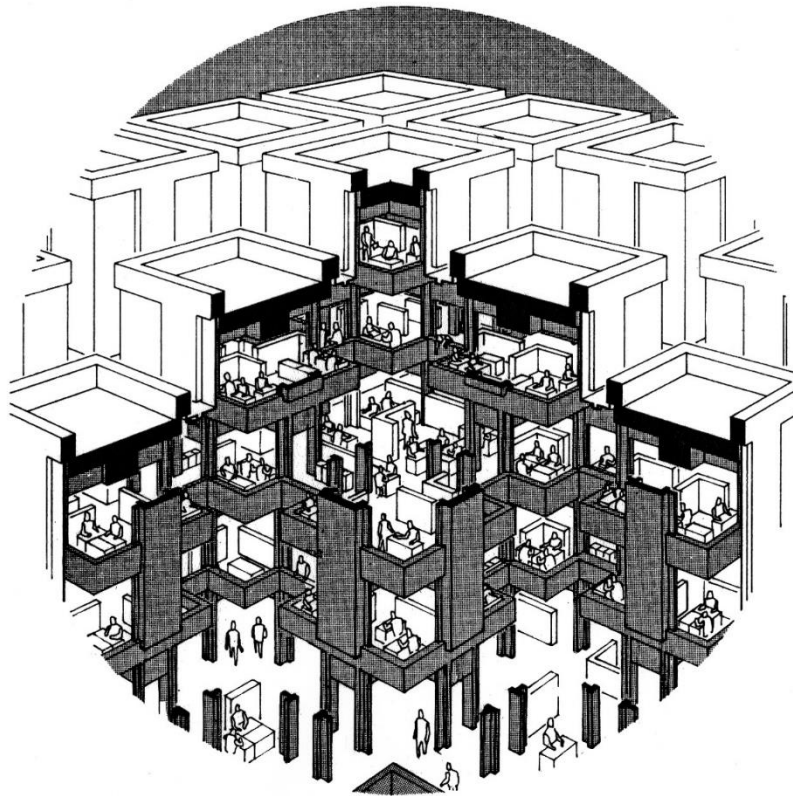


Polyvalent Space

Approach of polyvalence design theory applied in Centraal Beheer Office



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Content

Introduction -----2

Chapter 1 Influential Factors in formation of 'Polyvalence' Design Theory-----	
-----7	
1.1 Structuralism in Linguistic-----	7
1.2 Structuralism in Architecture-----	8
1.3 <i>Forum</i> and Aldo van Eyck-----	9
Chapter 2 Proposed bidding plans for the design of town halls leading to the final design of Centraal Beheer Office-----	
--13	
2.1 Valkenswaard' s Town Hall Competition: the original intention-----	
-----13	
2.2 Amsterdam' s Town Hall Competition: the developed conception-----	
-----15	
2.3 Centraal Beheer Office: the final performance-----	
18	
Chapter 3 Analysis of Centraal Beheer Office Building-----	
23	
3.1 Dynamic architectural functions-----	23
3.2 Structure - the foundation of 'polyvalent' space-----	
---25	
3.2.1 The priming 'structure' -----	25
3.2.2 The building 'order' -----	27
3.3 Collective space and place-----	28

3.3.1 Building configured as a city-----	28
3.3.2 Place with proper scale-----	30
3.4 Form and users-----	31
Conclusion-----	34
Bibliography-----	37

Introduction

Considering the stability and life span of architectural structure, public buildings, served as permanently functional construction should be able to accommodate changeable users. As a representative architect, who pursues to promote the development of structuralism in architectural design, Herman Hertzberger also asserts the viewpoint that flexibility and legibility are two essential properties for a space to function effectively. Based on this belief, he put forward the concept of ‘polyvalent space’ against functionalism’s excessive emphasis on common values, which leads to the lack of individuality of architecture. He believes that designers should enable buildings and cities to maintain their characteristics, while also having the ability to adapt to changes. The ‘polyvalent’ design theory also reflects Hertzberger’s attention from the research building itself extended to the user’s behavior and activities and polyvalence is defined as a specific spatial quality, which motivates people to transform the new space into a more familiar scene, and how to achieve this transformation is decided by users themselves. Besides, Herman Herzberg has exhaustive and thorough research on sociological thinking, especially on collective social activities and egalitarianism, making it another important theoretical basis for the design theory of ‘polyvalent space’. This thesis will take the Centraal Beheer as a case study to research how a ‘polyvalent’ approach applies in his design project which makes buildings able to accommodate the changeable use. From an individual perspective, I suppose that to actualize the ‘polyvalence’ architectural design should become a basic consideration for each architect to tackle the issue of land shortage, due to excessive urbanization. In 1959, the Dutch architecture magazine *Forum* was reorganized. Aldo Van Eyck and Jaap Bakema gradually became the core editors, which promoted the development of structuralism and younger architects such as Herman Hertzberger also became an editor. Van Eyck proposed that “a house is a small city and a city is a big house”.¹ He believes that the sense of domain is the key to establishing an identity between people and the environment. Therefore, the threshold means entering from one field to another, and transitional space is an important aspect of architectural design. The value of architecture lies in the “in-between” field. Inspired by this concept, Hertzberger has devoted himself to the study of “the Form of the in-between”—the type of transition space between public and private spaces, by testing different permutations and combinations of matchboxes. This research result was finally published in the 8th issue of *Forum* in 1959, which influenced his architectural design since then. According to his statement, his design process is a process of finding a balance in these seemingly contradictory relationships. Based on these ideas, Hertzberger summarized and collected his thoughts of architectural design in *Lessons for students in architecture* and *Space and the architect: lessons in architecture 2*, which are

popularized among architecture students. In 2015, the book, *Architecture and structuralism: the ordering of space*, was published and he elaborates more about what structuralism means in architecture, why that matters, and the meaning of the 'polyvalent' application to architectural design. From a chronological view, the formation of the theory about 'polyvalence' was developed from the theoretical basis of predecessors and his interpretation of architecture. Therefore, this thesis aims to answer the question of why polyvalent space is capable to ensure the sustainable use of architecture by analysing how these design theories are applied to the design of the Centraal Beheer and what types of secondary spaces provide feasibility for polyvalent approach.

Regarding the research method, collecting theoretical evidence and analysing the interaction between this and the main research objective is the primary strategy to prove the core argument. Secondly, a possible field trip to investigate the outside of this building can provide supplementary findings for the answer to the question. Finally, some recorded interviews about this project can help to understand the whole story of a design project.

This essay will start from the establishment of Team 10 and how the journal *Forum* becomes the media employed by the Dutch wing of Team 10 to lecture on and spread the new architectural theories, which facilitates the development of structuralism in architecture. Herman Hertzberger worked for years as a part of the editorial board, was highly influenced by the contents of the journal, especially the architectural conceptions of Van Eyck published on *Forum*. His later dedication to education as a professor at Delft University of Technology, and his association with Dutch Structuralism as well, turn him a key figure to study, because of the determining role of *Forum*'s acquired knowledge in his future professional activity. The impact of these experiences led him to the ultimate interpretation of architecture.

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Chapter 1 Influential Factors in formation of 'Polyvalence' Design Theory

1.1 Structuralism in Linguistic

Structuralism originated in the field of linguistic in the early 20th century, referring to the linguistic principles and word patterns proposed by the Swiss linguist Ferdinand de Saussure.¹ He differentiated between speech and language. The theory implies that language is an overarching structure of relations that enables individual use and interpretation. Based on this theory, Hertzberger made an analogy between structuralism in linguistic and architecture, which means architecture is able to provide a more permanent framework against which individual interpretation and changes over time can take place. In addition, Noam Chomsky's generative grammar had a vital influence on Hertzberger's design theory. He took generative grammar as his starting point, arguing that the basic pattern that various languages can be traced back fundamentally and there is an innate ability for this. Therefore, in this sense, different languages, like different behaviors, can be regarded as a kind of transformation between each other. In this theory, Chomsky introduced the concepts of 'competence' and 'performance'. 'Competence' means that a person has knowledge of his own language, and 'performance' means his use of this knowledge in specific situations.² In the context of architecture, competence is the ability to express form, and performance is the way form can be expressed under specific circumstances. This notion was the essential theoretical basis of 'polyvalence' design theory. Hertzberger used the structuralist thinking method to introduce these two concepts from linguistics into the field of architecture to find a feasible approach for the 'polyvalence' design theory. This theory contains two main points. On the one hand, the structural system and framework of architecture are used as the architectural expression of the concept of 'competence'. On the other hand, the "motivating factor" that continuously stimulates the individual interpretation of users is used as the expression method of the concept of 'performance'.

1.2 Structuralism in Architecture

The main cause of structuralism in architecture is generated aiming at the "functionalist architecture" movement advocated by CIAM. With the end of World War II, the modern architecture affected by functionalism exposed a significant issue that it no longer adapted to dramatic changes in the new era of social values, lifestyles, and social and psychological requirements. Therefore, at the

eleventh and final meeting of the Otterlo in the Netherlands in 1959, more than 40 'new generation' architects, led by Louis Kahn, Tange Kenyama, and TEAM 10, criticized the deficiencies of functionalist theory and put forward a thought worthy of reflection.³ After that, the ideas and methodology of 'structuralist architecture' spread rapidly throughout the architectural world. The difference between structuralism and functionalism is that it focuses on the analysis and research of the structural system that constitutes society and form, and considers space as a constituent element in the overall system of cities and buildings. Structuralism believes that form does not depend on function but is determined by the organization law of constituent elements. Structuralism as a methodology does not have a unified theoretical definition in architecture, but different architects use their architectural theories based on their understanding. Louis Kahn further developed the concept of "order" from the characteristics of the structuralist system view. He believed that this order is internal, which is similar to the 'unconscious structure' in structuralism. In Kahn's design thought, the design thoughts of "servant and served space" and "structural order" had a great influence on Hertzberger, especially Kahn's design approach to spatial units, which can be found in the design of Kang's Richards Medical Research Laboratories and Hertzberger's Centraal Beheer Office.

1.3 *Forum* and Aldo van Eyck

In 1950, with the massive post-war reconstruction, political changes, and economic prosperity, a new generation of young architects became increasingly dissatisfied with the theories and dogmas of modern functionalism. They were opposed to large-scale residential development and construction without individuality, and the disconnection between architecture and urban planning, and sought a completely different concept and direction. At the end of the 1950s, *Form*, dominated by Aldo van Eyck and Jaap Bakema, gradually became the main platform for the advocates of structuralism in architecture to present their thoughts and conceptions.⁴ *Forum* espoused that art and daily life are integrated and art cannot be separated from architecture, meanwhile, architecture cannot be disconnected from people's basic needs, whether it is personal needs or the needs of some members of society. Furthermore, members of *Forum* were looking for the possibility of form and structure growing over time and a form that can maintain its essential essence no matter in the initial stage of construction or in the later stage of growth. In other words, they endeavored to find an inherent ability that allows buildings to adapt to the addition of various new functions. These ideas were tantamount to an impact for Hertzberger, who became an editor of this architectural journal after graduation and changed his thinking about architecture in the future.

Aldo Van Eyck, as the spiritual figure of *Forum*, researched to dissolve the opposition of architectural elements, increase spatial experience to strengthen

the connection between architecture and city. His architectural concept has the most profound impact on Hertzberger, which can be divided into four aspects. Firstly, Van Eyck believes that design should be regarded as a configurative process in order to seek a flexible organizational principle. Another important thought is related to the theory of in-between space, which can be reflected in his specific design of the threshold. This particular structure represents the transitional space of inside-outside, dynamic-static, public-private. What Van Eyck emphasized is not the opposition and contradiction between them, but how to coordinate them, and the precondition for this coordination is the design of the in-between space. Inspired by this viewpoint, Hertzberger has devoted himself to the study of 'the Form of the in-between' —the type of transitional space between public space and private space, by testing different permutations and combinations of matchboxes.⁵ This research result was finally published in the 8th issue of *Forum* in 1959, which influenced his architectural design since then. According to his statement, his design process is a process of finding a balance in these seemingly contradictory relationships. In addition, the reproduction of small-scale units is one of the features of Van Eyck's architectural design. He aimed to find an appropriate scale of space as the fundament of design.⁶ Among Hertzberger's design projects, it's hard to see the exaggerated scale and huge space. He believes that that scale does not conform to the scale of people's behaviour and interaction, and users are often at a loss in that environment. Secondly, the single space can bring only or very little 'focus', and unable to stimulate the user's individual desire to express. Finally, the most important idea is to connect the architecture with the city and design buildings like a city. This is the most creative of Van Eyck's architectural theories, and it is also the most important of the architectural ideas of Van Eyck influenced by Hertzberger. This theory illustrates the core expression of Van Eyck's architectural view in structuralism, which are 'the aesthetics of number' and 'labyrinthine clarity'. A city-like building has 'streets', 'squares' and independent 'building units', which expresses Van Eyck's unique thinking and design techniques on the whole and parts of a building and the architectural order.⁷ Hertzberger's architecture was deeply influenced by these design techniques, which formed a different architectural design philosophy from other architects of the same period, and established the theoretical basis for the later 'polyvalence' design concept.

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Chapter 2 Proposed bidding plans for the design of town halls leading to the final design of Centraal Beheer Office

2.1 Valkenswaard' s Town Hall Competition: the original intention

In early 1967, the Valkenswaard (Netherlands) city council held a competition of proposals for the construction of the institution's new headquarters in Valkenswaard. Herman Hertzberger, a member of the architectural journal *Forum* editors' staff since 1959, decided to participate in the competition in the form of a plan that was directly connected to Team X's thinking. Influenced by Aldo van Eyck and Jaap Bakema, the two principal *Forum* editors, he has gradually formed his own ideology of design, whose crowning moment appeared in the late 1960s. Since there were not appropriate surrounded references and existing buildings to analyse at the location of the new town hall, Hertzberger intended to develop a new order for the new town hall. As can be said, the plan of the Amsterdam city hall and the office building Centraal Beheer had common characteristics as well. The extraordinary scale of the project, which reached 3755 m² according to the programs and the variety of applications of interior space, were another significant prerequisite for the creation of the proposal eventually tabled. With "Het Glazen Slot" as the slogan, Hertzberger proposed a building kit consisting of 28 units, which can expand to 34 units and arranged in two directions on the horizontal plane (Figure 1).¹ A central core was formed in the original design by connecting four of these unities, which would adapt to applications requiring a larger surface. The evident rigidity of the generation pattern allows the building to have great flexibility in adapting to the site and disposing of various spaces. As a result, "Het Glazen Slot" became a research project focused on two essential concepts: scale and intermediate spaces.² He defended the design on the basis of the assertive duality connected to the poetic resources of Aldo van Eyck: "The Town Hall must be fundamentally anti-monumental in the sense that monumentality is connected with power. The Town Hall must be substantially monumental in the sense that democracy is associated with monumentality".³ Hertzberger utilizes articulation and comprehensive increasing to react to the program to carry the building scale to the consumer. Consequently, on the one hand, an anti-monumental urban building emerges, which means the units and spaces are

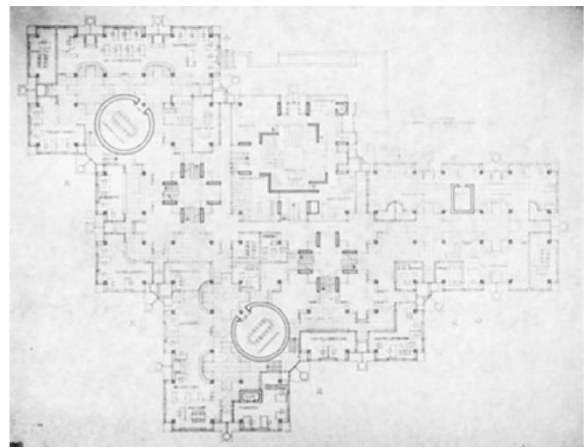
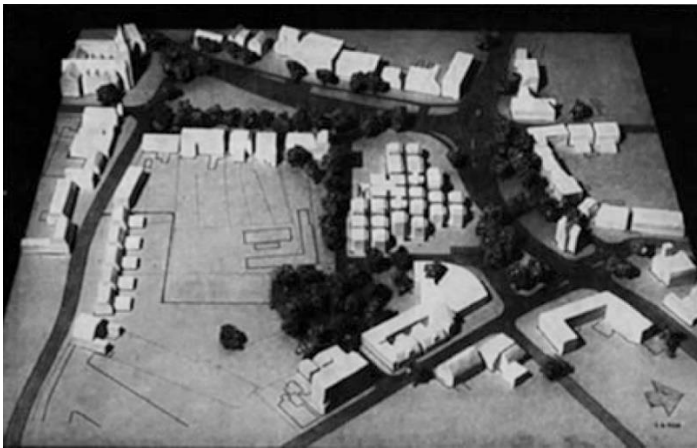


Fig. 1 Model for Valkenswaard' s Town Hall Competition (Bengoetxea J. and Merino R 2019)

Fig. 2 Access floor plan for Valkenswaard' s Town Hall Competition (Bengoetxea J. and Merino R 2019)

designed on a human scale. On the other hand, the articulated units make the whole building an enormous urban construction, which represents the collective will of individuals.

Additionally, the plan included several elements that indicated its primitive status, which will gradually fade away in the design schemes for Amsterdam's Town Hall and Centraal Beheer office. As seen in Figure 2, because the continuously changing horizontal reference lines are affected by various geometric volumes, like cylinders and partition walls, at specific points, the supporting grid structure is not continuously shown in the plan view. It was particularly evident in the entrance and underground floors, which deforms the grid of the structure and makes it difficult to interpret the building complex as a whole. As it can be seen in Fig. 2, the zones of circulation are separated from the structure, which leads to a flexible layout of the floor and maintains the geometric form of the staying space.

Despite the fact that Herman Hertzberger's project was well received by the jury's critics, who acknowledged that it was "a conscious, talented exponent of the Modern thought"⁴, the project was not ultimately awarded. The opponents argued that the project did not articulate the concept on the ideological background established and the jury's final decision was mostly based on design features. Nevertheless, considering the ensuing events and the project's eventual implementation a few decades later, the reason why Hertzberger's proposal was rejected was the excessive flexibility and interpretability provided to users, which is opposed to the interests of local governments.

2.2 Amsterdam' s Town Hall Competition: the developed conception

The City Council of Amsterdam held an international competition in November 1967

for the construction of a new institution headquarters on public land in the southeastern city, bordered by the Amstel River and the Zwanenburgwal Canal. Because of the widespread interest in the announcement, about 803 entries from various nationalities participated in this competition. In contrast to the Valkenswaard competition, it presented a particularly thrilling challenge for some local architects, including Hertzberger, who had witnessed the protests that had occurred in Amsterdam after the rebellious younger generation began their action in the early 1960s. Hertzberger had just published two of his most valuable articles in *Forum*, "Type and program are reciprocally evocative" and "Identity," in which he discussed and described his future research directions.⁵ In response to the idea for Valkenswaard's Town Hall that had been proposed a few months earlier, his plan seemed to be a significant move forward.

One of the first sketches, Fig. 3, reveals Hertzberger's growing concern about changing and meaning the reticule. The structural system in the plan for Amsterdam's Town Hall evolved from a basic pier structure to a net-like frame structure which leads to a clear tension diagonally in the interior of the building complex. Furthermore, as an advancement, a double structure is introduced to form a 'tower', allowing the pattern to gain the thickness of plan and the volume of space. Compared to the Valkenswaard proposal, Hertzberger proposed that the new 'towers'

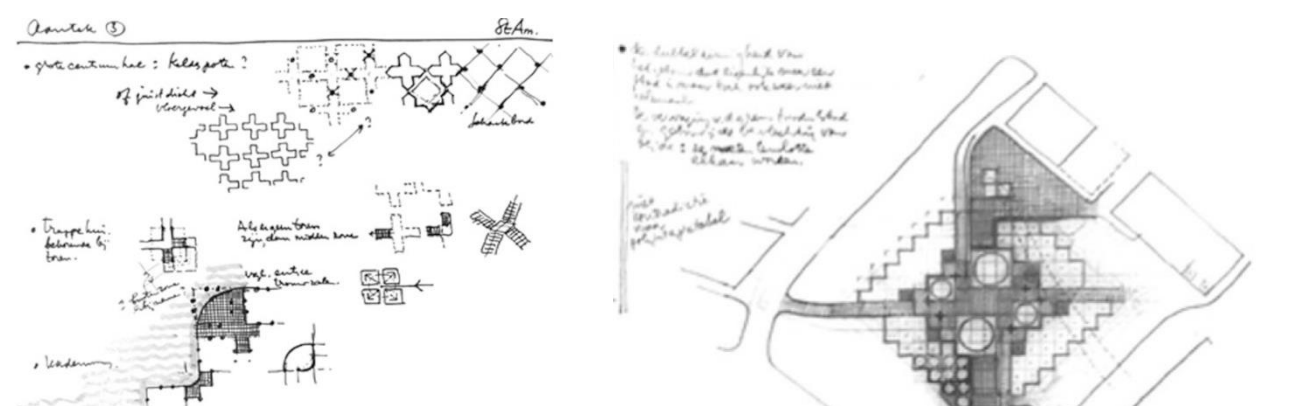


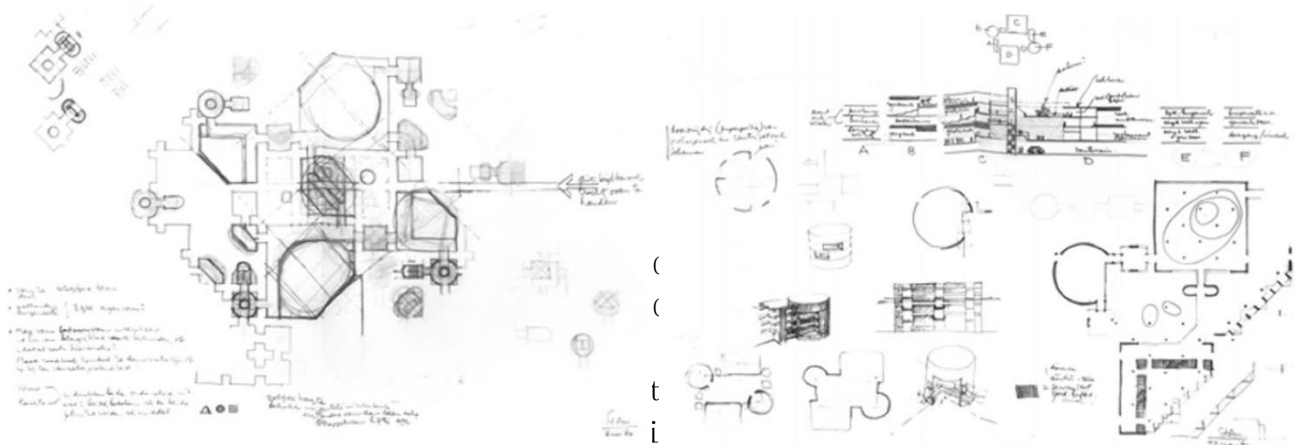
Fig. 3 Project sketch for Amsterdam's Town Hall
 Fig. 4 Project sketch for Amsterdam's Town Hall

be defined by eight supports. The new tower is defined by the square geometry of the new 'tower' and its tangent position of the piers at one-tenth of the proposal in Valkenswaard, Amsterdam, a sign of growth that reiterated the 'Tower' in horizontal plane directions. As the

guidelines, the final project proposed a building separated into four distinct domains, which creates four main pathways to the centre (Fig. 4). Hertzberger used various colour palettes and shaded areas to illustrate different levels of privacy of the access spaces leading to the central area, ranging from open public streets to 'streets' with restricted access inside.

In contrast to the proposed design for Valkenswaard, the Amsterdam project expanded

the theme of the transitional space, which began to take on its own identity as a result of Hertzberger's advances in other directions. The building was set up as a city using a 'towers' and 'streets' system to adjust and stimulate people's expectations.⁶ Therefore, interactions between users and between users and the environment were facilitated, due to the interests and needs of each person at a specific moment, taking on an automatic and regular character, as they did in an urban environment. Thus, the system developed into a relational construct that sought to be augmented by the use and understanding of all users.⁷ As Hertzberger said: "Everything we make must be the catalyst to stimulate the individual to play the roles through which his identity will be enlarged".⁸ One of the original drawings, shown in Fig. 5, presents Hertzberger detaching centre of the building, partly reflecting the contour of surrounding 'towers' and 'streets' to deal with the various geometric shapes that compose it. The care and disposal of the objects, as well as the celebration of the street encounter as the focal point of the project and the facilitation of fluent circulation between the various areas. Two plan schemes that clearly illustrate these relations can be found in Fig. 6.



which followed his design theory, which is why this competition became a watershed moment in the development of Dutch structuralism. The jury members were divided into two camps during the selection process, with one party wanting to improve some of the structuralist-design ideas while the others questioned their potential and solvency, claiming that the City of Amsterdam was unprepared for the competition.

2.3 Centraal Beheer Office: the final performance

In the early months of 1968, J.W. Ruiter, founder and owner of the Cooperative Association Centraal Beheer, commissioned Herman Hertzberger's team to build a new office in Apeldoorn on behalf of the partner 'Pensioen Risico'. The firm, which was consisted of 650 employees or so at the time and had headquartered in Amsterdam since its establishment in 1909, decided to transfer its headquarters to Apeldoorn. Hertzberger was able to bring into motion the architectural model he had been working on for many years thanks to the owner's versatility in the dynamic design. J.W. Ruiter's only stipulations were that careful consideration is given to the

planning and management of the plan and that it should be designed in phases to allow for the phased transfer of company personnel.

The earliest sketches we have, which date from the summer of 1968, indicate progress in comparison to the ones discussed in this correspondence. As illustrated in Fig. 7, it's obvious that Hertzberger compares the design frameworks of Valkenswaard and Amsterdam's town hall for the sole purpose to prove that the pattern system should be selected based on the grid. As a result, he was able to circumscribe and distinguish two types of spaces: circulation areas and explicable spaces. They are presented on two topics that are vital in understanding current developments after the Valkenswaard proposal: form and structure analysis, and polyvalency.⁹ Compared to the obvious fixation of the previous model, in Centraal Beheer office, a component of spatial adaptability is implemented. Hence, a structure was developed in which the structural system delimited a series of equal sectors with an area of 9 m² approximately in which the users

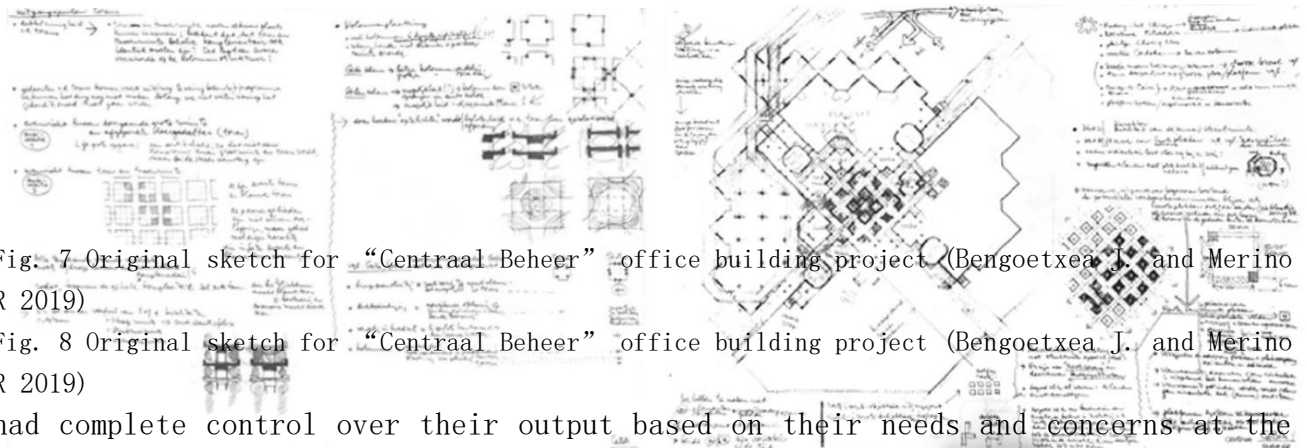


Fig. 7 Original sketch for “Centraal Beheer” office building project (Bengoetxea J. and Merino R 2019)

Fig. 8 Original sketch for “Centraal Beheer” office building project (Bengoetxea J. and Merino R 2019)

had complete control over their output based on their needs and concerns at the time. The location of these explicable areas in the grid system of ‘towers’ and ‘streets’ can be appreciated in the schemes of Figs. 7 and 8, since they are separated from the remained areas without shades.

In contrast to the design scheme for Valkenswaard and Amsterdam, the design proposal for the Centraal Beheer office brought another primary topic into motion, allowing us to relate this project to the Situationist International's ideology: the maze. As a result, it had shown that Hertzberger was influenced by some of Situationist International's theories, especially the psycho-geography and drift studies. The spatial isotropy that defined the Centraal Beheer inner space must be seen as a deliberate attempt to create a labyrinth model with all its implications for the users. (Fig. 9).¹⁰ Centraal Beheer came at a time when the continuous sacrifices made by the people to the government have resulted in the real lack of privileges and capacity for decision-making deemed unbearable by some population sectors. In response to

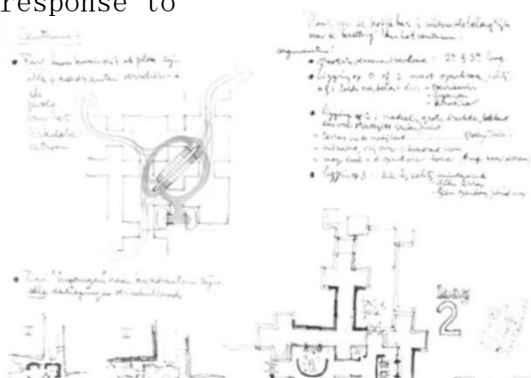


Fig. 9 Original sketch for “Centraal Beheer” office building project (Bengoetxea J. and Merino R 2019)

Fig. 10 Model for “Centraal Beheer” office building project (Bengoetxea J. and Merino R 2019)

this, some of the leading figures in the Situationist International suggested a new urbanism structure in which people became the benchmark of the system. Therefore, they were able to think about the world they experienced through their sensations and consciousness and change the world through perception.

In comparison to the Situationist International’s application of psycho-geography and drift to the urban sphere, Herzberg undoubtedly used techniques to restrict the range of these theories to his urban construction, so that people could freely decide the environment in which users spent the majority of the day. In restricting these ideas to use in his urban buildings, giving consumers the right to choose the atmosphere they live in most of the day. The building was planned as a sensible entirety of similar ‘streets,’ ‘crossroads,’ and ‘towers’ (Fig. 10), through which the only one who could identify a milestone was the worker, who perceived the left room to print his or her tastes and desires. As a result, it becomes a tool whose primary goal is to liberate and reiterate users. The constructed Centraal Beheer proves that the realization of certain assumptions insisted by Hertzberger is feasible. The majority of staff and consumers gave the complex a favourable review, soon citing Centraal Beheer as a representative model of a new building mode focusing on the expansion of human scale.

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Chapter 3 Analysis of Centraal Beheer Office Building

"Designing should be a matter of organizing material in such a way that its potential is fully exploited. Everything that has been deliberately shaped should function better, i. e., it should be better geared to doing what is expected of it, by different people in different situations and at different times. In whatever we set out to make we must try to not only meet the requirements of the function in the strict sense but also that more than one purpose may be served, so that it can play as many different roles as possible for the benefit of the different individual users. Each user will then be able to react to it in his or her way, to interpret it personally so that it may be integrated into his familiar surroundings" ¹ This illustrates the concrete manifestation of the 'polyvalent' space. Herzberger's thinking on 'polyvalent' space design is multifaceted. He puts forward his concept of "dynamic" architectural function based on the background of 'static' architectural design techniques that criticize functional buildings and ignore changes. And he applies this idea to the design of Centraal Beheer office building from the architectural structure, spatial organization, the creation of 'place' and architectural details, etc.

3.1 Dynamic architectural functions

As the above statements present, the architectural design must avoid over-specific division of functions, and instead focus on those aspects that can be changed, so that they can adapt to changes. The function of the building changes with the living conditions of the users and occupants, so there should be no rigid functional design ideas at the beginning of the design. What the architect has to do is not simply name the space, but first regard the variability itself as a continuous element, which gives meaning to each individual architectural form. As change is inevitable, the building should adapt to this change and not lose its features when changing. To achieve this, the design of architectural forms must allow people to have multiple interpretations, particularly when the function of the building has changed or even becomes something beyond the expectations of the architect.

As an illustration of the dynamic architectural features, the floor plan of buildings can be divided into a series of separate and repeated spatial units. The spatial plan begins with the premise that both work and pleasure activities take place in small groups, not independently. The entire design can therefore be based on the single building block or work area of a 3x3m square (Fig. 11), which corresponds to the amount of space that maximum of four workers collectively have to work. These areas of work were called 'interpretable zones,' so that changes can be absorbed and various office infills can be accommodated. One working 9x9m island comprises four of these working areas and an intermediate circulation area connecting them (Fig. 12). The circulation area passes through "bridges" which

connect the various working islands, which

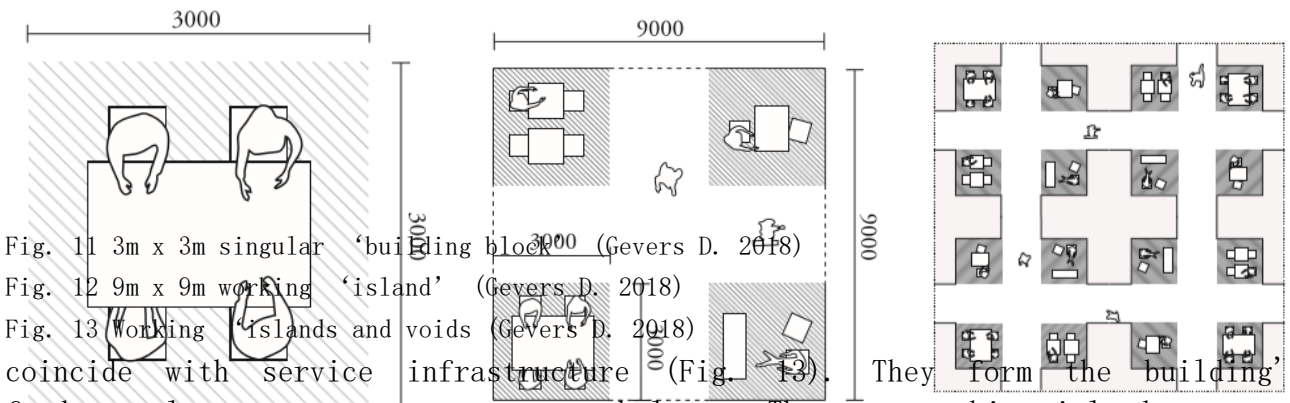


Fig. 11 3m x 3m singular 'building block' (Gevers D. 2018)

Fig. 12 9m x 9m working 'island' (Gevers D. 2018)

Fig. 13 Working islands and voids (Gevers D. 2018)

coincide with service infrastructure (Fig. 13). They form the building's fundamental, permanent structure or skeleton. The open working islands are not only horizontally but also vertically linked, which creates a strong sense of solidarity and makes the office a cohesive community attraction. In addition, the dimensions of each working island enable this space to be served as restaurants, exhibition space, and educational space effectively as well (Fig. 14).

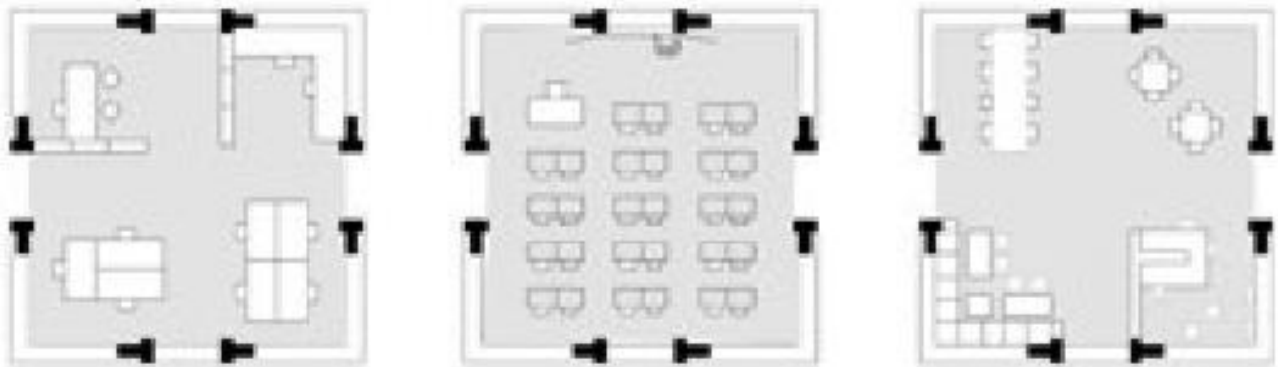


Fig. 14 the unit for office, educational space and restaurant (Hertzberger H. 2015)

3.2 Structure - the foundation of 'polyvalent' space

3.2.1 The priming 'structure'

"Broadly speaking, 'structure' stands for the collective, general, (more) objective, and permits interpretation in terms of what is expected and demanded of it in a specific situation." ² Interpreted from the perspective of architecture, it is a structural form that rarely changes or does not change at all, but it can be applied to different situations. The reason is that it provides new expressions for new functions. 'Polyvalent' space simultaneously represents two different architectural and temporal ideas: one is different expressions at different times; the other is the diversity of individual expressions at the same time and

constitutes a whole. Therefore, a structure with persistent characteristics and the ability to accommodate change can explain the ideas above. According to Hertzberger, the grid structure is based on very fundamental concepts and defines the general rules, but it is all the more flexible when it comes to the details of each site.³ In general, the grid structure can well control, reduce building space and maintain appearance integrity; however, the interior space-filling function and users have more flexibility. This grid structure has a priming framing role, and it contains the basic tendency to transform every result. Moreover, since this grid gives each constituent unit a common tendency and hence not only each part will determine the overall characteristics, but the whole in turn will give each part its characteristics.

The grid system plays a leading role in the entire design processes of Centraal Beheer office. Firstly, Hertzberger set the diagonal grid on the site, which defines the average area of each unit (Fig. 15) and then the boundary above the grid decides the main volumes of this building (Fig. 16). Secondly, there is a central cross space, which runs through the main architectural volume

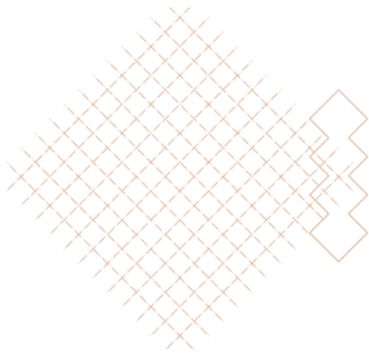


Fig. 15 the grid on site

(J.Lim, 2017)

2017)

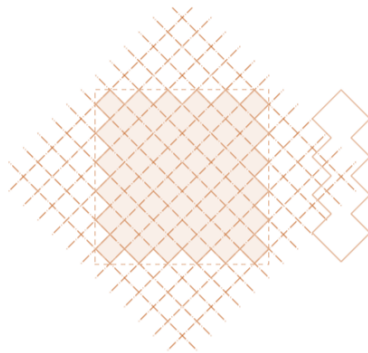


Fig. 16 the boundary line for the building

(J.Lim, 2017)

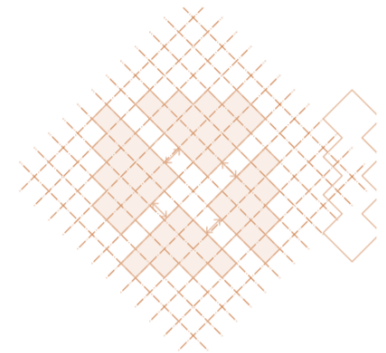


Fig. 13 the

(J.Lim,

and divides it into four ‘quadrants’ (Fig. 17). Based on the 9 x 9m area of one working ‘island’, the basic volume is articulated by the grid and this creates the module of the building (Fig. 18). In addition, this grid enables the individual to detach from each module and functions as an independent working ‘island’ (Fig. 19). Finally, there is an additional grid that coincides with the internal circulation system and connects each island to create the movement flow (Fig. 20).

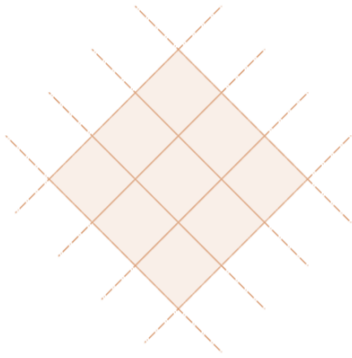


Fig. 18 the grid of volume
grid of circulation
(J.Lim, 2017)

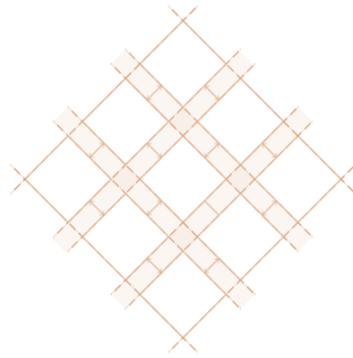


Fig. 19 the grid of detaching 'island'
(J.Lim, 2017)

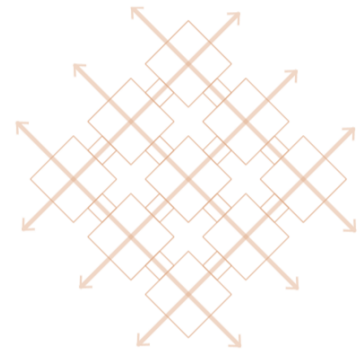


Fig. 20 the
(J.Lim, 2017)

3.2.2 The building 'order'

Hertzberger explained that when each part determines the whole together, or when the parts are formed from the whole with the same logic, the resulting architectural unity can be called 'building order' and this unity can be called 'structure' in a sense.⁴ In this way, he expanded the concept of structure to a broad level, where 'structure' not only refers to the structural system of construction but also represents the structural relationship between the whole and the parts that make up the building. Under the background of this basic design principle, the design of each component is carried out, meanwhile, the design result of each component, in turn, enriches the original design framework. The process of partial mutual determination finally makes the building form a certain order. This kind of building order is formed through overall consideration that can provide multiple functions. The internal architectural order can make the architecture have free expression. This ordering system is 'competence', which encourages " 'performance' belonging to a specific place.

The structure design stems from the building's space plan and significantly dominates the interior space. It begins with the layout of a single island divided into four working areas and cross circulation zones and the layout is equivalent to the 9x9m structural grid (Fig. 21). The primary beams and columns circumscribe the transition from the circulation to the work zones and space is often defined by the height of structural elements, as the primary beams are much higher and lead to a narrower circulation area. In addition, the secondary beams surround

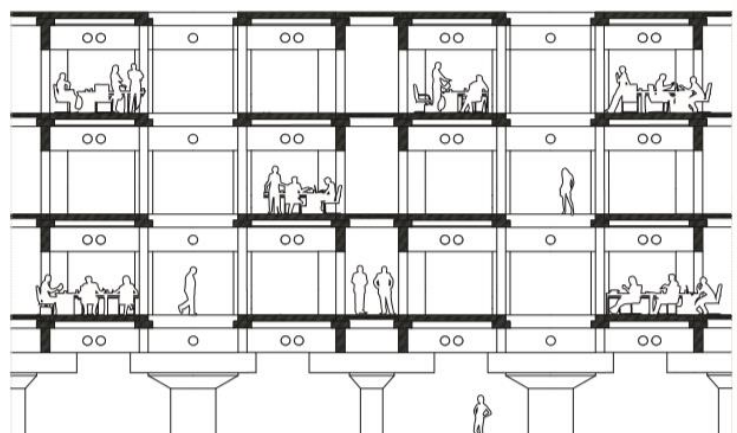
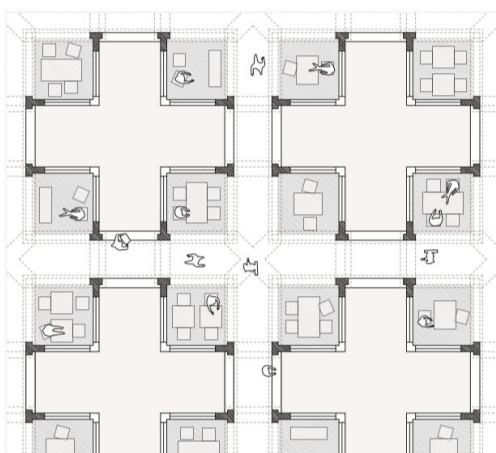


Fig. 21 Structure and space: plan (Gevers D. 2018)
(Gevers D. 2018)

Fig. 22 Structure and space: section

the working areas (Fig. 22). The structure's repetitive design represents a democratic office without hierarchy. A rigid and equal system, establishing order which is necessary for the freedom of the individual and the interpretation of the workers. Working areas are directly in contact because of the absence of internal walls and the open voids between four working islands, horizontally. The cantilevering, secondary beams, and the position of the columns at two corners of individual 'island' enhance this openness.

3.3 Collective space and place

3.3.1 Building configured as a city

One of the most essential points in Hertzberger's design theory is that the method that buildings can meet social changes continuously is to organize the architectural space in the way of urban spatial structure and make the building have a collective space structure such as 'streets' and 'squares' in the central area, as a support for the internal building order.⁵ There are two points to note here. For one thing, the meaning of this central area is a space for collective activities and social interaction. For another thing, the mainline of internal circulation is this central area and all internal loops shall be restricted to this area.

Followed by the grid system, there are four quadrants of this building, which are formed by working islands and surrounded by voids. Three of them were office quadrants and a service quadrant comprised a variety of services, including restaurants, kindergartens, barbers, sports facilities, and so on. The four quadrants were linked to the 'central street' (Fig. 23). An entrance

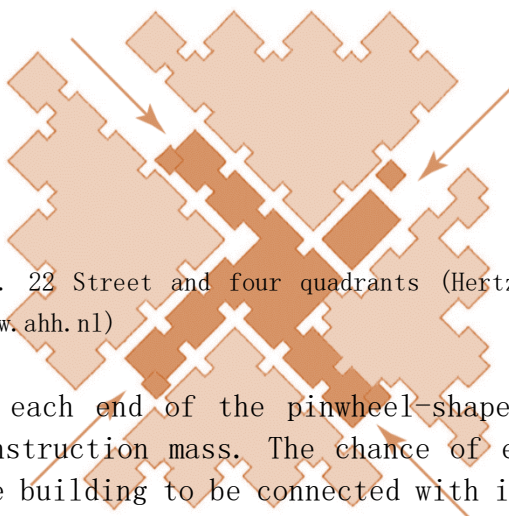


Fig. 22 Street and four quadrants (Hertzberger H. 1977)
(www.ahh.nl)



Fig. 23 the central space

at each end of the pinwheel-shaped street is located slightly in front of the construction mass. The chance of entering the building from various sides meant the building to be connected with its environment well and non-hierarchically. The social character of the building is greatest in this regard because it includes

all other programs, except offices, including a coffee corner, living room, bathrooms and boudoirs, for men and women to change their clothes (Fig. 24).

3.3.2 Place with proper scale

Hertzberger believes that the mathematical measure of dimension should not be used to determine the size of the space, which is more likely to depend on the needs of the ‘social interaction type’,⁶ and the concept of ‘scale’ should be introduced instead. The notion of scale is usually used indiscriminately to express size. In fact, the concept of scale should express whether a design frame or building is too large or too small, or larger than what we are usually used to.⁷ Scale is a relative concept. People’s perception of the size of an object is not only affected by its dimensions but also whether the scale is suitable for its function. Hertzberger also argues that the connection of these space units to an appropriate size and a right meaning of closure will generate ‘place.’⁸ The reason why combined spaces can create places is that a large space can only do a certain sort of activity for individuals. Multiple different organizations can simultaneously carry out several activities.

In the design of the Centraal Beheer office building, the combination of space with various scales has even become a basic principle, which is also the reason why this building has the potential for internal changes and allows people to adapt to many possible changes. The scale of the workplace is determined by the size of the worker’s desks. The plan of furniture in the workspaces is not fixed layout. Many choices have been made, but it has been permitted if office workers find various ways of designing them that would work well for them. Essentially, the building is just a framework, and it is for users to do as they want and their workplace (Fig. 25). It makes possible a wide range of layouts of all working areas in contrast to that which is itself a building: a repetition of the same unit, with the products carried by people, such as posters, decorations as well as pets.

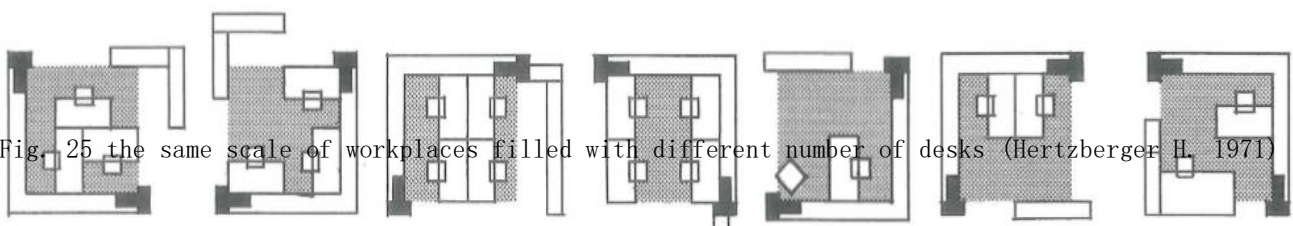


Fig. 25 the same scale of workplaces filled with different number of desks (Hertzberger H. 1971)

3.4 Form and users

“The more involved a person is with the form and content of his surroundings, the more those surroundings become appropriated by him, and just as he takes possession of his surroundings, so they will take possession of him.”⁹ The realization of ‘polyvalent’ space not only gives the space greater ‘competence’ but also integrates elements in the space that can evoke the collective memory of users and make them willing to understand and express it. Therefore, Hertzberger proposed to provide ‘incentives’ in the design to evoke associations and his approach to applying such design ideas to an actual project is to consciously leave some parts unfinished, which is not only suitable for renovation and expansion, but also

designed to provide a variety of possible results to a certain extent, and should be able to inspire users to complete.¹⁰ And these unfinished parts can be designed in terms of architectural components.

Regarding the architectural components, Hertzberger emphasizes that those parts are not independent and abrupt individuals, but should have a corresponding relationship with other components, which means they are one body from a form. These ‘unfinished’ components reflect a kind of temporality, to induce those temporary users to take corresponding actions, and can stimulate the initiative of users to reform. Columns and piers are the most common incentive components in the design of Centraal Beheer office. The section of the square column is to be easily connected to solid walls and low walls and the proportions are appropriate as well (Fig. 26). Besides columns, the leaning pillars that appear in the building in various forms can serve a variety of purposes, depending on their location and the space they leave. As figure 27 has shown, this leaning pillar marks the meeting space and provides a starting point, implying the entrance to this semi-private space.

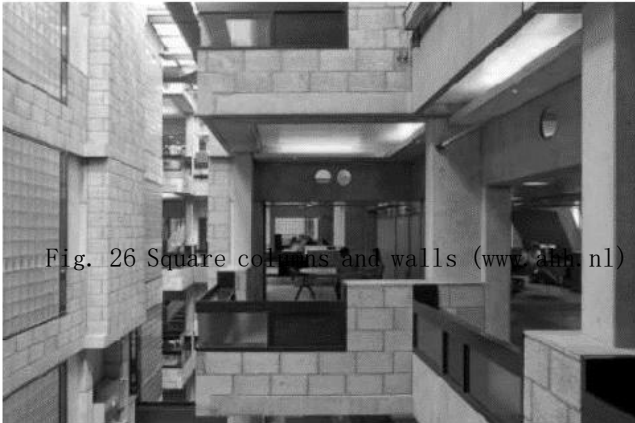


Fig. 26 Square columns and walls (www.ahh.nl)

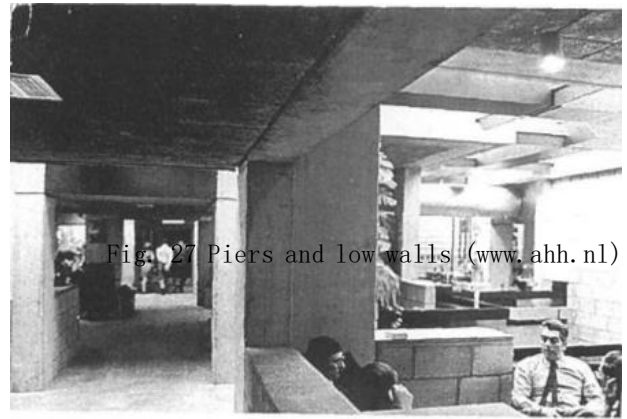


Fig. 27 Piers and low walls (www.ahh.nl)

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10. *ibid.*, p164.

Conclusion

This thesis aims to research the application of the core architectural theory of ‘polyvalent space’, espoused by Herman Hertzberger, in the real design project. By investigating the contents of his publications and analysing Centraal Beheer office Building, the design theory of ‘polyvalent space’ will be interpreted and elaborated more comprehensively and accurately. The first chapter discusses the theoretical factors influencing Hertzberger’s ‘polyvalent space’ design conception from four aspects: structuralism in linguistics, structuralism in architecture, Aldo van Eyck’s architectural ideology, and the *Forum* magazine. The concept of ‘polyvalent space’ is the result of Hertzberger’s comprehensive analysis and inheritance of the above influencing factors. He creatively connects the ‘competence’ and ‘performance’ in linguistic with the form and the expression of form in architecture, which is different from those architects who regard space as abstract material. Hertzberger creates space from the perspective of users, trying to find some structural forms that are not only functional but also effective, so as to motivate users to interpret by themselves. During his working experience in *Forum* magazine, the architectural thoughts of Aldo van Eyck’s architectural ideas solved his confusion. Those ideas became the most direct theoretical reference for ‘polyvalent space’ and the influence of those design techniques can be clearly seen in his early work. In the second chapter, the analysis of design proposals for the town halls of Valkenswaard and Amsterdam and Centraal Beheer company illustrates the formation of Centraal Beheer office building. By comparing Hertzberger’s conceptual drawings of the design schemes for the Valkenswaard and Amsterdam’s town hall competition and the bidding design for Centraal Beheer office, it is logical to comprehend the transformation of Hertzberger’s thoughts during specific historical time, influenced by constant social unrest and need and its impact on his presentation of design. In the design of Valkenswaard’s town hall competition, the repeated pattern of spatial units emerged initially and the discussion about the scale and intermediate spaces became the main subject of this proposal. Regarding the proposal for Amsterdam’s town hall, the combination of ‘tower’ and grid system contributes to the fundamental function of the central core space and circulation zones of ‘street’. And the idea of configuring buildings as a city has a significant influence on the design of Centraal Beheer office.

For the third chapter, the polyvalent design theory is illustrated further in terms of dynamic architectural functions, the fundamental structure of polyvalent space, the relationship between collective space and individual place, and inviting forms for users. Hertzberger inherits Van Eyck’s architectural theory, opposed the functionalist architect’s static thinking on the relationship between humans and architecture, which lacks the consideration of time and changing factors in the architectural function and space. He regards architectural function as the reaction of human social behaviours in architecture. Change is inevitable and continuous, which architecture must be able to adapt to. This is the background condition for

the emergence of 'polyvalent space' design theory. In addition, he interprets the concept of 'structure' as being used to express a framework and an internal architectural order. This represents the 'competence' of architecture, which has the ability to evoke potential understanding and expression in each individual situation. The central space is framed by the structural system, which is called 'collective space'. It is the place where collective activities and social interactions take place. This space reflects people's collective wishes and memories, which is the support of the 'competence' of building and the condition for users to make individual interpretations. In a broader sense, he understands this 'space' as the structure that maintains the architectural space to make the building durable. The 'collective space' contains people's experiences and memories, which makes them feel of belonging and security and then the 'place' comes into being. The sense of place is the external manifestation of the introversion of people's spirit and attention. It enables people to realize their desire for association and free expression of architectural forms. Hertzberger proposes to improve the sense of place of the building by refining the space division, which distracts people's attention to increase the complexity of the space. Therefore, the spatial scale is controlled within a suitable range for people to understand, allowing people to express themselves spontaneously. In terms of form, Hertzberger considers form as a general structure to construct the relationship between form and users. At the beginning of the design, it is necessary to maintain an idea of understanding the architectural form from the perspective of the user. In the architectural form, the factors that are sufficient to stimulate the user's understanding and free expression should be reflected in both the structural details and space.

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