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The Interpretation of Rem Koolhaas' Spatial Composition and Program Methodologies

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Abstract: *In contemporary architecture after modernism, the program plays a significant role in creating new types of architecture since the existing program's concept is insufficient to accommodate modern society's uncertain and multi-layered complex phenomena. This paper aims to analyze the characteristics of Rem Koolhaas' program organization and space composition method. As a methodology, the literature review examines the meaning of the program in modern architecture via theoretical consideration of the architectural program and, based on this, discusses the background of the formation of the concept of Rem Koolhaas' architectural program and organizational method. To compare the space composition methods that appear in the process of materializing into space, the area was classified into architectural thoughts, circulation, structure, and furniture. The result showed that Rem Koolhaas first viewed the program as indeterminate and reinterpreted it via an integration stage. Looking at the architectural way of thinking in the composition of space, Rem Koolhaas composed the space by focusing on the vertical relationship of space. Rem Koolhaas integrated the circulation and central activity parts for internal circulation in the main composition via a continuous path. It was proven that regarding the structure in spatial composition, Rem Koolhaas used structure to realize the concept of a program. Rem Koolhaas constructed the space in an anti-gravity form. It was investigated that furniture in space composition, and Rem Koolhaas shows a common tendency to use furniture as an element that creates events. In that way, Rem Koolhaas used furniture in an integrated manner with constructive elements.*

Keywords: OMA, Rem Koolhaas, Spatial Composition, Program Organization, Continuous Circulation

1. Introduction

A program is an essential condition all architecture contains (Pena & Parshall, 2012). This is a critical factor that distinguishes architecture from other arts (Groat & Wang, 2013). If the program was a passive meaning given by the client before the 19th century, it was criticized as 'functionalism' as it actively determined the architecture in the modernism period (Carranza & Lara, 2015; Hensel, 2013). However, in discussing contemporary architecture after modernism, programs, as Geoffrey Kipnis said, play a role in creating new types of architecture (Hensel, 2013; Hays, 2012). Since the existing program's concept is insufficient to accommodate the uncertain and multi-layered complex phenomena of modern society, a new kind of architecture is created by reinterpreting it through establishing the relationship between culture and architecture, which requires building types (Sevaldson, 2010).

This study focuses on Rem Koolhaas, a representative artist among contemporary architects who presents a new order in architecture through a new interpretation of these programs (Schumacher, 2011). Compared to other architects, he has a common point of using the program as the main vocabulary of architecture (Jerković-Babović et al., 2020). Still, his perspective on interpreting and organizing programs is different due to the difference in the architectural background (Van Ballegooijen & Rocco, 2013). The aspect of the space created by the program also shows much difference (Van Gerrewey, 2019).

Therefore, this study analyzes the interpretation of programs possessed by architects who deal with programs in modern architecture and the methods of constructing space in the process of materializing them (Böck, 2015). This study examines the characteristics of Rem Koolhaas' program organization and space composition method.

2. Literature Review

2.1 The Meaning of Program in Architecture

The dictionary definition of a program is ‘an outline that establishes the order to be followed’ or a plan or system to be taken for action toward a particular purpose (Ching, 2011). In architecture, a program is information that an architect can use to design a building for a specific purpose and includes everything about human, physical, and external factors as well as requirements presented by the owner (Kellert et al., 2011). In other words, an architectural program is not simply about function, but a collection of information that is always closely related to human life and society, the aggregate of human beings (Van Gerrewey, 2019).

2.2 The Changes in Meaning of the Program over Time

In the middle of the 18th century, a new public building was required due to the confrontation of previous styles, social changes, and architectural programs (Martinez-Millana & Alcaraz, 2022). It was first reflected architecturally in an academic study for the design of the Prix de Rome in France in 1779, but the term 'program' used at this time had a very comprehensive meaning (Isenstadt, 2021). It wasn't just a list of required elements but instructions for 'size' and overall 'composition.’

After the industrial revolution, the demands for these facilities, such as hospitals for Republicans and public health, theaters, and welfare facilities for the general welfare, increased to banks, railroads, and hotels as the 19th century passed (Vilar-Rodriguez & Pons-Pons, 2019). This new demand for various facilities, the diversified types of buildings that accompany them, and the need for redefining facilities make the program essential (OECD, 2020). In the end, in the 21st century, as these redefined types cross over, the boundaries of existing programs collapse, resulting in continuous confrontation and confusion in genres. Programs that reflect the times and are newly defined appear (Liu et al., 2018).

Under the influence of rationalism, 20th-century modernism developed into functionalism, which seeks to find the principle of generation of architectural form in function; as Sullivan said, form follows function (Harman, 2022). Functions replace programs, and processes create forms. However, it begins to be criticized for creating a uniform architecture that excludes diversity with a limited vocabulary that reduces the source of form to function (Romano, 2014). This denial of modern architecture is postmodernism. It emphasizes the primacy of form and focuses on the meaning of form (Bowden, 2019). In the deconstructionist architecture that appeared during this period, the discussion started with the program, criticizing functionalism

centered on Peter Eisenman, Rem Koolhaas, and Bernard Tschumi (Martins & Rodrigues, 2019). The above is summarized in Table 1.

Table 1: The Changes in Meaning of the Program over Time

Period	Keywords	Characteristics
Before 19th Century	Passive	- Passive meaning determined by social demand and client
Modern Times	Rational Functionalism	- Replacing the program with function with the rejection of the traditional form - Advocates functionalism based on rationality - 1:1 correspondence between function and form
	Social Reformation	- An attempt to reflect and capture the upcoming society in architecture by suggesting a new vision for social and family structures
1960s	Anti-Functionalism	- Negation and new attempts at the architectural composition method of modern architecture, in which form is determined by function
Post Modernism	Focus on form	- Criticism of 1:1 correspondence between function and form
Since the 1990s	Complexity Uncertainty Diversity	- Complexity of the program through the collision of various streams - Uncertainty through floating elements

2.3 Program in Contemporary Architecture

Thinking of a program simply as a list of complex functions, would be the same as repeating the functionalist error of reducing the name of the process that the building should contain, the amount appropriate for that function, and the size and shape of the space (Lardinois, 2017; Plevoets & Van Cleempoel, 2011).

While the function of a building has a fixed relationship with the structure of its use, a program can be understood as a concrete expression of a social institution about its use (Celani, 2012). Institutions are thoughts and ideas created individually or nationally to maintain society (Hartoonian, 2016). Because it is a network of action and is always directly related to the spatial field, the program can embody social relationships into spatial and architectural relationships (Böck, 2015). It is not governed by the program given at the beginning, but the agenda of the space can change according to necessity, or each other's programs can be reversed. At the same time, several programs coexist in one space and have the possibility of creating new programs through interaction (Gerrewey, 2013).

Modern society is constantly changing, and new interpretations of programs are needed to incorporate such changes into architecture (Koolhaas, 2011). The program is given to the architect, but the architect must interpret it and develop it into another program (Dunham-Jones, 2013). A new interpretation of the program accommodates the changes in society and adapts to the times. It allows you to create a new architecture that fits. If the program is both a limitation and an opportunity underlying architecture in general, it may be natural that new architecture emerges from a new interpretation of the program (Koolhaas & OMA, 2019).

2.4 The Concept of the Program

For Rem Koolhaas, who started in the context of Europe, the vast cities of the United States provided the basic framework for forming his theory, which is well shown in his book Delirious New York (Koolhaas, 2014). What he sees in Manhattan is a new building program shaping it. Through this, ‘function,’ which has been avoided since modernism, is exposed on the surface of architecture and placed as a subject of direct debate. He interprets Manhattan diachronically from before history to the present and says that the current Manhattan system consists of an external appearance and a program that forms it (Lacerda Neto, 2019; Oevermann, 2017).

In an interview titled' In Search of Freedom, ' Rem Koolhaas reveals his views on order and chaos.' "I really admire their thinking (Louis I. Kahn and Mies Van der Rohe). However, my one criticism is that they were destined to be caught up in 'order' and their obvious obsession to be dealt with through architecture" (Weir, 2022; Dunham-Jones, 2013).

Rem Koolhaas criticizes that most architects and urban planners since the modern era were obsessed with the illusion of order, such as proposing an ideal city and only pursuing a perfectly realized order (Nuijsink, 2022).

The program does not determine the form, and since the program and human behavior are unpredictable, it requires autonomy to be acknowledged as an architect (Martinez-Millana & Cánovas Alcaraz, 2020). To him, the meaning of order is the only horizontal and vertical grid premise in Manhattan, which shows the extreme density in architecture and urban planning (Colonnese, 2021). It refers to the 'minimum order,' the 'relative erasure of order' that can correspond to an uncertain program (Bianco, 2018).

2.5 The Program Organization

As shown in Figure 1, Rem Koolhaas first integrates the presented programs from an urban perspective, erases the form or requirements of each existing program, and makes it possible for different interpretations (Kim, 2014). At this time, integration can be seen as a way to establish a 'system' and is a conceptual work that has nothing to do with form (Teal, 2011). Instead, it sought new possibilities during the 'integration' of projects with complex and excessively dense programs that were difficult to solve due to the relationship between form and function (Nesbit, 2015; Samper, 2014).

He thinks the proposed program is only 'temporary' and tries to find a way to reflect the 'uncertainty' of the architecture program in a separate section, like a Manhattan building. In this case, disconnection sets programs for independent relationships that do not affect each other (Sennett, 2020). However, Rem Koolhaas's disconnected programs are not simply wholly separated but are characterized by porous separation surfaces that can penetrate each other (Žuljević, 2021).

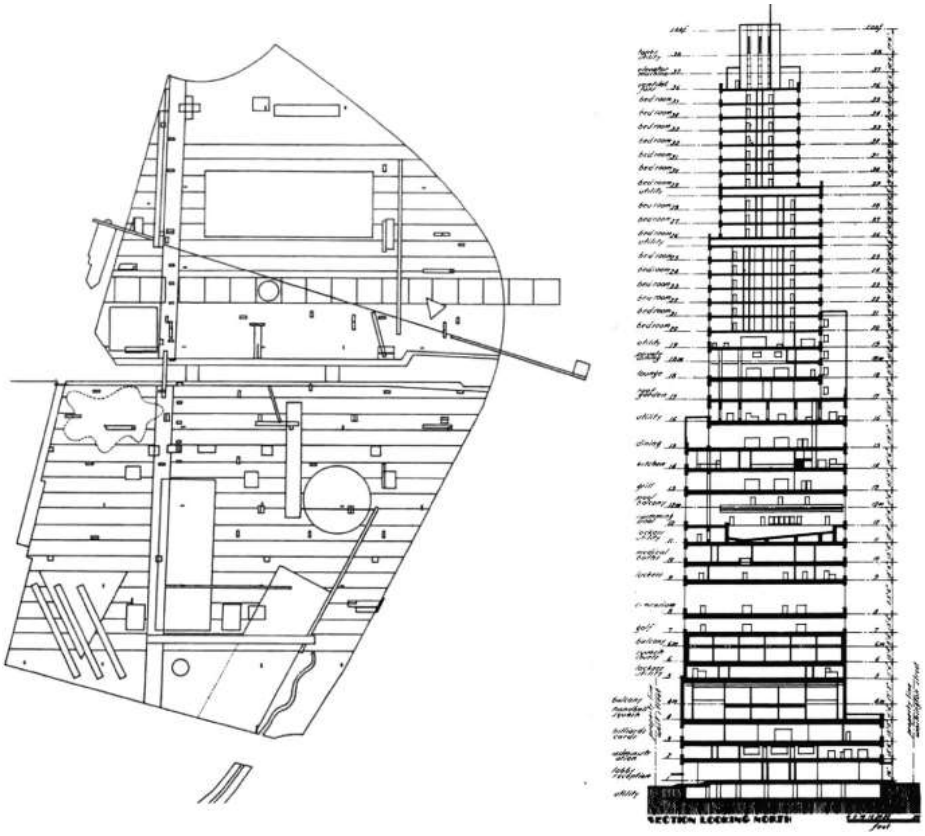

Figure 1: Rem Koolhaas' Downtown Athletic Club Program

3. Methodology

The scope of the study is limited to Rem Koolhaas, who uses programs as the main vocabulary of design (Yazici & Ozturk, 2022). The analysis of the organization of programs in individual works and the characteristics of the space composition method in the space created by this analysis are examined (Wetzel, 2012). Among the results, the research will focus on the works that clearly show the program's organization and the spatial composition method. While concentrating on the realized works as much as possible, in the case of unfinished projects judged to have significantly influenced the architect's work, reference was made as an example to study the architect's characteristics (Mattern, 2016).

The research method first examines the meaning of the program in modern architecture through theoretical consideration of the architectural program. Based on this, it discusses the background of the formation of the concept of Rem Koolhaas' architectural program, comparing the architect's program concept and organizational method. To reach the space composition methods that appear in the process of materializing into space, the area was classified into architectural thinking, circulation, structure, and furniture. The characteristics are centered on the common factors that appear in the architect's works, and exceptions are made for some cases that appear differently depending on the circumstances and constraints of the project.

4. Analysis

To compare the spatial composition methods of Rem Koolhaas's architecture, the comparison areas were classified into architectural thinking, circulation, structure, and furniture in spatial composition (Cook, 2014). Comparison details are shown in Table 2.

The subject of comparative analysis was selected as a work that is easy to compare and analyze because the process of organizing the program and the method of organizing space are relatively well shown in publications. Rather than comparatively exploring each area of the same work to compare the architect's spatial composition method, a more precise analysis was made by selecting a work with a more prominent composition method for each comparison area (Ling et al., 2021).

Table 2: Spatial Composition Method Classification

Criteria	Architectural Thoughts	Circulation	Structure	Furniture
Contents	The basic approach to spatial composition	- Relationship with Program Organization and Arrangement in Space Composition Method	Means of implementation of the program	Aspects of Spatial Composition According to Approach Methods

4.1 Architectural Thoughts in Spatial Composition

Rem Koolhaas discloses 11 patents in Content, a publication in the form of a magazine, and 8 designs focus on the vertical relationship of space in Figure 2 (Crewe, 2017). As seen from this, Rem Koolhaas's architectural way of thinking in spatial composition focuses on the vertical relationship of space (Campkin, 2013). This reflects his approach to architecture, starting from his interest in the vertical city of Manhattan, which he researched in his book Delirious New York (Kim, 2013).

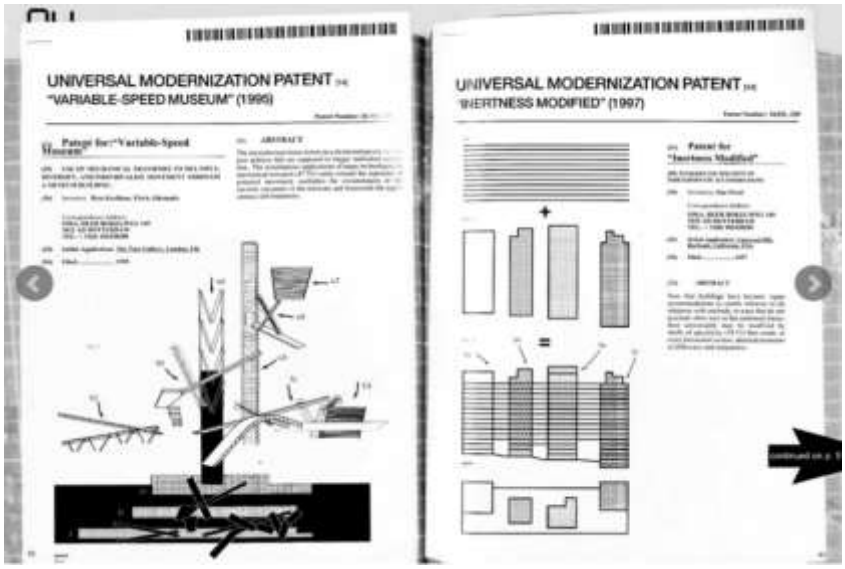

Figure 2: Patents for the Vertical Relationship of Space

He constructs a building at the Seattle Public Library as a stack of eight programmed horizontal layers in Figure 3 (Zook & Bafna, 2016). The vast mass, segmented into five programs: Headquarters, Meeting, Parking, Staff, and Spiral Archive, accommodates the maximum possible performance and continuously mediates by escalators without classifying floors (Fedorchenko, 2011). According to the characteristics of each program, the mass is segmented into different sizes and transparency (Ali & Al-Kodmany, 2012). The in-between space overlaps with each other as an urban void and creates a city made up of information networks. This internalized city exposes its organizational mechanisms and internal activities to the outside through an iron and glass outer shell, integrating each program layer and interspace (Ferguson, 2017).

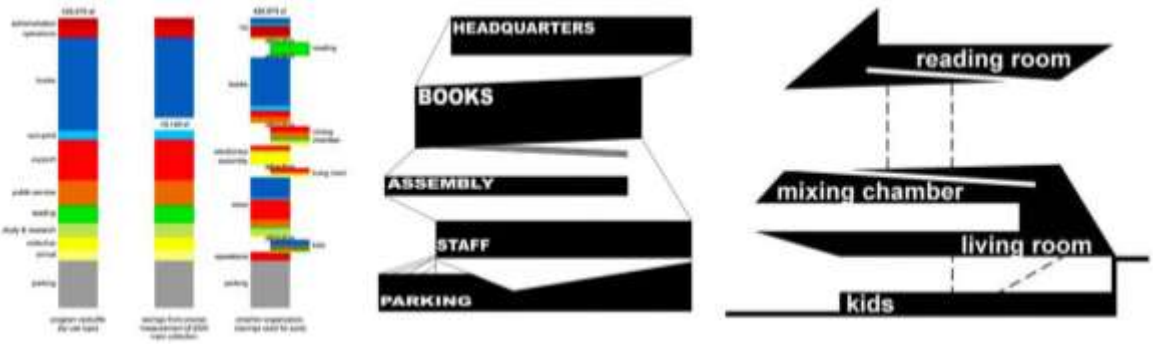

Figure 3: Flatform Program for Seatle Public Library

4.2 Inner Circulation in Space Composition

Rem Koolhaas uses one continuous path through the programs to organize the space, which is composed by integrating the circulation and central activity parts (Tan, 2015). Kunsthal is an excellent example of this problem, as shown in Figure 4 (Gargiani, 2017).

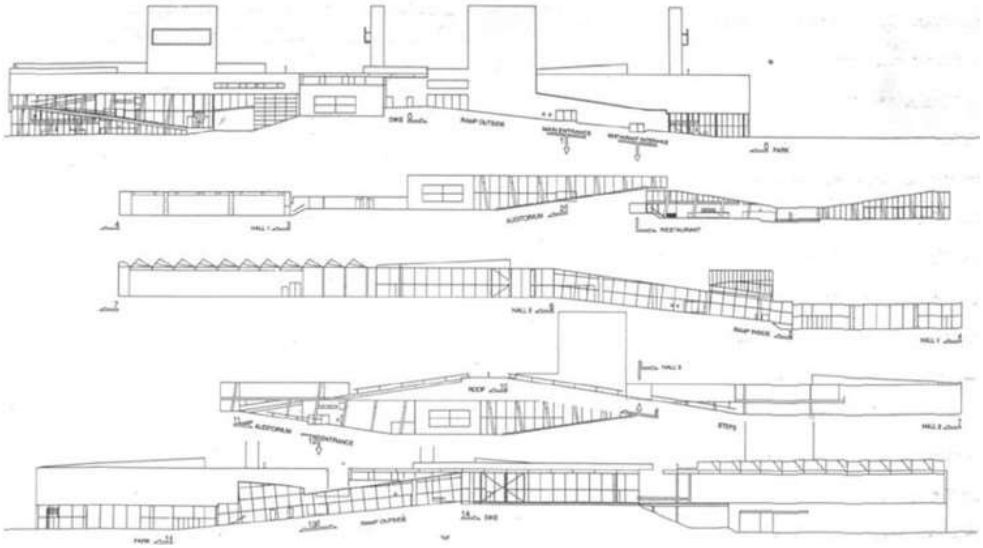

Figure 4: Continuous Circulation in Kunsthal

In addition, Rem Koolhaas planned the two libraries for Jussieu University so that the sections of each floor could touch each other from the top and bottom, rather than simply stacking the floors (Ahmer, 2021; Jauslin, 2019). Through this, all planes expose and express all program parameters and are connected along a single trajectory like a passage in a room (Kim & Koh, 2013). Program elements stand on floorboards and central plazas, like stalls on a city street, while the surplus space in the niches limited by ramps is left untouched (Figure 5) (Jauslin, 2015).

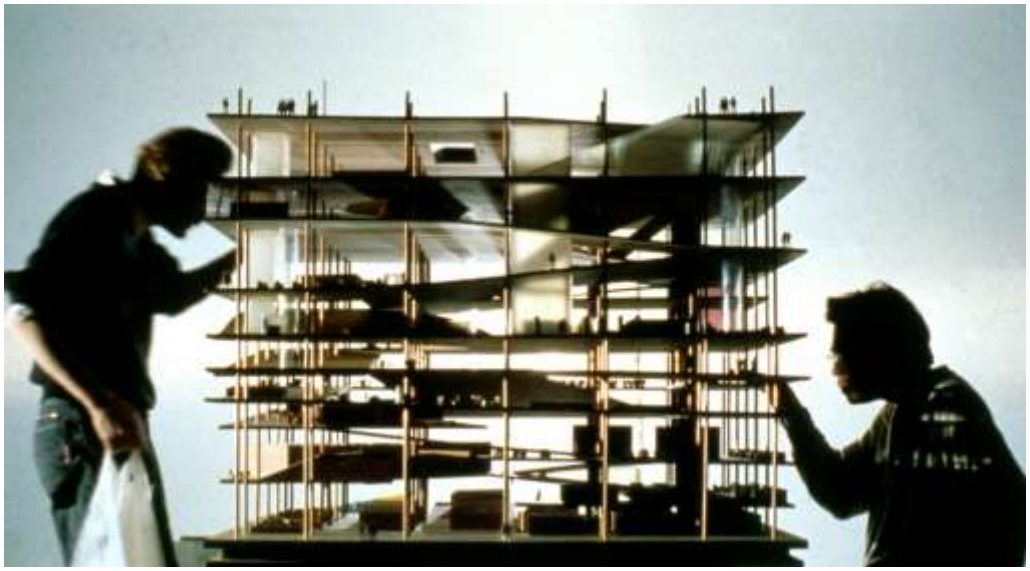

Figure 5: Continuous Circulation in Jussieu Library

At the Netherlands Embassy in Berlin, the basic idea is what Koolhaas calls a "track," a pedestrian path that can be described as a series of exterior entrance spaces which circle the perimeter of the building and eventually reach the cafe on the top floor (Figure 6). The 10th floor, including the roof as the lower floors, has a less representative character with several rooms or places connected to the public area, all 'suspended' on this track. The rest of the office and primary living space is located in the remaining distance between the track and the outer walls of the cube (Kubo, 2012). It has two other strong characteristics. The itinerant passageway forms a discontinuity concerning the main interior space, which does not open towards the interior except for the entrances to the interior, which are veiled with color or transparent glass to create a mystical atmosphere of partial transparency (Jashari-Kajtazi, 2014). In contrast, the passage is open to the outside landscape, and windows frame some main views.

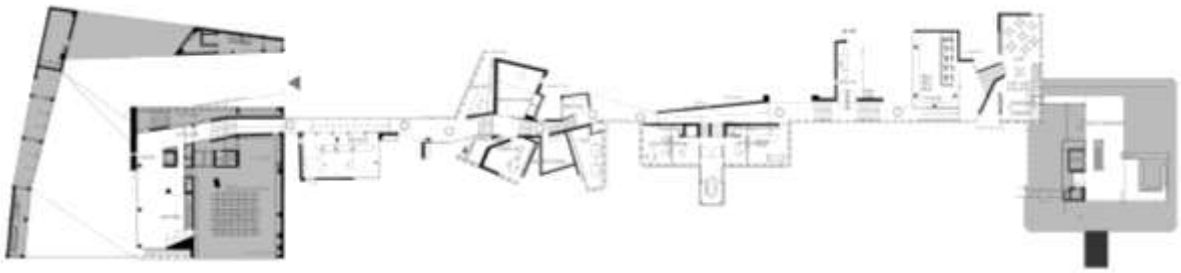

Figure 6: Continuous Circulation in Netherlands Embassy in Berlin

4.3 Structure in Space Composition

Rem Koolhaas approaches structure as a means of implementing his program concept. In general, it is common for structures to conform to gravity. Still, he devised an anti-gravity form by working with structural engineers in the planning stage to conceive a system that could realize the concept (Butragueño Díaz-Guerra et al., 2018).

At House in Bordeaux, he designed the platform to be the person's room by installing an elevator so that the client who had to use a wheelchair could easily use and experience all the spaces for the client who had been in a car accident (Figure 7). It was planned to let this room run through the entire house and reach the bookshelves in the back (Jencks & Koolhaas, 2011).

The space changes in various ways depending on the elevator's location, changing the whole space's character (Jung & Shin, 2016).

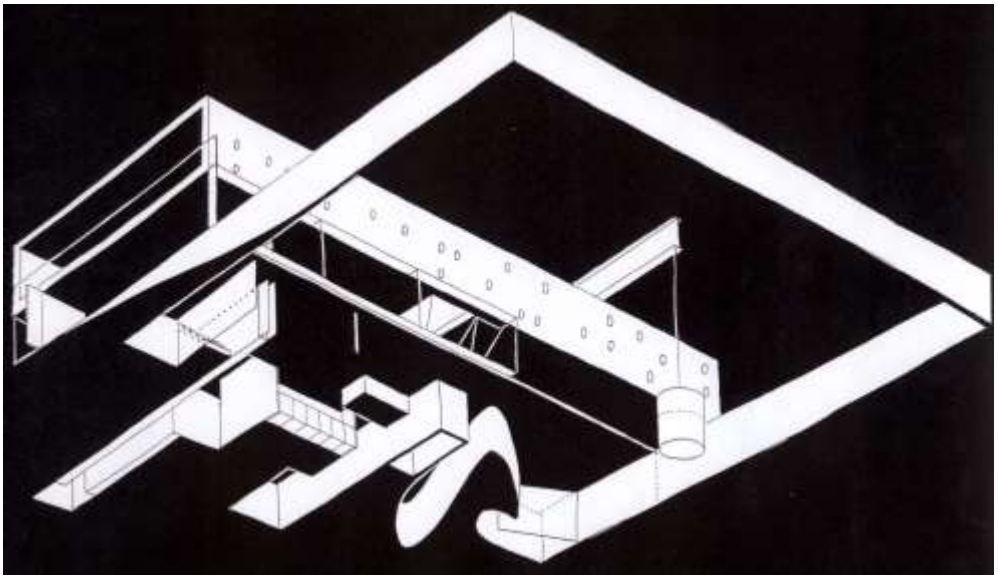

Figure 7: Continuous Structure in House in Bordeaux

4.4 Furniture in Space Composition

By integrating furniture with constructive elements in space composition, Rem Koolhaas shows that furniture is not a separate object placed in space but is on a continuum of space composition in interaction with architecture (Koolhaas, 2014). Through this, he uses it as an element that creates events in space, and the space takes on a complex character.

Figure 7: Furniture in Prada New York

At Prada New York, the cascading configuration of curved floors typically displays shoes but becomes a spectator when used as a cultural space (Figure 8). The Seoul National University Museum of Art integrates the stairs and the audience's seats using an inclined, sloping floor. Through this, the stairs can be used as seats and can also be used as an exhibition area when the exhibition space is expanded (Austin, 2012).

5. Conclusion

This study compared and analyzed the organization of the program and the space composition method in the process of materializing the space, targeting Rem Koolhaas, a representative artist who presents a new order in architecture through a new interpretation of the program. The results of the study are as follows.

The organization method of the program is analyzed as follows. Based on his research in Manhattan, Rem Koolhaas first viewed the program as indeterminate and reinterpreted it through a stage of integration.

The architect's spatial composition method is analyzed by area as follows. First, looking at the architectural way of thinking in the composition of space, Rem Koolhaas composed the space by focusing on the vertical relationship of space. Second, looking at the internal circulation in the spatial composition, Rem Koolhaas integrated the circulation and central activity parts through a continuous path. Third, looking at the structure in spatial composition, Rem Koolhaas used structure to realize the concept of a program. Rem Koolhaas constructed the space in an anti-gravity form. Fourth, looking at furniture in space composition, architects show a common tendency to use furniture as an element that creates events. In that way, Rem Koolhaas used furniture in an integrated manner with constructive elements.

Most of the contents of the projects discussed in this paper depended on the publications provided by the architects. Although the contents are universal features of the works of the two architects, in some projects, the architects depended on the architectural situation and the client's request. It is revealed that there can be diversity that can appear differently from the methods shown.

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