

AIRE FABRICATION

The refabrication of the Airey system for the second-generation to come, focusing on the design case 'Airey-strip blocks' in Amsterdam Nieuw-West.

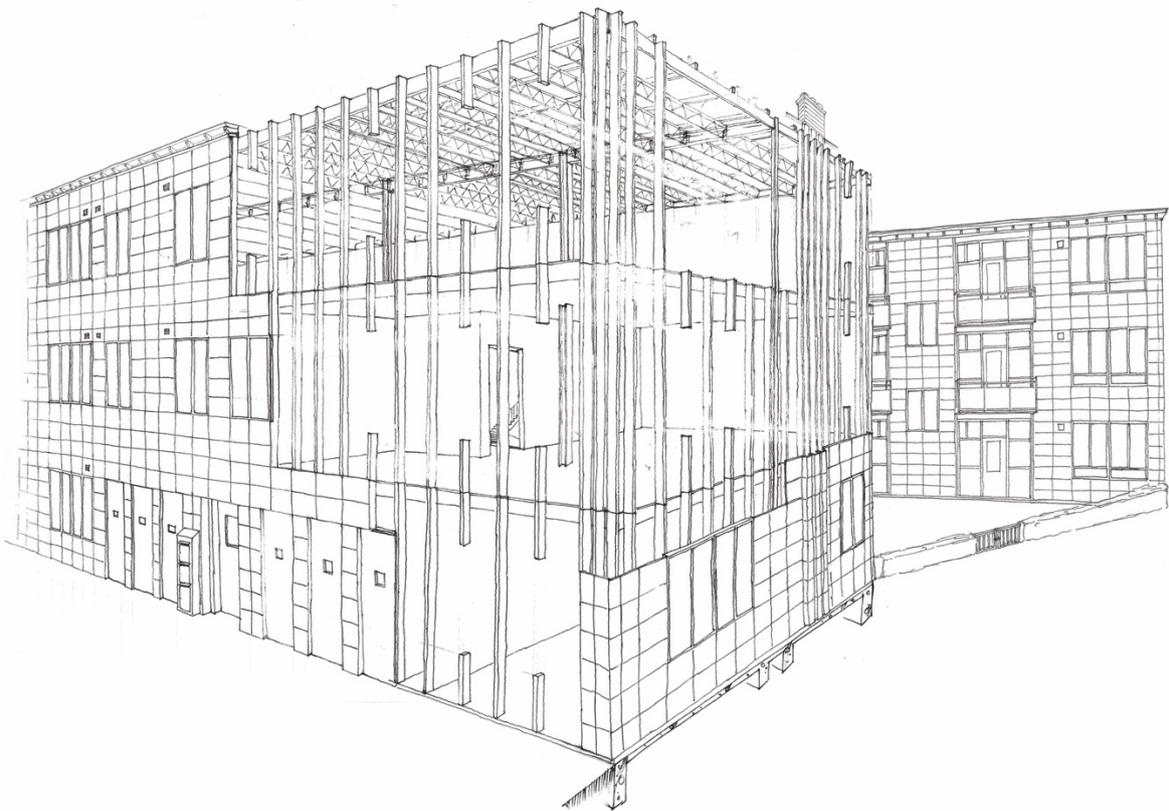


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1. INTRODUCTION

Amsterdam Nieuw-west, where the Airey-strip located, is planned followed by the urban design rule responding to the expansion of Amsterdam due to the Industrial Revolution in the 19th century. The population of Amsterdam in 1920 was about 750,000 that has more than trebled since 1865.¹ Therefore, Amsterdam needed a massive extension plan to accommodate people with overcrowding issue.

Cornelis van Eesteren, a prominent Dutch architect and urban planner, started to design the Algemeen Uitbreidingsplan, General Expansion Plan of Amsterdam known as AUP, in the end of 1920's while working for the Town Planning Department of Amsterdam (Figure 1). Also as a member of the C.I.A.M., he developed the main concept of this expansion plan influenced by the fourth C.I.A.M. Congress in 1933; 'The Functional City', Healthy living in which light, air, and space.

In the research site Airey-strip, the Van Eesteren Museum seeks the new value of this AUP area by arguing its cultural importance away and declaring this area as an 'Outdoor Museum' (Figure 2). In the far past, not many buildings gained the position of the monument, one of the best

and the most special witnesses of the built-up history.² From the recent past, however, the expert group such as DoCoMoMo started to shed light on the modern buildings and its value. It is noteworthy that the Airey strip survived from the demolition issue in 2009 after the financial crisis. This affair shows that the attitude toward built environment has been kept reflecting the spirit or the condition of the times.



Figure 1. Map of the General Expansion Plan of Amsterdam (vaneesterenmuseum.nl)



Figure 2. A large part of the Van Eesteren employees in the group. (vaneesterenmuseum.nl)

¹ Somer, K. (2007). The Functional City. CIAM and the legacy of Van Eesteren, 1928-1960.

² Meures, P. (2016) *Heritage-based design*. TU Delft

2. CULTURAL VALUE STATEMENT

The Airey-strip is one of the good models of modern movement. The 'light, air, and space' concept is well realized on the site. Firstly, enough daylight enters to the whole living spaces thanks to the open block planning (figure 3). Also, fifteen degrees angled positioning allows more light to the half of the dwellings (Figure 4). Secondly, the neighborhoods in Nieuw-west designed based on the garden city principles, known as Western Garden Cities. So the high quality of fresh air is guaranteed surrounded by greenbelts (Figure 5). Lastly, the collective configuration of the open blocks also allows providing a huge continuous open space. The combination of these design rules differentiated the quality of the AUP from the traditional urban plan.

In addition, one can find the 'light, air, and space' idea in the system itself; less than nine meters of building depth, big openings, and the minimum structure. The renovation plan needs to make the best use of the benefits of these characteristics because those are directly related to the quality of living. (Figure 6)

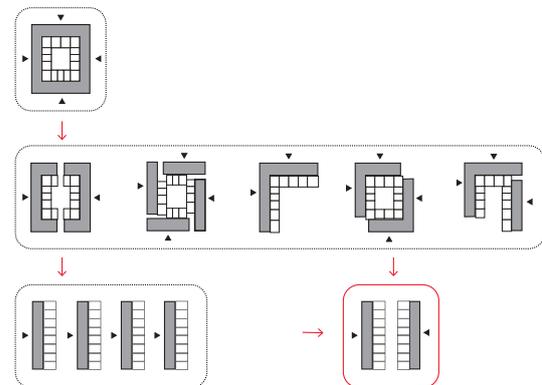


Figure 3. Typological history of the Dutch building block planning (own image)

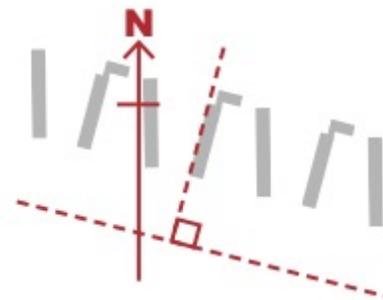


Figure 4. Fifteen degrees angled block positioning (own image)



Figure 5. Urban configuration (own image)

To find value from the building system, we need to look up the history of the Airey system. The invention of the Airey system stimulated by the request of the light, fast, and economic building system for the post-war reconstruction work. Due to the lack of the labor and the construction material, Airey system suggested a very tectonic structure that can be assembled by none skilled workers (Figure 7).

Sir Edwin Airey (1879-1955) in the UK developed this system and it is adjusted to the Dutch built environment introduced by the Nederlandse Maatschappij voor Volkshuisvesting (NEMAVO) as a name of NEMAVO-Airey (Figure 8). It is very symbolic fact that all the unit elements weight less than 25kg and can be carried by two adults.³ Therefore, the building system itself reveals a lot about the situation of 50's. On the other hand, it is no exaggeration to say that the envelope is almost everything of the system. So the industrial facade, which is about the aesthetical aspects of the system and its rigid grid, need to be considered very deeply and carefully.

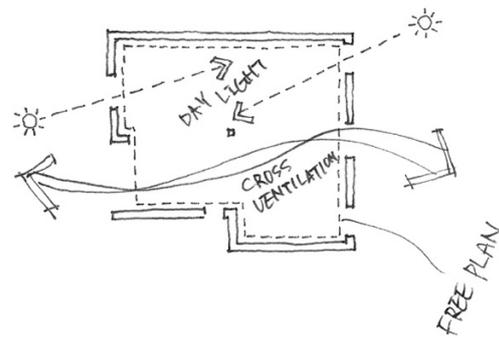


Figure 6. 'Light, Air & Space' idea realized in the building scale (own image)

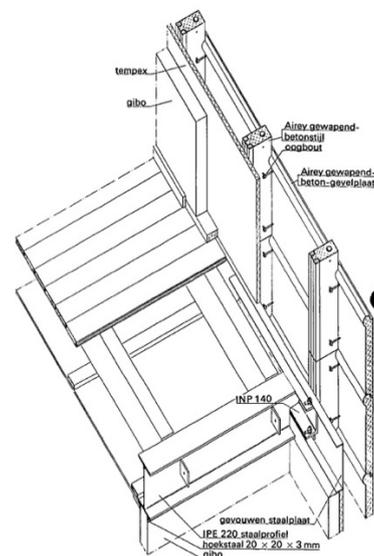


Figure 7. Building system Airey (R.S.F.J. van Elk en H. Priemus, 1971)



Figure 8. Scene of the NeMaVo Airey system building during the construction. (beeldbank.amsterdam.nl)

³ Messchaert, Z. (2004). Pracht in Prefab: Het Nemavo-Aireysysteem in Amsterdam.

3. POSITION ON REHOUSING

The population of Amsterdam grew about 30 percent in the past six decades and it is expected to be increased at this trend (Figure 9). This also means that there was the demographic change due to the continuous population movement. However, the Airey-strip blocks did not develop much and the quality of community lag behind the neighbors. To profit from the value of the site, a new position is needed to provide a value-added housing stock.

The city of Amsterdam already took the future expansion plan into account in 1985 to control the urban sprawl (Figure 10). Therefore, the issue is not the number of the dwelling but the target group to accommodate the changed type of population and promising a better community in the future.

In terms of a renovation of the housing heritage, the main goal should be on the guaranteed quality of living. My design approach focused on the transitional space that improves the living quality so the inhabitants can contribute to the community, which is intended in the initial design of the Airey-strip blocks (Figure 11).

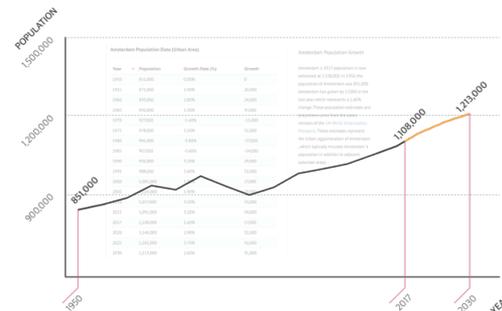


Figure 9. Population growth of Amsterdam; The estimates and projections come from the UN World Urbanization Prospects (own image)

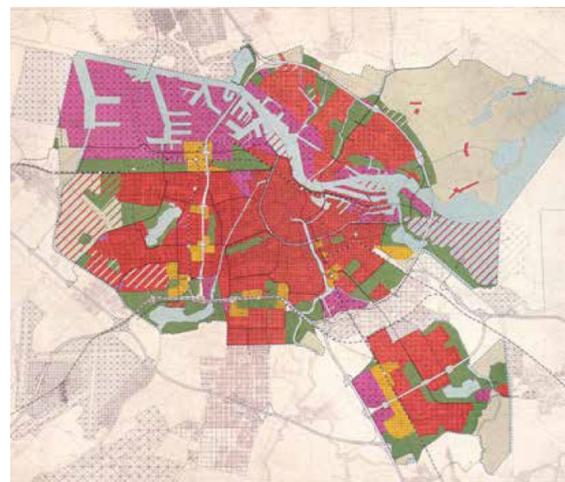


Figure 10. 'Light, Air & Space' idea realized in the building scale (Planning and Sustainability City of Amsterdam)



Figure 11. 'Light, Air & Space' idea realized in the building scale (beeldbank.amsterdam.nl)

This paper is about finding the cultural value that can obtain the current stakeholder's consent underpinned by a broad range of research and the in-depth

consideration. This is to ensure that the cultural values applied to the new design approach for the sustainable development.

4. ASSESSED VALUES

In this chapter, I would like to look up how to deal with the cultural value of the system in the new design. This will follow the framework by Stewart Brand in his research 'How building Learn'. (Figure 12)

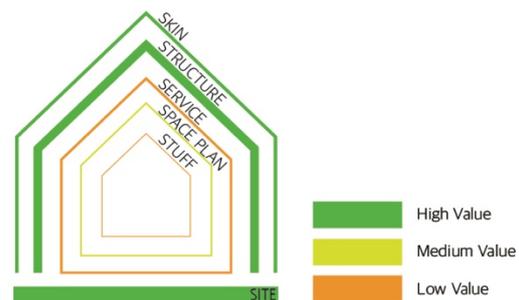


Figure 12. Value assessment of the Airey system inspired by the illustration from 'How building learn' by Stewart Brand (own image)

4.1. SITE

The urban plan drew a distinct line between the old urban block and the new one without any closed type (Figure 13). In detail, especially the Airey-strip in Amsterdam is a unique type of block because of the angled positioning. The characteristic makes the building blocks open toward the urban and strengthen the transparency. Also, the angled blocks face a perfect East and West, so that the building takes more daylight.

Thanks to this positioning, the parking space and the garden have its own quality with the enclosed gesture (Figure 14). Although the garden is closed and currently works only for 'looking garden', It has a potential use value for the future.

When the garden owned by Eigenhaard open to the public, or to the inhabitants, the real meaning of greenbelt will be accomplished. On top of that, the block planned car access from De Tourton Bruynsstraat that is the commercial street, but the stores are not in use or changed to another function such as housing or storage (Figure 15, 16). These days, inhabitants go grocery shopping to the bigger shop across the Burgemeester. This can be a clue to rethink about the access to the block.

Another interesting value the site has is the street names that named after the hero of the WWII. However, we only

can recognize it with the small sign on the building (Figure 17). In the current stage, the commemorative value is only valid on the urban scale. The intention to commemorate the war heroes and the spirit of the age with a physical element is meaningful, but the architectural gesture is needed to be more active to remind the value to the residents effectively.

4.2. STRUCTURE & SKIN

The skin is closely connected with the structure and these two elements are the key feature of the Airey-system. On top of that, the combination of the most efficient structure and the architect who trained in the classical educational system also made the system aesthetic. The module based on the metric system made the efficient use of material reach its peak, and take the ratio close to the golden ratio (Figure 18). As a result, all of the unit elements are effectively combined on the rigid and repetitive structure, and it opens the possibilities to respond to the diverse interventions.



Figure 13. Morphological map of Amsterdam after the WWII (Retouched image from 'The Dutch urban block and the public realm' by Susanne Komossa)

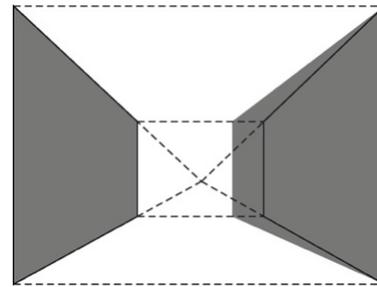


Figure 14. Strengthened perspective by angled positioning provides an enclosed experience (own image)



Figure 15. Initial use of store (beeldbank.amsterdam.nl)



Figure 16. Disused store on the commercial street (one image)



Figure 17. Sign of the street name and its history (one image)

In addition, the cavity in-between the structure and facade has many possibilities. We have already seen the example of its use in the current renovation project (Figure 19). We also need to remind the fact that the previous renovation method did not give their careful consideration. On the one hand, those renovation process did not weight much on the values of the system (Figure 20). On the other hand, the current renovation is trying to keep as many as features of the original building. However, conserving the complete image of the original building does not mean that it is valuable in the present and the future. In my opinion, the original facade is not so aesthetic but just symbolic. Also, the texture of the concrete tile has age value but it is not so high. The composition in the facade is even boring. Therefore, the aim of the renovation should not be on keeping but strengthen the value through intervention.

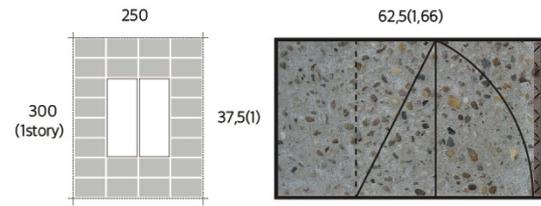


Figure 18. Golden ratio and the metric system (one image)



Figure 19. filling the cavity with the insulation in the current renovation project (one image)



Figure 20. different types of renovation (one image)

4.3. SERVICE

Since the building constructed in the early 1950's, it is hard to find any values in the service part. The development of the heating and the ventilation system throughout history is not valuable but only request a better function and quality (Figure 21,22). One thing we need to keep in mind, however, is the designed service elements such as the chimney or the roof gutter. Those elements are not the most important element but have value in terms of keeping the identity of the building (Figure 23). So the issue of conserving these elements should be discussed from various angles.

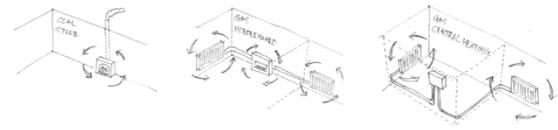


Figure 21. Development of the heating system (one image)

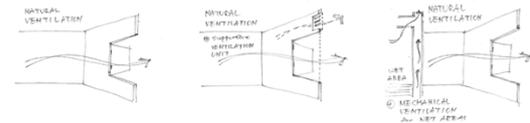


Figure 22. Development of the ventilation system (one image)

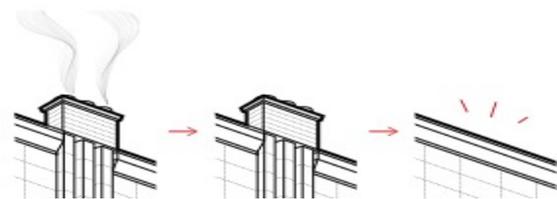


Figure 23. Dilemma in-between the use value and the aesthetic value. (one image)

4.4. SPACE PLAN

Through the 1933 design competition for affordable working-class housing, 'Portiek' type of access suggested as a standard.⁴ Given the fact that the target group was working-class, Portiek type housing is still useful and the demography of the current inhabitants is linked to it. Even if the target group changes, the access type can be maintained because it provides a chance to meet neighbors (Figure 24).



Figure 24. View of the Portiek (one image)

⁴ Komossa, S. (2010). *The Dutch urban block and the public realm: Models, rules, ideals*. Vantilt.

In the dwelling, 60m² unit designed as a 'modern' meaning of free-plan (Figure 25). Since the table structure has only one column in the middle, the renovation will accept many possibilities. This value can be developed into a spacious living space or maximizing flexibility.

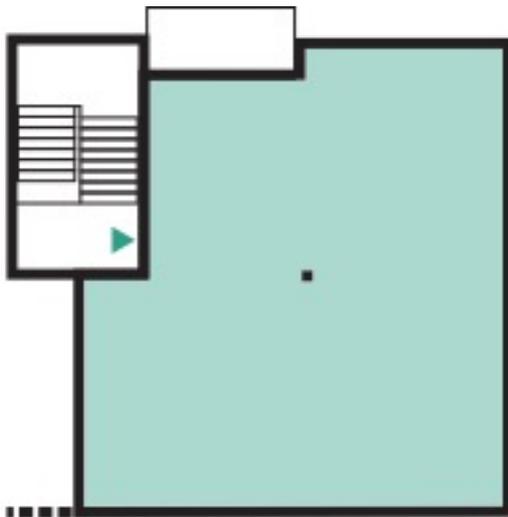


Figure 25. 'Modern' meaning of free-plan (one image)

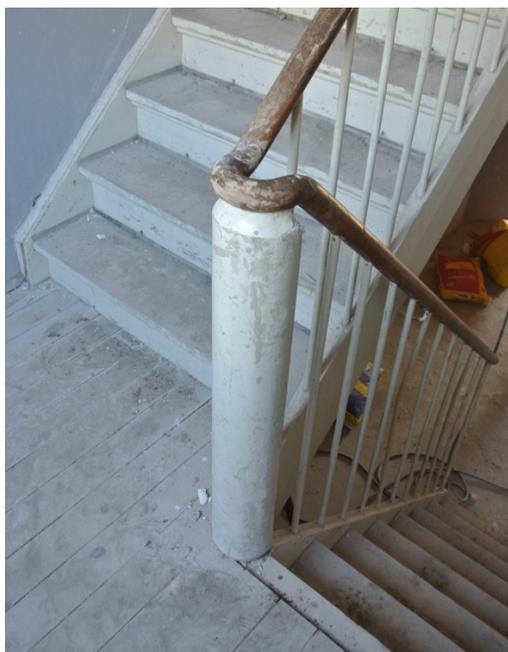


Figure 26. Handrail that shows the craftsmanship in the 1950's

4.5. Stuff and Story

The handrail of the staircase looks artistic and shows the craftsmanship of the 1950's but the importance is low (Figure 26). However, if one keeps the image of the stuff in the renovation, inhabitants might feel attachment in the building. We could find the similar example in the current renovation project. A new terrazzo bathroom floor is used according to the residents' request. There is something the dwellers do not want to change even when they renovate the interior completely.

The Nemavo-Airey system is based on the British Airey System by Sir Edwin Airey. Dutch Society for public housing subsidized the developments of the Nemavo-Airey system as a result of the extensive housing shortage after WWII. In the present, the society realized the importance of the system and brought it to the public sphere helped by Van Eesteren museum. In this trend, the architect should participate to make the building legacy more valuable. The developed methodology through deep consideration on Airey system will be applicable to another Airey site because all of the Nemavo-Airey systems follows the same set of measurement.

5. CONCLUSION

To sum up, Airey-strip blocks have two significant cultural values to keep; the value of AUP, and the envelope that represents the unique building system and the built environment in the 50's after the WWII. Also, in value-wise, Use-value become distinguished thanks to the background of the inventive Airey system. The radical idea in the early twenties still valid at the moment.

the AUP concept 'Light, Air and Space', the lofty ideal of the Modern Movement, is still a compelling issue in the contemporary architecture. Several characteristics of 'Nieuwe Bouwen' found in the expansion plan of Amsterdam are the benefits of the site, so those should be kept and strengthened in the renovation process.

For example, the expansion plan indicated the density of the living area while all the living properties connected to the small and large green areas. The overall sequence of the green area, from the buffer green space in between building row to the city park, raises the quality of the community (Figure 5). In the dwelling unit scale, AUP concept also applicable and still valid in the contemporary architectural field. The secured flexibility by virtue of the 'modern' meaning of open-plan allows

diverse intervention in the plan layout. (Figure 6)

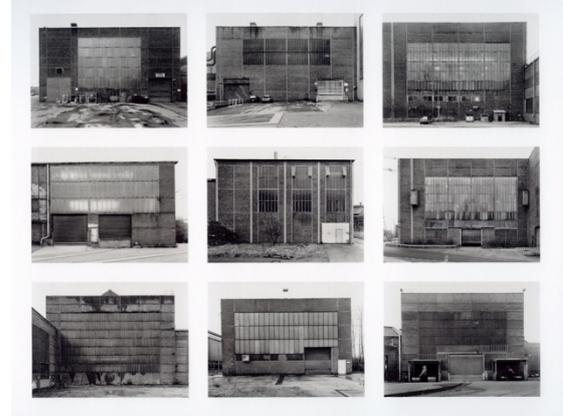


Figure 27. 'Industrial Facades' by Bernd and Hilla Becher, 2012

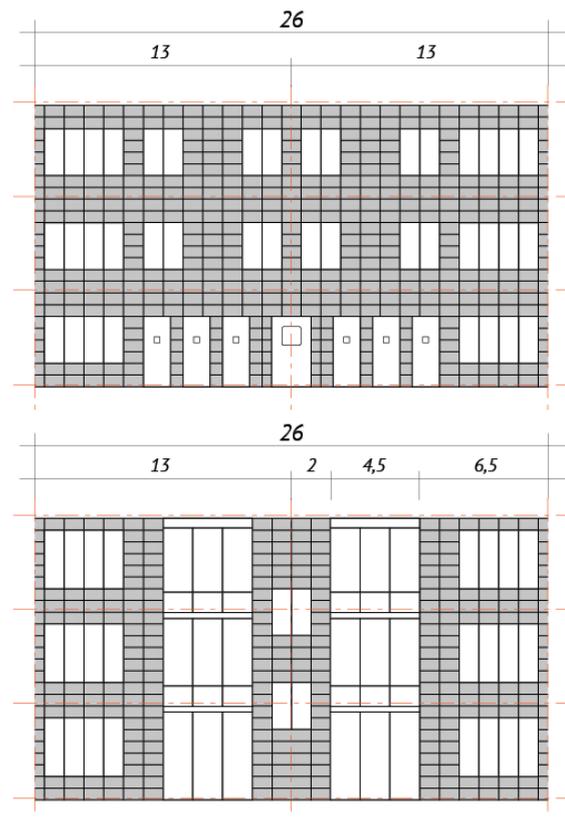


Figure 28. Elevation in grid (one image)

On top of that, the envelope of the system, that is mainly the combination of the structure and the skin represents the built environment in the 50's after WWII.

The economic aspect of the system invented under the devastating situation by the war is one of them. In addition, the aesthetical aspect of the system grid and the expression of the craftsmanship back then are not only the symbol or the beauty, but also the possibility of the practical use (Figure 27). The key feature of the system is that all the elements follow the dimension of the rigid grid including the window, door, and the balcony. (Figure 28) In the renovation project, one should take these characteristics into account while meeting the requirement of the contemporary building.

Sustainability is one of the biggest topics in the current architectural field. Also, the real meaning of sustainability in the architecture is not restricted to the energy issue but related to the quality of life in rather humanistic discourse. As indicated on the Burra Charter in 2013, a place that coexists with the cultural importance upgrades the people’s life by virtue of the diversity of the community. Also, it insists the importance of conservation grounded on the principle of intergenerational equity.⁵ The sustainable design and research focused on the reusability of visible and invisible values will contribute to the urban environment, so that the

community work actively as a living organism (Figure 29).



Figure 29. Individual process of Cultural Value Research in the Heritage Design Approach (Own image)

⁵ ICOMOS, A. (2013). *The Burra Charter: the Australia ICOMOS charter for places of cultural significance 2013*.

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_ Individual Cultural Value Matrix

HIGH VALUE

MEDIUM VALUE

LOW VALUE

<p>VALUE MATRIX</p> <p>AIREY STRIP</p> <p>SLOTERMEER</p> <p>AMSTERDAM</p>	AGE	HISTORICAL	ARTISTIC	COMMEMORATIVE	USE	NEWNESS	CONFLICT	DILEMMA
SITE		<p>Closed Building Block</p> <p>Strokes</p> <p>Modernism: Within the movement 3 points had focus: space, light and air. For housing, this meant no more closed building blocks but building strips, so each house had the same orientation. This can be perceived as an identity of the AUP.</p>	<p>Regular Building Strokes</p> <p>Slanted Building Strokes</p> <p>Slanted Strips: The fifteen degree angled site planning by Cornelis van Eesteren has an effect of strengthening the perspective that is also intensifying the directivity.</p>	<p>Leo Frieda Hof</p> <p>Naming of the street: The streets are named after the hero of the WWII. The street name commemorates WWII and its victims.</p>	<p>Good Location: Sloterveer is located close to city center, offers a lot of convenient facilities (i.e. supermarket, school, playground) and has good accessibility to public transport.</p>			<p>Grey Area & eroded transparency: The in-between gardens (property of Eigenhaard) are not accessible but just a looking garden. The garden is even invisible from the ground floor due to the fully grown hedges. This also means that the historical value 'transparency' has been eroded over time.</p>
STRUCTURE		<p>New Technological Development: The building system consists of small and lightweight elements, which are carried by 2 men. This approach expresses the idea of reducing the amount of materials and the labor hours, in order to solve the housing shortage as quickly as possible.</p>	<p>The module of the system: The structural system follows the module really well. One could find the artistic value from the re-usability of panel. Although it was not intended to be aware of beauty, the value has emerged in the renovation process.</p>		<p>Re-usability: The condition of most structural elements (concrete columns, steel beams and columns and trusses) is still good, and the whole structure is still stable and re-usable.</p>			<p>Loss of Aesthetics: The Airey-strip has many technical problems such as the cold bridge or the limitation of the load the structure can carry. While making the buildings sustainable regarding technological improvement, the aesthetics of the building blocks might disappear.</p>
SKIN		<p>The original tile: Compare to the shipap siding of the UK Airey system, Nemvo-Airey developed a totally new facade system with flushed concrete tile in a modern way.</p>	<p>Golden ratio & metric system</p> <p>Designed chimney</p> <p>Aesthetics & Prefabrication: Although the panel is not exactly the golden ratio, it compromises with the metric system. Also the designed chimney. The location of the tile is aesthetic as well.</p> <p>Designed service element: The designed chimney is the result of craftsmanship.</p>		<p>Concrete tiles</p> <p>Cavity wall</p> <p>Re-usability: The condition of the tiles is still good and re-usable.</p> <p>Cavity: The cavity between the tiles and the slab has possibilities for the use of services such as electricity, insulation, ventilation and so on.</p>			<p>Resident's preference VS Aesthetics: The white-painted facade which is preferred by most inhabitants is damaged the historical and artistic value. Also the stucco finished renovation changed its characteristics a lot while improving the energy efficiency.</p>
SERVICES								<p>Use value VS Aesthetic value: When one decides not to keep the chimney since it has no use value anymore, the artistic value will potentially be harmed.</p>
SPACEPLAN		<p>Portek: Through the 1933 design competition for affordable working-class housing, 'Portek' type of access suggested as a standard. Given the fact that the target group was working-class, Portek type housing is still useful and the residents are mostly composed of immigrants and the low-income target group.</p>			<p>Space, Light and Air: By the structural system the flexible space plan offers many options for its interior arrangement with no barrier only except one steel column. Also, the floor plan opening to both side makes the cross ventilation possible and the space bright.</p>			
STUFF			<p>Handrail of the staircase: The aesthetics of the handrail shows the craftsmanship of the 50s.</p>		<p>Terrazzo bathroom floor: It is noteworthy that the resident's preference for the usability of the Granito applied to the refurbishment.</p>			
STORY		<p>The Dutch Nemvo-Airey system is based on the British Airey System by Sir Edwin Airey.</p> <p>Dutch Society for public housing subsidized the developments of the Nemvo-Airey system as a result of the extensive housing shortage after WWII.</p>	<p>Set Measurements: The dimensions of the columns and tiles are for each Airey project identical. The tiles (62x375mm) create a rigid grid and is forms a strong characteristic of the Airey buildings. Also the core to core (625mm) distance of the columns are for every project the same.</p>		<p>61m²</p> <p>The size of apartment: The size of apartments (around 60 m²) is still popular in contemporary society.</p>			