



Cultural Value Report

## VAM System

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# 1. Introduction

The report is one of the outputs of the graduation project under the supervision of Graduation studio Re-Housing, which is under Chair of Heritage & Architecture at the Faculty of Architecture of Delft University of Technology. The theme of the studio is about transformation of existing post war housing stock built with non-traditional-building-methods. VAM-system building is the main focus of this report and one of the Intervam flats, the neighbourhood located at the Camera Obscuradreef in Overvecht, Utrecht, is taken as an example for further research.

Started in 1920 and becoming popular after WOII, research and practice of non-traditional-building- methods contributed to the developing efficient, mass-produced building systems. (Chen et. al., 2016)The systems are applied in large scale during post-war reconstruction to full-fill the urgent requirement on dwelling, due to their economic efficiency, characteristic of labour-saving and short construction period. VAM system is one of the non-traditional building methods developed for after-war reconstruction. It is based on a structural system composed of heavy mounting elements, including floor, wall, roof panels, stairs and windows, which were prefabricated in the factory. The dwellings constructed under VAM system are also named as Intervam flats, since is conducted mostly by Intervam N.V. (Priemus & Van Elk, 1971) As the location of the largest factory(Priemus & Van Elk, 1971), Utrecht is where the majority of Intervam flats are built. Between 1945 and 1970 ten new neighbourhoods were developed in Utrecht, of which Overvecht was the largest and the most quickly realised. (Connolly et al., 2011) Finished in 1965, Camera Obscuradreef is the largest neighbourhood that is still existed among the seven neighbourhoods composed of Intervam flats built in Overvecht.



Figure 1. Location of Camera Obscuradreef



Figure 2. Intervam flats in Camera Obscuradreef

The graduation studio investigates research and design, which is conducted by methodology of bringing together “the fields of cultural history, technology, and architectural design in a single holistic approach”. (Heritage & Architecture, 2016) The report reveals the study into cultural value aspects of the graduation project.

The framework of the cultural value analysis is based on 6’s system of Steward Brand: site, structure, skin, service, space plan, stuff + 1’s of “story”. (see Figure 3) Cultural value evaluation was assimilated into a matrix which is scaled on the y-axis according to the 7 S; and different heritage values designated on the x-axis: age, historical, artistic, commemorative, use, newness, conflict value of Alois Riegl’s theory. (Chen et. al 2017) The report starts with the general statement of cultural value of both the system and the site based on cultural value matrix. Personal assessment of the cultural values is categorized with high, medium and low, and indicated by colour of red, yellow and green respectively in the matrix. The detailed cultural value assessment of each “s” are analysed in the second part, including the key values, dilemmas and the obligations and opportunities resulted from the values. The design strategy responding to the value assessment is discussed in the third part of the report.

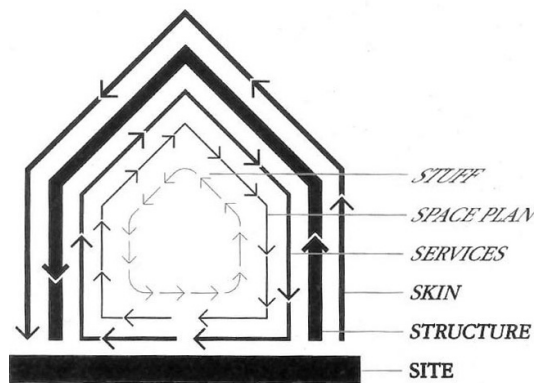


Figure 3. The “S” system of Steward Brand (Steward Brand, 1994)

## 2. General Statement of cultural value

In general, the majority of values are historical value, use values and artistic values. The structure system of Intervam flats and the site plan of the neighbourhood in Camera Obscuradreef, Overvecht are both embodiments of post-war architectural design and urban-planning concept, which are of significant historical value. In the architectural aspect, historical value can be regarded as the idea of standardization and industrialization of mass-produced dwellings at 1960s, which are reflected in the functional VAM system. The organized masterplan of Overvecht area delivers the historical value of the site, which is the urban planning concept of Wijkgedachte, the idea of building cities consist of recognizable neighbourhoods that would function as a community. The majority of use values are embodied in the rational structure, the efficient space plan and the skin system that enables flexibility of in-filled fragments. The use values can also be considered as reflections of the historical value on the Intervam flats. Artistic value, of which the most important embodiment are structure, is also of vital importance, since they express not only the uniqueness and distinctiveness of the system but also the aesthetic of after-war reconstruction period.


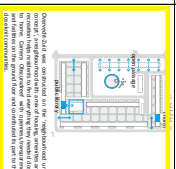


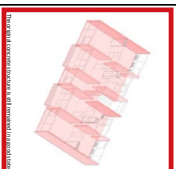
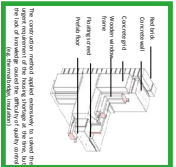
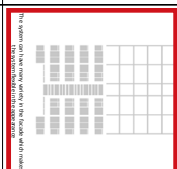
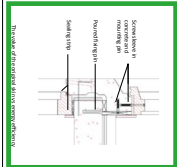
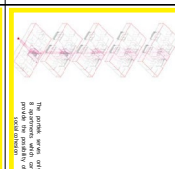
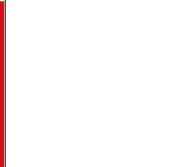
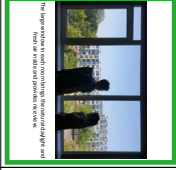
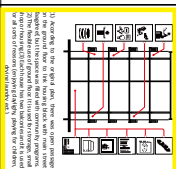
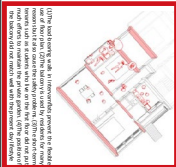


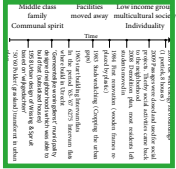

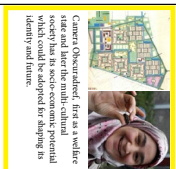

System \ Value	Conflict	Age	Historical	Artistic	Commemorative	Use	Newness	Social	Dilemma
Site			 The image shows a historical site plan of a circular building complex, likely a university or government building, with a central courtyard and multiple wings radiating outwards.					 The image shows a site plan of a modern building complex, featuring a central courtyard and multiple wings radiating outwards, similar to the historical plan.	
Structure			 The image shows a photograph of a modern building facade, featuring a grid of windows and a prominent vertical element.	 The image shows a photograph of a modern building facade, featuring a grid of windows and a prominent vertical element, with a red grid overlaid on the image.		 The image shows a 3D architectural model of a building, featuring a grid of windows and a prominent vertical element.			 The image shows an architectural section drawing of a building, featuring a grid of windows and a prominent vertical element.
Skin						 The image shows an architectural section drawing of a building, featuring a grid of windows and a prominent vertical element.			 The image shows an architectural section drawing of a building, featuring a grid of windows and a prominent vertical element.
Services						 The image shows an architectural section drawing of a building, featuring a grid of windows and a prominent vertical element.			 The image shows an architectural section drawing of a building, featuring a grid of windows and a prominent vertical element.
Space Plan				 The image shows a photograph of a person looking out a window, with a view of a landscape and a building.		 The image shows an architectural section drawing of a building, featuring a grid of windows and a prominent vertical element.			 The image shows an architectural section drawing of a building, featuring a grid of windows and a prominent vertical element.
Stuff						 The image shows an architectural section drawing of a building, featuring a grid of windows and a prominent vertical element.			 The image shows an architectural section drawing of a building, featuring a grid of windows and a prominent vertical element.
Story			 The image shows a text box with historical context, including a table with columns for 'Facilities', 'Low income gov.', and 'Individuality'. The table lists various facilities and their associated years and descriptions.			 The image shows a text box with historical context, including a table with columns for 'Facilities', 'Low income gov.', and 'Individuality'. The table lists various facilities and their associated years and descriptions.		 The image shows a text box with historical context, including a table with columns for 'Facilities', 'Low income gov.', and 'Individuality'. The table lists various facilities and their associated years and descriptions.	 The image shows a text box with historical context, including a table with columns for 'Facilities', 'Low income gov.', and 'Individuality'. The table lists various facilities and their associated years and descriptions.

Figure 4. Culture Value Matrix

### 3. Cultural Value Assessment

#### 3.1 Historical Value

There are two major historical value embodied in Intervam flats at Camera Obscuradreef: one is the value reflected on the site plan of Overvecht, and the other one is expressed by the VAM system.

The site plan of Overvecht area follows the concept of “Wijkgedachte”, which is an urban theory that was used to design the cities during the reconstruction period after the Second World War. The study was based on the vision to seek for a panacea against the superficiality and alienation of the big city, and create the society in which the religion, social status, and stage of life was no longer the determinant to form a boundary. The new city would be the place where diverse people can live together by establishing the community. (Geyl, 1948)

The Overvecht area has been realized in 1960s based on the idea of “Wijkgedachte” and it was the typical product of its time. (Connolly et al., 2011) The idea was to build cities consist of recognizable neighbourhoods that would function as a community. The neighbourhood therefore consisted of housing types for all ages: young families, the single, the elderly couple. The facilities were classed by the frequency of use and divided into certain distances. For example, each neighbourhood is partly self-sufficient by the existence of bakery, grocery store and community centre at the neighbourhood scale. The rest of the larger-scale facilities such as hospital, theatre or university are available at the city level. The principle of ‘stempel’ was used here as well. There was a combination of high-, medium-, and low- rise buildings with different kinds of public spaces located in-between the housings. The children were playing on the playground close to the houses and people were strolling along the park. (Connolly et al., 2011)



Figure 5. Catholic version of “Wijkgedachte”  
(Image link: <http://www.bestandewoningbouw.nl/begrip-van-het-verleden-biedt-kansen-voor-de-toekomst/>)

The VAM system reveals the spirit of Modernism. The value can be intensively regarded as a synthesis of rationalization at design and concept stage of the system, and standardization expressed in realization of the system. Modern architecture includes “the link between the phenomenon of architecture and that of the general economic system” (Peckham and Schmiedeknecht, 2014). Arising from standardization and rationalization, the general economic system propose requirement on minimum working efforts, including simplified working methods, reduced need for skilled labour and sacrificed individual requirements for maximized social satisfaction. The “economic system” can be revealed in design and construction of Intervam flats. Developed for fulfilling urgent requirements of dwelling due to baby-boom in 1960s, the starting point of VAM system is to provide large number of dwellings in limited time, and standardization is a vital working method to achieve the goal. The exploration on way of designing the “ economic system” can be regarded as historical value of VAM system.

Both Standardized floor plans (see figure 6-1, 6-2 and 6-3)and prefabricated and standardized building elements (see figure 7) were designed and applied for efficient design and fast construction. Six houses can be produced in the factory within one day, and four to five of them can be assembled on site everyday. Only fifty percent of educated labour is required during construction, and with one thousands working hour one properties can be finished. (Priemus & Van Elk, 1971)

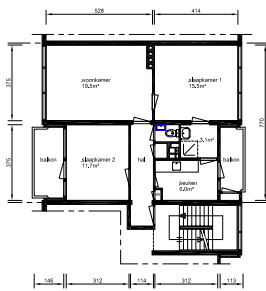


Figure 6-1. Floor plan of Intervam flats in Stanleylaan (Mitros, 2009)

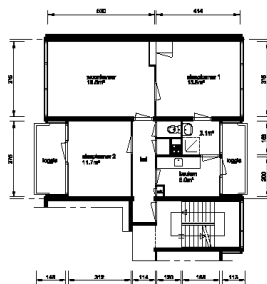


Figure 6-2. Floor plan of Intervam flats in Camera Obscuradreef (Mitros, 2009)

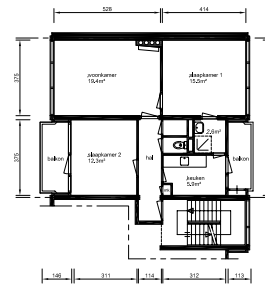


Figure 6-3. Floor plan of Intervam flats in Marco Pololaan (Mitros, 2009)



Figure 7. Construction of Intervam flats (Priemus & Van Elk, 1971)

### 3.2 Use Value

Rationalization, or to be more precise, the spirit of efficiency during post-war construction after 1950s, and study into standardization resulting in significant use value of VAM system, which are The use values are mainly revealed in its structure, space plan and skin.

Every fragment in the structural system is essential. All load-bearing walls, partition walls and floor slab (figure.8) are indispensable to the stability of the whole building. The walls are fixed with a certain distance and the space in between has a maximum of 3950mm. The span achieves balance between stable load-bearing system and proper dimensions of each room, which enabling efficient use of every space. (Figure 9)

The ambition and the method of efficient use of limited space, which is the use value of the space plan, is expressed by the well-organized floorplan. Designed for the “maximized satisfaction of the large numbers”, the standardized plan provides a proper living environment to accommodate a large family in a small apartment. Maximized size of each room is achieved by minimizing circulation, sanitary, kitchen, service and other serving spaces. As illustrated in figure 10, washing, cooking and evacuation space are grouped around the shaft and pipe, and the busy circulation in a large family is organized by one narrow corridor only.

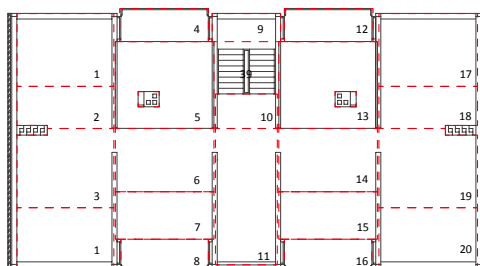


Figure 8 Pre-fabricated floor slab elements



Figure 9. Load-bearing system of Inter-vam flats

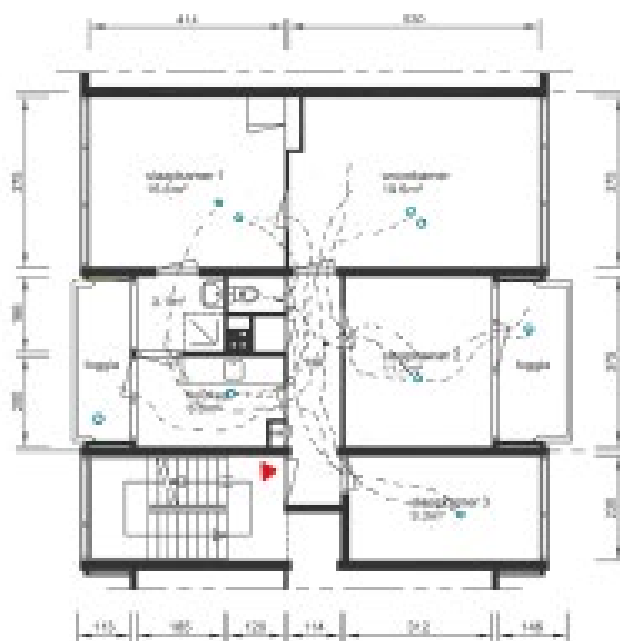


Figure 10. Circulation within one flat



Industrialized and standardized system also requires an efficient solution for flexibility to a certain extent, for both individualization of different buildings and fitting in with specific context. This idea can be regarded as the use value of the skin. The in-filled fragments of the skin can be variant from each building in order to fit different context (see Figure 11-1, 11-2 and 11-3), while fragments of all properties are sharing the same dimension due to the structure system. The flexible skin system leads to efficient design process of Intervam flats, since façade designed for a specific location can be simplified by a settled universal dimension and ration of the VAM skin fragments.(Figure 12)



Figure 11-1  
Skin of Intervam flats in Obscuradreef,  
Utrecht

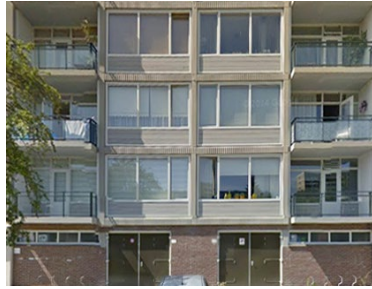


Figure 11-2  
Skin of Intervam flats in Stanleylaan,  
Utrecht



Figure 11-3  
Skin of Intervam flats in Altasdreef,  
Utrecht



Figure 12. Concrete grid filled with different fragments

### 3.3 Artistic Value

The aesthetic of rationalization and standardization revealed in Intervam flats is one of significant artistic values of VAM system. The artistic value is mainly embodied in the skin of Intervam flats.

Modern architecture is considered as “a rational construction approach defined by the materials and purpose of the structure”(Rossella and Richard, 1999), and in the Intervam flats, the “rational approach” is expressed on the skin. The prefabricated concrete structure is revealed in the concrete grid on the façade, which is one of the most recognizable characteristics of Intervam flats. (Figure 13) In spite of the structure, interior functions of Intervam flats are also revealed on the skin. Resulting from the typology of portiek flats (Figure 14), the skin fragments follows a rhythm of symmetry (Figure15)

Moreover, expressing standardization and mass-production, which is the figure of not only concept behind Intervam flats but also its realization, the rhythm of the in-filled fragments, the repetition of the module (see Figure15), is an important carrier of artistic value of VAM system as well.

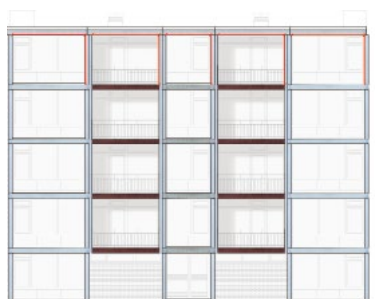


Figure 13.  
The concrete grid

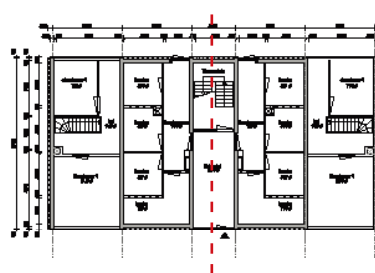


Figure 14.  
Intervam flat plan in Camera Obscur-adreef: a portiek flat  
(Mitros, 2009)

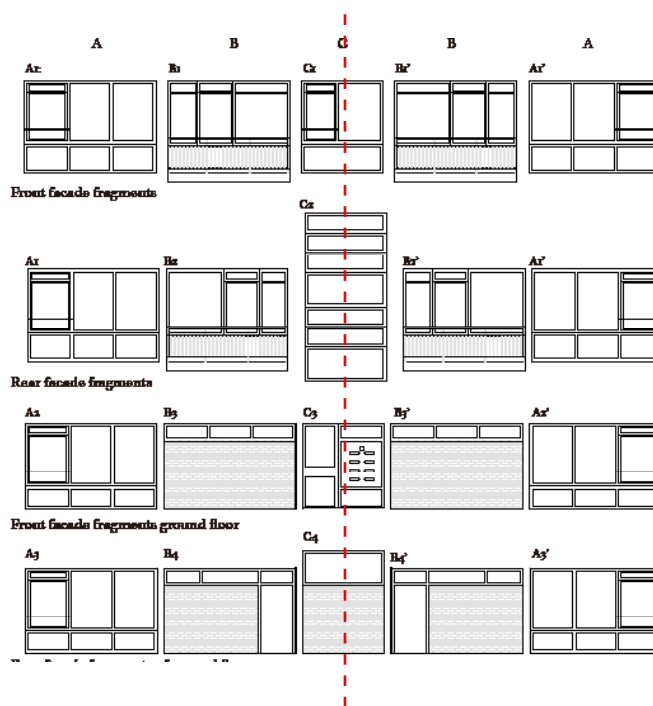


Figure 15. The rhythm of symmetry and repetition

## 4. Obligations and Opportunities

In general, the designers are with obligations to take consideration of certain values in both architectural scale and urban scale. In a small scale, the use value and artistic value of the structure are of vital importance. Every single part of the original structure should be carefully considered, since damaging the special interlock between pieces may influence the stability of the whole structure. As a strong and typical characteristic of Intervam flats, the concrete grid on the skin should be preserved, even strengthened. Method of making full use of the grid needs to be explored. In a larger scale, the idea of Wijkgedachte, which is the base of urban plan of Camera Obscuradreef and the whole Overvecht area, should be carefully considered if renovation of the neighbourhood plan and urban design are proposed.

As far as I am concerned, the idea of efficient construction, standardization and prefabrication behind the concept and realization of VAM system can be an opportunity for renovation and transformation of Intervam flats. Currently, the major problem, based on my observation, is the conflict between the diverse and frequently changing tenant groups with new lifestyle and the rigid apartment designed for 1960s large families only. The problem occurs in most of the Intervam flats instead of in Camera Obscuradreef only. Consequently, an efficient solution should be able to solve the problem of the system. As a result, the standardized system with flexibility to some extent may enable a flexibly standardized renovation scheme for VAM system. The structure is well preserved and can be efficiently re-used, and the proper span between load-bearing walls enables adequate use of space. The flexibility of the facade fragments resulted from the structure and skin provides more chances. More explorations can be done on in-filled skin fragments, making them fit the interior function and the specific context.

## 5. Design Strategies

The dilemmas caused by the historical value of VAM system is starting point of the design, VAM system embodies not only strong cultural value but severe problems. For my personal point of view, the main problem of Intervam flats can be concluded as the conflict between the Intervam flats designed for unitary residents in 1960s, which are large families, and more diverse tenant groups and their modern lifestyle. Current occupants include not only large families but also single tenants, who are mainly students and young commuters, starters and those with smaller size. For increasing number of smaller households, more small apartments with more open space-plan are in need. In addition, the new family structure and resulting new lifestyles are conflicting with the original plan. The problems result from the interior space, which is difficult to be transformed in a large scale in most of the social housing cases, since emptying the apartments and relocating current tenants can be both time-consuming and costful. Moreover, the historical value comes from the standardized plan for the whole system makes the problem standardized to most of the Intervam flats. Thus repeatedly re-designing different Intervam flats may result in repetitive work as well as unnecessary long design and construction period. Consequently instead of solving problems observed in Camera Obscuradreef, a sufficient solution for VAM system itself is essential. The research question is thus proposed based on research products and resulting problem statement, which is: how to re-design Intervam flat to serve residents with diverse requirements in an efficient way?

The historical value of VAM system also plays a key role on answering the question. Inspired by the historical value of the system, an industrial and systematic solution is proposed, which is a catalogue of proposals for renovation of most of Intervam flats. Space plan is the major part of the scheme, and the minimum units of renovation is scaled down to one apartment to maximizing the flexibility of the scheme and reducing the cost of relocation (Figure 16). The re-designed floor plans prototypes are the first part of the catalogue, and fragments, including interior fragments and exterior fragments are also designed as part of the catalogue to serve the floor plan and make the products at various location to fit different urban context.



Figure 16. The concept: a catalogue of renovating Intervam flats in flat scale

The design proposal tries to update the historical value of VAM system by solving the dilemma resulted from the value, including the rigid structure, limited possibility of flexible use and the standardized and mass produced problems of all Intervam flats. It is updated by the chances the system itself provides. The value of standardization is kept and used in the catalogue concept for reducing cost and time spent on both designing, producing and constructing process. By proposing the idea of catalogue, the design aims at finding a balance between flexibility and standardization, giving full play of individual efforts and variety, and yet taking full advantages of mass-production and standardization on solving problems in large scale. A standardized and rigid frame is designed to accommodate the flexibility. Together with the kept load-bearing structure and shafts, the re-designed logic of spatial arrangements and service equipment, including water and electricity supply, equipments for evacuation and ventilation compose the basic frame. (See figure 17.)

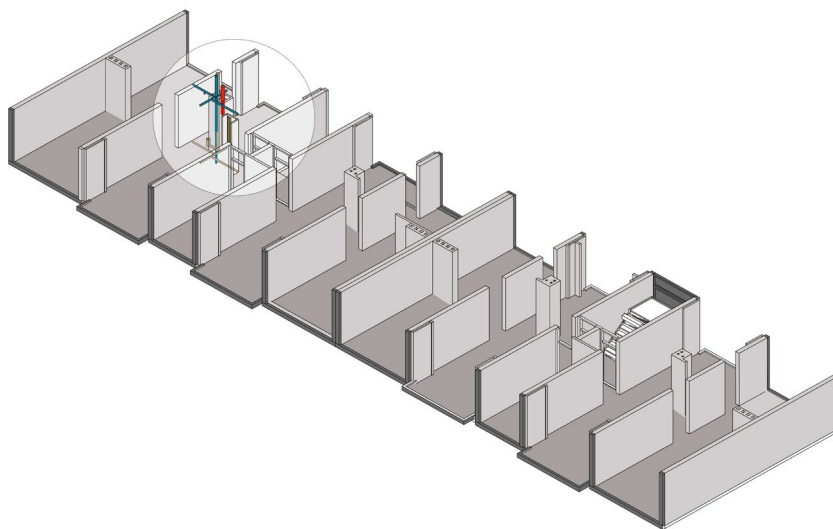


Figure 17. The fixed frame: kept load-bearing structure and service facilities

The fragments filled into the frame provide flexibility. The fragments are flexibly standardized. The spaces that can be different is fixed, including the balcony, the combination of kitchen and sanitary, the entrance and the extra storage (see figure 18). Based on research of different requirements on specific spaces, several design of certain spot is proposed to fit certain requirements. Moreover, the original construction concept of prefabrication is kept as well. All facade fragments, and part of the interior fragments are pre-fabed, since the shortened on-site installation process can minimize the influence on the surroundings and, which can be vitally important for the gradual renovation approach. (See figure 19.)



Figure 18. 4 spots

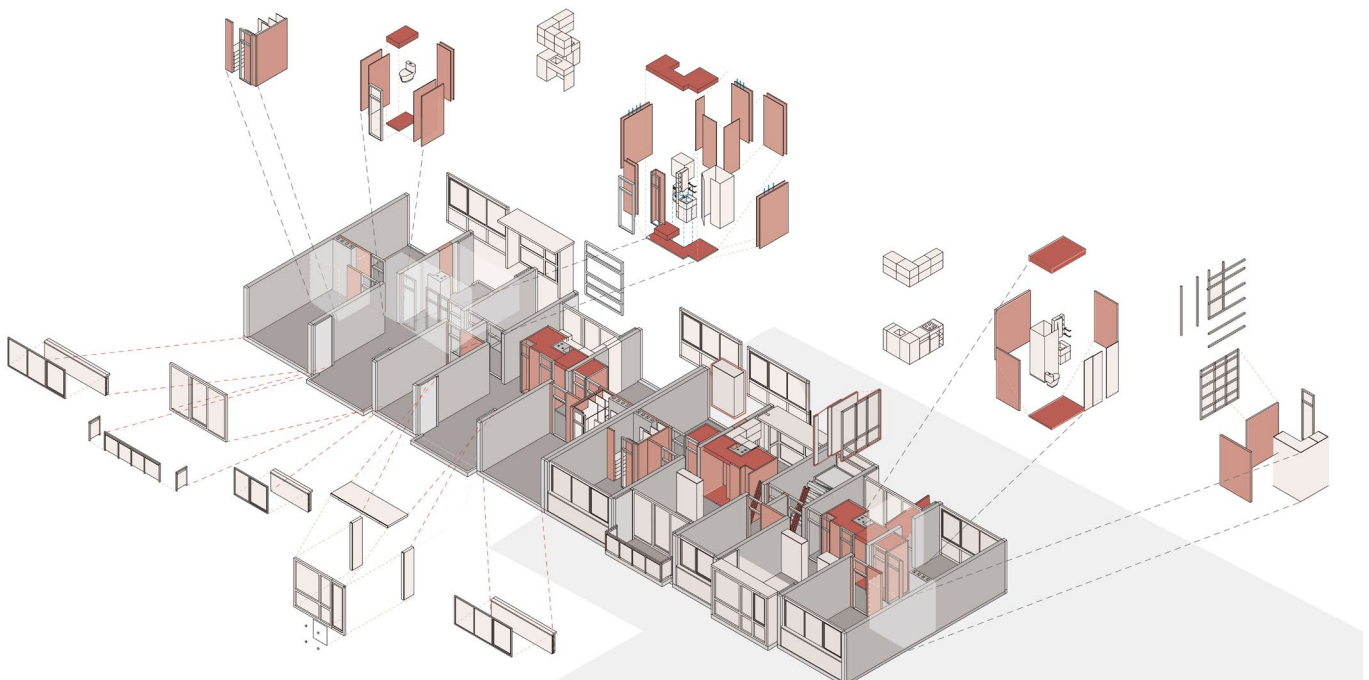


Figure 19. Assembly scheme

In spite of value of space plan and structure, the value of the skin is preserved as well. Both concrete grid and the rhythm of symmetry are kept, and become a chance for the design. Flexibility of in-filled fragments enabled by the grid provides possibilities for both the small-scale replacement of each inn-filled fragments and expression of variety on facade. Moreover, the use value of skin offers chances of organizing the variant facade fragments. The gradually renovated facade and the concept of expressing variants on the facade can result in an orderless elevation. The potential negative influence is prevented by the kept concrete grid and rhythm of symmetry. Different fragments in-filled in the grid are united within the grid, and the variants also follow the rhythm of symmetry (see figure 20&21.).

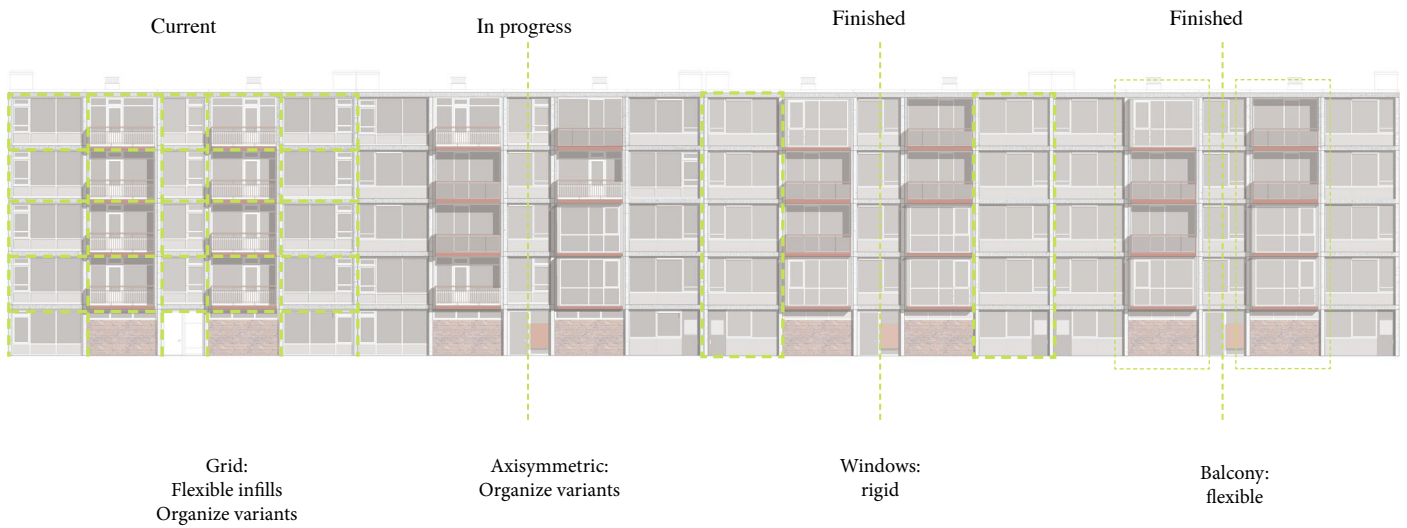


Figure 20. Composition of elevation

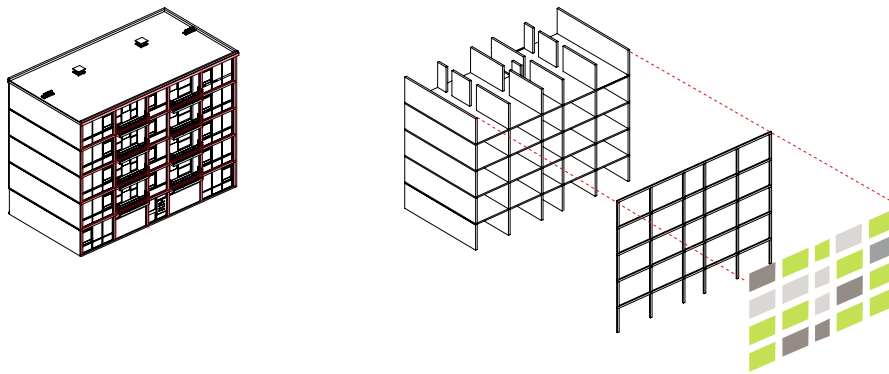


Figure 21. Skin: the grid and the flexible in-filled fragments

## 6. Conclusion

Both the VAM system and the researched site , Camera Obscuradreef, Overvecht, are embodiments of several cultural values. For the researched site, historical value of the site, the planning concept of Wijkgedachte, is of vital importance. As for VAM system, the majority of values are historical values, use values and artistic values. Values of the structure system, which can be concluded as the spirit of modernism delivered by the standardization, mass production and pre-fabrication, can be considered to be key values of the system. Values of skin and space plan, which are profoundly influenced by the structure system, deserve research as well. Dilemmas of VAM system result from conflict between its historical value and the current state, and can be concluded as difficulty for Intervam flats to serve current tenant groups with modern lifestyle and diverse background. In general, the designers are with obligations to take certain values into considerations, including historical value of the structure and the site as well as use value and artistic value of the skin, The cultural value assessed in this article can be a guideline for intervention of both the neighbourhood and the system.

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