Concretion, abstraction: the place of design processes in today architecture practice. Case Study: Sanaa

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1 ABSTRACT

Observing contemporary architecture, as a practitioner and teacher, we become aware of the difficulty to understand the constitutive rules of a project and even when one can identify some, they are often limited in reach. The qualifiers for the word architecture have multiplied over time: minimalism, hygienism, socio-participationism, formalism, high-tech, low-tech, sustainable and eco are some examples. After one century of avant-gardes, architectural practice has been scattered in uncountable styles and streams. This has lead to a free market situation in which architects and teachers are confronted by an almost endless catalogue of approaches and styles: between multiple-choice and pragmatist refusal, this context provokes an issue with arbitrariness and relevance.

Today the design processes are fundamental for the understanding of architectural projects, since universal rules of composition (harmony) and common ideals (beauty) have failed to support them exhaustively. A possible stable common ground to all constructed projects remains in the act of construction.

Where architects like Peter Zumthor or Herzog & de Meuron search a new way to use and interpret the materials and their use in our globalised world, SAANA work seems to remove materiality from architecture. This absence creates a kind of timeless spatiality which is not necessarily open or closed. However, this approach is not a negation of matter (in the sense of Semper), as making matter disappear implies a very strong commitment to materiality and very sophisticated technological solutions.

This paper bears relevance for both practitioners and teachers at two levels: it explores the theoretical relevance and the practical tools of an outstanding referential architect. It explores, with the specific tools of the architect, the design process of their projects through the question of the construction. The analysis is based on both their writings and the realized projects.

2 HISTORICAL SITUATION

Observing contemporary architecture, we become aware of the difficulty to understand the constitutive rules of a project and even when one can identify some, they are often limited in reach. The qualifiers for the word architecture have multiplied over time: minimalism, hygienism, socio-participationism, formalism, high-tech, low-tech, sustainable and eco are some examples. After one century of avant-gardes, architectural practice has been scattered in uncountable styles and streams. This has lead to a free market situation in which architects and teachers are confronted by an almost endless catalogue of approaches and styles: between multiple-choice and pragmatist refusal, this context provokes an issue with arbitrariness and relevance.

Jacques Lucan in *"On en veut à la composition"*[1] makes the assumption that the term composition is no longer able to describe the architectural design process. He affirms that architecture does not respond anymore to compositional logics and objectives that make the necessary correspondence of the parts in the unity of the whole the understanding key of architecture. The issue of composition has always played a central role in architectural theory. According to Jacques Lucan, the traditional relationships between the parts ensuring the unity of the whole, which are embodied in the compositional rules and objectives, fail to give an exhaustive account of most contemporary design processes.

To understand the loss of universal rules (composition) and common ideal (beauty), we can refer to the conference of Bernard Huet *"Sur un état de la théorie de l'architecture du XXème siècle"*[2].

[1] JACQUES LUCAN, 2002, On en veut à la composition, revue Matière n°5, 40-49, Swiss
[2] BERNARD HUET, 2003, Sur un état de la théorie de l'architecture du XXème siècle, Quinette, France

Vitruvius, Alberti and architecture theorists, who have followed them, do not make the distinction between architecture and the art of construction. The architect is omniscient and proficient in all disciplines. Traditionally, the architectural treaties are articulated in four parts, no matter how many books they consist of. A first part defines and outlines what architecture is. In this part, the author positions himself in the field of the existing treaties. The other 3 parts redefine or actualize the Vitruvian categories: firmitas (solidity: construction and architecture), venustas (beauty: how to compose) and commoditas (utility: what architecture is for architecture). Until the eighteenth century, it was around theses common themes that the architectural debate was being built. A first rupture happened with the affirmation of Boullée, stating : *"Vitruvius is wrong, there are two parts in the architecture, there is art and science and only art, i.e. Art, not the art of building; only art falls under the area of architecture"*[3]. For Boullée, Architecture lied in the project itself and not in the built reality. The unity of the Vitruvian trilogy was broken apart.

One can note that this epistemological shift coincided with the appearance of the first engineering schools in France (Ecole Nationale des Ponts et Chaussées was founded in 1747 by Jean-Rodolphe Peronnet following a royal decree). The outbreak of engineering schools fundamentally changed the construction field. The appearance of tender offers and constructive details caused the disempowerment of craftsmen.

This implied a gradual dislocation of the profession of the architect and of the craftsmen, who lost control over some parts of their field, which were based on tradition, and were now confronted with the integration of a group of specialists into the design process.

The nineteenth century and the industrial revolution confirmed the role of engineers by the apparition of new materials such as steel and reinforced concrete, modifying deeply the construction field. This epistemological shift pushed theorists to reinterpret architecture from the Antiquity and of the Middle-Age. This new knowledge questioned the composition processes. Viollet-le-Duc and Gottried Semper were the first to actualize the rupture of the Vitruvian trilogy in theory and in practice. Viollet-le-Duc proposed a theory based on the art of construction itself, in which spatiality was the result of a structural or constructive principle. On the other hand, Gottfried Semper proposed a theory in which spatiality was realized through the disposition of skins ("Prinzip der Bekleidung"). Structure and construction became spatially irrelevant and hidden necessities.

Since then, the Vitruvian categories can be thought separately. This has widened the field of research in architecture considerably and was echoed by "engineer architecture», represented in France at the end of the 19th century by architects like La Brouste and A. Perret. Since the beginning of the 20the century, the avant-garde experiments of the functionalist, formalist and constructivist architects developed the dislocation of the Vitruvian trilogy further. Their projects were mainly directed to one single Vitruvian category and marginalize the other two. Since the end of the 20th century, the freedom made possible by the Vitruvian dislocation seemed to question fundamentally architectural processes. A shift from a coercitive traditional unity towards a libertarian specialized dislocation had taken place. Are there still recognizable principles inherent to architectural processes? Are there still identifiable endogenous dimensions of architecture?

Many architects "who build" offer a specific approach to the act of building, as if this was an inalienable aspect of architecture feeding it from the first sketches. A possible stable ground to all built projects could remain in the act of construction. It seems to be useful to acknowledge and overcome the theoretical "skin-structure" debate induced by Viollet-le-Duc and Gottfried Semper, in order to focus on the making of architecture.

3 CASE STUDY: SANAA

In this contemporary context SANAA modified the approach of making architecture. They propose new design processes where hierarchy and materiality seem to disappear. However, this approach is not a negation of matter (in the sense of Semper), as making matter disappear implies a very strong commitment to materiality and very sophisticated technological solutions which are project specific.

The following analysis is based on both their saying and their realized projects.

[3] ETIENNE-LOUIS BOULLEE, 1968, Architecture, essai sur l'art, Jean-Marie Pérouse de Monclos, Paris

It is important to notice that Kazuyo Sejima and Ryue Nishizawa are not in search of creating a theoretical position. They did not produce, until this day, writings or discourses. We can find traces of what they are looking for in architecture in some interviews (although their answers shorter than the questions).

We base our reflection on the conversation between Koji Taki and Kazuyo Sejima published in el croquis n°77+99 where Kazuyo Sejima relates their design strategy.

3.1 System of the reality

"for us it is important to explain the intrinsic relationships of each project quite clearly… to show the idea clearly, not through figure, shape, or form but by the most simple and direct way. When you want to judge whether it is a simple idea or a simple scheme, then the concept must read clearly."[4]

Fig. 1: Scheme "system" of the Toledo Museum of art
(source KAZUYO SEJIMA + RYUE NISHIZAWA / SANAA, WORKS 1995-2003)

Kazuyo Sejima explains that the design process of their projects occur in two stages. The first one is not to focus on spatial images. They take all the elements conditioning the project such as the client's wishes, the condition of the plot, the regulations and try to organize them. There is no hierarchy relation between all these elements. They create a system with all the possible relations of the project elements and move this system forward exploring and developing new possibilities. The theme of the project emerges from this work.

They are not really interested to define their architecture in theoretical terms. They want to be close to the reality of the facts of the project. They do not care about the tradition without denying it. They start a project without pre-established answer.

When observing a first set of drawings of the Toledo museum of art, we can state that a first set of schemes tries to organize the program in a rectangle, which doubtlessly relates to the given plot. The first sketch makes appear a grid which cuts the rectangle in squares of equal dimensions. The squares are then interlinked. In the second scheme, certain variations appear in the grid. In the third scheme, we can determine "interferences" in the cutting. Interlinked cells take shape and can extend over several cuttings of the grid.

3.2 From a system to a structure

" 'Structure' is on the one hand a physical structure, but at the same time we are also very interested in how to arrange the program, which we use produce many different types of relations, and also how people can use and enjoy the building, from outside as well."[5]

In a second stage, they bring the abstract theme in the reality. Kazuy Sejima uses in this context the word structure maybe not as constructive structure but as living structure. They integrate the spatial experience of the people, the human movement in the project which affects the first scheme. They enter in the spatiality of the architecture in the third dimension.

[4] a conversation between Cristina Diaz Moreno & Efren garcia Grinda and Kasuyo Sejima & Ryue Nishisawa. El croquis 121/122, 2004 p23-24

[5] a conversation with kazuyo Sejima & Ryue Nishisawa, Juan Antonio Cortes, el croquis n°139, p10

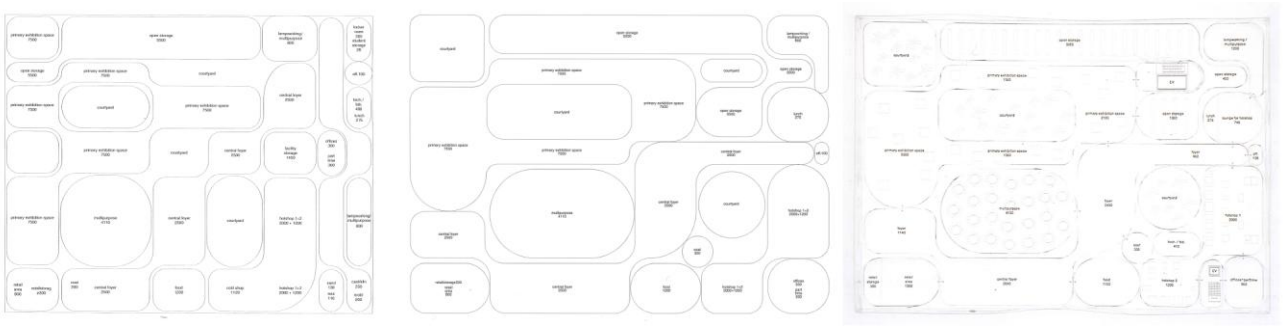

Fig. 2: Scheme and model "structure" of the Toledo Museum of art
(source KAZUYO SEJIMA + RYUE NISHIZAWA / SANAA, WORKS 1995-2003)

When looking at a second set of drawings and models we observe that the initial grid is transformed in a juxtaposition of independent cells the form of which is linked to the grid. Spaces arise between the cells. In the central drawing, certain cells take a different shape compared to the grid. It is also at that moment that the third dimension appears through the production of the models and the supporting structure will consecutively be integrated in the scheme.

3.3 Disappearance of matter

Observing the critic of SANAA's work, two issues are regularly brought forward: on the one hand the question of a diagrammatic architecture and on the other hand the disappearance of matter in their projects. When looking closer at the projects, the disappearance of matter does not always seem to be present. There is not necessarily a will to make matter disappear. But it is the way in which SANAA constitutes matter which makes it vanish. One cannot deny that a lot of different materials are used in their projects (concrete, wood, glas, textiles, metal, stone), even though the dominant chromatology is bright.

SANAA affirms that the disappearance of matter is not necessary their goal in the architecture project: *"usually, transparency and lightness, in terms of mass, are not the ultimate goals. What we are trying to do is to organize the components in a clear way"*[6]

3.4 From diagram to reality

"(...) the search for a clear spatial organization and an effort to display it clearly is perhaps what best explains Sejima and Nishizawa's architecture. This search for clarity leads them to approach their projects as simple schemes in which they only draw lines, without thickness and without anticipation of matter; lines that outline the spaces and define the complete plan. It is also a clarity that should remain intact from the project's scheme to our experience in the constructed building."[7]

Rather than aiming at the disappearance of matter to achieve architectural schemes, it can be useful to consider that SANAA aims a use of matter that allows the schemes (diagrams) to become architecture. Repositioning the issue in this way, disappearance, transparency, thinness, slenderness or lightness (the usual themes) only become possibilities that are not necessarily exhaustive. Matter should not necessarily disappear, but it may not introduce perturbations into the scheme, and it should support the diagram. This neutrality of concrete matter towards the abstract diagram can be achieved through a set of strategies, which overlap.

3.4.1 Diagrams and the physicality of matter

Surfaces ensure various physical functions: they segregate space, control temperature, water, sound and light, ensure solidity of the construction, etc. This traditionally results in layered complexes. When these complexes encounter other elements or complexes, specific details resolve the articulation of the different elements. We can think of the articulation between a brick wall and an insulated roof, solved by the detailing of a gutter. Materiality imposes articulations that are proper to the materials and the way they are used. In the work of SANAA, such independence of the material towards the concept (in their case, the diagram), is problematic, as they seek to transpose the diagram as directly as possible in built architectural forms. A first

[6] SANAA, in Lars. Cultura y ciudad. Vol. 1, no. 1, May 2005, p18
[7] Juan Antonio Cortes, Architectural topology, an inquiry into the nature of contemporary space, el croquis 139

set of strategies is about the complexes themselves: it is about the approach of complexes in order to maximize the neutrality and homogeneity of matter, and to avoid perturbations of the scheme.

a. Compaction of complexes into one solid

In some projects, the traditional complexes are replaced by some materials integrating all physical functions or to specific project-bound solutions that allow combining all these functions into one solid.

Example 1: Toledo Museum (glass – readymade monolith matter)

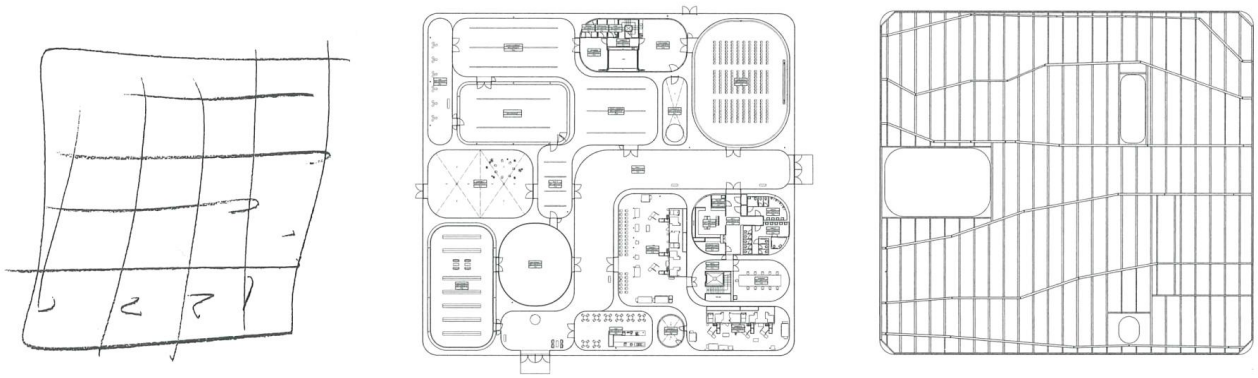

Fig. 3: Sketch, plan, structure of the Toledo Museum of art (source el croquis 139)

The diagram of the extension of the Toledo Museum is about the juxtaposition of independent cells, and about the in-between space that results.

The extensive use of glass, together with the possible variations of transparency and translucency also allow to perceive the layeredness of the diagram. Although insulated glass is a complex itself, is has the appearance of a monolith: it is uncomposed and homogeneous. However, glass must be framed. In the case of the Toledo Museum, the limited height of the rooms makes it possible to avoid vertical frames: glass panels are simply juxtaposed. The lower frame element is concealed in the concrete floor. The upper frame is concealed in a suspended ceiling. The ceiling and floor complexes also absorb most of the lighting and technical items. The edge of the roof is covered by metal sheets, conferring a massive appearance.

The irregular shape of the structure does not match the geometry of the cells, but is also hidden in the ceiling. In consequence, only a few slender cylindrical steel columns appear in such an independent and unpredictable way that they disappear from the spatial experience.

Fig. 4: picture of the Toledo Museum of art

Example.2: Zollverein Essen (concrete – made to measure monolith matter)

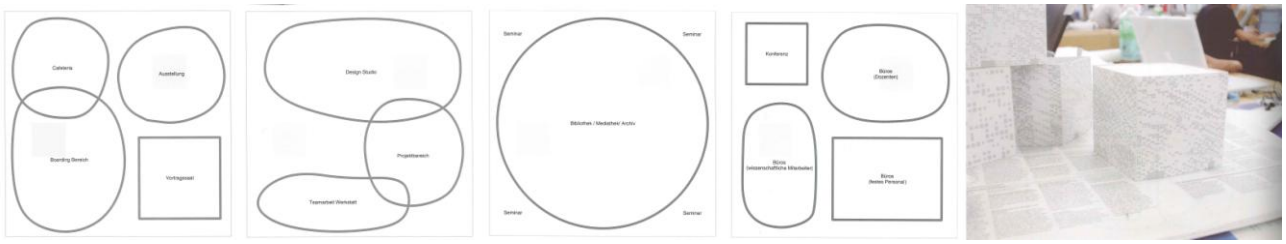

Fig. 5: diagram and model design school Zollverein
(source KAZUYO SEJIMA + RYUE NISHIZAWA / SANAA, WORKS 1995-2003)

The Zollverein in Essen is an isotropic cube composed of 5 square stories of different heights. The openings in the four facades and the roof seem to be freely placed. In consequence, the understanding of the stories is lost from the outside.

The outside walls are made of massive concrete. They ensure a structural role. The use of any other elements is avoided: the concrete walls are perfect translations of the cardboard sheets from the model. However, concrete does not naturally responds to the expected performances of a facade wall. In this case, the heating system is included in the wall. This is made possible by the presence of naturally warm water in the underground. The lack of insulation is therefore not problematic. The slabs are also made of concrete, lightened by the use of air balloons emprisoned in the structure. This way, the monolithical concrete is used as interior and exterior finishing, and absorbs all technics in its massivity. The frames of the windows are visible from the inside, but they almost disappear from the outside.

(Note that a similar approach was developed by Bearth & Deplazes in the Meuli House: insulated concrete makes it possible to reduce the wall complex to a simple monolith. Massive timber solutions achieve similar performances)

Fig. 6: pictures design school Zollverien (source http://thomasmayerarchive.de, Benoît Vandenbulcke)

Example 3: Moriyama House (compacted complex)

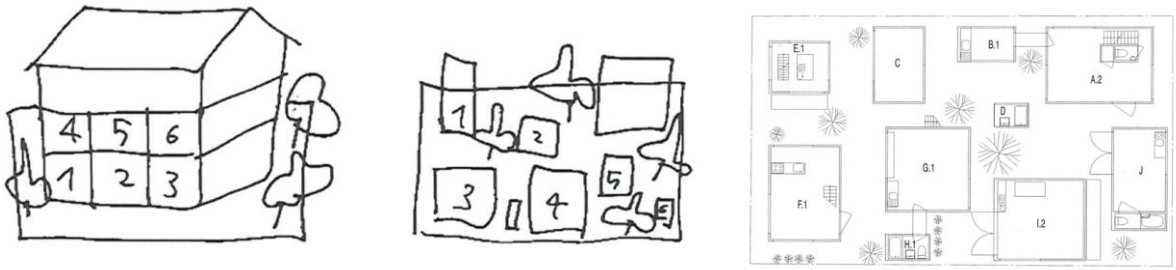

Fig. 7: sketch and ground plan Moriyama house (source el croquis 139)

The Moriyama House consists of a set of boxes corresponding to functional units of the house. The use of white steel walls strengthens the perception of the multi-cellular nature of the project. The walls are reduced to a minimum through the prefabrication of structural walls consisting of insulating material sandwiched between two plates of steel. This maximal compaction of insulation, structure, interior and exterior finishing is not a negation of the complex nature of walls. While respecting it, it is making all parts highly interdependent: the insulation confers the minimal thickness necessary for the structure, and the steel plates are homogeneous enough to provide the finishing. It still is a complex, but the different parts cannot be separated anymore.

Fig. 8: pictures and section Moriyama house (source el croquis 139)

b. Reduction of physical functions

Instead of compacting different physical performances in a unique or in fewer materials, in some cases, it is possible to reduce the functions addressed by the skin. Instead of combining functions into one solid, it allows to preserve the homogeneity of the component by spacing the layers of the complex, and make the space between the layers useable.

Example 1.Institut Valencia d'Art Modern extension (perforated steel plate)

Fig. 9: sketch and visualization of VAM
(source KAZUYO SEJIMA + RYUE NISHIZAWA / SANAA, WORKS 1995-2003 and www.arcspace.com)

3.4.2 Diagrams and the textures of materiality

The two strategies above are addressing the relationship between a diagram, a complex, and its physical functions. They aim to conciliate abstraction and physicality. On the contrary, the strategies evoked here assume that physicality does not necessary have to match the abstraction of a diagram. All over is about the appearance of things: it is about the application of a skin, of a texture, which confers a unitary appearance to a complex reality. The roof of the Toledo Museum is already such an approach: a suspended ceiling absorbs structure and technical infrastructure and creates a homogeneous surface.

a. Layering all over

A first method is the use of translucent or porous materials in order to absorb the perturbations induced by the programmatic, technical or spatial contingencies of the building. The skin may or may not address physical issues, but it is used to resolve complexity, like a veil.

Example 1: Bowery New Museum, New York (stretched steel plate)

The diagram of the New Museum in new-York is a simple stacking of rooms of different proportions, which host exhibition rooms and other functions. To ensure the direct expression of this stacking, a single skin of stretched steel is applied extensively to all faces. This veil covers windows, roof edges and technical elements such as ventilation outlets. These elements are not hidden, as they can still be perceived, but the perturbation they induce in the diagram is drastically smoothed. Uncovered windows appear on two places. First, on the entrance level (here, it doesn't enter in conflict with the stacking: is dissociates the stacked boxes from the ground). Second, a lobby opens on a terrace. However, this opening is lateral and is not very visible from public space.

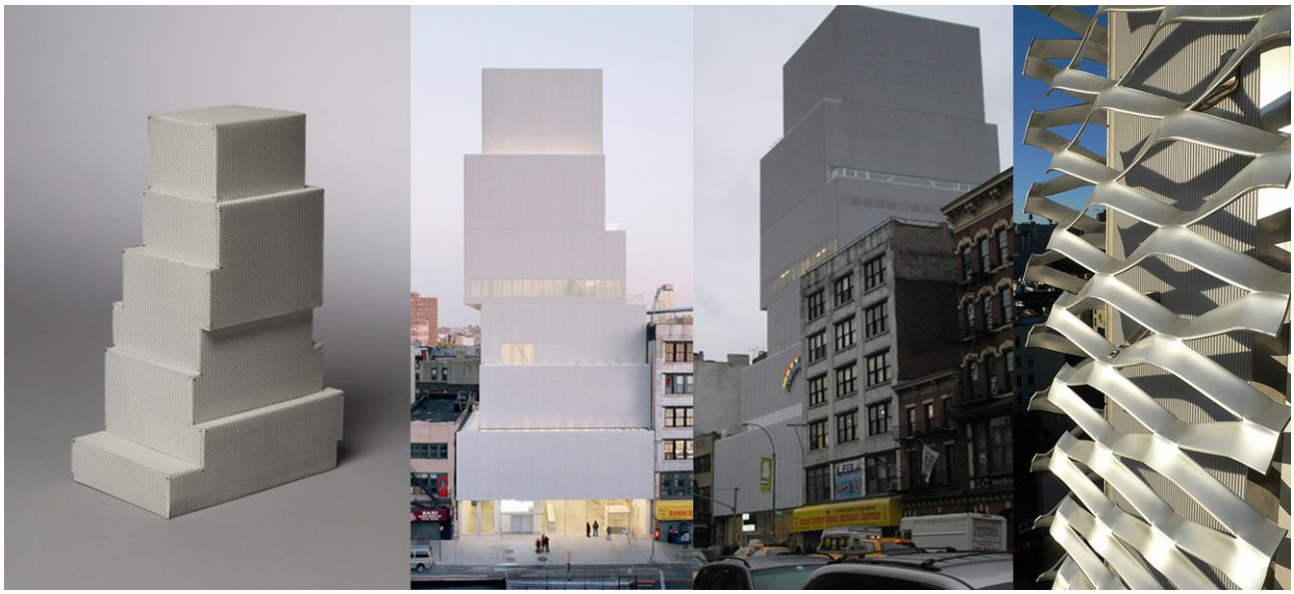

Fig. 10: model and pictures Bowery New Museum

b. Textures

A second method consists of using materiality as a mere graphical texture. This questions the necessity of a correspondence between the appearance of a material and its constructive reality. They are not necessarily used according to their natural laws (what matters want, cf Zumthor), it is also no point to explore their affordance, to which point they can be used in a different way that was intended, or specific, project-bound use (what materials can, cf De Meuron). The issue here is rather to make materials become abstract through mere repetition of a simple pattern.

Example 2: Seijo Houses (brick)

Similarly to the Moriyama house, the Seijo houses consist of a juxtaposition of unitary volumes. To identify this, an extensive use of a brick pattern is made in the facades, together with a completely white interior. The brick cladding is absolutely homogeneous. There is no perturbation of the brick pattern. Not only the house itself, but also the openings of doors and windows are carefully dimensioned to fit the pattern. Sills and lintels are not visible. Roof edges are recessed. From the available graphical documentations, it is even not clear whether the material used is natural brick masonry or glued tiles in the shape of bricks. The confusion itself in the nature of the exterior skin is meaningful: the point here is not the constructive reality. In this project, the search is for the conciliation of abstraction and a pattern induced by a material.

Fig. 11: picture and section Seijo Houses (source el croquis 139)

a. White

The extensive use of uniform skins is evident. White, homogeneous surfaces are often used. The use of poured concrete and other uniform materialities can be assimilated to white. Indeed, they can be considered as extremely refined textures (infinitely small bricks...), which do not interfere at all with the diagram, opposite to the Seijo House example.

3.4.3 Diagrams and the disposition of matter in space

Next to the physicality of matter and the induced patterns of materiality, there is a distinctive approach of the disposition of matter in space in the work of SANAA. There is a point in which the sum of discrete elements forms a uniform whole. It is a matter of quantity (repetition), scale (small parts for a larger whole), and homogeneity (dispersion, equivalence). This can be compared to natural phenomena: a wood cannot be reduced to a set of trees. It is the quantity, the scale of the wood in regard to the three, and the dispersion of trees that make the wood recognizable as an irreducible entity, in which the constitutive elements become secondary to the general image of a new whole.

It is striking that SANAA developed this approach both in constructed buildings and in artistic or research projects, like the Field Party (2002), in which different items are spread in the landscape, or the study for an arrangement of chairs that are spread in space.

a. Surfacic repetition

This concretion of discrete elements to a uniform whole can occur on a surface: repetition of beams, multiplication of folds…

Example 1: Naoshima Ferry Terminal (ribbed steel sheets)

The terminal which is thought as a foyer of the small island is a big roof in relation with the public floor which accommodates different functions of the program. Every function is enclosed according to its specific use by a glass or concrete wall. The roof made of ribbed steel sheets covers the totality of programmatic elements except for one. The nature of the steel sheets provides it with a homogeneity which extends over the whole surface and ensures its stability at the same time. In order to underline this effect of continuity, concrete boxes stop just before the roof whereas glass boxes touch it and thereby increase the effect of uniqueness of the roof. Fine steel columns are set up inside of the roof and the wind bracing covered by a mirror give the impression of extreme fineness and lightness of the roof.

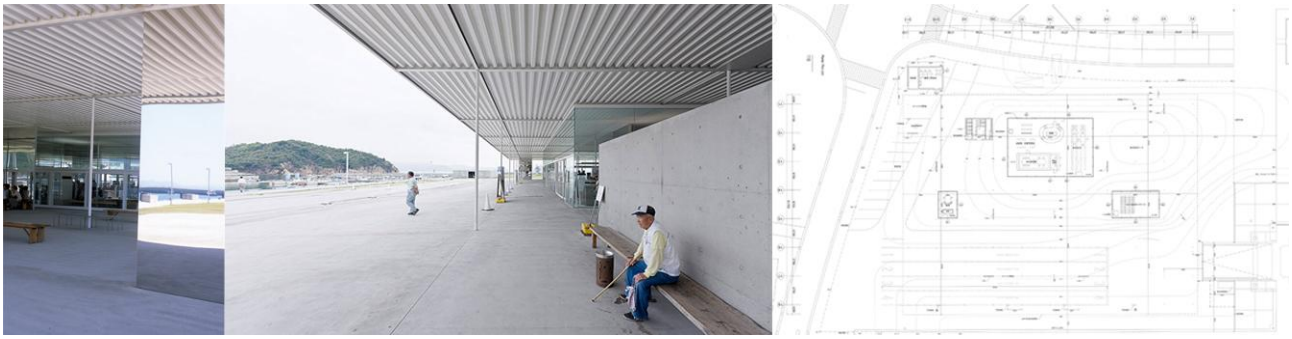

Fig. 12: picture and plan Naoshima Ferry Terminal (source el croquis 139)

Example 2: Multipurpose Facility in Onishi (wooden beams)

The project of a multipurpose facility accommodates at the same time a gym, an event hall and offices. The scheme dissociates the three functions in three buildings which intermingle and thereby make the fragmentation disappear. In addition, the three programs that need different heights are buried in the ground, allowing a constant height for the whole roof. The specific programmatic elements distinguish themselves through a strong material identity. Wood panels are used to cover the buried walls and the ceilings of the polyvalent hall and the gym are constituted of non-supporting wooden beams. These beams confer by way of repetition a homogeneity to the surface while allowing the readability of the specificity of the function. Those parts with a strong material identity address the isolated elements of the program.

Where Zumthor in his project Sankt Benedegt Chapel creates a unitary whole through the complementarity of the parts, SANAA creates a pure repetition which allows to create an open limit.

Fig. 13: picture and plan Multipurpose Facility in Onishi (source el croquis 139)

In both cases, matter does not disappear, it becomes the nature of a surface: it identifies with the surface instead of being something else, superimposed, independent. In a way, the material has no life outside the surface.

b. Spatial repetition

Repeating densely small steel column or other structural elements, they transform the void into a porous solid. They search to determine the distance between the columns in order to create locality in a continuous space.

Example 1: Park Café, Koga (steel cylindrical columns)

For the same quantity of material, the separation of fine elements gives the illusion of a sort of disappearance of matter. The program elements (WC, stocks,…) that need to be closed are accommodated in white boxes which do not touch the roof, emphasizing this effect. However, when observing the composition of the plan, we can determine that the disposition of the columns is related to the space of the tables. The columns create "open-closed" spaces where the tables stand. This search for spatiality between the tables can be found in the working scheme.

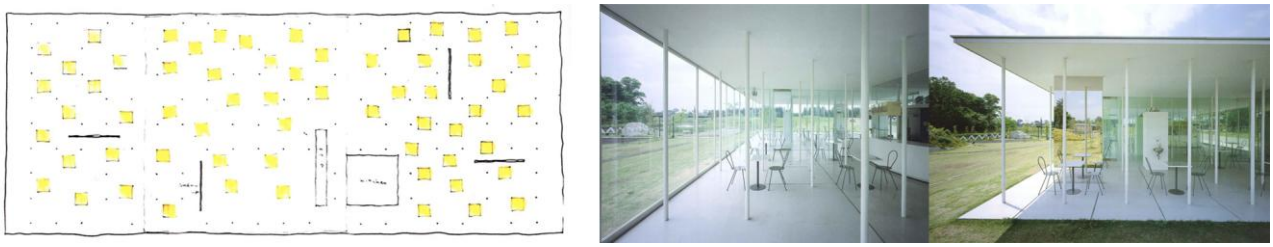

Fig. 14: picture and plan Multipurpose Facility in Onishi
(source KAZUYO SEJIMA + RYUE NISHIZAWA / SANAA, WORKS 1995-2003 and el croquis 77(I)+99)

4 CONCLUSION

Notwithstanding the same perception of the disappearance of matter SANAA's projects, we can identify a quite sophisticated use of matter and material in order to create this.

In the absence of theoretical means of orientation or tradition, the design process becomes the magic key to understanding and creating projects. Every project stems from a unique process where there is no hierarchy between the various parameters influencing the project. By contrast, all the projects aim to reach a single objective: to be a translation of a diagram in the real world without any perturbation. Matter should not necessarily disappear, but it may not introduce perturbations into the scheme, and it should support the diagram. Perturbations can occur if they coincide with the diagram but then the perturbations are also unperturbed in themselves and follow the strategies above. Strategies can be juxtaposed, superimposed or they even can coincide.

We can observe that there are other contemporary approaches that share the fundamental idea of "the act of building" as endogenous architectural force that enables to get out of the infernal spiral of "everything is possible". Where architects such as Zumthor and Herzog & De Meuron integrate the concrete in the abstract at the beginning of the conceptual process, SANAA aim to make the concrete abstract at the end of this process.

On the one hand, Herzog & De Meuron questions what the materials afford. They push materials to the limits of their capacities and twist their usual applications. And, Peter Zumthor proposes to respect what materials

want, following their natural "folds". He creates conditions in order to allow the materials to develop themselves without external interference.

On the other hand, SANAA develops strategies where materiality appears in a second stage and is subordinated to the simplicity and readability of the diagram. They find a way to make the abstract scheme coincide with the concrete reality.

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