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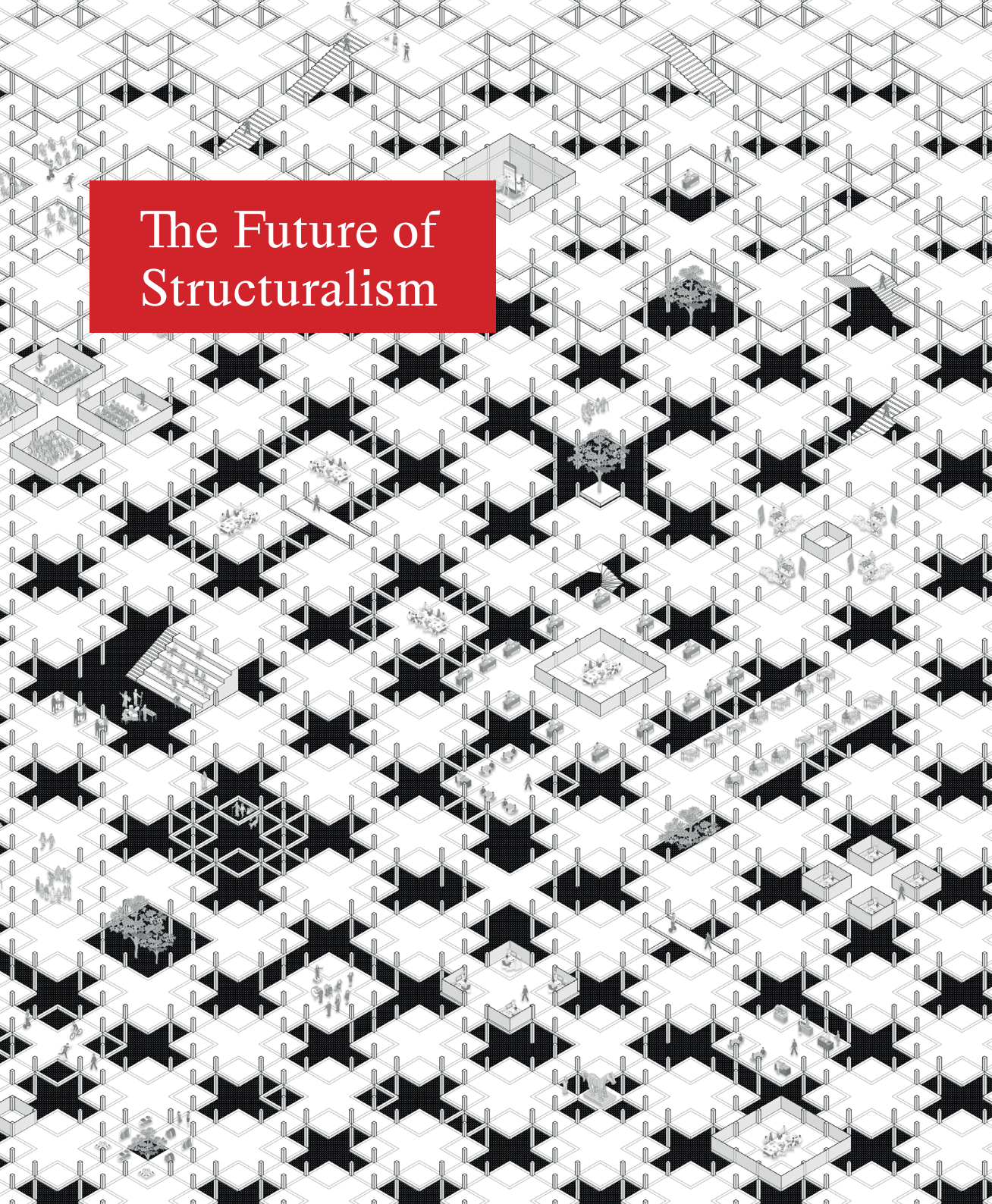

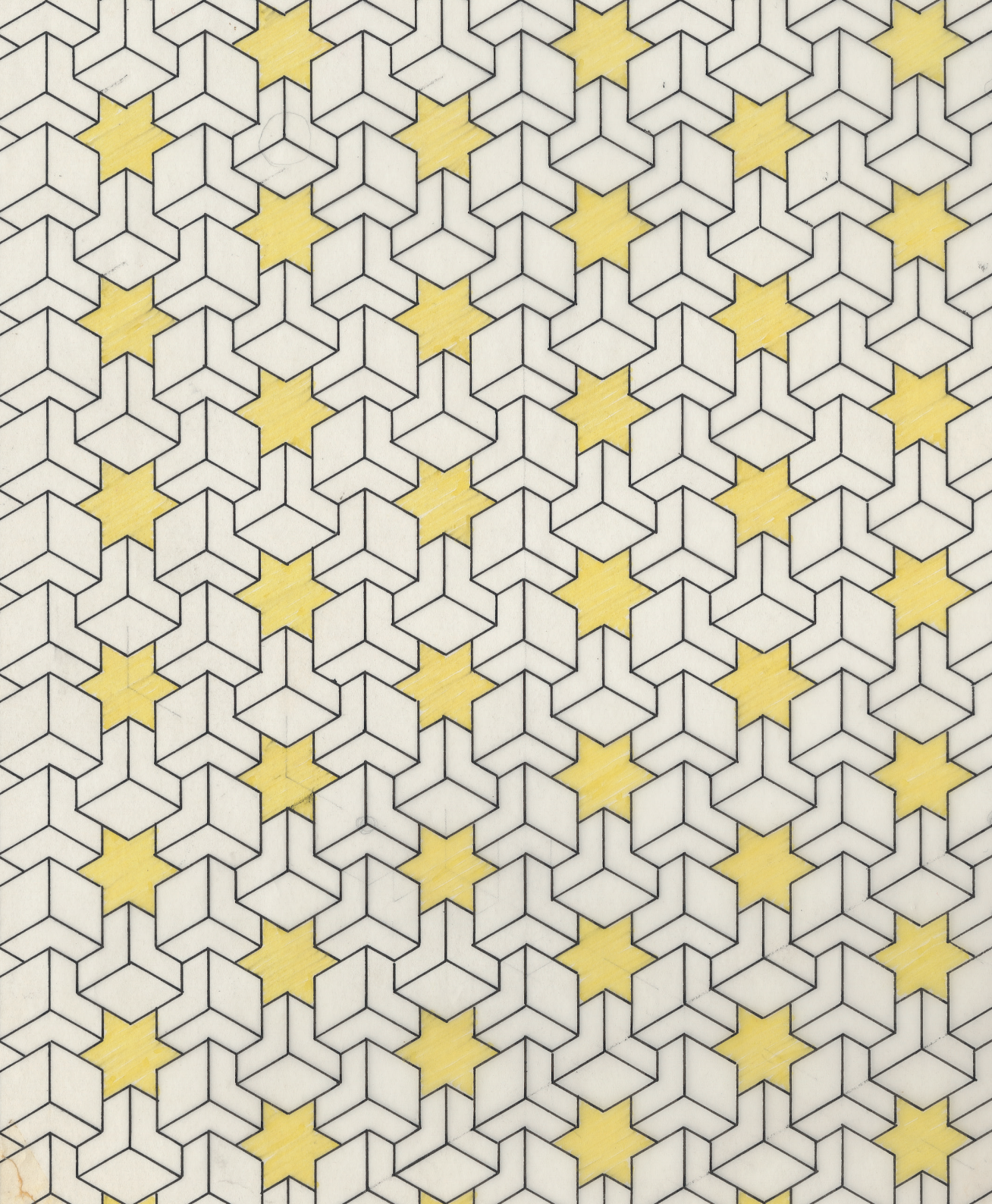

The Future of Structuralism

The Future of Structuralism

Publication presenting the work of the study project for the chair of Heritage and Architecture

Editors: Lidwine Spoormans, Shamila Gostelow and Wessel de Jonge

Text by Lidwine Spoormans
Cover image by TU Delft student Xiaokang Liu

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Orphanage by Aldo van Eyck (1960), adaptation
for re-use as offices by WDJArchitects

Preface

Structuralism has been the focus of the 2017-2018 educational programme of the Section Heritage & Architecture at the Delft Faculty of Architecture. It has been a resounding success and is has been a pleasure to see so many young designers being inspired by the works and concepts of what is one of the most influential movements in post-war architecture in the Netherlands.

In various Master studios, 64 students have surveyed and analysed four icons of Structuralism before embarking on a redesign project for their adaptive re-use: the Centraal Beheer office building, designed by Herman Hertzberger, the Faculty of Arts building and the Willibrordus Church, both designed by Joop van Stigt, and Aldo van Eyck's Pastor van Ars Church in The Hague.

As a professor of Heritage & Design within the Section HA, I believe it is relevant to study the heritage values of Structuralism while, at the same time, engaging with the challenges related the continued use of such buildings. Strongly associated with Team X, Structuralism has been a significant strand in the international development of 20C architecture. The idea to create non-hierarchical, changeable and expandable structures to meet the needs of everyday people was novel and resulted in buildings that today represent part of our cultural heritage. The question then is to explore what are the values represented by this legacy that one may need to retain when preserving such buildings or when redesigning them for a new use. Some of these buildings appeared truly generic in their design and allowed for change, while others represent a structure featuring specifically designed infills, creating a much more hermetic system. The views presented by Herman Hertzberger, who was involved in our studios as a visiting critic, have been revealing in that sense, and created excitement amongst the participating students.

Meanwhile a number of buildings that belong to this legacy are rendered obsolete and stand vacant. Also, most such buildings do no longer meet the present requirements related to functional needs, sustainability, and further demands of our contemporary society. Reprogramming and upgrading these buildings in a respectful way pose huge challenges. By educating the next generation of architects on both the ideas of Structuralism and possible models for change, we hope to continue the legacy of this powerful architectural movement.

It has been a pleasure to experience that the theme of Structuralism has attracted so many Master students of various backgrounds and from different parts of the world. The great interest for the design studios, the successful exhibition and well-attended lectures has proven that the ideas of Structuralism are still alive!

Wessel de Jonge, Chair of Heritage & Design

Studio BKCity

The Future of Structuralism

Structuralism represents an architecture that can interact, grow and adapt. The buildings can be recognised by their vivid open structures, composition of small units, and a spatial organisation like a city. As a reaction to CIAM functionalism, the avant-garde members of Team 10 proposed inclusive and social space and a more human form of urbanism and architecture. Starting in 1959, Dutch Structuralism became a very influential movement in the development of architecture in The Netherlands.

Now the Structuralist legacy has become heritage. Once the agent of a new era, the pioneering nature of this architecture seems to have faded and it is this building stock that is now in need of renewal. Although some of the Structuralist buildings have become icons, their existence is at stake. Many buildings are facing transformation or demolition, because they do not meet contemporary demands. Despite the design of open structures, being flexible for the future by extrapolation of the structure or adaptation within the building, many of the Structuralist buildings show shortcomings in for example: indoor climate, aesthetic appearance and programmatic possibilities.

Recently, the renovation of Aldo van Eyck's orphanage in Amsterdam has been completed, which once was the inspirational example for many of his contemporaries. Other icons of Structuralism still await a new future, like the Centraal Beheer office in Apeldoorn designed by Herman Hertzberger. Although several buildings have been renovated, there are no standard solutions. We believe that profound knowledge about both the original Structuralist buildings and the argumentation for redesign can help to prepare intervention strategies for upcoming projects. What building characteristics prove to be successful? Are these specific for one building, the oeuvre of one architect or widespread among this generation of buildings? Do renovation concepts reuse or contradict initial design themes? How can necessary renovations do justice to the cultural and architectural values of these icons? Do the icons prove what is promised? Or do we need alternative strategies?

This project 'The Future of Structuralism' shows our search for what Structuralism is and our assessment of some of its opportunities and shortcomings. But most importantly, it focusses on potential strategies for reuse. The structure of this booklet is thematic. By focusing on several themes that were important in Structuralism, we aim to link ideology, current examples from practice of transformed Structuralist buildings and design strategies.
Through an exhibition, a debate and this publication, we hope to bring the work from within the chair to a wider audience and add new perspectives to the debate on the movement and its future values.

Lidwine Spoormans

Student visit to the HNI Archive

Educational Context

In 2017-2018, the section Heritage & Architecture (H&A) of Delft University of Technology organised several Master courses focussing on the adaptive reuse of built examples of Structuralism architecture.
In order to get a good understanding of the ideas and design practice of structuralism, students started off studying a range of buildings associated with Structuralism. By visiting the buildings, observing and analysing design drawings and the contemporary situation, both the ideology and current values and problems were studied. In addition, specialists on the topic have been invited to share their knowledge with the students in the studios. This knowledge gathered formed the base for an informed start on the next step; the research and redesign for the intervention case.

The different Master studios focussed on Faculty of Arts buildings in Leiden, Centraal Beheer office in Apeldoorn, Willibrordus church in Amsterdam or the Pastor van Ars church in The Hague. Students were asked to identify, structure, discuss and prioritise architectural, technical and cultural-historical qualities and dilemmas for one of these specific buildings, by using a transformation framework, developed by H&A. Individually, students then set up a design brief, studied programmatic scenarios and developed an elaborated redesign. The results of their research by design make an important contribution to the project and to our way of thinking about the Future of Structuralism.

Faculty of Arts in Leiden

Designed by Joop van Stigt (1976-1978)
Building was completed in 1982
Design case for MSc3 + MSc4 graduation studios

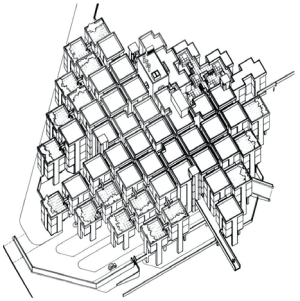
The two faculty buildings designed by Joop van Stigt are positioned on both sides of the library of the Leiden University, designed by Bart van Kasteel. The complex of three buildings is located on the west side of the historic centre of Leiden and is constructed on one collective parking garage in the basement.

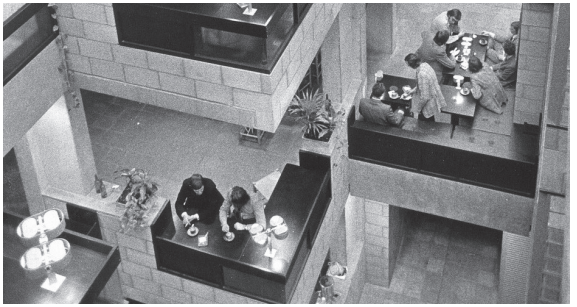
A strict grid of squares of 7,2 meters dominates the structural, the spatial and the aesthetic logic of the buildings. In the faculty buildings, office spaces and lecture rooms are organised around open courtyards. The buildings are constructed of concrete floor slabs on 'mushroom'-shaped columns that make a clear ornament in the masonry facades. A typical concept, related to the ideology of equality and democratic use of space, is the system of multiple routes and entrances to all building parts.

Today, the buildings are still owned and used by the faculty of arts. The buildings relation to its urban context, the spatial organisation and thermal performance, do not meet today's requirements and need to be changed. The University of Leiden has started the process of renovation.

Centraal Beheer Office

Designed by Herman Hertzberger (1967-1970)
Building was completed in 1972
Design case for MSc1 studio and MSc3 + MSc4 graduation studios





An office for one thousand employees of the insurance company 'Centraal Beheer' was built in Apeldoorn, on a location directly next to the railway tracks. The planned urban change of moving the train station and expanding the city centre that would have given Centraal Beheer a central position, was not realised. Herman Hertzberger created a grid of 9x9-meters 'towers', set at a 3-meter distance from each other, providing open space, diagonal views and daylight. This resulted in an open office landscape with a flexible plan, direct contact between floors and a non-hierarchical space. The structure of prefabricated concrete elements forms the interior spaces. Starting in the parking garage with massive concrete columns and beams, the concrete structure of the upper levels is supplemented by concrete and glass bricks. This results in a 'non-materialised' interior that could be appropriated by the employees.

Since 2008, the Centraal Beheer building has the status of a municipal monument. The organisation Centraal Beheer left the building and since 2013 the icon stands empty. Developers, the municipality of Apeldoorn and the architects of AHH are now preparing a transformation to a multifunctional building, including a residential program.

Willibrordus church / Afrikahuis

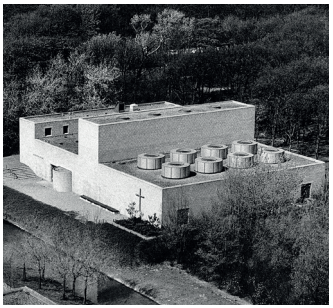
Designed by Joop van Stigt (1967)
Building was completed in 1968
Design case for MSc2 studio

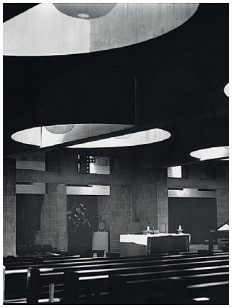
A new catholic church, designed by Joop van Stigt, was built in 'De Pijp', a densely populated district in Amsterdam. To make the church a social node for the neighbourhood, a kindergarten, an elderly centre and a space for music, dance, film and theatre and apartments were included in the program. The L-shaped building, located on a street corner, is composed of five interlinking octagons, based on a 7,3x7,3 meters grid. Van Stigt created a neutral interior of concrete, French limestone and wood that could serve for a diverse range of events. Strategic positioning of foldable walls and staircases add to the flexibility by enabling direct access and independent use of every room. A glass strip between the facade and the wooden roof structure provides daylight from all sides. The main religious space is positioned in the corner octagon on the first floor. This cantilevering volume creates a public entrance square.

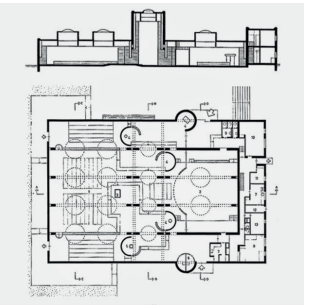
From 1994 until 2008 the church was named 'Afrikahuis', as a reference to the 'All Saints Church' African community that used it. Since 2008, the building no longer functions as a church, but is still owned by the diocese. The Willibrordus church is protected as an Amsterdam municipal monument.

Pastoor van Ars church

Designed by Aldo van Eyck (1964-1966)
Building was completed in 1969
Design case for MSc2 studio







On a small and wooded plot in Loosduinen, close to the coast in The Hague, a new catholic church was built. Aldo van Eyck was commissioned as the architect, supervised by Dom Hans van der Laan as a mentor. The church should serve 400 parishioners and a possible 200 extra visitors in summer season. The building has a rectangular plan of 41x27 meters with a strong articulation of different heights. The middle aisle is a formal, narrow and high space and could be interpreted as a classic nave of the church. The adjacent lower spaces form the church hall, a meeting room and other services. The exterior walls are completely closed, with the interior lit by multiple cylindrical skylights. Although the structure follows a grid, the composition of parts is not rational and repetitive, but designed to achieve a spatial and formal effect that is based on traditional Christian elements. The building is constructed from in situ concrete, left visible and unfinished.

Since 2004, the church is protected as a municipal Den Haag monument. The building still functions as a church. However, due to decreasing visitor numbers, the board of the Pastoor van Ars church is anxious about the future of the church: what other function could be appropriate and how to create a more sustainable energy performance?


of Renewal:
Celebrating 100 years o
Aldo & Hannie van Eyc

Discussion and Exposition

A debate event was organised at the opening of the exposition 'Future of Structuralism', on 27 November 2018. Two lectures introduced the debate.

't Karregat

The first lecture by Professor Paul Diederen was about the transformation of the building of 't Karregat in Eindhoven discussing 'Resilient Architecture' in relation to Structuralism. The two architectural firms DiederenDirrix and en en architects collaborated on the redesign for 't Karregat, which was designed by Frank van Klingeren in the 1970's. Their proposal has been implemented only partially. The school is located in the renovated section of the project featuring the enclosed high umbrella structures. These umbrellas provide daylight and extra space/spatial quality in the classrooms by added balconies. The height of the building makes these benefits possible. Yet the other part of the complex remained unchanged and accommodates the supermarket. It is a built-in space with a modular ceiling hanging from the roof and walls largely covering the umbrella structures.

The Orphanage

In the second lecture Professor Wessel de Jonge presented the redesign for the Orphanage in Amsterdam that was originally designed by Aldo van Eyck. With his office WDJArchitects some remarkable decisions were made for the redesign. First of all, the reinterpretation of the interior was mainly based on the photographs of the interior. These photos have been made directly on completion of the Orphanage in the 1960's, directed by Aldo van Eyck. The inner street connects the pavilions that have a rough exterior with a comfortable interior; like a coat with a soft lining. The acoustics of the spaces was a challenge as the domes of the roof scape should to be kept as existing. A spray system of approximately two centimetres of cellulose fibres helped to hide the new electric system, that is made invisible by this layer. The heritage authorities of Amsterdam conditioned the conservation of the additions made by Aldo van Eyck in the 1990's. Other later additions could or should be removed. Following this approach, the restoration even included the removal of the paint on the exterior concrete.

Adaptability

Jurriaan van Stigt lead the debate along several aspects of Structuralism. The first topic of the discussion was the adaptability of the building composition by units, including the possibility of extension. The example of Raadhuis Ter Aar by Joop van Stigt shows this idea. Graduate student Michelle Bettman, who has thoroughly studied the building for her graduation studio, believes that the expansion is correct in its general outlines, but not in a spatial sense. The extension affects all scale levels. In particular, it is visible in the connections between the old and the new, in the use of other materials and the application of different window frames and façade openings. The inspiration of the Palladian villa has faded into the background. As to whether that expansion is also cultural heritage, she says that also this historical layer has value.

of the original concept does not always lead to a successful solution.

Layers of change

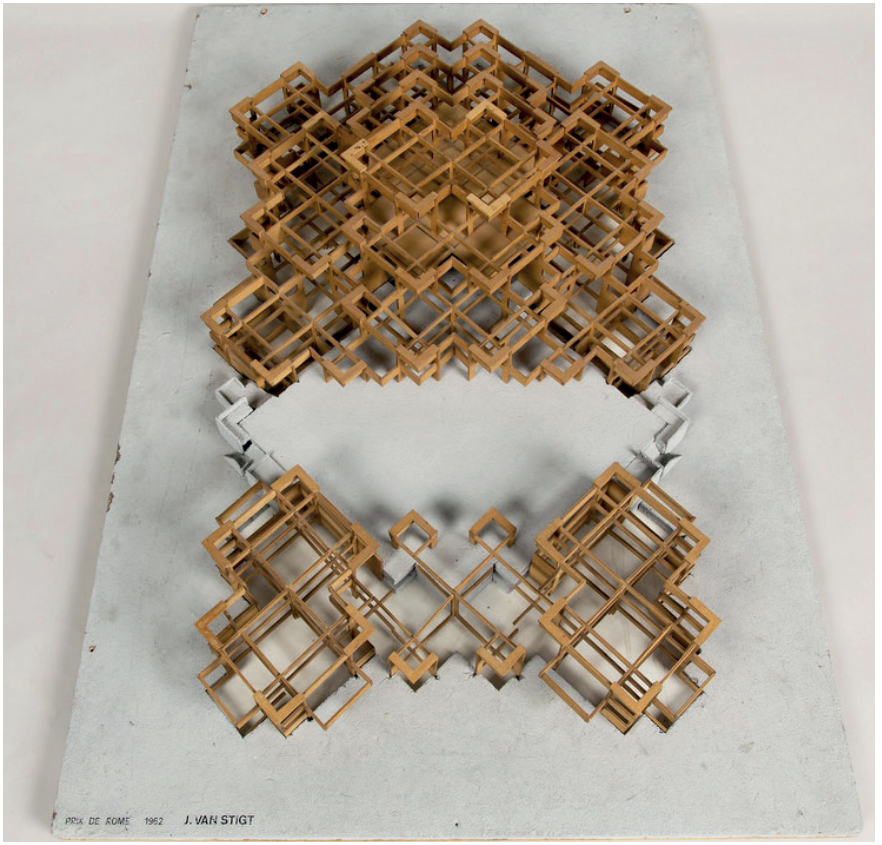
Also the Orphanage redesign shows these layers over time. The question is to what extent one can change the icon and which layers have value? Heritage authorities play a decisive role in this. Paul Diederen indicated that non-iconic buildings, especially post-war buildings with good structures, are easier to transform. Yet it is different for the Orphanage. That is poetry in itself and not a common structure. Student Dominik Gomólka believes that change and adjustment are also possible at the Orphanage. Wessel de Jonge asked him if the Orphanage could be expanded. Dominik replied that after a good analysis a new composition including an extension can be made. He said we must investigate and invent, and he refers to the adjustments made according to the photos by WDJArchitects. The firm BPD is the new user of the Orphanage, and client for the redesign. They are very proud of the building, showing it to every visitor.

Design freedom

't Karregat allows much more opportunity for design, stated graduate Jelle Hettema who climbed one of the umbrella structures. The building invites use, as the value lies more in the principle of the interspace and the umbrella constructions. It is playful, changeable and has a lot of residual space, even though it is a structuralist building. In this building, Structuralism is more prominent in the societal idea and the connection to the neighbourhood, Paul Diederen emphasized. It is a simple building in Eindhoven that works well for the users, in contrast with the work of Aldo van Eyck. The origin of the existing building sets the possibilities and limits for the redesign. Starting with the main ideals of the design as an inspiration seems a strategy both architectural firms have implemented. Van Klingeren designed 't Karregat from a social point of view to celebrate the meeting of different users under one roof, expressed by the umbrella structure. The Orphanage was an integral design, a building as a city, housing all the activities required for the children.

The examples of structuralist buildings that have been discussed in this event, show a variety of approaches. These are influenced by the attitude and beliefs of the redesign architect, but maybe even more by the character of the original design. Therefore, a deep understanding of the existing building on all scale levels and aspects is necessary, providing arguments and tools for a respectful transformation.

Lidy Meijers



Maquette Prix de Rome, Joop van Stigt

Structuring Space

Structuralist buildings are recognisable by their geometric grid structures, based on uniform patterns. The aim of this configurative way of designing was to create a non-hierarchic order that would serve democratic living. The buildings show a repetitive structure in which spaces are juxtaposed and interlinked. The hierarchy of 'main' and 'serving' spaces was unwanted and impossible, as all units were equal. Large spaces only existed as a multiple of small units.

Architects like Joop van Stigt and Jan Verhoeven developed mathematic concepts for their spatial designs. Verhoeven designed several schools based on a concentric form that could be subdivided by crystal shaped classrooms and smaller units. Van Stigt's contribution for the Prix de Rome in 1962 shows a basic pattern of squares that could be extended to a three-dimensional landscape of dwelling units. In many structuralist buildings, complex grids of overlapping shapes, form the base for many possible functions and spatial relations. The overlapping spaces could either be linked to create a continuous bigger space or could be divided for smaller and private rooms. Moreover, functions were interchangeable in this egalitarian grid, making the building flexible. One 'ideal' system could house multiple functions and address a diversity of spatial desires, every building with its own unique measurement.

"Things may be large, only as a multiplicity of small units, because excessive spaces easily create a distance, and by making everything everywhere and always too large, too empty and therefore too far away and too untouchable, architects will become producers of distance and inhospitality. Large as a multiplicity implies an increasing complexity and thus an enrichment of interpretations, because of the great diversity of relations in the interplay of separate units that construct the larger whole."

Hertzberger in Forum 1973, 'Huiswerk voor meer herbergzame vorm' (translated from Dutch).

"Groot mogen dingen slechts zijn als veelvoud van op zich kleine eenheden, want met overmaat wordt al gauw afstand geschapen, en door altijd overal alles te groot, te leeg en daardoor te veraf en te onaantastbaar te maken, worden architecten vooral producenten van afstand en onherbergzaamheid. Groot als veelvoud houdt toename van complexiteit in en daarmee verrijking van de interpretatiemogelijkheden door de grote verscheidenheid van betrekkingen in het samenspel van afzonderlijke eenheden waaruit het grote geheel is opgebouwd."

Original situation

Present situation

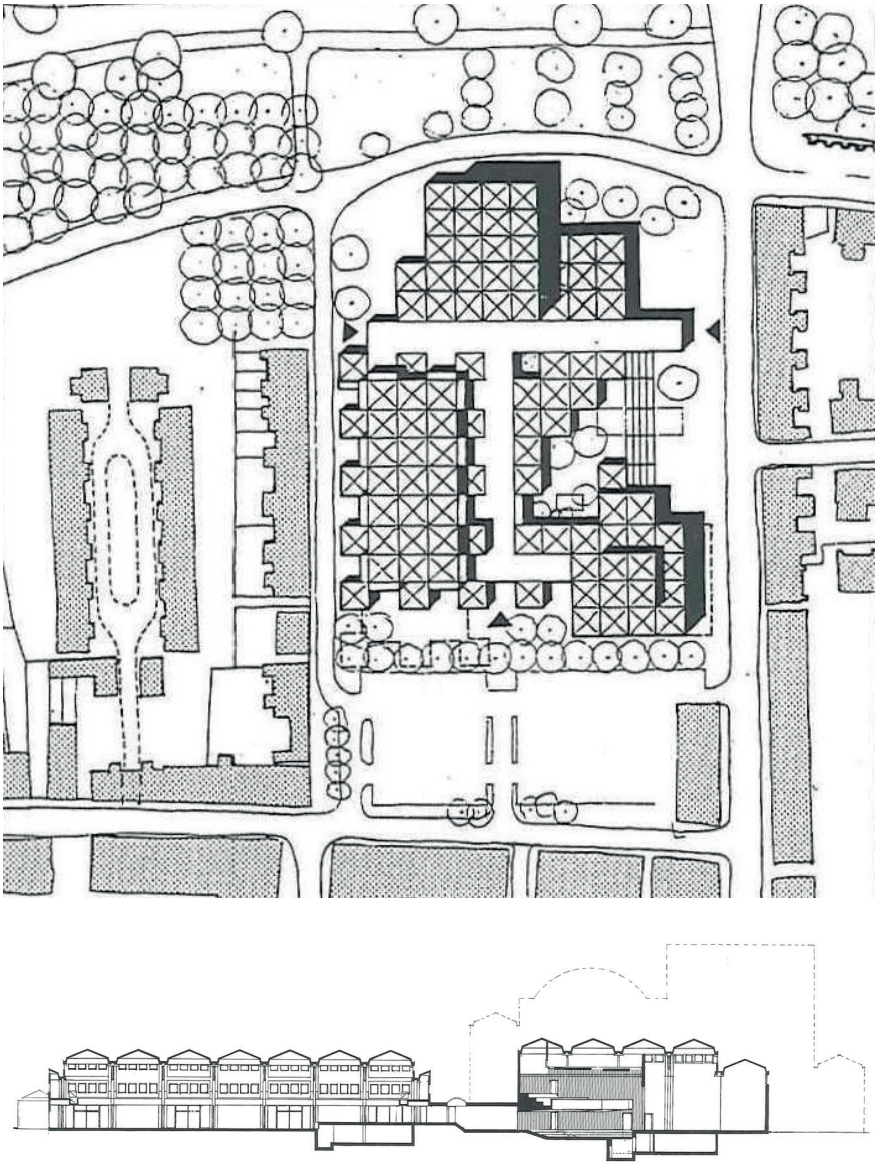
Case Study: De Flint

Amersfoort (1977) by Onno Greiner
First renovation by Onno Greiner (1990)
Second renovation by ADP (2013)

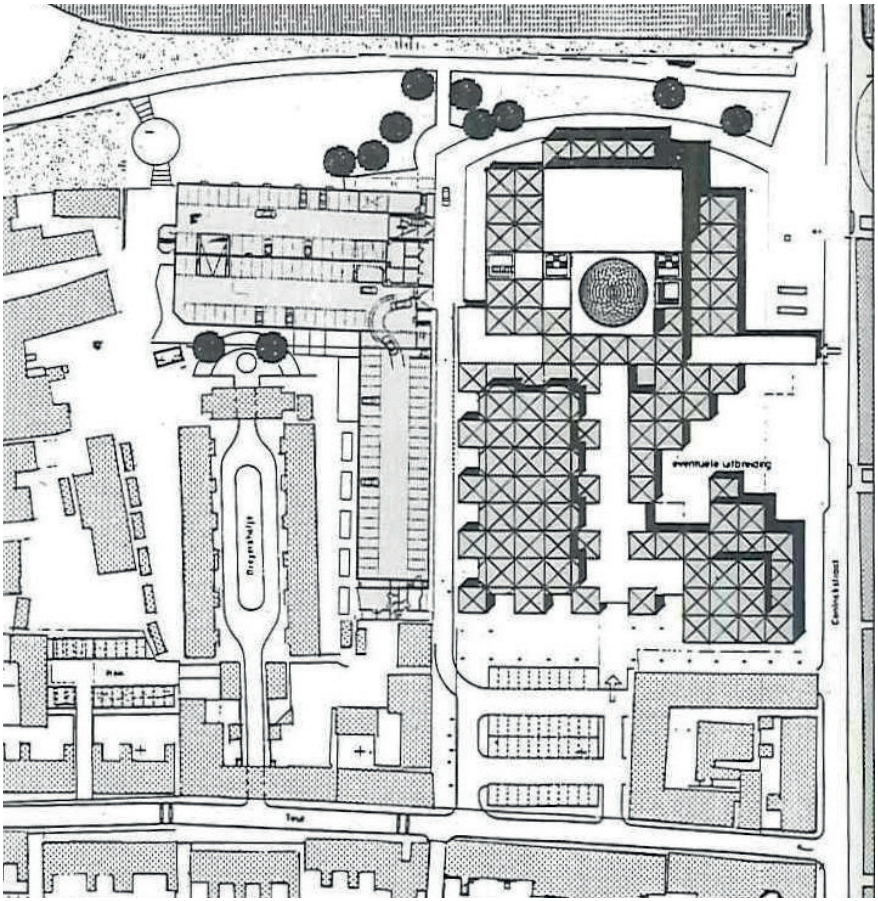
'De Flint' is based on a modular system, composed of repetitive units of 6,4x6,4 m, based on the dimensions of its historic context in Amersfoort. Greiner's aim was to make the theatre 'merge' in the residential neighbourhood, instead of creating a huge iconic building. Each module was intentionally designed to be a self-contained unit, a prefabricated reinforced concrete structure roofed by a timber frame. Units could be combined to create larger spaces and steel trusses provided wider spans. The mesh of units was intersected by two main inner streets in this building, that were publicly accessible. This T-shape axis was positioned in the centre of the complex as the main routing, leading from main entrances to the various functions. 'De Flint' included a theatre for 500 persons, a smaller theatre, a market hall, a creativity centre and a restaurant-café.

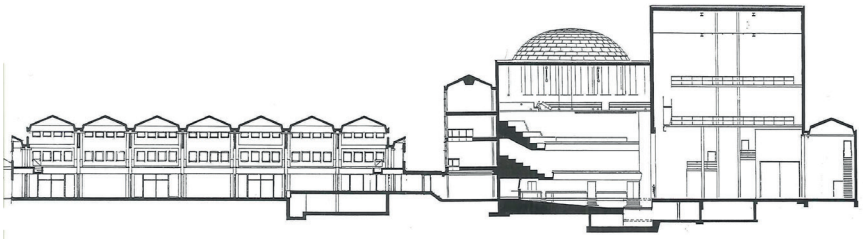
In November 1990, 'De Flint' caught fire. The theatre part of the building was badly damaged, but the part across the east-west street was still intact. Since the theatre had to be rebuilt, it was decided to enlarge it to 800 seats and update it, adding a state-of-the-art theatre tower and a parking garage. The renovation was designed by Onno Greiner and based on the same principles and unit structure as had been laid out in the original concept. The concept of a 'growing structure' was utilised by adding more units on the side of the theatre room. The undamaged parts of the building and the concept of perpendicular streets remained unchanged. In 2013 'De Flint' was outdated and didn't fulfil the needs of the users anymore. A renewal was required to keep the theatre competitive. ADP in association with SHS won the competition for a renovation design. The most explicit change is the new glass roofing crossing the building from east to west, which provides ample daylight. To create more openness, flexibility and daylight, many partition walls between units were removed, for example adjacent to the circulation spaces (axes). The former 'boxed' and dark spaces have become connected both physically and visually, resulting in more continuous and light space. A grid structure composed of repetitive modules, as can be seen in many Structuralist buildings, is limited in the type of spaces and uses it can accommodate. Bigger or higher rooms or irregular forms don't fit. Moreover, the configuration of similar modules in many cases are experienced as a maze and wayfinding can be problematic.

The two renovations of 'De Flint' have tested Greiner's aim for a structural system that can transform and adapt to the needs of users. Although the original design already contained some larger spaces and a creative use of the grid, the renovation designs show the need for even larger dimensions, more openness and more connections. One strategy used is the insertion and addition of larger rooms (new theatre room, parking) within the grid. Here, the units have been adapted in room height, structure and expression. Second, is the interior removal of unit boundaries, to open up of spaces inside the grid. The presence of the clear circulation system with two axes, makes it easier to adapt and repurpose units, without losing the structuring spatial concept.



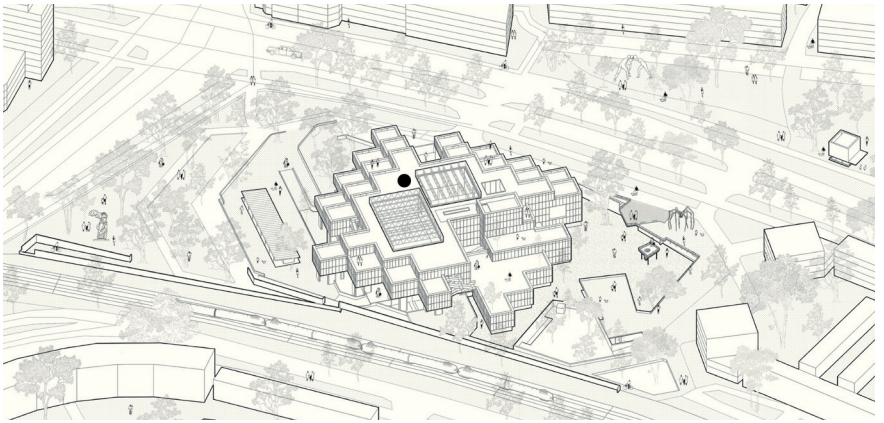
Original plan and section

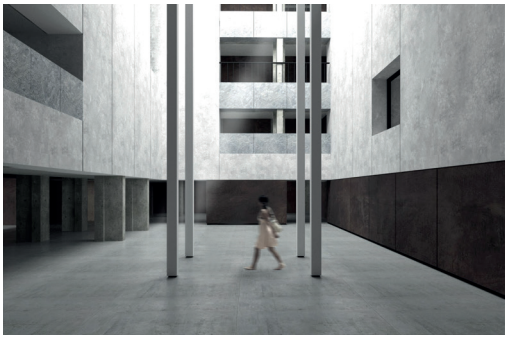


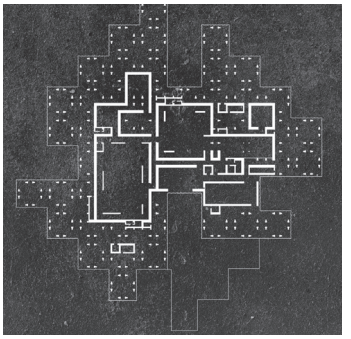


Present plan and section

Student Strategies

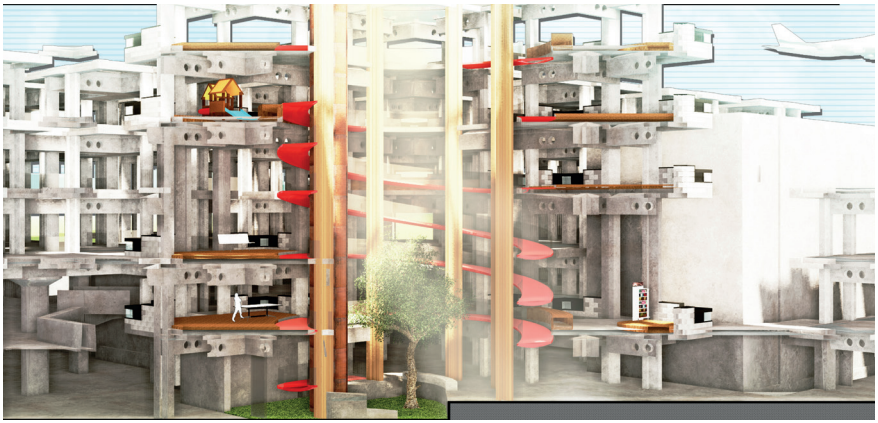


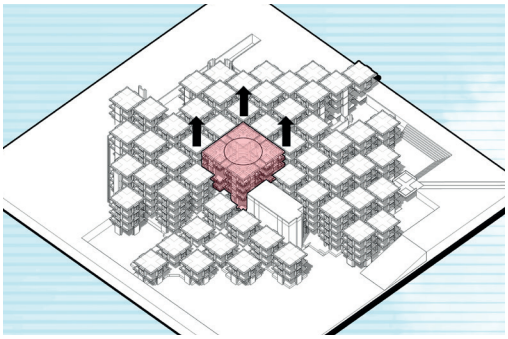


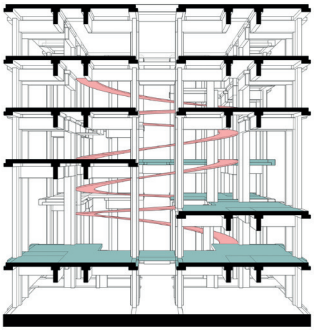


Creation of internal hierarchy
Feng Wang (MSc3 Centraal Beheer)

Partial demolition of eight unit-towers created internal larger spaces for the program of a museum of modern art. By taking out construction elements a hierarchy and spatial sequence was developed in vertical and horizontal sense. The variation of room measures, in relation to materialisation and light conditions, provides a range of exhibition possibilities of different pieces for art, in contrast to a new regular neutral exterior expression. The existing large space of the parking garage is transformed into an open gallery space.

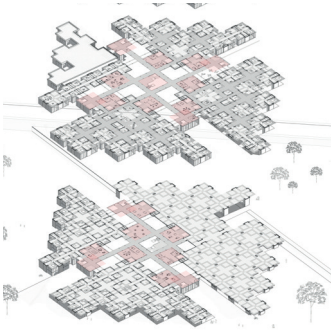


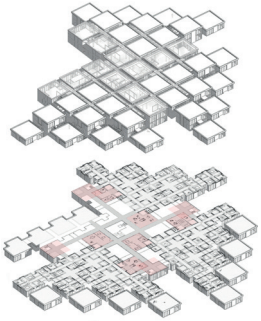




Contrasting form & colour as an additional layer
Bertrand Tan (MSc1, Centraal Beheer)

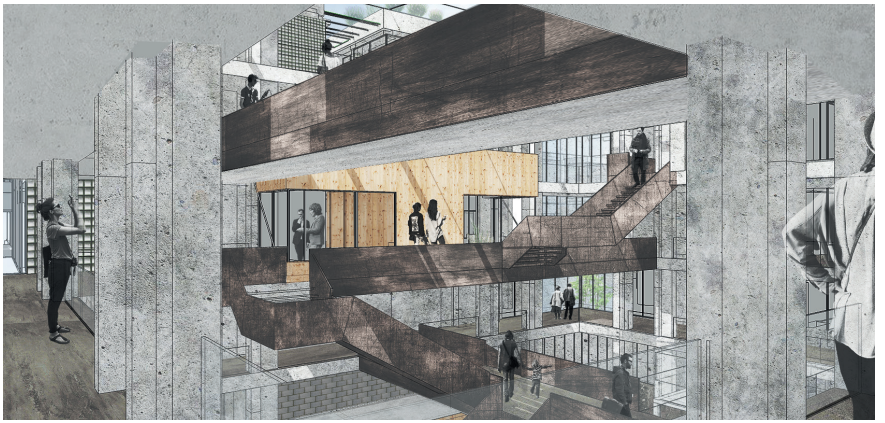
The existing building with its neutral structure has been accepted as starting point for the design. A circular red stair in the core of the building creates a centre in this neutral structure. This stair moves around an open space, letting light into the building, connecting floors and creating a recognition point for wayfinding.

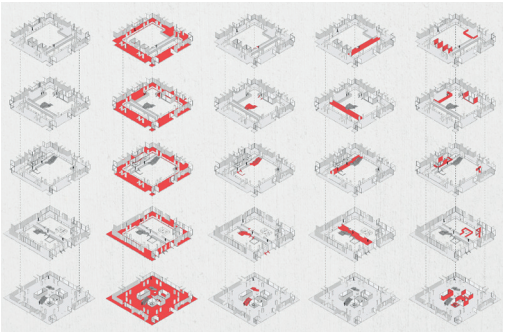


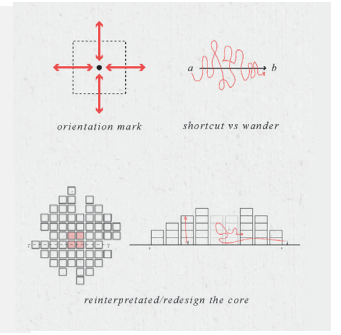


Intersecting with the grid
Emma Anzolin (MScI, Centraal Beheer)

Using the same elements in a different way, the neutral structure of the building becomes specific in the centre. Moving the floor-space to the space between the pathways and leaving out some of them, the sizes of both the floorspaces and the patios become bigger. It creates a bigger scale on the central axes and more possibilities for use.







Creating space in the core
Linde Petit dit de la Roche (MSc1, Centraal Beheer)

By taking out the four centre blocks of the building, a new open centre is created. It is used for both vertical and horizontal distribution of people throughout the building. This patio brings light deep into the building creating a recognizable centre, helping for orientation. The public functions are directly linked to this circulation system in the new centre.

Kasbah Hengelo Piet Blom, Aerial Photo

Growing Structure

The architects of Structuralism developed urban structures that could be extended and become a part of the city. Their ideas did not distinguish buildings or blocks, but growing structures that could be repeated endlessly and would replace the traditional master planning for city extensions. This neutral structure could be interpreted by individuals for a diversity of activities that could change over time. A growing structure requires expandability and interchangeability of the construction. The structural system was designed to be easily adaptable and was separated from the infill.

Many of the structuralist buildings are rather large and are somewhere between building and urban tissue. The Kasbah project in Hengelo designed by Piet Blom is a structure that has 'grown' to neighbourhood scale, although it was not literally extended. This 'urban roof' is an example of a pattern that contains housing, squares, shops, parking and gardens and could be repeated without limits. In between building and district, the ministries of Social Affairs in The Hague by Hertzberger and Education and Science in Zoetermeer by Rosdorff have the character of an unlimited structure that could continue to grow into its surroundings. Also, on building scale 'growing' was a theme. Van Eyck designed the primary schools in Nagele from the possibility to vary the configuration of units, based on the same plan. The three schools present different 'stages' regarding the number of class rooms and clusters.

"Every cell has the potential, while retaining its own identity, to create larger units that have an own identity enriching the individual cells. While these larger units, again varied, have the potential to make even larger residential units possible, retaining their identity through repetition - combination, which similarly enrich the identity of the smaller ones. Etc. etc."

Van Eyck in Forum 1960-1961 (translated from Dutch)

"Iedere cel bezit de potentie om met behoud van de eigen identiteit grotere eenheden als vanzelf te doen ontstaan met een eigen, die van de cellen verrijkende, identiteit. Terwijl deze grotere eenheden, ook weer onderling gevarieerd, de potentie bezitten om, met behoud van hun identiteit door herhaling – schakeling - nog weer grotere wooneenheden mogelijk te maken die op overeenkomstige wijze de identiteit van de kleinere verrijken. Enz. enz."

Original situation

Present situation

Case Study: Raadhuis Ter Aar

Ter Aar (1970), by Joop van Stigt
First renovation designed by Buro Van Stigt (1991)
Second renovation designed by Buro Van Stigt (2006)

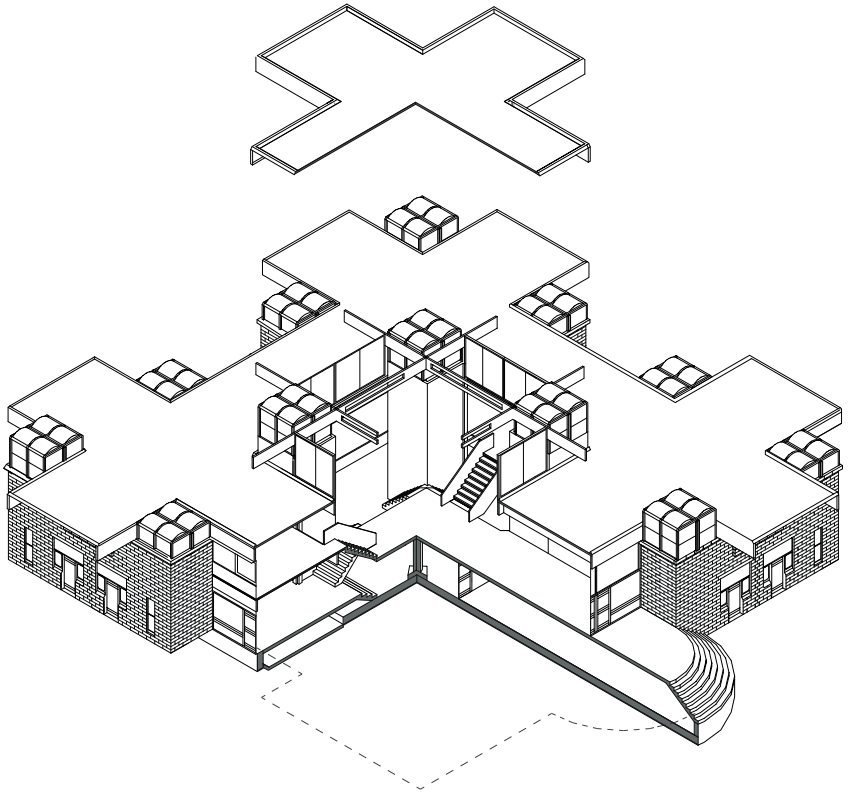
The plan for the town hall in Ter Aar consists of five interlocking elements of 11x11m, arranged in a point-symmetrical composition of four units around one higher central unit. The central open hall in the middle functions as a connecting space, linking the quarters and providing light and sight. Moreover, this atrium was meant as a public area, stimulating social interaction between the public and the civil servants. Big monumental stairs led to the central entrance into this main hall. The town hall was situated next to the old church and old town hall on the outskirts of Ter Aar. From the building one has a wide view over the polder landscape.

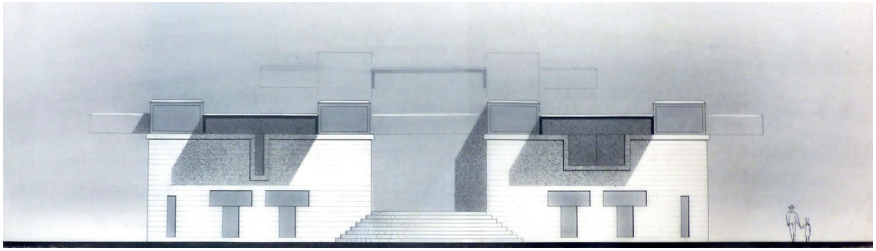
In 1991, an extension to the town hall was made, using a similar concept of interlocking square blocks. Three additional modules were built and one corner unit becomes the 'overlap' between old and new. Extending the structure is not a straight-forward repetition of the system. A double height interspace between original and new modules functions as a mediator. Moreover, the new modules are situated on a lower level, creating a new 'wing' and creating a cascading volume down to the landscape. The extension houses a canteen space and storage rooms for the municipality and is accessed directly through a new entrance on the ground floor. A glass elevator was added in the corner of the atrium for more comfortable usage and all original furniture, designed for multiple uses, was removed.

Nowadays, the building is not used as a town hall anymore, but functions as a municipal office only. The formal entrance with the monumental stairs was abandoned, signifying the disappearance of publicity. Additional partition walls were added to make private office areas and for reorganising the circulation, more toilet rooms were placed and all original furniture was removed.

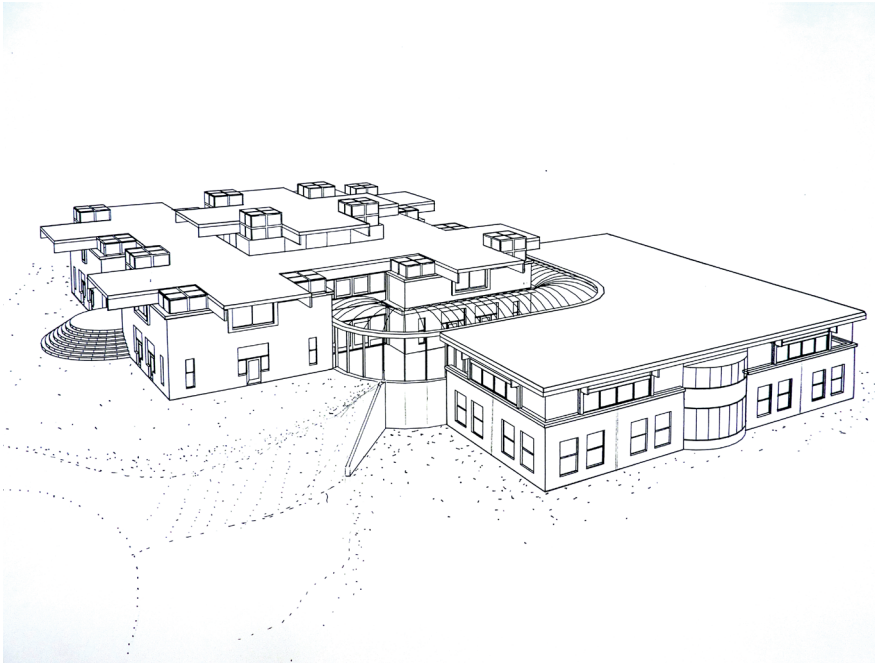
Although an expanding structure was a strong idea in many Structuralist designs, most examples have been 'frozen' in their initial form. Were the growing structures not possible, not feasible, or maybe not in demand?

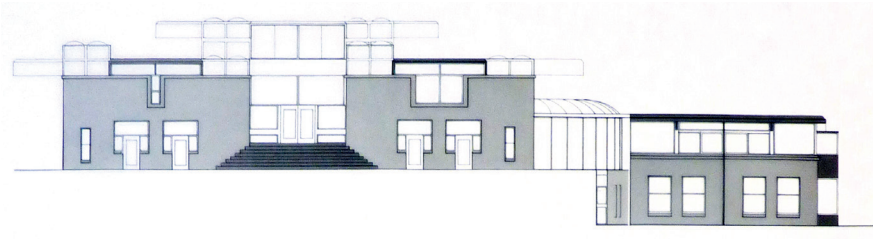
Van Stigt's 1990's extension is an exceptional example of a structure that has grown. However, it is not a simple repetition of units, but as specifically designed transformation. The lowered level of the new wing and the connecting round-shaped void space in between result in a non-repetitive but special spatial character. The strategy used is primary the addition of units continuous on the existing pattern, but using a intermediate connection area. Also, the material and detailing of the new modules is not the same as the original ones, but clearly 'inspired by'. Town hall Ter Aar is a rare but successful example of a configurative design of units that can 'grow'.





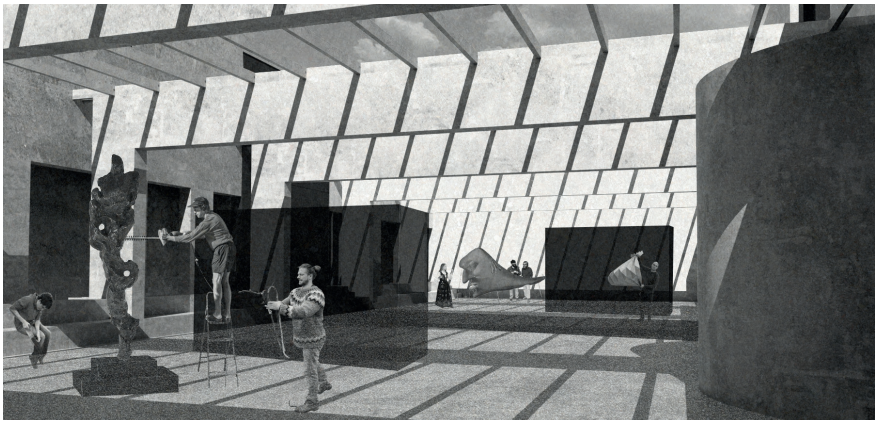
Original axonometric and elevation

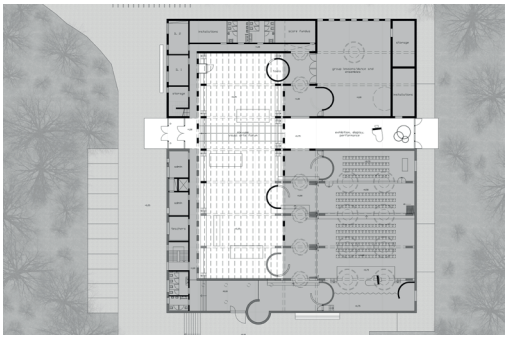


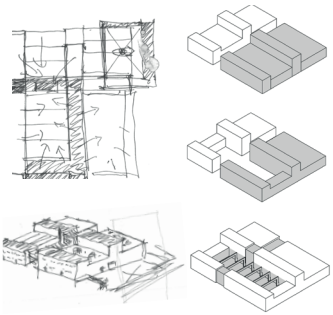


Present axonometric and elevation

Student Strategies

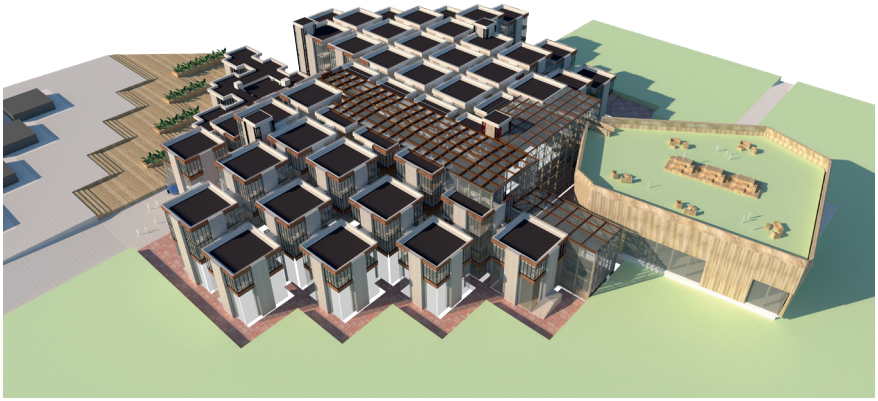


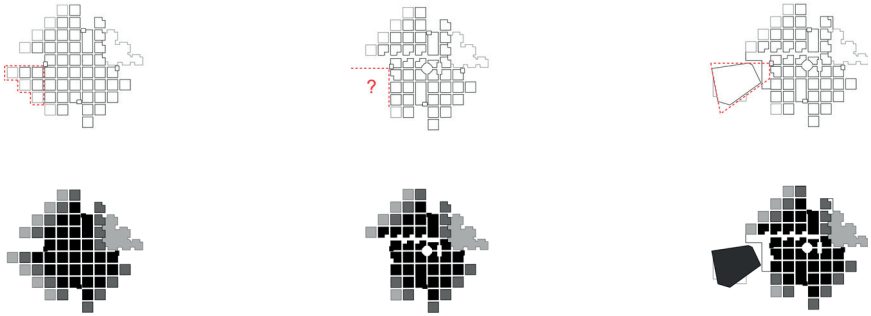




Analogue extension
Florian Reisacher (MSc2 Pastoor van Arskerk)

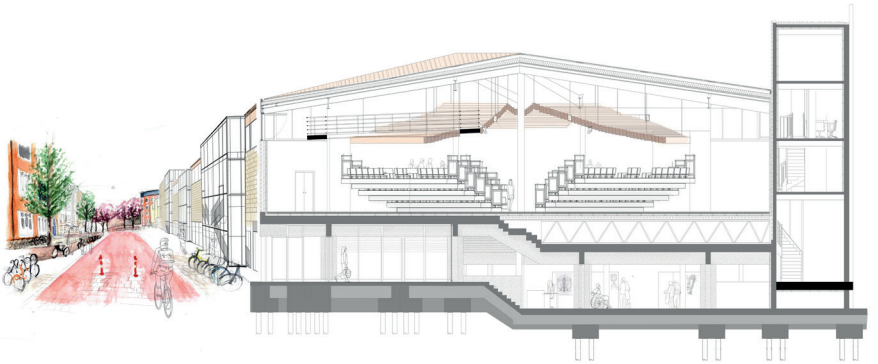
The building is extended by repeating two bays of the grid, using a ‘light street’ as a connecting interim-zone. The ‘light street’ is a unifying axe that evokes a new orientation in the composition. Resembling the original design in materialisation and proportion the new extension merges with the existing. A new bigger common space is created in correspondence with the rhythm of the bays, reinforcing the idea of a single identity.

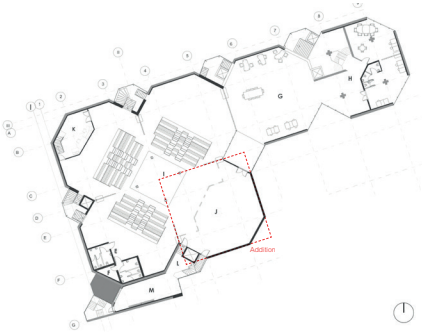




Addition of a new contrasting form
Anna de Bruijn (MSc3 Centraal Beheer)

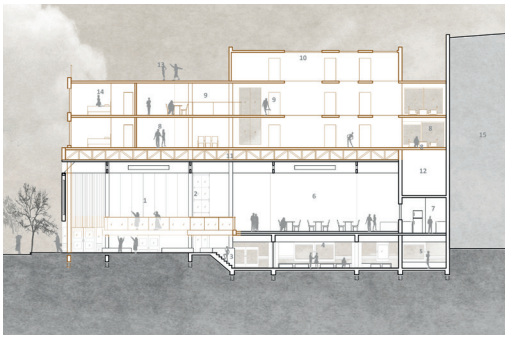
Because creating a big open space in the dense grid of Centraal Beheer is not possible, a new odd-sized larger space is added outside the grid. The new volume, that is a lecture room, is contrasting in all aspects: form, material, function. The addition is detached from the existing grid and linked to the building by an amorphous intermediate space.

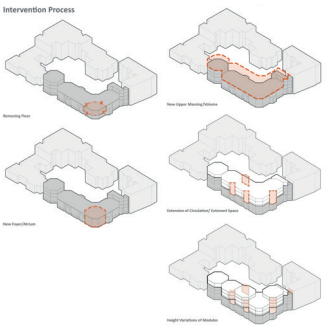




Filling the grid and non-filling the grid
Angelique Stegeman (MSc2 Afrikahuis)

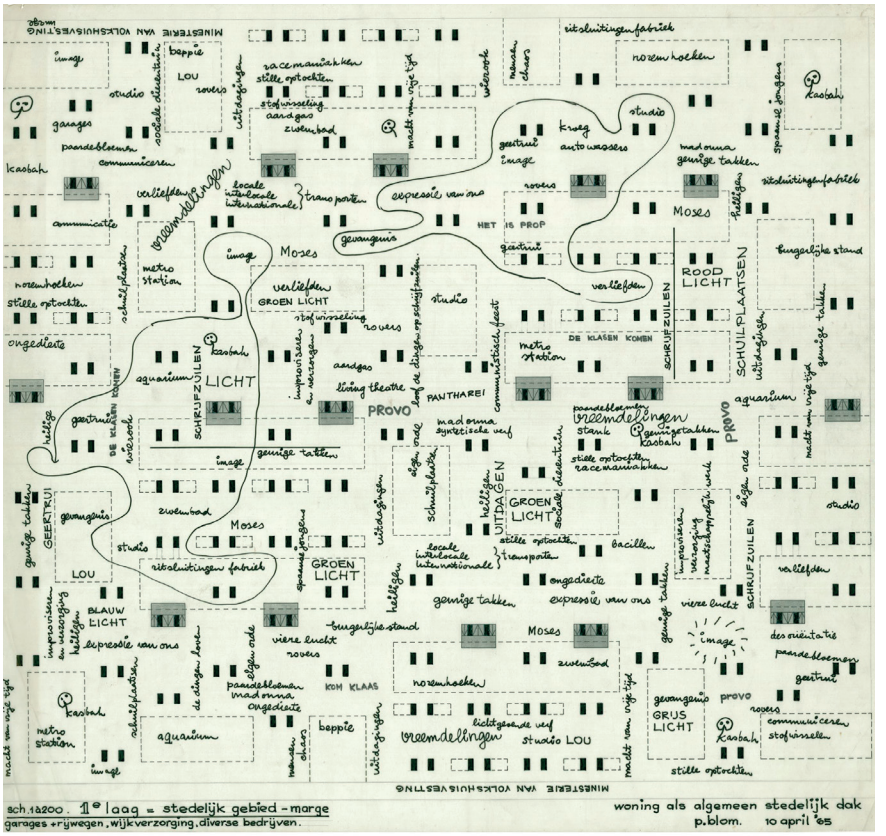
From the beginning of the design the sixth octagon is present in the inner corner of the composition and also visible in the pavement of the outside space towards the garden. The use of this octagon created a theatre comparable to the former church, although the stage is levelled out. Two by two octagons with a pyramidal shaped roof construction form the new main space. The open corner of the ground floor stays and makes a transition zone from the street to the interior.





Filling the urban block – vertically
Andy Tsui (MSc2 Afrikahuis)

By the vertical extrusion of the floorplan reaching the height of the adjacent residential buildings, the design relates with the urban morphology and with the spatial organisation of the existing complex. The added volume, created to house newcomers, is supported by a load bearing column structure that merges with the existing order. The composition and detailing of the upper facades show a complementary materialisation in comparison.



Drawing, Piet Blom

City as a House, House as a City

'The story of a different opinion' (Verhaal van een andere gedachte) was published in 1959 in Forum magazine by a group of architects under the inspiring leadership of Aldo van Eyck. They accused architects and planners of making The Netherlands 'unliveable' and plead for a new architecture that would create 'liveable cities' and coherence between people and things. The separation of functions as advocated by CIAM was to be replaced by organic structures with mixed programs. Inspired by the historic inner cities, structuralist buildings incorporated urban elements like squares, streets, private space and social space. In many buildings, a major part of the spaces was publicly accessible. Also, the house was regarded as a small city as described by John Voelcker in 1965: "The house is the centre from which living extends and to which it returns (...) the kitchen, for example, becomes the workshop, factory, warehouse and multiple store of the great city; the living room becomes the cinema, library and dance hall."

In the orphanage in Amsterdam, Van Eyck composed all spaces around an inner street, aiming to unite all functions in one order but in the same time respecting the specific meaning and position of separate rooms. On a larger scale, Hertzberger's design for the Amsterdam town hall and the 'City of Cahen' in Amersfoort, are examples of using streets, bridges, collective living rooms and alleys to make the building public and connect it to the existing urban tissue.

"In today's city, everything is too big and too small, too far and too close, too much and too little: too similar and not similar enough, too different and not different enough. That is why everything was done to try and build this house as a small city, based on the recognition that a city should be like a big house. Here, multiple different elements were allowed, as it were, to form a spacious and complex pattern."

Aldo van Eyck 'De milde raderen van de reciprociteit', Forum 1960-1961 (translated from Dutch)

"In de stad van nu is alles te groot en te klein, te ver en te dichtbij, te veel en te weinig: te veel en te weinig hetzelfde, te veel en te weinig anders. Daarom werd alles op alles gezet om te trachten dit huis als een kleine stad te bouwen, uitgaande van de erkenning dat een stad als een groot huis moet zijn. Hier werd een veelvoud van verschillende elementen als het ware toegestaan een wijd, complex patroon te vormen."

Original situation

Present situation

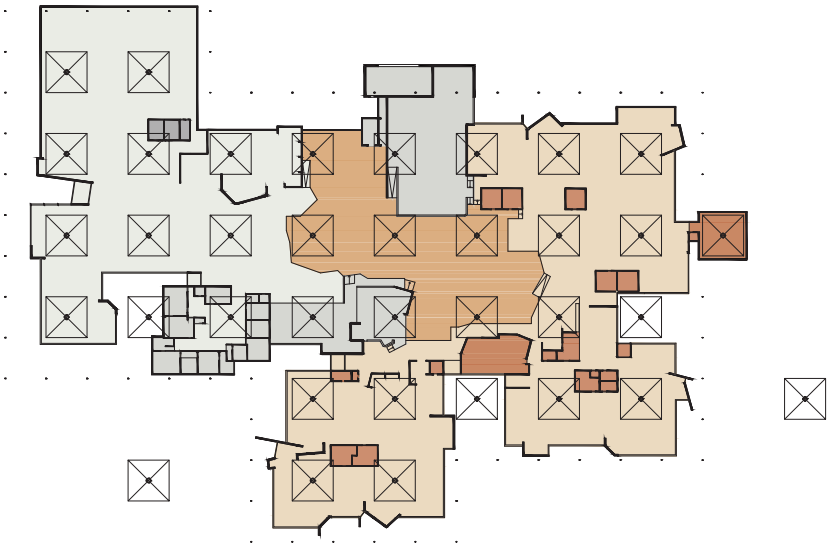
Case Study: ‘t Karregat

Eindhoven (1973), by Frank van Klingeren
First renovation designed by Architectengroep Noord (1981)
Second renovation designed by Passchier (1989)
Third renovation designed by Diederen Dirrix and Architecten en en (2015)

As designer of De Meerpaal in Dronten, De Agora in Lelystad and ’t Karregat in Eindhoven, Frank van Klingeren advocated an architecture that creates possibilities for unexpected things to happen. In reaction to the modernists tendency to separate functions, a central theme in Van Klingeren’s work was ‘de-clotting’ (ontklontering). By combining functions and removing boundaries, new possibilities for meeting and public life would arise. De-clotting causes ‘nuisance’ (hinder). This is usually considered as negative, but he turns it into something positive. Nuisance is contact and contact can lead to friendship or enmity or anything in between. The multi-functional centre ‘t Karregat was built in the new neighbourhood Herzenbroeken, to accommodate a combination of social and commercial functions. Under an enormous roof, constructed of steel ‘umbrella’-columns, schools, conference centre, supermarket, shops, restaurant, neighbourhood house and library were positioned. Room divisions by low walls or furniture elements, guaranteed optimal open space and social interaction. But soon after completion, separation walls were installed to avoid noise nuisance and to provide privacy.

‘t Karregat was renovated in 2015, designed by Diederendirrix Architecten and Architecten en en. The first conclusion of their research was that the open space never worked. There was a lack of climate control, privacy and acoustic insulation. Therefore, dividing walls were added even though the original concept was not to separate different functions from each other. For the transformation they chose to restore the floor, roof and construction to make the complex more sustainable. A former roofed public space became an outdoor patio space. The new construction provides traditional spaces, corridors, transparency and still retains some of its spaciousness. By movable inner walls and sliding doors, a certain degree of programmatic flexibility is preserved.

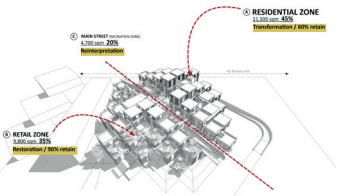
Many structuralist buildings combined functions in a more or less fluid way. The results are very diverse: sometimes functions or facilities were not feasible and left. In some institutional buildings, the ‘city’ was closed for the public and became a city only for the employees of one firm or ministry. After the 2015 renovation of ‘t Karregat, the number of functions and the amount of public space has decreased. In the renovation, physical aspects of the building like the roof, floor, colour schemes and umbrella constructions have been restored. But it did not reuse the most important and experimental concept of open space, because it had never functioned satisfactorily. Van Klingeren’s strategy of making a ‘building as a city’ by mixing to the maximum, is opposed by a strategy of separation. This leads to a renewed division of public (open) and private (enclosed) space.



Original plan

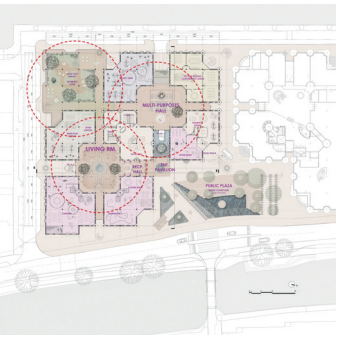
Present plan

Student Strategies



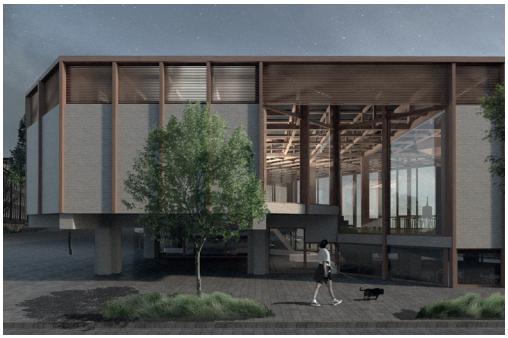
Splitting the building to introduce variety
Jaa Vangvasu (MSc3 Centraal Beheer)

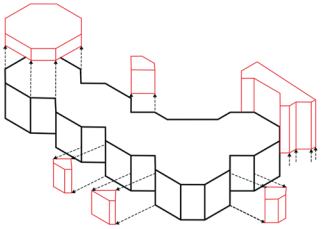
The vast complex of Centraal Beheer is cut in parts. Widening and opening the ‘streets’ will improve daylight, circulation and spatial quality. The former interior streets are now outside. This strategy results in splitting up the building into four quadrants that house different functions: residential, working and commercial. Collective indoor and outdoor spaces enhance the initial concepts of interaction and the ‘building as a small city’.



Covering public space to increase interaction
Tae Taemeyachat (MSc3 University Campus Leiden)

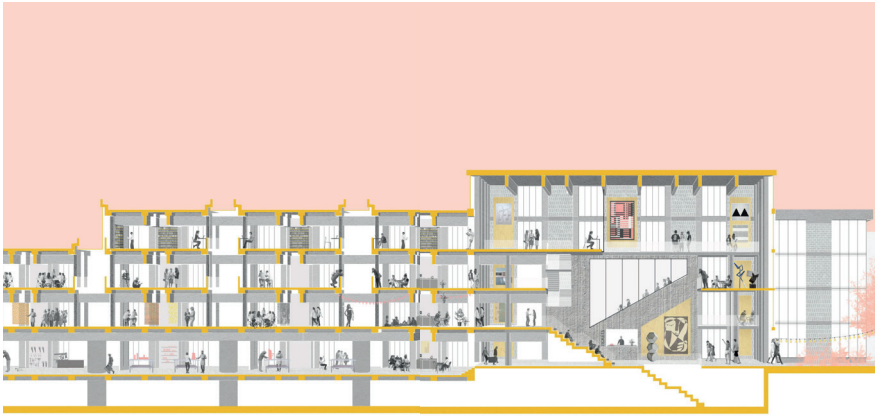
The public open courtyards of the faculty of arts are covered by glass roofs to make collective space for university meetings and public city events. These new ‘agoras’ provoke social interaction and improve circulation between the buildings. Inside the existing rooms, the former parcelled spaces (small offices) are transformed into open office space, to make people meet.

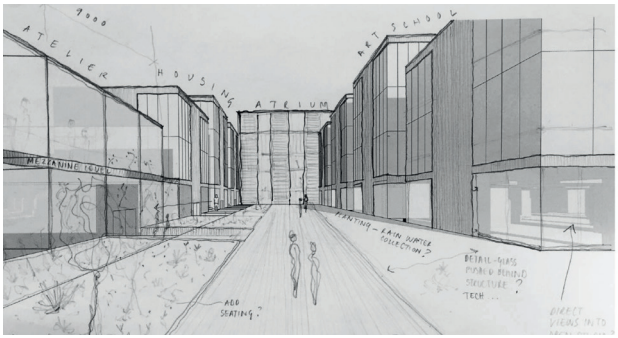


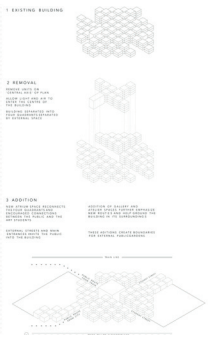


Replace function by contemporary social space
Kees Fritschy (MSc2 Afrikahuis)

The former big open church spaces are used for a contemporary function that bring people together. In the Van Ostadestraat repair shops give the street a vivid atmosphere. Working together, making use of machinery and enjoying a cup of coffee in the court yard brings new relevance to the building and neighbourhood. The openings of the floor make the interaction of people possible in a vertical way. Along the street the new transparent plinth and roof lights bring light to the different workshop spaces.







Introduce a new 'heart'/ core as a social catalyst
Ali Mc Mahon (MScl Centraal Beheer)

The building volume on the central axes has been taken out, a new big space has been placed in the centre of the building. All the inhabitants of the building use the central space to get to their part of the building. More public functions enforce the public character of the space, creating both a physical and a social centre of the building.

The reconstructed Sonsbeek Pavillion in Arnhem

Non-Material

Concrete blocks and prefabricated concrete structures have become signpost of Structuralist buildings. Although the architects of structuralism were explicit about many of their design ambitions, the material culture is not documented extensively. Generally, the structure is exposed and shows its dimensions and spatial system. Seeing and understanding the columns, beams and slabs could be regarded as a way to interact with the building for the user and make the building more human. Having a closer look at the concrete blocks, they appear to have different sizes, colour tone and texture. The load bearing structures are mostly composed of a limited set of prefabricated concrete elements, a construction method that suited the concept of neutral adaptable structures. Although concrete is dominant in the image of structuralism, other materials such as masonry, wood and natural stone are used. In most cases, the material is applied in an unfinished and 'honest' appearance, not cladded or painted. The application of rough materials is linked to brutalism that shows and celebrates the modern materials, joints and construction.

In his explanations about the materialisation of Centraal Beheer in Apeldoorn, Hertzberger explains the concrete block walls as a 'blank canvas'. It was his intention to provoke employees to make the space 'their own' by adding plants, posters or accessories.

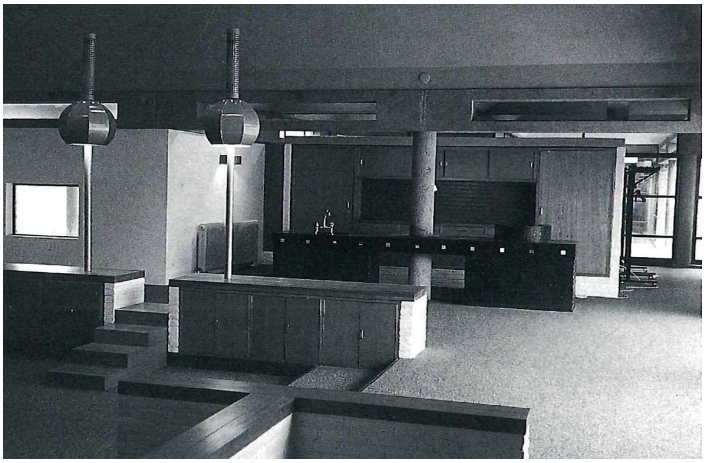
The descriptions of a craftsman like Van Stigt about the choice for materials mainly address functional or financial requirements:

"Redwood was basically waste, so it was cheap" - Canteen Twente

"Masonry details are not meant as an ornament but reasoned from a structural logic" - Leiden Faculty

"The interior materials are austere and neutral to make the space suitable for different purposes" - Willibrordus church.

Other critics write "Despite the simplicity of the architectonic means, a wealth of alternating spaces arose" - Sonsbeek pavilion.



Original situation

Present situation

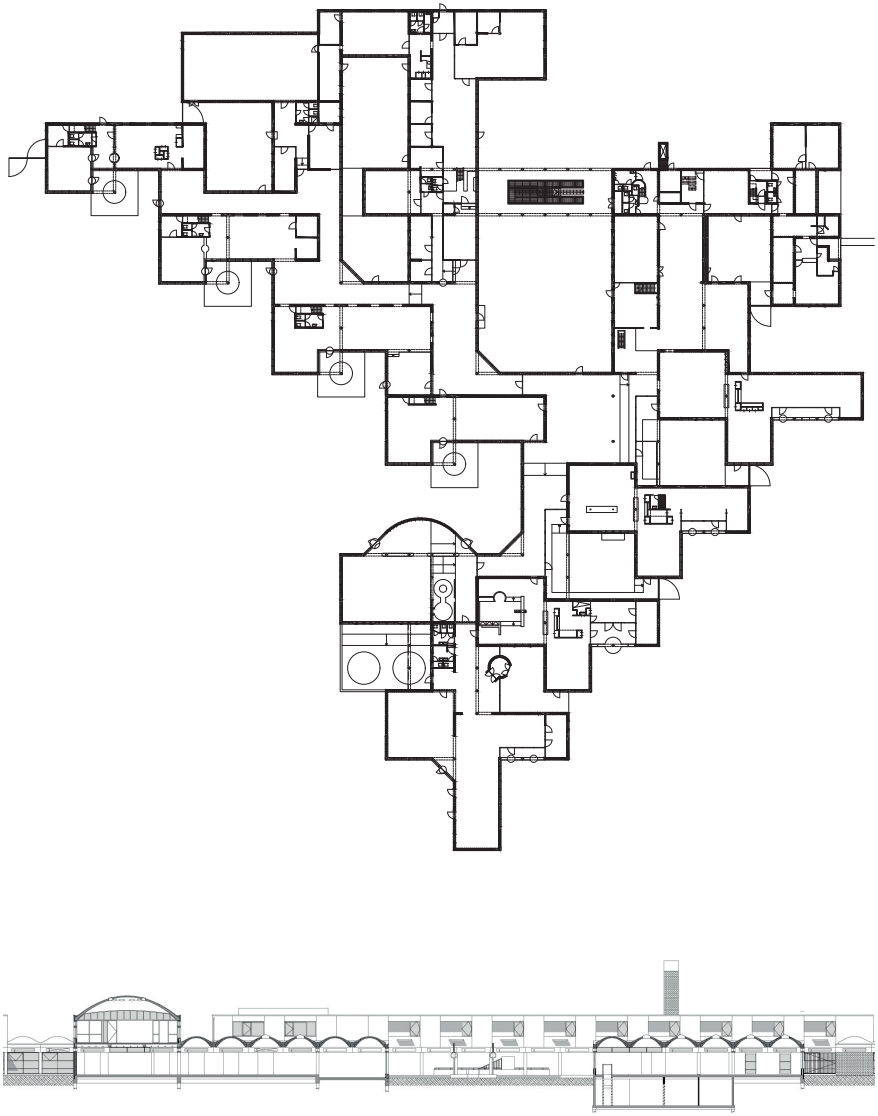
Case Study: Burgerweeshuis

Amsterdam (1960), by Aldo van Eyck
First renovation designed by Aldo and Hannie van Eyck (1991)
Second renovation designed by Wessel de Jonge architecten and Ex-interiors (2017)

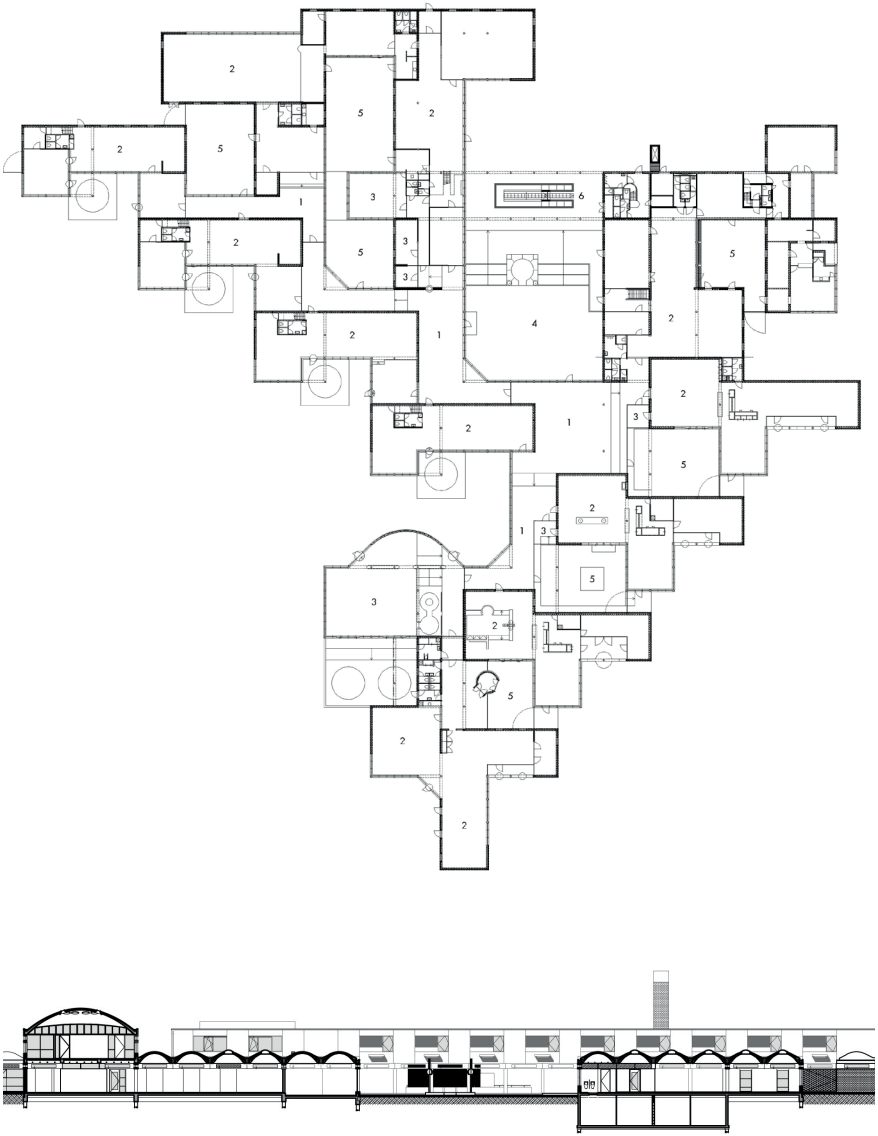
The orphanage can be regarded as the starting point of Structuralism in architecture, designed by its 'founding father' Aldo van Eyck. Although it lacks many characteristics of the architecture that has become known as Structuralism, this building was inspirational for the young Forum-architects in many aspects, like the inner street, the pattern of units and the reciprocity of individual and collective spaces. The Orphanage was located on the outskirts of the Amsterdam, and should not be an oppressive institution, but a welcoming home for a 'big family'. It was an orphanage for children of all ages including sleeping quarters, a kitchen, laundry room, gymnasium, library, and administrative spaces. A generic structure of equal units, covered by eight large and 328 smaller concrete domes, has become the iconic image of the building. The building materials as the concrete domes, columns and architraves, glass blocks and masonry walls are applied without finishing or cladding, as can be seen in many Structuralist buildings.

After a campaign to save the orphanage from demolition, The Berlage Institute moved in in 1991. Van Eyck designed the renovation that included changes to the window frames and to the festivity room. In later years the building became vacant. In 2017, the renovation design by WDJArchitects transformed it into an office space. Their approach was restorative, using the principles and ideas implemented by Aldo van Eyck. The poor acoustic performance of the concrete construction was a design challenge, since the exposed material is a characteristic of the monument. An important intervention was the integration of acoustic absorption and installations in the ceilings of the domes. By application of a concrete-mimicking plaster on the ceiling surfaces, new services were covered and the masonry walls were safeguarded from installations or finishing. The layers of paint that had been applied on the concrete façade elements over the years, were removed to expose the full concrete composition again. Original finishes of walls and floors were repaired and cupboards, counter tops and concrete wall fittings have been restored. The interior design by Ex-interiors adds coloured panels and textiles to the workspaces, specifying different rooms.

Visibility of 'raw' materials in the exterior and interior is typical for Structuralist buildings, but nowadays less appreciated. In many buildings, the interior concrete walls are painted. Apart from aesthetic reasons, the energy performance, installations or low comfort demand upgrading the façade constructions. The transformation by Wessel de Jonge of the Burgerweeshuis resulted in a restorative approach. Not hiding or changing, but revealing the original finishes and material qualities was the design aim. The chosen strategy to meet contemporary demands in the same time, was to 'sacrifice' one part (the dome ceilings) to solve several problems at once. This resulted in a Brutalist look.

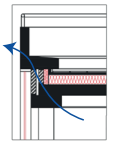


Original plan and section



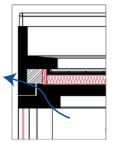
Present plan and section

Student Strategies



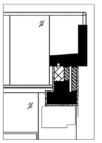
TYPE1
30CMX77400CM
70CM
masonry+concrete

Insulation masonry



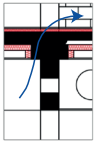
TYPE2
20CMX50400CM
40CM
concrete double

replace the block



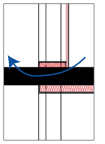
TYPE3
20CMX360CM
20CM
concrete

cut the beam



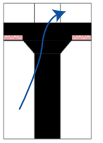
TYPE4
0CMX60000CM
20CM
concrete

add double layer



TYPE5
30CMX8000CM
50CM
concrete

accept

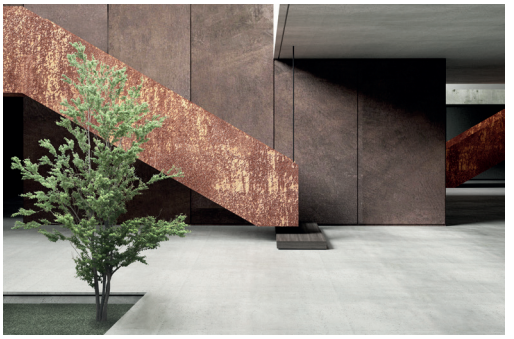


TYPE6
100CMX2000CM
30CM
concrete

accept

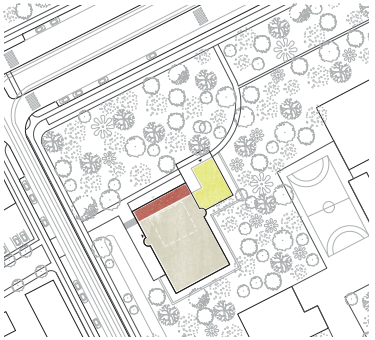
Accepting
Xiaoyu Xu (MSc3 Centraal Beheer)

The strategy is to accept the existing material as it is by embracing the brutalist expression of the concrete blocks in the design. Also, the poor energy performance of the prefabricated concrete elements in the façade is accepted, while thermal insulation is added where it is not disturbing the architecture. Calculating the relative energy loss of thermal bridges leads to finding the limits of the existing material.



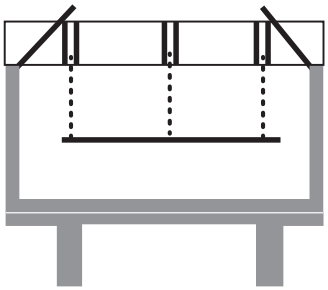
Introducing new cladding
Feng Wang (MSc3 Centraal Beheer)

In the exterior the facades are covered with perforated aluminium plates. In the interior the concrete blocks are clad with different materials such as glass, aluminium and steel to enhance and diversify the atmosphere. This design is on the one hand, creating hierarchy by enlarging spaces and on the other, using different materials that emphasize this new hierarchy.



Insulating
Anneleen Boersma (MSc2 Pastoor van Arskerk)

To meet contemporary energy standards, the church is wrapped with a layer of thermal insulation and an extra layer of concrete bricks that reflect the texture and structure of the original design. The exterior is ‘sacrificed’ to preserve the inner atmosphere. To give space to a teahouse, a distinctive extension is made in glass and wood. Using the same grid, a clear pronunciation of structure, sightlines and attention to the human scale, it reflects the existing qualities.



Adding colour
Debby Lam (MSc2 Afrikahuis)

In the interior of the Afrikahuis the redwood roof construction is replaced in this design by a new visible glulam wooden roof structure with sky lights and coloured stairs. It improves the orientation and interior atmosphere. The exterior openings are vertically covered with matt green louvers to keep the contact between inside and outside on all levels.

Centraal Beheer, Apeldoorn, The Netherlands (1974)

Appropriation

In their attempt to make architecture more human, the user was central. Ideas about the collective use were included in the system design and also the individual user was addressed. Van Eyck stands for specific spaces and fixed functional designs in order to accommodate comfort and shelter. For him, flexibility was as a 'glove that fits all, and therefore does not suit anyone'. However, many structuralist architects share ambitions of multi-functionality and different strategies were applied to provide multiple uses and to create hospitable buildings. A surplus of space in for example corridors would increase the possibility to interact or to organise a meeting. Anticipating multiple options, like in the units of Centraal Beheer in Apeldoorn, led to neutral structures that could house different functions. Designing secondary elements like a low wall, a corner, a bench or a deep window sill should evoke sitting down, placing something there etc. A next step is the appropriation of spaces in which users can change or build elements according to their preference. Inspired by John Habraken and his concept of separating 'structure and 'infill', experimental housing projects were developed that provide more freedom for inhabitants to choose their individual space plan. The Diagoon dwellings by Hertzberger, the Wandelmeent by Leo de Jonge and the Molenvliet in Papendrecht by Van der Werf are all examples of residential projects providing high level appropriation.

"The only constructive approach to a situation that is subject to change is a form that starts out from this changefulness as a permanent – that is essentially a static – given factor: a form which is polyvalent. In other words, a form that can be put to different uses without having to undergo the changes itself, so that a minimal flexibility can still produce an optimal solution."

Hertzberger in 'Lessons for students in architecture', 2005

Original situation

Present situation

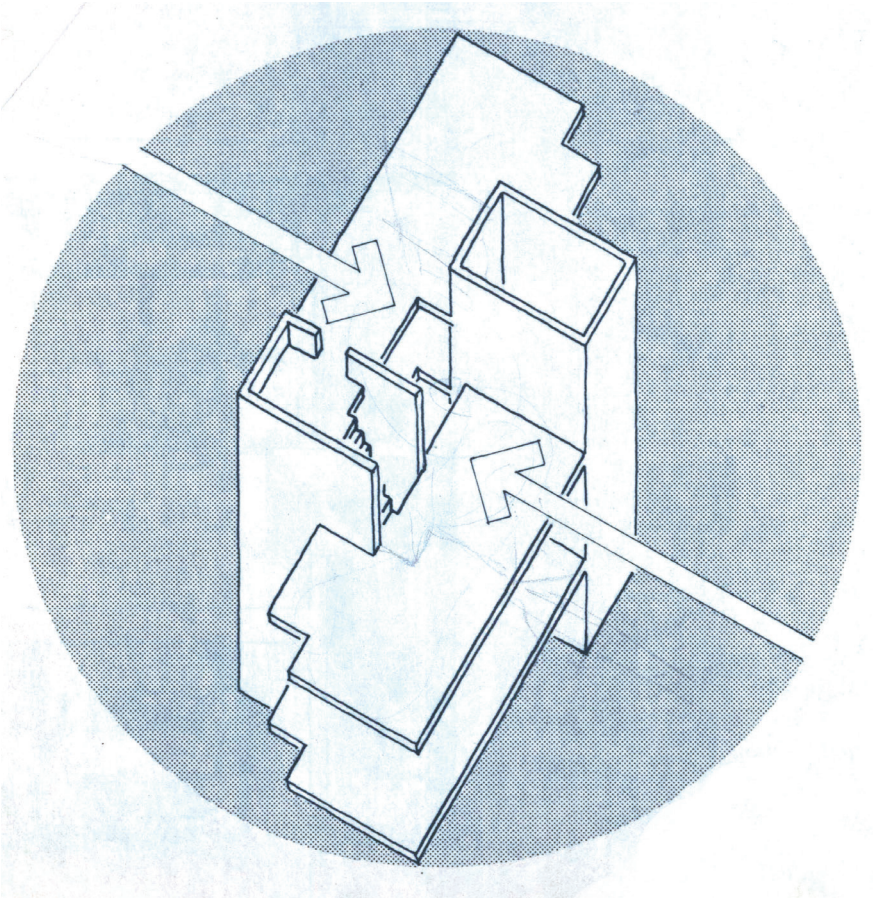
Case Study: Diagoonwoningen

Delft (1970), by Herman Hertzberger

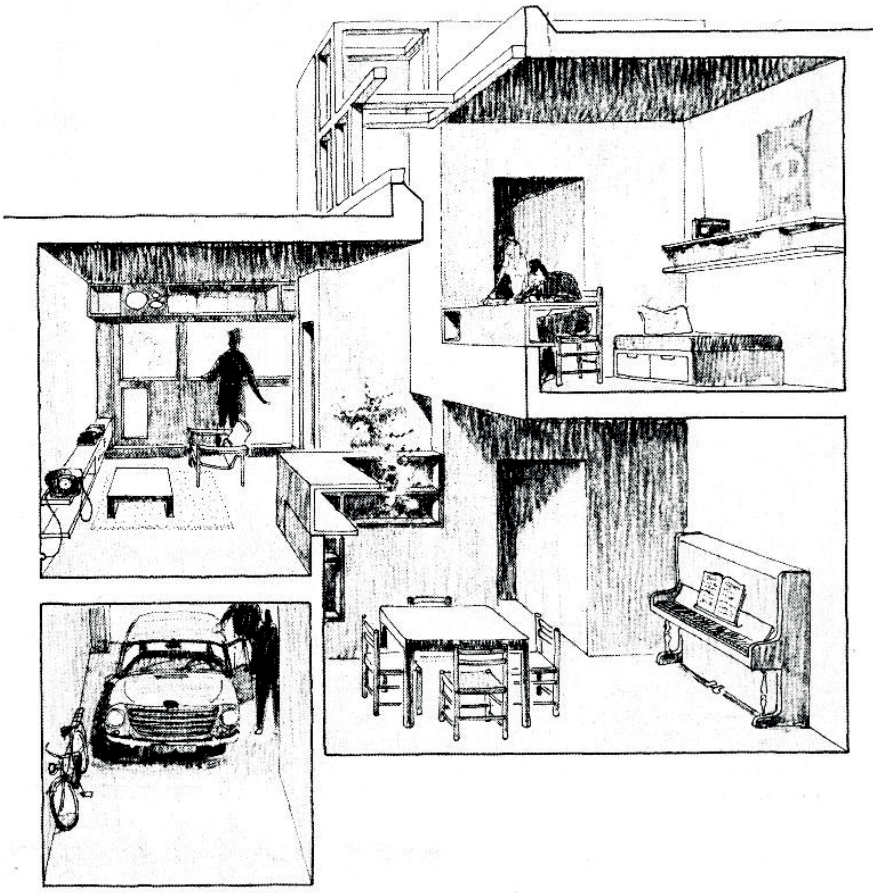
The Diagoon dwellings, designed by Herman Hertzberger, were subsidised by a national program for experimental housing. The opportunity for future inhabitants to determine their spatial layout was the innovative concept of these eight houses. Incompleteness as a condition was invented to encourage people defining their habitat and to break with persistent uniformity in housing. The concrete loadbearing structure, the stairs and superimposed kitchens and bathrooms are the fixed elements of the house. This core is accompanied by a void ending in a roof light. The rest is 'free for appropriation'. Split-level floors on both sides of the fixed core can be used and divided as desired by the inhabitants. Also, the floor-to-ceiling window frames could be decided by the homeowners. In time, the house could be enlarged by an extension on the roof terrace or by occupying the indoor parking space. The architectural design consists of a neutral structure that provides freedom for individual decisions.
How did inhabitants take advantage of the offered freedom? Hertzberger designed a set of wooden cabinets, doors and partition walls, as built-in packages that could be purchased when family circumstances demanded change. However, these options have not been ordered by any resident. The opportunity to change the panels and the colours of the window frames has not been used by residents either. Although the programming of the floors is free, the decision for bathroom or kitchen positions logically determines the room for sleeping and eating.

From a survey among residents in 1975 it was clear that most of them were very happy in their experimental houses. An interviewee praises the social aspect of the spatial concept: "It is one area; you live diagonally, from living room to kitchen, from living room to bedroom. You call and you're there. That is the richness of this house that all areas merge into each other. It makes you feel always be together. In this house is just more to experience for everyone." One resident however, the architect Carel Weeber, was less positive: "The house is actually too narrow and dark, especially in winter. Four windows are lacking. Despite the space in the living room, the use is actually quite limited. With straightforward rooms one can do more. The staggered walls limit the use. The house is too complicated and too present. Always. (...) But it is not necessary to make a house that complicated." (both quotes from www.diagoonwoningdelft.nl)

The appropriation of spaces and a certain flexibility or 'polyvalence' was an aim for many Structuralist architects. Often, it is a two-stage strategy. The primary ingredient is a minimal but 'ideal' composition and dimension of spaces. The second layer is a designed set of infill elements and multifunctional furniture.
The Diagoon dwellings show the quality of the first and the superfluity of the latter. In many cases, infill packages have not been realised or fallen into disuse over the years. Hertzberger's own definition of polyvalence seems to be the recipe for appropriation: 'a form that can be put to different uses without having to undergo the changes itself, so that a minimal flexibility can still produce an optimal solution'.

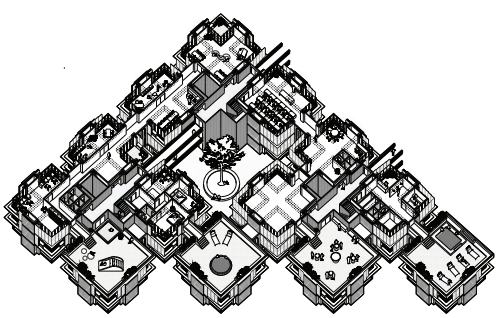


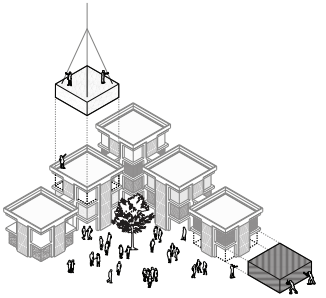
Original Axonometric



Original Section view

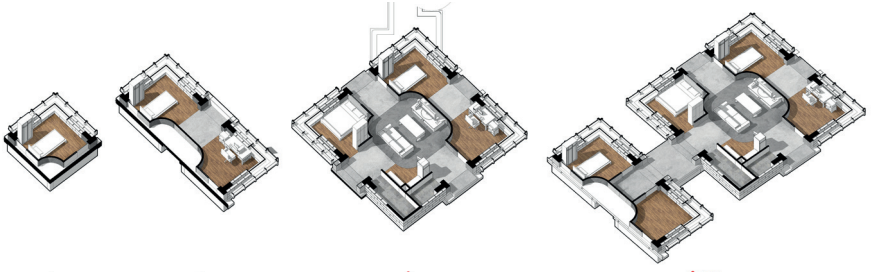
Student Strategies





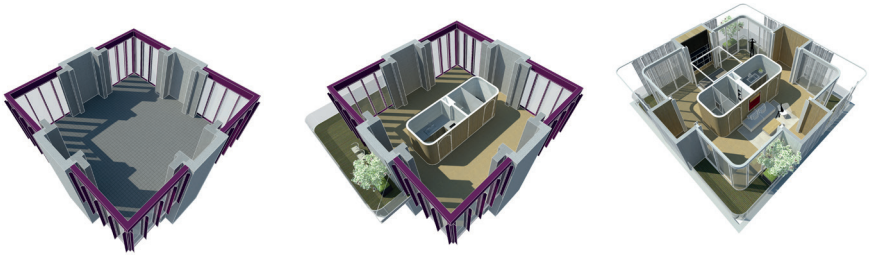
Extending the unit
Dirk Gevers (MSc3 Centraal Beheer)

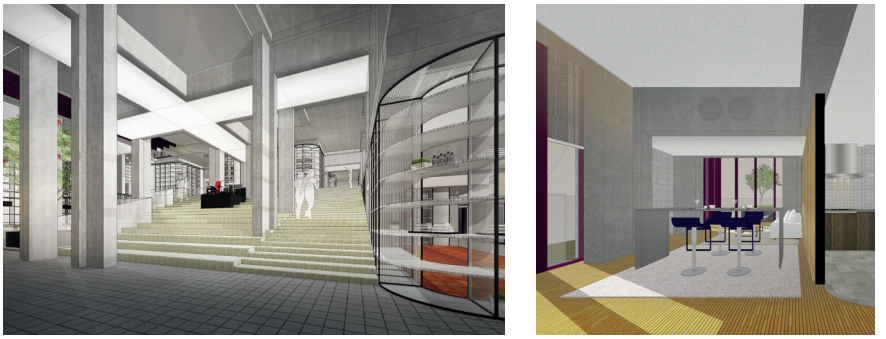
The promised 'polyvalence' of the units in Centraal Beheer is tested to the maximum. Units are grouped and linked to provide multiple functions: dwelling, office, kindergarten, café, cinema, etc. By taking out some towers, the spatial conditions are improved and accessibility of every unit is guaranteed. Furthermore, the unit's façade is flexible to adapt the amount of indoor and outdoor space per unit.



Modifying the units
Bertrand Tan (MSc1 Centraal Beheer)

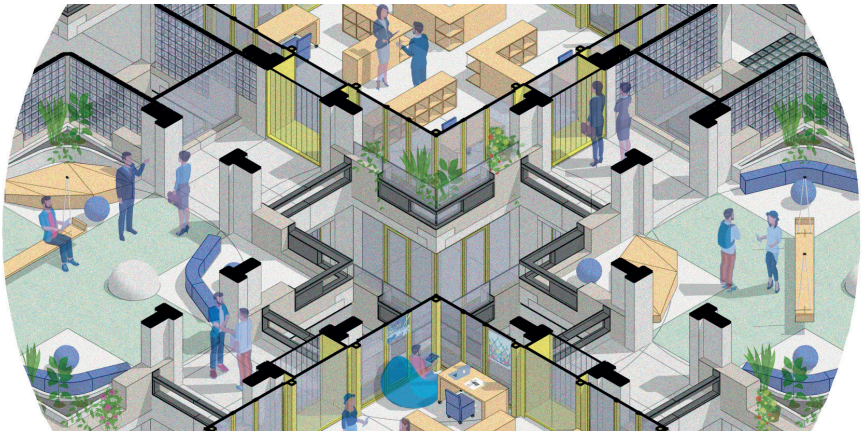
The existing building is considered as a neutral structure that forms the basis for the redesign. Reshaping the units in a way they can be used in different ways and serve different functions. Flexibility for these different uses is created by possibilities to partition or combine units or parts of units.

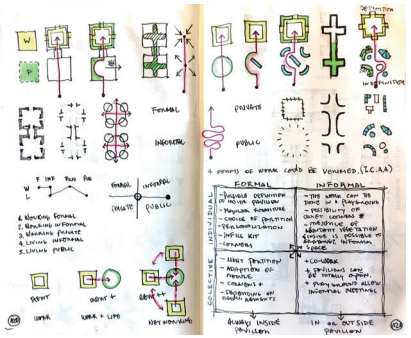




Inserting new elements
Jaa Vangvasu (MSc3 Centraal Beheer)

The prefabrication of building parts and furniture was the inspiration to insert new prefab functionalities. Prefab bathrooms in the dwellings and a system of shop windows in the commercial units, always on the same position in the grid, use the building's structure. The existing system is supplemented by smart elements that give new possibilities for use, by continuing the concept of prefabrication and repetition.





Introducing a new unit
Giulio Di Giuseppe Versluys (MSc3 Centraal Beheer)

The existing building is considered as a neutral structure that forms the base for reuse. A phased renovation process is proposed that starts by preparing a basic quality for the structure, entrances and collective facilities. Then new units are introduced to 'ignite' new activities and re-occupy the vacant building. Users design, build and acclimatize the units to their preference.

Final visualisation by Jinhyuck Lim

Reflection

It is evident that the existing buildings have their value and we should keep them as our cultural heritage. However, the built environments have to be the place where people can live. Therefore, when it comes to adapted reuse architecture, it is essential to support the existing buildings to catch up with the current social demands. Based on this approach, I set my position on Heritage Architecture (H&A); the adapted reuse architectural design should meet the requirements of the present and the future. Therefore, I believe that adapted reuse architectural design has not only to preserve existing buildings (and their previous values) but to transform them to satisfy the current needs.

The graduation studio, 'The Future of Structuralism,' had dealt with Centraal Beheer Office, designed by Herman Hertzberger, one of the most representative Dutch Structuralism architects.
What is notable in Dutch Structuralism architects, including Hertzberger, is that they pursued flexible architecture that could respond to the user's future needs. Therefore, Dutch Structuralism architects aimed to design the buildings that already implies the possibility of the transformation. The idea of Co-Determination, Polyvalent Space was the way to make their building grow/change themselves for the undetermined future needs. Concerning this study on Dutch Structuralism Architecture, I found that my position on H&A and their concept could respond to each other; pursuing the architectural design for the building that could satisfy the changing people's needs through the future grow/change of the building. In this regard, I intended to apply this idea to my project.

Herman Hertzberger was interested in the concept of Langue and Parole: Langue as 'structure' that fundamentally implying permanence, Parole as the individual interpretation. Related to this concept, I aimed to investigate the 'Langue' of Centraal Beheer Office, which could be a fundamental 'structure' of the building that should be preserved. After investigation, I set 'the architectural principle of Herman Hertzberger' as the 'Langue' of Centraal Beheer Office. Based on this 'Langue,' I considered all of my re-design processes could be the 'Parole,' the reinterpretation of the principle of Hertzberger. With this idea, I set the motto, 'Returning to the Origin.' It means I intended to reflect the design intention/ methodologies of Herman Hertzberger as the starting point of every re-design process. In this regard, the primary position in this project toward re-designing Centraal Beheer Office was 'keeping the rule while breaking the rule'; more precisely, modifying the existing situations while reusing the underlying principle of the building. Through these processes, instead of conservation nor mere transformation, the project aimed to be a new meaningful step to suggest 'the reinterpretation' of Centraal Beheer Office. Indeed, while redesigning Centraal Beheer Office, I did not hesitate to transform the existing status of the building. The Inner Street of the building was widely broadened to provide the public place, the spatial system was reorganized to accommodate the new program, and the existing facade was covered with a double facade scheme to improve the sustainability of the building. However, since all of these modifications were based on the architectural principle of Hertzberger, I believed that these transformations could be even the way to show respect toward the existing building and the architect.

Reflection by
MSc student Jinhyuck Lim

Colophon

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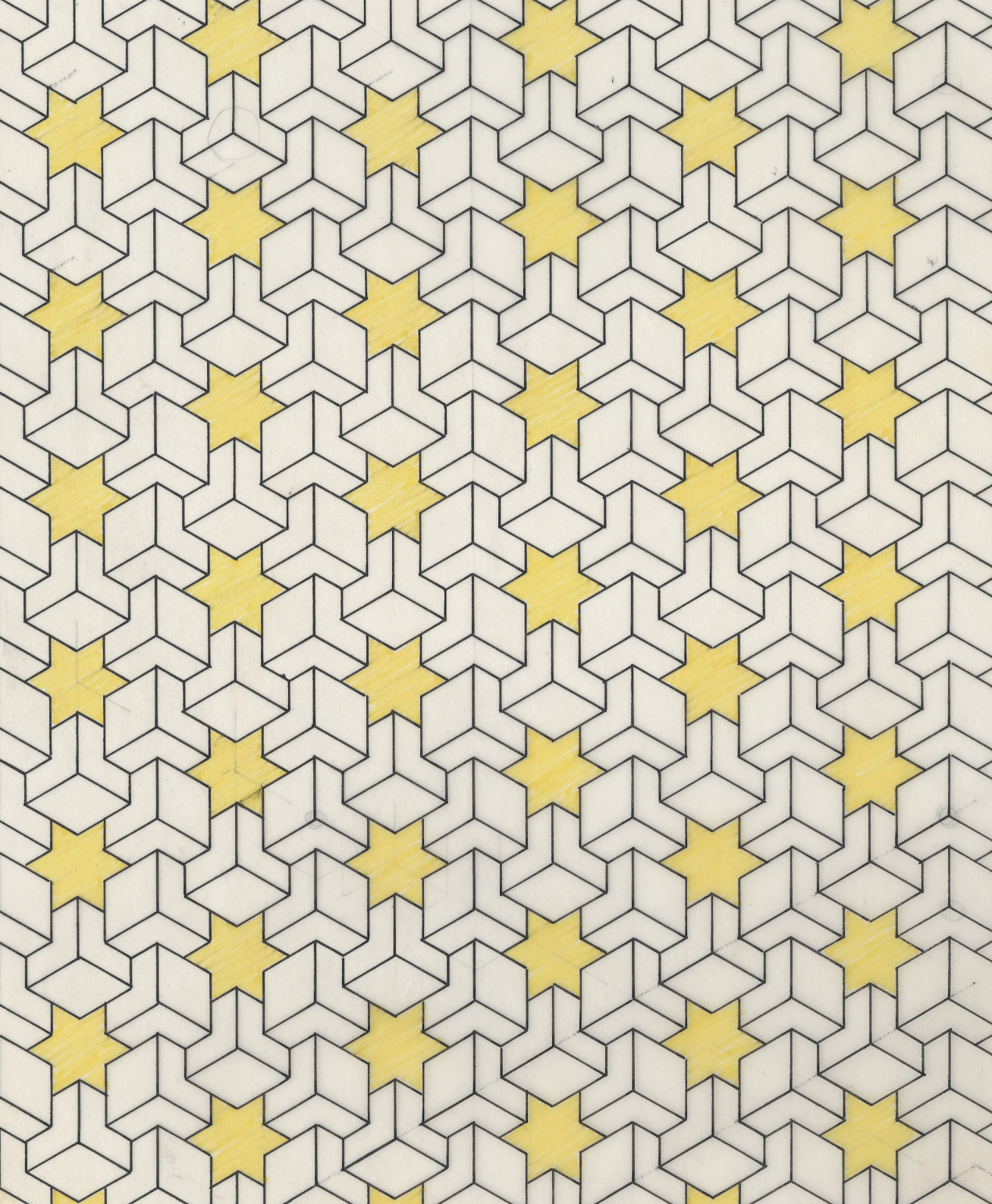

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