THE ARMAMENTARIUM: A REFLECTION OF DELFT
A creative mix of functions within valuable interior spaces

GRADUATION REPORT
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## CONTENTS

- Foreword  
- Introduction  

### PART I: Research
- Analysis  
- Value assessment  
- Conclusions  

### PART II: Design
- Problem statement & Goal  
- Design  

### PART III: Reflection
- Reflection  

- References  

- Appendix
  - Graduation plan  
  - Position paper  
  - Technical details  
  - Climate and building technology information
As a student of the Technical University of Delft I have developed an interest in the field of cultural heritage. This resulted in my decision for the studio of RMIT. RMIT stands for Research, Modification, Intervention and Transformation of the built environment. These four domains are greatly determined by the value of the concerned object as cultural heritage. Restoration, conservation and reuse are central topics, all implemented on several scale levels, from material to the built environment.

Prior to designing comes the exploring and analyzing of what is there. Every work of architecture includes its own layers of history. It is crucial to get to know the history of the building and its context on all scale levels. With analyzing comes understanding and being aware of the meaning of the architectural object. The actual designing then means dealing with these historical layers. Making an intervention means adding a new layer of architecture while respecting the valuable historical layers that are already present.

As a student I have to take into account research, a value assessment, materiality and design.

Monumental buildings have gotten my interest for the last few years. Nowadays a lot is changing around the re-use (herbestemming in dutch) of monuments. Where in history programs were chosen that fitted the monument, the current situation is more about adapting the monument to a new program. This can be translated to expanding the monuments by adding modern extensions. A reason for my interest is that monumental buildings are vulnerable to interventions. Values -both material as immaterial- of a building and the effect on its context have to be maintained and strengthened the best way possible. In my eyes a complementing intervention can stand out, but can also be unnoticeable to the passerby.

As you have seen in the title of this report, the object of this graduation studio is the Armamentarium in Delft. Before presenting the structure of this report, I would like to give a concise version of the complex 'history.

The Armamentarium, a 17th century building, has an extensive history. Several building periods, interventions, functions etc., make this building unique in its own way. Delft, war, Golden Age, East-Indian Company, warehouse, power, accessibility, renaissance, classicism, armymuseum. These are all key-words for explaining the history of the Armamentarium.

In the end of the 16th century the economic position of the Netherlands improved. DELFT, as the third largest city in Holland, took an important position in this wealth. Artillery was an important aspect in this period, concerning the Dutch rebellion against Spain: 80 years of WAR. This war ended mid-17th century. Nevertheless, 1602 was the year of the GOLDEN AGE, the founding of the EAST-INDIAN COMPANY, and the construction of the Armamentarium as a WAREHOUSE for artillery items. The 17th century in the Netherlands knew economic, cultural, political and military POWER. The East-Indian Company as world's largest overseas trading company played a great part in this wealth. Both expansion as protection of this powerful position was necessary. This is where the military power was utilized. For Delft the desire of having the Armamentarium was great, likely a matter of status. For the Armamentarium the desire of a perfect ACCESSIBILITY was great, a matter of functioning of the building. Delft offered the location and context the building needed. During the 17th century the Armamentarium slowly expanded. By the 19th century a large area of the peninsula on which it is situated belonged to the building. Parallel to the building styles at the time, the buildings of the Armamentarium are built in RENAISSANCE and CLASSICAL style.

After the 17th century military operations slowly decreased. The end of the East-Indian Company was around 1800. During the 19th century moreover, warehouse functions are moved to Amsterdam, made possible by the new railroad. The function of the building gets lost. In the end of the 20th century, the building became the ARM-MUSEUM. Right now the building lacks a function. What significance do these key-words have when thinking of a new use of the building in the future? Appointed as state monument the Armamentarium with its several layers of history is a challenging object for the RMIT studio. Having been of great importance for the economical wealth of Holland the complex is anchored in the history of the city of Delft. My assignment as a student is to design an intervention that relates to the complex as well as to its surroundings, and to make The Armamentarium a place of meaning for the city again.
This P5 report presents to you the research and design that I fulfilled in the RMIT graduation studio, in the academic year of 2013–2014. This introduction will explain the structure of the graduation report. The graduation process is built up out of the following steps: research and value assessment, design, reflection. It is therefore obvious to divide this report into corresponding steps, starting with the research. In the research the analysis is presented. The analysis is executed on the following scale levels: the urban-, architectural- and technical scale level. This analysis is accompanied by a number of research questions which are treated in the relevant scale level. After the analysis, the essence of the Armamentarium is summarized in a value assessment. The outcome of the analysis and value assessment forms the starting points of the design. In the design part naturally the design is presented. The last part treats the conclusions, containing a reflection upon the graduation project. Final, a list of references is given, followed by the appendix. In the end I hope this report provides a complete picture of my graduation project, and that you will enjoy reading it.
PART I: RESEARCH

URBAN ANALYSIS

In the urban analysis the relation between the Armamentarium and its surroundings is analyzed. After orienting the following research questions came up:

- What is the relation between the growth of the city and the meaning of the Armamentarium within this city?
- What is the position of the Armamentarium within the diverse program of the city?

As a start therefore the growth of the city over time is investigated, starting in 1200. This growth does not stop right in the present; the future plays a role in this investigation as well. The Armamentarium is situated in an area that is redeveloping, which could mean that it might have a different relation with its surroundings. Water, building morphology, and infrastructure are influencing aspects. After this investigation some turning points are pointed out: moments in history and future that changed/will change the meaning of the Armamentarium within Delft.

To find out what the position of the Armamentarium is within the diverse program of the city, an analysis on the current program and functions in the city is done. What different areas (private, public etc.) are present in Delft, and in what kind of area lies the Armamentarium? In my opinion Delft is a creative city; a city that contains business, tourists, culture, technique, and more that makes it a city full of life. According to the book 10x Delft there are ten themes that make Delft a famous city: history, growth, industry, university, tourists, markets, festivals, music, water and green. Motivated by the themes in the book, and by the vision of Delft, I investigated which functions are present in the city that for me make Delft a creative city. This research question resulted in the goal to reflect the creative program of the city on the Armamentarium, and to connect the building in a physical way with the city center.

FOOTNOTES:

1 TUURENHOOT, T. & VERHOEVEN, G. 2011. Page 7
2 De Visie en agenda binnensted 2020, opgericht door het college van B&W van Delft in december 2012.
1. 1200

Delft is an important trade center; it has good connections over water. The green arrow shows the main route over the Oude Delf through the city. Almost all traffic is over water. Little traffic (by horse or walking) is over land. The red dotted lines point out the two oldest waterways in Delft (the Oude Delf on the left and the Nieuwe Delf on the right).

2. 1300

In 1246 Delft obtains city rights. From this moment Delft starts growing in size and inhabitants. An important city like Delft had to be protected by canals and city walls. Already we can see a small part of the city border, though it is not a city border yet, this we can see in the next drawing.

3. 1365

The Schie connected Delft with the ‘Maas’ in the south. In 1389 Delft got its own sea-harbor here: Delfshaven. The Vliet in the north connected Delft with The Hague, Leiden, Harlem and Amsterdam. From the 14th century on, Delft was defended by canals, city walls and six gates (of which two are double gates).

4. 1536

Delft is the third largest city of Holland. It had two large churches, a town hall, monasteries, two hospitals, an old men- and an old woman house, an orphanage, chapels, towers and mills. In 1536 a big city fire demolishes hundreds of buildings. This means that nowadays there are almost no buildings left from the middle ages.

5. 1675

The Golden Age started in 1602, the year the VOC was founded and the Armamentarium was built in between the two oldest canals of Delft, in front of a city gate. This age Delft was teased by disasters: a town hall fire in 1618, an explosion of a gunpowder tower in 1654 which demolished many buildings in the northeast. The Government did not want warehouses in the city anymore.

6. 1860

In 1847 the railroad came. More traffic arose on land. Military functions now moved to Amsterdam, there was a lack of space in Delft for these functions; it no longer was one of the biggest cities. Delft lost its military function. No longer were the city wall and – gates needed. All got demolished except for the Oostpoort. Settlements along the waterways start to grow, close to the Armamentarium.

7. 1981

Delft has expanded a lot outside of the city borders, towards every direction. After removing the city and Delft became attractive for new industries. A freeway replaces the canal on the west side of Delft. In 1965 the railroad was moved. It made place for the freeway and it was raised. From the beginning of the 20th century traffic is mainly over land. South and west of Delft traffic passes by. The canals lost their function as main traffic ways.

8. 2013

Not a lot changed during the end of the 20th century and the beginning of the 21st century. The structure of the middle ages is still present, with the two oldest canals as strong axes.
PART I: RESEARCH

1. 1536

This represents the situation before the Armamentarium is built. Delft has developed into a large city. Most traffic takes place over water; the main route goes straight through Delft, via one of the oldest canals. The city border is formed by canals and a city wall with gates. The spot the Armamentarium will take has a prominent position within the city: in front of the gate connecting Delft with the Schie, routing always passes the building.

10. 1860

The railroad caused the disappearance of military functions in Delft. It took the place of the former canal that formed the city-border. In this situation, traffic is over water as well as over land. It is right after the coming of the railroad on land, but right before the coming of cars and freeways. Delft lost its military function so the Armamentarium lost its purpose. The city wall and gates started disappearing. The surroundings opened up towards the Armamentarium.

11. 2013

The old city-border is no strict line anymore. It is a visual line, but Delft has expanded a lot outside it. The Armamentarium is clearly visible from the south side of Delft. The building has a view on the Schie, with its Zuiderzee and industry terrains. On this side a lot of traffic passes by. The function of the canals as traffic ways is lost; this was the function the Armamentarium depended on. The building, with the water almost unused, is now less attainable.

12. Near future

The railway zone wants to achieve a connection between the inner city and the southwest part outside of the inner city. Until now there is a clear border here, defined by a wall of buildings, a freeway and the railroad. With the railway going partly underground, and on the west side of Delft bringing back part of the old canal together with a green ribbon, how will the connection between the Armamentarium and its surroundings be? I think the Armamentarium will still be embraced by its canals with their houses (illustrated on the next page).
This research shows the themes that I associate with Delft. According to the vision of Delft, the city is a city of tourism and technology. They name four main aspects: technology, history, creativity and innovation. Written in the vision is the wish for a creative mix of public functions in the Armamentarium. They want to achieve this by working together with partners out of the city, creating a lively work-, creation- and meeting place where innovative developments are possible and are stimulated.

The ten themes named in the book 10x Delft that make Delft a famous city are: history, growth, industry, university, tourists, markets, festivals, music, water, green. By investigating several themes I can find out what for me makes Delft a creative city.

13. Market
The market in the historical city center on Thursdays and Saturdays brings life and movement into the city.

14. Food
Delft is full of restaurants and cafes, especially in and around the historical city center.

15. Shopping
The historical city center and the more modern Zuidpoort area contain a lot of shopping places.

16. Hotels
Around the city center hotels are present for tourists and visitors.

17. Cultural/touristic
The city center contains a lot of cultural attractions for tourists and visitors.

18. Technical University
Delft is known for its technological university, it is placed outside the city center.

19. Offices (architecture)
The large amount of architectural offices shows the great presence of business in Delft.

20. Industrial areas
Close to the city center are industrial areas. The one along the Schie-oevers is visible from the building.
The vision on Delft speaks about Delft as being the cozy living room of the Randstad. This triggered me. Therefore I analyzed the creative and public areas and the more private and intimate areas of Delft. The Armamentarium is in a mixed area, close to the public area of the city center. Its direct surroundings have no strong public or private characteristics.

21. Public
This image shows the public area of Delft, containing all places that are accessible for public.

22. Mixed
These areas contain both public as well as private functions. For example buildings with shops on the ground floor and living spaces on the upper floors.

23. Private
The private character of Delft exists out of mainly residential area, but also some private or public courtyards. All these are far away from the Armamentarium though.

24. Public and private
There is a quite clear division between the private, public and mixed areas. Interesting to see is that the borders of these areas mostly follow the canals. It is as if the structure of canals divides the city into different areas.

This research has made me seen opportunities to connect the Armamentarium in a physical way with the creative program of the city center.

25. Creative area: visitors & inhabitants
The purple colored creative area contains functions for tourists, visitors and inhabitants. I agree with the vision of Delft to give the building a creative mix of public functions. In this image I want to show the possibilities of the Armamentarium to connect physically to the public area of the city. The public area appears to be embraced by two canals. The position of the Armamentarium within these canals seems to make it possible to connect it with this area.

26. Creative area: business & innovation
Business and Innovation is present in the whole city and outside of the city. On the south of the Armamentarium an industrial area is present along the Schie, and right next to those the TU Delft. The Armamentarium is in open connection with the Schie and its Industrial area, so there is a strong visual connection with the water. A strong visual or physical relationship between the Armamentarium and the creative area discussed in this image however does not exist in my opinion. Therefore I do not fully agree with the vision of Delft. I think the Armamentarium should be a building that is attractive for all to visit, assigning public functions based on working, creating and innovation might shut out a great part of inhabitants.
Having analyzed moments in the urban growth that affect the meaning of the Armamentarium, as well as the current program that for me makes Delft an interesting city, a conclusion can be drawn. I took into account the close surroundings of the Armamentarium. The west side of the city center works as a visual border. The freeway and a wall of buildings separate the center from the west side of Delft. The red dotted line shows this border. It is dotted because at some points the wall is penetrated by a street or small alley for people to reach the center. With the coming of the new railway zone the connection between the center and the west side will not be increased. For me the Armamentarium is embraced by its surrounding canals and buildings, and does therefore not have a visual connection with all but the south side of Delft. On the south side the building has a wide view on the Schie with its mixed program of industrial, private and public functions. This connection is more visual than physical. The program of this mixed area I will therefore not reflect on the Armamentarium. A physical connection can be made with the north and east: the city center. The purple lines illustrate my idea of adding the Armamentarium to this public area. The program of this creative public area can be an inspiration for the new program of the Armamentarium. Besides reflecting the public program of the city on the Armamentarium, I also see possibilities to reflect some more private aspects on the building. Courtyards are not in the direct surroundings of the building. However, the building itself has some closed off, outside spaces that could be interesting. Furthermore the building lot used to contain a courtyard in the 16th and 17th century, that was later moved to another spot in the city. I would like to investigate in Q2 if I can create more intimate spaces within a public area. These spaces are in my eyes not private (they will be a part of a public zone), but can have the sense being a quiet and peaceful place within a busy context. In these outside spaces you might experience of the bustle of the public functions less.
PART I: RESEARCH

ARCHITECTURAL ANALYSIS

The main focus of the architectural analysis derived from a problem I stated. Therefore prior to introducing the architectural analysis, is the explanation of the problem statement: The Armamentarium is not built as one building; it exists out of various buildings put together. Together these buildings do not give a clear overview of the complex as a total. The complex is divided into buildings, which are again divided into several interior spaces. Walking through the buildings, I developed a fascination for the interior spaces. What triggers me is to find out what interior spaces these buildings on their own have; not looking at the total, but at the smaller and more individual parts that together fill the total. The following research question came up:

- What interior spaces in the Armamentarium I find valuable, and what aspects (material and immaterial) define these spaces?

With the help of literature I chose a number of aspects that play a role in defining interior spaces. This literature furthermore helped me putting my thoughts into words that you, as a reader of this report, can understand. These words do not go without drawings, sketches and diagrams that give an impression of the interior spaces. With the use of 3D computer models and perspective drawings I am able to show the appearance of the spaces. With the use of reduction drawings I can show the impact a specific aspect has on shaping a space. Moreover, a research about the functionality and routing – which are strongly related to each other – of the building now and in history helps me find the immaterial value of the spaces. Conclusions that are drawn out of this analysis are used later to emphasize the quality of the interior spaces.

Besides this main theme, several other matters are analyzed. This architectural part starts with an analysis on the growth of the building, linked to happenings in economical, military and architectural history. Then, after treating the research question, an inventory on the changing of the facades over time is given. Analyzing all of these matters helps to value the building on its architecture.

For a more detailed description of the main focus of this architectural analysis I would like to refer you to my position paper in the appendix, in which I explain my position within the field of heritage, in relation to the focus of my research in the graduation project.
1665: Other terrains and houses were added to the mail house and all together it became the Oost-Indisch Pakhuis, a warehouse.

Building F is an all cooking-house, when small house was built it is not clear.

1661: There was not enough space in Building E, in between Building E and terrain B two new buildings were built. Building D: small warehouse and connection building between the new- and old warehouse.

From 1682 until 1720 the East-Indian Warehouse was considerably enlarged. Several other houses that were already present were added.

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1826
The small buildings (5) were demolished.

1833
The forge (4) was extended until Building C.
An oil smokehouse (building F) was built next to the 'large warehouse', on the spot of the older oil cooking house.

1907 Until this year the Armamentarium had bought up almost the entire peninsula.
In 1907 the district court (building H) was built and with that several service homes. Former service homes on this spot were demolished.
The Armamentarium had to give up some space. Also a wall had to be built in between the district court and the Armamentarium terrain.

1986 During restoration work in 1976-1986 the forge was demolished, including the part of the north wall that was left. In 1986 a new building was built on this spot.
Also in the end of this century building G was built, a guardhouse and museum shop.

MILITARY/ECONOMICAL HISTORY

End 16th century
Expansion transport over water
Large army
Artillery was an important aspect

1568 – 1648
Dutch rebellion against Spain

17th century
Golden Age
Economic, scientific, cultural wellbeing
Trading
Political power
Military power, especially at sea

New warehouses are built

>1648
Economic growth
50 years of (religious) war

≈1698
Economic growth, especially in the industry

1799
End of the VOC

End 19th century
Lack of space: warehouse functions to Amsterdam (new railroad)

ARCHITECTURAL HISTORY

Beginning 17th century
Gothic and renaissance style

1647 – 1672
Building on a larger scale
Monumental buildings with ornaments
Display of new alloys

17th century
Classicism, vertical elements, less ornaments, natural stone preferred over bricks

End 17th century
No decoration
The entrance is the most present and central element

1826
A new entrance was built in connection with building C.

2004
A new entrance was built in connection with building C.

2013
The situation as it was in 2013, during the analysis of this graduation project.

After analyzing the growth of the Armamentarium on the peninsula the following can be said: The expansion of the Armamentarium was parallel to the happenings in the military and economical history.
With the start of the East-Indian Company and the Golden Age > the Armamentarium was built.
During the Golden Age there was military power > the Armamentarium got expanded.
With the ending of the East-Indian Company > in the Armamentarium stopped expanding significantly.
When military functions moved to Amsterdam > the Armamentarium sells some space on the peninsula.
Looking at the architectural history the following can be said: The building style of the Armamentarium was parallel to the prevailing building style at the time.
The 1602 building is built in renaissance style.
The 1962 building is built in classical style. (More about these styles in the 18th century are treated in a later part of the analysis)
Intrigued by the several interior spaces of the Armamentarium, I have read some literature that handles the perception of architectural spaces. Especially the book of Lou Michel —Light: the shape of space— I would like to introduce in this part. Michel wrote: “To know how people see is to know how to design for them.” Exactly this is what I want to achieve. Knowing how spaces are defined, and thus how people see them, will help me in the further design. As a start, I analyzed how daylight is present in the building. As Michel writes, light defines our visual world, light and architectural space have a close relation to each other, they influence each other. With light comes shadow, how are the spaces in the Armamentarium influenced by light and shadow. After this I focused on the routing and function of the building. These two aspects are closely related to each other and have a strong influence on how the spaces inside the buildings are shaped. Continuing, I searched for the spatial envelope. According to Michel, architectural spaces are defined by its boundaries. These boundaries can be walls, floors, ceilings and other major surfaces. Together these boundaries form the spatial envelope. Michel makes it clear that this spatial envelope is a conceptualization of space, without any temporary or movable objects inside. Apparently, edges and outlines are the first aspects the eye sees, after this it scans the surfaces within these outer contours. Sudden breaks —objects that disturb the continuous surface— weaken the perception of the outer contours. These sudden breaks can be windows, patterns, shadows in the surface, but they can also be objects within the space that is defined by surfaces. I therefore decided to leave objects within the spaces out of this analysis. In a later stadium, when I have defined the spaces, I could try to integrate them and see the effects on the perception of the spaces. Openings in the facades however I will take into account, simply because they have a permanent character, and in some cases they have a positive effect on the perception of the space. Besides boundaries, focal accents have influence on the perception of a space. They can attract or distract. Windows for me could work as focal accents, to attract one’s eye. In short: What is shaping the spaces inside the Armamentarium? I will focus especially on the elongated areas in the building, where the edges and borders are clearly perceptible.
Daylight infiltration has impact on the spaces inside. It is a matter of visualizing the things that are present and that we see. Some areas are relatively dark; they have large and deep floor plans and smaller window openings. Some areas are relatively light; they have smaller, less deep floor plans and larger window openings. According to Michel shadow is one of the finest features of light. They influence each other (Michel, L. 1996. Page 31). Below I drew two diagrams to make clear how the daylight infiltration creates shadows. The columns work together with the light to create light nuances, and they are the border between brighter and darker areas.
Some window openings are on the end of elongated areas. In the introduction of this analysis, I wrote about windows working as focal accents. Here I point out the positions of windows in elongated areas in the building. Being bright, these windows have the power to attract the eye. When standing in these areas, the windows work as focusing points. They are bright and striking elements in a sometimes relatively dark space. In these drawings for every floor plan is marked where these focusing points are present. Some are stronger than others (small windows in dark areas versus large openings in lighter areas). More about these focal accents is shown in the research for the spatial envelope later on.
When calculating the amount of daylight entering the building, the different facades can be compared with each other. I did not take into account the courtyard facades; these spaces are relatively small so less daylight enters the interior through these facades. I wanted to find out if there is a relation between the percentage of openings and the size (noted above the roofs) of the floor plans. To find out what impact opening the doors could have I calculated the percentages for the situation without and with open doors.

Building A: ± 860 m²
± 9.5% openings without doors
± 13% openings with doors
Building D: ± 1590 m²
± 6.5% openings without doors
± 16.5% openings with doors

A floor plan almost twice as large, has a smaller percentage of openings. The percentages change significantly when the doors are opened.
Some of the facades differ in their opening percentages on each floor level. These percentages I calculated, again with and without open doors.

Building A, ground floor:
- Doors closed: ± 5.5 %
- Doors open: ± 15 %

Building A, level:
- No doors: ± 12 %

Building E, ground floor:
- Doors closed: ± 15.5 %
- Doors open: ± 18.5 %

Building E, level:
- Doors closed: ± 6.5 %
- Doors open: ± 8 %

Building A has a more closed off ground floor, the plinth is higher, the higher level has a percentage of openings twice the amount of that of the ground floor, not taking into account the doors. With the doors however, the percentages differ less.

Building E has a more open ground floor; the plinth of the building is low. The way the openings are situated in the lower level define in a way the character of the building. High and small windows make the building look more introvert, the plinth is high. Larger windows that make you able to look inside make the building look more extrovert.
Routing used to be mainly over water. Via the canals artillery items could be transferred into the Armamentarium. Because the building was embraced by canals from three sides (east, south and west), this loading and unloading was very accessible. Nowadays the building is not accessible anymore via the water, though it is possible; it is not the way of entering. People can enter the site by foot, but only on the north side. The entrance in the north-east corner was the most used one during the time the Armamentarium was used as a museum. The black circle shows the very spot from where walking to the building while seeing it is the longest: 310 meters. If we want to enter the building from the Zuiderkolk, we have to go around the canals to reach the main-entrance in the north-east corner. This natural separation of the water between the building and the streets makes the building (appear) less accessible.
If the routing in the (empty) complex now is compared to the routing of the complex when it functioned as a warehouse there are not a lot of similarities. The warehouse did not have a large internal routing plan. It was more about getting inside the building with goods and after that storing them. As the Armamentarium got its museum function, several objects were built inside the former free floor plans. The routing of the complex changed because of these additions. With this museum function, the building became accessible to the public. This required an internal routing through the buildings. With this routing the different building parts got connected. Because the buildings did not give a lot of opportunities to connect, it resulted in a slightly complicated routing plan. The empty building now, has a less clear routing because of all the new permanent additions the museum required.
To investigate the routing in 2013 I chose the museum function. This explains better which areas are open and which are not. The composition of the functions in the museum is different from that of the artillery warehouse. The purple areas are exposition areas. An interesting point is that the buildings 1602 and 1692 are kept open on the ground floor and on the first level (the most public areas). By that I mean that there are hardly any permanent walls or items placed, except for the sanitary cells/elevator shaft.

The composition of the functions in the Armamentarium as a warehouse was clear: straight axes of storage space with in between space for walking and bringing the items to its place. Unfortunately I could not find out what the function of the light grey areas is (see appendix for the references). They are drawn different so they don’t look like storage space. These areas are also seen outside of the building. It could be possible that these areas are indicated zones for packing and unpacking, since they are either close to the entries, or outside where there is daylight.

The comparison of the routings already showed a great change. The functions are much more fragmented in 2013 than they were in the 17th to 19th century.
FUNCTION & ROUTING

Function and routing have always been in close relation to each other. Together with the change of the function (from warehouse to museum) the routing changed drastically.

The concluding drawings here show that the routing of the warehouse was all about the connections between the inside and the outside. It was based on the transport of items, getting them inside the Armamentarium. The internal route was as clear as possible, and based on an easy transport of the items to their storage places.

The museum was a public function; this change resulted in a completely different way of using, and therefore walking through the building. The connection with the outside got reduced significantly, and the internal route got longer and more complicated. The route connected the different buildings with each other. Suddenly from the inside all buildings were approachable, and not from the outside.

With the building being emptied from all of the museum items, the floor plan seems to be freer, but the internal route remains complicated, as can be seen in Image 46.

**Image 45**

- Storage space
- Unknown use
- Exposition space

**Image 46**

45. situation 17th – 19th century, artillery warehouse

46. situation 2013, no function
PART I: RESEARCH

ARCHITECTURAL ANALYSIS

SPATIAL ENVELOPE

The images on this page show impressions of the spaces. The edges and contours of the surfaces are pointed out. Spatial boundaries can be located in the forms of walls, floors, ceilings and other major surfaces (Michel, 1996, page 102). Together these boundaries form the spatial envelope. Furthermore, Michel writes that a spatial envelope is best identified by the dominant boundaries that shape a clearly defined volume (page 103). Building A (image 47) and building D (image 48) contain several elongated areas, in my opinion these are the spaces that are defined the most by their boundaries. Looking at the impressions, I decided what boundaries form the spatial envelope:
- Floor and ceiling are horizontal boundaries
- Rows of columns together form boundaries
- Walls are vertical boundaries.
Also I decided what aspects have influence on the appearance of the surfaces of the boundaries:
- depth/shadow
- color/material
- focal accents
- breaks/disturbing objects on a surface

47. building A (1802)

48. building D (1992)
For the interior spaces of building A the aspects are shown that have influence on the appearance of the surfaces for building A.

- depth/shadow: When a feature has shadow, the shadow gives visual “weight” (Michel, 1996, page 40). The wooden beams in the ceiling create shadows. The constant repetition of the beams creates a constant relief of depth and shadow on the surfaces.

- color/material: Colors and materials make the surfaces differ from each other. This is more obvious in image 47 and 48, where different colors are used. Every color attracts light in a different way, and is therefore brighter or less bright than others.

- focal accents: Focal accents catch the eye when scanning the environment (Michel, 1996, page 62). Michel names a few things that could be focal accents: People, movement, brightness, high contrast, vivid color, strong pattern. The windows work as focal accents in my opinion. They possess brightness and are contrasting with the sometimes dark interior. I think only windows at the end of an elongated area work as focal accents, the others are more distracting than attracting (see next).

- breaks/disturbing objects: Things like shadow, shape, or color patterns lying on the plane of a surface can interrupt a surface by creating edges. These edges compete with the edges of the boundaries (Michel, 1996, page 11, 12). In my opinion the windows are forming breaks, some more than others. In image 47 and 48 for example, the windows together form a more continuous composition. This I find less disturbing than the window/door composition in image 45 and 46, where there is no repetition of windows of the same size and type.

SOURCES:
PART I: RESEARCH

CONCLUSION: SHAPING SPACES

To define the quality of the space, I analyzed several aspects that were of influence:

**Material aspects:**
- Boundaries that together form a spatial envelope: walls, ceiling, floor, rows of columns.
- Aspects of influence for the perception of the spatial envelope: depth and shadow, color and material, focal accents, breaks/disturbing objects.

**Immaterial aspects:**
- The routing over time.
- The function over time.

Together for me, these aspects define strong interior spaces pointed out with orange arrows in Image 49. These spaces I find valuable. Material aspects are responsible for perceiving the space as it is. Immaterial aspects like function and routing have also been of great influence in shaping these elongated spaces.

The grey arrows are spaces that I think have less strong boundaries. I have no extensive analysis of these spaces, so that may not give me the right to draw conclusions for these spaces. However, Images 50 and 51 already show that the spatial envelope here is less defined. The area is shorter and boundaries are less defined. The zigzag lines show areas that for me have the least strong boundaries, which are in my opinion the spaces in between the valuable interior spaces.

There are also objects within the interior spaces (not accents on the surfaces) that change the perception of the spatial envelope (Image 52). I did not show these objects in my analysis. This does not mean that I already eliminated them. To find the quality of the interior spaces, I used reduction drawings, in which I only show the aspect I am analyzing. I will either find a way to work with them without them affecting the quality of the space, or still eliminate them.

ARCHEITECTURAL ANALYSIS

49. defined interior spaces

50. space a

51. space b

52. objects in the interior spaces
PART I: RESEARCH

ARCHITECTURAL ANALYSIS

Renaissance style masonry with speklagen of natural stone
Cross frame windows with wooden and/or stone framing
3 building layers
Gables

1602

1751

1860-1890

1951

1976-1986

2013

1. Building layers
Attic floor was lowered 0.5 meter
Placement of the current window framing (question marks mean that I am not sure how those windows looked like after the intervention)
On the east and west facade two polik deklenen, drielingen are replaced by tweelingen.
Courtyard: 6-pane windows were placed in the cross-frames

Plastering of the facade
Removal gables, without making changes to the roof structure
Flemish facade with lifting hatch was placed on the south facade

De-plastering of the facade, the renaissance decorative facade can be seen, but it is damaged. Already in 1934 the 4 small windows on the north facade were placed.

Renewal of the six pane windows in the courtyards
Re-plastering of the facade
The 4 small windows in the north facade are removed

A large square window replaced a wooden door in the north facade.
In the east and west facade the polik deklenen are again drielingen.
Courtyard: the chimneys are removed

SOURCES:
Bouwhistorische documentatie: Armamentarium, Korte Geer 1 Delft, Afbeeldingen (Rijksgebouwendienst, Bureau Rijksbouwmeester, augustus 1997)
PART I: RESEARCH

ARCHITECTURAL ANALYSIS

HISTORY TERRAIN B (1660) & FACADES

CONNECTION BUILDING C (1692)

1660

Some small buildings present on the 1660 terrain are demolished and a small guardhouse and workplace building are built.

1692

The connection building is built.

1833

The workplace building gets lengthened up to the connection building; it also now exists out of an extra building layer. Two small windows are added to the east facade of the connection building.

1934

This year the roof of the workplace building is flattened.

1976–1986

The north facade of the small guardhouse is changed into the current composition; the large window in the west facade got replaced by two smaller windows.

2013

End of the 20th century the addition to the east facade of the connection building was made; the modern entrance building.

SOURCES:

Bouwhistorische documentatie: Armamentarium, Korte Geer 1 Delft, Afbeeldingen (Rijksgebouwdienst, Bureau Rijksbouwmeester, augustus 1997)
55. Facades Building D over time

**HISTORY FAÇADES BUILDING D (1692)**

- **1692**: Classical style façade: masonry with sharp edged openings.
  - The north façade was blind. The south façade was blind. The workplace building with its roof was in front of this façade.

**PART I: RESEARCH ARCHITECTURAL ANALYSIS**

- **1867**: Window openings were made in the north façade.
  - Courtyard: A lot of blind niches are present.

- **1885**: In the courtyard the lower windows were enlarged.
  - In some of the blind niches glass is placed.

- **1934-1940**: During the Second World War doors were added to the north façade.
  - The two large doors in the north façade were removed and replaced by the current wooden door. The windows are replaced by windows similar to the windows above.

- **1976-1986**: Openings in the south façade are closed off.
  - Courtyard: Some middle openings are closed.

- **2013**: The east and west façade did not change significantly.
  - Overall, the classical style is maintained in all façades.

**SOURCES:**

- Bouwhistorische documentatie: Armamentarium, Korte Geer 1 Delft, Afbeeldingen (Rijksgebouwendienst, Bureau Rijksbouwmeester, augustus 1997)
TECHNICAL ANALYSIS

The technical part of the analysis handles an inventory on the structure, the structural elements, and the technical aspects that contribute to defining the interior spaces of the Armamentarium. The following research question came up:
- What structural elements have influence on the appearance of the spatial boundaries?

The technical analysis in a way complements the architectural analysis. However, here I will illustrate the structure of the building more detailed. This way I can emphasize arguments I have already introduced in the architectural analysis.

The analysis starts with an analysis on the overall measurements in the building. After this, the structure of the building is analysed: the load bearing structure and the structure of floor beams. Here I will search for either disturbing or positive things in the structure that have influence on the boundaries of the spatial envelope. The last part zooms in a bit more on structural elements within the building. These analyses I can use later to value the building on its technical aspects.
The sections shown in images 56 and 57 give vertical measurements of the buildings A (1602), C (1692) and D (1692).

Image 58 gives all the horizontal measurements of the buildings. Some common measurements are present. For example in both building A and building D, the bay size is the same (marked orange). There is an exception in building D: the measurement from wall to wall on the east and west side (marked green).

To measure all these sizes I used the floor plans provided on blackboard. I traced the outlines and tried to do this as exact as possible, but this means that not all measurements are exact.

SOURCES:
Bouwhistorische documentatie: Armamentarium, Korte Geer 1  Delft, Afbeeldingen (Rijksgebouwendienst, Bureau Rijksbouwmeester, augustus 1997).
These drawings show the importance of the masonry shell as an important structural part of the building. This shell together with column rows (standvinken) carry the girders and with that the floor. These column rows in building A and D are situated on the line where two slopes of the roofs come together. These roof caps are equally sized, thus the column rows split the areas exactly in half. These areas have the same width in both building A and D (already illustrated in image 58). With this I would like to refer to the definition of the interior spaces I mentioned in the architectural analysis. The column rows not only work as surfaces, they also create areas with equal widths. Also, these column rows do not function as closed off surfaces, they are perforated surfaces. This makes it possible to see the column rows as objects in the middle of a larger spatial envelope, emphasizing the shape of the elongated interior spaces. In the image below the larger spatial envelope is shown.

Girders carry the floor. On the ground floor of building A the girders work together with joints (kinderbalken), here the density of the girders is lower than in the rest of the building, where only girders are used. In the longest directions of the buildings, the whole of wooden girders goes from wall to wall, east to west (see green arrows for direction). In the shorter directions you see the girders change direction (orange arrows). These girders together create a balanced surface, without distractions of girders moving directions (disturbing accents).
Wooden window framing
Single glazing
Wooden shutters
Wooden lintels

Stone cross-frame
Window framing
Single glazing
Wooden shutters
Wooden lintels

Wooden columns:
1. wooden column with: stone base (a), ‘korbeels’ (b) and ‘sleutelstuk’ (c)
2. wooden ‘onderslagbalk’
3. wooden girders
4. wooden floor

Wooden columns:
1. wooden column with: ‘korbeels’ (a) and ‘sleutelstuk’ (b)
2. wooden ‘onderslagbalk’
3. wooden girders
4. wooden floor

Roof structure:
1. ‘spantbeen’
2. ‘tussenbalk’
3. ‘korbeel’
4. ‘gording’
5. ‘standzoontje’
6. ‘windschoor’
7. ‘dakbeschot’
8. ‘tengel’
9. ‘panlat’
10. ‘dakpan’

SOURCES:
Bouwhistorische documentatie: Armamentarium, Korte Geer 1, Delft, Afbeeldingen (Rijksgebouwendienst, Bureau Rijksbouwmeester, augustus 1997).
Wooden columns:
1. Wooden column with: stone base (a) ‘korbeels’ (b) and ‘sleutelstuk’ (c)
2. Wooden ‘onderslagbalk’
3. Wooden beam with: girders (a)
4. Wooden floor

Wooden columns, same as ground floor but without stone base.

Wooden gate with brick curved ‘frame’ and windows above doors.

Wooden gate with brick curved ‘frame’ and ‘spinnekopraam’ above doors.

Wooden window framing
- Single glazing
- Masonry lintels

Bricked openings
- Masonry lintels

Bricked opening (blind niche)
- Masonry lintels

Wooden window
- Framing
- Single glazing
- Masonry lintels

6. Brick opening (blind niche)
- Masonry lintels

Wooden gate with brick curved ‘frame’ and windows above doors.

Wooden gate with brick curved ‘frame’ and windows above doors.

Wooden window framing
- Single glazing
- Little load bearing (wind, rain)
- Masonry lintels

Bricked openings
- Masonry lintels

Bricked opening (blind niche)
- Masonry lintels

Wooden window
- Framing
- Single glazing
- Masonry lintels

6. Brick opening (blind niche)
- Masonry lintels

Wooden gate with brick curved ‘frame’ and windows above doors.

Wooden gate with brick curved ‘frame’ and windows above doors.

Wooden window framing
- Single glazing
- Little load bearing (wind, rain)
- Masonry lintels

Bricked openings
- Masonry lintels

Bricked opening (blind niche)
- Masonry lintels

Wooden window
- Framing
- Single glazing
- Masonry lintels

6. Brick opening (blind niche)
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Wooden gate with brick curved ‘frame’ and windows above doors.

Wooden gate with brick curved ‘frame’ and windows above doors.

Wooden window framing
- Single glazing
- Little load bearing (wind, rain)
- Masonry lintels

Bricked openings
- Masonry lintels

Bricked opening (blind niche)
- Masonry lintels

Wooden window
- Framing
- Single glazing
- Masonry lintels

6. Brick opening (blind niche)
- Masonry lintels

Wooden gate with brick curved ‘frame’ and windows above doors.

Wooden gate with brick curved ‘frame’ and windows above doors.

Solid masonry wall
- ±0.6m

(supporting) structure

±4.6m

±3.7m

±4.2m

±3.5m

±4.6m

±3.5m

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VALUE ASSESSMENT

The value assessment exists out of two parts. The first part is a matrix in which aspects are placed opposite dimensions.

Dimensions: general historic value
              urban values
              architectural historic values
              construction historic values
              functional values

Aspects: location and context
         form and design
         spaces
         materials
         construction elements
         construction detailing
         tradition and techniques
         use and function

Every dimension has aspects that are important for that dimension. But not every aspect is important for every dimension, in this case a cross is placed. When a specific dimension only has two aspects that are filled in, this does not mean that this dimension is less important. Important aspects are marked green.

For the value assessment I used as references:
- Richtlijnen bouwhistorisch onderzoek
- The Nara grid: An evaluation scheme based on the Nara Document on Authenticity

Together with these two references, and my own thoughts about what for me was interesting to evaluate, I chose the dimensions and the aspects.

The second part is the value assessment in image, based on the information in the matrix. Drawings of facades and floor plans show how I value specific elements.

SOURCES:
Richtlijnen bouwhistorisch onderzoek (RCE, Stichting bouwhistorie Nederland, VNG, Atelier Rijksbouwmeester, RGD, april 2009)
The Nara grid: An evaluation scheme based on the Nara Document on Authenticity (Van Balen, 2008)
Delft was one of the most important cities for the economical and military wealth. For the appearance of Delft the building was of importance; the city gave the city expanded towards the north and east. With changes over time in the location and its context was of major importance for the function of the building. The building needed this location with its great connections over water and the city like Delft, powerful in its economical and military wellbeing and its size.

The Armamentarium was built as an artillery warehouse. In 1602 in Delft the Armamentarium was built as an artillery warehouse. Delft was well accessible via water. The complex was built on a prominent spot in the city, the spot where all traffic over water entered Delft. The location of the Armamentarium regarding its use and function was of major restrictive aspect in this use.

The Armamentarium is built with a thick and solid shell of masonry, together with wooden roof construction and the tiled roof. Also typical is the flemish gable on the south facade of building A, which was placed when all the original gables were removed. Other typical elements are the large openings with shutters and at some window frames and only decoration in the middle is very traditional. The facades of the VOC warehouse is changed a lot over time, the west facade has some original window framing left.

The traditional facades in renaissance and classical style are still partly present. The facade of the 1602 building undertook the most changes: a large opening with shutters was replaced by a large opening with glass, middle wall was changed in the plane of the face. Some other changes were made to make it to French style, the lower part was changed to French style and the upper part was changed to classical style.

In 1860-90 the gables were removed, one, on the south facade of building A, got replaced by a Flemish gable. The use and function of the building asked for a specific arrangement of construction elements. Long, deep and open spaces were required for both the transport as the storage of items.

The traditional warehouses were small and deep (approximately 30 meters). The use of storage space. The Armamentarium existed out of elongated interior spaces. These small and deep spaces were used for storage. The less elongated spaces were, besides as storage space, also used as transport zones.

Building overall has a trapezium shape. The two largest buildings (1602 and 1692) have inner courtyards. Besides the walls as outer loadbearing shell, inside the building rows of wooden girders were placed, some with a stone base and covered with wooden roof structures. The interior space was divided into different zones, with wooden girders and the roof construction.

Interesting details are:

- Wooden columns, sometimes with a stone base.
- Wooden roof structures.
- 400 to 600 mm thick, solid masonry walls.
- When the attic floor was lowered 0,5m, the old roof construction was changed. The new roof construction was not changed.
- 400 to 600mm thick, solid masonry walls, which support the wooden girders and the roof construction.

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Building A (1602), outer facades:
The plaster layer has a positive value because it protects the masonry. When removing the plaster, damage will be done to the bricks. This was the case already when the plaster layer was removed in 1951.

Building A (1602), courtyard:
The original appearance of the facade of the 1602 building is still visible in the courtyard.

Building A (1602), guardhouses:
The masonry of the small guardhouse is still original, except where old windows have been removed and new bricks had to be added.

The workplace building has been demolished completely in 1976-86; therefore the masonry does not have a high value. The shape of the east facade however reminds of the shape of the old guardhouse.

Connection building C (1692), facades:
The connection building has original masonry. The entrance building in front has no valuable exterior aspects.
Building D (1692), outer facades

The original masonry has never been covered; all of the original materials are present and visible.

The original sculpture in a blind niche in the center of the east facade dates from 1692. It represents the weapon of Holland.

The original ornament in the center of the west facade dates from 1692. It represents the weapon of Holland together with 4 family weapons.

Buildings E & F, facades:

The original masonry of the VOC building is covered by a layer of plaster; this layer has never been removed. It is not known when this layer was applied.

The west facade of the oil smokery is original; this is a part of the old wall that was the border between the terrain of the Armamentarium and the water/other building properties. The other two walls have been replaced later.
**PART I: RESEARCH**

**Ground floor:**
- Building A: The pavers on the floor date back to either 1602 or 1751.
- Guard houses: All interior aspects are modern.
- Connection building C: façades might have been plastered originally.
- Building D: The pavers on the floor probably date back to 1837.
- All interior walls were originally plastered.
- Building E: The floor is modern (including the sunken theatre floor). The interior walls are plastered; not original. An original (1826) spiral staircase is present next to building F.
- Building F: The floor tiles are modern. All interior walls are plastered, not original.

**First floor:**
- Building A: The wooden floor is modern, approximately 20 cm beneath are parts of the original wooden floor from 1602. All staircases are probably from 1751.
- Guard houses: All interior aspects are modern, including the roof.
- Connection building C: The floor is modern. façades might have been plastered originally.
- Building D: Underneath the modern wooden floor are parts of the 1837 floor and maybe even the 1692 floor. All interior walls were plastered originally.
- Building E: The floor is modern. An original (1826) spiral staircase is present next to building F.
PART I: RESEARCH

SECOND FLOOR:

Connection building C: The floor is modern.
Building D: Underneath the modern wooden floor are parts of the 1837 floor and maybe even the 1692 floor. All interior walls were originally plastered.
Building E: All interior walls are plastered, not original.

THIRD FLOOR:

Building A: The wooden floor is modern, beneath this floor are parts of the old wooden floor from 1602.
Connection building C: The floor is modern.
Building D: Underneath the modern wooden floor are parts of the 1837 floor and maybe even the 1692 floor.
Building E: The floor may contain original parts.

VALUE ASSESSMENT

- High monument values
- Positive monument values
- Indifferent monument values
- Monument values ceiling/roof
- Monument values exterior/interior aspects
The conclusion of the research provides a link between the outcome of the analysis and the starting points of the design. The research forms the base of the graduation project. The true values of the Armamentarium came forth out of this research. In this conclusion the research questions are concisely answered.

**URBAN ANALYSIS**

- What is the relation between the growth of the city and the meaning of the Armamentarium within this city?

The Armamentarium takes up a prominent spot in the city. It was the entrance of Delft. Delft grew all around this spot. A big change in the meaning of the Armamentarium within the city came with the shift from traffic over water to traffic over land. Where traffic used to pass the building over water directly, it now passes by over a freeway, not directly passing the building. Nowadays the Armamentarium has a clear visual connection with the Zuidkolk on the south. No strong connection has grown between the Armamentarium and the west part (railway zone, freeway) outside of the city center.

- What is the position of the Armamentarium within the diverse program of the city?

The diverse program of the city can be reflected upon the Armamentarium. A physical connection can be made both with the creative and public program of the city center, as well as with the more private and intimate program of the city. The connection with the south (Zuidkolk, Schie-ovens) is purely visual. The Armamentarium and the city have no strong visual and physical connection with the technical university of Delft. A physical connection in the new function is therefore not feasible.

**ARCHITECTURAL ANALYSIS**

- How, and by which aspects, are spaces shaped inside the building?

In the architectural analysis I stated that the column rows work as surfaces, they are one of the boundaries that form the spatial envelope (the interior space). Analyzing the structure of the building I found out that the column rows can also work as objects within the interior space, emphasizing the shape of a larger spatial envelope. This I stated because the surface of columns is not closed off, it exists out of a repetition of vertical elements with nothing (air) in between them. They split this larger spatial envelope exactly in half and can therefore in my opinion emphasize the shape of the interior space.

**TECHNICAL ANALYSIS**

- What structural elements have influence on the appearance of the spatial boundaries?

Now, and by which aspects, are spaces shaped inside the building? The interior spaces of the Armamentarium are defined by material and immaterial aspects. For me, valuable interior spaces are shaped through spatial boundaries and the routing and function the building had in history. The spatial boundaries create some clear elongated areas. The function and routing were in close relation to each other, they caused a clear and rectilinear layout of the floor plans. Objects on the surfaces of the boundaries or within the interior space can strengthen or weaken the perception of the space.
THE ARMAMENTARIUM: A REFLECTION OF DELFT
A creative mix of functions within valuable interior spaces

GRADUATION REPORT
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Mentor architecture: Nol Hermkens
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TU Delft, Studio RMIT
Graduation date: 04-07-2014
PART II: DESIGN PROBLEM STATEMENT & GOAL

PROBLEM STATEMENT
The Armamentarium is not built as one building; it exists out of various buildings put together. Together these buildings do not give a clear overview of the complex as a total.
The complex is divided into buildings, and the buildings are again divided into several interior spaces.

GOAL
The new program is a reflection of the creative program of the city center. Together with the shapes of the interior spaces the interventions create a harmonious arrangement.
The goal is achieved whilst on the one hand connecting the individual buildings with each other, and on the other hand embracing the fact that the buildings work as individuals.
The chosen program on the one hand refers to the past, and on the other hand to the present. The market function refers to the VOC and its history of trading goods and spices. The other buildings with their functions refer to the current creative program of the city center.

An important decision in my design was to divide the complex into a merging ground floor layer and a layer of individuals on the levels. The market theme does not only bring the several buildings together, but also makes a connection between the complex and its surroundings. The individual functions on the higher levels are just as public, but in a more tranquil way.

The masterplan makes the accessibility between the Armamentarium and the direct surroundings better; the complex will appear more accessible and therefore invites the passerby to enter the peninsula.

A REFLECTION OF DELFT: CREATIVITY & HISTORY

UNITY
VERSUS
INDIVIDUALS

ACCESSIBILITY
As written on the previous page, the market function refers to the VOC past. Not only in function, but also in use. In the floor plan therefore the routing of the artillery warehouse is brought back. As an extra addition I created a public and a logistic side: the public side on the more open east side, and the logistic side on the more closed off west side. The logistic theme of the market is exploited some more by adding a route for loading and unloading on the outside of the building. This way all doors will be used again, just like in history.

To make the routing as clear as possible, the two small guardhouses are demolished. A new facade is necessary to maintain the ensemble of individual facades, which for me was a valuable gain. With the new facade a new and stronger connection is made with the direct surroundings of the complex. The old gate that was present in between the two guardhouses is brought back in a modern way. The new facade also makes it possible to continue the hanging of the lifted street.

The water is free to reflect the image of the front facade, nevertheless the lifted street is visible and inviting.
The shape of the lifted street is designed to appeal inviting. A formed girder makes the gesture of opening up, pointing to the sky. This form makes it possible to hang the street to the facades. A thick element on the side of the facade is one of the visual highlights for the facades and the street. This way the facades are not strongly split up into a part below and a part above the street. The design of the lifted street allows enough daylight to penetrate underneath the street.
Though the market has an outside climate, a shelter is desirable for when it rains. The courtyards are covered by a structure of cables and a point-fixture system for the glazing. I have chosen for this construction because of the light appearance it has. There will not be a heavy structure of girders to carry the glass. This way the appearance of the courtyards will not be affected in a negative way. In my calculations in the appendix you will read more about this process.

Terrain B is not covered, here the market stalls themselves will provide in shelter by large roof caps. These oversized roof caps will at the same time distract you from only seeing the high and plain facades around the terrain.
The market stalls inside the buildings are organized in a way that the rows of columns are the center objects of the spaces. Along the columns the public route is placed. Along the masonry walls the logistic route is placed. Within the furniture of the stalls, heating, electricity, and water is kept. This furniture also gives the opportunities for merchants to present their items to trigger the visitors.

The market stalls 1692

Via the lifted street the individual buildings can be reached. In the 1692 building both entrances are connected to a glass entrance; these entrances lead you to the welcoming area. For these entrances fire resistant glass is used (pyrobel), since they are directly connected to the flight route.

In the 1602 building there is no permanent division between the entrance door and the interior space. A thick curtain as a non-space taking object keeps most of the draft away. Further furniture leads you to the welcoming area (bar).
Interventions in the interior should be subordinate to the existing structure of the monument. As is clear by now I value the interior spaces highly, and do therefore not want to divide the floor plans by using objects that prevent you from seeing the total space. This results in a clear routing, as in the ground floor market. At the same time this means that I integrate technical aspects within interior objects and floors/ceilings.
For the 1692 building (the workshop building) I designed furniture with sliding doors. The images show how it is possible to create various interior spaces, but never to lose the openness of the total interior space. The whole surface of the ceiling is not interrupted, as well as the surfaces of the walls and the columns.

Using furniture as objects to hide technical aspects as well as to divide several spaces within the interior, a free floor plan arises. From most of the interior a clear overview of the total interior space is possible. Also important is the fact that the spaces can be used in their totality whenever needed; mostly there are no permanent defined spaces. Flexibility is a key word here.
The 1602 building is in closer connection with the courtyard (smaller floor plan, larger windows, higher ceiling). Reacting upon the direct surroundings the floor plan is divided into different atmospheres. The lounge on the quiet side is designed with cushions, soft furniture and bottles hanging from the ceiling, to reduce noise. Kitchen and restaurant have a strong visual relation with each other. By playing with lighting on the east and south side I can make the building look inviting during night time.
PART III: REFLECTION

Introduction
In this document I will reflect upon my graduation project, I will explain the relationship between my design and the research I have done, and how my approach in the whole process did or did not work.

Studio
The graduation studio I am joining is the RMIT studio: Research & Education of Modification, Intervention and Transformation. The concerning building is the Armamentarium—an also known as the army-museum—in Delft. This complex used to belong to the East-Indian Company and functioned as a military warehouse. After serving this storage function it became the army-museum. The building is now empty and unused.

1. The relationship between research and design
My research started with an analysis on the urban, architectural and technical scale, as well as a value assessment.

In the urban analysis I did a research on how Delft grew throughout the ages. I also investigated the creative program of the city center. I analyzed these subjects in relationship with the Armamentarium. This urban analysis gave me a clear opinion about the relationship between the complex and its surroundings, in terms of visual and physical connections and boundaries. As a result of this analysis, I decided to reflect the program of the city on the Armamentarium. The new program also reacts upon the close visual surroundings.

Images 1 and 2 show my findings in a brief sketch. In the design I am connecting the program of the Armamentarium with the creative program in the city center. This physical connection resulted in a public route on the one side, and a logistic route on the other side of the complex. The wide view on the south is maintained.

Images 1 & 2: Self reflection, physical connections/borders, Public and logistic uses.

The architectural analysis I focused on the interior spaces. Fascinated by the shapes of the interior spaces I did a research on what aspects, material and immaterial, made these spaces appear the way they do. Image 3 shows the basic material aspects within the spatial boundaries of a certain interior space, that for me define the appearance of this interior space.

This analysis helped me designing a composition within the interior spaces, subordinate to the boundaries (walls, floor, ceiling, columns) of the spaces. I eliminated objects that did not, and added objects that did harmoniously integrate in the interior spaces. Throughout the whole process I have been busy trying out different shapes and compositions to fit in the building.
In the technical analyses I focused on the primary technical supporting system. This analysis is overlapping a great part of the architectural analysis. Walls and rows of columns are striking elements that define how we perceive the spaces within the complex. As a part of the technical analysis I investigated the direction of beams carrying the floors. In the design these directions serve as a guiding matter.

The value assessment has helped me finding arguments to underlay my interventions. Throughout the whole design process my decisions were tested to the value assessment. Overall I have eliminated one large element that I found valuable in the assessment: a small guardhouse on terrain B. My argument for demolishing this guardhouse was the value the terrain B got by this move. This upgrade meant that other values I stated in my value assessment, could be strengthened more. Overall I still feel a slight sadness for removing the guardhouse. It is a valuable historical building which can never be brought back. For the chosen program on the ground floor (a market) I did several small analyses on markets and their floor plans. Though this helped me understanding how market stalls could be configured, overall these analyses were not used during designing. An explanation for this is that I was very much bound to the typology of the floorplan. I wanted to bring back the former routing of the artillery warehouse, and had to design my market stalls around this routing.

2. The relationship between the theme of the studio and the subject/case study chosen by the student within this framework. RMIT stands for Research, Modification, Intervention and Transformation of the built environment. These four domains are greatly determined by the value of the concerned object as cultural heritage. Restoration, conservation and reuse are central topics, all implemented on several scale levels, from material to the built environment. Students are to take into account research, a value assessment, materiality and design. The Armamentarium as a state monument, is a challenging subject for the RMIT studio. The complex has several layers of history, since it has been built in several stages of time. As a building it was of great importance for the economical wealth of Holland. The complex is anchored in the history of the city of Delft. The interventions will have to relate to the complex as well as to its surroundings. How can it become a place of meaning for the city again?

3. The relationship between the methodical line of approach of the studio and the method chosen by the student in this framework. In the studio of RMIT, prior to designing comes the exploring and analyzing of what is there. Every work of architecture includes its own layers of history. It is crucial to get to know the history of the building and its context on all scale levels. With analyzing comes understanding and being aware of the meaning of the architectural object. The actual designing then means dealing with these historical layers. Making an intervention means adding a new layer of architecture while respecting the valuable historical layers that are already there.1,2 To find out the meaning and the value of the complex, my research was greatly based on investigating how the interior spaces are perceived. By researching the typology of the building I could implement this investigation. Being aware of the meaning of the architectural object for me meant being aware of its structure, material and spaces. My way of dealing with this within the complex is making interventions that are always subordinate to the original interior spaces. Though from different viewpoints, it is always possible to see the buildings’ boundaries that capture the interior spaces. Overall, research and design are closely related throughout the whole graduation project: Research by design and design by research.3 During analyzing I was already designing, during designing I will keep on reflecting back to my analysis.

4. The relationship between the project and the wider social context. The new program is a refection of the program of the city center: a creative mix of functions. The new program makes both a connections with the past as well as with the present. The former artillery warehouse brings back the VOC in a modern context: a large market hall. This is not the only history it brings back: the (public) archive of Delft is placed in the VOC building. As a result of the urban analysis, the remaining program exists out of a restaurant and meeting rooms in building 1602, and workshop spaces in building 1692. The complex will be used by a diverse group of people. Activities will take place from early in the morning until late in the evening. Spaces within the complex can be used in a flexible way, so that the use can be adapted to the needs. An improvement of my intervention is that people passing the Armamentarium will now be triggered to enter the complex. Not only it is made easier to access the complex, due to the activities/noises, lighting that will take place throughout the whole day and evening, you are invited to enter.

1 Brochure_RMIT_Masters_2013-2014_semester_1
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In the design then my goal is to present the interior spaces within these boundaries without losing the experience of the exterior space. This means that I need for the function work together with the structure of the Armamentarium, rather than in contrast with it. With my interventions, buildings like the old plans, facades and sections. In 3D I then am deploying my interventions into the 3D computer model to test if the design still matches my goal. A strategic viewpoint from which you see the history of the space, in which snapshot you can see. By comparing the snapshots of several interventions I decide what the best solution is. These results are translated again in the 2D drawings. With the help of the computer, it becomes possible to make an intervention which starts up this cycle again occurs. In a later stage, a non-computer 3D model shows how the interventions are designed, this ensures that the impact of the Armamentarium seen from all possible sides.

In Designing one developed an intervention which makes the building more dynamic, during designing I was already designing, during designing I am reflecting on my back analysis. Literature and general practical practioner passing. During this I already studied several works of literature, articles and web pages for this reference is shown above. Together with these references, the meetings with my teachers has a continuous influence on my design decisions.

<table>
<thead>
<tr>
<th>100</th>
<th>APPENDIX</th>
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**Graduation Plan:**

**Introduction and motivation**

In this Graduation Plan I introduce my graduation study and explain the research and design methods that I use during graduation. I will conclude with a time planning schedule for the graduation year.

The graduation studio I am joining the RMIT study: Research & Education of Information: Intervention and Transformation. My interest in the field of heritage is the possibility to design with existing architecture. Adding a new layer of architecture respecting the older layers, and by that creating a harmonious whole. Creating Architecture that stands out does not have to be done by drawing attention to the new layer. At the studies of RMIT I have the chance to design while being humble to the History of the architectural work and its context.

**Product**

**Research interest**

The Armamentarium is not built as one building; it exists out of various buildings put together. The problem I find here is that these buildings do not give a clear overview of the complex. So a new layer of buildings is divided into steps, and the buildings are again divided into several interior spaces.

**Research questions concerning the urban part**

What is the relation between the growth of the city and the meaning of the Armamentarium within this city?

What is the position of the Armamentarium within the diverse program of the city?

**Research question concerning the architectural part**

What interior spaces in the Armamentarium I find valuable, and what aspects are relevant to redefine these spaces?

**Research questions concerning the technical part**

What structural elements have influence on the appearance of the interior space?

**Design**

**Analysis**

Arguing from the problem statement and research questions is my design assignment.

The creative program of the city centre of Delft is reflected on the Armamentarium, this results in a physical connection between the complex and the city centre. The new program of the Armamentarium collaborates with the valuable interior spaces and main structure of the complex. Elements needed for the new function provide a harmonious arrangement within the interior spaces.

While translating this assignment into design, close attention is paid to how the several buildings are related to each other at all times. It is my intention to take advantage of the problem I stated. Partly I am connecting the several buildings with each other, but partly I also am embracing the fact that these several buildings work as individual. It is connected realized through a public function space. Elements needed for the function work together with the structure of the Armamentarium, rather than in contrast with it. With my interventions, buildings like the old plans, facades and sections. In 3D I then am deploying my interventions into the 3D computer model to test if the design still matches my goal. A strategic viewpoint from which you see the history of the space, in which snapshot you can see. By comparing the snapshots of several interventions I decide what the best solution is. These results are translated again in the 2D drawings. With the help of the computer, it becomes possible to make an intervention which starts up this cycle again occurs. In a later stage, a non-computer 3D model shows how the interventions are designed, this ensures that the impact of the Armamentarium seen from all possible sides.

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The EXPERIENCE of the INTERIOR SPACE

Robert McCarter and James Fekete write that architecture cannot be understood without our experience of it. These two architects make a clear case for the role of experiencing architecture is not about what a building looks like, but how several aspects offer when the building is like to feel in it. Architectures cannot create aestheticized objects or space, but should provide frames, horizons and settings that offer the possibility to interpret architecture in our own way. Not only McCarter and Fekete write about the experience of architecture. Louis Kahn for example is known for his words about the measurable (light) and the unmeasurable (space), and how architecture is the meeting of these two. "With the measurable he meant things that are already made, like the instruments we use to build an architectural work. With the unmeasurable he meant the senses, the realization we feel when being in it in the architectural work, the desire to express. If good instruments are used, than if the manifesting something good happens on the spirit within you. I am intrigued by the fact that an interior space evokes a certain feeling within us when we are in this space. This feeling can be a different feeling in every room, and a different feeling for every human being.

"Designing instruments or the architectural writings by Emn Fekete, made me realize that a lot of elements (both material and immaterial) are important when judging architecture, but they might be the best of them all." I share Fekete's opinion that this instrument, feeling, is not faultlessly or pure. Struggling with the above given feeling, I started searching for an approach to tackle my interest in the experience of an interior space. This is where I got inspired by the frames, horizons and settings of Kahn to look at what about the space, the interior space taken as a whole. As a question for the analysis of the Armaturentum I therefore had chosen; what interior space can I find in the Armaturentum that offers the observer what aspects of these space, the appearance of the space within these outer edges? There are several aspects that have influence on the appearance of the major surfaces, they can change the way we experience the space. Reading Louis Kahn’s LIGHT: The Shape of Space, I made me realize that objects within these major surfaces, for example patterns or windows, can weaken or strengthen the perception of the outer edges. Analyzing this book I could point out aspects in my opinion that have these influences of weakening or strengthening in the Armaturentum. In figure four, I share the aspects I found. The study and shadow make a surface 'heavier' and therefore more present. Materials and their colors cause differences between the major surfaces. Every material and color attracts light in a different way and is therefore brighter or less bright. Focus within this study, is the division of a window, a bright object within a more or less dark space. The object, its distance or objects can distract, highlight as well as the strong in the same form of a window.

To find the original, I have created a focus on the present in the building I find valuable, I only took account the boundaries when analyzing. In figure three and four this is shown. By eliminating objects like furniture, stairs, elevators etc., I could show the essence of the space. Without disturbing objects that block the view of the total interior space, the dominant surfaces within the Armaturentum are more or less divided into parts that are temporary or permanent furnishing. Michael's goal is to achieve visual order. It is for this reason he analyzes spaces without instantly the objects within showing only the dominant boundaries of the space.

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APPENDIX

roof top, scale 1:5

rooftop, roof edge, scale 1:5

106 DETAILS 107

mokvorst
andervorst
ruler
aflichting
afdichting
gordig

dakpan
pannlat
tengel
waterweerende & dampdoorlatende laag
plaatmateriaal
minerale wol +
sporen h.o.h. 600mm
dompemmende laag
houten planken (originele)
muurplaat

120mm
18mm

120mm
18mm
APPENDIX

roof in between roof slopes, scaled from 1:5

 DETAILS

roof cover connection courtyards, scale 1:5

waterdichte laag
plaatmateriaal
balk t.b.v. verhogen dakgoot
isolatiemateriaal
plaatmateriaalmuurplaat

plaatmateriaal
balk t.b.v. verhogen dakgoot
isolatiemateriaal
plaatmateriaal
muurplaat

gootbodem doorzagen t.b.v. hemelwater afvoeren naar zakgoot

20mm
140mm
50mm
18mm
410mm
300mm

anker
stalen plaat
bevestiging draad d.m.v. vork
staaldraad 10mm doorsnede

muurplaat
metselwerk gevel
regenpijp (aanzicht)

335mm
210mm
355mm

1:5 roof cover connection courtyards, scale 1:5
ventilation in & air out, scaled from 1:5

houten planken (eiken)
Isolerende tussenlaag
benton
PE folie
ingestort kanaal
onderkant kanaal
rooster in lijn met en in kleur van plafond

houten constructie meubel
houten bekleding

eternit bekleding
houten constructie meubel ...

houten planken (eiken)
Isolerende tussenlaag
ingestort kabel kanaal

ventilatie rooster in lijn met en in kleur van meubel
ventilatie rooster
ventilatie kanaal
benton
PE folie
XPS isolatie
waterwerende laag
metselwerk gevel

afwateringsgoot
(over gehele lengte vloer)
afwateringspijp
50mm doorsnede
ligger (aanzicht)
afwateringspijp

details
drain kitchen, scale 1:5

 tegels
(tot 1m80 hoogte)
handyfloor vloertegel
isolerende tussenlaag
benton
PE folie
XPS isolatie
waterwerende laag
metselwerk gevel

afwateringspunt
(over gehele doorsnede)
afwateringspunt
50mm doorsnede
ligger (aanzicht)
afwateringspunt
lifted street-facade & girders (girders parallel to facade), scale 1:5

stalen plaat verankerd aan liggers (aanzicht)

lifted street-facade & girders (girders perpendicular to wall), scale 1:5

stalen plaat verankerd aan houten liggers (aanzicht)
metselwerk gevel
stalen plaat verankerd aan gevel
T ligger verzinkt staal
pleisterwerk

DEUR NAAR BINNEN DRAXELD
dorpel gemetseld
metselwerk gevel

DEUR NAAR BINNEN DRAXELD
dorpel gemetseld
houten planken
met groeven
HEA 100

24mm
96mm

houten planken
met groeven
HEA 100

metselwerk gevel
stalen plaat verankerd aan gevel
T ligger verzinkt staal
pleisterwerk
Berekeningen aan de constructie
Dakligger Dakligger-Binnenplaats 1602

Bouwprofiel: 100,2 mm
Lengte-bouwprofiel: 10 m
Breedte dakligger: 1,2 m

Permanente belasting glas: 2,5 kg/m² x 6 mm (dubbel) = 10 kg/m² x 0,088 kN/m²
Permanente belasting: 1,2 x 0,0088 = 0,0117 N/m²

Veranderlijke belasting (wind): 0,48 kg/m² = 0,0048 N/m²

Eigen gewicht bouwprofiel: 41,5 kg/m² = 0,415 kN/m²

DOORBOUIGING (UTC)

\[ T_{\text{UTC}} = 2 \times 0,003 \times 10,0 + 0,038 = 0,1 \text{m} \]
\[ U_{\text{UTC}} = 0,48 \times 0,0048 = 0,0023 \text{N/m²} \]
\[ U_{\text{UTC}} = 0,176 x 0,052 + 0,045 = 0,0706 \text{N/m²} = 0,0706 \text{N/m} \]
\[ T_{\text{UTC}} = 0,3 \text{m} \]
\[ E = 25.000 \times 10^5 \text{N/m}^2 \]
\[ \gamma = 2.444 \times 0,07 \text{m}^3 \]
\[ U_{\text{UTC}} = 0,578 x 0,0174 x 1002 = 2.300 x 2440000 = 2,5 \text{m} \]

Doorbuiging UTC: 0,053 mm
Belastingfactor permanente belasting: 1,2
Belastingfactor: 1,5

Veranderlijke belasting: 0,176 x 0,052 + 0,045 = 0,1216 kN/m²

Dakligger Binnenplaats 1602

Voor de binnenplaats van gebouw 1602 geldt dat de liggende beleid een lengte van 10 meter heeft. Voor de constructie zal dus eenzelfde bouwprofiel gebruikt worden: 100,2 mm dikte. De bouwprofiel heeft een duidelijke richting, die zich voornamelijk richt op de typologie van de platteland. Deze richting mag hierom doorgaans in de binnenplaats. Er is echter een voordeel voor beide binnenplaatsen evenredig te overkappen, en dus zal ook hier niet van rime aan te meten van 100 x 200 bouwprofielen gebruiken.

Oplossing overkapping binnenplaatsen 1602 en 1603

Voor de overkappingen heeft het de keuze voor een systeem van dak te kiezen en drukspanningen werken. Aan dit systeem van dak koppelt er een point-finite systeem dat de gleuzen plakt op het plaats houdt. Dit voorkomt een lijnplooi van de glazen. Dit heet het koken. Er is een aantal vormen van de binnenplaatsen. Hierdoor zijn de vormen van de binnenplaatsen overgeschikt en zal het overkappingpakket hier geen visuele veranderingen zijn aangetrokken.

Gezamenlijke liggende straat

L 0 = 200 = 2020 m
\[ x = 10 \times 1040 = 10420 \text{Nm} \]

Deze liggende straat varieert van 104,5 mm naar 105,5 mm.

Dwarsliggen liggende straat

\[ L_{\text{d}} = 200 x 10450 = 2090000 \text{Nm} \]
\[ x = 0,5226 \text{N/m} \]

Het pakket van secundaire liggen, dwarsliggen en houten planken (25mm dik) komt tussen de gemoet liggende in lagen. De hoogte van het pakket moet dus overeenkomen met de hoogte van de liggen: 250 mm. Echter mag ik ook gebruik van stolen schermen om de liggen te leggen. Deze hebben eenzelfde diepte als de ene geringe liggen. Dit betekent dat het pakket in totaal 140 x 4 x 8 = 448 x 172 mm dik zal zijn.

De gemoet liggen zijn uiteraard niet standaard in verkrijgen en zullen dus zelf geproduceerd moeten worden. Hieron tev en de dikte de standaard afwering van 200 x 125 x 6 mm te veranderen naar 275 x 170 x 6 mm. Er is ruimte voor het pakket tussen de gemoet liggen in.

Berekening van de verdiepingshoogte

\[ h = \frac{1}{2} \times 10450 \times 10420 = 5226 \text{Nm} \]

\[ q = 0,5226 \text{N/m} \]

\[ q = 0,5226 \times 2 = 1,045 \text{N/m} \]

\[ h = \frac{1}{2} \times 10450 \times 10420 = 5226 \text{Nm} \]

De verdiepingshoogte bepaalt de verdiepingshoogte bij een keurig pakket van de gemoet liggen. Dit pakket moet dus van de hoogte van de liggen zijn: 250 mm. Echter mag ik ook gebruik van stolen schermen om de liggen te leggen. Deze hebben eenzelfde diepte als de ene geringe liggen. Dit betekent dat het pakket in totaal 140 x 4 x 8 = 448 x 172 mm dik zal zijn.

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Noten

Ik had de mogelijkheid te kiezen uit twee methodes voor het berekenen van de verdiepingshoogte. Van deze twee methodes heb ik per ruimte de beste passende methode gekozen. Volgens berekenen is de verdiepingshoogte bij de hand van de resterende aanwezige personeels. Erbij bij de berekening voor de keuze van het restaurant (onderliggende pagina) is het een van de andere methodes. Het betreffende de liggen is hier neergezet omdat de standaard liggen object aanwezige personeels.


For de berekeningen van de luchtbehandelingsplaatjes moet genoemd worden dat deze volgens oude methodes berekend zijn. De hedendaagse luchtbehandelingsplaatjes zullen naar waardeprogramma kleiner uitvallen. Ik heb erover gesproken de afmetingen van mijn berekeningen precies in vertalen naar de plaatsspanners, zodat ik eerst weet dat dergelijke installaties zullen passen in het gebouw.
**Benodigde hoeveelheid luchtverzuiming**

Aantal personen in de ruimte: 113 personen
Hoeveel verzuim lucht per persoon: 25 m³/h
Verse luchtbehoeftes Q: 213 m³/h; 243 m³/h

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**Beladingskast**

Aantal ruimtes: 2 ruimtes
Behuizing: 1,050 m²
Aanbieding: 2,900 m²

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**Luchtbehoefte**

Verse luchtbehoeftes Q: 50 m³/h
Hoeveel verzuim lucht per persoon: 40 m³/h
Verse luchtbehoefte Q: 1015 m³/h; 1082 m³/h

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**Luchtkanaal**

Opendraai schacht A = Q/v
Max. luchtbehoefte Q: 197 m³/h

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**Luchtbehandeling**

Luchtbehandelingskast

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**Luchtbevoorrading**

Aantal ruimtes: 1 ruimte
Behuizing: 300 m³

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**Gekozen systeem**

Gekezen systeem: benodigde luchtbehoeftes van alle verdiepingen te combineren in luchtbehandelingskast.
Alle vluchtroutenhuizen komen onder uit het verhoogde en, onder uit de mantel op de degene grond, aanwezig zich direct de buitenkant kan worden bereikt.

**Brandcompartiment en vluchten**

Gedurende het gehele ontwerp heb ik rekening gehouden met de brandveiligheid van het gebouw. Opmerkelijk is dat er toen het gebouw van publieke functie was (museum) niet de richtlijnen van het bouwbesluit voldoe op betrekking tot brandveiligheid.

Zo goed als mogelijk was heb ik geprobeerd dit probleem aan te pakken.

Onderstaande tabel geeft voor mijn ontwerp de verdeeling in brandcompartimenten weer in het complex.

<table>
<thead>
<tr>
<th>Brandcompartiment</th>
<th>Oppervlakte in m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gebouw 1602</td>
<td></td>
</tr>
<tr>
<td>Eerste en tweede verdieping</td>
<td>1045</td>
</tr>
<tr>
<td>Tweede verdieping</td>
<td></td>
</tr>
<tr>
<td>Gebouw 1609</td>
<td></td>
</tr>
<tr>
<td>Eerste verdieping</td>
<td>1095</td>
</tr>
<tr>
<td>Tweede verdieping</td>
<td></td>
</tr>
<tr>
<td>Gebouw 1600</td>
<td></td>
</tr>
<tr>
<td>Eerste verdieping</td>
<td>1000</td>
</tr>
<tr>
<td>VOC-gesl.</td>
<td></td>
</tr>
<tr>
<td>Begane grond, eerste en tweede verdieping, publieke ruimtes (entree, workshop- en ateliers, bibliotheek)</td>
<td>1166</td>
</tr>
<tr>
<td>VOC-gesl.</td>
<td></td>
</tr>
<tr>
<td>Eerste verdieping (kantoor en vergaderruimte)</td>
<td>75</td>
</tr>
<tr>
<td>VOC-gesl.</td>
<td></td>
</tr>
<tr>
<td>Tweede verdieping (kantoor en opslag)</td>
<td>75</td>
</tr>
</tbody>
</table>

Te zien is dat ik gevoel van de grens van 1000 vierkante meter wordt overschreden.

Hiervoor ben ik bewust ik heb echter voor gekozen om geen brandveiligheids elementen toe te passen. In de afbeeldingen hieraan is het aantal vluchtroutes te zien. Daar in gebruik 1603 in elke hoek van de vluchtroutenplaten aan te brengen, waarbij de route hiermee nooit de grens zoals genoemd in het bouwbesluit 2012 overschrijdt, denk ik geen mogelijkheid tot vluchten te hebben geïmplementeerd.

De gehanteerde genoem zijn:

10 meter: Directe lijn van vluchtroute naar vluchtroutenplaats
10 meter: Een (indirecte) route van vluchtroute naar vluchtrouteplaats
5,5 meter: Een (indirecte) route vanuit een cel naar vluchtroutenplaats
Een (indirecte) route beletkent het entsnijden van objecten als meubilair, waarbij de afstand tussen persoon en objecten minimaal 30 centimeter is. Gebouw 1602 zou ergens problematisch kunnen zijn met betrekking tot het vluchten vanaf de zolder. In mijn ontwerp heb ik deze vluchten niet tot in detail uitgewerkt. Vluchten vanuit deze vluchten gebruikt via de eerste verdieping (het restaurant). In enkele gevallen zij de vluchtroutes op de zolderoverdekking dus ook verder dan 30 meter verwijderd zijn van veiligheid. Indien deze plattegrond verder uitgewerkt zou worden, zal ik dus rekening gehouden moeten worden met het gebruik van de zoldergrond. Plaatsen die ver verwijderd liggen van veiligheid bijvoorbeeld gebruikt worden als opslag of technische ruimte. Plaatsen die wel binnen de 30 meter zullen dienen als zanger en opvoedingsruimtes.