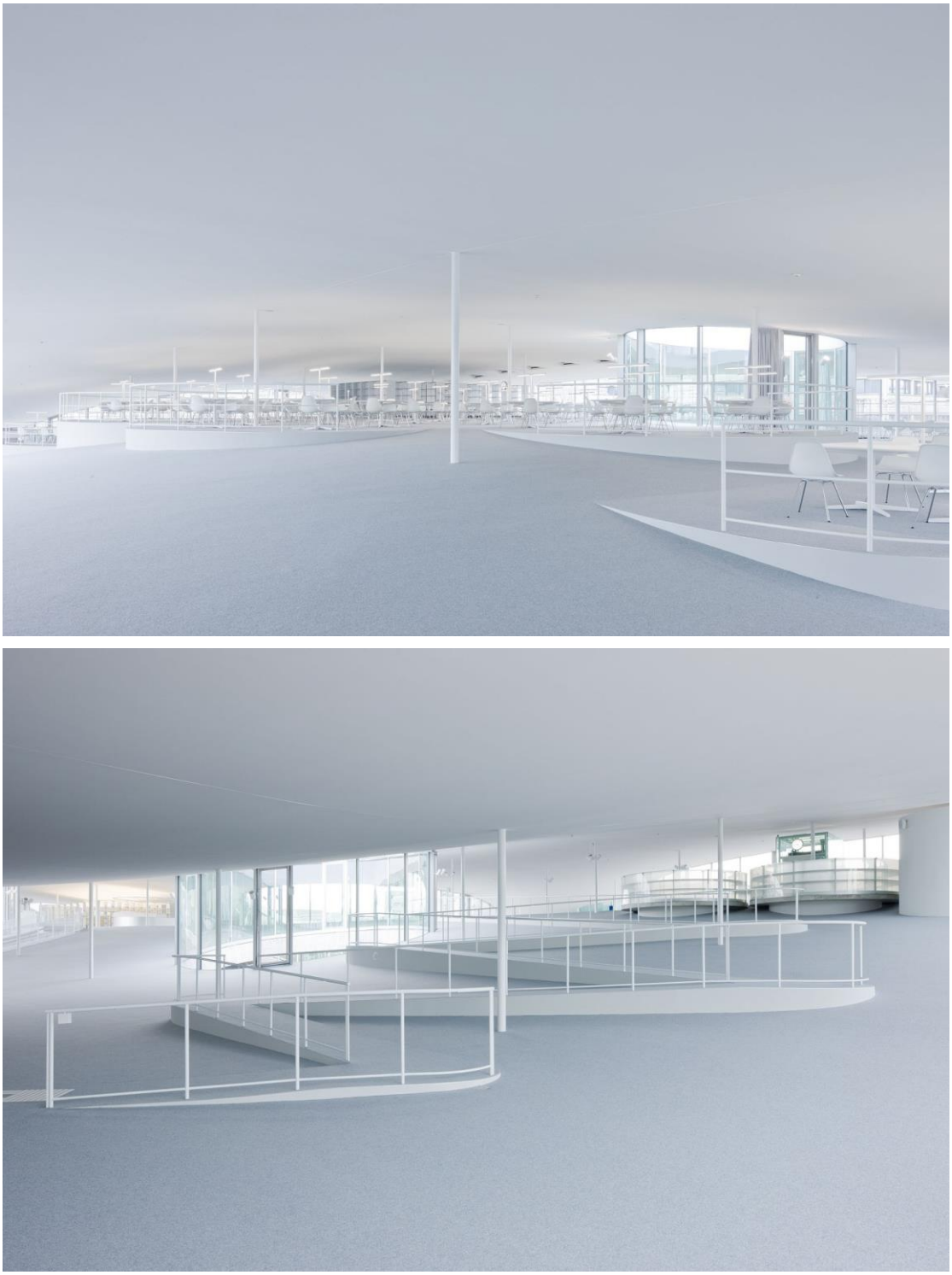


Figure 6-50 Cloudiness of the Rolex Learning Centre (Source:

http://iwan.com/projects/sanaa-epfl-rolex-learning-centre-lausanne/)

Deleuze comments that Bacon's work creates volumes only through different colours of planar surface, producing a haptic space.[22] In other words, volumes are created through different colours. If there is no colour difference in the surface, can we tell the volumes? Furthermore, if there is no colour difference in the surface of architectural space, what would the space be like?

The built landscape of the Rolex Learning Centre is pure, with no trace of colour. Whiteness stretches everywhere. Walking on the white landscape feels like walking in the cloud. By allowing the parallel ceiling and ground planes to undulate from a two-dimensional surface into a three-dimensional topography they distort perspective, and also expand the proportion of whiteness in one's vision, so that the whiteness blocks the vertical partitions which usually appear at eye level in a building with a level floor. The ambiguity of the vanishing point facilitates a flux between what is perceived as foreground and that which is in fact background. The floor-to-ceiling height helps to control the definition of interior space and directs movement flow and circulation, creating diminishing views and hidden areas. Nothing in this building dominates, so that all the elements have the same valence and visibility, from objects to architectural structures. Whiteness blurs boundaries between spaces, which makes it hard to tell the horizon, background, perspective, limit, outline, form or centre of the space from a distance. This coincides with Deleuze's close vision in the smooth space: the eye not only has its optical function, but also fulfils non-optical functions.

Besides whiteness, thinness of the building components also contributes to haptic character of the interior. It has come to supplant our conventional perceptions of traditional building components, and requires an elaborate process of constructive refinement. Painted white, with little thickness and visual presence, the columns offer

[22] See section 2.2.2 Deleuze's concept of smooth space.

a different relationship between structure, shadow, and daylight, and the figure of the structure is blurred in the clouds. As Moreno and Grinda put it, the structural elements of the building are almost 'atomised' and 'dispersed' throughout the building (Cecilia and Levene, 2004, p. 27). Mark Wigley points out that thinness dissolves solidity and creates a transparency-like air, which becomes a constituent element of building, maximising of air, minimising of structures. Therefore, "thinning the building thickens the air" (Sejima et al., 2015, p. 37).

In this cloud, one can turn one's eyes in any direction without finding a focus, because there is nothing to fixate on. It has no texture, no contours, no shapes, and no horizontal or vertical axes. One cannot say where it is, or describe its shape and proportion, or tell someone how to get to a certain point. It is nowhere but everywhere at once. There is no more detail where one expects more details; therefore the What system, which is responsible for our ability to recognise objects in colour and in complex detail, is less stimulated in this building.

However, in the cloudiness, one can always focus on the people in front of you, which is the clearest spot amidst the cloud. People appear to float in a cloud between layers of whiteness and transparency. Different places appear in this homogenous space through the activity of various people and events.

Flatness and Where system

In the Rolex Learning Centre, whiteness and thinness exaggerate the lack of orientation, scale, details and colours, which makes the What system less effective. However, our perception of depth, three-dimensionality, movement, and spatial organisation are all carried by another part of visual system – the Where system – that responds only to luminance differences and is insensitive to colour. It is a colour-blind

system; therefore whiteness does not affect it. So, does the Where system work efficiently in this building? Is there enough luminance contrast to provide adequate information about the spatial depth, the object's three-dimensional shape, its location, or its motion in this space?

SANAA seems to favour even, diffuse light in their interiors, which they produce through the manipulation of surface, and the suppression of structure and the attenuation of thicknesses. There are few clues of scale and orientation, just an all-pervasive atmosphere, with no sense of depth and no sense of volume. These feel like spaces in which one is immersed rather than inserted.

Luminance mapping was undertaken in the building in order to achieve a better understanding of its luminous environment. The luminance values were recorded by using Photolux, a luminance mapping software which measures in cd/m^2. Figures 6-51, 6-52 and 6-53 show the undefined in-between space, library, and cafeteria respectively. Even though the function is different, the luminance distribution pattern of each space is almost the same. In each of these spaces, light is relatively evenly distributed, which leads to a flat visual appearance. To have an idea of how flat the visual appearance of the space is, as indicated by the mapping, we can first have a look at the luminance mapping of the interior of Walt Disney Concert Hall (Figure 6-54), designed by Frank O. Gehry, whose work is famous for its exaggerated form and volumes. The mapping shows that the luminance ratio between the brightest part of the white wall and the darkest part of the column is about 15:1. This indicates a high brightness contrast, which is due to the exaggerated volumes and forms in the Concert Hall. In contrast, SANAA produces an even and diffused light in the interior of the Rolex Learning Centre through the manipulation of surface, including its form and colour, and the suppression of structure. Even if there are slight luminance differences in these almost evenly lit areas, it is hard to stimulate the visual system because our visual system is selectively sensitive to discontinuities, and not to

gradation in luminance and colour. Therefore, this space with almost equal luminance may seem flat because it is poorly seen by the Where system, which informs us of depth through the luminance contrast. In addition, the whiteness of the surface further exaggerates the homogenous lighting condition, resulting in insufficient visual perception of depth. Nothing in this building dominates, so that all the elements have the same visibility. Flavio Albanese relates the Rolex Learning Centre's whiteness with lighting condition: "This built landscape is pure, with no trace of colour. Whiteness stretches everywhere, etched only by the thinnest functional black inserts. But what does white mean in this place of magic and transparency? It means light in all its infinite daytime and nocturnal nuances. The pinkish whiteness of dawn, the reddish white of sunset, the grey-tinted whiteness of rainy days…" (Albanese, 2010, p. 25). The work done by light helps to deform the space. The light itself appears weightless.

Figure 6-52 and Figure 6-53 are also the evidence of why people are always the focus of the space. Distinct from the surface of the space in both colour and luminance, they can be seen by both subdivisions of the visual system and perceived most accurately in the space. They become thus the clearest objects in the ambiguous cloud.

In most buildings, we are used to playing with strong luminance contrast to choreograph a route to organise someone's view. However, in this case, with the even luminance condition, there are few clues of scale and orientation. What is present is an all-pervasive atmosphere, with no sense of depth or volume. The light becomes space itself. It is the light that establishes the flat space, not the physicality of the column and its shadow. The evenly distributed light shapes one's senses in a special way; it changes the way one perceives objects and space. In fact the flatness is a tradition of Japanese culture, which is discussed further in the next chapter.

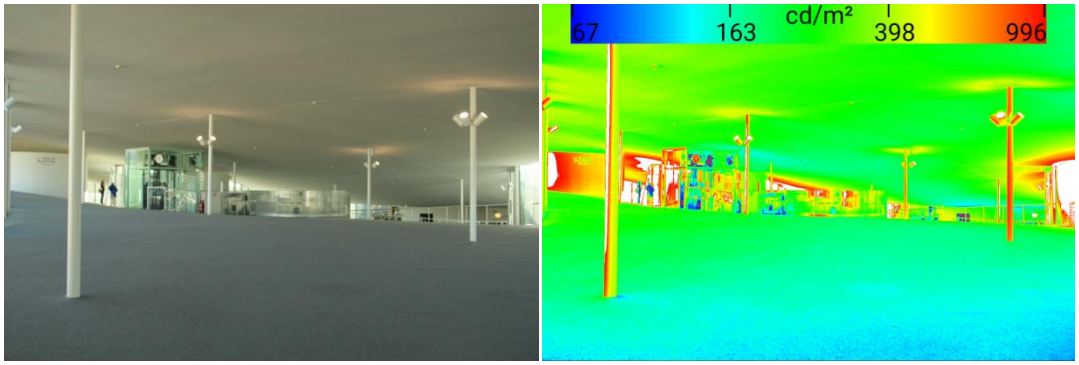


Figure 6-51 Luminance pattern and mapping data of undefined in-between area in the Rolex Learning Centre (Source: Author)

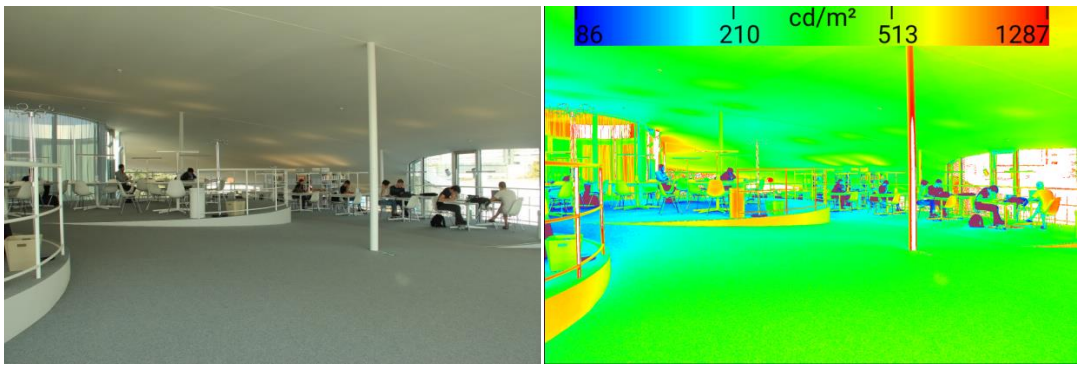


Figure 6-52 Luminance pattern and mapping data of library in the Rolex Learning Centre (Source: Author)

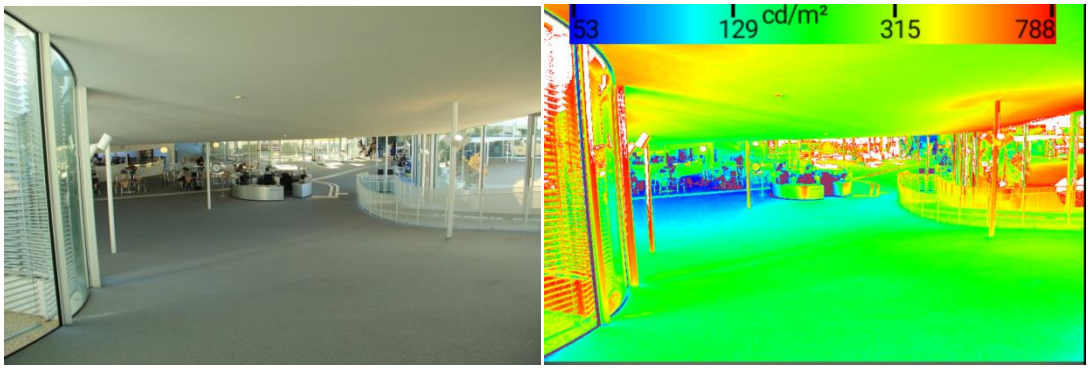


Figure 6-53 Luminance pattern and mapping data of cafeteria in the Rolex Learning Centre (Source: Author)

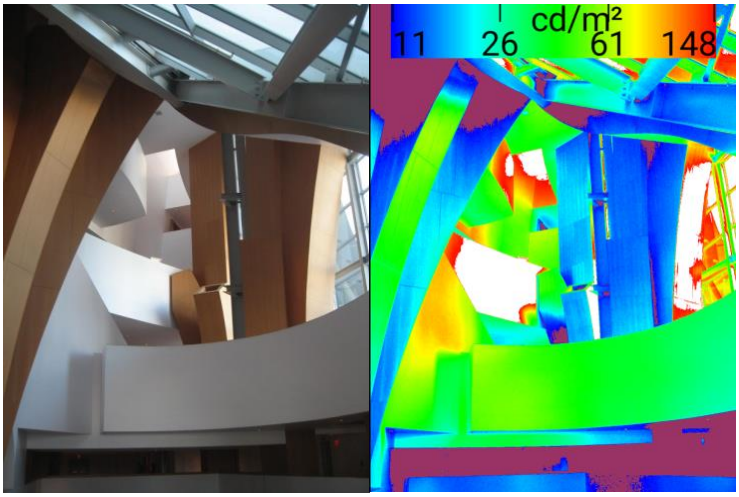


Figure 6-54 Luminance pattern and mapping data of the Walt Disney Concert Hall (Source: Author)

Besides the tactile encounter with colour and light, sound encounter is another way to be in and understand the space. In the entry zone and reception area, because of the busy flow of people and two restaurants, there are noises around this area. As one walks away from the noisy area to the in-between spaces, the noise diminishes, and one immediately realises that he or she is entering a quieter zone. For there are no physical boundaries between these noisy and quiet zones, acoustic condition is also a sign to differentiate areas. Despite the single space with its wide range of uses, there are no adverse acoustic effects. A carpet, sound-absorbing ceiling and low ceiling height relative to the expansive space all ensure good acoustic conditions.

Figure 6-55 Cloudiness of the Louvre-Lens Museum (Source: http://iwan.com/projects/louvre-lens-sanaa/)

Whiteness also creates a haptic space in the Louvre-Lens Museum. The main exhibition space Gallery of Time is a large single space, 25 m wide by 120 m long, bridged by thin steel beams and flanked by the same sort of aluminium surfaces as are used outside. Both the beams of the ceiling and the concrete floor are white, with the reflective walls amplifying the effect, so that the whole space is like being in a white mist. Mirrorings of art and viewers recede into an infinite mist. Because the walls are actually subtly curved, almost imperceptibly, the warped reflections are all dreamlike. The floor unexpectedly slopes gently, following the fall of the land. It reminds one of the site and the presence of one's own body because it feels different from walking on the flat. The art objects, arranged like a forest, provide the visitors freedom to choose any route they like among the art. The anodised aluminium interior walls dissolve the boundaries of the gallery space and bring nuances of reflected colour, creating a ghostly backdrop of reflections, a blurry mingling of people and artwork. The reflective aluminium also expands the space, giving you an illusion that you are in a veil of white and ambiguous mist; however you can always focus on the art in front of you, which is the clearest one within the mist that stimulates one's What system. The boundary between reality and virtuality becomes diffuse. One is simultaneously taken into a metallic cloud.

Luminance mapping was also undertaken in the main exhibition space and the entrance hall (Figures 6-56, 57). Different from the Rolex Learning Centre, there are reflective surfaces in the exhibition hall, the light is even more evenly distributed, so the Where system becomes less effective as a result.

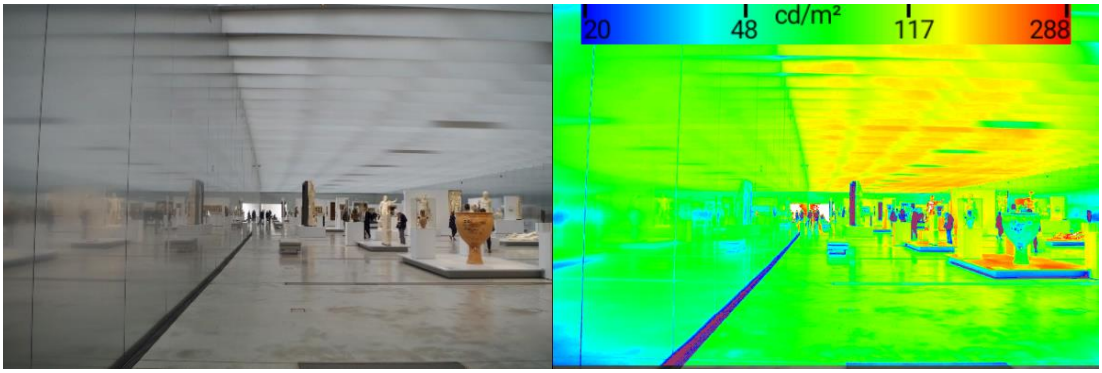


Figure 6-56 Luminance pattern and mapping data of main exhibition hall in the Louvre-Lens Museum (Source: Author)

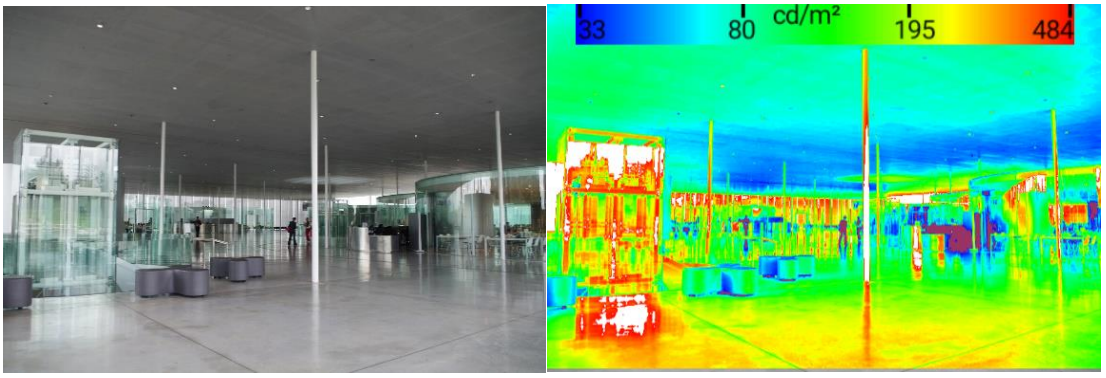


Figure 6-57 Luminance pattern and mapping data of entrance hall in the Louvre-Lens Museum (Source: Author)

In the exhibition space, the works are removed from the contexts in which people are used to seeing them, and put into a new context composed of art and people, and with a white background. The effect of this is to make each work more immediate and mysterious. The art can be lifted by its setting. These projecting reflections of both the works and visitors onto the aluminium walls create an ever-changing experience for the viewers. The reflecting aluminium literally changes the museum with relation-creating potential. The reality of this work results from a continuous process of creating relations. Thresholds between the building, art and visitors are

intentionally blurred through a continuously emerging visibility and interaction that gives the visitor an experience of being part of a process of architectural becoming.

Conclusion

The role of materiality has been discussed in the three themes of SANAA's weak architecture. In the first theme, two meanings of diagram architecture have been investigated. The first meaning is that SANAA's building inherits the formal characteristics of the diagram. In order to maintain the diagrammatic feature in the constructed buildings, the converting of this two-dimensional graphic scheme into the three-dimensional reality requires an elaborate process of constructive refinement, which is reflected in their formal and material austerity, and the thinness of their component elements. However, more than being a dry, inhuman "diagrammatic architecture", as the critics accuse the early modern architects of creating, SANAA's architectures are capable of producing complex phenomenological effects. The materiality creates ambiguous atmosphere and aura. The second meaning is that SANAA's building could be seen as a built diagram, in which the diagram is a generating vehicle, rather than an explanatory tool. The architecture reflects the "diagrammatic" character of contemporary life. The building should be open enough to provide a place to contain various possible events and actions. Without the user's creation and participation, the building is not completed. In terms of spatial organisation, the building itself has a clear relationship as shown in a diagram.

In the second theme, the Rolex Learning Centre manifests itself on the formal analogy of landscape, as well as phenomenological, spatial, and programmatic aspects. The thinness of columns contributes to the effect of an artificial landscape, which could be seen as "atomisation of structural elements". The transparency offers visual connection to the exterior landscape, roof landscape, and inner landscape. In the

Louvre-Lens Museum, the transparency and reflection of material blur the boundaries between the building and its environment, and make the environment a construction element of the building, thus making the building an integral part of its environment. Rather than a total continuity between the interior and exterior, SANAA's dematerialisation of boundary appears to be more interested in blurring the view and vision.

In the third theme, transparent boundaries of liminal spaces in the Rolex Learning Centre offer visual connection between spaces, creating a more ephemeral and homogeneous space in which programmes are allowed to change, which serves to implement the actions of people. At the same time, transparency of space – the rhizome structure of the space – offers the possibility of various patterns of movement, as the nomadic movement in smooth space. The uncertainty, becoming, and ambiguity of their smooth space coincide with Vattimo's weak thought: the plurality and the incompleteness of reality.

In the analysis of these three themes however, a more tactile experience of vision is revealed through the discovery of SANAA's building as a certain atmosphere and spatial phenomenology contained by physical reality. This ambiguous visual perception is closely related to another character of smooth space: the haptic character. By using psychologist Margaret Livingstone's theory of two parallel systems in human vision – the "What system" and the "Where system" – the analysis of the materiality, surface treatment, and luminance conditions of the two cases is conducted. It could be suggested that the What system in their cases becomes less effective than normal, due to the predominant quality of whiteness and thinness, and a lack of conventional perceptual clues such as colour and detail. The Where system is also much less stimulated, because of the unusually even luminance condition that causes a blurring of the sense of depth. Visual perception within the Rolex building and the Louvre-Lens Museum is therefore profoundly ambiguous.

In next chapter, the ambiguous visual perception of the dematerialisation of SANAA's architecture is further discussed in terms of physical manifestation, place, and function of weak architecture. What is more, how the visual perception changes the user's involvement with the building is also discussed.

Chapter 7 A critical discourse on the role of materiality in weak architecture

Introduction

Based on the case study of the three themes of SANAA's architecture, this chapter attempts to undertake some theoretical investigations on the role of materiality in the realisation of the ambiguous nature of weak architecture. Ambiguity has to do with a questioning of the meaning of architectural boundaries. The three themes reflect ambiguous boundaries in different categories in architecture. The following sections discuss the role of materiality in creating ambiguous boundaries in three categories of building according to the themes of SANAA's weak architecture investigated in Chapter 6: diagram architecture – the physical presence of the building; architecture as landscape – the relationship between building and environment; and smooth architecture – the relationship between different spaces and functions. How does the surface of material affect the perception of space, and how do the transparency, whiteness, and thinness create ambiguity in architecture?

7.1 Materiality for ambiguity between conceptual version and physical manifestation of architecture

As discussed in section 6.1 Diagram architecture, SANAA has been aiming at the dissolution of the gap between the abstractness as expressed in drawings and the substantiality of the actual building. The diagrams or the drawings could be seen as representing the immaterial conceptual existence of architecture, which one can conceive in the first place in the way of becoming a building. In many conventional buildings, the boundaries between the concept and the physical building is clear – in the process from concept to real building, various materials, decorations, and colours

are added on the drawings or models. Therefore the conceptual abstraction is added through layers of surfaces to become the actual building. However, by dematerialising the building, SANAA seems to achieve some kind of in-between status between the conceptual abstraction and the actual building. What is the role of materiality in the relationship between pure conception and the physical building?

7.1.1 A paradox in SANAA's built idea

Plato's geometry could be seen as the equivalent way to conceive architecture. Plato proposed that geometrical figures, triangles and solids underlie the substance of the world. In making anything, argues Plato, the maker follows the "form", not things already existing. Plato used Form to refer to the independent, eternally existing prototypes of mathematical things, which are not ideas in the human mind. Material things are only reflections of eternal Forms; because they are composed of matter, they are perishable and imperfect.

Renaissance humanists were concerned to show that architecture conformed to ancient philosophers' conceptions of the world, and provided an analogue for its processes. Alberti (1988, p. 7) writes about that architecture is not physical things; it is exactly the idea of diagram. He says that "it is quite possible to project whole forms in the mind, without any recourse to the material", which accords with Plato's thought. Alberti (1988, p. 156) distinguishes beauty from ornament: "Beauty is some inherent property, to be found suffused all through the body of that which may be called beautiful, whereas ornament, rather than being inherent, has the character of something attached or additional." For him, architectural beauty is based on a building's lineaments – his term for its geometric form, and design features that could be captured by a three-dimensional outline drawing, which is described as "the correct, infallible way of joining and fitting together those lines and angles which define and

enclose the surfaces of the building" (Alberti et al., 1988, p. 7). Good geometry and proportions produce beauty. Qualities like material, decorative details, or colour fall under "ornament". Thus, the physical building is the ornamentation of diagram, what differentiates building from architecture.

Before SANAA, architects in the early times of modern architecture had been trying to make the buildings approach the abstract concept, the ideal form. One of the strategies they used to suppress the materiality and reveal the form is a layer of whiteness on the surface of building. The whitewall phenomenon has indisputably been a peculiar and ubiquitous characteristic in the early days of modern architecture and further extends into the contemporary architectural practice.

How does a coat of whitewash reveal the form of the building? According to Mark Wigley (1995, p. 15), compared to other materials such as stones, the coat itself is immaterial while covering other material. This does not mean that the white coat has no physicality as an architectural material; rather, the white coat tends to hide itself because of its lack of surface texture and unique form. The hidden property of the white coat removes the decoration completely and celebrates the pure form of buildings. Wigley argues what the early modern architecture removes is the elements of variety of the coat instead of the coat *per se*. The sensuality of clothes is removed to reveal the formal outline and the visual proportion of the body; at the same time, the materiality of the body is covered. However, contrary to this, whiteness in SANAA's work is blurring the outline, weakening the mass of the building. Instead of producing a sense of precision and definition, it dematerialises the object and produces a blur. Gravity and definition give way to the delirious experience of a cloud. This is further discussed in section 7.1.2 Ambiguity of materiality and 7.2.1 Cloudiness.

Figure 7-1 Shooting of 3D film "If Buildings Could Talk" in the Rolex Learning Centre (Source: http://neueroadmovies.com/film/if-buildings-could-talk/)

As Elizabeth Grosz (2001, p. 78) discussed, Plato's ideas exist in some state of virtuality. However, nowadays the computer and simulation work offers possibilities in the sight of virtual objects. We are conceiving architecture with the help of virtual reality: we can use the computer to simulate the space and enjoy a CAD animated 'walk-through' to experience the space before it is actually built. In terms of tectonics, virtual spaces carry "less is more" to an extreme. In this new architectural domain, joints just do not matter. William J. Mitchell describes the anti-tectonics of virtual space as following: "Surfaces have no thickness, and they can be fitted together with mathematical precision. You don't need nails, screws, or glue. There is no need to accommodate changes of material. Furthermore, there is no weather to keep out. In short, there is no room for ingenuity in the details; the game is entirely one of space and surface" (Beckmann, 1998, p. 207).

In the Venice Architecture Biennale 2010, curated by Sejima, a 3D film entitled "If Buildings Could Talk" on the Rolex Learning Centre ran in a continuous loop, without a tangible beginning or end, like the building itself. Invited by SANAA to develop a film about this building, the German director Wim Wenders found himself confronted with a new type of space of which he had no prior experience, and no

vocabulary to describe it. “The Rolex Learning Centre,” said Wenders during a talk given at the Biennale, “is more landscape than building.” Because this is a non-hierarchical space that has neither borders nor contours, neither defined layout nor fixed paths, Wenders gets lost inside the building. He identifies the most difficult problem of this film-making as: what sort of narrative does this building have? Believing that places have stories to tell, he finally decided to turn the building into the main protagonist, let her speak for herself. With a sensual female voice, the building sends messages to the users, creating dialogues between them and her. An experimental 3D-steady camera travelled slowly up and down, inside and out of the enormous continuous three-dimensional space, to give viewers a fluid and continuous experience of the space. In the end, Sejima and Nishizawa rode Segways[23] in the building, showing us a special way to experience the space (Figure 7-1). Viewers really feel as if they are taking a virtual tour through the architectural landscape. Watching the film is like watching a CAD ‘walk-through’ animation of the building. The film could be seem as am immaterial conceptual existence of the building. It is the whiteness and flatness of the space that help the film to blur the boundaries between the virtual version and the real building.

Different from the traditional audio guide in museums, the Louvre-Lens Museum provides a 3D visual guide for visitors. In a way, the virtual exhibition hall in the visual guide could be seen as an expression of Platonic Ideals or Alberti’s lineaments: there is no matter, no Alberti’s ornament of material. Surfaces have no thickness, so everything can be fitted together with mathematical precision. By touching the screen, the visitors can control their own fly-through forward or backward in the virtual exhibition space, and can stop and choose to listen to the introduction of any exhibits

[23] Segway is a two-wheeled, self-balancing, battery-powered electric vehicle.

appearing in the screen. As shown in Figure 7-2, the main feature of the materiality in the virtual space of the visual guide is whiteness, which is also the material expression of the real exhibition space. The real space looks like the virtual space in the visual guide. With the reflection of the aluminium wall and smooth concrete floor, the physical space appears even more unreal. Therefore, walking in the exhibition hall is like walking in a virtual space.

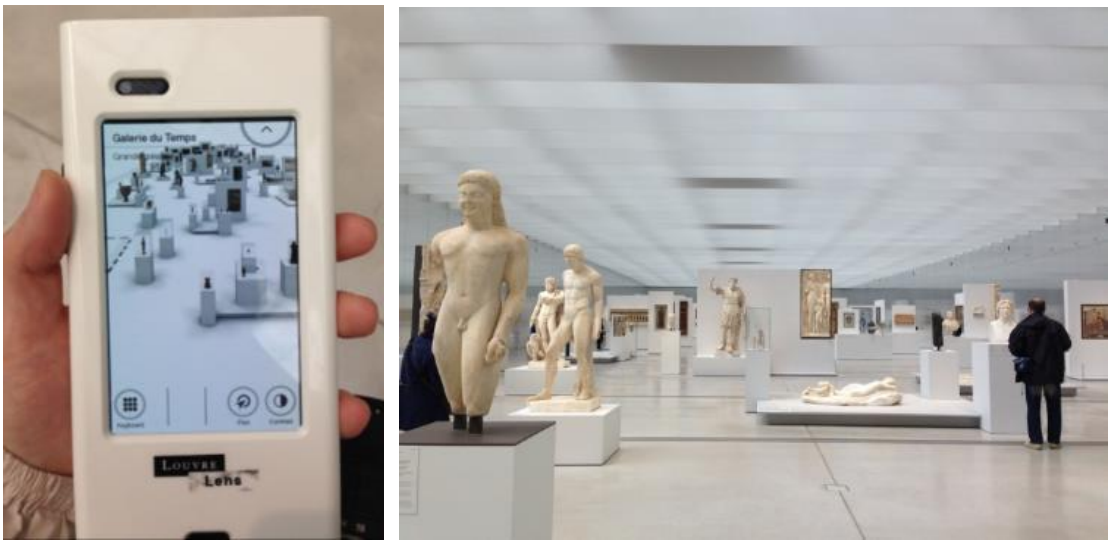


Figure 7-2 Virtual and real spaces of the Louvre-Lens Museum (Source: Author)

Jaron Lanier, a pioneer in Virtual Reality, observes the qualities of reality by comparing it to the virtuality we experience today. According to him, when we leave a virtual world we can observe a curious phenomenon: the real world that surrounds us has a "superreal" condition, a special texture and beauty. But this "superreal" does not exist in the Rolex Learning Centre and the Louvre-Lens Museum, because it is not a conventional corporeal world. Its unconventional materiality, lack of detail, and manipulation of subtle tonal variation help to create the evenness and smoothness in the

visual field, which implies a seductive tactile quality. The materiality of this building gives people an unreal, strange, and even odd feeling, for the normal "superreal" condition of the real space is replaced by some materiality which extends as if from the virtual space, providing a new corporeal experience in the real space.

Being neither "superreal" in conventional real space nor nonmaterial in virtual space, it could be said that it is a "liminal materiality" existing in a physical building. This is a different way to blur the boundaries between the real and the virtual spaces. Conventionally, the virtual space simulates the real space by increasing graphic fidelity, whereas in the Rolex Learning Centre and the Louvre-Lens Museum, the real space itself lacks texture and colours, which appears unreal in a conventional building. Different from virtual reality or real virtuality, the real and the virtual spaces that we constantly inhabit are merged through the body's perception of corporeal space, rather than that of the virtual. This is why when watching the 3D film of the building one feels like they are experiencing a CAD fly-through in a virtual space.

There is a paradox in SANAA's built idea. On the one hand, it could be seen as a kind of non-architecture because of its denial of materiality; on the other hand, in the sense of Plato and Alberti's form or pure concept, it is an exaggeration of what architecture mean to be; it lacks what Alberti called "ornament" – qualities like material, decorative details, or colour. Plato proposed *chora* is that which is lacking any substance or identity of its own falls in between the ideal and the material; it is the receptacle or nurse that brings matter into being, without being material; it nurtures the idea into its material form, without being ideal. Similarly, we can see SANAA's work is a hyper- or ultra-architecture like *chora*, a built idea, which falls in between the ideal and the material, and blurs the boundaries between the architecture as concept and architecture as physical building. In other words, the physical presence is a built idea.

7.1.2 Ambiguity of materiality

Although whiteness, thinness and transparency are strategies to dematerialise a building, SANAA's intention seems not just about the dematerialisation.

As mentioned in last section, the whitewash wall complex is quite common among early modern architects; it is the celebration of pure form and volumes, which is for visuality. For example, the distinguishing aesthetic principles of the International Style as laid down by Hitchcock and Johnson are three: emphasis upon volume – space enclosed by thin planes or surfaces as opposed to the suggestion for mass and solidity; regularity as opposed to symmetry or other kinds of obvious balance; and, lastly, dependence upon the intrinsic elegance of materials, technical perfection, and fine proportions, as opposed to applied ornament (Hitchcock and Johnson, 1995, p. 29). Le Corbusier was no doubt a representative of this phenomenon because of his purism work before 1930, and to some extent, the way he made whitewash his personal myth. Le Corbusier celebrates the pure form of architecture; for him, it is only the whitewash can make architecture "the magnificent play of forms under light", and "contains sufficient geometry to establish a mathematical relationship" (Le, 1987, p. 207).

Whiteness makes a difference on visuality and sensuality of space. Le Corbusier describes civilization as gradual passage from the sensual to the intellectual, from the tactile to the visual. His villas are read in terms of a visual logic of transparency to structure and function. The white surface liberates the eye by reconstituting the idea of a body hidden behind it, recovering a sense of space that has been lost. Wigley points out that "the white wall is intended to radically transform the status of building by transforming the condition of visuality itself….a hygiene of vision itself" (Wigley, 1995, p. 2). SANAA's whiteness also liberates the eyes, but their whiteness has turned the eyes from visual to tactile again, which is in the sense of Deleuze's haptic vision – the eye is tactile. For SANAA, instead of celebration of the form, they use whiteness to

blur the depth and volumes. Whiteness helps to reduce the depth of space, which means that one cannot distinguish the horizon, background, outline, or centre of the space from distance as in a striated space. This coincides with Deleuze's close vision – the eye not only has optical function but also fulfils non-optical functions. One has to go into the space to experience the dynamic tactile relationships. If the whiteness of modern architecture provides a visual form for the building, SANAA's whiteness makes the eye has a haptic, non-optical function, and it also create ambiguous spaces. It is a shift from form to perception. This is similar to Juhani Pallasmaa's idea of unconscious and unfocused peripheral vision, which transforms retinal images into a spatial and bodily involvement and gives rise to the sense of atmosphere and participation. The perspectival fixation of eye gave rise to an architecture of vision, leaving us as outside observers, whereas to liberate the eye from the fixation has enabled the conception of atmospheric space, which encloses and enfolds us in its embrace (Böhme et al., 2014, p. 38).

Another difference between modern architecture and SANAA's architecture is what lies beneath the smooth and white surface. For the modern architecture, there are concrete frames and brick walls hidden behind the white coat. The whitewash, which lacks texture and colour, hides the actual material and the way of construction. As Kenneth Frampton points out, the construction reality of Le Corbusier's ideal villas of the late 1920s "anticipated such formalism inasmuch as they masqueraded as white, homogenous, machine-made forms, whereas they were in fact built of rendered concrete block-work held in place by a reinforced-concrete frame" (Frampton, 2007, p. 248). If what behind the whiteness in the early modern architecture is still heavy and solid material, then SANAA's thinness of architectural elements makes them conform much more to the white coat. Mark Wigley points out "modern architecture presented itself as a resolute project of thinning, an overdue pruning of architecture's excess physical and symbolic weight. Thinning itself was understood as modernisation

through optimization" (Sejima et al., 2015, p. 31). However, SANAA pushes the thinness of architecture to the limit, and hides all the tectonic and structural secrets under the white surfaces. This is on the one hand due to the lightweight assemblages of high-performance materials as the latest forms of concrete, metal, glass, and plastic attain new levels of strength and resilience. On the other hand, we cannot ignore the Japanese background of SANAA. The two-dimensionality described by Takashi Murakami and Kisho Kurokawa[24] is based on the thinness of spatial elements. Thinness dissolves the roof, walls, or floors into plane elements, into surfaces. In SANAA's building, the thinness of structure makes them transform into something else disappearing in a normally white background; therefore the figure of the structure is blurred. As claimed by Mark Wigley, "Thinning the building thickens the air…The thinner the elements, the thicker the experience" (Sejima et al., 2015, p. 37). The less of the tangible elements, the more of the ambiguous and intangible atmosphere. Both whiteness and thinness endow the eye with a haptic, nonoptical function, making the space a smooth space.

Besides whiteness and thinness, transparency is another material strategy to blur the abstract concept and the physical buildings. Transparency is an extreme way of dematerialization, however, it is also a way of blurring. The language of reflection introduces confusion into the field of perception, relativises reality, and creates dynamic and complex images as opposed to a static and obvious transparency. The reflection and lightness of the glass makes it difficult for a view to penetrate through it. The layering of glass is perceived as a solid mass and gives the impression of constantly changeable visual appearance. Many architects use glass not only because of its transparency but also because the quality of reflection. Glass is the ultimate material of

[24] See section 2.3.2 Weakness and ambiguity in Japanese culture.

this modern dream world and it is also the source of the illusory world of transparency, reflection and mirroring. For instance, by using glass, Mies's intent was to liquefy the surface, rather than just transparency. What sets the façade in motion was not the prismatic structure of glass that transformed sunlight into a shadowless coloured light but the reflective patina that liquefied the surface, which reached its peak at his Barcelona Pavilion. Along the layout of the pavilion, polished glass and marble surfaces dislocated the things in and around it, blurring the rational structure into a perceptually ambiguous space. Robin Evens described his experience in the pavilion as a "dreamy disorientation" (Evans, 1997, pp. 233-278). Thus the contemporary, ambivalent quality of transparency is revealed.

For SANAA, transparency does not only mean 'see through': In Eve Blau's words, "at times it denotes visual and spatial connection, clarity (visual, conceptual, functional), at other times flexibility and variety, but also spatial ambiguity, reflection, and atmosphere, as well seeing and not seeing" (Blau, 2008, pp. 29-37). Transparency in SANAA's work is about surface. The multilayered planes of clear, translucent, and reflective glass and perforated screens have an ambiguous feature in themselves, which provides some in-between performances: depth and reflectivity, form and formless-ness, access and block-age, material and virtual presence.

Therefore, SANAA's architecture is not just about dematerialisation, it is also a kind of ambiguous materiality, which highlights the philosophical problem of certainty and uncertainty about the nature of things. For SANAA, the ambiguous materiality is closely related to the subjective participation of observers. The French philosopher Maurice Merleau-Ponty discusses that the live, active, and cognisant body is central to our experience and understanding of the world. According to Merleau-Ponty, the perceived world is the foundation of all existence, and all rationality. The value of people's experience of the world is gained through their immediate bodily engagement with it. A phenomenological perspective relieves architecture from a

rigid understanding of form and space to a more dynamic and flexible interpretation informed by experiential factors. These ambiguous features of material in SANAA's work need to be experienced through people's immediate bodily engagement.

7.2 Materiality for ambiguous boundary between building and landscape

As mentioned before, Western architecture emerged from a philosophy of confrontation with nature and the impulse to conquer it while the Japanese concept of space reaches out to embrace nature and to achieve harmony with it. SANAA's attitude towards environment is that the building should not be a monumental or dominant centre or as an object within its environment, but as an integral part of it. However, this is still treating architecture as an object confronting the landscape. From the case study we can see that there is another meaning in the relationship between the two: architecture itself becomes landscape rather than a simple shelter. Therefore, if SANAA is blurring the boundaries between architecture and landscape, there are two meanings: firstly, architecture *becomes* landscape; secondly, architecture *dissolves into* landscape. What role does materiality play in the transformation?

"Cloudiness" and "saturation" are two terms that could be used to describe the status of materiality of SANAA's building in its relationship with environment. "Cloudiness" is a metaphor more on the materiality of building itself as landscape while "saturation" is an understanding more on the relationship between landscape and building's surface.

7.2.1 Cloudiness

Mark Wigley talked about the cloudiness in SANAA's work. He reviewed the history of this cloud, from the indeterminate haze inside a gothic cathedral, which was an extraordinary experiment in thinness. It suspends within the sky and the light passes down through the thin screen diffusing everything. Then nineteenth-century engineering brought a new cloudiness with its thinness of steel and glass spans, the structure and fabric forming an ambiguous surface, all materiality is blended into the atmosphere. Wigley comments, "this sense of being in a cloud is very much the point with SANAA, who so deeply share Le Corbusier's early affection for the thin coat of white paint and disinterest in revealing structure" (Sejima et al., 2015).

Clouds have a sense of ambiguity. They have their own boundaries, which give them form. When they get close to each other, these boundaries become blurred. A cloud may appear white due to the high reflectivity of visible rays; it may appear any number of other colours as well, depending on the cloud's thickness, or the angle and colour of sunlight. The whiteness on the SANAA building's surface produces the similar effect; with the same colour in the space one cannot tell whether there are any boundaries between spaces, which also provides a feeling of lightness. People and objects inside appear to be floating in a cloud with no limit.

Besides the obvious feature of whiteness, another material strategy that relates to cloud is thinness, which dissolves solidity. The thinness creates a transparency like air. Air becomes a constituent element of building, maximum of air, minimum of walls. In terms of the effect of thinness in SANAA's work, Mark Wigley points out, "Thinning the building thickens the air" (Sejima et al., 2015, p. 37). The words "thin" and "thick" mark the beginnings of perception. Glass screen is understood as the ultimate thinness by Wright, who wrote "the building apparently stood in mid-air. Glass did it….I suppose as material we may regard it as crystal – thin sheets of air in air to keep air

out or keep it in" (Wright, 1928, p. 11). The "thin sheets of air" allow a building to float in mid-air.

"Thinning the building thickens the air": in this case, the building and air are still two separate entities; however, Japanese architect Junya Ishigami, one of Sejima's students, is actually building the air. He is investigating the limits of what can be constructed. He tries to eliminate the boundaries between empty space and structure giving form to that space. "This will require thinking of architecture as air: all around us, endlessly spreading, filling space as it goes." (Ishigami, 2010, p. 185). Ishigami claims that perhaps in future, building will change not in style, but dimension of scale. Technological progress may allow the likes of building equipment and structure to shrink further and further, bringing architecture closer to a natural phenomenon. His work "pushes the limits of materiality, visibility, tectonics, thinness, and ultimately of architecture itself."[25] Is it still architecture when the space and structure become infinitely blurred? Or it is a new definition of architecture: a phenomenon? We may arrive at the critical point of the act of constructing space. In these architectural

[25] The Golden Lion for the Best Project of the 12th International Architecture Exhibition – La Biennale di Venezia 2010 with the title "People Meet in Architecture" was given to Junya Ishigami and Associates for their installation "Architecture as Air: Study for Château la Coste". The jury acknowledged the "unique and uncompromising vision of its author… The work pushes the limits of materiality, visibility, tectonics, thinness, and ultimately of architecture itself." This installation could be said to border on the fringes of architecture, it seems to be as ephemeral a relation to architectural form as can be imagined. Ishigami is a practicing architect, concerned with structure and space; however, rather than the formal implications of organic geometry, he is concerned about the poetics of natural and physical structures. By dealing with space at an atomic level – between particles of matter, at the scale of cloud particles and rain droplets – Ishigami's investigations are not pragmatic with today's technology. The Golden Lion Award for "Architecture as air" raised some heated arguments on whether this project is an architecture or art. Critics Igarashi Taro comments that Ishigami's work is an architecture that challenges the boundary and limit.

phenomena, you can see no more solid volumes, walls, or obvious structures; yet you are in an artificial landscape which can still keep you from bad weather.

Whiteness and thinness in SANAA's building create cloudiness, or to use another word, atmosphere in architecture. Juhani Pallasmaa, along with Peter Zumthor, believes that the quality in architecture is about atmosphere, namely when the ambience of a space "fuses and heightens the sensory experience". Pallasmaa points out that architects should focus less on the visual properties of their work; instead, they should pay more attention to the multisensory gesture-informing and atmospheric approach. In Pallasmaa's terms, such a move would replace perspectival perception with peripheral, in that "the immediate judgement of the character of space calls upon our entire embodied and existential sense, and it is perceived in a diffuse and peripheral manner rather through precise and conscious observation." (Böhme et al., 2014, p. 38). Atmosphere is an exchange between the material of the place and our immaterial realm of imagination. Pallasmaa argues that the power of architecture lies in its ability to strengthen the real, and the imaginative dimension arises from this strengthened reality; therefore it is an experience of "thick" space and time (Böhme et al., 2014, p. 29).

According to German philosopher Gernot Böhme, the experience is always bound to particular individuals; therefore architectural atmosphere is in fact a manifestation of the co-presence of subject and object (Böhme et al., 2014, p. 43). He points out that atmosphere is a difficult thing to put into words given the background of Western ontology; however the Japanese philosophers have an easier time of it with expressions such as *ki*, which seems also have an influence in architecture. Western tradition is entirely based on seeing architecture as a material and geometric object, whereas atmosphere is a kind of immaterial halo that the Japanese architects intend to create in their weak architecture (Böhme et al., 2014, p. 43). The concept of atmosphere in Japanese architecture and design is intricately tied to the Japanese

notion of emptiness, an indication of latent energy and potential. As Kenya Hara describes in his book *Shiro*, "Emptiness does not merely imply simplicity of form, logical sophistication, and the like. Rather, emptiness provides a space within which our imaginations can run free, vastly enriching our powers of perception and our mutual comprehension" (Hara, 2015, p. 45).

This concept is embodied in the work of SANAA. In the interiors of the Rolex Learning Centre and the Louvre-Lens Museum, the stark and minimally detailed volumes liberate the creative thinking of their users. In the Rolex Learning Centre, different places appear in this homogenous space through the action of various people and events. With the movement of body, the roof and the undulating floor block or reveal a continuous view of the space, thus the outline of the whiteness changes constantly. Walking on the white landscape feels like walking on the cloud. In the exhibition hall of the Louvre-Lens Museum, the cloudiness is more blurring because of the fuzzy reflection on the polished aluminium surfaces, and the distorted reflections due to the slightly curved surfaces. Therefore, the visitors feel immersed *in* the cloud rather than walking *on* the cloud. The architects employ extreme precision in crafting empty containers devoid of unnecessary elements, which creates this atmosphere or emptiness, as if being in a cloud. This cloud blurs the boundaries between real and virtual, material and immaterial, natural and artificial, and creates preconditions for an architectural phenomenology which reveals itself through elusive form and suggestive indeterminacy. SANAA's cloudiness provides a new landscape for our contemporary life.

This cloudiness is different from the artificial clouds of the Blur Architecture designed by Diller and Scofidio, which enclosed the building completely in a cloud that shrouded it from view and enveloped those visiting the building. In Blur Architecture, the visual and acoustical references are erased along the journey toward the fog, so one loses the sense of depth. In SANAA's two cases, the cloudiness is

transparent, so it does not block the view but eliminates spatial details and blurs boundaries and volumes, creating an impression of endless space. The cloudiness of the homogeneous interior intensifies the sensation of being lost. There is no here, there is only now, as it is in the virtual world.

7.2.2 Saturation

If the building itself could be seen as landscape, what happens to the boundary between the built landscape and the natural landscape?

"Saturation"[26] is a term that David Leatherbarrow introduces to elaborate on Jean Nouvel's understanding of the city-architecture relationship. Nouvel looks for qualities that result from the saturation of surfaces by natural light. According to the case study, SANAA is making similar efforts: assimilate the building into the milieu. Architectural images are usually expected to seek clarity rather than ephemerality, a finiteness rather than deliberate vagueness. The previous dematerialised glass membrane creates total continuity between the interior and the exterior; however, what SANAA creates on the boundary is not such a static and obvious transparency. Instead, a contemporary and ambivalent quality of transparency is revealed through their materiality.

The use of big translucent or glass facades does not aim at an easy and simple observance of visible landscape. It rather enables the surrounding atmosphere effects to "saturate" the architectural envelope by tactics in the level of transparency,

[26] David Leatherbarrow introduces three terms to elaborate what is common in Zumthor and Nouvel's understanding of the city-architecture relationship: "sedimentation", "saturation", and "surplus"; see Leatherbarrow 2012.

translucency or reflection, and thus become the constituent element of object's structure itself. Unlike the previous, total continuity between the interior and the exterior, the ambivalent quality of transparency turns dematerialised glass membrane into an active in-between space, by which the consciousness of interior and exterior is stimulated. David Leatherbarrow points out that this is a new form of engagement with the city and environment, one of connectivity, flow, and immediacy. Technical progress leads toward a nontechnical goal: renewed contact with nature. This progressive reductionism is supposed to bring us back in touch with the natural world, for the absence of "things" means the unobstructed presence of the environment (Leatherbarrow, 2012, p. 85). However, even the material of the building tries to dissolve into the environment; the milieu can never conceal it, which represents an ambiguous balance between presence and concealing.

Nature, for SANAA, is not an object to be viewed but an element that can "structure" the building. Their aim is to have the building and the environment work together. What is the difference between the conventional building material and the material that is "constituted" by nature and the environment? First of all, the latter has a becoming nature, rather than a static and universal entity. The experienced reality of buildings changes in relation to its context, which is plural and incomplete. The surface of the building draws from a source that is as abundant as it is non-architectural, which offers much more experience than the architects themselves could have designed and foreseen. Once the surfaces are constructed, the material invites behaviour and environmental influence, which recur over time. Thresholds between surface, context and visitors are intentionally blurred through a continuously emerging visibility and interaction that gives the visitor an experience of being part of a process of architectural becoming. Therefore, the building's performances depend in part on conditions that cannot be rationalised. Space is measured not only by length, but also by time. Human and environmental forces are registered onto the building's

surfaces in the form of momentary traces constituting the memory of those events and sceneries, which is a continuous process of creating relations. It is central to the future of architecture that the question of time, change, and emergence becomes more integral to the process of design and construction.

What the becoming nature of those surfaces brings is the ephemeral effects – which seem to join step with the pace of contemporary life. According to Jean Nouvel, traditional or classic architecture has always played with the permanence of architectural effects. More and more, we are trying to work with concepts involving the programming of complex architectural effects for the same building, and working with transparency involves nothing more than working with matter to give a building different appearance (Ballantyne, 2007, p. 62). Transparency is a kind of evaporation; it is the means by which the building allows itself to be absorbed into the atmosphere. However, "the whole point is not transparency but blur,"[27] says architecture historian Beatriz Colomina. She talked about the relationship between transparency and medical technology, citing the X-ray. The X-ray is not just about showing an inside. The exterior envelope remains a kind of shadow or blur. To look at an X-ray is to feel one's eye penetrating the surface of the body and moving through space. The very act of looking is exposed. She points out that with glass the important thing is the play of reflections and not the effect of light and shadow. It is a way of tricking the senses, which is played diversely in the Louvre-Lens Museum. The landscape, the seasons, the light conditions are all reflected on the surface of the aluminium and glass façade, causing the building to dissolve into the surroundings. It is true that the material of the façade is aluminium and glass; however, one will see not only the aluminium and

[27] See 1.1.2 Transparency

glass, but also another kind of material – the surrounding that “structures” the surface of the building.

With the aluminium facade of the Museum, the vision stops on the surface, whereas with the glass facade, the vision penetrates the surface like the X-ray. What makes the Museum’s surface of glass more complicated than an X-ray is that the exterior envelope does not only remain as a kind of shadow or blur; it is also a reflection of the surrounding in the same way that the aluminium surface is, and what is more, the Museum does not have only one layer of glass. The inside of the glass facade are another glass partitions, which has the reflection of surrounding as well. Therefore it does not have a clear interior as an X-ray shows. The entrance hall of the Museum is a mix of X-ray and layers of clear reflections, which dissolve the boundary of the building, in a way distinct from that of aluminium.

7.3 Materiality for ambiguous relationship between building and human occupation

Besides the two aspects – physical presence of building and the relationship between building and environment – discussed in 7.1 and 7.2, SANAA’s consideration of materiality is also closely related to the user’s habitation. On the one hand, they are concerned with the arrangement of functions – on the other hand, they give attention to the sensuality of space. In the nomad space, the human is considered as a dominant factor, so the role of a plan is not to predict but to remain attentive to the unknown possibilities. What role does materiality play to realise SANAA’s smooth architecture?

7.3.1 Materiality for ambiguous distinction between space and function

As discussed in section 6.3 Smooth architecture, the ambiguous functions are realised based on ambiguous boundaries of liminal space and nomadic movement of the users. For SANAA, flexibility is not created by movable partitions, but through an individual's experience. Detlef Mertins talked about the similar incomplete features in Giedion's conception of space-time:

> Their identities as objects remained necessarily incomplete, indeterminate, and contingent on the plastic process of space creation grasped through the apperception of partial perspectives integrated over time. In Giedion's conception of space-time, static forms and elements became support for the endless and endlessly varied activity of creating space in the fourth dimension (Mertins, 2011, p. 50).

This is a concept that accords with Vattimo's *plurality* and *incompleteness* of the weak thought. The functions of spaces are not fixed; they can change spatially as well as temporally. Sejima says, "I like the space to be related but independent. I get uncomfortable when it fits the brief too exactly." Therefore, there are no clear boundaries between different function zones. They are either a totally transparent boundary which the vision can get through, or the boundary which is a blurring zone rather than a state of line. The architects are looking for the kind of architectural space in which individuals are able to perform a reproduction of their own values. The popularity of their architecture can be explained in that it responds with agility to the changing requirements of society.

These features are closely related to material strategies of transparency and thinness. Firstly, two types of transparency help the nomadic trajectory distributing people on an open space, without borders or enclosure. At the physical level, through the

removal of walls, the partitions of glasses can provide a visual connection. Each function is completely exposed in the open-plan. Dematerialisation of barriers and weak boundaries offer the potential to diffuse programmes and spaces. However, transparency is not only about physical property – it also means concept and relations in space. Sejima stresses her conviction that it is not possible to achieve transparent spaces simply by using glass in the architecture.

In spatial level, the rhizome structure of space means the organisation of relations, which directly affects the distribution of programme and people's way of movement. Similar with the way in which the saturation of building in the environment has a becoming nature, the spatial transparency constitutes a model of space as relational and contingent, both objectively and subjectively constituted over time, and therefore in a perpetual state of becoming. The perceptual process of being involved in the space is open and dynamic. The spatial transparency can be appreciated only by moving in the building and experiencing it in different times, rather than looking at it from a single viewpoint. It is a four-dimensional spatiality activated by a mobile and participatory subject, in which the boundaries between inside and outside, subject and object, are dissolved. One has to come to terms more with the phenomenology of experience than with the psychology of seeing, more with being in the object than looking at it. The four-dimensional spatiality was also discussed by Giedion, who described this as a "relational" space rather than a space of objects, relative to a moving point of reference rather than the absolute and static entity.

Both of the physical transparency and spatial transparency offer the user the freedom to occupy the space and make up their own routes. Different from the conventional buildings in which the physical boundary defines the distance between users, physical transparency and spatial transparency allow users themselves to adjust the relations of public and private, which is in a state of becoming.

The experience of spatial transparency is made possible by the fluidity and openness of the new construction condition. In SANAA's case, it is not only the transparency that provides the space with ambiguous boundaries and nomadic feature, but also the thinness of the architectural elements.

Therefore the second material strategy concerning undefined functions is thinness. According to the architects, the thinness has a relationship with flexibility of building. The architects claim, "We wanted to study an idea of reducing the usual hierarchy between structure and partition, where structure comes first and partitions are infill. So we tried to make the structure disappear and the partitions very thick and heavy" (SEJIMA, 2000, p. 16). Sejima clearly indicates that for each design the particular concern regarding division is pushed to provide a basis for the work as a whole (Sejima and Nishizawa, 1999, p.118). Treating structural elements and partition equally is one of the methods that they consider divisions, which reflects their approach to remaining liberated from hierarchy and given programmes. Thinning the structural elements is the strategy that SANAA uses to reduce the usual hierarchy between structure and partition. A typical SANAA case to illustrate this point is the Stadstheater in Almere, the Netherlands. Its plan is a rectangle that is subdivided into smaller rectangles of different sizes. All the rectangles are of equal rank, and the plan is reduced almost to a geometrical pattern. Some of the rectangles represent corridors, but they are simply long, narrow rooms that just happen to be used as corridors. Corridors in the usual sense have been eliminated, and everything has been made into rooms. A rectangle can be a room at one time and a circulation at another time. Thus, the entire programme can be arranged in any way, so any number of combinations is possible with this plan; that is why it is flexible. Each wall, compressed into the thinnest possible membrane, contains within it the matrix of the total structure. Some part is structure and some parts are for the acoustics, some parts are transparent and some parts are opaque. The objective and result are flexibility of use and intensity of

experience. Sejima claims, “Each room in itself may not seem outstanding, but allowing people to connect the spaces by themselves means there are many moods to explain the whole architecture. So I hope that each time someone goes into the space they experience something different. It’s the gathering of all those experience that actually makes up the building” (Sejima and Levene, 1996, p. 16). By making all wall panels the same thickness, whether structural, transparent, or opaque panel, it becomes possible to remove the division between structure and non-structure.

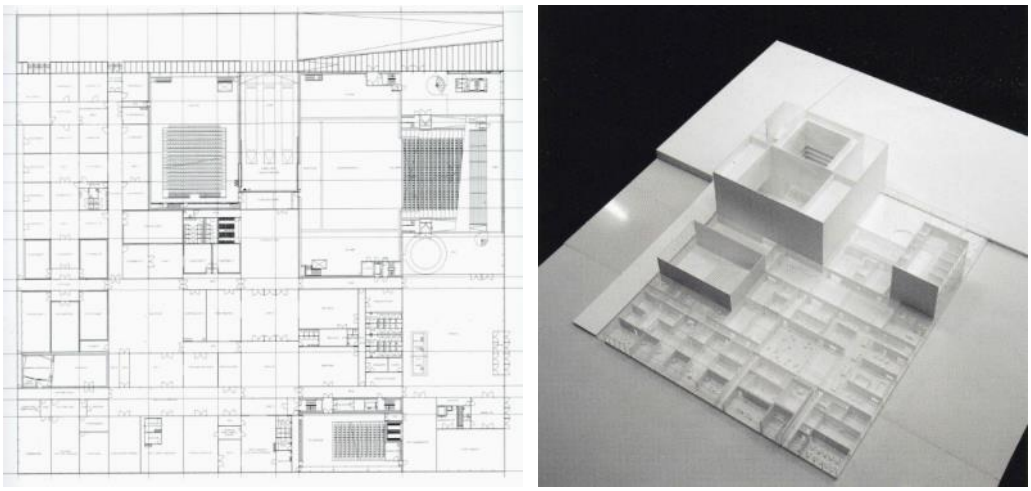


Figure 7-4 Stadstheater in Almere, the Netherlands (Source: *El Croquis 121-122*, p. 40-41)

However, thinness does not mean disregarding structure. On the contrary, it would not be going too far to say that it is a building whose concern is dedicated to the issue of the expression of structure. “We wanted to think about something that couldn’t be called structure” (Sejima and Nishizawa, 1999, pp. 118-119). The extremely thin columns become items which have nothing to do with whether or not they are structural.

In the article “Everything Keeps Moving”, Annette Svaneklink Jakobsen discussed the thinness and the open consequence of such construction strategy, “SANAA tends

to create buildings that are open, 'thin' in terms of material and construction dimensions, and with a degree of transparency. As if they want to resist possible presumptuous and static identity definitions of what their architecture is, they create architecture that clearly "does" with context" (Jakobsen, 2012). Thinness gives them a degree of freedom in the functions they envisage. With thin architectural elements, they resist defining what their building is. The space will not restrict people's actions. This implies a notion of weakness in architecture, which no longer proposes itself as the central theme but focuses on human relations and activities, frictions and encounters, and their contexts. SANAA has created architecture where becoming performs more explicitly as expression; an expression of in-between becoming with materiality, subject and context.

By dematerialising barriers and forming weak boundaries that act as open filters, architecture can reveal the potential to enable the intersection of numerous programmes and spaces, allowing novel spatial and programmatic possibilities.

7.3.2 Draw people to move and explore

As suggested in the previous chapter, the Where system is being affected by the flatness of the space. The flatness is a tradition of Japanese culture. Critics have linked the graphic, diagrammatic qualities and simplicity of SANAA's architecture and their lack of spatial and semantic depth with the abbreviated representation of *manga* comics. SANAA's architecture is considered to belong to the 'Superflat'[28] culture. In the superflat architecture, shadows fall away into flatness, and outlines lose definition, blending more than defining. Boundary is created by the disappearance of

[28] See section 3.1.2 Historical connection.

clear glass and the presence of surface reflections, whereby the enclosed space surrenders its volume to the softness of the shadows. Sejima explained her intention of the flat space when talking about the House in a Plum Grove: "We wanted to eliminate the feeling of depth. You can see into the next room through the openings, but it makes the room itself look flat, like a photograph. You can't tell how deep or shallow the space is. It looks more like a trimmed picture tacked flat against the wall" (Ota, 2006, p. 71). By emphasising flatness instead of depth, they changed the perception of depth of space, which also helps to remove architectural hierarchies.

The Rolex Learning Centre is a superflat space. As one moves through the space, one's attention is not pulled in different directions, which evokes a sense of calmness. At the same time, the evenness and flatness of the space also suggest a slightly unreal and peculiar perception, which someone may find discomforting, because in such flat space both the Where system and the What system are disturbed in their response, or less stimulated by the material and lighting of the interior space. How does the change to the visual system make a difference to people's behaviour in this space?

According to Merleau-Ponty, our complete experience of space is linked to movement and sight. Movement is one of the basic properties of our visual system. We possess eyes that are dynamic and it is precisely their movability that allows us to feel the depth. Furthermore, a more active form of vision depends on maintaining bodily movement (Hale, 2016, p. 21) – responding to what Merleau-Ponty described as the 'solicitations' of the surrounding environment (Merleau-Ponty and Smith, 2002, p. 322-323). Therefore, compared to the traditional philosophical and scientific accounts of depth perception that begin by presuming an already established space and defined geometrical system, the meaningful order of perceived depth moves beyond the division of subject and object to reflect the dynamic "crossing of body and world" (Morris, 2004, p. VIII). It is a matter of moving in the world in a limited way, and what you see expresses limitations of that crossing. We are not merely passive

recipients of spatial information; instead, we actively constitute the sense of space. Therefore, the uncertainty of depth caused by the disturbance of the visual system will draw people to move around, and confirm ambiguous perception of the space.

Some artists play with the learning process and the crossing of body and world by using unrealistic luminances so as to generate illusory sensations of brightness, depth, and motion. James Turrell's work (Figure 7-5) challenges the viewer's perception of depth. Walking into a darkened room, one is confronted with what looks like a rectangle of light projected on the wall, and may wonder what one is supposed to be seeing. The whole experience is ambiguous and vague. It compels movement in order to discover that there is neither a flat rectangle nor a wall behind it: there is a rectangular hole in the wall and behind it a uniformly lit room. There is a perceptual disturbance that draws one to explore the room and rectangle. The rectangle remains the same and appears featureless and unreal, whereas the place around it is constantly changing because of the movement.

Figure 7-5 James Turrell's art work (Source: http://jamesturrell.com/work/type/)

The similar principle is carried out in the Rolex Learning Centre, although it cannot be realised in a large architectural space as perfectly as in an art work. The cloudiness and even luminance give out very limited and ambiguous visual information about the space, so the eyes urge the body to move around to provide them with information, the body hence becoming a data-gatherer. During the journey in the building, the moving body constantly comes to terms with different types of ground conditions: the flat land, the sloping ramp, and the serpentine pathways. As one's position and relationship with the landscape is continually challenged, the undulating floor and roof simultaneously block and reveal a continuous view of the space, sometimes other viewers become visual cues or points of reference from which one tends to read the space. Given the constraints inherent in the moving of the ocular body, information in the visual field of this vast space will stream outward as the body moves forward as famously described by J. J. Gibson (Gibson, 1986, p. 227). The rate of this outward flow directly specifies a rate of motion. In the 3D film of the building, the movement on the Segway shows an unusual speed in an interior space, breaking the normal connection between the movement of body and the rate of view flow. This new way of moving creates a new spatial experience. SANAA takes the user's body as live, active, and cognisant, encouraging the user to explore and go on a journey of discovery. Only through embodied exploration and movement can we confirm the reality of the ambiguous perceptions.

It should however be pointed out that it is the space organisation that enables the movement of exploring, as each movement-environment authorises its own patterns, which become habitual guides of movement and depth perception. The Rolex Learning Centre has its own pattern. The undulating floor, the transparency of the space, including the physical transparent boundary and the rhizome structure of the space, make it possible to adopt a moving relation between body and things. And it is the deliberately flatness and ambiguity of the space draw people to explore. From the

luminance mapping of the two cases[29], we can see that it is the light that establishes the flat space, and not the physicality of the column and its shadow. The light shapes one's senses in a special way; it changes the way one perceives objects.

Gaston Bachelard makes a distinction between "formal imagination" and "material imagination". He suggests that images arising from matter project a more profound experience than images arising from form. Indeed, the right materials can make the atmosphere apparent by making it almost tangible. Colin St Wilson's book *The other tradition of modern architecture* (Wilson, 2007) opposes the modernity with an engagement with the material imagination. Hans Scharoun, Alvar Aalto's material evokes unconscious images and emotions, so does SANAA's dematerialisation of architecture. Rather than concerning with form, the works of SANAA is highly atmospheric. Moreover, atmosphere cannot be standstill, it is productive and active. Compared to the conventional materials, dematerialisation exaggerates these changes; therefore it could be assumed that the atmosphere in their weak architecture is richer than others.

To conclude, SANAA pursues the rich experience temporarily rather than through complicated layers of spatial depth. Their architecture is one of a range of intentionally limited formal means that seeks to engender the experience of the viewer. The perceptual ambiguities allow the experience to become very personal, actively engaging the participatory imagination of the user. The theme for the Venice Architecture Biennale curated by Sejima is "people meet in architecture". Sejima explained: "the idea is to help people relate to architecture, help architecture relate to people and help people relate to themselves." The ambiguity of materiality, deliberate confusion and disorientation actively encourages bodily engagement of people, and

[29] See 6.4 Haptic space

creates more interaction between the building and people and between people themselves.

Conclusion

To realise the ambiguous nature of weak architecture, materiality plays its role in different categories. Three meanings of weak architecture are realised by SANAA's material strategy.

For the first meaning of weak architecture: by suppressing the materiality, the building tries to escape the condition of being an object. It is more of a phenomenon, existing between the concept and the physical manifestation. The whiteness adds a surface to cover the materiality of the physical building, the thinness removes the excess materials, and transparency creates multiple, clear, translucent or reflective surfaces, a strategy aiming at both dematerialisation and blurring materiality, to realise the ambiguous state between virtuality and physicality. Being neither "superreal" in conventional real space nor nonmaterial in virtual space, the materiality could be seen as a "liminal materiality" blurring the boundaries between real and virtual space. The lack of texture and colour disturb the visual system – therefore experiencing the space is like experiencing a virtual space.

SANAA's architecture is not just about dematerialisation, it is also a kind of ambiguous materiality. Different from the suppression of material in the early modern architecture, SANAA's whiteness has turned the eyes from visual to tactile, and their transparency focuses on surface rather than seeing through. It is a shift from form to perception. If Pallasmaa claims that the power of architecture lies in its ability to strengthen the experience of the real, and that its imaginative dimension arises from this strengthened and re-sensitised sense of reality, an experience of "thick" space and

time, then in weak architecture, the experience of the real is blurred by the transparency, thinness, and whiteness of the materiality; therefore the imaginative dimension in a building changes as well.

In the second meaning of weak architecture: both the cloudiness, which is a metaphor for the status of interior, and the saturation, which describes the relation with the environment, imply an ambiguity of boundaries between natural and artificial, real and virtual. “Cloudiness” is captured within the concept of architecture and landscape, whiteness and thinness eliminate spatial details and colours, creating an atmosphere of cloudiness in architecture, which is an experiential property that is suspended between the object and the subject. “Saturation” occurs on the physical boundary between building and landscape. Transparency and reflection blur the boundaries between the building and its environment, meaning that the building is absorbed into the environment; that is, the environment becomes a construction element of a building. Weak architecture should have soft boundaries which can respond to the environment and its various elements. We cannot return to a life in which we depend only on the natural environment, but also we should not build an architecture which detaches itself from nature. Weak architecture incorporates an interactive relationship between the artificial environment and the natural environment. The materiality determines the building’s dimensions, geometries, and atmosphere, which are also determined by external forces. Therefore, materials and buildings become more than they were.

The relationship of materiality with the third meaning of weak architecture is about the relationship with human occupation, including two aspects: On the one hand, the materiality affects the use of the space – dematerialisation of barriers and weak boundaries offer the potential to diffuse programmes and spaces. Both of the physical transparency and spatial transparency offer the user the freedom to occupy the space and create their own routes, and also allow them to adjust the relations of public and private. Thinness has a relationship with flexibility of building. By reducing the usual

hierarchy between structure and partition, the architects resist a static definition of each space. Thinness gives them a degree of freedom on functions. The organisation of function is based on the behaviour of people, rather than on the stereotyped notions of functions or lifestyle. The space that is designed according to a very strict interpretation of programmes can no longer respond to the flexibility of the present society, which tends to have an ambiguous superimposition of functions in one space.

On the other hand, the materiality affects the visual perception of space. As suggested in the previous chapter, due to the unconventional material expressions of the buildings, the What system and Where system are being affected. The visual perception becomes ambiguous and unreal in such dematerialised spaces. However, this ambiguity of visual information encourages active bodily engagement, requiring the visitor's exploratory movement in order to explore and confirm the perception of the space – in response to what Maurice Merleau-Ponty described as the 'solicitations' of the environment. The user's involvement with the building becomes therefore a two-way interaction process, rather than a simple reaction.

Part IV Conclusion

Chapter 8 Conclusion

The thesis asks the question: How do we understand the role of materiality in SANAA's architecture – characterised as it is by whiteness, thinness, and transparency? How might the concept of weak architecture be applied to this work in three aspects: physical presence, the relationship with the environment, and the relationship with user? A more comprehensive understanding of materiality in SANAA's work has been established through a new theoretical framework and the case analysis.

As reviewed in Chapter 1, one of the distinctive features of SANAA's weak architecture is simplicity, transparency, and formal austerity of the expression of materiality and tectonic articulation. However, focusing purely on the visual aesthetic of the materiality, many people disregard the importance of spatial intention behind these physical performances. What such materiality implies to space and user and what it offers to the future of architecture remains obscure. The contribution of this research is to study materiality from a spatial and formal perspective, testing and verifying the criticisms and comments about SANAA's work through the field study of two of their buildings. This is to provide a better understanding of the role of materiality in realising certain spatial and social qualities in SANAA's work and, further, to comprehend in greater depth their distinct understandings of architecture and space, which makes a difference on designing, inhabiting, and structuring our living arrangements.

To study materiality from a spatial and formal perspective, the concept of weak architecture is used as tool. A theoretical model is built up to investigate this concept, which comprises four parts. The first part is Gianni Vattimo's concept of weak thought, which engages with two main concepts: the plurality and the incompleteness

of reality. The blurring state of physical presence of weak architecture, the ambiguous relationship of the building with environment and user imply an uncertainty of the reality. The second part is Deleuze's concept of smooth space. Deleuze's work has a certain understanding of space, spatialisation, and movement, which could offer a spatial model to understand the movement, programme looseness, and visual perception in SANAA's space. The third part is the concept of liminality, which interprets weak architecture from two aspects. On the one hand, it refers to the liminal space with ambiguous physical boundaries; on the other hand, it is about the ambiguous social boundaries where the identity and the private/public relationship are blurred. The fourth part is the weakness in Taoism, which not only has an influence on the relationship between building and nature – that the building should be an integral part of its environment, or that the building is subservient to nature – but also the relationship with the user, whereby architecture acts in the background of people's activity instead of as a confrontational or dominant spectacle.

By analysing SANAA's two cases, a more detailed and clearer understanding about weak architecture has been formulated, which was presented under three themes: diagram architecture, architecture as landscape, and smooth architecture. The analysis of the cases suggested that the role of materiality in SANAA's weak architecture is to create ambiguous boundaries in three aspects of architecture: site, space and materials.

1. **Diagram architecture**. This theme relates to the physical presence of the building – weak architecture has a tendency towards lightness, dematerialisation, and a sense of floating. SANAA's work seems to follow this tendency to a physical extreme, and is therefore referred to by Toyo Ito as "diagram architecture".

There are two meanings in diagram architecture. On the one hand, SANAA's building inherits the formal characteristics of the diagram. In order to maintain the diagrammatic feature in the constructed buildings, the converting of this two-dimensional plan into the three-dimensional reality requires an elaborate process of constructive refinement, which is shown as their formal and material austerity and the thinness of their component elements. On the other hand, SANAA's building could be seen as a built diagram, in which the diagram could be seen as a generating vehicle, rather than as an explanatory tool. The architecture reflects the "diagrammatic" character of contemporary life. The building should be open enough to provide a place to contain various possible events and actions. Without the user's creation and participation, the building is not completed. A weak architecture will never function as planned once it is released into the real world – it will always become much more than its original plan. In terms of spatial organisation, the building itself has a clear relationship as shown in a diagram.

To realise such qualities, the architects suppress the materiality of the building, instead making it escape the condition of being an object. Whiteness adds a surface to cover the materiality, thinness removes the excess material, and transparency creates multiple surfaces which are clear, translucent, or reflective. The dematerialisation quality of whiteness, thinness, and transparency makes the physical presence of building an ambiguous in-between state existing between the concept and the physical manifestation of architecture.

The ambiguous state of material can also be understood as a response to the instability of the information age, where the sense of reality and the conventional notion of space are affected by the virtual space. Being neither "superreal" in conventional real space nor nonmaterial in virtual space, the materiality in weak architecture could be seen as "liminal materiality" blurring the boundaries between real and virtual space. Such

real/virtual perceptual ambiguity disturbs the visual system, which provides a new corporeal experience in the real space.

2. **Architecture as landscape.** This theme is about the weak architecture's relationship with its environment – the weak architecture has been conceived not as a monumental or dominant centre or as an object within its environment, but as an integral part of it.

There are also two meanings in this theme. The first meaning is that the building could be seen as the formal and topographical analogy of landscape, and the building also has the performative and organisational potential of landscape when applied in architecture. The second meaning is that the building is dissolved in the landscape. The building is an integral part of its environment – there is no clear boundary between the building and its environment.

Regarding the role of material in this theme, whiteness and thinness create an atmosphere of cloudiness or emptiness for the interior of the building, which blurs the concept of architecture and landscape, material and immaterial, natural and artificial. The transparency and reflection of material blur the boundaries between the building and its environment, meaning that the building is absorbed into the environment. The environment becomes a construction element of the building – an environmental surface of the material; therefore the materiality is also determined by external forces. As a result, materials and buildings become more than they were, and are always in a state of becoming and uncertainty.

3. **Smooth architecture.** This theme is about the weak architecture's relationship with the human occupation – the organisation of function is based on the behaviour of people rather than on the stereotyped notions of functions or lifestyle, and the building also creates ambiguous visual perceptions for the people.

SANAA's space can be read as smooth space in three facets. The first facet is about the ambiguous boundaries of the liminal space in the smooth space. Similar as in smooth space where there are no clear boundaries and it is created in a continual state of becoming, the liminal space in SANAA's building is active, open to change and transformation. In terms of the programme looseness, transparency of spatial boundaries and thinness of architectural elements help to create a more ephemeral and homogeneous space allowing programmes to change, which serves to implement the actions of people. The uncertainty and looseness of the programmes imply a becoming nature that smooth space has.

The second aspect is the user's free movement in SANAA's building, which is like the nomadic trajectory in smooth space, distributing people across an open space. The spatial transparency – the rhizome structure of the space – offers the possibility of various patterns of movement. The spatial transparency is another interpretation of transparency in SANAA's architecture.

Thirdly, the issue of visual perception – a more tactile and ambiguous experience of vision – is revealed through the analysis of previous themes. This ambiguous visual perception is closely related to another character of smooth space: the haptic character. By using psychologist Margaret Livingstone's theory of two parallel systems in human vision – the "What system" and the "Where system", the study suggests that the What system in SANAA's cases becomes less effective than normal, due to the predominant quality of whiteness and thinness, which results in a lack of conventional perceptual clues such as colour and detail. The Where system is also much less stimulated, as the unusually even luminance condition blurs the sense of depth. However, this ambiguity of visual information encourages active bodily engagement, requiring the visitor's exploratory movement to confirm the perception of the space. The perceptual ambiguities allow the experience of space to become very personal, actively engaging the participatory imagination of the user.

From above we can see that the whiteness, thinness, and transparency of SANAA's work is not only for the visual aesthetic of a building, but also in the service of creating ambiguity in architecture, including the ambiguity between the abstract concept of architecture and the physical manifestation of building; a blurring state between architecture and landscape, including both the concept of architecture and landscape and the physical boundary between building and its environment; and a flexible arrangement between functions and spaces, which creates a becoming and liminal state in programme arrangement. To conclude the role of materiality in SANAA's work, the thesis suggests the notion of "weak tectonics" to consolidate the meanings in the three themes: i) building as an object is questioned because SANAA dematerialises architecture by suppressing the legibility of structural tectonics and dissolving its physicality; ii) the distinction between the building and site is weakened because the saturation of building in the environment, and the materiality is also determined by external forces of the environment and subjective experience; and iii) the joining of spaces – or spatial tectonics – is weakened for the ambiguous boundaries and the liminal space existing in the smooth space, which can stimulate all kinds of behaviours and more active engagement.

All these ambiguities of "weak tectonics" lead to the ambiguity of visual perception, which transformed the focus of architecture from form to sensibility and perception. The meaning that their architectural sensibility and ambiguity try to convey by the fugitive materiality might be a reflection of the uncertainty and paradoxes of informational society, in which our perception of materiality and space are increasingly affected by virtual spaces. Buildings like SANAA's work inevitably question the role of architecture in an infinitely indeterminate world, whereby the weak tectonic of their buildings seems to start facing this confrontation between the necessarily material dimension of architecture and the increasingly immaterial nature of the information age. The transparency, whiteness, and thinness are strategies to make the matter

disappear. To disappear does not mean to be eliminated; architecture will continue to exist even in a state of disappearance. Rather, the transparency and homogeneity of weak architecture symbolise the detachment from location and the infinite extent of time and space.

The weak architecture tries to escape the condition of being an object. It is an ambiguous state between concept and physical material; it is an artificial landscape blending in the natural and urban environment; it is a smooth space which encourages the user to understand the space by inhabiting and moving in it. At first glance, it might seem as though SANAA's work is just exaggerating the spatial quality of immateriality or disembodied spectatorship, which is the problem of disembodied inhabiting architecture. However, contrary to this point of view, this study paradoxically suggests that SANAA's work is the rediscovery of embodiment; it is a positive response to the idea of the only way to experience and inhabiting space is through the body exploring it. By being deliberately ambiguous, confusing, and disorientating, it is not a denying of physical bodily exploration; rather, it actively encourages bodily engagement.

The weak architecture is full of uncertainty, preserving its power to unveil the intense apprehension of reality, which is neither absolute nor constructed on the basis of universal rationality. This is a weak approach based on a notion of temporality that "does not present itself as a system but as an aleatory instant that, responding above all to chance, is produced in an unforeseeable place and moment" (Rubió, 1997, p. 68). SANAA's weak architecture confronts a contemporary condition that is exemplified by a lack of conceptual and perceptual certainty. The weak tectonics in their architecture responds to Vattimo's uncertainty of truth. As an investigation into SANAA's architectural implications of weak philosophy, this thesis does not attempt to draw any precise conclusion, which will contradict the weak thought itself. Their work is not about a style but as a way of understanding the human relationship to

architecture. Moreover, the weakness and ambiguity are not all that SANAA's work is about; they are just one character that situates their buildings within a weak context. The reality of their architecture is far more complex.

Jean Nouvel writes: "the future of architecture is not architectural." Maybe SANAA's weak architecture, which is a reflection of the ambiguity and paradoxes of contemporary society, is a beginning of the future non-architecture, providing inspirations for what the future architecture could be.

Future research directions:

The beginning of the thesis asked the question: Is light and immaterial architecture the unity of real world and virtual world? In this study, weak architecture was read as a liminal space between the real and the virtual because the materiality offers a real/virtual perceptual ambiguity. However, this "liminal space" is still a physical space: its virtual dimension lies in a perceptual sense of the physical. With the development of augmented reality (AR), weak architecture can be an actual liminal space between the real and virtual. Virtual input directly intervenes in the reality, both perceptually and socially. Therefore the next question related to the liminality could be: to what extent is the visual perception and social interaction enhanced if the space in weak architecture is actually overlaid with virtual information? In other words, placing the issues of this study in the specific framework of AR, or what I called "augmented weak architecture", could be a possible direction for future study.

Media theorist Lev Manovich posed the same question in a more general way: "How is our experience of a spatial form affected when the form is filled in with dynamic and rich multimedia information?" He coined the term "augmented space" from "augmented reality", describing it as "the physical space overlaid with dynamically

changing information, multimedia in form and localized for each user" (Manovich, 2006, p. 219). He reconceptualises augmentation as an idea of cultural and aesthetic practice rather than as technology, viewing it as a different experience of space. Instead of disembodied occupation of virtual worlds, AR shares the physical and digital realities in the same sensorial and spatial configuration. The physical and virtual are seen together as a contiguous, layered and dynamic reality. This reality rejects the idea of a framed representational regime, proposing instead a perceptual experience that dissolves the borders between virtual information and the material world. It expands the *experience* of space, not the space *per se*. AR is trying to offer a seamless combination of the real scene perceived by the user with virtual information overlaid on that scene interactively and in real time. The virtual reinforces our sense of the material and the material determines the perceptual outcome of the virtual.

Two issues could be explored. Firstly, what is the visual perception in the augmented weak architecture? AR does not simply place the real and virtual space in an adjacent position, but makes them perceptually convergent. The idea of spatial (dis)continuity provides the key to understand the aesthetic and phenomenological specificities of AR visual experience. Does weak architecture provide the liminal space to enhance the continuity of the virtual and real space? The visual exploration could focus on blending reality and virtuality within the same perceptual field. Is it possible to seamlessly merge real and virtual elements in a specific visual regime, so that the user cannot tell the difference between the real world and the virtual augmentation of it? Manovich asks, "Do we intuitively combine the static spatial elements with the dynamic media layer into a perceptual gestalt or do they remain separate?" Applying this question to weak architecture we could ask: What is the phenomenological experience of being in a new augmented weak architecture if the underlying physical space is in an ambiguous and dematerialised state – it is already perceived as if it is virtual? Does the weak and ambiguous reality help us to combine the spatial elements

with the dynamic media layer into a perceptual gestalt since the reality itself is no longer static?

The second question is concerned about the social phenomenon in weak architecture in AR circumstances. Augmented space is not something to simply look at, but also something to act in. It should be seen not as an environment simply overlaid with data, but as an expanded space activated within the media sphere by the subjective user. The thesis draws the conclusion that the materiality in weak architecture encourages people to move around in and explore the space; similarly, AR's spatiality is a product of the user's activity – the product of the moving body in space and of the location now expanded by the user in the virtual sphere. It could be assumed that the spatial experience of augmented weak architecture relies equally on *finding* the space and *founding* it more intensely via the wandering body. There could be a different experience of spatial sociality that transcends the model of traditional person-to-person meetings, or the typical social-media encounters online. AR permits all these types of experience at the same time. So, what is the social phenomenon in augmented weak architecture, where the virtual interaction is added on top of the physical space which can already actively engage people to interact with each other? The case studies in this thesis show that the liminal space in weak architecture disrupts the long-established dichotomies of public and private. With the intervention of the virtual information, it could be asked if the augmented weak architecture could further intensify the disruption, and this leads to calls for new terms to describe our inhabitation of the new space.

The weak tectonic is a specific condition of the material reality that could possibly acquire different senses through the virtual image's input and with the corporeal experience in situ. How much of the two ingredients – reality or virtuality – is enhanced in augmented weak architecture? How does the overlaid virtual information

expand the meaning of weak tectonics? This unexplored area would offer an interesting direction for future study.

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