MAASSILO ROTTERDAM

AN ANALYSIS ON
ARCHITECTURE, CULTURAL VALUE AND BUILDING TECHNOLOGY
This document is the result of a study that has been done within the heritage program at the TU-Delft faculty of Architecture and the built environment. It focuses on the redesign of industrial heritage in the former harbour district of Rotterdam South. The study was carried out during a two-month period from February until April. Amy Stuik, Kostis Vatanidis, Koen Hoogeveen, David van Weeghel and Simme Bruinsma studied the building and its surroundings.

This team came together due to the mutual interest to redesign the Maassilo complex, a huge silo complex for the storage, treatment and distribution of different types of grains. It tells the story of the historical development of the buildings and surroundings and explains the current situation and future opportunities.

This book is intended to educate the reader about the wealthy historical development and current situation of the harbour industry of Rotterdam and the Maassilo complex in particular. Most of the research was based on historical content. The existing value report that was done by the ‘Transformers’ in 2008 has been of great value for our understanding of the building. The size of the assignment and the limited amount of time proved to be a great challenge. Due to profound archival research and plain observations we managed to come to new and better understandings, however it also caused us to leave some questions un answered.

The following people should be mentioned for their supporting role in this research: Alexander de Ridder, Sara Stroux, Frank Koopman and Lidy Meijer.

Simme Bruinsma, Student nr: 4326903
Koen Hoogeveen, Student nr: 4081935
Amy Stuik, Student nr: 4429834
Kostis Vatanidis, Student nr: 4521609
David van Weeghel, Student nr: 4086627

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INTRODUCTION

The analysis of the Maassilo Rotterdam starts with a general introduction to the history of the Maassilo and the architects that were responsible for the different building phases. After this, the analysis is divided into three parts.

part 1: Architectural Analysis

In order to come to a thorough understanding of architectural heritage - in this case the Maassilo - an analysis should value this heritage in all its multiplicity. Therefore, the first part of this analysis is carried out by interpreting the building through different layers. The structure that is used is given by Steward Brand, who defines architecture as a culmination of ‘shearing layers’. Brand defines the following layers (Brand, 1994):

- Site: The geographical setting of the building, including the urban context and the building site itself.
- Structure: All the load-bearing elements of the building.
- Skin: The surfaces of the exterior, e.g. the facades and the roof.
- Services: All the service systems used for heating, plumbing, ventilation and electrical systems.
- Stuff: All the things that are placed in the building but currently in;
- Surfaces: The skin of the interior spaces.
- Services/stuff: The remaining machinery and services, which are mostly out of order.

Each layer is placed in a historical perspective in order to clarify its present state. Consequently, meaning is ascribed to the architectural and cultural findings in each layer. It is important to mention that architecture and cultural value are not separated here, as the one is always present in the other.

part 2: Technical Analysis

Where part 1 focuses mainly on the meaning of the building in its historical context, part 2 is about the technical possibilities of the building. This part is further divided into:

- Structure, which focuses on the loadbearing structure of the building, both as a whole and in the detailing;
- Materials, in which an inventory is made of the material properties of the building and the state that they are currently in;
- Services, focusing on the way that machines, drainage and ventilation work or used to work in the building.

part 3: Value Assessment

After exploring the meaning of the different layers and the technical possibilities of the building, part 3 focuses on valuing these findings. This part starts with a general qualitative interpretation of the building in its historical context and puts this into perspective towards the future. After this qualitative historical embedding, the specific architectural, cultural and technological findings from part 1 and part 2 are weighed against each other in the value assessment. Since the ascribed values are impossible to put under one common denominator, they are divided into multiple categories. The division in categories is in this case provided by Alois Riegl. In his The modern cult of monuments: its essence and its development, the following cultural values can be found (Riegl, 1903):

- Age value: The extent to which existence through time, and therefore physical decay, is made visible. This value is perceived immediately by both laymen and experts.
- Historical value: The extent to which valuable information about the past is provided. This information is mostly valued by experts and in most cases has to be explained to laymen.
- Intentional commemorative value: Value in the human endeavor to keep certain memories alive in the consciousness of the public.
- Unintentional commemorative value: Appreciation of the readability of unintended events in history that became part of the public consciousness.
- Newness value: The extent to which the triumph over the test of time is visibly present. This is the exact opposite of age value.
- Art value: The value of artistic meaning in historic artifacts.
- Use value: The extent to which certain aspects in the current situation are directly adaptable for new usage.

Again, in order to capture the essence of the Maassilo, different values had to be added to the set of values provided by Riegl. The values that have been added are:

- Aesthetic value. This value does not merely concentrates on the visual perception of the building, it rather involves everything that contributes to the current experience of space.
- Rarity value: Focuses on the uniqueness of certain elements.

In this analysis, the unintentional commemorative value is left out, because it did not significantly brought different values to light that were already ascribed to historical value. The layers as described by Brand and the values that are described by Riegl are used as a y- and x-axis in a matrix in which all the values are placed.

After the value matrix, the most important values are summarized in four condensed discussions. Together, these tension fields form the backbone for the development of the Maassilo in its historical setting. They lead to the key opportunities, conflicts and obligations. It is from these tension fields, that the possibility arises for a new design that is grounded in history while projecting towards the future.
METHODOLOGY

Introduction
During this research on the Maassilo complex we applied a set of different research methods to come to our knowledge. Literature research, archival research and fieldwork proved to be a great source of information. But also previous research within the faculty of architecture and even research by design contributed to our understanding of the old grain silo. Finally collaborating together as a team and discussing brought us to a deeper understanding. A more detailed description of these different methods is described in the following.

Context
This analysis was part of a larger research project within the Faculty of Architecture at the Technical University of Delft. This larger project focused on a set of different industrial buildings in the old harbour area of Rotterdam. During this specific research on the Maassilo complex we had the chance to consult this knowledge from within the faculty, both design projects as academic research.

Literature research & archival research
Initially our information on the Maassilo was provided through this previously mentioned study program. This included a cultural value report that was carried out by the Transformers in 2008, which proved to be our main source of information. Additional information consisted of a document that discussed several future perspectives for the Maassilo (also carried out by the Transformers), a technical report on the renovation of the elevator towers, and a set of digital drawings that more or less indicated the recent intervention in 2004 and the state of the building in 2008.

We started our research by mastering the information in the cultural value report. As mentioned by the Transformers, their time was limited as well. Consequently this resulted in some unclear and ambiguous information of which sources where also hard to trace back. It does however provide a profound basic knowledge of the Maassilo Complex that proved to be essential for our own research. Improving our knowledge of the matter required us to engage in the field and apply research by design.

Field research
To provide a good understanding of the current situation, a documentation of todays building, site and surroundings through photo’s, drawings and observations was essential. By visiting the building in February (2017), we where able to apply these different research tools. Also physically being in the building and taking a moment to experience the atmosphere of the place sparked our imagination and enthusiasm.

Research by design
After visiting the building one of the exercises we did was redrawing the Maassilo building as a collage of axonometric and perspective drawings. By “designing” the building from our memory we established an understanding of what the important aspects of the building were to us, based on this first impression.

Value matrix
Finally it should be mentioned that the TU-Delft study program also initiated the theoretical background of this research. To carry out this research on the building we were introduced to the concept of value assessment and the value matrix by Marieke Kuipers, as has been explained in the introduction. All the knowledge that we gained from research was put in perspective in this matrix, to come to a set of clear and critical conclusion for a redesign.

The structure of the matrix is flexible and we created a personal interpretation to it. We established a more specific set of layers that fitted better to the Maassilo complex. We introduced spatial composition to the building layers because of the ensemble of different building phases. We also drew a more transparent line between structure and skin because these can almost be regarded as one. The reality is more complex though, and some aspects always fit in more than one box.

The matrix provided a helpful structure for the analysis on the building and its surroundings on every scale. The different methodologies that we applied resulted in knowledge that could then be inserted into this cultural value matrix. It was a helpful tool to see these different aspects and there values in perspective. It allowed us to get a better understanding of the hierarchy of the importance of values. This knowledge will help us to make well thought through decisions in the design process. It is a source of inspiration and will help us to defend our decisions for a redesign.
Directly connected to the creation of the Maashaven, the Maassilo was part of a series of buildings, including the Sleeve Camp Building, Santos Warehouse and Coal Trade Association, which were clearly intended to link the port with the city and establish Rotterdam as a modern world port. Furthermore, they were meant to address the catalyst future role of warehouses, factories and offices in relation to the surrounding workers housing.

The implementation of the American model of construction techniques as well as overall infrastructural attributes (cup elevators and cranes, in constant interaction with conveyor belts and adjacent railway lines), would play a dominant role in this process.

1st Phase
In 1906, J.P. Stok was issued the design of a graansilo building by the N. V. Rotterdam grain silo society, which would be completed in 1910. This would include the creation of a series of three adjacent parts, serving the storage and distribution of grain in different scales and conditions. On the southeast corner of the Maashaven, the first part would provide flat storage space of 7 floors and also shape the main façade of the building. Following it, the second part would act as a continuous façade of the first volume, carrying 72 square silos. The third part, also carrying the main elevators in the west edge of the building, would include 30 octagonal cells, larger in storage space and distribution pressure. The total amount of cells and floors would provide storage space for 20,000 tones of grain. In addition, a small office and apartment wing was adjusted to the northeast part of the main façade.

As a protagonist figure in the shaping of the industrial language of the port during that time, Stok would be implementing a personal eclectic style in combination with the American functionalist influence throughout his buildings. In relation to the historic momentum of a formalization of the elevators attributes in a series of other buildings, the Maassilo stood as a clear emphasis of the American influence and one of the largest silo buildings in Europe

2nd Phase
With the ownership of the building being taken over by the Société Générale de Surveillance Geneve and the grain elevator company (AVG), a new silo extension was issued to the architects J.A. Brinkman & L.C. Van der Vlugt in 1929, reaching completion in 1931. This would be eventually doubling the capacity of the first phase to 44,000 tones and maximizing its overall storage and distribution efficiency. By establishing two continuous groups of silos, both taller and lighter, the new building would also include the implementation of cup elevators, securing faster loading (200 tones per hour), as a response to the higher frequency of the expected vessels and barges. This would also include the creation of a machine tower in the northwest end of the first part, as a central regulator and provider of the air and water pumps. Finally in an additional attic level, another set of conveyor belts and dump pipes would distribute the grain to the cells.

As primary figures in the translation of the New Objectivity, Brinkman and Van der Vlugt had been specialists in the adaptation of the American influence in the context of industrial harbor buildings. Particularly expressed in the Van Nelle factory, their designs would formalize building technology, guided by the functional production and good working conditions, as the main driver of the design.

In the case of the Maassilo, the architects followed the same principles of construction efficiency and advanced technologies, by clearly expressing the separation of the realm of the silos from the minimum space of the workers, in the rational arrangement of the cells, adjusted to a machine tower and served by the cellar and attic. The launching of the McDonald method, involving a sliding framework for the casting of the silos, also reflected the state-of-the-art efficiency which was thoroughly applied.

3rd Phase
The third addition by the major independent office of A.G. & J.D. Postma in 1950, would attach to the south part of the complex another two rows of 11 large silos, offering an extra capacity of 22,000 tones. Symmetrically covering the complex and adjusted to the footprint of the previous transformer house this would also include another set of conveyor belts in the upper level, connected with bridges to the 2nd phase.

4th Phase
The addition of the office building by H. Haan in 1963 northeast from the first building would mark the final on site intervention. Established in three concrete pillars, adjacent to the waterfront, the building included 250m2 of office space, also introducing pre-fabricated elements.

Current Activity
From 2003, the NOW&WOW dance club became the first tenant of the newly owned building. With most of the redevelopment taking place in the ground floor and basement, the club focused on the re-arrangement of the entrance, and the shaping of three main halls, throughout the footprints of the first and second phase. The attic of the 2nd phase would be also temporarily shaped into an extension of the club, whereas the third phase would be primarily used for circulation and services. Finally, making the second official tenant of the building in 2008, the Creative Factory would occupy the 2nd and 7th floors of the first phase and introducing a entrepreneurial platform for young artists in Rotterdam Zuid.

First grain silo by J. P. Stok, 1910, Transformers (2008), p.31
Completion of the 2nd phase, 1930, Transformers (2008), p. 49
Construction of the Postma’s part, 1951, Transformers (2008), p.85
The following image should be read as a chronological map that explains the physical growth of the Maassilo as an accumulation of different buildings. The scheme is put into a time line that runs from left (past) to right (current). This time line highlights some of the major historical events of the last century and by this puts the evolution of the building into perspective. The historical development of the building and economical development of the company are strictly related. An interesting aspect is that the building is always extended in times of crisis. These moments are best to invest in expansion to increase capacity for future times when it is needed again.

LAYERS OF TIME
SITE - SCALE 1:500

- 1910 1st Phase J.P. Stok wzn.
- 1930 2nd Phase Brinkman & van der Vlugt
- 1951 3rd Phase A.G. & J.D. Postma
- 1958 (extension) A.G. & J.D. Postma
- 1963 4th Phase H. Haan
- 2002 Lisa Lux wall painting
- 2004 Now & Wow Club
- 2008 Creative Factory
- 2014 Renovation Elevator Towers
LAYERS OF TIME
BASEMENT - SCALE 1:500

1910 1st Phase J.P. Stok wzn.
1930 2nd Phase Brinkman & van der Vlugt
1951 3rd Phase A.G. & J.D. Postma
1958 (extension) A.G. & J.D. Postma
1963 4th Phase H. Haan
2002 Lisa Lux wall painting
2004 Now & Wow Club
2008 Creative Factory
2014 Renovation Elevator Towers

basement floor plan
scale 1:500
LAYERS OF TIME
7TH FLOOR - SCALE 1:500

1910 1st Phase J.P. Stok wzn.
1930 2nd Phase Brinkman & van der Vlugt
1951 3rd Phase A.G. & J.D. Postma
1958 (extension) A.G. & J.D. Postma
1963 4th Phase H. Haan
2002 Lisa Lux wall painting
2004 Now & Wow Club
2008 Creative Factory
2014 Renovation Elevator Towers
LAYERS OF TIME
NORTH FACADE - SCALE 1:500

- 1910 1st Phase J.P. Stok wzn.
- 1930 2nd Phase Brinkman & van der Vlugt
- 1951 3rd Phase A.G. & J.D. Postma
- 1958 (extension) A.G. & J.D. Postma
- 1963 4th Phase H. Haan
- 2002 Lisa Lux wall painting
- 2004 Now & Wow Club
- 2008 Creative Factory
- 2014 Renovation Elevator Towers
LAYERS OF TIME
CRANES & OFFIC BUILDING NORTH FACADE - SCALE 1:500

1910 1st Phase J.P. Stok wzn.
1930 2nd Phase Brinkman & van der Vlugt
1951 3rd Phase A.G. & J.D. Postma
1958 (extension) A.G. & J.D. Postma
1963 4th Phase H. Haan
2002 Lisa Lux wall painting
2004 Now & Wow Club
2008 Creative Factory
2014 Renovation Elevator Towers
LAYERS OF TIME
EAST FACADE - SCALE 1:500

- 1910 1st Phase J.P. Stok wzn.
- 1930 2nd Phase Brinkman & van der Vlugt
- 1951 3rd Phase A.G. & J.D. Postma
- 1958 (extension) A.G. & J.D. Postma
- 1963 4th Phase H. Haan
- 2002 Lisa Lux wall painting
- 2004 Now & Wow Club
- 2008 Creative Factory
- 2014 Renovation Elevator Towers
LAYERS OF TIME
SOUTH FACADE - SCALE 1:500

1910  1st Phase J.P. Stok wzn.
1930  2nd Phase Brinkman & van der Vlugt
1951  3rd Phase A.G. & J.D. Postma
1958  (extension) A.G. & J.D. Postma
1963  4th Phase H. Haan
2002  Lisa Lux wall painting
2004  Now & Wow Club
2008  Creative Factory
2014  Renovation Elevator Towers
J.P. STOK 1863-1942

Jacques Pieter Stok designed the first part of the Maassilo that was built in 1910. Stok was a practicing architect from 1886 to 1917, so the Maassilo can be seen as one of the later works in his oeuvre. This oeuvre mainly consists of offices, warehouses, and factories, most of them situated in Rotterdam. Since the second half of the nineteenth century Rotterdam was in the process of expanding and modernizing its industrial harbour; something that Stok evidently profited from. Unfortunately, due to the bombing of Rotterdam in the Second World War, many of the buildings designed by Stok were lost. In his oeuvre, a development can be traced which was exemplary for Dutch architecture at that time. From 1890 on, Dutch architects were searching for ways to simplify the architectonic form, as an answer to the more decorative and conservative styles in the years 1850-1890.

The first important commission that Stok received was for an office and factory building for the firm Lamings & Sons. Stok designed the building in a Neo-Renaissance style. The building was completed in 1889 and is one of the few remaining works of the architect. The front facade shows a division in four parts and is made out of a combination of brick, bands of natural stone, diamond blocks and string courses. The entrance of this symmetrical facade is marked by two highly decorated pilasters and two bronze weapon shields.

In 1903, Stok designed the Santos warehouse on Katendrecht, Rotterdam. This building was an example of the eclectic style, which was commonly used at that time. Eclecticism is characterized by an unrestrained use of different elements from different stylistic periods. However, compared to the Hulstkamp building, the Santos building has a more sober facade with less plasticity in the ornaments. The facade is flattened, so to say. This objectification is, for example, also clearly visible in the Beurs van Berlage in Amsterdam. It should be added here that the Santos building was once topped with a highly decorative, Jugendstil-inspired, iron construction, carrying the name of the firm. What the Hulstkamp building and the Santos building have in common, is the highly symmetrical facade.

Parallel to the stylistic tendency towards abstraction, the enormous growth of cities and industrial areas due to the industrial revolution asked for an architectural solution to build in a high tempo with an cost-efficient use of materials. Obviously, this was also the case for Rotterdam in the beginning of the twentieth century, with the expansion of the harbour area and the need for housing of workers. This need for efficiency explains the growing interest in 'the American way' of building during that time. According to Dutch architects, the stylistic development in America was inferior to the Dutch development, however their building techniques were far more advanced. Slowly but steadily, architects started to adapt the idea that the architectural form should rather express structural and functional logic than a decorative style. For example, in the Dutch architectural magazine Bouwkundig Weekblad in 1910, an article titled “The aesthetic character of civil structures ("Het aesthetische karakter van ingenieursbouwwerken") was placed, elaborating on the 'triumph of technique' in architecture.

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Civil structures and industrial buildings found their way into the architectural discourse. And so, in 1910, J.P. Stok was commissioned for the design of the Graansilo in the newly built Maashaven in Rotterdam. However, the building was, much more so than the former examples, an expression of functionality. In the silo part of the building, no distinction is made between structure and skin. The building is structure, and this structure is made visible to the observer. The silo was mentioned in another article in Bouwkundig Weekblad in 1910, in which an enthusiastic case was made for reinforced concrete, the material of the future.

The part of the Maassilo that was designed by Stok plays a significant part in the oeuvre of the architect, as it is a meaningful work in his development, and parallel to that the development of Rotterdam, and Dutch architecture as a whole.

Fragment of the article “The aesthetic character of civil structures”, Bouwkundig Weekblad (1910)

Graansilo Maashaven, Bouwkundig Weekblad (1910)


Santos warehouse. Design by Stok for Blauwhoedenveem. Built in 1903. (Rijksmonumenten.nl, 2014)

Bouwkundig Weekblad (1910)

fragment of the article “The aesthetic character of civil structures”, Bouwkundig Weekblad (1910)
Brinkman & Van der Vlugt were an important architectural duo for the city of Rotterdam and for the functionalist architectural movement of ‘Het Nieuwe Bouwen’. When Michiel Brinkman (sr.) unexpectedly passed away in 1925, his son Johannes Andreas Brinkman (jr.) had to step up and temporarily quit his studies in Civil Engineering at the Delft technical college to take his father’s place at the office. Brinkman (jr) started a collaboration with Leendert Cornelis Van der Vlugt who had studied at the Academy of Art in Rotterdam and had been a practicing architect since 1919, just like his father. In the beginning of this new dynamic, Brinkman mostly concerned himself with liaising with clients and running their business while Van der Vlugt did more of the actual designing (‘Brinkman en Van der Vlugt’, 2016). Brinkman went back to finish his studies in Delft and graduated as an engineer in 1931. Their partnership ended when Van der Vlugt passed away in 1936. After the death of Brinkman in 1949, the firm was renamed Broekbakema and it is still an influential architectural practice.

Brinkman & Van der Vlugt received the design brief for the expansion of the grainsilo at the Maashaven in January of 1929. Their task was to create as much grain storage as possible on the available small plot, while seamlessly connecting to the machinery and grain circulation of the first building. On the 18th of July in 1929, the first foundation pile was put into the ground. (Brinkman, 1931)

The Van Nelle Fabriek, one of the most prestigious designs of Brinkman & Van der Vlugt is also situated in Rotterdam. Even though this factory was built in roughly the same period as phase 2 of the Maassilo, there is a striking difference between the two. Where the façades of the grainsilo are purely structural, the façades of the Van Nelle factory only function as a skin, with a separated structure behind it. This allowed the Van Nelle Fabriek to have large windows that let in a lot of daylight with the aim to create a pleasant and spacious working environment for the factory personnel. In the maassilo on the other hand, nearly the entire façade is closed off since the storage of grain didn’t require any daylight. The top floor however, where the distribution of the grain to the different silos took place, does have the similar characteristic horizontal strip windows. These types of windows, together with smoothly rendered façades, are a signature element in their oeuvre and appeared in many designs by Brinkman & Van der Vlugt, like Huis Sonneveld and other villas.

Their designs for grainsilos and factories made Brinkman & Van der Vlugt into masters of The New Objectivity. And they can be seen as pioneers of Het Nieuwe Bouwen, a derivative from functionalist architecture that focussed on upscaling and incorporating modern technologies and efficiency into architecture (Kunstbus, n.d.). With designs like the Van Nelle factory they left a big impression on people like Walter Gropius, Le Corbusier and Richard Neutra (Molenaar, 2012). Le Corbusier also made 20th century functionalist designs for industrial architecture like silos and factories, but it were Brinkman & Van der Vlugt who’s designs actually got built (Hulsman, 2012).

Molenaar (2012) writes that the oeuvre of Brinkman & Van der Vlugt can be seen as a radical expression of a modern Rotterdam city-ideal that was shared by many entrepreneurs of their generation. This new generation was right in the middle of many new developments in the beginning of the 20th century, not only on an urban level but also with technological progress, and wanted to create beauty and international credit for the city. After World War II, architecture and urban design got firmly separated from each other (Hogervorst, 2013).

Although Brinkman & Van der Vlugt were seen and presented as masters of functionalist architectural styles, their own publications on the Maassilo do not elaborate much on the architectural style of the silo building as they do on the building technology and methodology. The design is not portrayed as belonging to a style, but simply as an efficient solution for the design task in which new materials and building techniques help achieve the strongest, fastest and most economical outcome.
Jan Diederik Postma senior started his own office in Deventer in 1919. He had participated in 1913 in this place to build an office building for the company of his father Ae.E. Kluwer.

Postma was soon in a circle of big national financial families. Postma specialized in designing industrial and office buildings and developed a great knowledge for new construction methods and materials. He had a good sense of business, making him nationally renowned to acquire large clientele. He built offices for various utilities. He also worked abroad, amongst others in Germany, Belgium, France and Ireland. In the latter country he built state alcohol plants. Thanks to his contacts with industrialists Postma developed a second specialty, designing houses.

A good example is the mansion with thatched roof that he is in front of his brother-Evert Kluwer (1892-1964) designed in Epse.

On August 15, 1939 Aebele Postma joined and in 1941 the office Postma & Van Kempen was founded in Amsterdam. On August 1, 1950 came the J.D. Postma yr. Working at the desk. In 1951 they built the second expansion of the ‘Graansilo Maashaven’.

Postma had a big production of structurally often innovative buildings. Architecturally, he showed himself a craftsman with a sense of proportion and balanced spatial structures, but he did not develop a distinct style. He followed the mainstream, such as the Amsterdam School, Art Deco, an English country style and the Gooi country style. Factory buildings he designed in the interwar period in the style of The Hague School, a commercial variant of the Amsterdam School.

In the thirties, forties and fifties the Delft School had influence on his work. The choice of style and idiom Postma customized to the building type. He chose the austere Hague School for production buildings and factories, he was inspired by the offices of electricity companies by the more representative Delft School.

In the fifties Postma worked in the typical reconstruction-on-form language: plain brick building with concrete cornices and concrete frames around windows and doors, combined with references to classical architecture.

WPC Knuttel explained in his obituary on Postma emphasis on technical and organizational skills, “Beautiful are his floorplans that show an empathy for the company, daring, mostly new construction methods and beautifully finished interiors and facades.” Furthermore Knuttel writes about Postma: “He was blessed with a robust body and a sharp, quick mind, an indomitable work ethic, thoroughness and indestructible optimism. This work ethic demonstrated by the number of buildings he designed, in total more than 1,500.

(hetnieuweinstituut.nl, 2017)
Herman Petrus Coenraad Haan was born in Amsterdam on the 22nd of May 1914. After leaving several studies unfinished he decides to become an architect in 1932, when he is only eighteen years old. His drawing skills are the main drive for this and hence without an official diploma he starts his own office in 1935 named ‘H.P.C. Haan, architect’. His father was the manager of a big stone factory in Groningen and through his contacts Haan got his first big projects. Just before the bombing in 1940 Haan moves to Rotterdam where he helps Ph. Kanters an architect/contractor with an office building, a silo and a warehouse. In 1941 Haan subscribes himself for the Amsterdam Academy. And it is only after the war that his own practice really starts off. Mainly through his contacts in the Rotterdam resistance, the fight club Rotterdam-Zuid. The ‘50 could be seen as his most vibrant, also as an architect this is when he built a few bigger housing complexes. In 1948 he marries the artist/designer Hansje Fischer living together in an apartment in the centre. In 1953 they move into there own house, designed by Haan, in a more quiet neighbourhood. This is where he also establishes his new office: atelier aA. Haan’s second passion besides architecture has always been Africa. As a fifteen-year-old boy he became fascinated by the desert cultures of the Sahara. He frequently returns to Africa, often more then ones per year. He organised expeditions, taking architects and friends with him. It seems logical to find the relation with architecture. However often this is subtle and indirect. He did incorporate the basic principles to survive by working with minimum amount of materials and to use (building)materials as little as possible. Besides that the relation between inside and outside is most prominent in his work.

Haan’s work can roughly be divided into three different periods. In the start he is searching for his own ‘position’ in relation to the pre-war modernistic idiom. The second phase is characterized by a series of villa’s, which is introduced by the designing, and building of his house in 1951. In this phase he really finds a way to develop a personal architectural language. In the last phase he dares himself to work on bigger housing projects in which he is able to incorporate his passion and interest of the African culture more explicitly (Vollaard, 1995).

The old office had to make way for the metro line that started construction in the early ‘60s. That’s why, in 1963, Herman Haan got the assignment to design 250 m2 new office space combined with two staff accommodations and a garage. Since there was no space left on the wharf the building had to be built on the water. The building is rectangular block of two floor levels. The dwellings and garages are housed on the ground floor and the office space was placed on top of that. The whole volume is placed on a base structure of three big pillars.

What is interesting is that this office building comes closest to the architecture of Le Corbusier. The pilotis principle, the open layout and freedom in the open facade. But even the ‘roof garden’, as it is said that due to loose grain seeds, grain was used to grow on the roof (Vollaard, 1995).
THE ARCHITECTS
INTERPRETATION AND CONCLUSION

As the Maassilo ensemble constitutes a clear distinction between four different building phases, it documents the efforts of four different architects that played an important role in the history of Rotterdam in the twentieth century. Thus, the building has both historical meaning in the individual oeuvres of the architects and the overal historical development of Rotterdam. When assessing historical significance to the building as a whole, two interpretations are possible.

On the one hand, it could be argued that the building must be seen mostly as a set of structural achievements, rather than a record of different aesthetical approaches. This interpretation is underlined by many historical articles about the Maassilo. Most of them emphasize either the enormous capacity of the building, its dazzling dimensions, or its highly efficient construction methods. A clear example is the publication of J.A. Brinkman himself in Dutch construction magazine De Ingenieur, in which the focus clearly lies on the materials, techniques, and building methods that were chosen and applied during the construction of the building (Brinkman, 1931). Besides that, the article elaborates on the functional efficiency and storage capacity of the design. What lacks is any mention of architectural expression, visual characteristics or style. Obviously, this is not the focus of the magazine. Still, most of the articles on the Maassilo that were found in the archive study for this report showed a similar focus on the state-of-the-art technical achievements, indicating that this would be a legitimate historical interpretation of the building.

On the other hand, the building cannot be seen distinct from the New Objectivity movement in the Netherlands, certainly in the case of Brinkman & Van der Vlugt. The New Objectivity is characterized by an enthusiasm for new construction methods, an emphasis on functionality and the ridding of ornament, which all lead to a new objective aesthetic. This liberation of stylistic excess can be found quite distinctly in the artistic development in the oeuvre of J.P. Stok. As mentioned before, the Maassilo was one of the later works in his oeuvre. In that sense, the building, as an outcome of Stok’s development towards a more objective style, also marks an important moment in the New Objectivity movement in general.

Brinkman & Van der Vlugt were commissioned to realise a new building part with the largest possible storage capacity on the available plot. Although there was a practical need for this extension, it is reasonable to argue that Brinkman & Van der Vlugt saw in this commission an opportunity to put the ideals of the New Objectivity into practice. It should also be mentioned that their office already had experience in building grain silos, for example the Meneba factory that Michiel Brinkman (the father of Johannes Brinkman) designed at the Maashaven in 1913, just after the first phase of the Maassilo was built. The commissions for part three (Postma) and part four (Haan) also seem to be based on the expertise of the architects.

Perhaps the two historical interpretations as described here, the functional/economic and the ideological/aesthetical interpretation, are not that far from each other. After all, the ideal of the New Objectivity was a new aesthetic that was rooted in function and efficient construction. Whether the Maassilo meant an ideological or a lucrative opportunity for the architects, its specific functionalist design approach led to a very specific building, with a remarkable aesthetic presence.
PART 1

ARCHITECTURAL ANALYSIS
In part 1, the architectural qualities and cultural values of the Maassilo are described. The structure of this part is given by the Brand layers, as described in the general introduction. Stewart Brand used these layers to indicate the general life span of each layer, thereby providing a useful framework to think of buildings as existing in time. Another usable feature of these layers is that they more or less work their way from the big scale to the small scale. Part 1 will start with the big scale, which is the city of Rotterdam.
SURROUNDINGS
The industrial areas have shifted over time from being near the center of Rotterdam and Rotterdam south to the west side. This happened due to the fact that the residential areas were expanding and the complaints about different kinds of pollution kept increasing. Resulting in the movement of industry away from Rotterdam and leaving behind the old industrial buildings/areas. Which over time created a big contrast between the newly built low-rise residential areas and for example the Maassilo with its monolithic concrete mass. This movement created an icon out of the Maassilo which now looks like a remnant of the past and a little out of place which makes it really special. The whole ensemble shows the development of harbor activities in that area that are now slowly but clearly fading away.
Historical Development
Infrastructures

The maps that are shown on the next two pages give an idea of the development of the infrastructure between 1708 and today in the south of Rotterdam. We see how this area developed from being the small Feyenoord village to the metropolis it currently is. It involves the creation of harbours and the implementation of train and metro lines and bridges and tunnels that came with them. The more the south grew the more important became the connection between the two sides of the river. At first it was mainly about train tracks as a result of the growing industry. But in the 70’s a turning point occurred in this development. Industry shifted away and made place for the city to expand. Finally the development of the ‘Kop van Zuid’ recreates the image of the city with a strong visual connection that really makes the south part of Rotterdam.
1911, Further development of Network and building 1st phase of the Maassilo

1938, Construction of the Maastricht is finished + 2nd phase Maassilo

1944, Development of the harbour continues mainly to the west

1968, The Metroline from central station to south plein is finished, traintracks are slowly disappearing

1996, Erasmus bridge and the 2e Willemsbrug are constructed, but also train tracks are disappearing rapidly due to the moving harbour industry.

2017, Most of the harbour activities have moved away. New developments have taken place by the transformation of "De Kop van Zuid". The Rijnhaven brug has been constructed in 2012.
HISTORICAL DEVELOPMENT
BUILDINGS AND WATER

The following maps show the development of water and buildings in Rotterdam, focused on the southside of the Maas and the areas around the Maassilo. The four analyzed times show the area before the Maashaven was dug (1900), after the first phase of the Maassilo by Stok was built (1910), after the second phase by Brinkman & Van der Vlugt was built (1930) and after the third phase by Postma & Postma was built (1951). On the maps we see that the Maassilo was one of the first buildings in the south of Rotterdam and that with its expansion in building volumes and in harbour activity, the surrounding neighbourhoods attracted working people and grew as well.

Illustration by A.Stuik, based on maps from Kadaster (n.d.)

1900 - without the Maashaven and Maassilo

1910 - Maassilo phase 1
HISTORICAL DEVELOPMENT
BUILDINGS AND WATER

1930 - Maassilo phase 2

Illustration by A. Stuik, based on maps from Topotijdreis.nl (2017)

1951 - Maassilo phase 3, after WO II

Illustration by A. Stuik, based on maps from Topotijdreis.nl (2017)
HISTORICAL DEVELOPMENT
BUILDINGS BY AGE

This map illustrates all current buildings in Rotterdam-South based on the time in which they were constructed. We see a vibrant mix but also hard contrast of buildings from 1850 and buildings that have been built in the last 5 years. It illustrates what we also experience when we move around the city. Rotterdam is a city of a contrasting built environment which is not only visible in architectural style and the use of material but also in the height of buildings as we see on the earth image on the right. The Maassilo complex contributes to this contrast by being a big industrial building that clearly represents its creation in another time. Not only in material but also in architectural style and scale the building forms a contrast with its surroundings. It is important to be aware of this original contrast since the buildings representation might be altered in a redesign.
In the morphological map on this page, the most significant urban axes towards the Maassilo (red) are highlighted. From this map, a clear set of axes emerges that connects the Maashaven area to the city centre of Rotterdam.

When coming from the north part of the river Maas, the ‘path’ starts at the Coolsingel (1). Here, the observer is enclosed from all sides by the dense urban grid. After crossing Blaak, the Coolsingel continues as the Schiedamsedijk (2). Here the axis opens up towards the docks of the Leuvehaven. When moving alongside the edge of the urban grid, the observer’s view is directed towards the boats in the inner harbour.

The Schiedamsedijk leads to the Erasmus Bridge (3), where the urban grid completely opens up to grant the observer a panoramic view of the river Maas. After crossing the Maas and moving straight ahead, the observer reaches the Tillemakade (4). This axis is opened to one side, just like the Schiedamsedijk. In this case, the observer’s view is directed towards the Rijnhaven.

Moving along, the observer reaches the eastside of the next industrial harbour, the Maashaven, where the Maassilo is situated (5). Moving along the edge of the urban grid at the eastside of the Maashaven, the viewer’s gaze is directed towards the harbour. A view that is dominated by the colossal appearance of the Maassilo.

When the Maassilo is reached, the route dissolves in a system of crossing axes. When choosing to continue the path along the Brielselaan (6), the axis has the potential of providing the observer with a view on the Maashaven. In this particular case however, the view is hindered by a string of buildings, situated closely to the Maashaven. The Maassilo is one of these buildings.
URBAN CONFIGURATION

Directly connected to the creation of the Maashaven and defining its southern edge, the Graansilo acted as the generator of the southern working class neighborhoods of Tarwewijk and Bloemhof.

In this context, the building assumed a central pivotal role towards the city and harbour, also acting as a ‘gate’ between north and south.

Illustration by K. Vatanidis
The industrial development was so important in this south district of Rotterdam it really shaped the urban context. The importance of the specific industry (grain) is still found back now a days in the districts surrounding the site of the Maassilo as well in the street names of the surrounding districts which reflect what kind of goods were going through the Maashaven. This commemorative value just shows that the Maassilo holds alot of value for the surrounding and the municipality of Rotterdam.
RELATIONSHIP TO SURROUNDINGS

Being strictly defined by the arteries of Hillelaan and Brielselaan and bordered by the railway, the building becomes clearly separated from the eastern neighborhoods of Bloemhof and acts as a northern terminal (yet abstracted) for the southern district of Tarwewijk.

Illustrations by K. Vatanidis
TRAFFIC

Here you can see the different speeds of the traffic surrounding the site. Next to the south facade there runs a busy car road in close proximity to facade, this could limit the accessibility of pedestrians and might be a challenge for future development. On the north side of the building there runs an industrial road only used for destination traffic and trucks. This less used road still has vehicles which travel faster than through an dwelling area due to the fact that there is no clear speed limit other than that there is no separation of different means of transport.
Next to the site are multiple important traffic veins for the city of Rotterdam, especially for the connection between north and south as well as a connection towards the Maastunnel and the A13 highway. Shown on the left are the two busiest traffic times of the day on average most likely due to workers commute. The top image is 9 AM and the bottom image is 5 PM. What is clear in these two images is that on the south side of the building there seems to be problem with the traffic flow, maybe its due to the fact that it is only 1 lane for each traffic direction.
THE METROPOLITAN APPROACH

ELEVATION

The approach of the Maassilo by metro is essential to the experience of the building and its surroundings. The metro is the fastest way to reach the Maassilo from the city centre at the other side of the Maas.

After the metro emerges from the underground at the Rijnhaven, the metro passenger is presented with a dramatic view on the Maashaven, completely dominated by the concrete mass that is the Maassilo. The observer is literally elevated from daily life. The scale is one of urban giants. It is the scale of the mass (Maassilo) and the void (Maashaven), not that of the human. No people are visible on the docks, all is swallowed by the enormous scale. The Maashaven, once humming with activity, is abandoned.

When the metro station adjacent to the Maassilo is reached, the observer may walk to the end of the platform, in order to look back to the distant skyline of the Kop van Zuid. When entering the station, a glimpse is given on a completely different face of the building. It is here that the human scale is reintroduced to a certain extent. People are waiting for their tram on the platform, others walk their dogs and bikers go by.
On ground level, the scale and complexity of things has changed completely. No longer is there a dominant scale to be perceived. The scale is here that of the buildings and the brutalist construction of the metroline, as well as that of the posters, of the streetlights, of emergency stairs. The observer’s view is not directed; it is continuously distracted. Paradoxically, the Maassilo building perfectly adapts to this unreadability, since there is no clear entrance. It is only through remembering the place of the docks and the water, that the observers is drawn to the other side of the building. A somewhat awkward entrance emerges.
TWO-FACED

The main lineair layout of the building is closely related to its position towards the Maashaven and the former railways. The result is that the building has two long facades, each with a particular relation to the public space. The public space on the south side (left in the section above) has a strong lineair character and is enclosed from both sides. The repetition of concrete columns in the facade enhances this linearity. In terms of scale, the building has an ambivalent relation to this public space. On the one hand, the human scale is introduced through the so-called “plofroosters”, the concrete ornament tiles in the lower part of the facade. On the other hand, the division in two parts, mirrored in the high bridge in the middle, imposes a colossal scale. The north side of the building is perhaps a more challenging public space, mainly because of the distance to the water. The space is narrow, certainly in relation to the height of the building, and is completely cast in schadow. The original elevator constructions block the view towards the Maashaven, and so the space is now used for parking. The facade does not have an articulated expression of the human scale as the south facade has. The result is that the building becomes inconceivable. Its totality disappears because of its swallowing scale in relation to the narrow public space.

Both facades have one thing in common, they completely conceal their interior. The relation between inside and outside is almost non-existent in the Maassilo, certainly in this section.
It is said that in the mid-twentieth century one could walk from Katendrecht to the Maassilo over the boats in the Maashaven. This is clearly visible on the picture to the right. The harbour used to hum with activity, and the Maassilo has always functioned as a static colossal mass in the midst of this activity. Together with the Maashaven, it formed the stage on which the boats, the grain elevators and the workers were the actors. In the current situation however, all this activity has vanished. The Maassilo remains as an empty stage. The elevator towers, once used to connect the static building to its vibrant surroundings, are the only remaining elements that refer directly to the industrial activity in the harbour. The question should be raised if the current stage should be regarded as the absence of a scene. It could also be stated that the absence of industrial activity itself forms a new scenic presence.
SPATIAL COMPOSITION
On the pictures on this page, the movement of grain and workers through the building is made visible per building phase. In the first phase, the grain was transported into the building using mostly the west grain elevator. Two elevators transported the grain to the attic, where the grain was distributed among the silos. In the east part of the building the grain was weighed and cleaned. The former entrance was located at the north facade. This entrance is not present anymore. In the second building phase, the horizontal transport was connected to the first phase, so the building worked as a whole. In the machine tower, machines were placed to weigh, filter and dehumidify the grain. An extra entrance with a rounded wall was added. In the third phase, two extra silo clusters were added.
BUILDING FUNCTIONS

The functions within the Maassilo are pretty much all build up the same way in each phase. The basement and groundfloor of the buildings are used to transport grain horizontally as well as allow workers to move about and have access to the funnels, machines and train tracks. The middle ‘floors’ of the building or in the case of the Maassilo the silo’s take up the most space in the building. The top floor of each building phase gives room to distribute grain to the silo’s and also for workers to adjust the grain pipes and have access to the machines. As for the two vertical exceptions, they are used as rising cores for the workers as well as storage and other activities such as washing grain. The office and former dwelling were situated over the water due to the lack of space on the site.
COMPOSITION OF THE NORTH FACADE

There is a clear change from left to right, the vertical elements are slowly decreasing and stop at the tower, followed by a giant horizontal mass which really shows the ensemble working as a whole entity but still being separate design phases. Stok really wanted to show the elements which were inside the building as seen in the facade the vertical lines which represent the silo’s can be seen through the whole facade of phase 1. Phase 2 from Brinkman shows no sign of what might be present on the inside of the building and because of this shows a wide horizontal surface which really diverse in orientation compared to the first facade.
Symmetry is something that is present in all the building phases of the Maassilo. But the third phase by Postma is more meaningful in its symmetry than the other phases. Where as in phase one and two there are certainly elements that show symmetry like the grid in the facade of Stok or the giant surface of Brinkman in the south facade. The ensemble of these two phases is not really symmetrical anymore, than comes Postma which puts his third phase infront of both south facades with a structure and mass that shows rhythm and alot of symmetry. By emphasizing the hole between the two masses it really feels like a repetition of two and the same facade. The smooth surfaces also make it easier to see symmetry, rather than making alot of texture and depth in the facades. So Postma tries to combine the ensemble on the southside by creating a homogenous south facade for the whole building.

Later on the symmetry was destroyed a little when Lisa Lux made a wall painting on the left side of the facade creating a disbalance and difference between the two parts.
The hierarchy of the architectural presence, is something which is very much present in the east facade of the Maassilo. The Grid of the of structure in the Stok part dominates the view from the east side of the building. Phase 2 is not even visible from the east unless you are standing very far away, so it’s presence is almost non. As for phase 3, it only shows its bare concrete facade which is quite slim but doesn’t really draw any attention to it. So you could say that the first phase is the most iconic of the east facade of this ensemble.

A darker fill means less present to the eye.

Illustration by K. Hoogeveen based on: model of D. van Weeghel
SKIN
Phase two of the Maassilo by Brinkman is directly built against the western facade of Phase one from Stok. This facade of phase one is rather unique as it shows signs in the facade which clear up certain questions about a shorter silo in phase 1. In the north facade the same silo pattern can be found as on the western and south facade, but on the left side of the western facade you can clearly see a shorter silo pattern being present which is also visible in the north facade. But without the context of the western facade it would have been very hard to determine whether or not the shorter pattern in the north facade was just an anomaly. Thus making it very valuable as to telling a story about the internal workings of building phase one.
UNNOTED FAÇADES

The North and South façade are the most prominent elevations of the Maassilo. Not only because of their size, but also due to the open view on the north façade from the Maashaven and Katendrecht and with the wide view on the south façade due to the wide street profile on the Brielseaand. The east façade is also located in a prominent spot on the crossing of the Brielseaand and the Maashaven Oostzijde and used to be the eye catcher of the silo building, with the large company sign on top. However, when various annexe buildings were placed in front of it and when the elevated metroline was built in 1968, the view on the east façade got more obstructed, although still quite visible. The east façade and the roof (fifth façade) are subordinate to the rest of the skin in of the building. They are largely away from sight and unnoted to most people passing by.

west façade

Throughout the years, after phase two of the Maassilo was built, the west façade has had multiple appearances due to industrial developments in the adjacent plot and due to different types of cladding.

The west façade is a nearly blind façade with just four small windows on the top floor of phase two. In its original state, right after phase two was built, the west façade used to be completely unobstructed as seen in the picture below. This changed when the Quaker factory, built in 1935 (Quaker, n.d.), built some new additions or annexe buildings right against the west façade of the Maassilo, partly covering the existing skin.

The three pictures on the right show the differences in finishings over time. Some years after phase two got built, the west façade was covered with bitumen (Transformers, 2008), presumably as protection against the weather or the surrounding industrial activity. This treatment resulted in a darker colour and contrasted with other parts of the skin (top picture). In the 1960s the west façade had rendering to cover the concrete walls, similar to the rest of phase two (middle picture). For some decades now, the west façade has been covered with a white corrugated steel cladding (bottom picture).

roof

Aside from some new installations and distribution spaces that were built with the addition of the new phases of the Maassilo (mainly within the red circle on the picture below), the roof has not changed a lot over time.

The most notable alteration on the roof has been closing up the roof lights in phase two. These roof lights used to allow natural light on the top floor of the building where the grain was distributed to the silos (top right picture), but was closed when the top floor was transformed into a multifunctional space for parties and events (middle right picture). The rooflights in phase one are still intact (bottom right picture).

The north and south façade are the most prominent elevations of the Maassilo. Not only because of their size, but also due to the open view on the north façade from the Maashaven and Katendrecht and with the wide view on the south façade due to the wide street profile on the Brielseaand. The east façade is also located in a prominent spot on the crossing of the Brielseaand and the Maashaven Oostzijde and used to be the eye catcher of the silo building, with the large company sign on top. However, when various annexe buildings were placed in front of it and when the elevated metroline was built in 1968, the view on the east façade got more obstructed, although still quite visible. The east façade and the roof (fifth façade) are subordinate to the rest of the skin in of the building. They are largely away from sight and unnoted to most people passing by.
LOST FAÇADE OPENINGS
PHASE 1: J.P. STOK WNZ. 1910

The following pages show per phase where in the buildings the façade openings got lost and filled up over time. This resulted in less and less natural daylight being able to enter the building when the Maassilo continued to develop. In the current situation there are hardly any windows left.

The grainsilo as seen from the Brielselaan (Baanders, 1912)
Original - exterior: square windows in ell attic above octagonal silos on the seventh floor, situated in multiple walls with three different orientations.

The grainsilo as seen from the Maashaven O.Z. ('Gewapend beton en bouwkunst', 1912)
Original - exterior: rectangular windows placed high up in the façade of the ground floor.

Current - exterior
Former façade openings have been filled up with concrete.

Current - interior
Former façade openings have been filled up with concrete.

Current - interior
Original windowframes remain visible in front of / on the surface of new concrete filling.
**LOST FAÇADE OPENINGS**

**PHASE 2: BRINKMAN & VAN DER VLUGT 1930**

The grain silo as seen from the Maashaven. (Brinkman, 1931)

*Original - exterior:* long horizontal window strips on the top floors of phase 2, similar on the back façade on the Brielselaan.

*Current - exterior:* The top row of horizontal window strips is closed off on both the Maashaven side and Brielselaan.

*Current - interior:* The rolling shutter door and window above are replaced by bricked walls and sliding doors.

*Current - interior - Brielselaan:* Space behind former windows is filled with insulation.

*Current - exterior - Maashaven:* Concrete or plastered brick infill in façade.

*Facade of phase 2, Brielselaan.* (Brinkman, 1931)

*Original - exterior:* rolling shutters with large windows, divided by mountins in small glass panes.
LOST FAÇADE OPENINGS

PHASE 3: A.G. POSTMA & J.D. POSTMA 1951

The grainsilo from the Brielselaan in 1953 ('Rondom Charlois', n.d.)
Original - exterior: the characteristic plofroosters on the
groundfloor.

The grainsilo as seen from the Brielselaan (Transformers, 2008)
Original - interior: daylight coming through plofroosters
and creating patterns.

The grainsilo as seen from the Brielselaan. (Transformers, 2008)
Original - exterior: large sash-window in the west façade of the third phase, similar on the east façade at the other
end of phase 3.

Current - exterior
Metal plates visible behind all the plofroosters.

Current - interior
The plofroosters are closed off with metal plates on the
inside.

Current - exterior
Due to new buildings close to the west façade of the silo building, the façade opening is now filled in by a brick wall
and steel plate above.
In the original situation, daylight penetrated the concrete mass, in order to provide a more pleasant working environment for the workers. Obviously, the silos were completely dark on the inside, in order to protect the grain from growing into little plants. The bundled rays of light, together with the rigid lines of columns must have been a powerful spatial interplay. Unfortunately, little historic photos can be found to verify this. However, an impression can still be found on the seventh floor in the Stok building part, see image to the right.

In the current situation, many of the openings in the facade have been closed off, mainly in order to prevent noise pollution coming from the disco. This disco completely inverts the system of light penetrating the building. In the current situation, artificial coloured light and laserbeams come from the very center of the building and shine on the inner surfaces of the building.
CONCRETE APPEARANCES

From the urban and site scale, the building is conceived as a monolithic mass of concrete. At a closer look however, the concrete has multiple appearances in the Maassilo. These appearances point to the developments in the economy of the building, the different stylistic choices of the architects and the development of the material itself. All these appearances have their own texture, scale, and relation to the observer.

- **Concrete tiles - part 4 (Haan)** - rational - indifferent - sober
- **Hollow concrete stones - part 1 (Stok)** - tactile - human scale - contingent
- **Plastered concrete surface - part 1,2,3** - damaged - inconceivable scale - worn
- **Ploistroesters - part 3 (Postma)** - lively - human scale - active - semi transparent

All illustrations by D. van Weeghel
Lisa Lux is an artist that resides in Rotterdam, the Netherlands where she does most of her work. She makes mosaics, sculptures, art commissions for public spaces, national and international exhibitions, art commissions, and work featured in collections. She basically describes her work as “Emo-Form-Structures” as the forms and structures are a result of an emotional process.

On the south facade of the building by Postma, she designed a wall painting of 55 by 35 meters. She explains how she is always interested to place her art in public spaces that appear as dull, grey and overall gruesome in nature. Her biggest challenge was to adapt the building to fit a modern visual context that would blend in with renovation program that was being carried out in the urban area at the time.

To carry out the project in 1999 she started looking out for sponsorships and organised permission from the municipality. Maashaven Silo bv was the first party she asked for permission. They did not only give permission to do the work, they also became her very first sponsor. Ultimately after a long process it was only in 2002 that the financial side of matters was tied up and she could finally carry out her work.

Later she explains: “I am an artist with a profound spiritual approach and this monumental artwork is a symbol of my deepest wish to contribute my work to this world, in order to promote universal harmony and bring together human kind as one”.

Her wall painting is one of Europe’s largest and called: “Flyers of Hope for Universal Love” (Lux, n.d.).
‘GRAANSILO MIJ’ SIGNS

When club Now & Wow took the initiative to reuse the Maassilo complex in 2004 the sign on the main facade said “Maashaven Silo bv” and included their green logo (Transformers, 2008). The original sign however for the building in 1910 said: “N.V. Graansilo Mij”. On the facade drawings from that where made in 1969 for the design of a workshop space by Postma we see this logo. All though when we take a good look at historical photos the IJ seems to be a bit different. In 2008 when the Creative Factory moved in to the building this sign was restored in that way. In this sense the original is restored as good as possible.

Another intangible element is the “Graansilo Mij” sign that used to stand in giant steel letters on the steel beam above the electricity transformer house. The beam is still there but the letters are gone.

From a historians perspective it would be interesting to bring these elements back to its original state. On the other hand, this building is all about the change and growth of the company in that sense the “Maashaven Silo bv” sign is also an element that resembles this.
STRUCTURE
The Maassilo is built as a highly functional building. Not only in its layout, but also in its appearance. Many buildings have a skin that can regarded separately from the structure. This has to with the fact these buildings should represent something more than merely the technical logic of the building itself. These buildings have a face.

The Maassilo does not have such a face. The facade is no more than the functional limit of silo groups. In the most parts, it has exactly the same thickness and structure as the inner silo walls. As can be seen in the drawing to the right, the beams extend in the facade. Thus, the facade presents us with a functional and structural logic rather than an aesthetic principle. It should be noted however, that although the facade hints at the internal logic of the building, it does not in any way tell the observer anything about the spatial composition of the silos and the rest of the interior.

three-dimensional section, building part Stok, illustration by D. van Weeghel
As the newspaper and magazine fragments on this page indicate, the different building phases of the Maassilo, especially phase 1 (Stok) and 2 (Brinkman & Van der Vlugt), can be seen as part of the movement ‘Het Nieuwe Bouwen’, which is characterized by a great interest for new construction methods, an emphasis on functionality and the ridding of ornament.

The need for fast and cost-efficient construction methods led to a great interest in the American way of building. Dutch architects became increasingly interested in the American high-rise buildings and their use of reinforced concrete, which was a state-of-the-art material at that time. In many historical articles about the Maassilo, its massive dimensions are emphasized with strong language, proving that the building was conceived most importantly as a structural achievement, rather than an aesthetic structure.

**THE AMERICAN WAY**

As the newspaper and magazine fragments on this page indicate, the different building phases of the Maassilo, especially phase 1 (Stok) and 2 (Brinkman & Van der Vlugt), can be seen as part of the movement ‘Het Nieuwe Bouwen’, which is characterized by a great interest for new construction methods, an emphasis on functionality and the ridding of ornament.

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The ground floor provides the most direct spatial experience of the silos. As the place where the previous moment of tension between the vertical distribution of grain and its horizontal transportation took place, the spatial experience is a collision between two different languages: the orthogonal grid of concrete columns and beams and the multiple shapes of funnels with which these are fixed.
GROUND FLOOR INTERVENTIONS
PHASE 1: J.P. STOK WNZ. 1910 & PHASE 2: BRINKMAN EN VAN DER VLUGT 1930

When club Now & Wow moved into the building in 2004 it to be adapted to the new use. The structure was meant to carry the load of more than 300 silos full of grain. To bare these loads the reinforced concrete columns where massive. The floor on the other hand would only have to carry the equipment and about a hundred people. For the club the frequency of people would increase tremendously. To be able to bare these extra loads the floor had to be reinforced with a new top floor. The silo’s however stood empty and wouldn’t have to carry the same loads.

To visually create one space, 35 columns have been demolished of which a majority with the use of explosives. Thin steel columns have replaced some of the columns. They are filled up with concrete and forced to tension to secure their loadbearing capacity (Keijnemans, 2004).
The historical sequence of the multiple grids, has resulted into an ‘open plan’, continuous hierarchy in the lower levels, which becomes split and mirrored in the attic levels of the 1st and 2nd phase, with the machine tower as mediator.

As fundamental prerequisites for the movement of grain, the rail tracks and conveyor belts played a catalyst role for the specification of the grid system and the overall orientation within the building.
RELATION BETWEEN SPACES

This experimental drawing is based on a cubistic style that Aldo Rossi developed to explain some of his projects. He uses different perspectives and 2-dimensional drawings to get a new idea of the spatial arrangement of a building or object. This drawing was made in the preliminary phase to get a better idea of the personal interpretation of spaces and elements in the building and the relation between them. It clearly shows the accumulation of building layers, characteristic for the Maassilo complex. The silos take up about 80% of the building volume, whereas in the section we see they are dark spaces that are inaccessible and not experienced by the user. A view on the rooftop looks over on the harbour and skyline of 'De kop van Zuid'.
SURFACES
SURFACE INVENTORY

A collection of surfaces that stand out or represent multiple surfaces that are unique throughout the building. The reason for this selection is because they showcase the biggest differences. Showing original surfaces and new surfaces and their use. Also on the 10th floor there are some graffiti artworks which need further investigation.

New paint stripes throughout the basement of the second phase/Brinkman to make a contrast between the existing rough surfaces of the bare concrete and the newly painted surfaces which highlights the texture differences.

Original octagonal funnel of a silo in the first phase with original metal spout and lettering. The weathered surface due to dirt and usage is valuable because it shows its activities from the past.

Original elevator machine room door in the basement of the second phase/Brinkman. Special because of its locking mechanism and steel door and hinges as well as original lettering.

Original tiles on the structure/surfaces surrounding the machines for hygienic reasons, for cleaning up fluids which may have come out of the machine or were present during maintenance.

Original door with original unique lettering showcasing the function of that room and giving a clear view of the font used throughout the building.

Original square funnels at the new entrance hall for the creative factory. Shows really well the concrete cast of the funnels as well as dirt and a little bit of damage.

Original elevator door with original lettering. Steel doors of the original personnel elevators for maintenance staff and machinery.

New graffiti artwork for pepsi max by Graffitinetwerk.nl. Advertisement for pepsi max due to the high frequency of parties. (September 2016)
Throughout the structure, evidence of movement of the machinery in relation to the supervising role of the workers can be traced. Based on the fact that most of the machines’ activity was concentrated on the ground floor, traces of their movement are still present in the lower parts of the concrete columns. Additional steel elements attached or embedded to the columns provide further proof of that. Similarly, other indications of the workers’ activity can be spotted in the various objects and additional services in the basement and machine tower.

Objects adjacent to the former conveyor belts still present in the basement

Series of service openings primarily in the basement

Lower parts of concrete columns and surrounding walls still carrying traces of the machinery movement

Columns carrying multiple elements for serving the surrounding functions such as steel coverings, railings, and extensions
CONCEALED PRESENCE

On the ground floor of the building, the surface that imposes its presence to the greatest extent is the ceiling. The particular character of this presence lies in the fact that it conceals a void that lies above. It is through this hiding of space, that this surface attains its meaning.
SERVICES & STUFF
Some of the machines have been lost during the renovations for Now & Wow and the creative factory. Many have been kept original though and some are still in place while others have been repositioned to form an exhibition. Throughout the complex and the site there are a number of tools, equipment and machines that can be found. These all served different purposes and where crucial for process of cleaning storing or distributing the grain.

The purpose of the conveyer belts is quite clear. Grain was placed on them and distributed through the building (Transformers, 2008). The exact way grain got onto the belt and was taking of is a bit trickier. Some of these belts needed to make space and have simply been thrown away. There are still some original belts to be found on the top floors of the 1st and 3rd phases.

A moveable telescope tube was used to collect grain from the silo. The angle of the tube could be changed to guide the grain onto different conveyer belts to distribute it through the building, either to go through a cleaning process and get packaged or go back into storage (Transformers, 2008).

The moveable scale could be used outside to weigh the grain on the spot so that it could be packaged afterwards and immediately sold on the spot (Transformers, 2008).

For other equipment its purpose is less clear. The picture on the right shows two tools that seem to be able to collect grain from the silos. To probably further clean, package or distribute the grain in some way.

During the renovations carried out to make space useable for the Creative Factory many machines and tools have been saved. On every floor of the Creative Factory a space has been kept in original state in which these machines are save guarded (Transformers, 2008). Further investigations on these tools and machines still needs to be carried out.
**FIXED MACHINES**

Here are some of the fixed in place machines that really showcase former functions of the spaces that they are in. The combination of these machines within the building are the major components in moving the grain through the whole building. From sucking the grain out of the boats through vacuum pumps to delivering the grain on the top level of the building, and moving it horizontally throughout the building and distributing the grain to the divider pipes which put the grain in the top of the silo’s in each phase of the Maassilo.

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**Electro-motors with flywheels which power the pneumatic pumps they were cooled by cooling pumps which used water of the Maashaven. These motors really give meaning to the basement as to what it function was.**

**Conveyor belts which transport the grain from the Cup elevators to the distribution pipes for the silo’s**

**Pneumatic pumps which create a vacuum (suction) which make it possible for the elevators and cranes outside to suck 400 tons of grain out of the boats per hour and transport them indoor. The machines were made by SIEMENS**
FUSION OF STATIC AND DYNAMIC

On the scale of the site, it was concluded that the building has always functioned as a static and sturdy mass in the midst of economic activity and rapid change. This contradiction becomes particularly interesting when these two extremes meet, or ‘touch’ each other. An interesting example in this case is the inlay of the iron gliding rails in the columns and beams on the ground floor and in the cellar in building part 1 and 2. These rails were presumably installed to mount a variety of temporary installations to the concrete construction, as can be seen on the photo underneath. It shows that flexibility was not only sought in the structural layout of the building, it also became part of the detailing.

This shows that from the beginning, the building was made to facilitate functional change in the future. The building was comprehended as existing in time. Consequently, in this particular case, the static and the dynamic fused together.

On a practical level, the rails may prove to be useful for future interventions, as is already shown in the montage of the new signage, see image underneath.
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PART 2

TECHNICAL ANALYSIS
Building technology is one of the most essential aspects to research in the Maassilo. In the case of the Maassilo the structure is the building and vice versa. Due to the functional nature of the building, the structure lies bare almost everywhere in the building. Also the dimensions of the structural elements like the columns and the silo’s give an indication of the massive loads it has to bear.

By creating a framework of all the structural elements and showcasing these in an analyses, it already gives a slight glimps towards the possibilities for future use/interventions in the structure of the Maassilo.
TA1: STRUCTURE
The following two pages give an overview of the different types of structures that can be found on the site of the Maassilo, as 3D axonometrical sections that show the characteristic structures of phase 1, 2, 3 of the silo buildings and phase 4 as the detached office building.

**phase 1 - 1910**
J.P. Stok Wzn.

**phase 2 - 1930**
Brinkman & Van der Vlugt

Illustration by D. van Weeghel

Illustration by A. Stuik

**Top floor**

**Groundfloor**

**Basement**

No access / no photos available

**Top floor**

**Groundfloor**

**Basement**
OVERVIEW OF DIFFERENT STRUCTURES

phase 3 - 1951
A.G. Postma & J.D. Postma

phase 4 - 1963
H. Haan

Illustration by K. Hoogeveen
Illustration by S. Bruinsma
CONSTRUCTION SYSTEM
PHASE 1: J.P. STOK WNZ. 1910

The picture to the right shows all the different elements in the concrete construction system of building part 1. It must be noted that in reality these systems are not separated. The whole building is cast in situ, so all the elements are one monolithic concrete mass. By separating them however, insight is given in the way that the construction functions. In order to maximize the grain capacity of the silos, everything below the silos is built as strong as possible, everything above the grain load is built as light as possible.

below the grain load: structure as strong as possible
above the grain load: structure as light as possible

concrete roof
concrete beams and columns in facade
concrete columns
concrete floor
concrete silocells
concrete beams
concrete columns
concrete floor
concrete foundation

silo section showing all the construction elements
Illustration by D. van Weeghel
analyzed silo section
Resting on the lower grid structure, the main octagonal silos are fixed between the beams and infilled with additional concrete on their perimeter. In addition, smaller, secondary silos are shaped from the negative space created above the columns.
The images on this page show the flow of the horizontal and vertical forces building part 1. These drawings show the original situation, in order to show for what forces the construction was calculated and dimensioned initially. The arrows do not represent actual calculated values, they are more a general estimation. The pink fields show surface loads.

In the sections for the vertical loads, it is shown how the weight of the grain in the silos is taken up by the construction and ultimately the foundation. The section with the horizontal loads shows how the wind is taken up by the construction. In the case of windloads, the silowalls work as a whole, as one big wall, in order to take up the bending moment that results from the wind. This results in vertical loads on the foundation. It can safely be assumed that the vertical forces resulting from the wind loads are much smaller than the vertical forces caused by the load of the grain and the dead loads of the building. This means that the resulting forces in the foundation will always be compressive stress, and not tensile stress.
CONSTRUCTION SYSTEM
PHASE 2: BRINKMAN & VAN DER VLUGT 1930

foundation
The foundation system for phase 2 was chosen to be as affordable as possible while having a load-bearing capacity that was as high as possible since this determined the amount of grain that could be stored in the silos on top. A special type of foundation piles was chosen for this: the Sprengerpaal (Brinkman, 1931). With a thickened head, this pile could carry up to 60 tons of weight instead of the maximum 50 tons in regular piles (‘Graansilo te Rotterdam Brinkman vd Vlugt’, 1931). On top of a total of 1366 Sprenger piles (De Maasbode, 1929), a massive concrete plate of one meter in height was built. This system was chosen because details of the superstructure were not precisely known at that time yet since the building method of the superstructure depended on the contractor that would be chosen. The thick concrete slab would just evenly distribute the building’s loads over the foundation piles.

silo structure
Aside from the roof structure, the entire superstructure is made out of reinforced concrete. (Partially) making the silos out of iron was no option, not only because of its costliness but also with regard to cooling and condensation, the Graansilo-Maatschappij did not want silos out of sheet metal (Brinkman, 1931). The 146 nearly square silos have thickened corners that together with the corners of adjacent silos act as columns. The total load bearing capacity of the building was set with the chosen foundation system. This included the building’s own weight and the weight of the grain that could be stored inside. To maximize the grain capacity, it was important to keep the structure of the building as light as possible. The silo walls are connected to the concrete ceiling of the groundfloor and together they form an upside down T-beam in which more or less the full height of the silo walls can be included, meaning that these composed T-beams are very strong. This allowed the structure of the silos to be made up of very thin walls of merely 165 mm which saved a lot of weight. The weight of the building turned out to be roughly the same as the weight capacity of grain it could store: 44,000 tons (Brinkman, 1931). When looking at the short section of phase 2, in the middle row of silos the funnels are alternating between two sides. One sloping towards the north, the next sloping to the south. This was probably done to bring the grain closer to the two main distribution lines that run parallel to each other on the north and south side of the building. The superstructure was built with the ‘Gleitbau’ or ‘Macdonald’ system. This method was only chosen at a later stage, when the construction of the new building did not go fast enough with regular methods (‘Nog niet snel genoeg’, 1930). The Gleitbau made it possible to add around one meter in height to the building each day during the construction phase (Brinkman, 1931).

roof structure
The roof of phase 2 is supported by a construction of iron trusses in order to save weight for maximal grain capacity and for a short construction time (Brinkman, 1931). The building was topped off with an extremely thin roof that acts as plofdak in case of dust-explosions from the grain so that the roof can fly off and pressure of an explosion can quickly be released, thereby sparing the silos and the rest of the structure.
Settlement in the structure occurs due to temperature change. In phase 1, a settlement of 8 cm was measured (Brinkman, 1931). To prevent the structure from cracking or otherwise deforming, an expansion joint was added in the middle of phase 2, throughout all levels of the building except for the basement, since temperature change is less beneath ground level.

Phase 2 can be seen as two structurally separate buildings. On the top floor the separation is realised by building two iron trusses close to either side of the expansion joint. In the levels of the silos the walls of the silos are slid into one another without being structurally connected. And on the groundfloor level the columns underneath the expansion joint are wider than the rest of the columns and are split down the middle with a few cm of space inbetween.

A for now unexplainable/curious detail in the roof structure are the thin horizontal metal plates that connect the iron trusses on both sides of the expansion joint. The whole purpose of this expansion joint is to allow free movement and settlement of the structure, the linking metal plates prevent this.

Measurements:
- Silo walls: 165 mm
- Original concrete columns with steel reinforcement:
  - Standard columns: 1250 x 1250 mm
  - Columns with expansion joint: 1250 x 1800 mm
- New steel columns under regular silos: Ø 270 mm
- New steel columns under expansion joint: 2x Ø 190 mm
By removing the concrete columns in the middle row of the building, the loads on these former columns are now distributed to the new slender steel columns in the rows next to them. These columns bear more forces than the remaining original concrete columns further away from the center of the building, but less than in the original situation since there are no longer massive amounts of grain stored in the silos above.
An isometric exploded view of the stability 'gate' between the two main volumes of phase 3, build because of the existing transformer house and the need of the structure to support an floor crossing from one part of phase 3 to the other part of phase 3 for the distribution of grain on the top floor.

Gateway Postma part
Illustration by K. Hoogeveen
piller schemes
there are two different divisions of the pillers within the foundation. on the left side there are strokes of 2 silo’s next to each other which leaves a little more room in between the pillers when compared to the scheme of the right side which holds strokes of 3 silo’s next to each other. illustrations by K. Hoogeveen

franki-palen
foundation pillers which are made by first digging out a hole in the sand and then filling the negative space with concrete to create a solid piler over time.

franki-palen above ground (ugent-memorie.be, 2017)

explanation of the installation of franki-palen (franki-grondtechnieken.nl, 2017)
The structure of the third phase does not have any particular innovations or different building methods other than the usage of a meter thick foundation and the usage of Franki-palen. What is special about phase one is that it blocks the wind loads for building phases one and two.
office and dwellings
The architect Herman Haan designed a two story building for the ‘Graan Elevator Maatschappij’ in 1963. This building was meant to host the growing need of office space. The office was located on the 1st floor, on the ground floor two Haan designed two apartments of which the layout was mirrored. The need for office space kept growing, and in 1971 the two dwellings where converted into office space as well.

context
Due to a lack of space the building had to be built in the water what made it an interesting structural challenge. Located on the eastside of the site in the very far corner of the harbour looking over the water.

groundwork and foundation poles
Already in 1957 several cone penetration tests where made to determine the length of foundation poles. According to the foundation pole reinforcement drawing these where made 20 meters long so that the buildings loads would stand on the second sand layer.
CONSTRUCTION SYSTEM
PHASE 4: H. HAAN 1963

As the building stands on the water and needed to remain connected to the wharf it is placed on an elevated structure. This base consists of three hollow pillars that are shaped as a wall and become wider towards the top. The structure stands on 20-meter long foundation piles. The prefabricated beam-cover proves Haans eye for detail. Also the sloping ground floor that stands on the base structure was an aesthetic intention to make the building seem to float above the water. However it also testifies Haans intentions to be economical with building materials. As do the columns that have different sizes.
main structure
The main structure of the building is based on Le Corbusier's Pilotes system of columns and floors. Columns carry all the vertical loads that allow a free open layout in the facade. The whole structure works as one fixed element of reinforced concrete. It was casted over several stages in which the reinforcement is connected throughout the solid structure.

vertical loads
Vertical forces are as usual, based on the weight of the structure and the varying loads of people defined by the function. These so called surface loads are taken by the floors and distributed to the columns. Finally these forces end up in three big pillars that stand on three foundation beams. Consequently the foundation beams rest on 42 pillars that stand on sand layer 20 meter down in the ground. These pillars provide the reaction forces to keep the building standing.

horizontal loads
It should be mentioned that except from wind in this case also some water pressure is forced on the structure.

Water pressure and passing wind that creates a draft are both illustrated in the diagram but can almost be discarded. The main horizontal load is the wind pressure on the facade. These load are illustrated in both the short and the long section. The horizontal wind pressure basically results in two forces that have to be contrasted by the foundation pillars.

Firstly the building tends to tilt over. If we dramatize this behaviour the wind pressure causes forces to go up on the side of the wind and down on the other side. The foundation has to compensate these forces by pulling on one side and pushing on the other.

Secondly the horizontal wind pressure tends to ‘push’ the building a side. All foundation pillars have to compensate these tensile forces with a reacting force that works in the opposite direction.
the structure of the silo’s are made up of concrete cells with a rebar structure consisting of horizontal rings and vertical bars to also being able to hold tensile stress. This structure allows for variable loads since certain silo’s aren’t always next to other filled silo’s and need to be able to support their own forces instead of being dependend on the horizontal pressure of neighboring filled silo’s.
A 'plofdak' is a very light and thin roof structure which allows pressure to escape in case of an explosion in the building. The roof parts will come off from the structure creating space for the pressure from the explosion to be relieved. The reason for this roof method to be implemented is the cause of dust explosion which happen very fast and can expand in a matter of milliseconds. So for the structural integrity of the building the explosion must go upwards and not damage the silo’s or concrete structure.
The silo capacities show really well what this structure can handle in terms of loads and also shows with it sheer number of tons how massive this complex really is in terms of cubic meters of space. 86,000,000 KG of grain could be stored in the Maassilo making it Europe’s largest grain storage facility when the three phases were completed. To give some kind of scale to that gigantic number, an full grown elephant weighs 6000 KG. So that would mean that the building could possible house 14,333,3 elephants in the building, which could also be translated to housing floors on top of the Maassilo because it is no longer used as a storage.
TA2: MATERIAL
This page shows the inventory of the different facade systems that have been used for the Maassilo in the different phases. Further research needs to be done on the exact dimensions in the sections. Also, on the drawings of part 2 insulation is shown. For now, it is not certain if this is also the case for building part 1 and 3.

- **west facade**
  - concrete, cast in situ
  - plaster
  - bitumen
  - corrugated sheet

- **attic & ground floor part 3**
  - brick, cross bond
  - columns, cast in situ

- **silos**
  - (70 mm aerocrete insulation in part 2)
  - concrete, cast in situ
  - plaster

- **ground floor part 3**
  - plofroosters, concrete

- **part 1**
  - hollow concrete blocks
  - columns, cast in situ

- **office, part 4**
  - concrete, cast in situ
  - steel mounting construction
  - concrete tiles

Illustrations by D. van Weeghel
elevation by Transformers 2008
### Damage Analysis

**Phase 1: J.P. Stok Wzn. 1910**

#### Exterior - East Façade

**Damage type:** Soiling (black) on hollow concrete blocks in façade  
**Hypothesis cause:** Air pollution from harbour activities or traffic  
**Possible solution:** Brushing, washing, steaming or abrasive cleaning

**Damage type:** Erosion  
**Hypothesis cause:** Rainwater runs along the façades  
**Possible solution:** Add a small water gutter underneath the protruding beams in the façade

#### Exterior - North Façade

**Damage type:** Biological growth - Algae  
**Hypothesis cause:** Orientation of façade (north) - no sun and little rain  
**Possible solution:** Brushing, washing, steaming or abrasive cleaning

**Damage type:** Corrosion  
**Hypothesis cause:** Rain and air combined with chloride ions (salts) from brackish water in the Maas  
**Possible solution:** Replacement of iron parts or de-rusting

**Damage type:** Exfoliation  
**Hypothesis cause:** Corroding reinforcement increases in volume, pushing off the top layer of concrete and plaster  
**Possible solution:** Check integrity of rebar, replace if necessary and fill with repair mortar

**Damage type:** Mechanical damage  
**Hypothesis cause:** Accidental impact load through use of the building  
**Possible solution:** Fill with repair mortar

#### Exterior - Northwest Façade

**Damage type:** Soiling (black)  
**Hypothesis cause:** Air pollution from harbour activities, occurs on inward walls with a roof above where rain doesn’t wash it away  
**Possible solution:** Brushing, washing, steaming or abrasive cleaning
**Damage Analysis**

**Phase 2: Brinkman & van der Vlugt 1930**

**Exterior - north façade**

- **Damage type:** Soiling (black) - gradient in darkness from top west to bottom east
- **Hypothesis cause:** Air pollution from harbour activities, more severe on the west side due to the prevailing wind direction
- **Possible solution:** Brushing, washing, steaming or abrasive cleaning

**Exterior - west façade**

- **Damage type:** Soiling (black) - gradient in darkness from top west to bottom east
- **Hypothesis cause:** Air pollution from harbour activities, more severe on the west side due to the prevailing wind direction
- **Possible solution:** Brushing, washing, steaming or abrasive cleaning

**Exterior - north façade**

- **Damage type:** Biological growth - Algae
- **Hypothesis cause:** Orientation of façade (north), no sun and little rain
- **Possible solution:** Brushing, washing, steaming or abrasive cleaning

**Exterior - north façade, tower, 7th floor**

- **Damage type:** Corrosion
- **Hypothesis cause:** Rain and air combined with chloride ions (salts) from brackish water in the Maas
- **Possible solution:** Replacement of iron parts or de-rusting

**Exterior - north façade**

- **Damage type:** Exfoliation
- **Hypothesis cause:** Corroding reinforcement increases in volume, pushing off the top layer of concrete and plaster
- **Possible solution:** Check integrity of rebar, replace if necessary and fill with repair mortar

**Exterior - north façade**

- **Damage type:** Exfoliation
- **Hypothesis cause:** Corroding reinforcement increases in volume, pushing off the top layer of concrete and plaster
- **Possible solution:** Fill with repair mortar

**Exterior - north façade**

- **Damage type:** Erosion
- **Hypothesis cause:** Possibly rainwater damage due to a broken window, only occurs on this one location
- **Possible solution:** Check windows on leakage
**Damage Analysis**

**Phase 3: A.G. Postma & J.D. Postma 1951**

**Damage type: Soiling (black)**
- **Hypothesis cause:** Air pollution from harbour activities, severely occurs on west façades due to the prevailing wind direction
- **Possible solution:** Brushing, washing, steaming or abrasive cleaning

**Damage type: Biological growth - Algae**
- **Hypothesis cause:** Orientation of façade (east) means little rain, proximity of metrostation prevents a lot of sunlight
- **Possible solution:** Washing or steaming to remove the algae

**Damage type: Spalling**
- **Hypothesis cause:** Accidental impact load through use or surrounding the building
- **Possible solution:** Replace with new masonry

**Damage type: Corrosion**
- **Hypothesis cause:** Rain and air combined with chloride ions (salts) from brackish water in the Maas
- **Possible solution:** Replacement of iron parts or de-rusting

**Damage type: Exfoliation**
- **Hypothesis cause:** Corroding reinforcement increases in volume, pushing off the top layer of concrete
- **Possible solution:** Check integrity of rebar, replace if necessary and fill with repair mortar
### Damage Analysis

**Phase 4: H. Haan 1963**

**Damage type: Soiling (black) - west side of façade**

**Hypothesis cause:** Air pollution from harbour activities, more severe on the west side due to the prevailing wind direction.

**Possible solution:** Brushing, washing, steaming or abrasive cleaning.

**Damage type: Dead algae (black)**

**Hypothesis cause:** Varying contact with water due to changing tides, little sunlight with the building on top.

**Possible solution:** Brushing, washing, steaming or abrasive cleaning.

**Damage type: Biological growth - Algae**

**Hypothesis cause:** Oriented to the west but a lot of sun and rain is obstructed by proximity an elevator.

**Possible solution:** Washing or steaming to remove the algae.
TA3: SERVICES
The process of the conveyor belts can be understood as the primary generator of the building’s purpose as a constant field of interaction with the infrastructure of the waterfront (cranes & bridges). With the two elevator towers at the west edge of the first phase acting as the central points for the vertical circulation of the grain, a main set of conveyor belts were established in the basement for the weighting and transportation of the cereal. In the same logic, the conveyor belts in the attics (1st and 2nd phase) would be connected to a series of tubes, distributing the grain in the various cells.

Conveyor belts in the basement, Rotterdamsch nieuwsblad (1930)

Conveyor belts in the basement, Transformers (2008), p. 27

View of the tubes and conveyor belts in the attic of the 1st phase

Conveyor belts in the basement, Transformers (2008), p. 72
DRAINAGE
PHASE 1: J.P. STOK WNZ. 1910

Drainage system in the 1st phase is rationally positioned at the edges of the roof and extended to the corners of the building, as well as the sides of the silos.
**RAINWATER AND VENTILATION**

**PHASE 2: BRINKMAN & VAN DER VLUGT 1930**

Rainwater drainage indicated on the north façade of phase 2, based on archive drawing (BRDX 110404096 Silo aan de Maashaven, Rotterdam, 1929).

- **Route of rainwater, in front of the façade**
- **Route of rainwater, behind the façade**

Rainwater drainage and ventilation indicated on the roof plan of phase 2, based on archive drawing (BRDX 110404096 Silo aan de Maashaven, Rotterdam, 1929).

- **Fall direction for rainwater**
- **Rainwater drainage pipes**
- **Basement ventilation shafts**

Rainwater drainage indicated on the silo plan of phase 2, based on archive drawing (BRDX 110404096 Silo aan de Maashaven, Rotterdam, 1929).

- **Cut-out of the silo plan indicating ventilation shafts for ventilating the basement (BRDX 110404096 Silo aan de Maashaven, Rotterdam, 1929).**
- **Cut-out of the groundfloor plan indicating ventilation shafts for ventilating the basement (BRDX 110404096 Silo aan de Maashaven, Rotterdam, 1929).**

Rainwater drainage indicated on the north façade of phase 2, based on archive drawing (BRDX 110404096 Silo aan de Maashaven, Rotterdam, 1929).

- **Horizontal detail indicating the location and dimensions of drainage pipes embedded in the silo wall (Brinkman, 1931).**

Rainwater drain visible on the roof above the grain distribution level in phase 2 which goes down to the level below and will then enter the silo wall.

Rainwater drainage pipe visible on the outside of the tower, direction of fall (slope) on the roof visible by the accumulated rainwater on the left.

Rainwater drainage pipe visible on the outside of the façade of phase 2, coming down from inside the silo wall above.
It's not really clear if there are more branches of the drainage system inside. We think a horizontal pipe runs all the way towards the transformer house and then goes through the side facade and then joins a vertical drainage pipe and goes down.
DRAINAGE SYSTEM
PHASE 4: H. HAAN 1963

septic tank
As explained the building stands on three wall structures that are hollow to use a minimum of concrete. Besides that the wall in the middle serves another purpose, it houses the septic tank to deal with wastewater treatment. Since the building was put on water it was probably more difficult to connect it to the main sewage system at that time.

drainage
water drainage is quite straightforward in the office building. Most characteristic are the gutters that 'spray' the water from the roof on either end. On the balconies the water is drained through a pipe in the concrete straight into the water underneath.

piping
All sanitary cells are ventilated through pipes with air vents on the roof. The wastewater is lead through pipes into the septic after which it is treated and disposed. Two pipes are connected with the main land, one provides the building with electricity and water the other disposes the wastewater.
PART 3

VALUE ASSESSMENT
As an historic ensemble of grain silos, office spaces and grain elevators built in different phases between 1910 and 1964, the Maassilo complex in Rotterdam Zuid carries a multilayered historical value. Directly linked to the rapid growth of the harbor in the early 20th century as well as the creation of the Maashaven, the complex stands as a key actor in the socioeconomic development of the city. Located in the infrastructural heart of the harbor area, the building also played a catalyst role for the creation of the southern (working class) neighborhoods of Tarwewijk and Bloemhof (Charlois, Rotterdam Zuid).

Within a span of almost 50 years of its construction, taking place in 4 different phases, the building also stands as a physical record of evolving typologies, construction methods and technological possibilities in the context of silo buildings. Providing by definition a clearly (uncompromising) functional context, the building directly reflects the climaxing functiona
tional language, as expressed in the Van Nelle factory. In the context of the newly introduced New Objectivity, whereas Stok’s part stands as a subtle proof of these gradual changes, the second phase boldly expresses the manifestation of the functionalist approach as the very (industrial) ideal of the city at the time. The third addition of J. D. Postma in 1950 further homogenizes the initial phases in the south part by occupying the footprint of the adjacent railway, subsequently followed by the smaller addition of an office building at the waterfront by H. Haan in 1956.

Parallel to encapsulating these successional architectural languages, the complex also provides a record of the evolving construction processes and building technology of silo making. Furthermore, in the context of a historical revolution in the use of reinforced concrete, the building marked one of the largest in situ constructions in Europe.

As an originally uncompromising functional environment, the atmosphere which constitutes Maassilo’s present situation is characterized by the stripping-off of its initial activity. Today the building stands as a weathered, decayed mass, concealing the empty cells of the silos.

In the context of a cultural initiative triggered by Transformers and the local municipality, the building started to attract attention during the 1980s as a significant case of a rarely condensed, large scale ensemble of silos, expressing exceptional industrial caliber. The restoration of the central elevator in the waterfront and the original sign by Stok, as well as, the re-arrangement and displaying of the machinery, marked the first series of (fragmented) commemorative interventions.

The involvement of the music venue (NOW&WOW) in the space, from 2003 onwards, remains the most consistent act of interaction and possible re-programming of the building so far. The re-shaping of the ground level and partial replacing of the central columns, made an attempt to infill and take advantage of the orthogonal nature of the space plan.

Although giving the impression of a not yet conceived or developed to its full potential cultural initiative, particularly involving the role of the silos, it nevertheless emphasized an overall cultural intention, as a new profile for the building.

Based on that, and in addition to its alienation from its surroundings and developments at Kop van Zuid, the complex continues to convey a simultaneously ambiguous and intriguing atmosphere, rooted in its imposing mass and the historical tension which it bears.

The building therefore carries a dual sense of identity: the aspect of historical continuity and its equally dominant physical presence. Hence, for the consideration of its future transformation, a primary tension is raised between its strategic urban positioning and its exclusi
tive structural capacity.

Bound with the evolving role of the Maashaven, the Maassilo can play a protagonist role in the future profile of Rotterdam Zuid and the multiple needs of the surrounding districts.

Reaching a consensus towards emphasizing the public character for the harbour, which would primarily address the lacking recreational profile of the districts, as well as preserve its inland shipping functions, a programme for the river as ‘Tidal Park’ has been approved by the Municipality of Rotterdam, the Port Authority and the Ministry of Infrastructure and Environment (Stadhavens Rotterdam, Creating on the edge, 2008, p. 5). A connection with Katendrecht through a bridge is also part of this plan. Furthermore, the possibility of a floating neighborhoods programme is also gradually withdrawn due to its small scale in relation to the compromising of the harbour’s public profile (K. Kokhuis, 2013, p.7-9).

As a major municipal monument in the process, Maassilo is therefore caught in this intense context of addressing a diversity of future functions at the Maashaven. On the other hand, its fundamental functional context of silo cells, allows a series of speculations on new technical possibilities that shapes a parallel guiding force on its own for introducing new functions.

In this context, the group is approaching future scenarios in which methods of intervening to the silos and utilizing their load bearing capacity can (synthetically) serve the emphasizing of a new public profile for the building. These vary from interpreting the existing club function and re-introducing other cultural initiatives, to educational programmes and small scale production and storage processes.
The Maassilo, Rotterdam, is a cultural landmark that has undergone significant transformations. Its spatial composition and surroundings have contributed to its cultural value. The building's surface and skin, with its visible damage and decay, enhance its aesthetic value. The functional value of the building as a space plan is significant, as it is highly related to the original building and its different volumes. The building also has historical value, as it was important in its previous function and is part of the architectural discourse in the early 20th century.

The Maassilo's structure and surfaces are important for its historical value. The building has been renovated, but some of the machinery and equipment remain, adding to the building's cultural value. The building's user value is high, as it has been used for various purposes, including as a storage facility and a cultural center. The building's potential value is also high, as it has the capacity to attract a large number of visitors.

The Maassilo's cultural value is evident in its ability to attract visitors and inspire cultural activities. Its spatial composition and surroundings have contributed to its cultural value. The building's surface and skin, with its visible damage and decay, enhance its aesthetic value. The functional value of the building as a space plan is significant, as it is highly related to the original building and its different volumes. The building also has historical value, as it was important in its previous function and is part of the architectural discourse in the early 20th century.

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After many long discussions between the authors of this analysis, a hierarchy was found for the various cultural values of the Maassilo, based on the research that was carried out during the analysis of the building and its physical and historical context. The values that are absolutely essential to the identity of the Maassilo were colour-coded red in the value matrix. It is notable that most of these essential values are found within three columns of the matrix: historical value, rarity value and aesthetic value. The hierarchy of cultural values has made it possible to summarize and translate the identity of the Maassilo into the four value statements below. These value statements should always be kept in mind when working on a new design for the Maassilo complex and when making decisions on interventions in the existing building.

**History – economic relevance to Rotterdam (essence)**

As the first building connected to the Maashaven and instigator for the worker districts of Rotterdam Zuid, the Maassilo has played a catalyst role in the consistent history of Rotterdam as an international harbor city. Having served as a primary instrument for a key grain transshipment company (Granssilo N.V.) the building forms an integral part of the city’s socioeconomic development.

**Presence – aesthetics (appearance)**

A monolithic concrete mass stripped-off of its initial activities, the building’s appearance carries a strong imposing effect in relation to the historic tension that it carries. Confined by the surrounding infrastructure, the building creates a strong contrast with its surroundings and the harbor, in terms of volume, material and scale. This attribute of a solo entity mediating between different districts, also gives the building a characteristic urban role as a ‘gate’ between north and south.

**Rarity – complete ensemble of buildings**

In the context of bulk transshipment and silo typology, the complex stands as a rare ensemble of different phases reflecting the growth of the company within a span of fifty years. This sequence of different volumes in relation to the preserved machinery and cranes in the waterfront, highlight the building’s uniqueness.

**Technology – state-of-the-art front runner**

The complex also stands as a record of evolving construction processes and state-of-the-art building technology of silo making. As one of the largest in situ constructions in Europe, the complex further demonstrates the advanced use of reinforced concrete, such as the McDonald casting system, which was thoroughly applied.
The Maassilo was one of the instigators for the industrial development of the Maashaven and the south of Rotterdam. Around this industry, the development of the residential areas increased exponentially. After the industry moved to the west, the reminiscence of industrial activity remained, because of industrial artifacts like the Maassilo. The former industrial area is undergoing an intense process of gentrification, while the adjacent workers’ districts remain underdeveloped. The Maassilo exists on the border between these two contrasting areas. This border is spatially defined by a heavy traffic line (Brielselaan). Since this is the result of the infrastructure that was connected to the Maassilo, the Maassilo is historically bound to this barrier.
conflict
The two-faced character of the Maassilo and its historical relation with the public space and infrastructure have historical significance. On the other hand, they form a barrier that makes it difficult to connect the southern districts to the harbour area north of the building.

opportunity
The Maassilo could be treated as a gate, mediating between two different stages of development and help gentrify the districts with a low social standing.

OBLIGATION
The areas north and south of the Maassilo have completely different characteristics and show opposite states of socio-economic development. If the aim is to develop the workers’ districts to the harbour area, the right balance must be sought between connecting the two neighborhoods and respecting their historical separation. The Maassilo, historically connected to both the districts and the border itself, plays a key role in this respect.

value statement involved:

history
The Maassilo played a key role in the socio-economic relation between the harbour area to the north and the workers’ districts to the south.
PUBLIC / PRIVATE

The Maassilo is, in heart and soul, not a public building. This was already the case in the first phase, when a small and insignificant entrance located to the side of the building was withheld from the eyes of the public. This unpublic character was - and is still - even more present in the enormous closed concrete surfaces of the facades.

In 2004 the NOW&WOW disco opened their doors in the Maassilo. Formally though, they did the opposite, as all the windows and openings in the facade were closed to counteract noise pollution.

Thus, while the formal characteristics became even more uninviting, the building assumed, for the first time in its history, a public function. It is debatable how public this new function is.
conflict
The formal characteristics of the exterior appearance of the Maassilo are impressing, but uninviting to the public. Also the original function of the building is non-public. Opening the building up visually would undermine the specific historical and aesthetic character of the Maassilo. However, keeping the building closed off to the public may hinder the efforts to make the Maassilo a meaningful building in the development of Rotterdam south.

opportunity
The closed-off character of the building could be turned to an advantage instead of a hindering factor. A solution could be finding a function that is both meaningful to the public and in need of closed-off space. A different solution may lie in the historical daylight situation, in which much more daylight penetrated the building. Opening up the building according to the original situation could be a historically legitimate design decision.

OBLIGATIONS
The character of the Maassilo, as a closed-off mass, is grounded both historically and aesthetically. Therefore, this character should be cherished and, if possible, turned to an advantage. If the building should assume a public role in the city, the solution could be found in finding the right program or function. One that requires little or no daylight, but is still accessible to the public.

value statement involved:

presence
An essential aspect of the presence of the Maassilo is its closed-off - and therefore unpublic - appearance.
STATIC / DYNAMIC

The Maassilo in its historic setting can be comprehended as a heavy static mass in a highly dynamic environment. The very essence of a silo building comes down to this tension between the static and the dynamic. The silo is a place where the grain waits: it is in temporal rest, stored securely, protected from external forces, until it is set in motion again by workers, conveyor belts, elevators, trains and boats. Both rest and movement of grain were accommodated by the Maassilo.
conflict
The material sturdiness of the Maassilo is something that cannot be avoided. The heavy structure, the adamant concrete and the impenetrability of the silos hinder spatial flexibility in new developments. Paradoxically, the heaviness of the building was one of the reasons why it has not been destroyed after it got out of use.

opportunity
The architects of the Maassilo were well aware of the obstinate character of the concrete structure. They understood it was essential for each building phase to implement flexibility and maximize efficiency in the space plan. Another measure was the integration of rails in every beam and column on the ground floor and the basement. Since these measures are inscribed in the current state of the building, they allow for flexibility in new developments. In addition, the loadbearing capacity of the construction is very high, which opens up a wide array of possibilities.

OBLIGATION
The Maassilo has existed for more than a century, and it still stands strong. This has to do with the fact that different strategies, like a structured open space plan and integrated flexible detailing, have been used to make flexible space with rigid material. Still, the Maassilo is a very specific building for a specific function. This specificity is found in the vertical building sections (attic, silos, ground floor). In a new design, one would do well to built upon these qualities, in order to make this building stand the test of time, like it has always done.

value statements involved:

presence
It is the abandonment of the static mass that is key to the current presence of the Maassilo.

rarity
The complete ensemble of silos and cranes is an essential reminder of the former activity at the site.
READABILITY / CONCEALMENT

The Maassilo knows a strong contrast and interplay between readability and concealment. This tension field is played out on multiple scales. On a large scale, it is clearly visible from the exterior that the building was built in multiple phases. However, without proper research, it remains unclear what the exact order of this development was. The skin of the building has exactly the same structure as the internal silo walls, and in that sense it does not mask the interior. However, the skin completely hides the internal spatial logic of the building. In the interior, the signage on the funnels give a direct indication of historical use, while the enormous void above the funnels in the ceiling remains hidden from the eye.
conflict
When the quality of the experience of the Maassilo lies partially in its secrets, then it becomes difficult to intervene spatially, as the value of a secret lies in its concealment.

opportunity
The interplay between hiding and revealing can be enhanced, for example by partially revealing the formerly unseen. The unknown could be made even more exciting by revealing parts of it, and thereby strengthening the sense of curiosity and wonder. This could be a powerful tool in establishing an architectural route through the building.

OBLIGATION
The interplay between readability and concealment plays a very important role in both the experience of the building as the possibility to read its history. This tension should be taken in high regard, and if possible made even stronger, as it constitutes the mysterious atmosphere in and around the building.

value statements involved:

presence
The monolithic building conceals its interior, adding to its imposing, yet mysterious nature.

rarity
The functional layout of the ensemble entails a clear readability of the original logistics on the site and in the building.

technology
The building stands as a visible (thus readable) record of developing construction techniques.
group statement vs. cultural value report

Since the cultural value report by the Transformers has been the main source of information for our own understanding of the building, it is only logical to reflect on their statement and compare it with our own position as a group.

Generally we can concur with most statements made by the transformers (Transformers, 2008, p. 96-158). This is exactly because their conclusion is still quite general. The most concrete statements they make are illustrated in the elevation, section and plan drawings. In these drawings they use the colours: red (pinkish), green, yellow and blue to determine their importance (page on the right). Here it is remarkable that the Transformers do not address the Western facade or the roof at all.

Preserve and conserve in original state. These elements are essential for the experience of the silo complex and are of great historical value.

Redevelopment is possible with the original structure and materialisation. The original design ideas should remain readable.

Maintain if possible. These aspects contribute to the total understanding of the ensemble.

These elements interfere with the total understanding of the complex. When intervening in these parts it should be designed more in the spirit of the building.

That this assessment is not directly referred to in the text makes it more difficult to understand. This leaves us to only make assumptions based on the explanations in the text. We can agree on the way different elements are ordered on their importance. However we are not architectural historians, thus we presume our interpretation of possible interventions in relation to the value assessment is not completely on the same wavelength. A few of these aspects deserve a more elaborate explanation.

To our interpretation the Transformers seem to have the tension to "freeze" the building in time. Meaning 1980, the time that it lost its original function of storing, cleaning and distributing grain. We presume this from their recommendations for total preservation and conservation of the different elements that are coloured red. As for the overall statement by the transformers we can draw the conclusion that the Maassilo complex has a lot of potential for redesign.

The real potential however, lies in the west facade and the roof. We do agree with the transformers, that the most characteristic aspect of the roof are the two modest towers on top of the first phase building (Transformers, 2008, p. 146). That these have disappeared from sight, partly integrating with the 2nd phase, is a shame but also reflects the constant transformations this complex went through. We believe that the roof could be extended, if this would be in line with the existing composition of different volumes and different building phases. The elevator towers as illustrated in the east facade on the next page are an important aspect. The Transformers have not explicitly addressed the west facade in their value statement. This might be for its low value or the adjacent Quaker’s factory that is still in operation. Presumably because this side of the building has to bare most of the rain and wind, this facade is almost entirely covered by corrugated sheets as an extra protection. Since it is not in its original state, we believe that this facade bears a lot of potential and should be redesigned (top left image). Superfluous to mention, this redesign should be done while keeping the spirit of the building phase in mind.

As for the red coloured parts, we are of the opinion that also these shouldn’t be judged so black on white. We don’t want to exclude small interventions, if really found necessary. Even to these aspects that are regarded as extremely important, there are other possibilities to maintain the essence of the building. This goes especially for the interference in the facade on the north side of the Brinkman en Van der Vlugt building, as long as it is in line with the spirit of the place. For this we believe that our bold statements provide a more specific description of the tangible and intangible aspects that consciously and unconsciously form the essence of the building.
Cultural Value statement illustrated in drawings by the Transformers (2008 p. 96 - 146)
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LIST OF FIGURES


Google Earth (2017)


All other photo's are the authors’ own material, taken in February / March of 2017.