NIGHTSCAPES Maastricht

NIGHTSCAPES MAASTRICHT

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PREFACE

This report contains the outline for my graduation project at the Faculty of Architecture of the Technical University Delft. The studio I have chosen is *Heritage & Architecture*, with the aim to deepen my understanding in the relation between the past and the present in the built environment. My project focuses on the decay of industrial heritage. The building I have chosen for the design project is the former gas factory of Maastricht, which is located near the old town centre. Its heavy, concrete structure sparked my interest. It seemed so permanent, while its products were so fleeting; smoke used to rise from the chimney and gas from the ovens to illuminate the streets of the city.

This report consists of two parts. Part I is about the chosen location. Chapter 1 contains the analysis of the site and the building in a chronological narrative, chapter 2 is a technical analysis of the structure and materials of the building. Part II is about the position I take in the evaluation of the location. It contains a concluding piece of writing on the cultural values which I consider most characteristic and significant. This is followed by a final assessment, in which three aspects are selected to form the basis of the design project.

Ananda de Vos

14-03-2016

CONTENT

1912

2015

Images

Photograph of the building during construction from 1912, retrieved from Rick Joseph in September 2015.

Photograph of the north facade in 2015, taken by Martin Beumer in September 2015.

INTRODUCTION

In many cities across Europe, vast terrains which used to be connected by train tracks and inhabited by machines, have become redundant and lay vacant. This is also the case in Maastricht, the first industrialised Dutch city. Today not only the industry is moving away, the population count is also decreasing. The lack of funds complicates the reuse of the city's former industrial sites and as a result they are fenced off. The former gas factory of the city is located in the derelict site of Vredestein near the old city centre. Built from 1912 until 1914, it was one of the first industrial buildings in reinforced concrete and one of the first works engineered by Jan Gerko Wiebenga. In his later career, Wiebenga played an important role in the development of the concrete architecture of the Dutch modern movement.

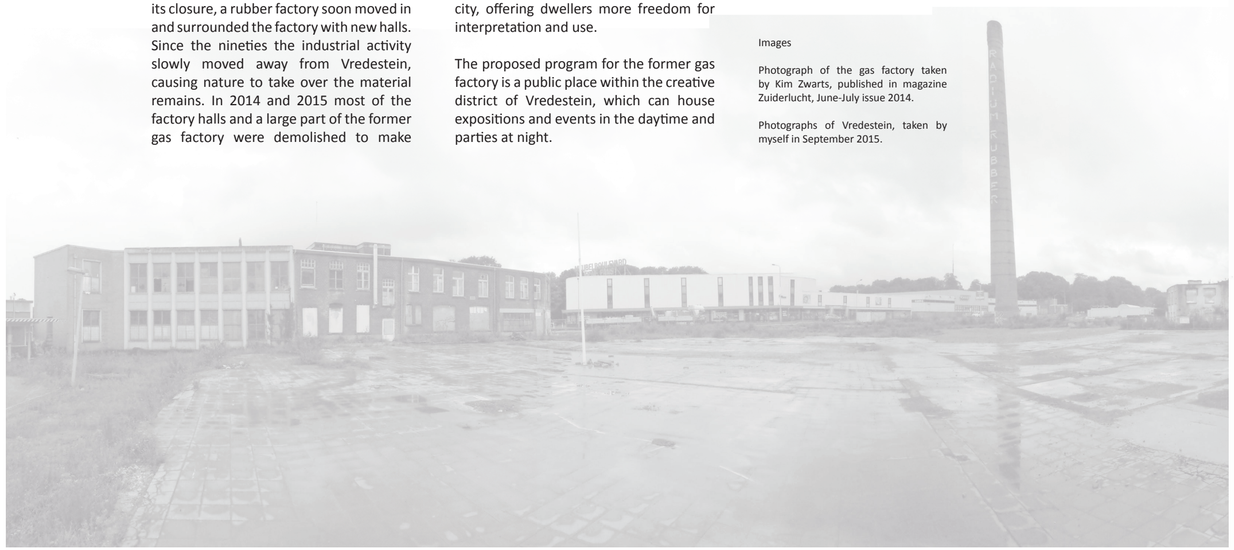
The gas factory produced gas for public illumination from 1914 until 1930. After its closure, a rubber factory soon moved in and surrounded the factory with new halls. Since the nineties the industrial activity slowly moved away from Vredestein, causing nature to take over the material remains. In 2014 and 2015 most of the factory halls and a large part of the former gas factory were demolished to make space for a new bridge landing. The city now envisions Vredestein as a creative district and event terrain. In some other preserved buildings the creative industry has already moved in, but the gas factory remains empty and closed off because of its damaged state.

Today the site of Vredestein is a site of memories; some have been buried, some have been intentionally preserved while others have been cleared for new construction. Both the site and the factory have played an important role in the development of the city, but are closed off because they are not productive at the moment. But despite the fences, the site has attracted artistic interest from photographers and new kinds of activities like small events and secret parties. In its current state, it has gained the appreciation of local residents. Its indeterminate nature contrasts the organised and designated city, offering dwellers more freedom for interpretation and use.

The proposed program for the former gas factory is a public place within the creative district of Vredestein, which can house expositions and events in the daytime and parties at night.

In the reuse of built heritage, designs are often aimed at restoring the original state or image of the building. As a result, many characteristics which are gained over time may be neglected and lost. The exploration of the qualities of decaying structures and how these can be preserved, may create new awareness of how the passage of time can play a crucial role in design. This leads to the following research question:

HOW CAN THE CURRENT STATE OF DECAY OF BOTH THE SITE AND THE STRUCTURE ADD VALUE TO THE EXPERIENCE OF THE SPACE IN A DESIGN FOR REUSE?



Images

Photograph of the gas factory taken by Kim Zwarts, published in magazine Zuiderlucht, June-July issue 2014.

Photographs of Vredestein, taken by myself in September 2015.

1. SITE AND BUILDING

BUILDING TYPOLOGY

Before the 19th century, city streets were lit by candles or oil lamps. The first street lights in Maastricht were lanterns crowned with candles, placed in 1658 on corners of dangerous intersections. In the year 1710 over four hundred iron posts were placed, lining the streets with candlelight like in other Dutch cities.[1] In 1783 Jan Pieter Minckelers, a physicist from Maastricht, found that by heating stone coal without oxygen, a gas could be produced more suitable for public illumination.[2] This technique of dry distillation was improved for largescale application by the English, so that by the beginning of the 19th century London was the first gas lit city.

Gas factories required relatively large sites and were therefore often located near the town centre, where land was not as scarce. Some distance was also preferred because of the pollution the factory produced. On the other hand, a good connection to the distribution network by train or boat was crucial for the supply of stone coal and vicinity to the city also reduced the length of the underground pipework. The gas factory had three main parts; the distillery, the purification building and the gas holder. Other noticeable features were the chimney and the water tower. In the distillery the coals were distilled to produce raw gas. Before the gas could be used for lighting, it was exhausted to the purification building where it was cleaned. From there the gas was lead to the gas holder, a circular structure from where the gas could be distributed to the city.

The first gas factory in the Netherlands was built in Rotterdam in 1825 by an English company called the Imperial Continental Gas Association.[3] The ICGA would build many more gas factories in the Netherlands and across Europe. In Amsterdam gas production from stone coal started some ten years later. Because of Maastricht's status as fortification, it was not allowed by law to light the streets with gas.[4] Industrialist Regout established the first gas factory on the grounds of the Sphinx in 1848. The gas was used to light his factories at night, so that the workers could make longer days. Regout proposed to also produce gas to light the streets, but the city of Maastricht decided to take over gas production. Despite the law, a municipal gas factory opened in 1858 south of the Sphinx.

By the end of the century many other cities also established municipal gas works in order to lower the price of gas. The city of Rotterdam took over existing factories in 1882, forcing the ICGA to move its business somewhere else. A year later the company started the construction of the largest gas factory in the country; the Western Gasworks in Amsterdam. The photograph on the right page shows the site on the edge of the city, where coals were supplied by train. The distillery is located along the train track furthest away from the city. The large building along the river was the purification building and the round building left in the photograph used to be the gas holder.

At the turn of the century, the municipal gas factory in Maastricht was in a bad state. After losing the city lost its status as fortification, a large area of land right outside the city centre became available for construction of a new gas factory. In 1912 a second municipal gas factory was established, which still remains today. The factory was one of the first in the country to use chamber ovens instead of gas retorts. The factory already closed in 1930, when it became more economical to buy gas directly from the State Mines. By that time, most other cities had switched to electric lighting and only produced gas for heating and cooking. In the sixties a natural gas field was discovered in Groningen, which lead to the closure and disappearance of gas factories in the Netherlands. Most have been completely demolished, but some have been partly preserved.

Notes

1. Maastricht, Bestemmingsplan Centrum Ruimtelijke Karakteristieken

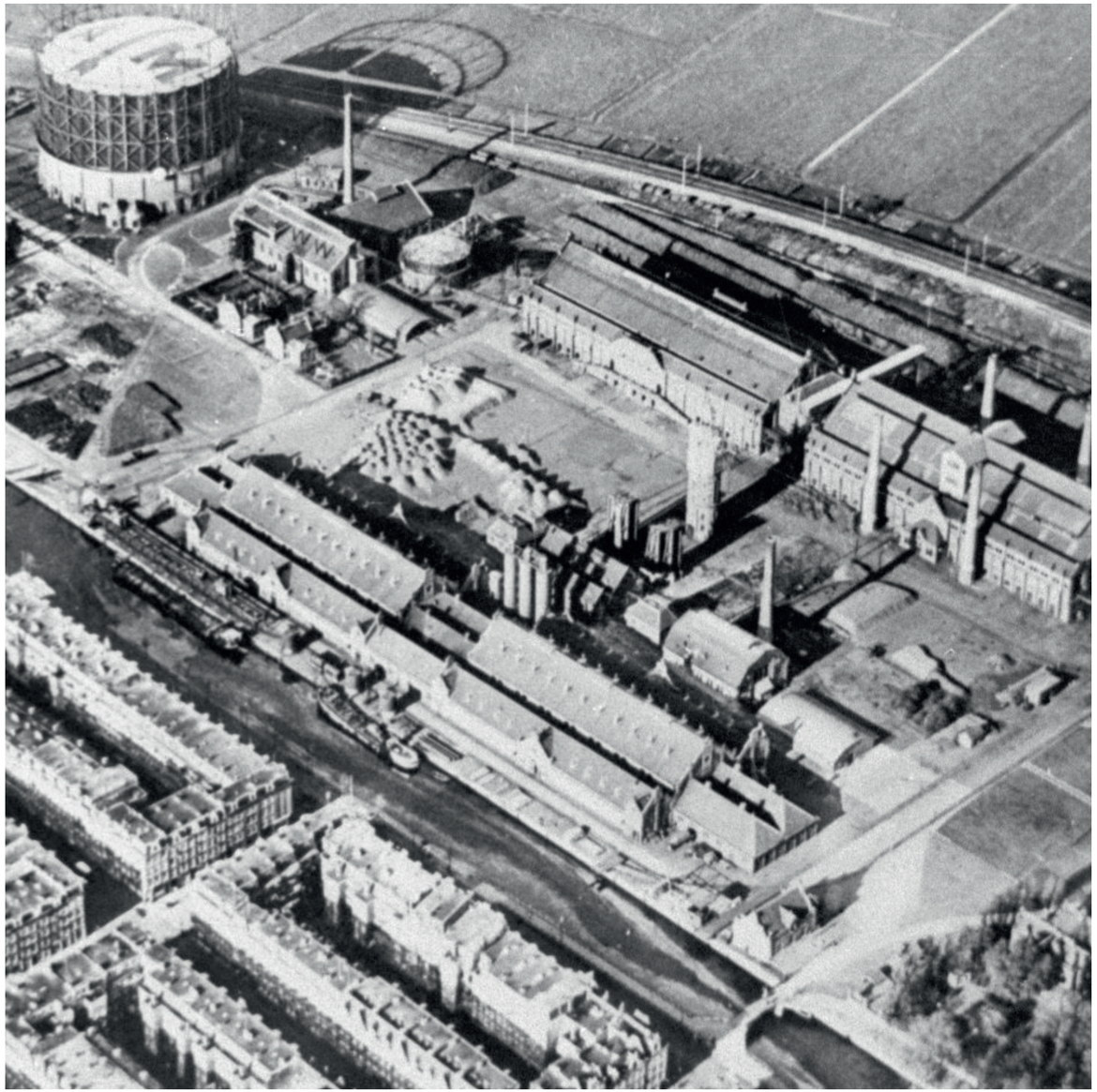
2. Zuid Limburg, www.zuidlimburg.nl/economie/producten-en-innovaties/made-in-zuid-limburg/18/minckelers-gaslicht.html, 03-10-2015

3. http://www.stadsarchief.rotterdam.nl/gasfabrieken-rotterdam

4. Driessen, C. L. G. (1933, 21-10-1933). De "Gatema" te Maastricht. De Limburger Koerier. Retrieved from www.delpher.nl

Images

Photograph of the Western Gas Factory, retrieved from stadsarchief.amsterdam.nl on 03-10-2015.



LOCATION

The former gas factory of Maastricht is located in the district of Bosscherveld, near the edge of the old city centre. Before the construction of the gas works in 1912, Bosscherveld was a low lying grass field. Over the course of the 20th century it has become an industrial site of around one hundred hectares.

Map of Maastricht

Sources

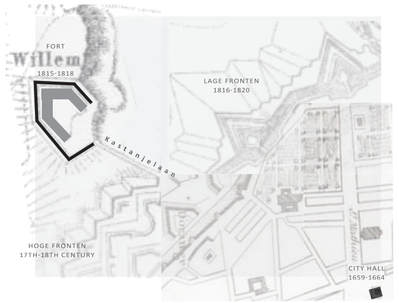
van den Boogard, J., & Minis, S. E. (2001). Monumentengids Maastricht: Primavera Pers.

Maps

Map of Maastricht, Forum Mestreech Online, forum. mestreechonline.nl, retrieved on 23-10-2015.
Map of Fort Willem, plaatsengids.nl, 09-10-2015.
Maastricht in 1747, Edward-Wells.nl, 09-10-2015.
Maastricht in 1850, ppsimons.nl, 09-10-2015.
Maastricht in 1925, watwaswaar.nl.
Maastricht around 1900, Werkgroep Industriele Archeologie Maastricht: deelrapport 2 Boschstraat-West. (1986). Werkgroep Industriele Archeologie.

Images

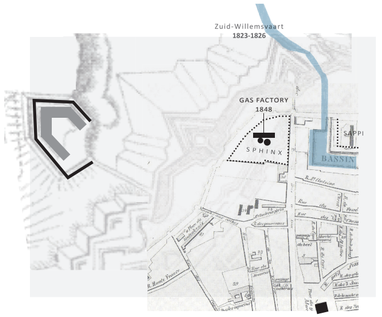
Photograph of fort Willem, www.mestreechtersteerke.nl/pagfortwillem-art.htm, retrieved on 28-09-2015.
Photograph of the Bassin, Wikipedia.nl, 09-10-2015.
Photograph of the goods station, www. tibeart.com, retrieved on 24-10-2015.



1815-1823

City protection

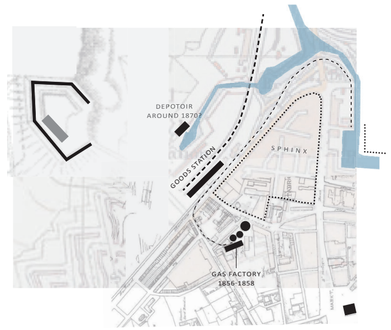
The city of Maastricht had been enclosed by two city walls. The first one was built in the 13th century and the second in the 14th century. Despite the impressive defensive works of which the Hoge Fronten were part, Maastricht had been occupied by the Spanish and later by the French. In 1815 Napoleon falls, leading to the unification of The Netherlands. The same year construction of the Lage Fronten and Fort Willem starts, named after the first king of the republic. A small lowered path lead to Fort Willem from one of the city gates close to the Markt. Later this path is turned into a lane lined with chestnut trees called the Kastanjelaan. The photograph below shows the fort seen from the lane.



1823-1848

Early industrialisation

The plans of the French to better connect Maastricht to the surrounding region are realised after the Dutch take back the city. From 1823 to 1826 a new canal to Den Bosch and a new harbor are constructed. The harbor, the Bassin, is dug north of the city centre between the first and second city wall. Around the harbor new industries emerge like the glass and diamont works of Sphinx established by Peter Regout and the paper factory Sappi. From 1830 trade slows down however, because of the secession of Belgium from the Netherlands. The existing and new industries replaced import and expanded towards the city. The photograph below is taken around 1900 overlooking the Bassin, with the site of Sphinx in the background. Here Regout had established the first gas factory of the city.



1867-1890

Improved infrastracture

The first municipal gas factory opens in 1858 south of Sphinx. Over the years the factories of Sphinx expanded more towards the city and space inside the walls became scarce. In 1867 Maastricht loses its status as fortification, the same year the gates are demolished to improve accessibility. Two years later Fort Willem is also partly demolished. In the following decades the defensive works are dismantled according to the plan of Frits van Gendt. The second city wall is turned into boulevards and the city gates into traffic nodes. A new train track runs north and east around the boulevard, the photograph below shows the interior of the goods station. Also a new harbor is dug north of the train track enabling the industry to expand in that direction. For storage a depotoir is built.

URBAN PLAN OF 1905

An urban plan for the development of Bosscherveld was drawn in 1905. The plan shows the existing landscape in thin lines and planned roads in grey. The most northern line in the plan marks the boundary of the city; a line that would disappear in 1920 when the towns of Caberg and Oud-Vroenhoven were joined with Maastricht.

In 1907 the director of the municipal gas works pointed out to the city board that the factory was in a bad state. He insisted on building a new gas factory, using a new type of chamber oven instead of the commonly used gas retorts. After years of discussions the board agreed and decided in 1912 to build a new municipal gas factory in Bosscherveld, only six hundred meters away from the existing one.

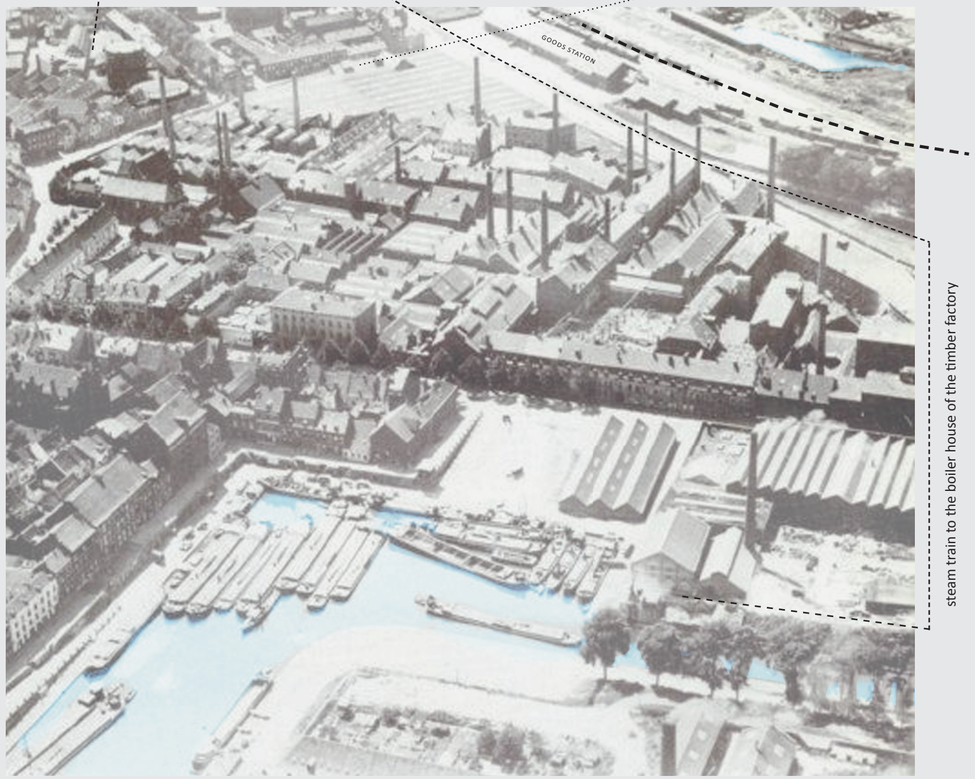
The location for the new gas factory was chosen due to its proximity to the existing distribution network and because the land was already owned by the city. The position of the gas factory is shown in yellow. It seems the factory was situated parallel to the Kastanjelaan along an existing path leading to Sint Andries Plaats south of the Sphinx terrain.

Sources

Urban plan of Bosscherveld from 1905 and photograph made in 1920, Rooij, A. v., Minis, S., & Mes, W. A. A. (2003). Bosscherveld & Belvédère (1e dr. ed.). Maastricht: Stichting Werkgroep Industriële Archeologie Maastricht.

1 : 10.000

Urban plan for Bosscherveld from 1905

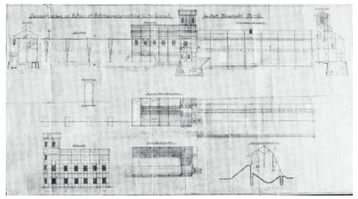


The original design of the gas factory was made by a company from Dortmund called Klönne and is shown below. As was common at the time, the factory was to be built as an iron frame. Engineering company F.J. Stulemeijer & Co from Breda offered to design a more economical and explosion proof structure in reinforced concrete, a relatively new builing technique at the time. The offer was accepted by the city board and the task of translating the iron structure into concrete was given to Jan Gerko Wiebenga, who had just graduated as a civil engineer.

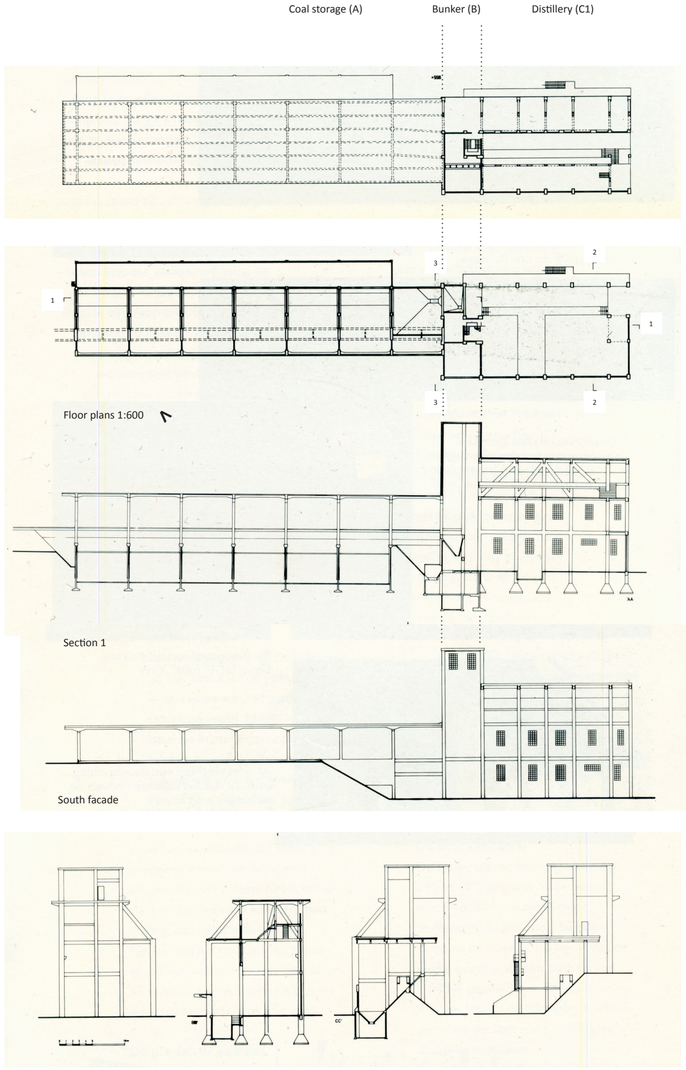
The layout of the site and the factory remained the same. The main building consisted of three parts; the coal storage (A), the bunker (B) and the distillery (C_1). At the side of the city, the train track splits into two; one for supply of coals west of the factory and the other to take away the byproduct cokes east of the factory. The height differences of the field were used so that the train track for supply could run inside the coal storage so coals could easily be dropped down into the silos.

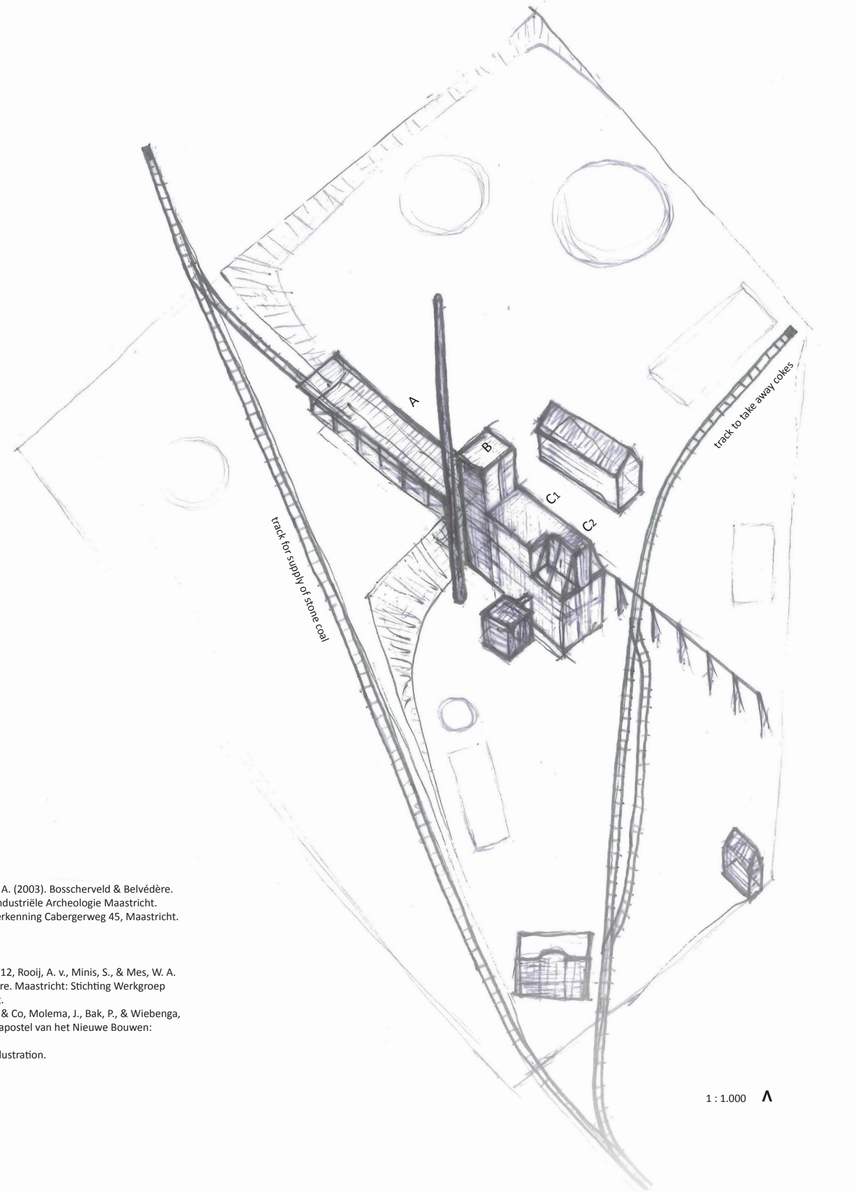
The biggest change in the design was the roof; the iron structure had pitched roofs while the concrete structure had flat roofs. The iron truss which would span almost the full length of the distillery, were translated directly into concrete. Diagonal supports on the outside of the distillery stabilize the truss.

The factory was completed in 1913. Because of the innovative ovens and distribution system, the whole factory could be operated day and night by only five men. But soon after opening, it turned out the chamber ovens were not functioning as expected. The ovens had to be replaced and in the process the distillery was expanded. Because the new ovens required less space, the extension (C_2) is smaller at the top. The factory started gas production in 1914.



Drawings made by Klönne from 1912



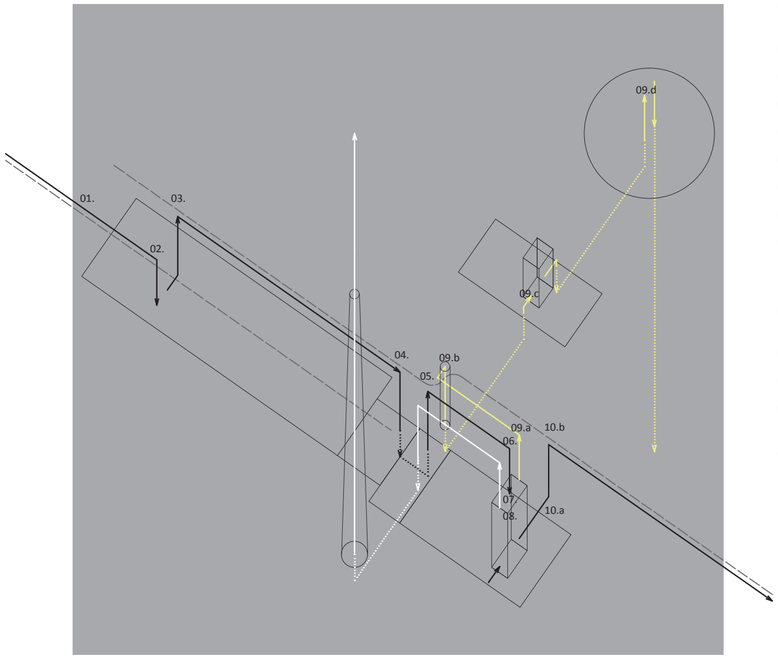


Sources

Rooij, A. v., Minis, S., & Mes, W. A. A. (2003). Bosscherveld & Belvédère. Maastricht: Stichting Werkgroep Industriële Archeologie Maastricht.
Loo, B. (2012). Bouwhistorische Verkenning Cabergerweg 45, Maastricht.

Images

Drawings made by Klönne from 1912, Rooij, A. v., Minis, S., & Mes, W. A. A. (2003). Bosscherveld & Belvédère. Maastricht: Stichting Werkgroep Industriële Archeologie Maastricht.
Drawings made by F.J. Stulemeijer & Co, Molema, J., Bak, P., & Wiebenga, J. G. (1987). Jan Gerko Wiebenga: apostel van het Nieuwe Bouwen: Uitgeverij 010.
Drawing of the site in 1914, own illustration.



GAS PRODUCTION PROCESS

Coals

01. Supply of stone coals per train.

02. The coals are dropped into the silo's.

03. The coals are moved by a suspended cart to the last silo.

04. The coals are dropped and fall into a cloth elevator.

05. The elevator moves the coals up in the bunker.

06. The coals are moved into the distillery by suspended baskets.

07. The coals are dropped into the ovens below.

08. The ovens are heated by burning cokes, the fumes are released through the chimney.

The ovens heat the coal without oxygen, turning it to cokes while releasing raw gas.

Gas

09.a The gas from the ovens is collected to a single duct in the attic, the hydraulic main.

09.b The gas is cooled with air and falls down a tube outside the distillery.

09.c The gas is exhausted to the plant room, where it is purified and distributed to the city.

Cokes

10.a The cokes are removed from the ovens by a machine pressing them out and are extinguished with water outside.

10.b The cokes are moved by a suspended cart towards the train track.

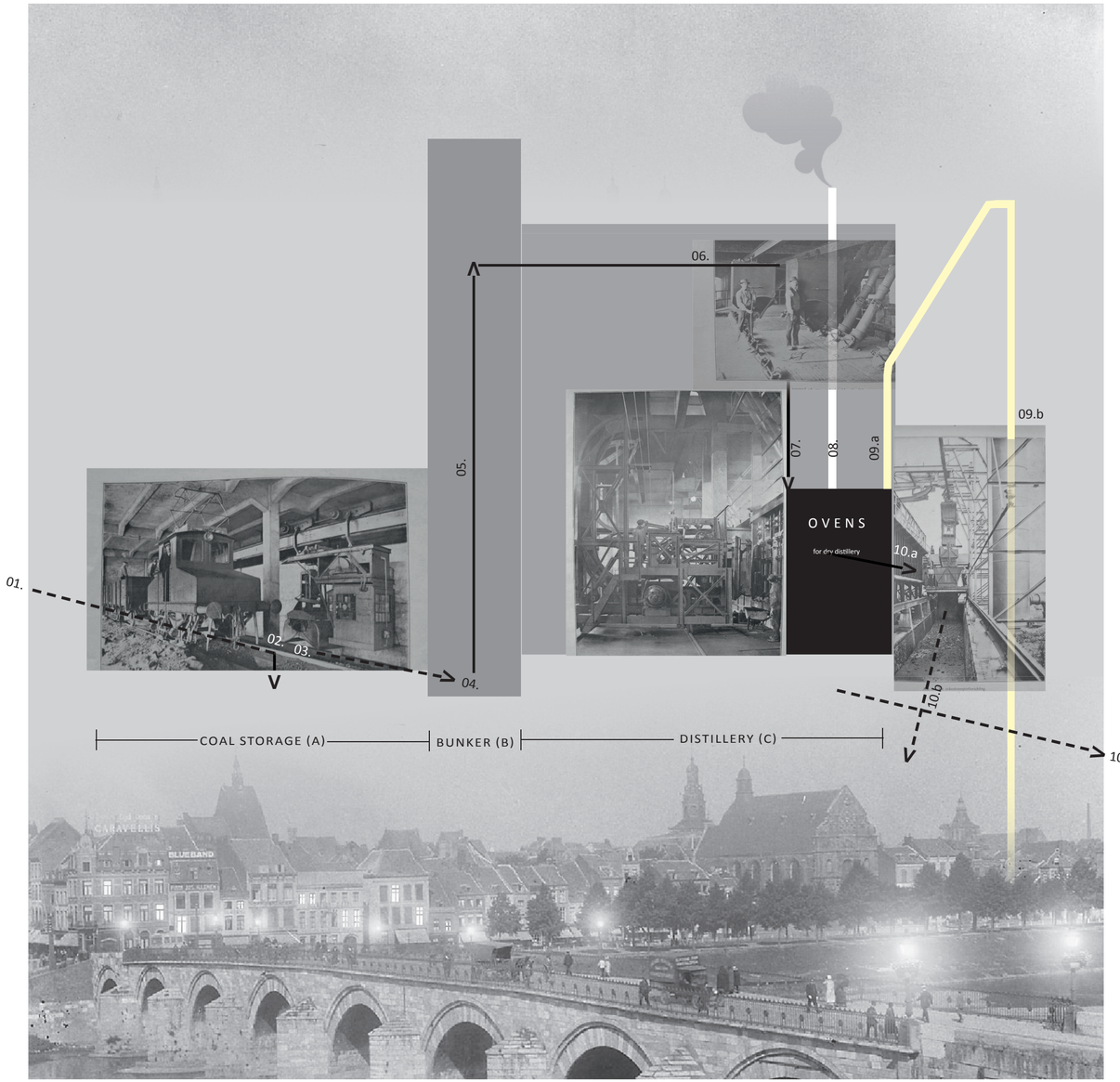
Some of the cokes are used to heat the ovens.

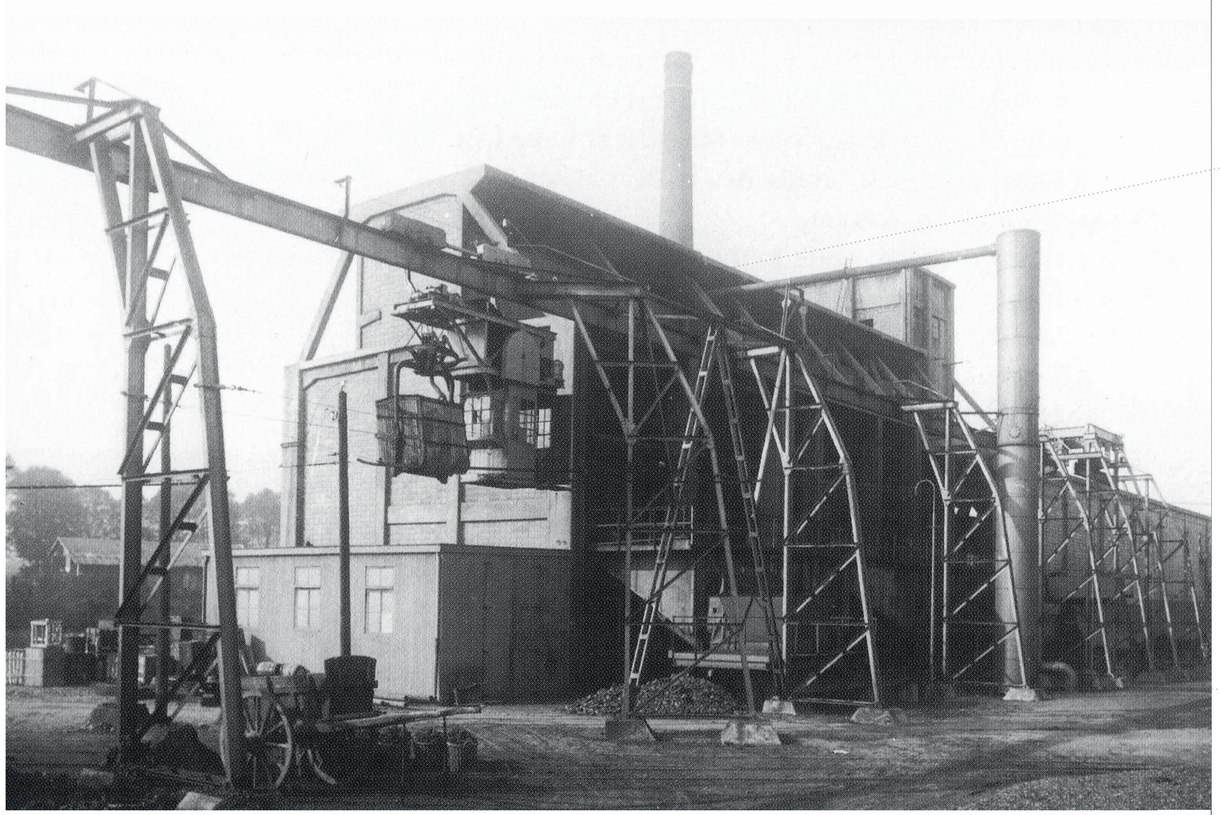
Source

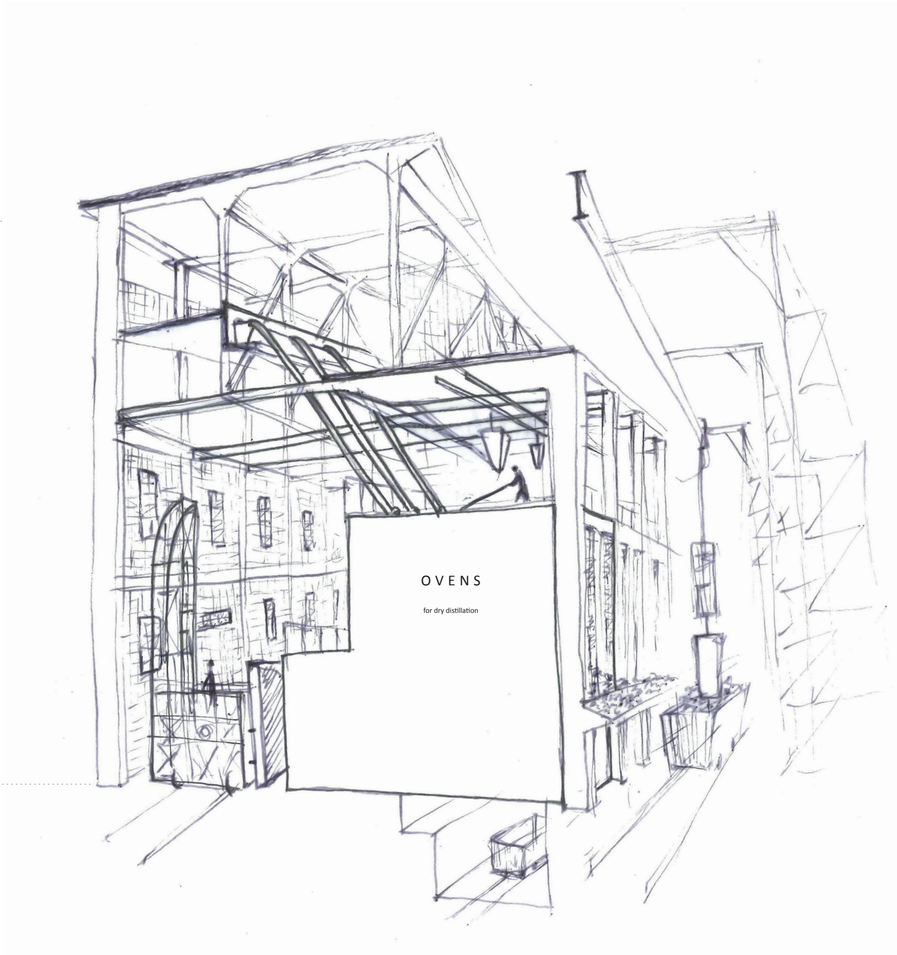
Loo, B. (2012). Bouwhistorische Verkenning Cabergerweg 45, Maastricht.

Images

Production process diagram, own illustration.
Production process collage: old photographs of the gas factory are taken from the Bouwhistorische Verkenning Cabergweg 45 (2012), photograph of Maastricht around 1930, www.geheugenvannederland.nl, retrieved on 12-09-2015 and edited by myself.





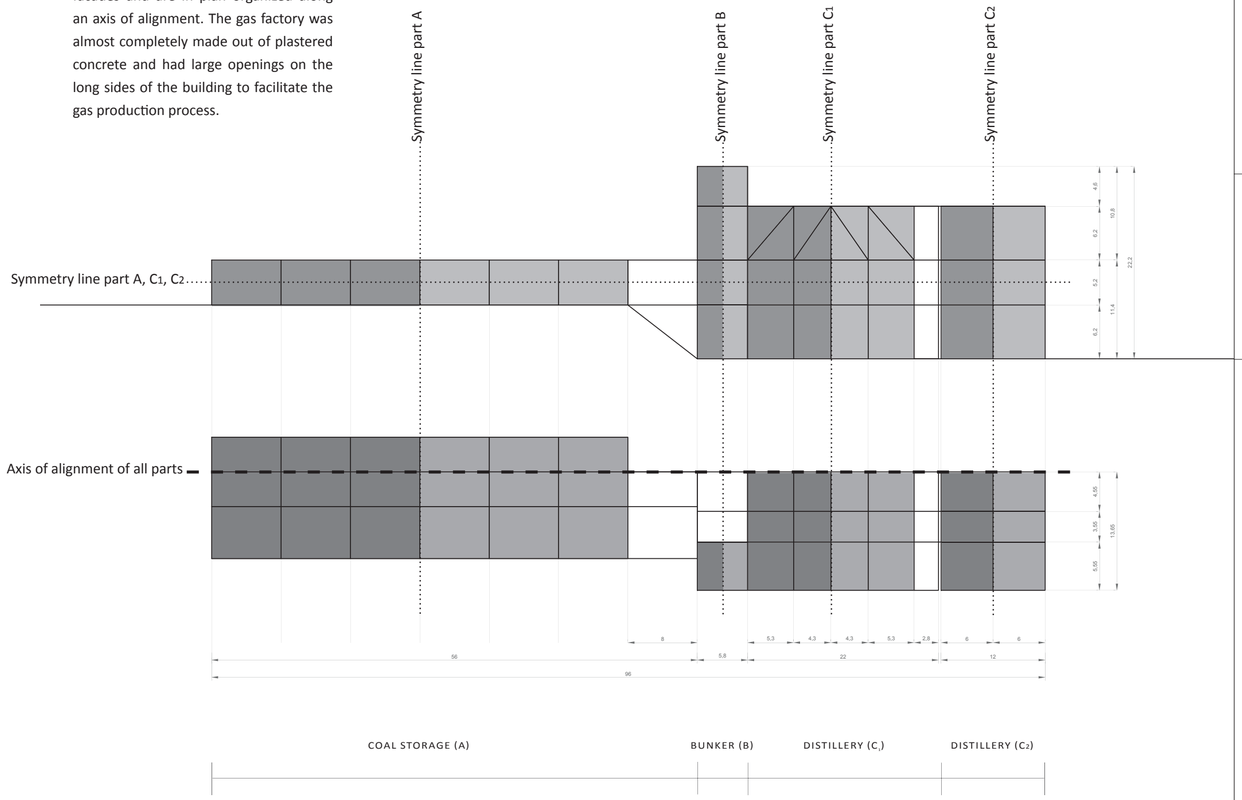


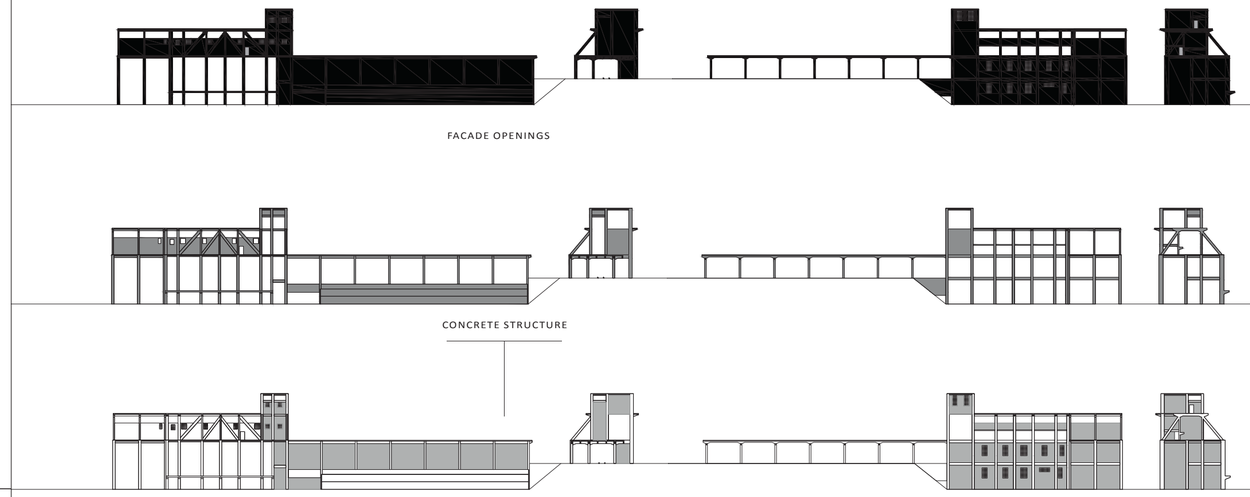
Images

Photograph of the north side of the factory around 1920, retrieved from Rick Joseph in September 2015.
Drawing of the interior of the distillery, own illustration.

COMPOSITION AND MATERIALS

Each building part has a vertical symmetry line in the elevation. The coal storage and the distillery also share a horizontal symmetry line. The building parts are all connected by long horizontal lines in the facades and are in plan organized along an axis of alignment. The gas factory was almost completely made out of plastered concrete and had large openings on the long sides of the building to facilitate the gas production process.





TAKE-OVER BY THE RUBBER COMPANY

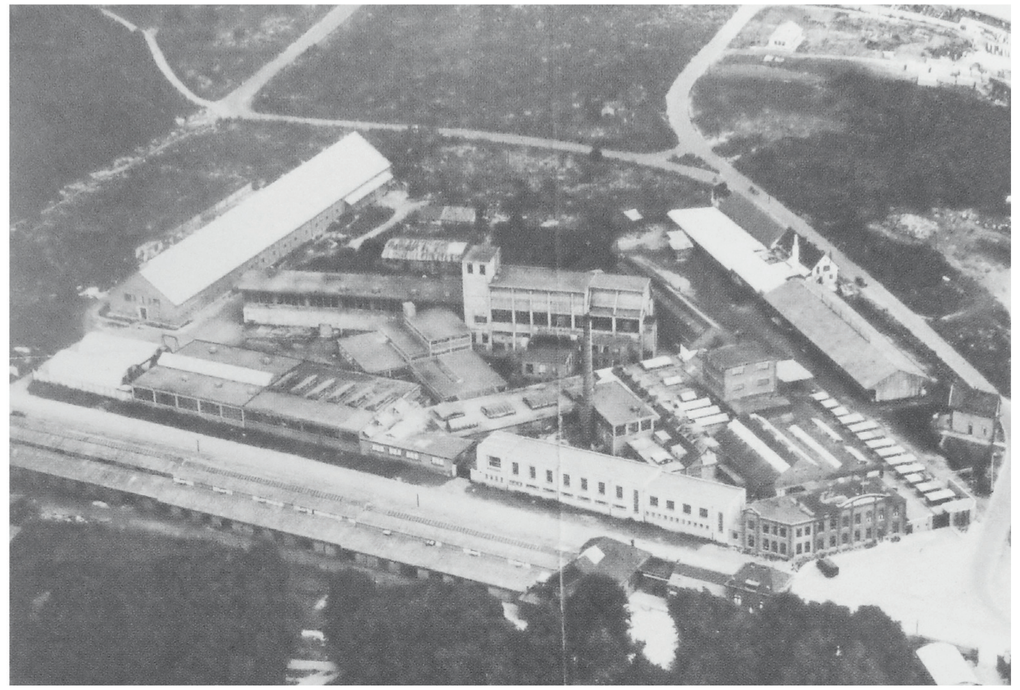
The same year the gas factory opened, marked the beginning of a coal shortage due to the First World War. Already in 1916 the municipality started negotiations with the State Mines to supply gas, so that the factory could be closed. During the war gas for heating and cooking was limited to 30 cubic meters per person per year. After the war the use of gas was advertised in the newspapers and slowly grew again. In 1928 an agreement was made with the State Mines. For two years both the factory and the State Mines supplied gas to the city, leading up to the closure of the second municipal gas factory in 1930.

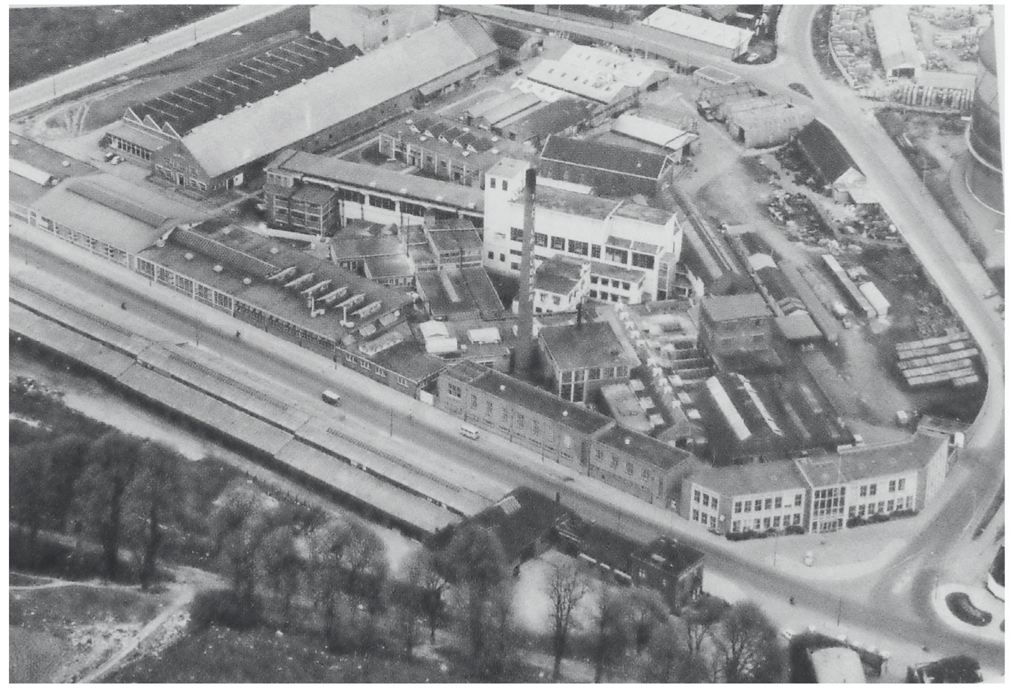
The article on the right page is from a newspaper of 1933. It celebrates the 75 year existence of the municipal gas works. The photograph shows the reveal of the statue of Minckelers, the city's inventor who had played a key role in the development of the gas production process. The statue is located near the Markt and is a national monument today. The portrait circled in white belongs to the director of the Municipal Gas Works, who initiated the construction of a new gas factory in Bosscherveld. According to the article, the city of Maastricht had 93.000 meters of underground pipes and used 8.000.000 cubic meters of gas each year. The writer ends on an optimistic note:

''Gas will continue to have a big role in the near future, both in homes and in the industry. May the Municipal Gas Works continue to flourish and grow until the end of days en contribute this way to the prosperity of Maastricht.''

In the mean time, the gas factory was taken over by a new rubber factory called the Bafaasche Rubber Industrie. In the decades that followed the roads around the site were poured in concrete and the rubber factory expanded. The photographs on the right show the site in the fifties above and in the sixties below. In 1959 tire producer Vredestein took over the company and since then the site is known by this name.

To facilitate the rubber production process, the layout and facades of the factory were changed in multiple building phases from 1946 to 1950. The changes in the design were made by Anton Swinkels, a local architect. The different building parts were connected by a new first floor which served as a workshop. The ground floor was mainly used as storage space. The open parts of the structure were filled in with bricks and large steel framed windows.





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Limburger Koerier, 21-10-1933, retrieved from www.delpher.nl on 10-10-2015.

Images

Photographs of Vredestein in the fifties and sixties, Rooij, A. v., Minis, S., & Mes, W. A. A. (2003). Bosscherveld & Belvédère (1e dr. ed.). Maastricht: Stichting Werkgroep Industriële Archeologie Maastricht.

88e JAARGANG. 11 ZATERDAG 21 OCTOBER 1933. No. 248.

De „Gatema" te Maastricht

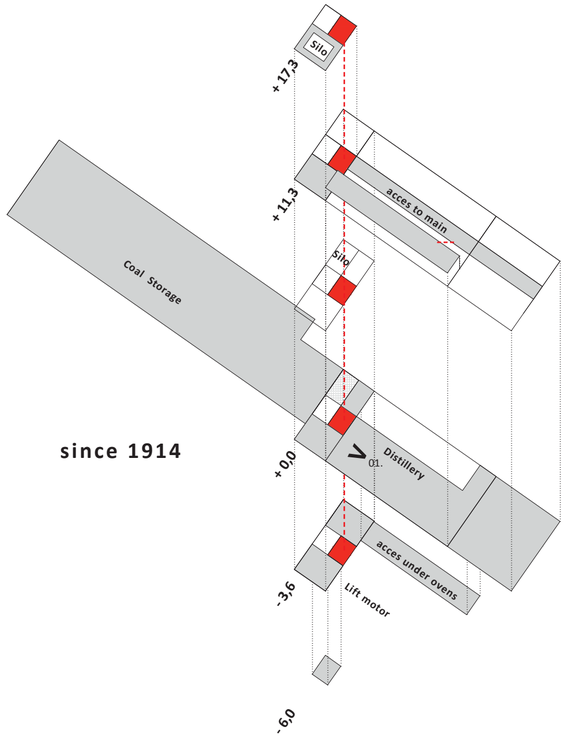
BIJ HET 75-JARIG BESTAAN VAN HET GEMEENTELIJK GASBEDRIJF

Tentoonstelling van Gas-installaties, Waterleiding- en Sanitaire-artikelen

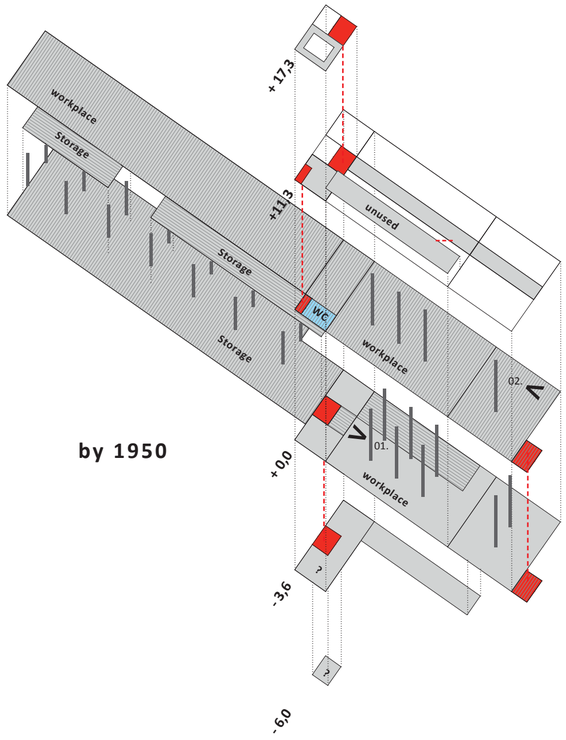
DE ONTWIKKELING VAN HET MAASTRICHTSCHE GASBEDRIJF

Snelle groei in drie-kwart eeuw.

HET NUT DER TENTOONSTELLING



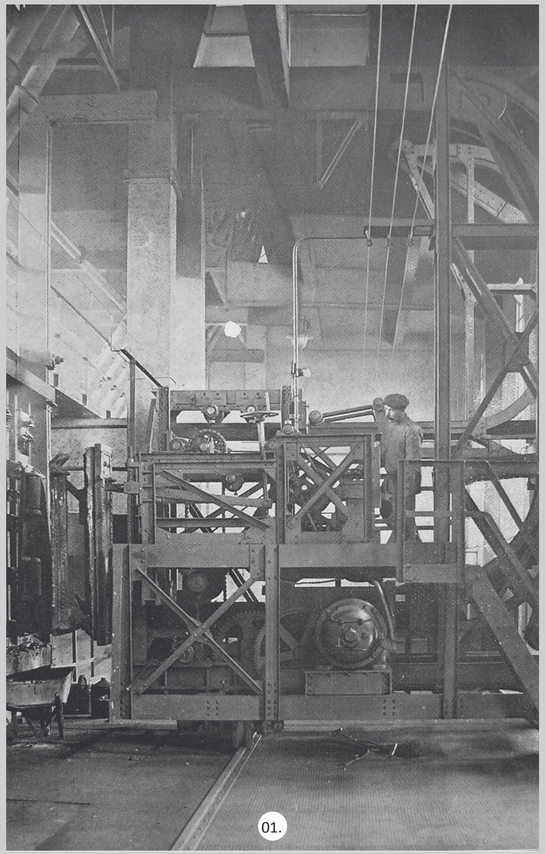
since 1914



by 1950

STAIRCASE NEW FLOOR NEW COLUMN

SOUTH FACADE



1914

since 1950

Images

Floors and facades diagrams, own illustration.
Old photograph of the interior of the distillery and recent photographs of the distillery, retrieved from Rick Joseph in September 2015.

TAKE-OVER BY NATURE

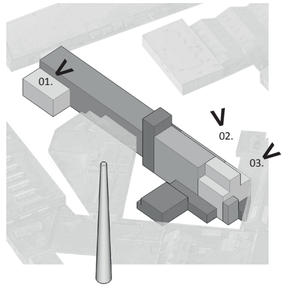
From the seventies the gas factory was only used as storage space.[1] From the nineties until 2014, the rubber company slowly moved away from Vredestein. The halls were left empty for many years; trees, grass and flowers grew in between the remains. The photographs on the right were taken in 2012 by two Finnish bloggers. They show the additions built against the former gas factory in a state of decay. The photograph on the right page shows the site seen from above around the same time.

Notes

1. Castermans Engineers, http://www.castermans.nl/project16.html , retrieved on 11-01-2015.

Images

Photographs taken in 2012 by Gost Fun Fair, retrieved from http://ghostfunfair.blogspot.nl/2012/04/radium-rubber-factory-maastricht_11.html, 23-09-2015
Diagram below, own illustration.
Aerial photograph of Vredestein on the right page, retrieved from Bing.com on 23-09-2015.



01.

02.

03.

PLAN PALMBOUT

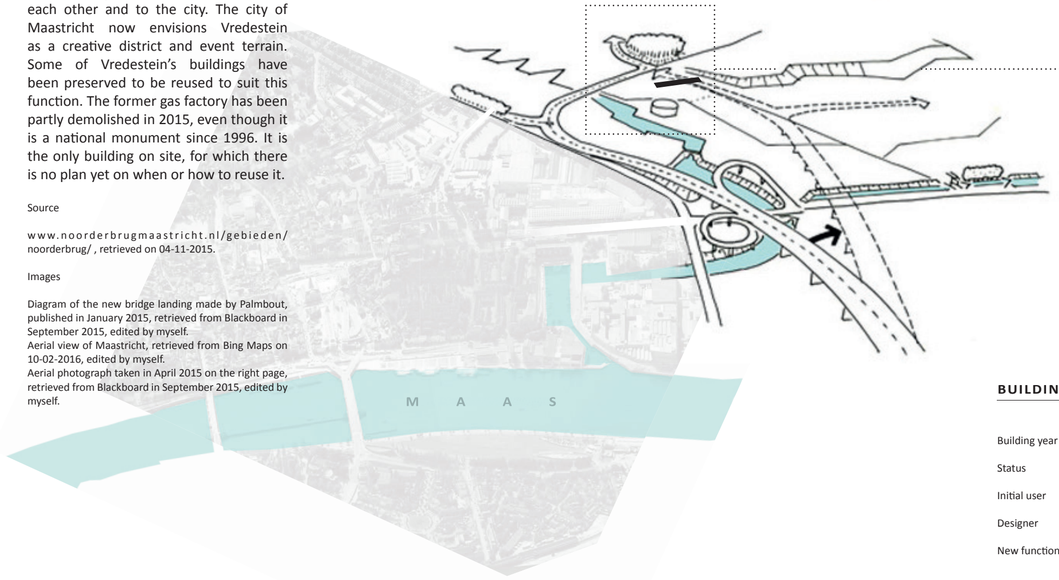
Rubber Resources moved away to make space for a new bridge landing. The new northern bridge over the Maas is planned to improve the regional traffic flow by moving the road further away from the old city centre. A new highway will go around the Hoge Fronten and Lage Fronten, so that these parks can be connected to each other and to the city. The city of Maastricht now envisions Vredestein as a creative district and event terrain. Some of Vredestein's buildings have been preserved to be reused to suit this function. The former gas factory has been partly demolished in 2015, even though it is a national monument since 1996. It is the only building on site, for which there is no plan yet on when or how to reuse it.

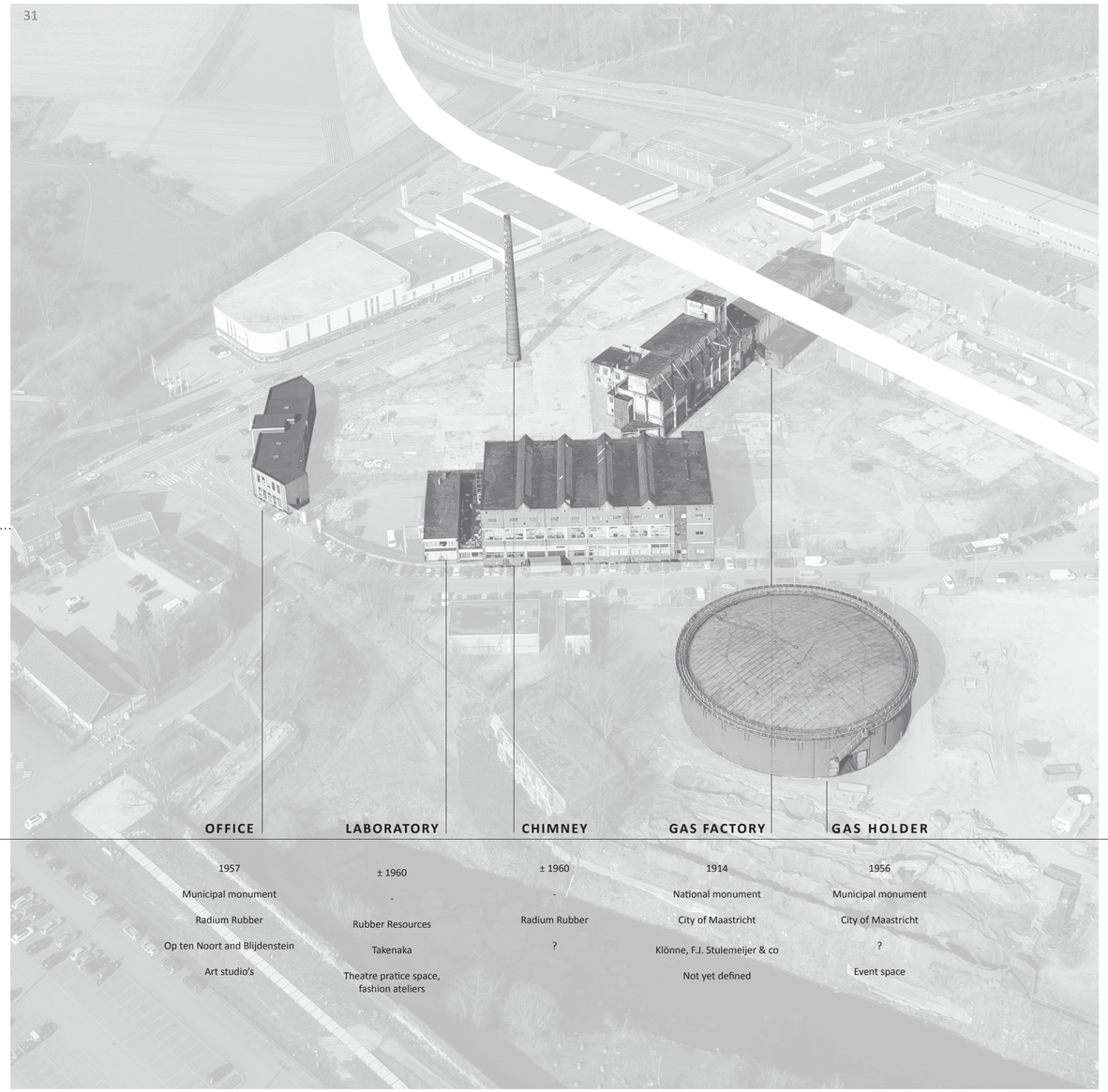
Source

www.noorderbrugmaastricht.nl/gebieden/noorderbrug/ , retrieved on 04-11-2015.

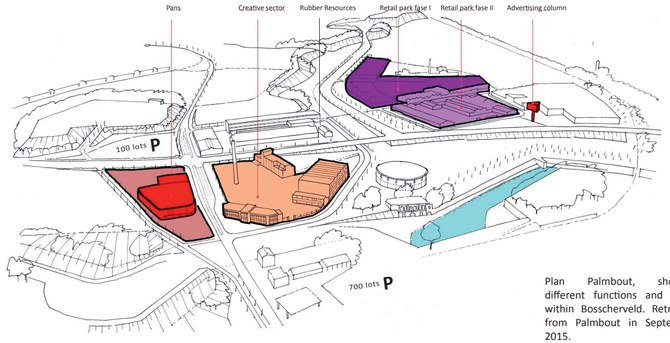
Images

Diagram of the new bridge landing made by Palmbout, published in January 2015, retrieved from Blackboard in September 2015, edited by myself.
Aerial view of Maastricht, retrieved from Bing Maps on 10-02-2016, edited by myself.
Aerial photograph taken in April 2015 on the right page, retrieved from Blackboard in September 2015, edited by myself.





BUILDING	OFFICE	LABORATORY	CHIMNEY	GAS FACTORY	GAS HOLDER
Building year	1957	± 1960	± 1960	1914	1956
Status	Municipal monument	-	-	National monument	Municipal monument
Initial user	Radium Rubber	Rubber Resources	Radium Rubber	City of Maastricht	City of Maastricht
Designer	Op ten Noort and Blijdenstein	Takenaka	?	Klönne, F.J. Stulemeijer & co	?
New function	Art studio's	Theatre pratice space, fashion ateliers		Not yet defined	Event space



Plan Palmbout, showing different functions and areas within Bosscherveld. Retrieved from Palmbout in September 2015.

FUNCTIONS AROUND VREDESTEIN

PANS SHOP

Along the Cabergerweg is a furniture store of the family Pans, who announced in 2014 to close their business. At the moment the store is still open, it is unsure what will happen to the building after Pans leaves.

Photograph retrieved from Google Maps street view, on 26-10-2005.

KUNSTFRONT

Kunstfront is collective of artists who have moved their ateliers to the former office building of Rubber Resources. They organise workshops and other kinds of art related activities.

Photograph retrieved from www.sandersinko.nl on 09-22-2015.

LABORATORY

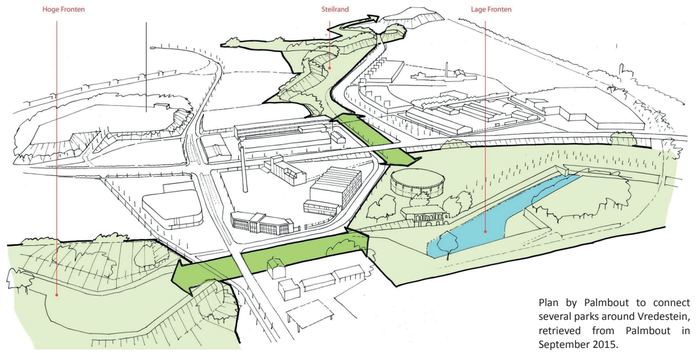
The local theatre group named Maastricht will move their practice space inside the former laboratory of Rubber Resources in the beginning of 2016. Later this year Fashion Lab, ateliers for starting fashion designers, will also move in.

Source: www.belvedere-maastricht.nl, 26-10-2015.
Photograph made by Martin Beumer in September 2015.

GASTHOUDER

After a period of vacancy the former gas holder is now an experimental event space; during the summer anyone can hold any type of event for just 750 euro per week. The gas holder has an area of 1500 m^2 and has a maximum capacity of 500 people.

Source: www.belvedere-maastricht.nl, 26-10-2015.
Photograph of the interior, retrieved from Pinterest on 10-02-2016.



Plan by Palmbout to connect several parks around Vredestein, retrieved from Palmbout in September 2015.

PARKS AROUND VREDESTEIN

HOGE FRONTEN

In between the defensive walls of the Hoge Fronten is a low path where people take walks, often accompanied by their dogs.

Photograph taken by Gert-Jan Groenewoud in September 2015.

LAGE FRONTEN

Both the harbor and the depotoir have become redundant and are being taken over by nature. The location is planned to be part of the Frontenpark, so in the future there will probably be more people here taking a walk or siting by the water.

Photograph taken by Gert-Jan Groenewoud, September 2015.

STEILRAND

Steilrand in Dutch means steep slope. The sloping landscape, which is covered by plants and trees, runs along the edge of Bosscherveld's industrial site.

Photograph overlooking the Steilrand and the city, retrieved from google.maps.nl on 29-11-2015

FORT WILLEM

Around the fort runs an old canal which is now filled with grass. Since 1946 the fort has a playground for children in the middle and today it also has a swimming pool and a student society.

Recent photograph of Fort Willem, retrieved from wikipedia.nl on 29-22-2015.

ROUTES AND TRAFFIC

The site is surrounded by footpaths and by two main routes through the city on the west side. At the west corner these main routes cross, so here traffic will be most intense. The road east of Vredestein, the Lage Frontweg, is only for local traffic and can therefore be closed off in the case of a large event. In the current plan there is plenty of space for cars to park, but no parking for bikes.

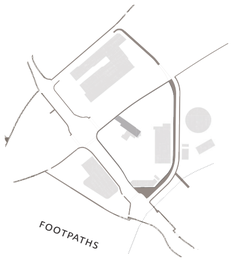
The former gas factory stands nearly perpendiculair to the planned bridge landing, making it a very noticable element in the landscape.

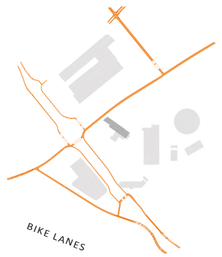
Source

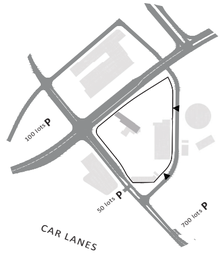
Plan published by Palmbout, retrieved from Blackboard in October 2015.

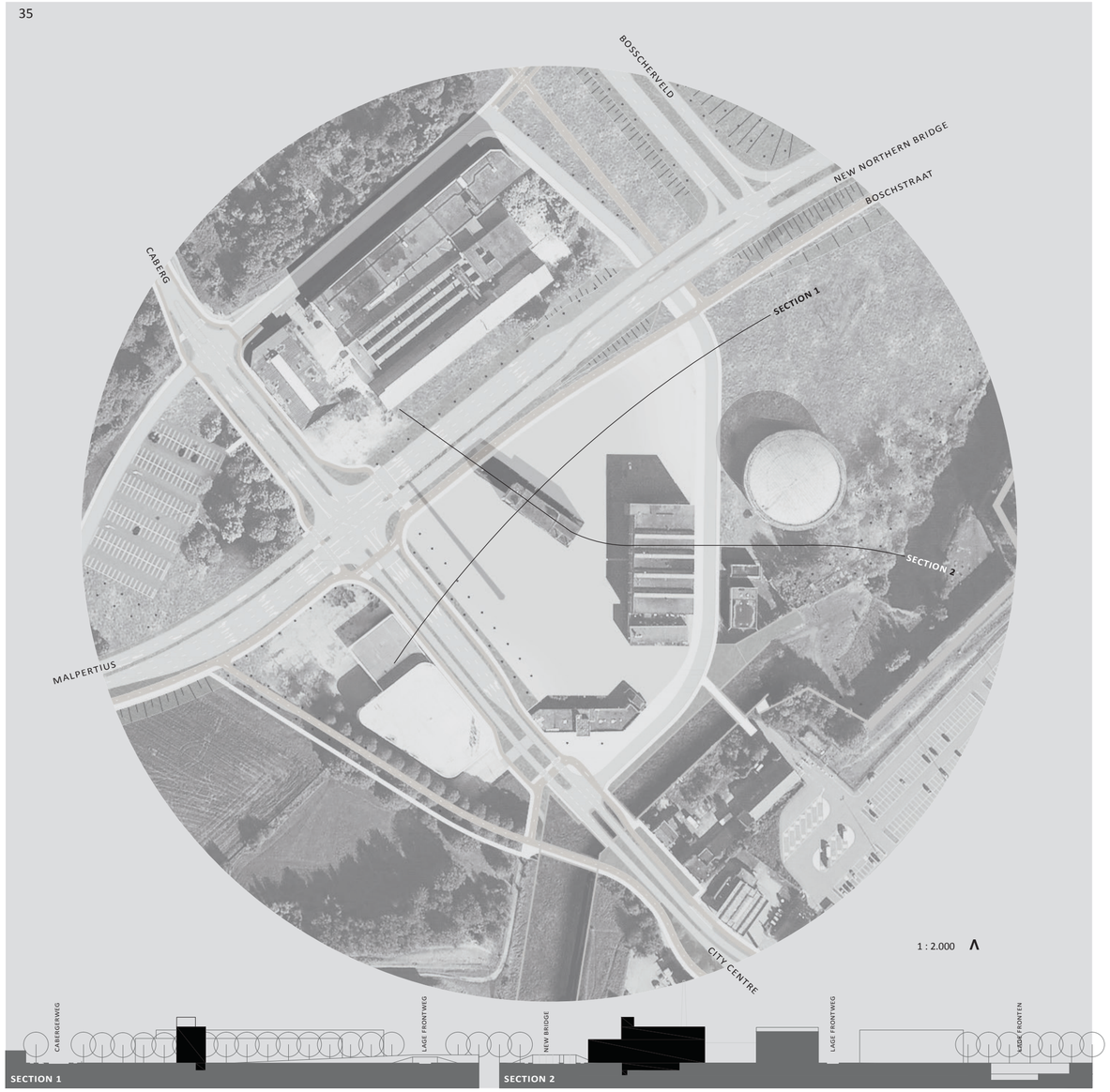
Images

Diagrams, own illustrations.
Collage on the right page, aerial photograph retrieved from Google Maps on 21-10-2015 and an edited plan of Palmbout.







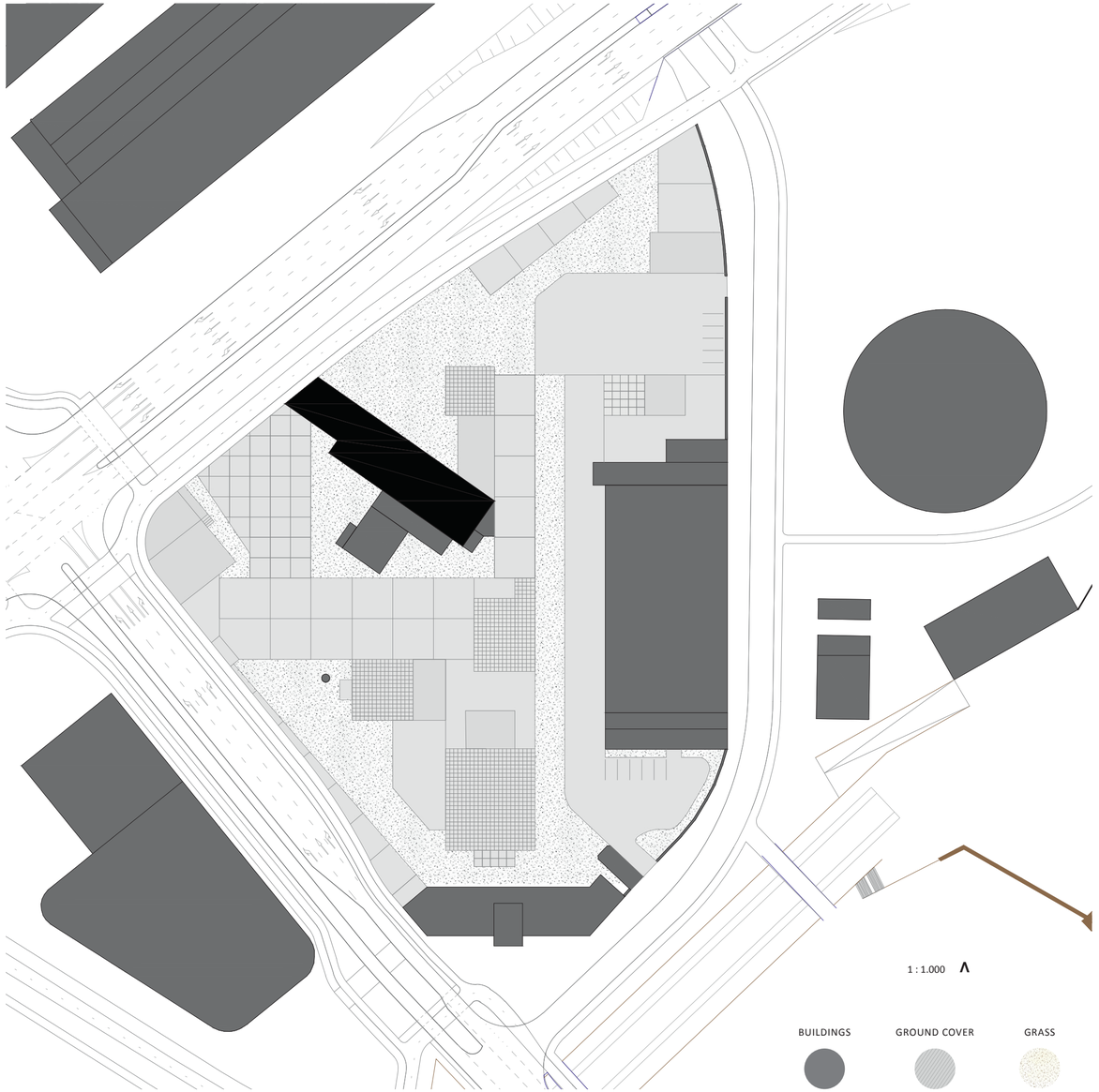


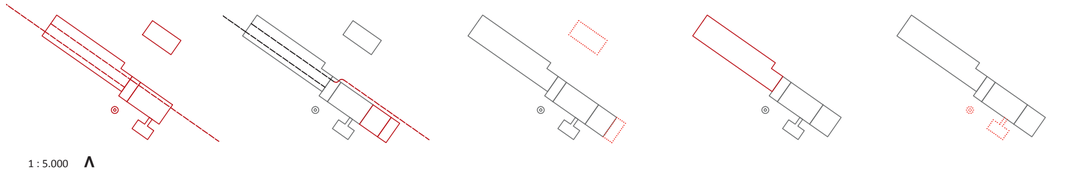
BUILDINGS AND TERRAIN

The photograph below shows the former gas factory in its current state. Windows and doors are closed off and a steel structure supports what is left of the coal storage. The concrete foundations and tiles of the demolished factory halls still remain on site. On the right page the future paths and roads are projected onto the existing ground cover, forming the base of the design project.

Images

Photograph made by Martin Beumer in September 2015.
Map of the existing ground cover with the planned road projected into it, own illustration.





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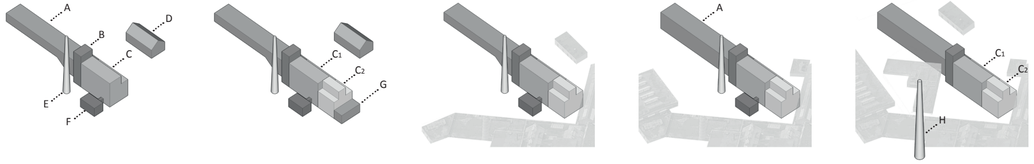


Phase 01

1912

Construction

Completion of the gas factory in six building volumes:

A	Coal storage	(14x56 m)
B	Bunker	(14x6 m)
C	Distillery	(14x22 m)
D	Plant room	(10x20 m)
E	Chimney	(4x4 m)
F	Staff room	(6x11m)

Phase 02

1914-1926

Extension

1914. Extension of the distillery (C2).

1920. An extra cantine (G) is built next to the distillery.

1926. The cantine (G) is converted to laboratory.

Phase 03

1930-1937

Take-over

1930. The factory is closed. The State Mines take over gas supply.

1932. The Bataafsche Rubber Industry, BRI, moves into the factory.

1937. BRI takes over rubber factory Radium. The mechanical room (F) and the laboratory (G) are demolished to make space for new factory buildings parallel to the former cokes track.

The road to Caberg is laid around Fort Willem instead of right through it like in the urban plan of 1905.

Phase 04

1946-1948

Transformation

1946. The floors of the silos in the former coal storage (A) are flattened out to be used as storage hall.

1947. In the former coal storage (A) an extra floor is built of 550 m².

1948. In the former coal storage (A) another extra floor is built of 225 m².

More factory halls are built along the road to Caberg, the Cabergerweg.

Phase 05

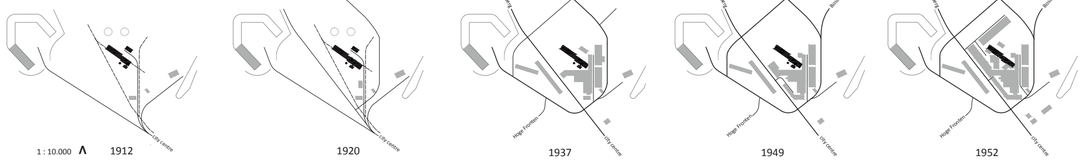
1948-1949

Demolition and addition

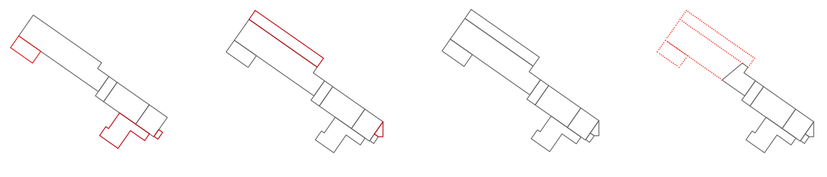
1948. The staff room (D) and the chimney (E) are demolished to make space for new factory buildings and a new chimney (H).

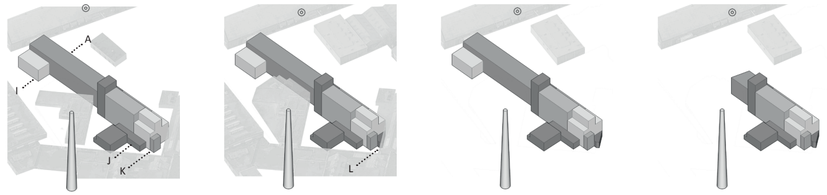
1949. The facades of the former bunker (B) and the distillery (C) are changed and an extra floor is built of 450 m². The staircase in the bunker is partly demolished.

New halls close in the gas factory on the northside.



1 : 10.000 1912 1920 1937 1949 1952





Phase 06

1952-1959

Extension and take-over

1952. A new workshop (I) is built against the former coal storage (A). A new staff room (J) and staircase (K) are built against the distillery.

1959. Tire producer Vredestein takes over BRI and changes its name to Rubber Resources. Many extensions follow, the main buildings of the former gas factory (A, B, C) remain the same. They remain in use as workplace and storage.

Phase 07

1960-2014

Addition

More and more buildings surround the former gas factory, as Bosscherveld attracts more industrial activity. In the nineties Rubber Resources leaves some of the factory halls unused and empty. Nature slowly takes over the site.

1996. The former gas factory attains the status of national monument.

Phase 08

2014

Demolition

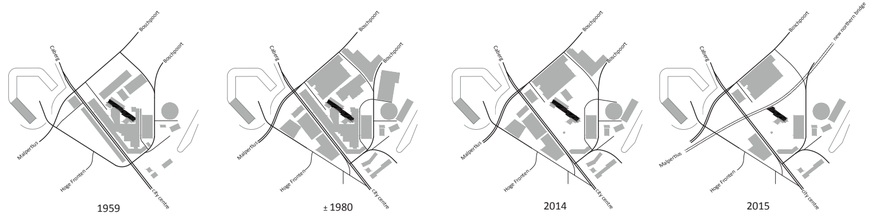
2014. Rubber Resources has almost completely moved away from Vredestein, most of the empty buildings are demolished.

Phase 09

2015

Ambition

2015. Part of the former coal storage (A) is demolished where a new road is planned.



1959 ± 1980 2014 2015

CONCLUSIONS

Slow concealment, sudden reveal

Over time the former gas factory has been slowly surrounded by new roads and buildings and lost the connection to its context. Despite the urban plan of 1905, the Cabergerweg was developed around Fort Willem in between the factory and the Kastanjelaan. The new buildings faced the streets and were connected to the factory. In 2014 the former gas factory was suddenly revealed to the city again when most of Vredestein's buildings were demolished. In 2015 part of the interior was also revealed when the largest part of the coal storage was demolished.

Sources

Rooij, A. v., Minis, S., & Mes, W. A. A. (2003). Bosscherveld & Belvédère (1e dr. ed.). Maastricht: Stichting Werkgroep Industriële Archeologie Maastricht.
Loo, B. (2012). Bouwhistorische Verkenning Cabergerweg 45, Maastricht.

Diagrams and maps, own illustration.

2. STRUCTURE AND MATERIALS

REINFORCED CONCRETE

Reinforced concrete is a wire structure cast in artificial stone, combining the mechanical qualities of each material. Concrete has high compressive strength, but cracks easily under tensile stress. The reinforcement, historically iron and later steel, is embedded inside the concrete where tension due to bending occurs. Reinforced concrete has become so familiar to the landscape of the city, it is hard to imagine that only one hundred years ago this technique was just being explored. Over time the production and application of reinforced concrete have changed significantly and have also increased dramatically. In a process of trial and error, people have gained knowledge and experience on how to build with this synthetic material.

Though the application of cements and concrete mixtures have a much longer history, reinforced concrete was an invention of the 19th century. It developed from a French traditional technique of pisé, ramming earth into a wooden framework.[1] Frenchman Francois Coignet replaced the rammed earth with a concrete mixture of hydraulic lime, sand and gravel. In 1853 he used this technique to construct a house in Saint-Denis, of which the flat roof was supported by iron beams.[2] Plain concrete structures were applied in the Netherlands for defensive and infrastructural works during the middle and late 19th century. In France, several experiments were done to combine iron and concrete as one building material. The main aim of this investigation was to find a more durable alternative for wood. In 1844 Joseph-Louis Lambot patented a technique using woven iron meshes and cement to create impermeable objects like water tanks and boats. Another notable figure in the development of reinforced concrete was the French gardener Joseph Monier, who patented several applications for flower pots and reservoirs since 1867.

In the last two decades of the 19th century, the structural behaviour of reinforced concrete was examined and reinforced concrete elements were integrated in buildings as floors and walls. The main advantage of reinforced concrete as building material was its resistance to fire compared to iron and wood. Frenchman Francois Hennebique was the first to patent a construction system which combined structural elements like walls, floors, columns and beams into one monolithic whole in 1892. By the end of the 19th century several patented systems existed, but there was no standardised method of design or calculation.

The Netherlands had no patent law from 1878 to 1912, but the application of these new foreign techniques were not easy because of the lack of knowledge and experience.[3] The design and engineering was centralised by patent holders and surrounded by great secrecy. The first reinforced concrete factory in the Netherlands was established by a Belgian company of the brothers Picha, who held a Monier patent. They took advantage of the situation in the Netherlands regarding patents by opening a branch in Zeeland in 1888 called Picha-Stevens. Soon after, more reinforced concrete factories opened, like the Amsterdamsche fabriek van Cement-Ijzerwerken Wittenburg in 1890 and the Rotterdamsche cementsteenfabriek van Waning & Co in 1888.[4] In the beginning, these factories mainly produced underground building parts like basements and foundations, as well as decorative elements which imitated natural stone.

The engineering company of the gas factory in Maastricht, F.J. Stulemeijer & Co, was established in 1901 in the city of Breda. The company specialised in civil works and industrial buildings, of which the gas factory was one of the first. Because of the inexperience with this new material, the design was based on an existing formal scheme, which Wiebenga translated right after graduating as a civil engineer in Delft.

Notes

1. Collins, P. (1959). Concrete : the vision of a new architecture : a study of Auguste Perret and his precursors. London.

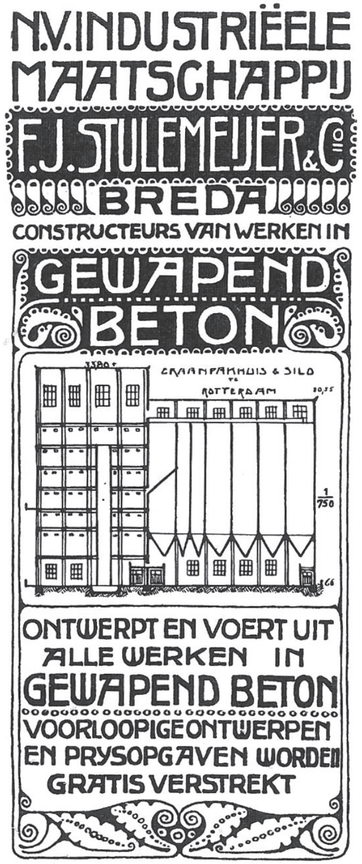
2. Oosterhoff, J. (1988). Bouwtechniek in Nederland 1, Constructies van ijzer en beton : gebouwen 1800-1940, overzicht en typologie. Delft: Delftse Universitaire Pers, pg. 22.

3. Heinemann, H. A. (2013). Historic Concrete; From Concrete Repair to Concrete Conservation. Technical University Delft, Delft, pg. 41.

4. Oosterhoff, J. (1988). Bouwtechniek in Nederland 1, Constructies van ijzer en beton : gebouwen 1800-1940, overzicht en typologie. Delft: Delftse Universitaire Pers, pg. 31.

Image

Advertisement of F.J. Stulemeijer & Co, retrieved from Stenvert, R. (2010). Historisch Beton in Nederland. Vitruvius(10).



THE ENGINEER AND ARCHITECT

Jan Gerko Wiebenga was born in 1886 in Soerakarta, Indonesia. The family moved back to the Netherlands around the turn of the century, where Wiebenga would spend the rest of his young years. Wiebenga's father worked in the shipping industry; he had seen the great advances automation had brought about in his field of work. So despite his son's affinity with architecture he insisted that Jan would become a civil engineer.[1] During his studies in Delft Wiebenga found inspiration in the work of Berlage and he came into contact with architects Bijvoet and Duiker.

In his first year at F.J. Stulemeijer & Co, Wiebenga was involved in engineering the halls of Société Céramique and the Municipal Gas Works in Maastricht. He remained at the company until 1916, when his contract was ended due to a lack of projects because of the First World War. From 1916 until 1921 Wiebenga was a teacher in several architectural schools and he continued to work as a structural advisor in building projects. During this time, he made structural calculations for Bijvoet and Duiker and worked together with van der Vlugt for the first time. In 1921 Wiebenga moved to Groningen where he was commissioned to reorganize the Technical Schools and design a new building in the timeframe of just one year. Now he finally had the opportunity to express his own ideas about building and architecture. He invited van der Vlugt to collaborate for the project and together they produced a building which was truly unique at the time. It was the first building in the Netherlands to be designed by a civil engineer and the first school with a concrete post and beam structure instead of brick walls.[2] The configuration of the school minimalized circulation space and the economic design had little decorations. Instead, it expressed a different kind of beauty in the most essential parts; the composition of symmetrical building parts, long horizontal lines in the facades and repetitive structural elements. In these aspects, his design shows great resemblance to the structure of the gas factory of Maastricht. The photograph on the right page shows the interior of the workplaces. The diagonal supports of the roof are also reminiscent of the structure of the distillery. The design of the school set a new movement of Dutch rationalist architecture in motion, known as *Nieuwe Zakelijkheid*.[3]

In 1924 and 1925 Wiebenga worked in engineering companies in America. He was very impressed by the high rise buildings and advanced building techniques. After his return to Holland Wiebenga worked at press company Moormans in Den Haag. He wrote articles for several journals in the field of civil engineering, often depicting his impressions from his time spent in America. In 1926 Wiebenga became involved in the architecture company of Brinkman and van der Vlugt in Rotterdam as technical advisor. Together they worked on a new design for the Van Nelle Factory in Rotterdam. The design was aimed to improve the working conditions in the factory, by letting air and light into the workplaces. To make this possible, the building had a concrete mushroom structure behind a glass curtain wall. Air and light also played a key role in Wiebenga's next project for Bijvoet and Duiker. It involved a sanatorium for the treatment of patients suffering from tuberculosis, a decease which was common among diamond workers. The cantilevering structure was designed on a square grid of 1,5 meters. It had glazed facades so plenty of sunlight could enter the rooms. The sanatorium was named Zonnestraal, which means sun beam in Dutch. Wiebenga and Duiker worked together more frequently and developed new visions on architecture in the Netherlands. Both men were inspired by American high rise and the ideas Le Corbusier and CIAM. From 1925 until 1928 Wiebenga and Duiker designed the first high rise apartments in the Netherlands; the Nirwana flats in Den Haag. Due to the high costs and many other problems which surrounded the project, only one of the planned flats was built. But Wiebenga and Duiker continued to develop more ideas to make the construction of high rise more economical by making use of prefabrication and standardization of concrete elements. In the book *Hoogbouw* published in 1930, Duiker expresses their vision on residential high rise; it promises a more hygienic and a more comfortable way of living. They proposed these ideas during meetings with *De 8*, an architectural group that preferred a scientific approach to design; a type of architecture based on research. Throughout his later career Wiebenga remained an active member of the group and continued to work on a myriad of projects.

Sources

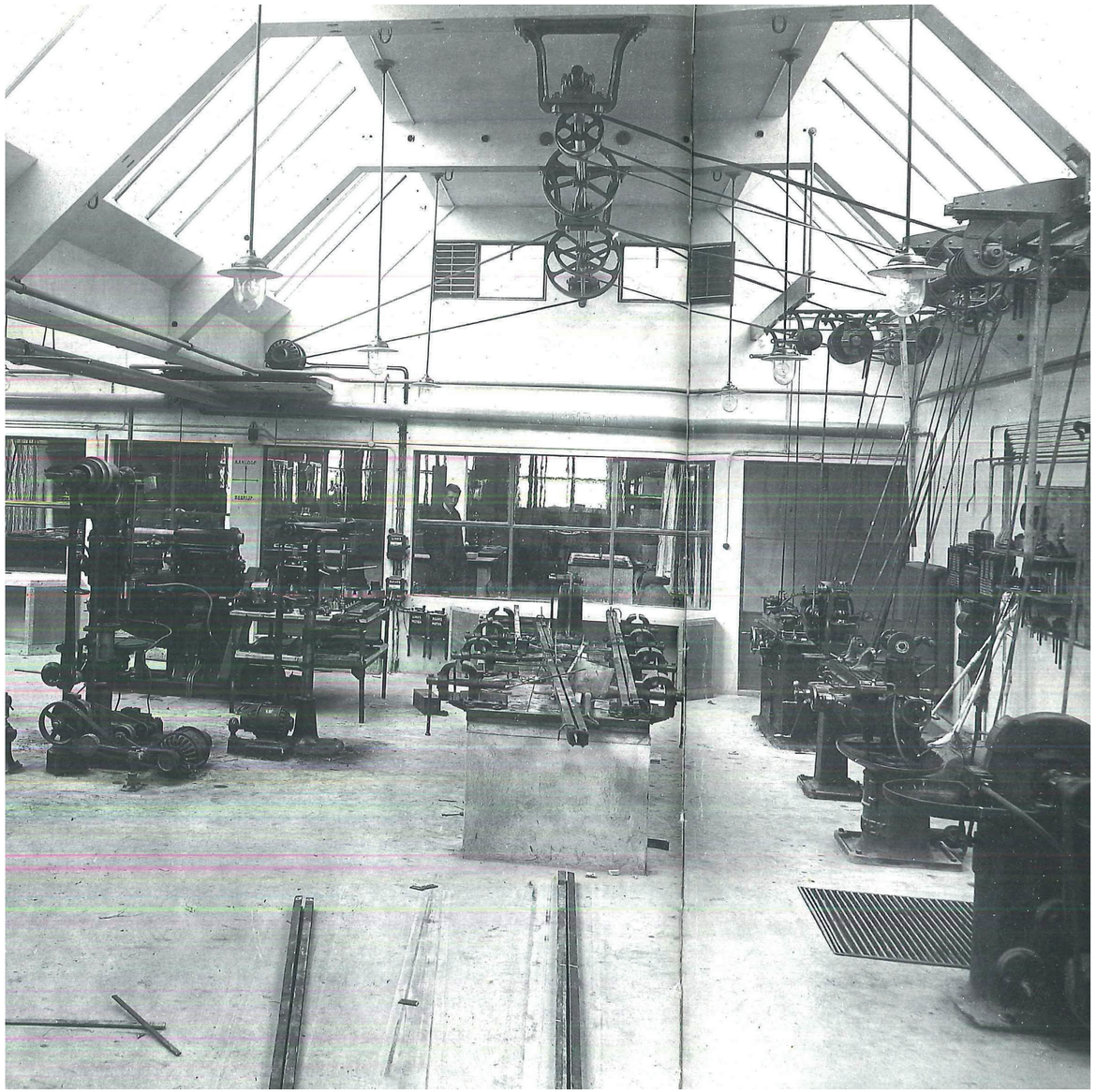
1. Molema, J., Bak, P., & Wiebenga, J. G. (1987). Jan Gerko Wiebenga: apostel van het Nieuwe Bouwen: Uitgeverij 010.

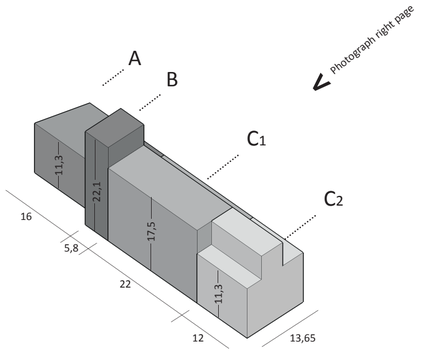
2. Idem.

3. Barbieri, U., Duin, L. v., & Jong, J. d. (1999). Honderd jaar Nederlandse architectuur, 1901-2000 : tendensen, hoogtepunten. Nijmegen :: SUN.

Images

Portrait of Wiebenga, Loo, B. (2012). Bouwhistorische Verkenning Cabergerweg 45, Maastricht.
Jap Sam, E., Jong-Dalziel, R. d., Blonk, A., & Wiebenga, J. G. (2000). The Wiebenga complex : conversion and restoration of the Technical Schools in Groningen (1922-1923). Rotterdam: 010 Publishers.





Part A	Coal storage	1912
Part B	Bunker	1912
Part C1	Distillery	1912
Part C2	Distillery	1914

The load bearing structure is a reinforced concrete frame with rigid connections. The structure was cast in situ in two stages; part A, B and C1 were built in 1912, part C2 was added in 1914. The only dilatation can be found between part C1 and C2.

By 1950 the rubber factory had added more floors inside the structure. Most changes were made to part A; the floors of the silos were flattened out and were most likely partly filled with concrete. The ground level at the south side was lowered and two extra floors were added. In parts B and C one extra floor was added.

Sources

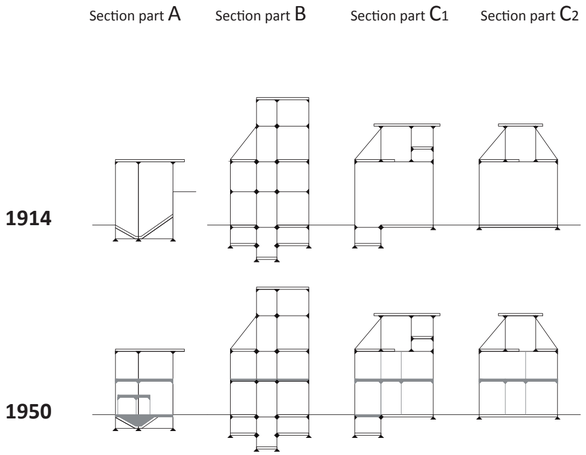
Werkgroep Industriele Archeologie Maastricht: deelrapport 2 : Boschstraat-West. (1986). Werkgroep Industriele Archeologie.

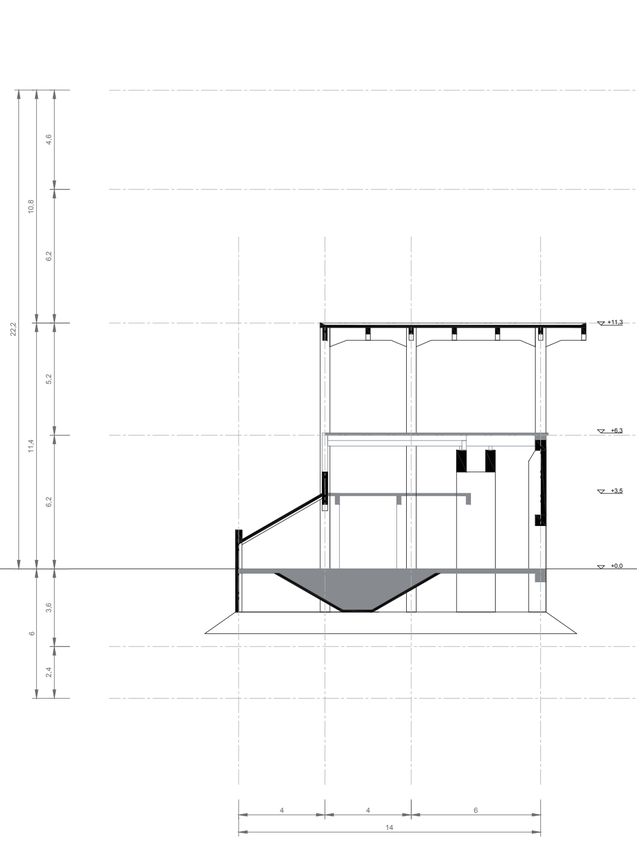
Measurements taken on site in October 2015.

Images

Diagrams, own illustrations.

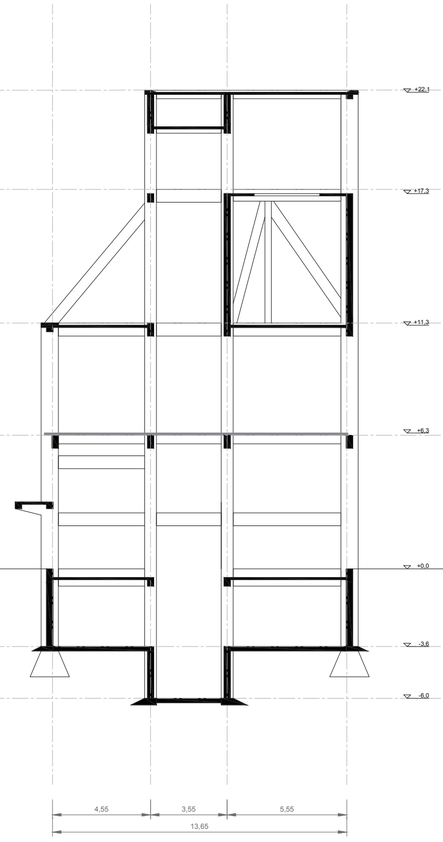
Photograph of the building during construction from 1912, retrieved from Rick Joseph in September 2015.





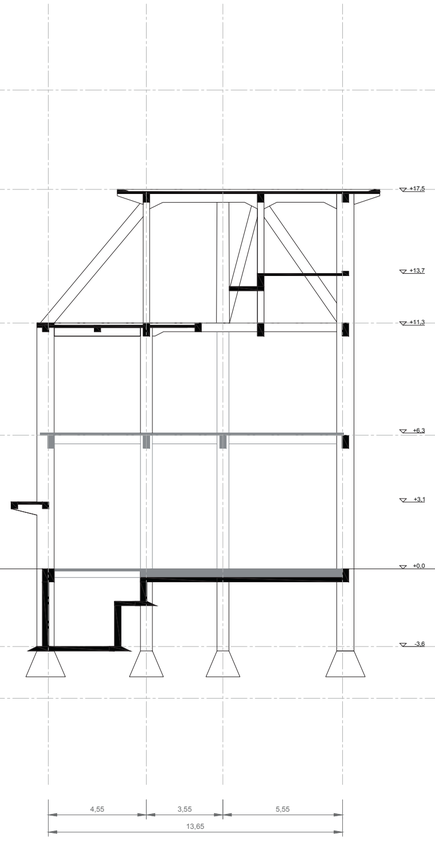
Section part **A**

Concrete portal frame
on concrete wall footings



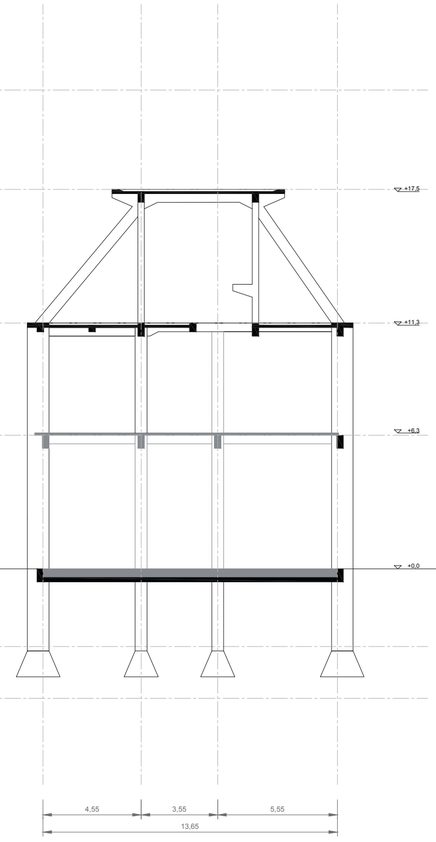
Section part **B**

Concrete frame
on sloped concrete footings
and concrete wall footings



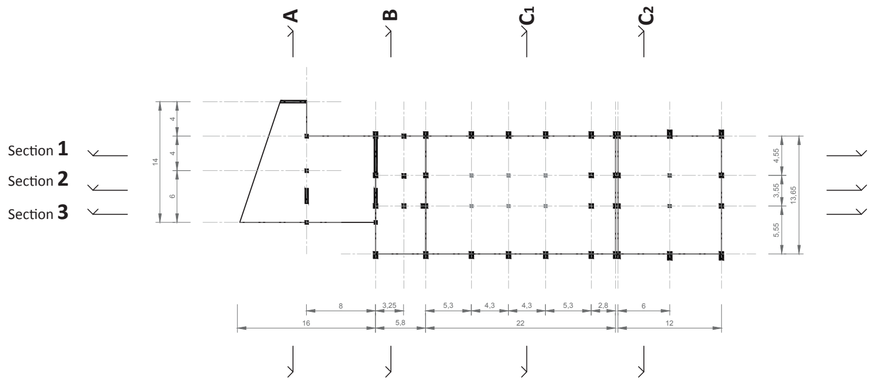
Section part **C1**

Concrete portal truss
on sloped concrete footings

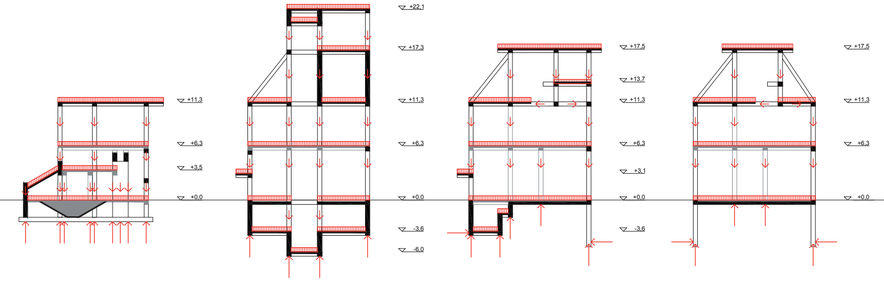


Section part **C2**

Concrete portal truss
on sloped concrete footings

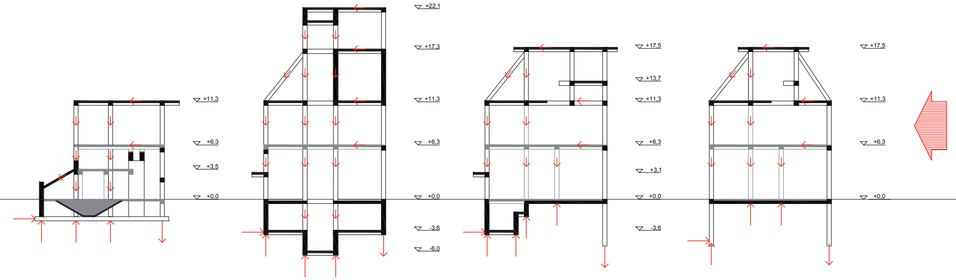


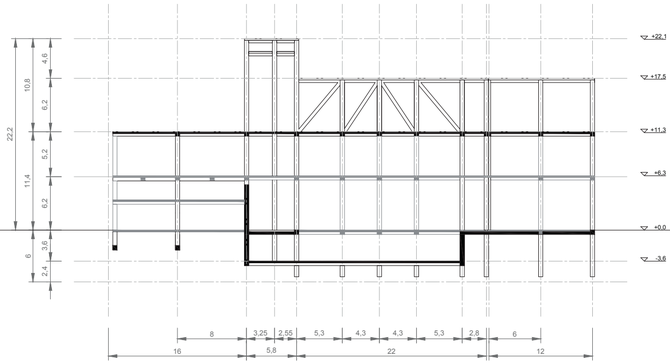
VERTICAL LOADS
1:500



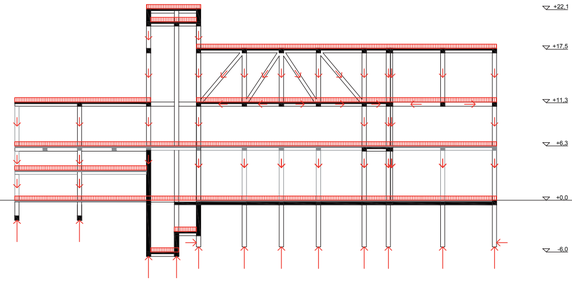
Section part **A** Section part **B** Section part **C1** Section part **C2**

HORIZONTAL LOADS
1:500

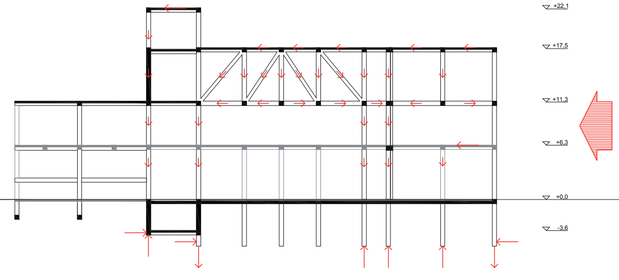




Section **1**



Section **2**



Section **3**

STABILITY: FLOORS, WALLS AND DIAGONALS

DAMAGES

The most noticeable damage to the concrete is the exposed corroding reinforcement. The cause of this damage is a natural chemical process called carbonatation. Concrete naturally has a high pH value, which creates a protective layer on the reinforcement also known as passivity. Calcium hydroxide ($Ca(OH)_2$) is a component of concrete which contributes to its alkalinity. When carbon dioxide ($C0_2$) from the air dissolves in water, it reacts with calcium hydroxide forming calcium carbonate ($CaCo_3$) and water.

$$Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$$

Due to this chemical reaction the pH value of the concrete gradually lowers. When the concrete around the reinforcement is carbonated, the bars are no longer protected against corrosion. If the covering layer of concrete is less than around 15 millimeters, the reinforcement will rust due to moisture changes. When corrosion occurs, the volume of the bars increases and pushes off the covering layer of concrete. Soon cracks appear on the surface, followed by the falling off of whole pieces of concrete.

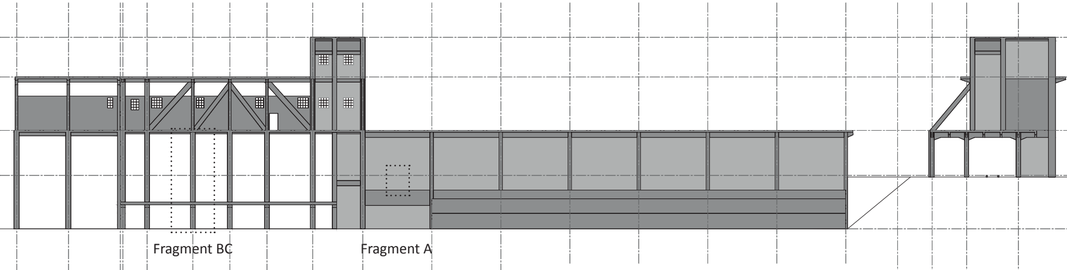
At the time of construction of the gas factory, the effects of carbonatation were unknown. Because of the lack of experience in building with reinforced concrete, the way the factory was designed and constructed has accelerated the process of decay.

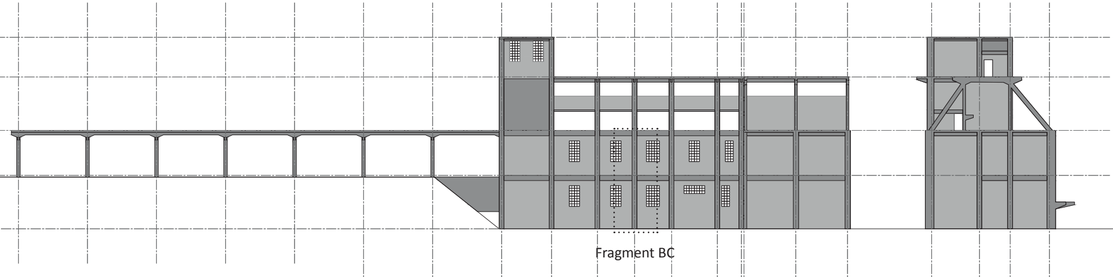
The concrete mixture contained too much water, which makes the concrete more porous when water evaporates during drying. At the time of construction there were no regulations or guidelines on how much water should be added in the mixture. The high porosity of the concrete affects the strength of the material negatively and increases the ingress of gas and moisture, which makes it more vulnerable to carbonatation. The same applies to small cracks, which already showed on the surface of the concrete during drying. The reason why this happened was because the building had no dilatations despite its length. Another main cause of this kind of damage was that the covering layer of concrete over the bars was very thin, leading to the corrosion of the iron reinforcement.

Images

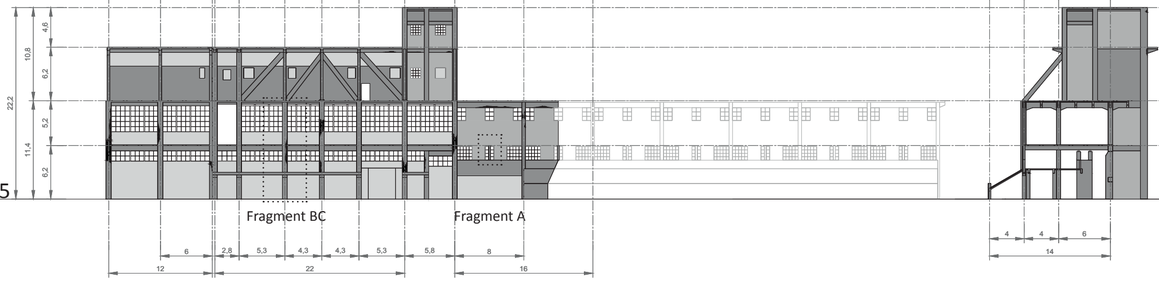
Photograph of the building during construction from 1912, retrieved from Rick Joseph in September 2015.
Photograph of the north facade in 2015 and of the damages, taken by Martin Beumer in September 2015.

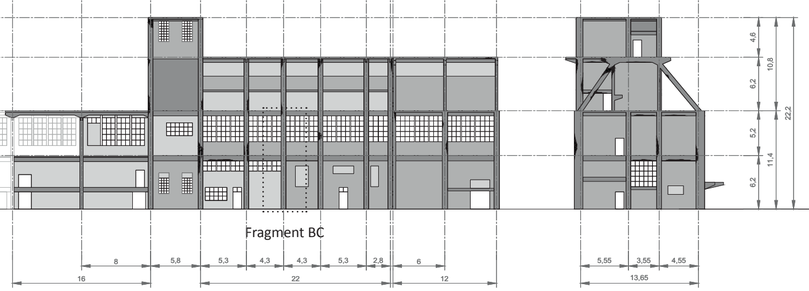
1914





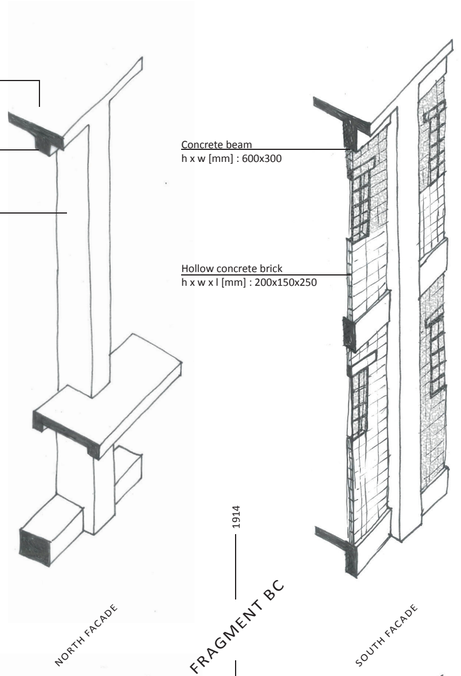
2015





N W S E

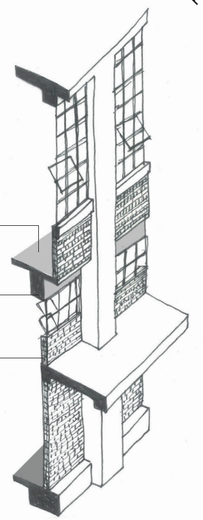
CONCRETE CONCRETE BRICKS STONE BRICKS OPEN FACADE EXPOSED REINFORCEMENT

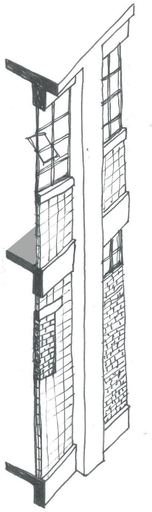


1914

FRAGMENT BC

2015



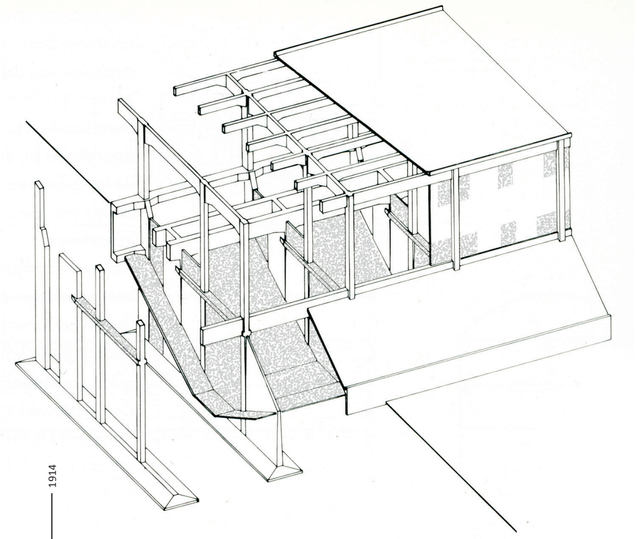


DEMOLISHED BY 1950

ADDED BY 1950

Images

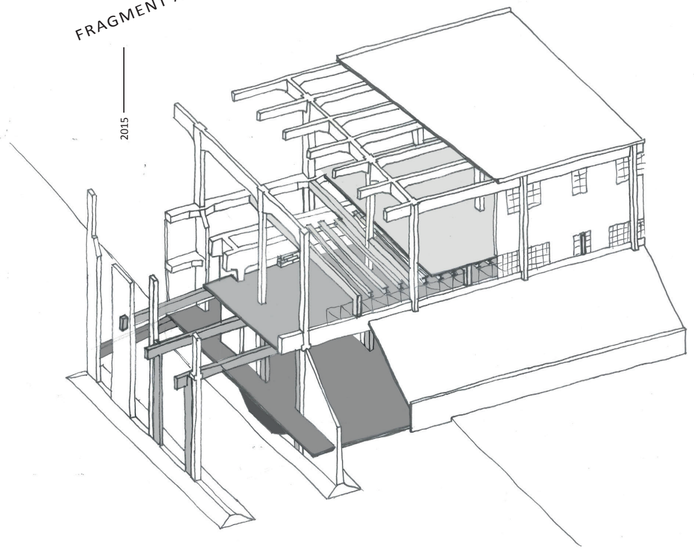
Fragment BC, own illustrations.
Fragment A in 1914, Molema, J., Bak, P., & Wiebenga, J. G. (1987). Jan Gerko Wiebenga: apostel van het Nieuwe Bouwen: Uitgeverij 010.
Fragmnt A in 2015, own illustration.



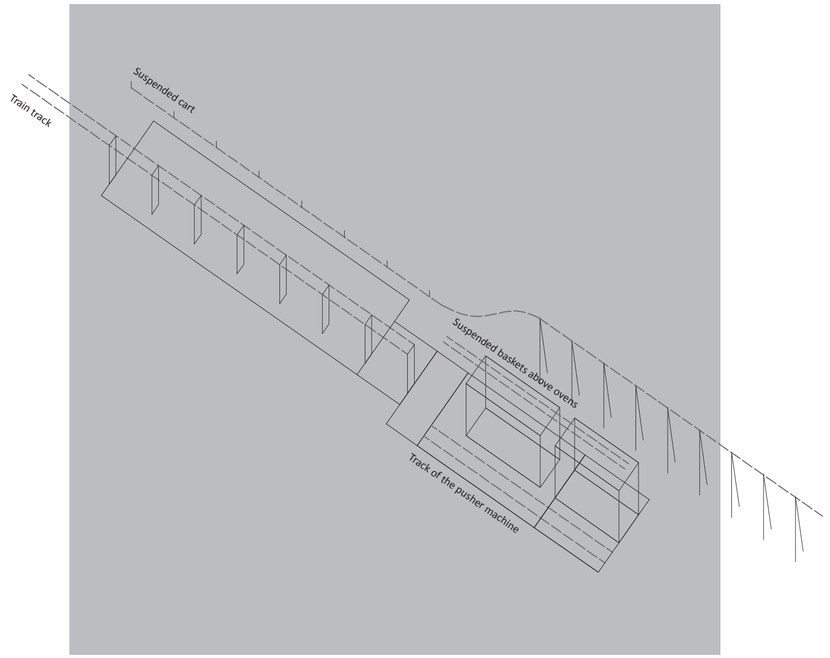
1914

FRAGMENT A

2015



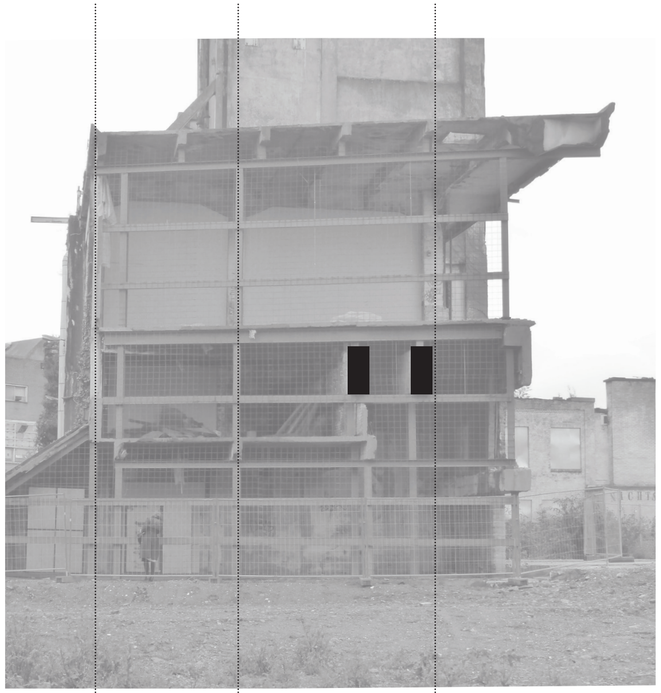
FORMER TRACKS



Images

Former tracks diagram, own illustration.
Photgraph of the former coal storage, taken by Martin Beumer in september 2015, edited by myself.

TRACK REMAINS



4 m. **6 m.**

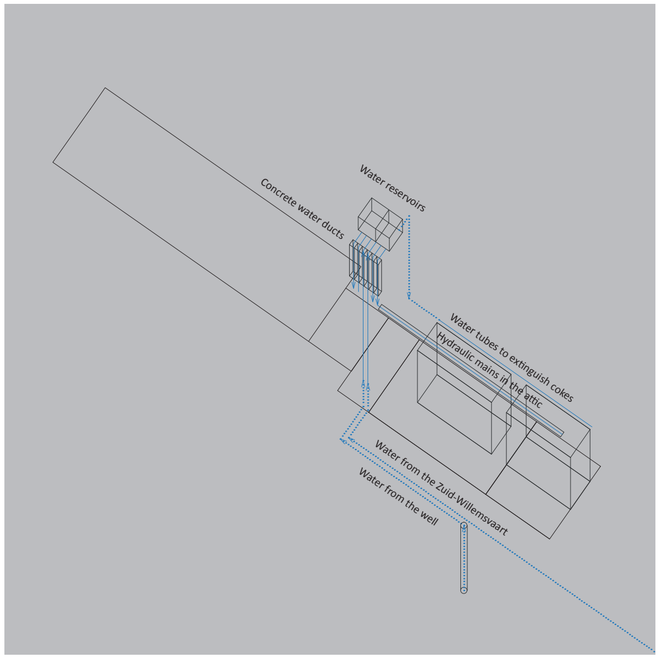
Portal through which the suspended cart ran

Portal through which the train track ran

The beams on which the train track ran still remain today and are shown in black.

The part of the portal of the suspended cart is stronger; it has the same beam heights but a shorter span.

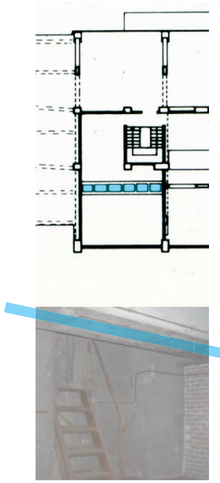
FORMER DUCTS



Images

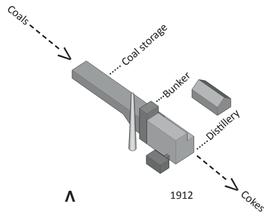
Former ducts diagram, own illustration.
Plan of the bunker, Molema, J., Bak, P., & Wiebenga, J. G. (1987). Jan Gerko Wiebenga: apostel van het Nieuwe Bouwen: Uitgeverij 010.
Recent photograph of the concrete ducts, Loo, B. (2012). Bouwhistorische Verkenning Cabergerweg 45, Maastricht.
Photograph of the attic, retrieved from Rick Joseph in september 2015.

DUCT REMAINS

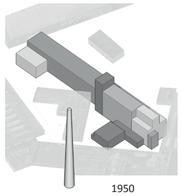


Concrete water ducts leading from the top of the bunker to the hydraulic mains in the attic of the distillery.

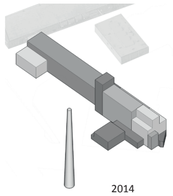
3. CULTURAL VALUES



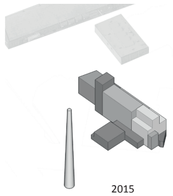
1912



1950



2014



2015

Images

Building diagrams, own illustration.
Aerial photograph, retrieved from Google Maps, on 20-09-2015.

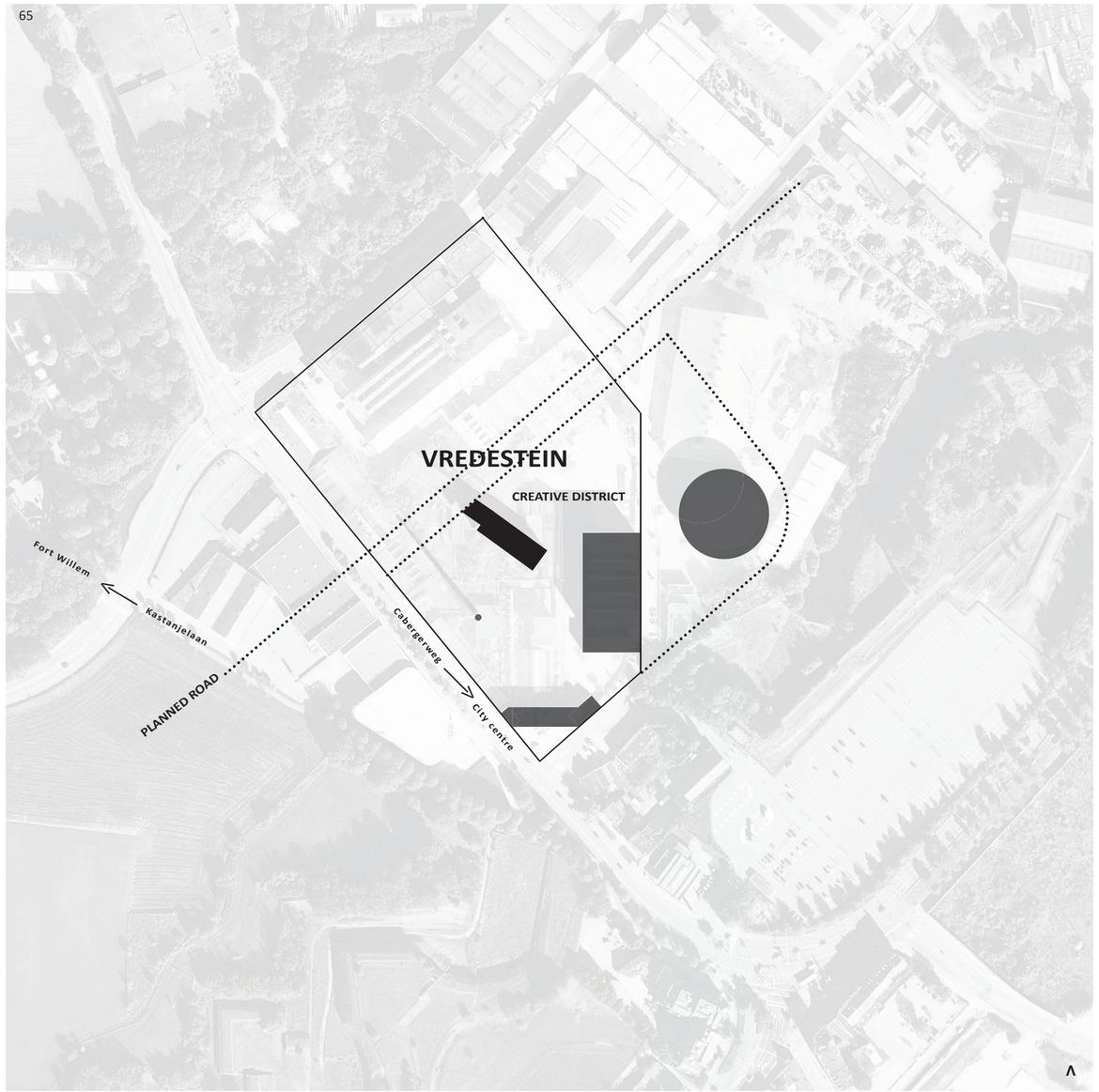
The gas factory is a type of industrial building with a short history; in the Netherlands it was in use for a period of around 100 years. The process of dry distillation of stone coal to produce gas for illumination was invented in Maastricht in 1783 by physicist Minckelers. The process was further developed by the English for large-scale application, so that London was the first gas lit city at the beginning of the nineteenth century. In the Netherlands the first factories were built by the English Imperial Continental Gas Association and Dutch private companies. Over the course of the century more and more cities took over gas production in order to lower the price of gas, leading to the nationalisation of energy production. From the twenties of the 20th century electric light replaced gas light. Many gas factories closed, but some remained in use for the production of gas for heating. In 1959 a field of natural gas was discovered in Groningen, leading to the closure and demolition of most gas factories in the Netherlands. Besides the gas factory in Maastricht there are six other gas factories listed as national monuments. Only the one in Den Haag also still features the main part of the complex; the distillery. The former gas factory of Maastricht is also unique because of its reinforced concrete structure, one of the first applications of this building technique in the Netherlands and one of the first works of civil engineer Jan Gerko Wiebenga. During the twentieth century concrete became the material favoured by the modern movement and Wiebenga became the engineer who made some of the country's most innovative buildings possible. The design of the gas factory must have had a great impact on Wiebenga's ideas about building, for his later works show great resemblance to its economic and orderly design.

The first gas factory in Maastricht was built in 1848 by industrialist Regout to light his factories of the Sphinx at night, so the workers could make longer days. Because Maastricht was a fortified city, it was not allowed by law to light the streets with gas. Despite the law, the city of Maastricht took over gas production for public illumination and the first municipal gas factory was opened south of Sphinx in 1856. After the dismantling of the defensive works, a new gas factory was built in 1912 in the field of Bosscherveld, right outside the former city walls. The site was only 600 meters away, so that the new factory could be connected to the existing distribution pipes and train tracks. The new gas factory was situated parallel to the Kastanjelaan which led from the city to Fort Willem, along an existing path leading south of Sphinx.

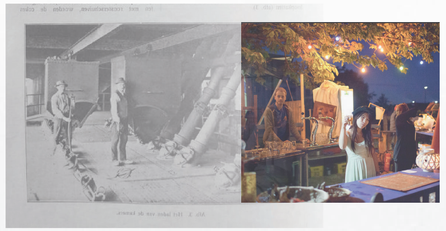
The main building of the factory consists of three parts; the coal storage, the bunker and the distillery. The three parts differ in height and length and were organized along a central axis to allow horizontal distribution through the different parts. A train track ran from the city to the factory and split into two tracks; one to the left for supply of stone coal and one to the right to take away cokes, the by-product of gas production. The track for supply lead inside the coal storage, where the coals were stored until they were lifted and moved by a suspended cart towards the bunker. There elevators moved the coals to the high bunker, from where they were tapped off and moved above the ovens in the distillery. After the dry distillation, the raw gas was collected, condensed and purified. The cokes were removed from the ovens and taken away by another suspended cart to the train.

The original design of the gas factory was made in 1912 by Klönne, an engineering company from Dortmund. As was common at the time, it was originally to be built as an iron frame. Engineering company F.J. Stulemeijer & Co from Breda offered to design a more economical and explosion proof structure in reinforced concrete. The same year the offer was accepted. The task of translating the iron structure into concrete was given to Wiebenga, who had just graduated as a civil engineer in Delft. The biggest change in the design was the roof structure; the pitched roofs were changed to flat roofs. The distillery required a large open space for the ovens, so the iron truss was translated directly into concrete; today it is the only concrete truss left in the Netherlands. Inside it spans almost the full length of the distillery, on the outside diagonal concrete supports stabilize the truss. Large parts of the structure used to be open, the closed parts of the facades were filled in with hollow concrete bricks.

Over time the gas factory expanded, more roads were developed and Bosscherveld attracted more industrial activity. The Cabergerweg was developed in between the Kastanjelaan and the factory, going around Fort Willem to the annexed village of Caberg. In 1930 the factory closed because it became more economical to buy gas directly from the State Mines. The site was taken over by a rubber factory in 1932. The open structure was closed with stone brickwork and steel framed windows and extra floors were added inside. Over the years parts of the factory were demolished, parts were changed and the former factory was slowly surrounded by other factory halls. Because of the planned construction of a bridge landing right through the site, the rubber factory moved away and most of its halls were demolished in 2014. Suddenly the former gas factory was exposed again to passersby on the street and nature slowly took over the site. A year later part of the factory was also demolished where the planned bridge landing will cross it. A few other buildings which could be reused for the future function of Vredestein as creative district, were also preserved.



In this final assessment I have selected three aspects of the former gas factory and its context which I consider to be most significant and remarkable. The first aspect considers a memory, the second the site and the third the building. These aspects form the basis of my evaluation of the existing materials and the basis of later design choices.



NIGHTSCAPES

The process used for the production of gas for public lighting was invented in the city of Maastricht. At first, it was used so that people could make longer working days. Like in the gas factory, men worked both day and night to increase the productivity. Over time, artificial lighting was no longer used for night work, but for enjoying the nightlife. Streets, cafés and homes are illuminated so people can enjoy strolling around the city and spending their evenings together. Even the factory itself, a place established by thoughts of efficiency, can now become a place where artificial light provides enjoyment.

Design starting points: accentuate the space and structure of the building with artificial light.

CITY'S COLLAGE

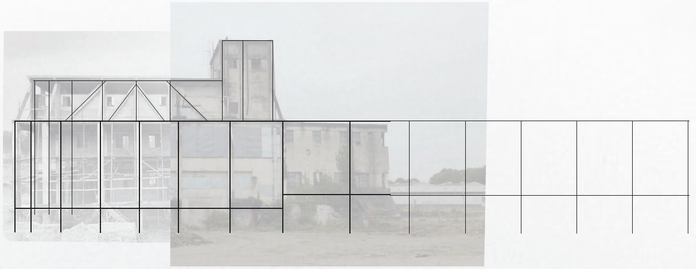
On the site some relics of the past have been preserved in an odd collage-like composition. Each structure was built in a different time period and differs in shape and materiality. Together they form a unique assemble which bears traces of Maastricht's industrial history. The space in between the buildings has become indeterminate; it has lost its function within the city and as a result it is fenced off. But in its current state it offers unique qualities. The terrain is now a combination of man-made remains and natural elements. It is a landscape of concrete foundations and broken tiles where grass and flowers grow in between. Unlike the orderly and productive nature of the city, it offers freedom of interpretation and use. The former gas factory is situated in the middle of this landscape, perpendicular to the planned bridge landing. Because the factory has been detached from the surrounding halls and because it has no apparent logical relation to the surrounding roads, it has become very noticeable again. This could spark curiosity in passersby to explore the city's newly gained terrain.

Design starting points: accentuate the character of each building volume and preserve the ground cover.

HIGH VALUE remaining main building volumes; composition and material

POSITIVE VALUE concrete foundations and tiles of the demolished halls

INDIFFERENT VALUE additions to main building volumes, which negate the clarity of the composition



CONCRETE STRUCTURE

The heavy concrete structure is the most characteristic and permanent part of the building. It was a novelty of its time and it remains unique today. It was designed purely to accommodate the gas production process and it was left as bare as it needed to be. Large parts of the structure used to be open, making it even more readable than it is today. The orderly and functional design of the structure must have influenced Wiebenga's ideas about building; his later works show great resemblance to the factory. Its horizontal lines and symmetrical facades are reflected in Wiebenga's later designs. Like modern architects of his time, he found beauty in the composition of the most essential parts of the building.

Today the concrete structure is in a state of decay. Because reinforced concrete was a relatively new building technique, the structure already revealed damages during construction. The mixture of concrete contained too much water, the building had no dilatations and the layer of concrete covering the reinforcement was very thin. As a result, the concrete cracks and crumbles and the steel reinforcement is exposed. The decaying structure reveals the trial and error of a new building technique which is so commonly used today. It also reveals that even something which seems so orderly and permanent, crumbles down in time.

Design starting points: accentuate the composition of the structure and preserve its materials.

HIGH VALUE concrete structure; composition and materials

POSITIVE VALUE concrete and brick infill; textures and colours

INDIFFERENT VALUE added floors and attached structures