

THE BEURSGEBOUW

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PREFACE

Preface

This booklet is the product of P1 phase for graduation studio 'Flevoland' from Heritage &Architecture (HA). The research studies the case in different scales, mainly from three aspects: 1 Design analysis; 2 Cultural value and 3 Building technology. The findings provide basis for individual renovation design in the following process.

The analysis is done by the joint effort of Yu Chen, Yu Li, Qingqing Li, and Nan Xia. The tutors include Lidwine Spoormans from Heritage & Design, Marie-Therèse van Thoor from Heritage &Cultural value, Bas Gremmen from Heritage & Technology. We would like to express our sincere gratitude to their instructions and guidance.

Introduction of booklet structure

This research booklet is intended to analyze the building Beursgebouw from different scales and to find the opportunities and challenges. Both the original design and current situation are studied.

For the analysis of the building, we have used the framework formulated by Steward Brand: Site, Structure, Skin, Services, Space plan, and Stuff. (Brand, 1994) (Fig 0.1)Before all these chapters, we add the topic of Urban analysis which briefly introduces the development of Almere city. Because the Beursgebouw is the first office building in Almere, the evaluation of this building also needs to take urban background into account.

The analysis of the building starts with the site analysis. This chapter studies the development of the site to provide the context for the building. General topics of accessibility, greenery and transportation are researched, a specific focus is put to the current situation of office building to see what and why is office market nowadays.

Then the study zooms in to the building skin analysis. This chapter discusses about the features of façade in terms of aesthetic and technical aspects. The historical change of façade is also looked at. More importantly, the coherence of façade and interior space is studied.

Next, the research continues from the outside to the inside of the building and look at the structure of the building. It turns out that there is certain interrelation between structure and façade. Structural elements, structure system, and construction process are analyzed. The relationship between structure, space, and façade is studied as well.

The research then comes to the space plan. This chapter mainly looks at the flexibility and checks whether this building is flexible and to what extent is the building really achieving flexibility.

Furthermore, the service system is studied, which is an aspect that influences people's comfort. The original design and initial ambition of high energy efficiency is illustrated, and further information of the current situation is also shown.

Finally, the stuff as the very detailed elements of the building is studied. How the small elements stick to the design language of the whole building will be checked. Also, the current situation of these details is analyzed.

In the analysis of building, different parts are not just individual, but rather having an interrelation between each other. Only when all aspects are studied together with the relationship can the building be understood better. On the other hand, the research of site is also closely related to the building. What is the effect of development of the site and what is the change of the role of the architecture turns out to be our research focus.

On the basis of all the research, we conclude on the cultural value of the building. On the one hand, we identify the values of all the six topics and use the culture matrix to show all these values as well as the priority of them. We explain these values with culture value statements. On the other hand, we determine the overall value of the different building elements. To draw this conclusion, we consider all the aspects regarding an element and make an overall conclusion. The elements that get highest and lowest values need to pay more attention to.

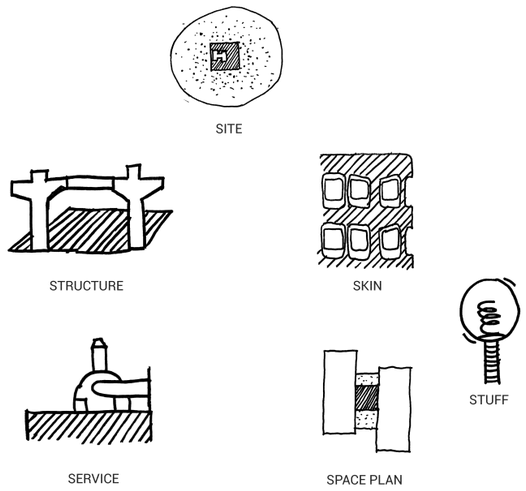

Fig 0.1Layers of analysis(Author, 2018)

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THE BEURSGEBOUW AND THE ARCHITECT

As the first office building in Almere-Stad, the Beursgebouw had a big ambition. Except from the very advantageous location near the central station, according to the report of Stichting Projektontwikkeling bureau (nd), this office building is a very remarkable project for two reasons, the maximum layout freedom and low energy consumption. This building has been the office for company Oranjewoud from the very start. Oranjewoud is mainly concerned with the construction of infrastructures in the early days of Almere-Stad. From approximately 2005, the company moved out from the Beursgebouw and this building remained vacant until now. Nowadays only the parking lot around the building is still working.

The architect responsible for this building is the design bureau Environmental Design (ED). In 1970, the design bureau originally called Grinten N.V. changed its name into ED. The name of the office and the composition of the board continued to change several times until in 1984 the final name was Stichting Architekten Kollektief Heijdenrijk (AKH). In 2002, AKH was lifted with the retirement of two main designer.

Main designers of ED include Leo Heijdenrijk, Hans Hermes, and Wim de Lange. Leo earned his diploma from Architecture Engineering at TUDelft in 1961. He joined Grinten N.V. immediately after his graduation. Hans Hermes at first learned interior design at the Academy of Fine Arts in The Hague, later he went to study in the Academy of Architecture in Amsterdam. Wim de Lange started as an engineer at the Technical College in Deventer and continued his education at the Academy of Architecture in Arnhem. The three members formed a good trio. They were responsible for different work and were complementary for each other.

ED didn't specialize in a certain type of building, and they realized many different building types: houses, shops, malls, office, schools, etc. The designer payed attention mainly to three aspects; effectiveness, solidity and beauty. Their work is not based on an established architectural concept, the architecture is mainly determined by the client, the program requirements and the environment in which the building stands.

Human aspect is very important for ED, so the design not only focused on exterior, but also the interior. Furthermore, Leo Heijdenrijk got great inspiration from the use of colorand the surface distribution of Piet Mondrian. This can also be seen from some details of Beursgebouw.

BASIC INFORMATION

Architect & Constructor: E.D. Partnership of architects and engineers Amersfoort
Client: B.V. Project development company Amro Amsterdam
Advices technical installations: Technisch Adviesbureau Treffers B.V. Baarn Building Physics - Acoustics: Lichtveld and Buis, Consulting Engineers B.V. Utrecht
Contractor: Dura Aannemingsmaatschappij B.V. Rotterdam

Designed: 1979
Built: 1981

Site area: 5519 m^2
Built territory: 1750 m^2

Number of layers: 9
Layer height: 2.8 meters (parking layer), 4.6 meters (ground floor), 3.3 meters (conventional layer)
Building height: 28.45 meters (including heat wheels)

Built area of floors: 5966 m^2
Area per layer:
-2: 1409 m^2
-1: 951 m^2
0: 1135 m^2
1: 1001 m^2
2 - 4: 1010 m^2
5: 905 m^2
6: 484 m^2
7: 81 m^2
Central core: 81 m^2

Grid dimension:
Massive part: 12.45×7.2 meters
Glass part: 9.45×7.2 meters
Core: 9×9 meters

Number of parking space: 85 (indoor), 90 (outdoor)

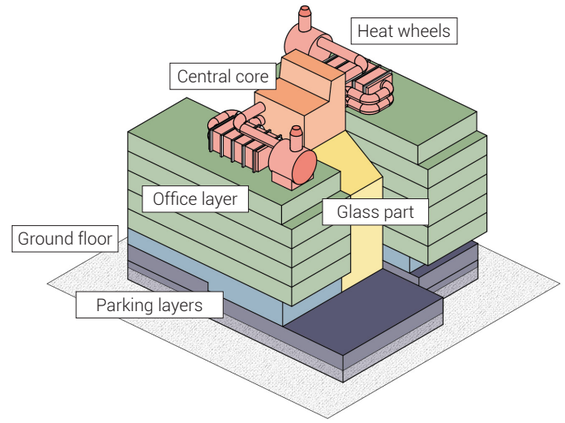


Figure 0.1 The beursgebouw (Author, 2018)

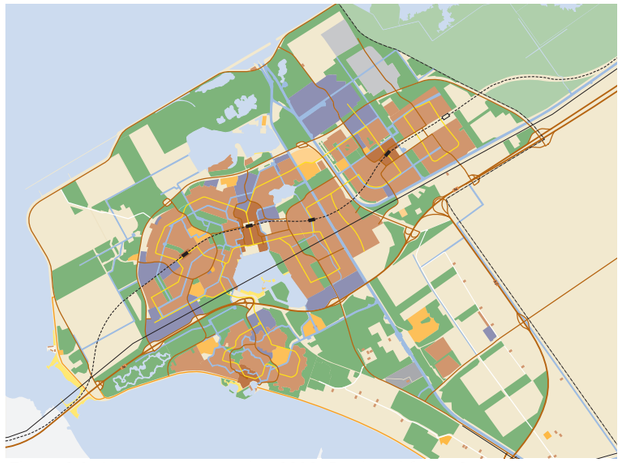


Figure 1.1: Almere structure plan 2010. Retrieved from: Gemeente

1 URBAN

What kind of urban context is and will be De Beurs in?

This chapter will introduce the original urban planning of Almere to show the origin of city development. In addition, the timeline of urban development will show the changes in position and planning of Almere. Moreover, the future development goal and trends will be discussed. It also guide for the architecture design. Finally, the challenges and opportunities the De Beurs may have in the Almere city context will be discussed in the conclusion.

URBAN PLANNING OF ALMERE

INTRODUCTION

Almere is a city in the Flevoland, the youngest province in the Netherlands. Flevolands consists of the Noordoostpolder which is continuation of the mainland and the Flevopolder which is the largest artificial islands in the world. After a flood in 1916, it was decided that the Zuiderzee, an inland sea within the Netherlands, would be enclosed and reclaimed. The Zuiderzee Works started and the Noordoostpolder and Flevopolder were the results of the Zuiderzee Works. Originally, the Flevopolder was mainly intended as agricultural land. After the Second World War, the rapidly growing population of Amsterdam need to be accommodated elsewhere. Two cities were designed to solve this problems. The first city was Lelystad which was built in 1967 and was the capital of Flevoland. Almere was built in 1975. It was the newest city in Netherlands. Also, it has been the fastest growing city of the Netherlands in terms of the economy, jobs and population over the past 20 years (DutchNews.nl, 2018).

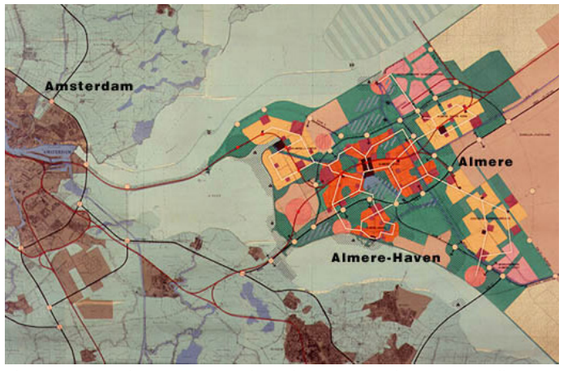


Figure 1.2: Design structure plan Almere, 1977 by Teun Koolhaas & Associates. Retrieved from: www.archined.nl

CHARACTERISTICS OF URBAN PLANNING OF ALMERE

"Almere, from satellite to parasite city in some progressive circles, Almere was often seen as a parasite city 'that would empty Amsterdam and deprive the old neighborhoods of a large part of its middle class and its facilities' " (Otto, 2017)

Almere was designed as a satellite town to release the population pressure of Amsterdam. The plan of Almere learned the lesson from the urban design of Lelystad. Different from the planning of Lelystad which is a detailed urban structure for the long term, the plan of Almere is more flexible for the future change. Instead of a single coherent urban image, an urban district with five separate cores was presented in the Design-Structure Plan Almere, 1977 (fig1.2) (Static.nai.nl, 2018). Almere is built as an urban region with five residential areas of different sizes each with its own identity. The areas between the cores are mainly intended for green and water-rich recreational areas, which also penetrate deep into the cores to serve as many homes as possible. Circular roads keep through traffic as far as possible outside the residential areas. The connections between the cores are reserved for public transport and bicycle traffic (Static.nai.nl, 2018).

An extensive public transport system was proposed in Almere. In 1972, the report Limits to the growth of the Club of Rome was published. Also, in 1973, the energy crisis came with a sharp increase in oil prices. As a result, bus transport and limitation of car traffic were formulated as objectives on Almere (Otto, 2017). Almere had one of the first free bus lanes in the Netherlands. This benefits the flow of the bus traffic and the passengers can reach their destination faster. The distance from the houses to a bus stop in Almere was nowhere more than 400 meters, while that on the old land was a maximum of 800 meters (Otto, 2017). Moreover, "Almere is one of the five nominees to become best Cycling City of the Netherlands in 2014. (BICYCLE DUTCH, 2014)" In lelystad, "all the cycle routes were elevated and all crossings were built as 5 meter high overpasses." It is difficult for cyclists to cycle up steep inclines or cycle in the winds. Almere took a lesson from lelystad. "All major roads in Almere were elevated one and a half meters, so that all cycle tracks only had to be lowered with one and a half meters too, to provide the necessary clearance for the crossings without needing steep inclines. In tunnels cyclists would be cycling protected from the winds (BICYCLE DUTCH, 2014)."

Additionally, unlike in Lelystad, a certain mix of functions took place in Almere: companies and shops were not concentrated and separately laid out from residential areas, but spread across residential areas (Otto, 2017).

Moreover, Almere advocated the ideal living environment which the general public hoped for at that time. It was single family house in a quiet and green environment. As a result, 90 percet of the housing in Almere were low-rise single-family housing with low density.

To sum up, as the newest city in Netherlands, it learnt the lessons from Lelystad. Almere's planning was advanced at that time.

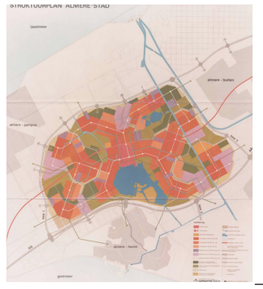
TIMELINE OF ALMERE'S NUCLERA

1975



Almere Haven was the first nucleus to be built. It is characterized by its maze of so-called 'cauliflower neighborhoods' which encouraged social contact. Almere Haven was designed as a traditional Dutch harbor





1984

The first settlers arrived in the Almere Buiten district. At that time, city grew rapidly. "The major part of the urban nodes which are housing areas ended up sharing similar building typologies, neighborhood designs, urban density and construction time" (Zhou, 2012).



1979

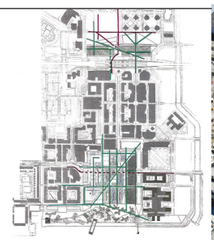
Almere-Stad functioned as the economic, administrative and cultural center (Constandse, 1989). Provisions (large department stores, head offices of banks and businesses, hotels etc.), which provide for a care facility for the city of Almere, also belong here. The urban planning of Almere stad seems to be the epitome of the whole Almere. Tussen de Vaarten district was the final district to be built in Almere Stad. It marked a departure from the original concept of lining each district with parks and other green areas. Tussen de Vaarten fused the districts of Almere Stad and Almere Buiten together (English.almere.nl, 2018).

1988

The creation of a diversity of living environment against monotony was focused (zhou, 2012). Some neighourhoods in Buiten were built by different theme to generate diversity. Such as 'rainbow district' characterized by color and 'seasonal district' reflecting its woodland surroundings (english. Almere.Nl, 2018).

1995

Development on new city center of Almere was proposed. OMA master plan of city center which marked the transformation of city position from medium and suburban city to an independent and large city.







2005

The first building completed in the district Almere Poort. The large-scale program for private commissioning in the housing sector was held here, 'I build my house in Almere' (Feddes, 2008). Residents can join efforts to build their own district (English.almere.nl, 2018). (Custom-build housing)

2013

The construction of **Amere Hout** started.





2030

Planning of Almere Pampus, oosterworld, floriade. Almere Oosterworld by MVRDV is the project bucks the trend of governmental planning and invites town residents to design their own city.

Figure 1.3: Images retrieved from internet.

CITY DEVELOPMENT

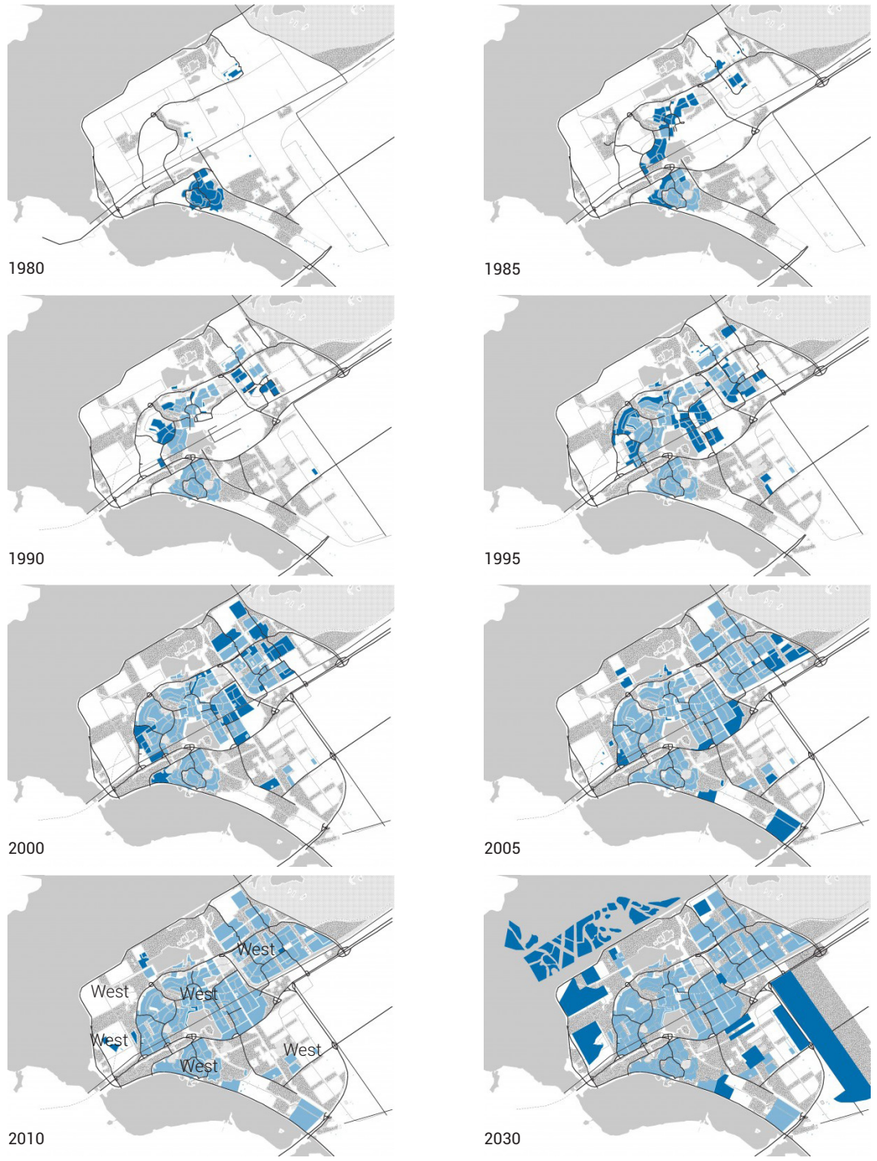


Figure 1.4: Almere City Growth. Retrieved from: http://www.6under60.com

The city grow map shows the flexibility of urban planning. The city did not grow and expand from one node but from several nodes at the same time. In this way, city also could be successful although the maximum construction was not achieved (Webb, 2010). In addition, developing city in stages can ensure the flexibility to accommodate different types of development under different social-economic context over time (Zhou, 2012). In the map, we could see that there are still space undeveloped. It leaves space for city to update the position, adjust urban development policies and have the chance to learn from the previous plans. Actually, according to TIMELINE, the positions and planning of Almere are evolving with the city growth. More and more attentions has been creating diversity in living environments and enabling people to participate in the construction of the city. However, different from the original plan, it could be seen that the urban is devouring greenery. The green belt between Almere stad and Almere Buiten was not realized. The different cores are fused. It means that, urban sprawl will unavoidably consume the nature. It is important to think how to deal with the relationship between city and nature.

OMA MASTER PLAN

TRANSITION OF CITY POSITION

The position of Almere changed with the urban sprawl and rapid growth of population. According to Webb (2010), “the original plan for Almere was for 250,000 residents. By the early 1990s, growth projections estimated that Almere would soon reach these upper limits and that it would likely become one of the Netherlands five largest cities by 2010.” The new plan should be proposed to cope with the changed social, cultural and economic conditions of the society. In addition, there is a desire that Almere should be more than a satellite of the Amsterdam. It should have its own identity which can attract people and activities not only from the donor region but also from abroad. “The growth of the town should come from within, from its inherent characteristics.” (Webb, 2010). This transition from a medium to large city required Almere to strengthen the existing facilities and develop new facilities to meet the need of a large city. Therefore, in the early of 1990s, the municipality of Almere decided that it was time to start the development of a new center which should become the main core of the whole city. The master plan competition was held. The goal of the competition was to transform Almere from a suburban town to a city in its own right (Webb, 2010).

AGAINST THE EXISTING CONTEXT

In the original plan, Almere stad as the centeral nuclear of Almere was planned to be an urban area with an urban character in the original planning. However, there was no high rise apartment buildings were allowed at the beginning (Webb, 2010). The first plan of the center of Almere was proposed in 1976. “A primarily orthogonal grid pattern (referencing Barcelona) formed the main structure” (Zhou, 2012). An area was reserved for future accommodation and expansion (fig1.5). According to Zhou (2009), the new program for the new city center required that “the northern part of the centre, above the railway line, would become a business centre. The southern part, between the railway and the artificial lake ‘Weerwater’, would become an area of shops, housing, cultural facilities and entertainment.” The master plan competition was held. The goal of the competition was to transform Almere from a suburban town to a city in its own right (Webb, 2010). In 1996, OMA won the master plan competition (fig1.6). The plan for the new city center is a reaction



Figure 1.5: Birds-eye-view of competition site and existing city center. Retrieved from: courses.umass.edu



Figure 1.6: Almere stad center master plan by OMA. Retrieved from: http://oma.eu

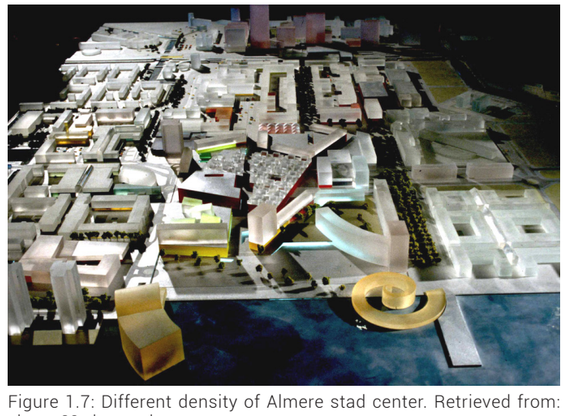


Figure 1.7: Different density of Almere stad center. Retrieved from: almere20.almere.nl

against the existing city. Koolhaas explains "The plan is to a certain degree an attack on everything Almere is: Almere is low, the plan is high; Almere is a grid, the plan is full of diagonals; Almere is low density, the plan is high density. More than anything, the plan wants to be different to Almere." (Webb, 2010) (fig1.7). The main characteristic of the OMA'S plan is vertical separation of functions. The ground floor of the shopping area is lifted with the car park and traffic passage underneath. On the top of commercial, there are residential buildings with garden (fig1.12). In addition, the pedestrian and bicycle connections to the existing street grids (fig1.8). A large number of modern architectures constitutes the dynamic lake skyline. Many international architects were invited to contribute the urban design of the new city center. The new center design contrasts with the existing urban context. It indicates the ambition of Almere and shows the new statue of Almere.

EVALUATION

The atmosphere of city center is quiet active which contrasts with the north business center part. Many high rise office buildings are vacant in that area (fig1.9). Many new modern buildings contrast with the old buildings in form, style and materials (fig1.10). The center is quiet international and young which seems to be attractive to young people but not the old residents. We interviewed a resident who live in the Almere stad for 30 years, he mentioned that he disliked the city center because it is quiet British. It seems that the city center is quiet international and lack of the Dutch traditional characteristics. Also, the slop in the commercial center is sort of inconvenient (fig1.11).

De Beurs as the first office building in the Almere stad, it is located in the junction of old and new. It was challenge for it to balance and react to this contrast between old and new.



Figure 1.11:City center slope. (Author, 2018)



Figure 1.12: Housing on the roof in Almere center. (Author, 2018)

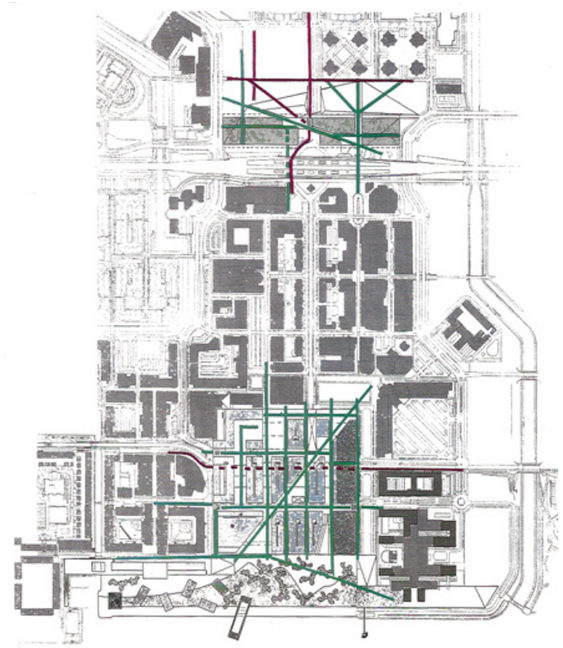


Figure 1.8: Pedestrian and bicycle connections to the existing street grid. Retrieved from: courses.umass.edu



Figure 1.9: Almere city center commercial area. Retrieved from: almere20.almere.nl



Figure 1.10: Almere city center business area. (Author, 2018)

FUTURE DEVELOPMENT

ALMERE 2.0

By 2017, the total population of Almere is over 200,000. It is now the seventh city in the Netherlands. The position and statue of the city renews and transforms continuously. At the beginning, Almere was established as a suburban city which providing a sustainable alternative to the dense, urbanized metropolitan region of Amsterdam. With the urban sprawl, the city tried to create a new and independent statue. Almere is evolving from a young city into a mature one. In the future, "the aim of the national government, the provincial government of Flevoland and the municipality of Almere is to position Almere as a national demonstration site for the large-scale implementation of sustainable systems. The joint desire is to turn Almere into an icon of sustainability." (English. almere.nl, 2018)

The municipality of Almere proposed new development goal: Almere 2.0 which envisioned how the city can grow to accommodate 350,000 haibitants in the year 2030-2040. Almere 2.0 follow the ALMERE PRINCIPLS which is the guide for the sustainable development.

ALMERE PRINCIPLES

The Almere Principles consist of seven starting points for sustainable urban development. These points are developed from the past and will guide for the future urban plan. Next, the princples will be concluded. Also, these points can also project on and inspire the architecture design.

1. Cherish Diversity

Almere is a young city with short history. It means that Almere will be more inclusive for differences and diversity. However, it means the various elites (financial, service-providing, and cultural) are under-represented compared to older cities, and with that also their input into the public life of the city. Therefore, it is important to attract elites to stay in the city by increasing the diversity in residential environments and facilities, particularly by focusing on citizen's own initiative. For the economic diversity, it is important to encourage the different ways of working and different kinds of businesses. Getting more and higher education to Almere also ensure the economic solidity.

It indicates the possible function of the building innovation, the city encourage higher education, different residential typology, multicultural working environments.

2. Connect Place and Context

It is important to strengthen the own identity and connection to the surrounding cities.

3. Combine City and Nature

Almere always pays attention to the relationship between urban and nature. Urban and nature are not opposite but develop at the same time. nature and city must be connected in spatial design. "From the scale of the Oostvaarderswold to the vegetation roof or the bird-friendly construction method, from the contact with nature in the form of a marsh trip to the winning of wind or solar energy" (Feddes, 2008).

It seems that in the future, nature is not only literally trees near the building, building itself can be the part of nature. Nature and building interact with each other. The boundary between urban and nature will blur in the future.

4. Anticipate for Change

"Almere has been set up from the beginning as a framework for growth. It is a textbook example of 'planning for uncertainty'" (Feddes, 2008). The future development should continue this tradition of planning for uncertainty. In one hand, it remains possible to leave physical space open. On the other hand, the reversibility of urban interventions is emphasized (Feddes, 2008).

At the beginning, the city is flexible to grow. After growth finishing, the flexibility is transformed into the reversibility. It inspires to apply this reversibility concept into buildings. The building could be cradle to cradle.

5. Stay Innovative

"For thirty years, the city has been a sanctuary, a breeding ground and a laboratory for innovation in many fields." For example, there are lots of experimental projects in Almere. Almere is attractive for (university) research institutes and specialist companies to be part of this. Also, Almere has the opportunities to become the center of knowledge and business in the area of sustainability (Feddes, 2008).

It inspires the possible function of the converted building. Also, It indicates that the whole city encourage the newness for building design. It is an opportunity to develop a new and sustainable strategy in building renovation.

6. Design Healthy System

There are many healthy systems in Almere such as the unique public transport system and abundant green presence. In the future, more and more healty systems should be developed in different aspects of society. According to Feddes (2008), "If new buildings look like trees and provide shade, for a habitat for songbirds, for food, for energy and for clean water? If every new acquisition deepens the ecological, cultural and economic wealth of mankind? If modern societies are seen as benefactors, because they would focus on the good instead of chasing the planet to the edge of the abyss?" (From: Cradle to Cradle).

It seems that architecture building itself is not only has the basic function serving for people but also serve for nature and the whole society. It inspires to think how the architecture could be the part of the healthy system of the city?

7. People Make the City

According to Zhou (2012), Almere is the largest top-down planned new town in the Netherlands. However, with the development of city, the city encourage the citizens have more and more initiative to participate the design of city. Everyone can speak for city. For example, in Almere Hout Noord, there is large-scale program for private commissioning in the housing sector 'I build my house in Almere' (Feddes, 2008). In the planning of Oosterworld, residents can realize their own city planning dream.

It indicates the participatory design in architecture and encourage us to think architecture for public.

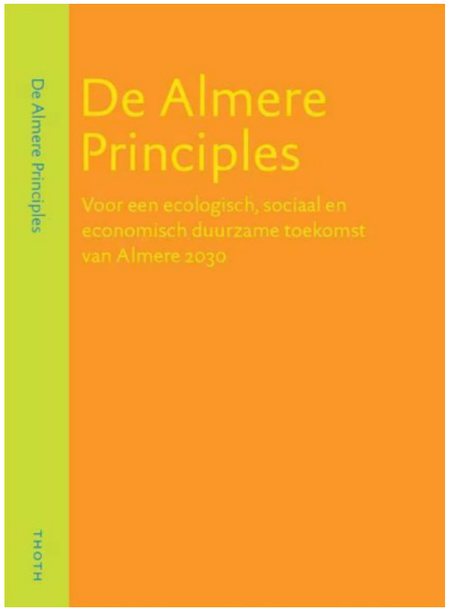


Figure 1.13: Almere principle. Retrieved from: http://www.cristina-ampatzidou.com

CONCLUSION

Almere is a quiet young city and it is a truly flexible city that can evolve in response to change of city context. The planning, policy and position of city change and evolve over time. The concept of planning evolve from flexibility to cradle to cradle. The initiative of urban design was gradually transferred from the government to the citizens to some extent. The position of the city transit from a suburban and Satellite city to a city which has own identity and can develop as the icon of sustainability.

CHALLENGE AND OPPORTUNITY

CHALLENGES FOR DE Beurs

As the first office building in Almere stad, it represents the history and witnesses the development of city. It is located in the junction of old new. The context of it is full of contrast. It is a challenge for De Beurs to find his position and identity to react to this contrast. As a renovation project, how to balance old and new should be dealt with not only in building itself but also the context.

OPPORTUNITIES FOR DE Beurs

The Almere principles provide many points which can guide for the architecture design. Firstly, the possible functions of the project are suggested from the Almere principles: higher education institutes, center of knowledge and business, housing in different typologies, multicultural working space,

Then, the sustainable concept inspire us to think about the relationship between building and nature. The building itself can be the part of nature. Nature and building interact with each other.

The building could be cradle to cradle. Also, it is an opportunity to develop a new and sustainable strategy in building renovation. The principles inspire us to think the building design as the part of city development. The building renovation should follow the trend of the city development. Additionally, we can also pay attention to the participatory design in architecture and encourage us to think architecture for public.

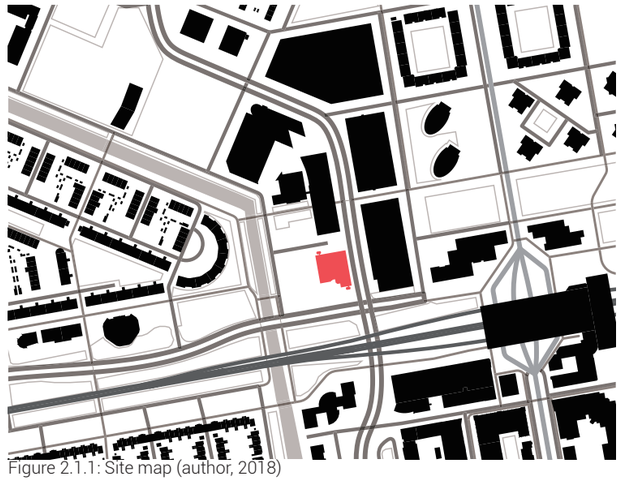


Figure 2.1.1: Site map (author, 2018)

2.1 SITE & SURROUNDING

What is the role and situation of Beursgebouw among its surrounding nowadays through its life of 37 years?

This chapter is about the site and surrounding of the Beursgebouw. For us, the site of De Beurs is relatively still and constant, especially during the recent decades, however its surrounding is ever-changing. And the role of De Beurs changed a lot with the influence of context evolution through years. So how should we regard this building considering its history background and current site condition? To answer this question, this chapter starts with a general introduction of location, then it goes to historical development of both office area and road structure, afterwards the current accessibility and function distribution, and surrounding environment will also be presented in the end. In conclusion, the question will be answered, and attitude will be demonstrated by synthesizing the former sections.

LOCATION

As the urban planning strategy and basic characteristics of Almere have been introduced in former chapter, it is also necessary to zoom in and understand the urban context of the Beursgebouw.

Almere is located on the east side of Amsterdam with a driving distance of 36km between them. The other two main cities that closely connect with Almere via roads and railways are Utrecht on the south and Lelystad on the northeast. (Fig 2.1.2) Almere is the place that must be passed if one goes from Amsterdam and its regional area to Flevoland or even further on the north, and it is also the case the other way around. Almere plays an influential role in development of both Amsterdam and Flevoland.

As for the city itself, the vehicular traffic follows the hierarchy from highways to city main roads to neighbourhood main streets and local streets. (Fig 2.1.3) On one hand, this network concentrates traffic flows to certain route and reduces traffic in residential areas. On the other hand, this also causes inconvenience, for example, from one neighbourhood to another, one must go up several hierarchies to meet the main roads, and then go down the hierarchy again to the destination. The through traffic in inner city is discouraged by the cul-de-sec (dead-end or pocket) street patterns, which is a ubiquitous design feature throughout different neighbourhoods of Almere. (Zhou, 2012)

The Almere Stad, as shown in Fig 2.1.4, has great accessibility to nature. Two natural parks, which are parts of the Green Zone of the planning, situate at east and west side of city center area respectively, and an artificial lake sites on the south of it. If we focus on the Beursgebouw, the Almere Centre is only 10min walk away on the south, and Almere Centrum station is nearer. (Fig 2.1.3) While on the west side of De Beurs, there is the residential area across the canal. So, the Beursgebouw is at the junction of public area (Almere Centre, Centrum station and office area) and private area (residence).

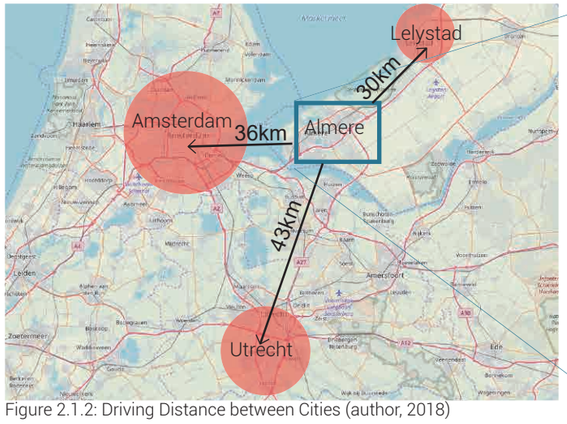


Figure 2.1.2: Driving Distance between Cities (author, 2018)

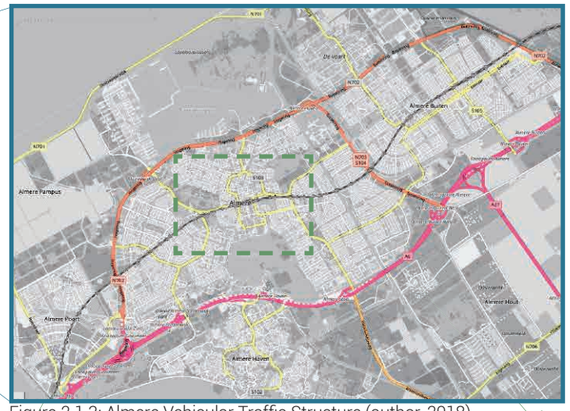


Figure 2.1.3: Almere Vehicular Traffic Structure (author, 2018)

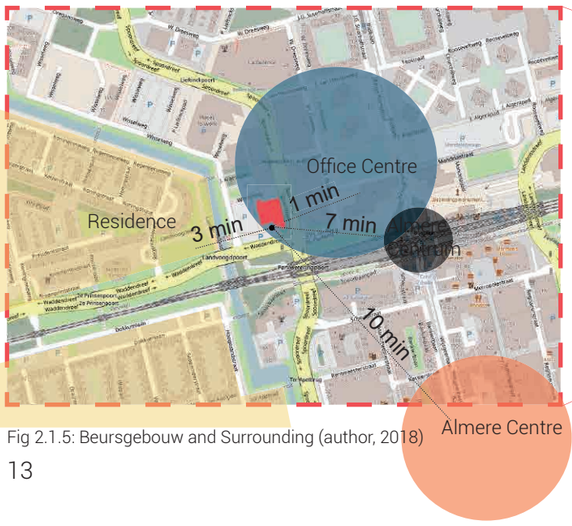


Fig 2.1.5: Beursgebouw and Surrounding (author, 2018)

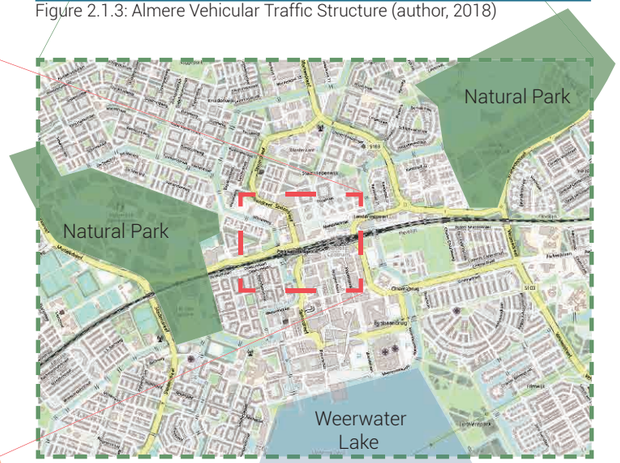
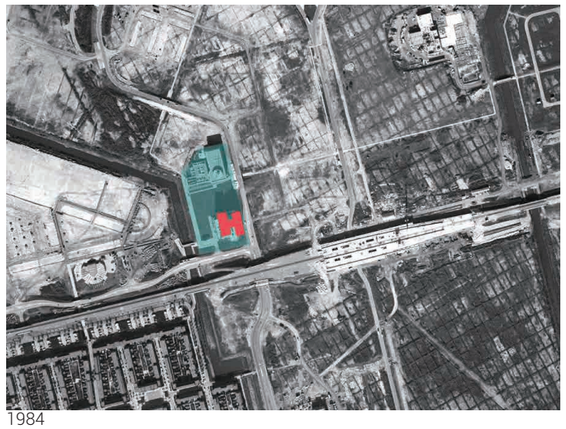


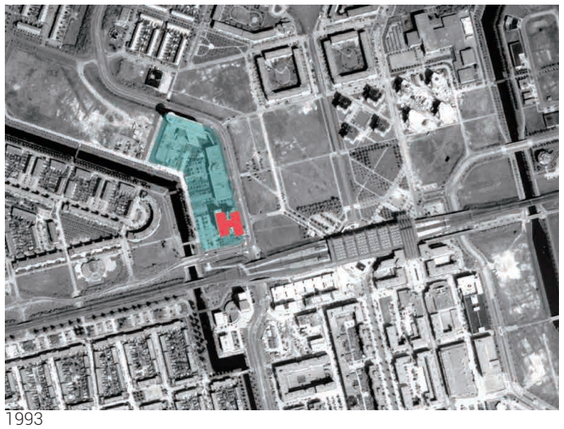
Fig 2.1.4: Almere Stad with Woods and Lake (author, 2018)

HISTORICAL DEVELOPMENT OF OFFICE AREA

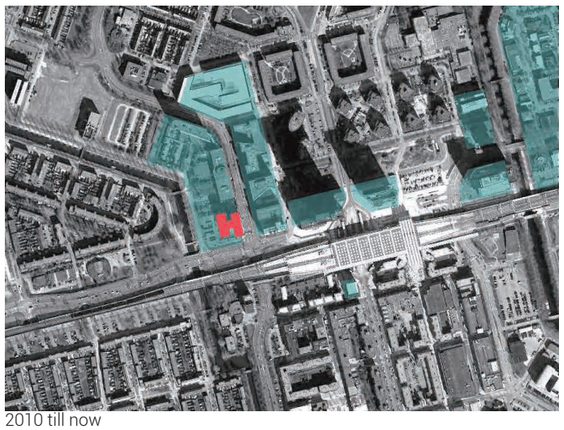
The office area at Almere Centre has been developing since the Beursgebouw was built, and the changes through decades impact a lot on the site of the Beursgebouw. This section introduces this historical development by analysing change process and current office vacancy situation, to have a comprehensive understanding of De Beurs's current situation in this area.

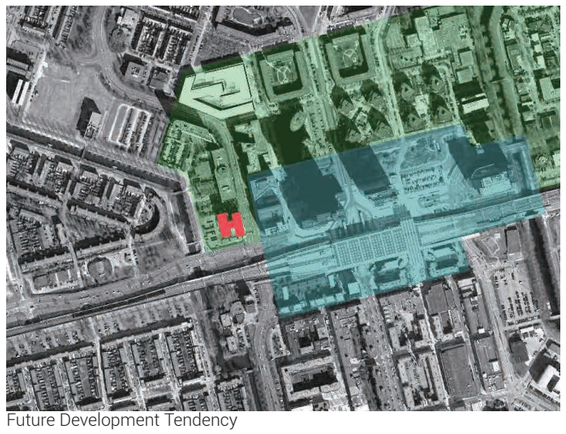

Fig 2.1.6: Photo of Beursgebouw on 1981 (photo by Stadsarchief Almere/ Hanzevast, unkown)


1984


1993


2000


2010 till now


Future Development Tendency

Office area

Area to be transformed to be subordinated and multifunctional area for city centre and office area

Fig 2.1.7: Historical development of office area (author, 2018)

HISTORY PROCESS

The Beursgebouw was the very first building built in this area, before which only two city main roads and a canal had been constructed. (Fig 2.1.3) It didn't know what is going to happen around, and was just built up, becoming an office building pioneer in the middle of nowhere.

As shown in satellite maps, from 1984 to 2000, shortly after the Beursgebouw was built, the main office area grew slowly around it, and several small-scale office blocks appeared on east side of city centre. After 2000, three high-rises stood up on the north of train station, then the office centre was shifted from De Beurs to these high-rises. Since 2010, there was no big spatial changes till now in office buildings, however almost half of the office place turned to be empty since the last economy crisis, such as De Beurs, and the vacancy problem is waiting to be solved. The vacancy issue in the Dutch real-estate market is remarkable, and Almere is not an exception.

As for the future development, the office centre will be the area on both sides of central station, and the area on the north where De Beurs locates is going to be a multi-function supplemental and service zone for office area and city centre. It is said that fully transformation combining the strength of the market in centre area is encouraged in municipality's report. And the office function will only be strengthened and densified in office centre, the blue area in Fig 2.1.7. (Gemeente Almere, 2017)

To sum up, Beursgebouw started as the pioneer of office building in Almere Stad which seemed full of ambition, well years after it became the minor and substitutable one in office area. De Beurs's initial confidence and power as the centre of office buildings is no longer there anymore. We need to consider the internal quality of De Beurs when trying to give it a new life.

OFFICE VACANCY SITUATION

The vacant situation in the Dutch real-estate market is remarkable, although the economy recovers and is flourishing, some buildings simply no longer meet the demand. (Rabo Real Estate Finance, 2018) Almere has six office areas distributed in different districts, and the Almere Centre is one of the largest and most important districts, however, with highest vacancy rate, which reached almost 40%, being vacant for 10 years.

Why the vacancy is so high for such a long period of time?

Many speculative developments were planned and delivered just prior to, and during, the last financial crisis. (Savills World Research, 2018) Several buildings stood largely or even completely vacant from the moment of completion. Issues with office vacancy all around the country have led to a trend to conversion activities, particularly to residence. Almere started to convert structurally vacant office buildings in 2016. (Savills World Research, 2018)

What is the recovery strategy for the vacant offices?

2017 marks Almere's first significant fall in vacancy since 2008 (Fig 2.1.8) caused by two main reasons. Firstly, the conversion activities have been planned, and 80% of the planned conversion will happen in Almere centre soon. Secondly, there is an increasing demand for office space, especially for smaller innovative offices such as start-ups and small business. Considering the scarce office area in Amsterdam and Utrecht, Almere Centre is expected to become an affordable alternative accommodation for small companies. (Savills World Research, 2018)

As for why the conservation is recommended rather than remove in Almere, firstly, Dutch real-estate market has continuing high vacancy rates in the real estate sub-markets, especially office and industrial property, while at the same time is lack of affordable houses. Therefore, it could solve the both problems by converting the surplus to shortage functions. (Rabo Real Estate Finance, 2018) Furthermore, according to Almere Principle, the city is expected to be sustainable and reversible, thus reutilization is the first choice unless demolish is inevitable.

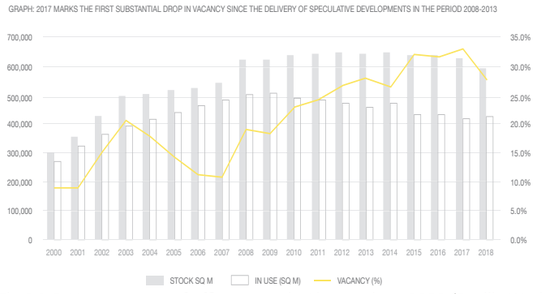


Fig 2.1.8: Vacancy rate of office space in Almere since 2000 (Savills World Research, 2018)

HISTORICAL DEVELOPMENT OF SITE ACCESSIBILITY

The Beursgebouw was the witness of Almere Stad's growth, it saw the development of city infrastructure. Accessibility of the site experienced huge changes during decades which influenced a lot on its role in this area.

The area in front of Beursgebouw was originally designed as a public space, and the ramp was meant to serve as part of cycle path bridge leading to the other side of Spoordreef. (Fig 2.1.9) Before 1984, a road along the canal was connected to Beursgebouw, and bicycle lane on the west side was also completed. Well, an additional bicycle path through the Spoordreef was built on the north of the site. At that time, the site could be a vital meeting place contain public activities because it was at the joint of roads and the green space is open for public. (Fig 2.1.10)

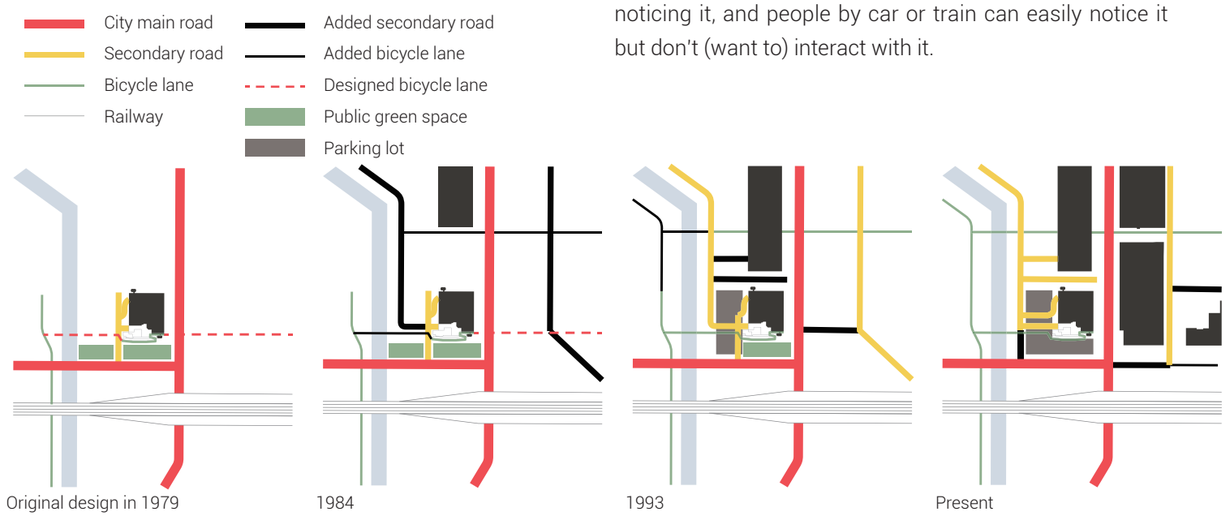


Fig 2.1.10: Circulation changes around the site (author, 2018)

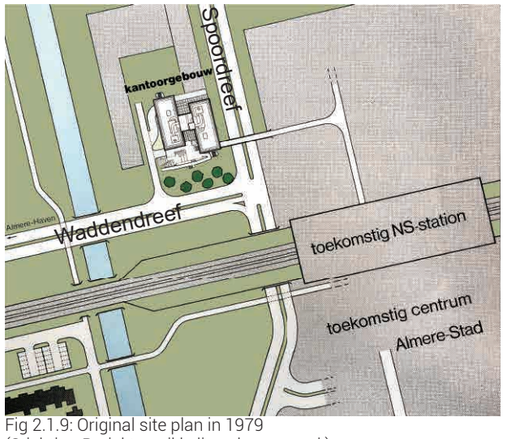


Fig 2.1.9: Original site plan in 1979
(Stichting Projektonwikkelings bureau, n.d.)

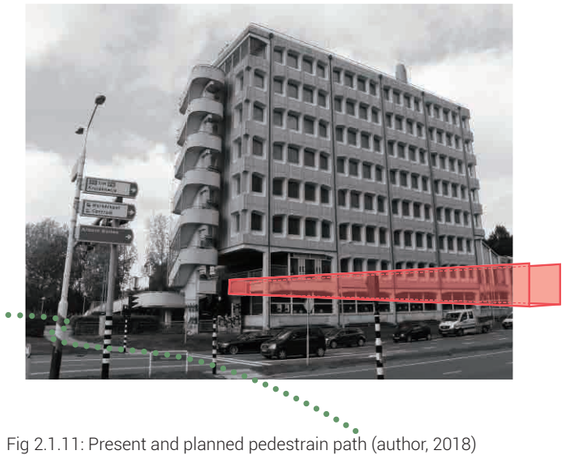


Fig 2.1.11: Present and planned pedestrain path (author, 2018)

While a big modification of bicycle lane system happened by 1993, and the bridge that was promised turned into a vehicle lane. The bicycle lane system was completed, leaving De Beurs the dead end of bicycle lane. The road along canal became dominating since more buildings was built along it. Part of the green space on the entrance of the site became a parking lot. By then the site was not part of city infrastructure anymore. (Fig 2.1.10) Furthermore, after more than 20 years, the road along the canal connected to the main road directly, and green space in front the building is totally end up as a big parking lot. The Beursgebouw is isolated by the main city roads on the south and east sides, as well as parking lot on the west and building next to it on the north. (Fig 2.1.10)

As a result, De Beurs changed from an ideal traffic and social hub to an isolated and inactive corner. (Fig 2.1.10) Pedestrians only hurriedly passing by it even without noticing it, and people by car or train can easily notice it but don't (want to) interact with it.

CURRENT SITE ACCESSIBILITY

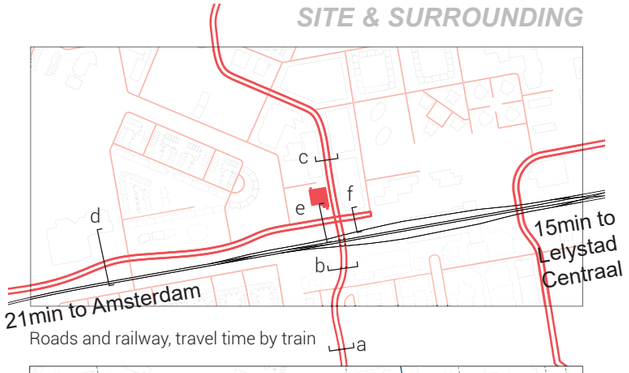
Based on the historical development and location analysis of site, nowadays accessibility to the site is convenient in the inter-city and inter-district scale, because it is close to Almere Centrum, bus station and city main roads. It only takes 15 to 20min to Amsterdam and Lelystad by train from De Beurs, bus lanes and bicycle paths are also linked to other neighbourhoods efficiently. (Fig 2.1.12) All of this is beneficial from the urban structure planning.

However, if zoom in to a smaller scale, the site is somewhat disconnected with surrounding areas. Spoordreef and Waddendreef together with railway reduce site's connection with south and east area to a large extend. If we see the street profile of Spoordreef and Wadden dreef in Fig 2.1.13, the abruption between roads and buildings or pedestrians are strong, either with compelling green belt, height difference or physical fence. The obstacle in the high-speed main roads should be as less as possible, and the seemly temporary crosswalk at the southeast corner of the building is one of the few interruptions in north part of Spoordreef.

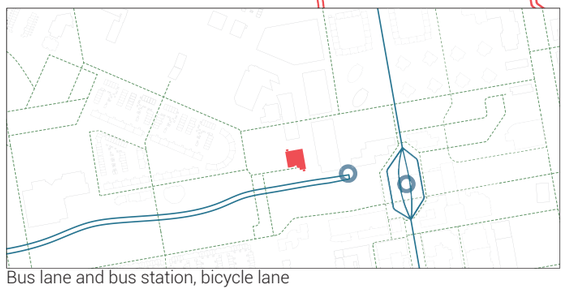
Consequently, the visitor flow is mainly from the Wisselweg, a neighbourhood main road on west side of Beursgebouw. (Fig 2.1.14) The main site entrance for cars, bikes and pedestrians is on Wisselweg, while the sub-entrance at Spoordreef is also used frequently according to our observation during visits. But generally speaking, the site is better connected with the west side, where residence zone is located, than the east side.

As for the current use of the site, parking lot and pedestrian shortcut are two main functions now. The site is full of parking place (Fig 2.1.14) and rent out to a third-party parking agency by the owner, and only few cars were there each time we visited. As a shortcut sidewalk, pedestrians come and forth between residence zone to train station were often seen at the site.

To sum up, the accessibility of the site is good from the Wisselweg, but it doesn't perform well from Spoordreef and Waddendreef. In another word, the site related to residence area across the canal but disconnected with Almere Centrum where people mostly come from.



Roads and railway, travel time by train



Bus lane and bus station, bicycle lane

Fig 2.1.12: Road structure in neighborhood scale (author, 2018)

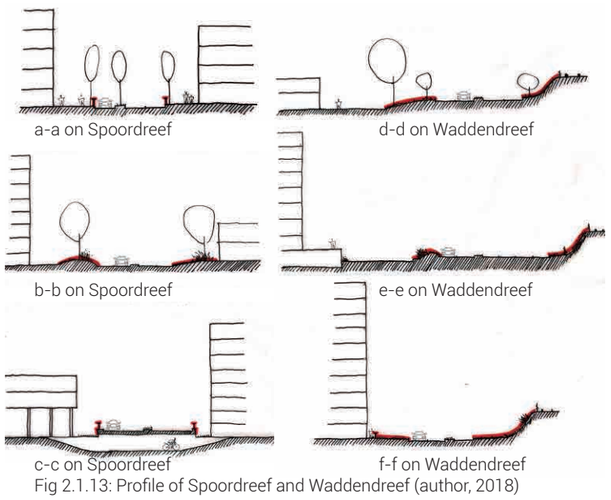


Fig 2.1.13: Profile of Spoordreef and Waddendreef (author, 2018)

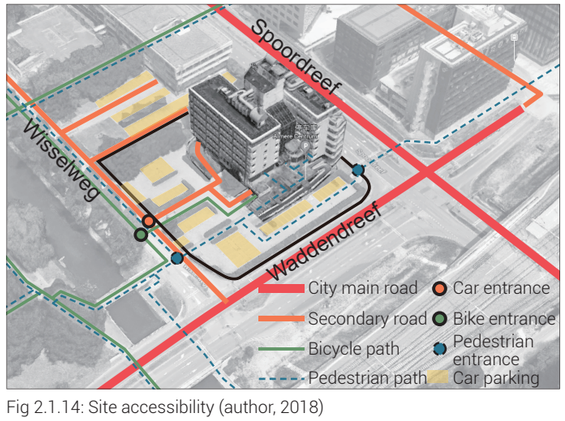


Fig 2.1.14: Site accessibility (author, 2018)

CURRENT FUNCTION ANALYSIS

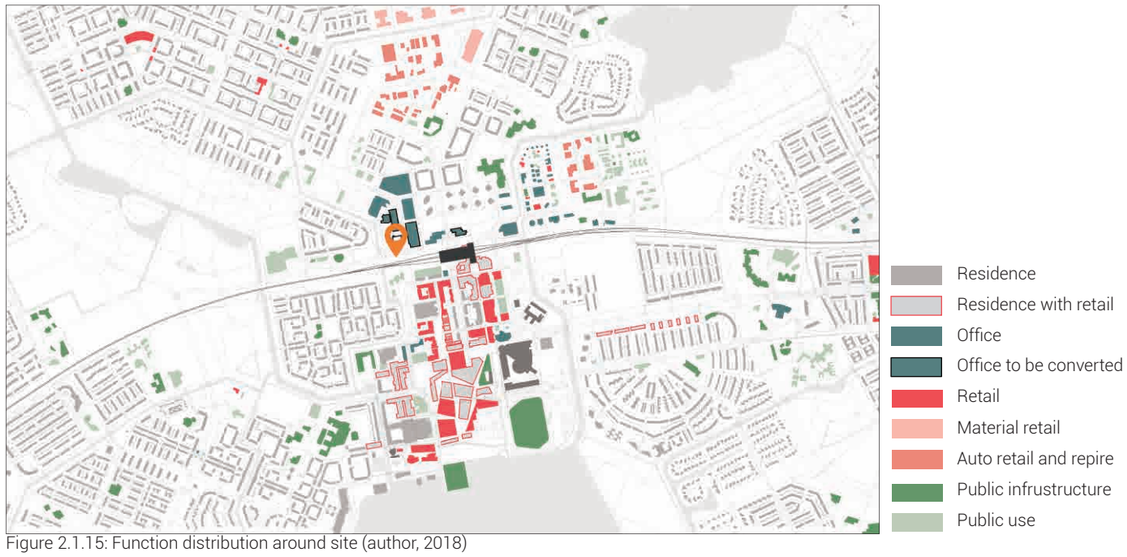
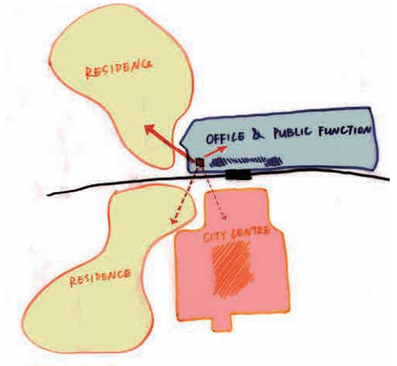
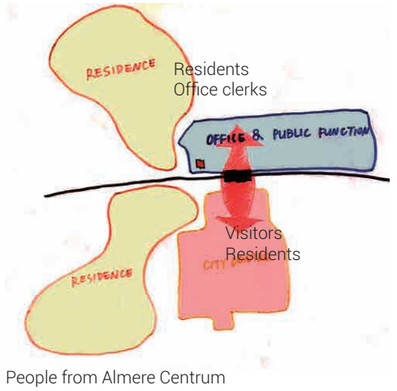


Figure 2.1.15: Function distribution around site (author, 2018)



Site's connection strength to function zones around it



People from Almere Centrum

Figure 2.1.16: Target group analysis (author, 2018)

As illustrated in Fig 2.1.15, the site is located at the junction of different function zones. Almere's commercial and cultural centre is located to the southeast of De Beurs, and the office zone is just next to De Beurs on the east side. Then the rest part near the site is mainly residence area. On the north, there is an area of auto and material retailing which is directly connected to highways on its north side, so it is safe to say that it has little influence on inner city and De Beurs.

If zoom in to the site, the main function zones closely related to Beursgebouw is the residence area on the west, office area on the east and the city centre. De Beurs is just at the connection point of them. Considering both the function and accessibility to De Beurs, the building has stronger connection with residence area next to it. The office area on the other side of Spoordreef is not really related to De Beurs although they had same function. (Fig 2.1.16)

And taking central station into account, people go to north side of station are mainly residents and office clerks, well for the south side, people go mostly for visiting, shopping and, partly, going home. (Fig 2.1.16)

To sum up, the Beursgebouw is sited at the junction of diverse function zones, what De Beurs offers to this area could be integration of these different functions and meet needs of residents and office clerks especially.

SURROUNDING PUBLIC BUILDING



Fig 2.1.17: Office buildings around site (photo from the internet, diagram by author, 2018)

BUILDING APPEARANCE

As was mentioned in office development section, the office buildings near Almere Centrum were mostly built after 2000, therefore they look new and shiny. While De Beurs seems somewhat modest, massive and a little outdated among them, because they are not the same age. (Fig 2.1.17)

The appearance of De Beurs is both its challenge and opportunity. The way to integrate the massive block to its environment could be the challenge, on the other hand, the unique and rich facade makes it outstand among the others and gives its opportunity to survive.

CITY IMAGE

Buildings along Waddendreef compose an important city image, that you can see form Waddendreef and the railway. De Beurs sat on the end/beginning of the picture and is supposed to contribute to the harmonious image and serve as the prelude/epilogue of the whole story. But it now seems out of space and isolated from other buildings.

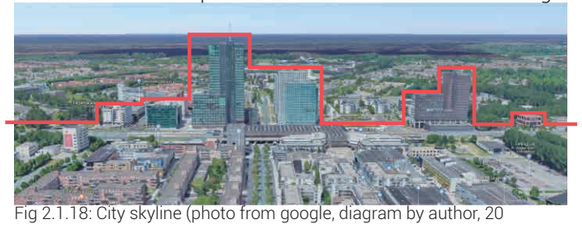


Fig 2.1.18: City skyline (photo from google, diagram by author, 20

SURROUNDING OPEN SPACE

Apart from surrounding buildings, open spaces around the Beursgebouw also help to determine characteristics of the site. In the urban scale, as shown in Fig 2.1.19, two huge green zones are situated at both sides of Almere Stad which were planned for Almere's further growth at the beginning. And in inner city, there are also some dispersed undefined green area with a various range of sizes. Some of these undefined areas are now left empty, some are planted several trees to make it a "public space" and others are used as parking lot. Except the "public space" mentioned, defined community parks are designed in some neighbourhoods as illustrated in Fig 2.1.19. Vast green area without activities or urban furniture is a very common urban landscape in Almere Stad, and we assume that the city is still growing, and this typical urban landscape is an inevitable outcome of Almere's upper planning. The planning strategy focuses mainly on the Red Zone, which represents built environment, and regards the rest Green Zone as reserved urban space.

In neighbourhood scale, it's noticeable that open space around De Beurs are diverse, including cosy street greening along the canal, empty green land between residential buildings and canal, bare and boring green belt along Waddendreef as well as some defined community park with little urban furniture. (Fig 2.1.20) Undeniably, natural environment around De Beurs is excellent, and each kind of open apace have its own features and is different from others, however, there are few people using the public space.

In general, open space around De Beurs is fragmentary, people have discontinuous walking or cycling experience in this neighbourhood. This is due to Almere's planning strategy, so how to integrate friendly and popular public space in the planning scheme could be a task for our intervention.

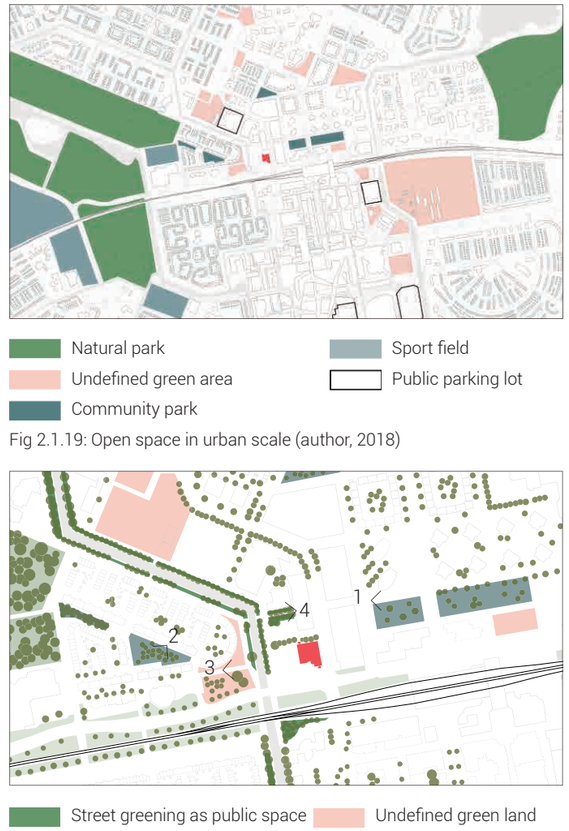


Fig 2.1.19: Open space in urban scale (author, 2018)



Fig 2.1.20: Open space in neighbourhood scale (author, 2018)

CONCLUSION

In general, the site or the Beursgebouw is a combination of "junction" and "disconnection". On one hand, De Beurs is situated at the junction of big cities which means big development opportunities in a large scale, and in a smaller scale, it is the junction of multiple function zones of Almere Stad, which provide the building with lots of opportunities. Junction here indicates good connection and opportunities. While on the other hand, De Beurs's historical development and surrounding environment make the site disconnected in the aspects of accessibility, appearance as well as people's urban experience, and "disconnection" here just has the opposite meaning of "junction", indicating isolation and dilemma.

Nowadays, the role of the Beursgebouw is paradoxical and embarrassing to some extent, and the disadvantageous aspects of the site are dominating and troublesome. So, it is worth to think whether there is a way to trigger the site's positive potential, the junction opportunity, by intervene in the disconnection situation.

CHALLENGE AND OPPORTUNITY

The location provides De Beurs good accessibility by car and public transportation, so it's possible to make the building attract users from nearby cities. While the scarce accessibility for pedestrian from central station is a big challenge for the building.

The different function zones around De Beurs are opportunities for it to have an integrated role and function in this area.

The contradictory of site's original position as a public social area and its present isolated situation provides opportunities. It's worth to consider whether to recover its social role and how to make the entrance with cycle path reasonable.



Figure 2.2.0: Skin of De Beurs (Author, 2018)

2.2 SKIN

What the relationship between skins and exterior and interiors?

This chapter will analyze the skin from exterior to interior. Firstly, the skin from different views will be introduced to show the hierarchy of visibility for public. Then, the main characteristics of the skin will be discussed. In addition, the solid and voids will be analyzed to study the relationship between interior function and the façade expression. Additionally, the construction of skin will be analyzed. Finally, the conclusion will evaluate the skin and talk about the challenges and opportunities for future change.

SKIN FROM DIFFERENT VIEWS – HIERARCHY OF VISIBILITY



Figure 2.2.1: Skin from different views(Author, 2018)

The building is located in the junction of two main roads. The south-west, south and east façades are noticeable from the main roads. Also, the building could be seen on the train. All people who leave or arrive the Almere can firstly see this building. As the first office building in Almere stad, it always represents the strong impression of Almere.

These facades seem to be very important and need to be paid attention to design.
Because of the rich greenery, the north-west façade of the building is relative hidden for people from the west of the site. The north side of the façade is unnoticeable because it is blocked by the trees and building nearby.

SKIN ANALYSIS

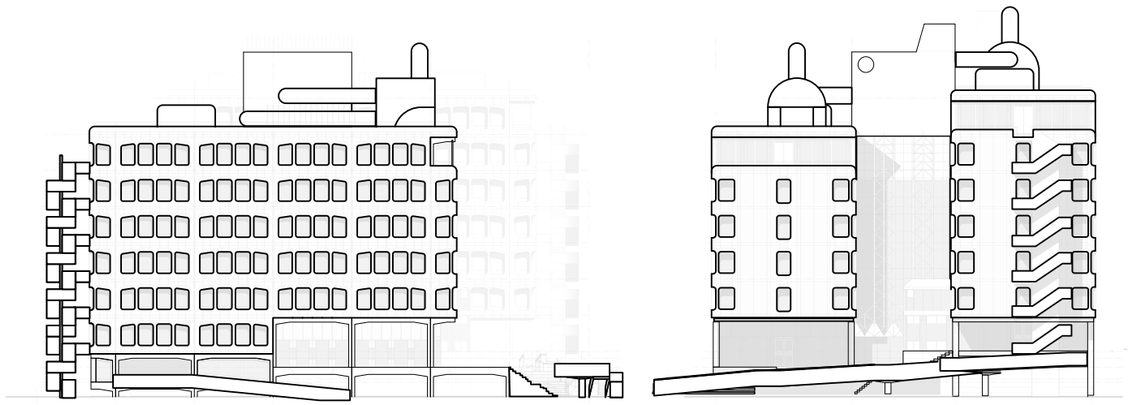


Figure 2.2.2: Curved form (Author, 2018)

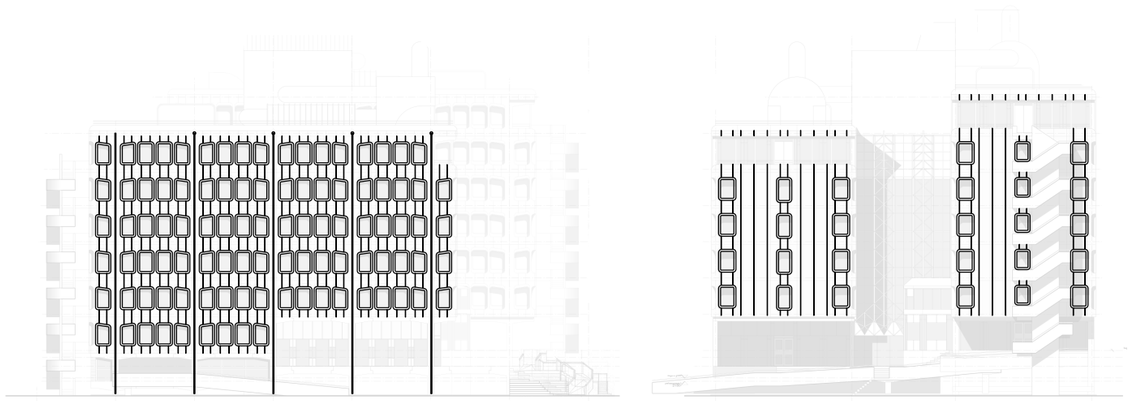


Figure 2.2.3: Refined detail (Author, 2018)18)

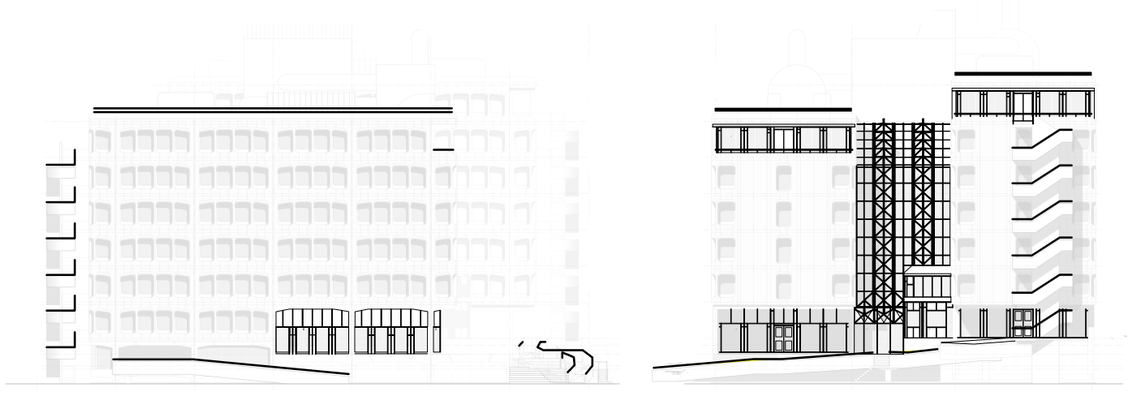


Figure 2.2.4: Conflict (Author, 2018)



Fig2.2.5: Concave corner detail



Fig2.2.6: Machine on the roof



Fig2.2.7: Hanging staircase and the ramp



Fig2.2.8: Dramatic staircase of the entrance



Fig2.2.9: Water pipe



Fig2.2.10: White line of concrete



Fig2.2.11: Openings



Fig2.2.12: Vertical line of façade



Fig2.2.13: Contrast



Fig2.2.14: White steel glass frame



Fig2.2.15: Yellow steel railing



Fig2.2.16: Interior view of glass façade

CURVED FORM

The main characteristic of the building's skin is the curved form. The architect used filet to weaken the hard boundary. It seems that the machine on the roof corresponds to the whole style to be curved. The whole building gives the sense of softness and movement because of the curved line. In addition, the circulation, the hanging external staircase and dramatic staircase both echo with this movement. The curve and thick mass concrete make the whole building sculptural. Although the building does not have any certain style, the design of skin gives people the sense of brutalism. The form of skin shows a unique gesture to the public.

REFINED DETAIL

There are lots of details on the prefabricated concrete façade. The water pipe seems to be the decoration which emphasize the verticality of the long side façade. The white line seems to reduce the mass of the facades. The edge of the opening was finished by white which emphasize the thickness of the façade. The white and thin window frames look invisible and blend in the white opening of the wall. The design of opening looks pure. The shading of the window are designed as the part of prefabricated concrete.

CONFLICT

The glass central part seems to be designed as a whole by colored glass material which contrast with the massive concrete façade. The steel truss elements in front of the glass part of the skin were added in 1995. This steel truss has a total different design language from the whole building. It seems to show the conflict between temporality and permanence, smooth and roughness. The white glass frames and yellow steel railing also look temporary and informal.

RENOVATION

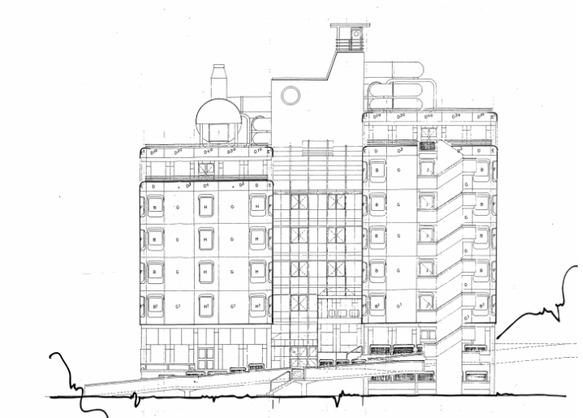


Figure 2.2.17: South elevation of 1979 (Drawing by Environmental Design, 1979)

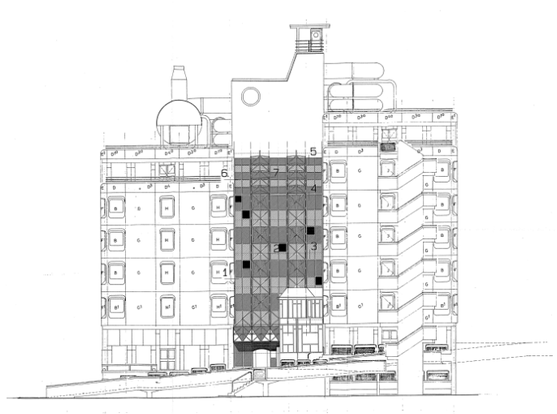


Figure 2.2.17: South elevation of 1979 (Drawing by Environmental Design, 1979)

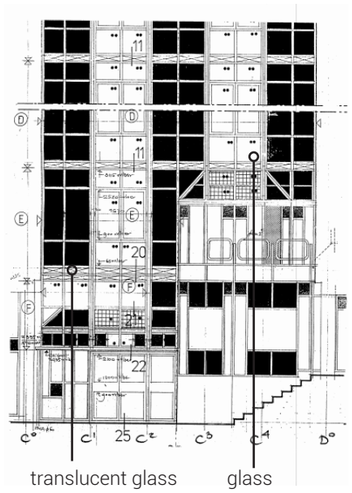


Figure 2.2.19: Detail of south elevation (Drawing by Environmental Design, 1979)



Figure 2.2.20: redesigned colored glass façade



Figure 2.2.21: Original colored glass



Figure 2.2.22: steel truss of glass facade



Figure 2.2.23: canopy and structure in Almere centrum station

The canopy of entrance was changed in 1992. The original canopy has the same style with the pavilion nearby. Later, the canopy was changed. The steel truss was added in front of the glass wall to support the canopy. Also, the steel truss can strengthen the stability of the glass wall part. However, its style is totally different from the whole building but echoes with the steel elements of the train station.

In addition, the glass part of the façade seemed to be changed as well. The material of the curtain wall changed. The original glass was changed to solar control glazing and steel panel (fig2.219). From the exterior, the central glass part was designed to be a whole by blue glass. It is difficult to tell the interior from the exterior. Moreover, some part of glass are colored which echo with the original design.

SOLIDS AND VOIDS
- RELATIONSHIP BETWEEN EXTERIOR AND INTERIOR



Figure 2.2.24: solids and voids analysis (Author, 2018)

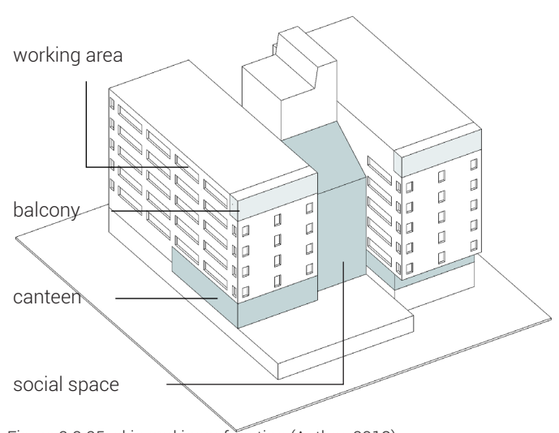


Figure 2.2.25: skin and inner function (Author, 2018)

In terms of concrete part of the skin, the south and north façades are more closed than west and east facades. The reason is that the main working space is east-west orientation to ensure the maximum daylight. In the south and north sides, the central glass part is the social space in the interior which connect the east and west working space. The contrast between solid and voids are strong by the more closed concrete wall and glass curtain wall. At the same time, the difference of interior function is also obvious. Additionally, the first level of west and south facades are transparent and more open to public where the entrance and canteen areas. To sum up, the façade is accordance with inner function (fig 2.2.25).

CONSTRUCTION

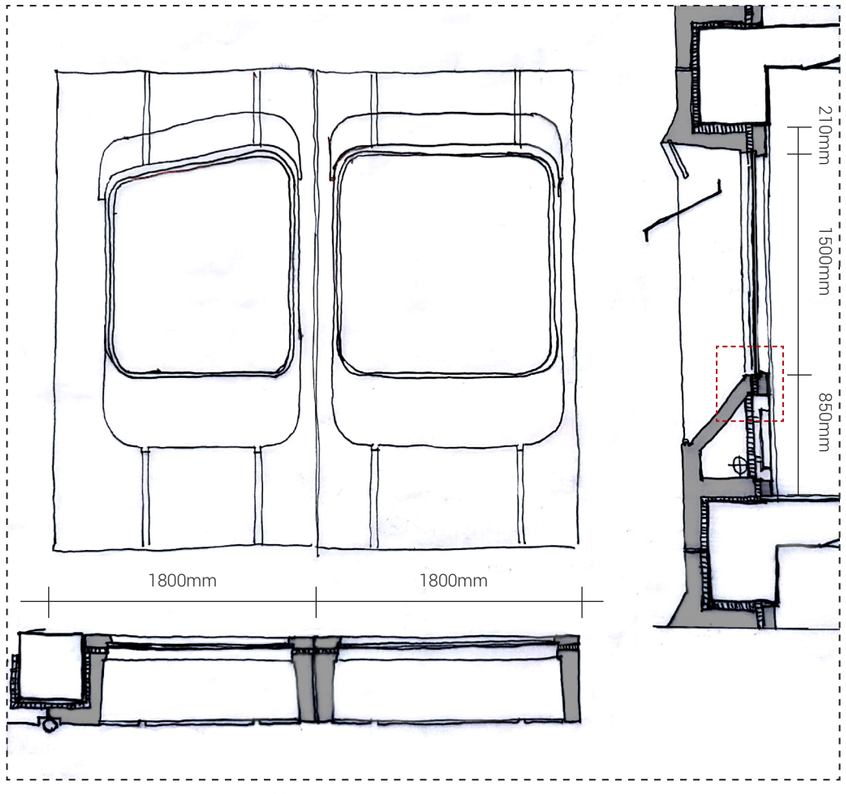


Figure 2.2.26: Construction detail of façade elements (author, 2018)

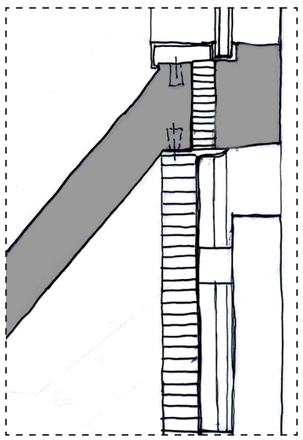


Figure 2.2.27: Window detail of the concrete prefabricated panel (author, 2018)

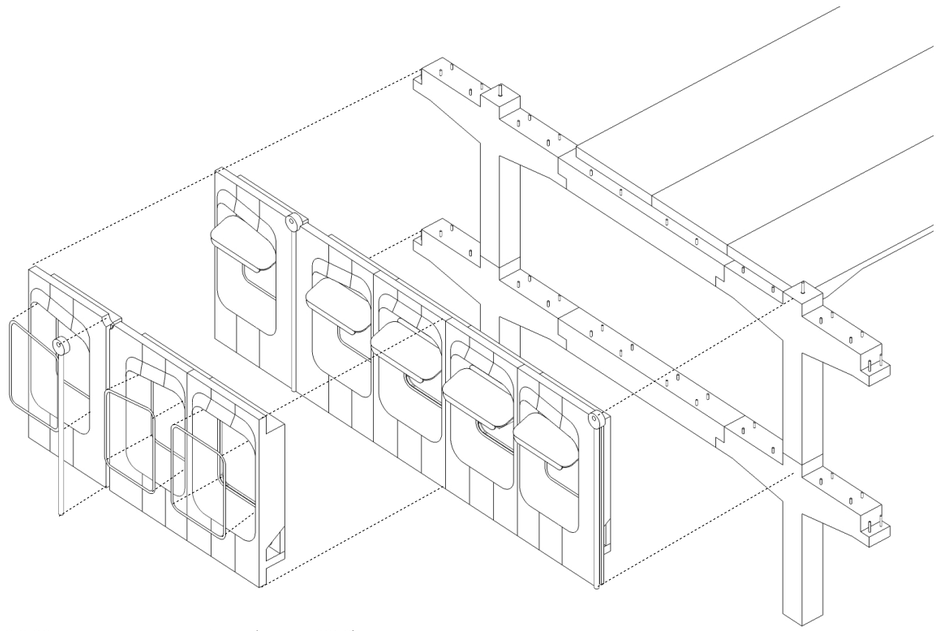


Figure 2.2.28: Exploded drawing of skin (author, 2018)

The main skin of the building consists of prefabricated concrete panels with windows. It is noteworthy that the positions of water pipe are also prefabricated. The concrete panels are hollow. It not only shows the thickness of the wall visually but also economical (fig2.2.28).
The prefabricated concrete panels also functioned as the shading. The gradient of the sill emphasize the thickness of the wall and the huge opening of the façade. It also encourage the diffuse reflection of light. The height from the floor to the bottom of the window is 850mm which corresponds to the height of the working table (fig2.2.26).
The window's shape are decided by the structure shape. The window frame is deep but not wide (fig2.2.27). It make the window frame invisible from the exterior. However, the windows are not operable.

CONCLUSION

The east, north and west side of skin is important to design because as the first building could be seen when arriving the Almere, it represents the first impression of Almere. The form of the skin is quiet unique and refined and give people the sense of sculpture. The whole building skin style is consistent: the machine on the roof, the external staircases and ramps echo with the curved form. However, the central steel truss part contradicts the style of the whole building. It shows the certain conflict. The steel rail and glass frame also look informal.
The exterior and interior of the building are consistent as well. The façade is accordance with inner function.
The concrete part of the skin is all prefabricated. the detail design of skin is related to exterior and interior. It realizes the uniqueness of exterior but also is a consideration of the needs of interior.

CHALLENGE AND OPPORTUNITY

CHALLENGE

The skin has strong and unique form. It is a challenge for the new intervention to react or continue this strong form. Also, how to deal with the central conflict part is also a problem.

OPPORTUNITY

The building represents the first impression of Almere. It could be an opportunity to use this advantage and pay attention to the skin design. In addition, all concrete part of the skin are prefabricated and assembled, it is feasible to change the part of the skin.

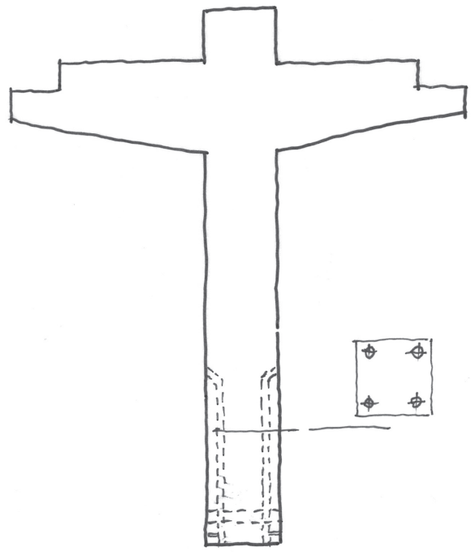


Figure 2.3.1 The prefabricated column (Author, 2018)

2.3 STRUCTURE

Why is this structure scheme selected, and what is its relationship with the requirement of office building?

The analysis of structure starts from the general introduction of the structure scheme of the building and the constructive design principle. The Schokbeton system is then introduced to show pursuit of architectural quality of the structure elements. Next, the construction process is analyzed to see the joint of structural elements and of main structure and sub-structure. The study then zoom in to a typical prefabricated unit, and details are also illustrated. Afterwards, the stability core and the sub-structure--the curtain wall are analyzed. Then structure-related space is illustrated. Finally, the opportunity and challenge of the structure system are listed as the reference for further renovation.

STRUCTURE SCHEME

The building consists of two wings centered around the inner core (Fig 2.3.2).

The two wings and core
The two outer wings, with a width of 12.45 meters are on the office bays. The floors consist of double-T plates imposed on beams and T columns.
The central part contains the core stability of the building with the vertical circulation, washrooms and shafts. Also, floor areas at the front and rear side of the core connect the two office bays. The core consists of pre-cast concrete walls, and poured concrete floors. The floor areas at front and rear side consist of double-T plate.

The glass part
In the central aisle, located on both the front side and the rear side of the building, there is a glass part. This glass part (at an inclination lying down and oriented vertically) is carried by a steel frame which is arranged on the outside of the building.

The car parking
The substructure (parking layers) mainly composed of an in-situ poured basement floors and cellar walls. The structure consists of beams and T-columns and floors of double-T plate.

The main structure
The main structure consists of a complete prefabricated construction. The structure consists of T-columns. On the top of the T the column stretches a little to two sides which forms a part of the floor beam. Between these parts is a concrete beam is placed. The bending moment of the column-beam unit is illustrated in Fig 2.3.3. The beams carry the double-T floor plates. In the heads of the wings precast concrete stability walls exist. These do not continue to the foundation, but are intended to stiffen the office bays.

To sum up, the overall structure scheme fits well with the spatial requirement of office building. The structure of two wings centered around the stability core not only provide stability in the structural sense, but also enables a very clear circulation and effeicient office space.

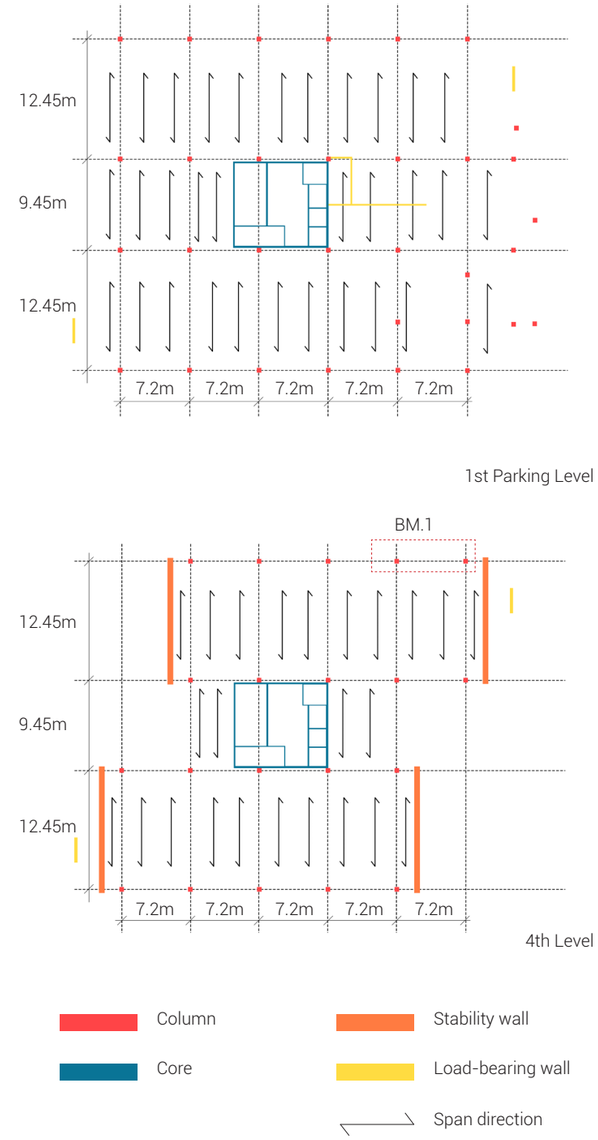


Figure 2.3.2 The overall structural scheme (Author, 2018)

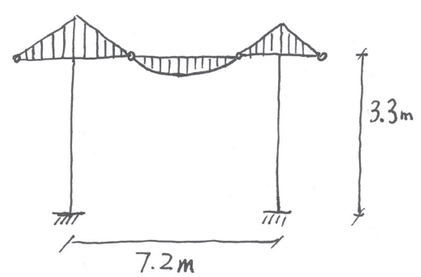


Figure 2.3.3 The bending moment of beam (BM.1) (Author, 2018)

CONSTRUCTIVE DESIGN AS PRINCIPLE

The design of the building highlights the constructive design principle. According to the study of Stichting Projektontwikkelings bureau (nd), there are two main features of the design: the low energy consumption and the freedom of the layout. As an integral design, these features also guided the design of the structure of the building.

Prefabricated facade element and the low energy consumption

On both ends of the two wings the walls are made with sandwich construction(Fig 2.3.4). The shape and construction (sandwich construction) of the elements play their role in the package of measures to limit the energy consumption.

The façade is massive (although not heavy by the sandwich construction), because mass absorbs; gives thermal, but also acoustic insulation, keeps warm in the winter and cool in the summer.

Freedom layout and the structure

The design realizes a maximum freedom layout by using a prefabricated structure system, which allows the large span. Based on ergonomical, social and economical requirements for office space, efficient column distence of 7.2m is applied, which can be divided into four 1.8m double-T floor plates(Fig 2.3.5)(Fig 2.3.6). And this division is highly efficient for the layout of typical office units (Fig 2.3.7) which take up 1.8m longitudinally. The whole office sets 1.8m*4.8m as the smallest functional unit.

So, the design of the structure system is an important part of the architectural design as a whole. Rather than the building chose this structure, it's the structure itself that guided the design.

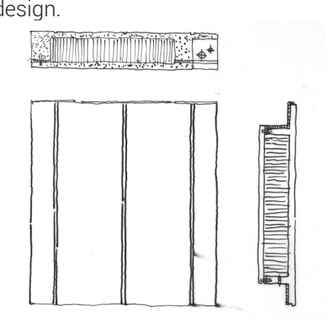


Fig 2.3.4 Sandwich Construction(Author, 2018)

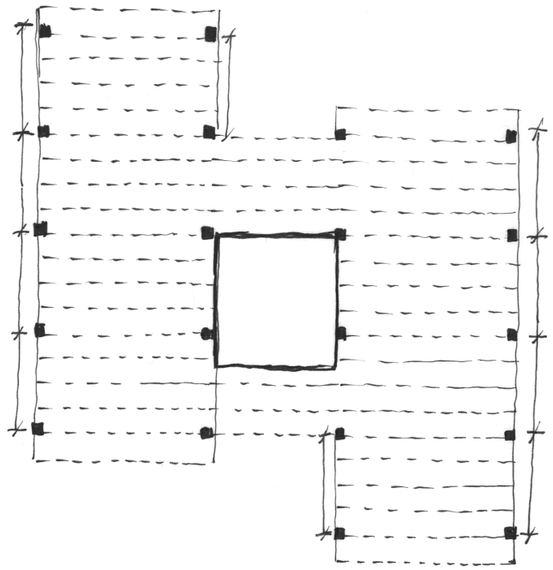


Fig 2.3.5 Floor plates division (Author, 2018)

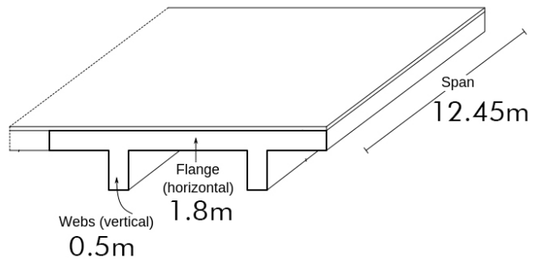


Fig 2.3.6 Efficient Structure Element Retrieved from https://en.wikipedia.org

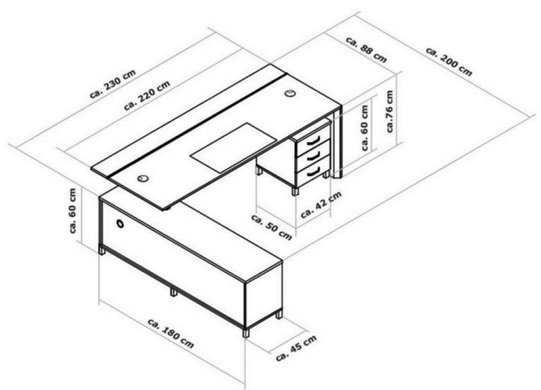


Fig 2.3.7 Typical office units Retrieved from http://www.nwudesign.com

SCHOKBETON SYSTEM

Introduction of Schokbeton System

Schokbeton is an architectural concrete precasting system, which was developed in the early 30s in the Netherlands. The shock system was invented by two concrete workers who converted a washing machine into a 'shock table' on which concrete during the casting process was 'shocked' for a few minutes to consolidate the material.(Pyburn & Van Zuijlen, 2015) The founders got an international patent for this technology in 1935. Over the almost 50 years that the shocking process was used by the company (Fig 2.3.8), it was exported from the Netherlands to 30 countries around the world, from Japan to USA.

The initial goal of founders, G. Lieve and M. Leeuwrik, was to make low-cost, custom-made artificial stone elements intended to replace stone in buildings. (Stenvert & Van Zuijlen, 2015) As the amount of natural stone is very limited in most parts of Netherlands, importing stones from other countries is necessary and they can be very expensive.

Feature of Schokbeton System

The primary advancement of Schokbeton system for its time was its approach to vibration as a means of achieving an output from a production process that was exceptionally consistent in compaction, strength and finish. (Stenvert & Van Zuijlen, 2015)

Schokbeton and The Beursgebouw

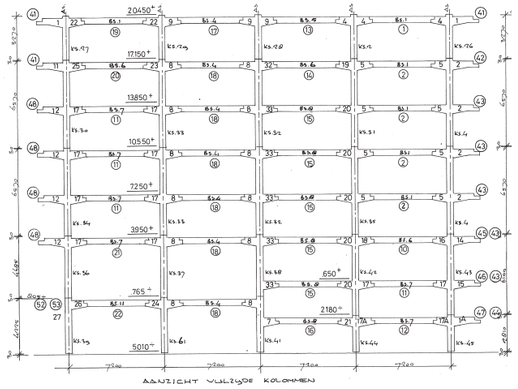
From 1947 to 1953, more than 1000 farm barns in the Noordoostpolder were constructed using Schokbeton (Pyburn & Van Zuijlen, 2015), which shows the widespread usage of Schokbeton in the then reclaimed new land. Furthermore, the company cooperate closely with architect in the design process, which ensure its high architectural quality (Stenvert & Van Zuijlen, 2015).

The Beursgebouw uses prefabricated elements both in the structural parts and the facade. The prefabricated columns, beams and floor plates use Schokbeton (Fig 2.3.9), and the facade elements also use it. The external staircase and the core use Schokbeton as well.

In short, the designer might be in pursuit of a good architectural quality of this building and he chose Schokbeton, and this system might account for the good structural, thermal and acoustic performance of this building.



Figure 2.3.8 The trade mark of N.V. Schokbeton Kampen Retrieved from http://www.schokbeton.info



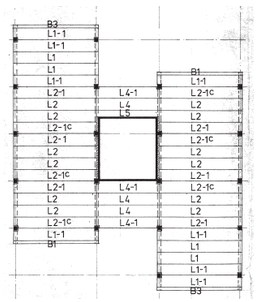


Figure 2.3.9 Schokbeton elements in the building (N.V.SCHOKBETON, 1980)

CONSTRUCTION PROCESS

A big proportion of the building is prefabricated. The assembly took place as followed (Fig 2.3.10).

The parking garage
The big foundation piles are first constructed, and then the columns of the parking garage rest on them. The beams connect the foundation piles together, and on top of the beams lay the floor of the 1st parking level. The foundation of the centering core is a thick plate with the dimension of 11m*12m*0.5m. There are two layers of parking ground, and the double-T plates lay on the 1st layer of columns. On the south-west of the building, the area is two-level-high.

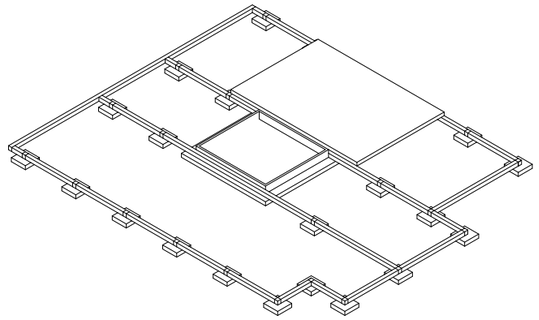
The entrance platform and ramp
Except from the prefabricated columns, some of the columns on the parking level are in-situ poured, and then the ramps and the platforms in the entrance lay on them.

The standard floors
The prefabricated columns lay on top of the lower one floor by floor, and beams connect the columns together. On the ends of each wing is the prefabricated beam that connects the two facing columns. The double-T plates lay on the beams one by one.

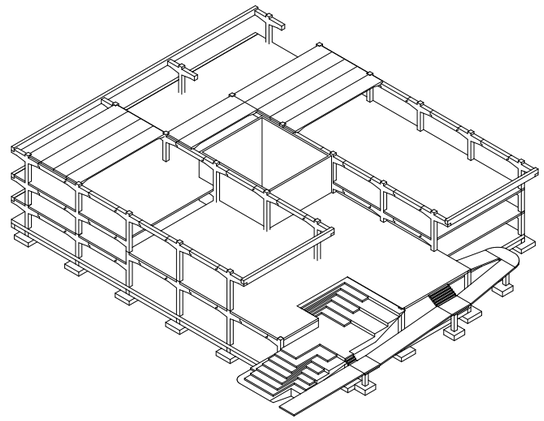
The glass part
On both ends of the core there is a glass part, the glass parts are connected to the main structure with steel joists
.

The external staircase
The external staircase is centered around a load-bearing wall, and the elements are prefabricated before-hand and then assembled on site. The external staircase is connected to the main structure, which adds to its stability.

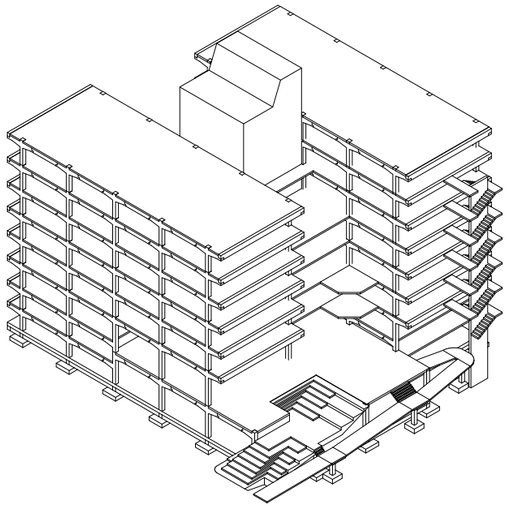
All in all, the construction process of the building shows consistency from the bottom to the top, from main structure to the sub-structure, and from inside to the outside. The whole process emphasizes prefabrication and standardization, which ensures both the efficiency of construction and the quality of the final building.



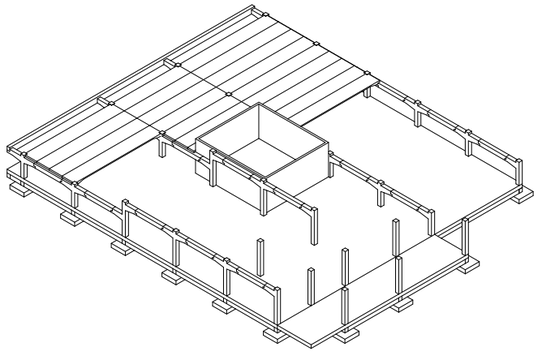
Basement



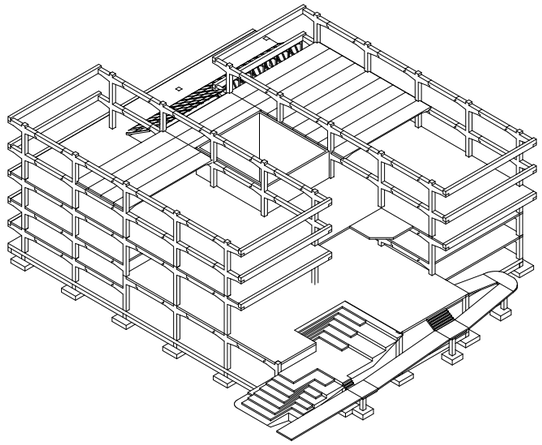
Ground floor



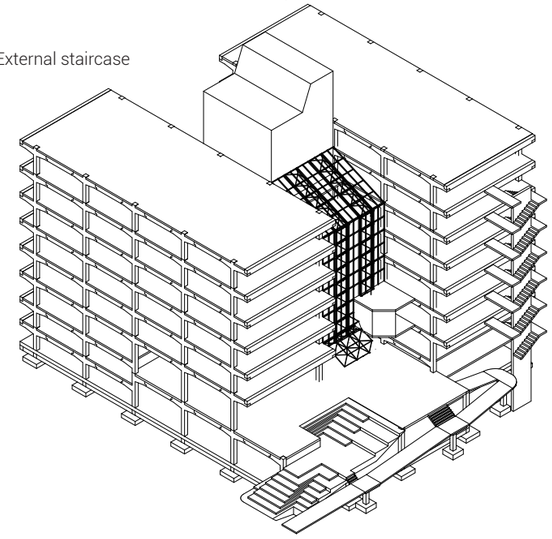
External staircase



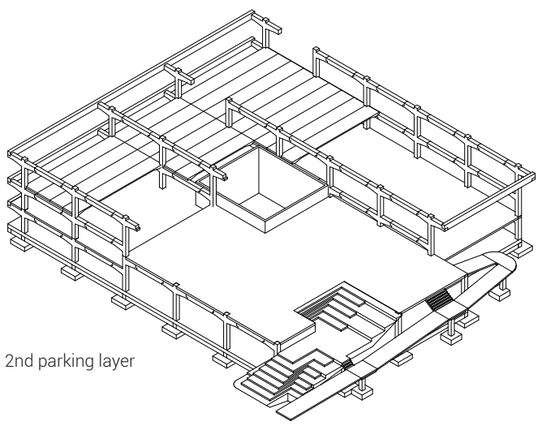
1st parking layer



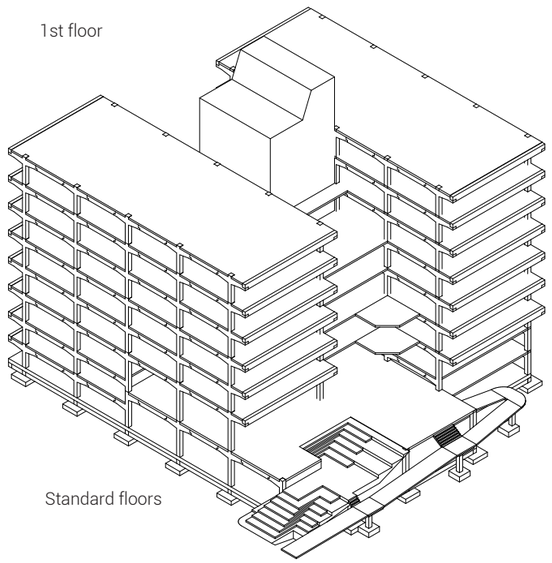
1st floor



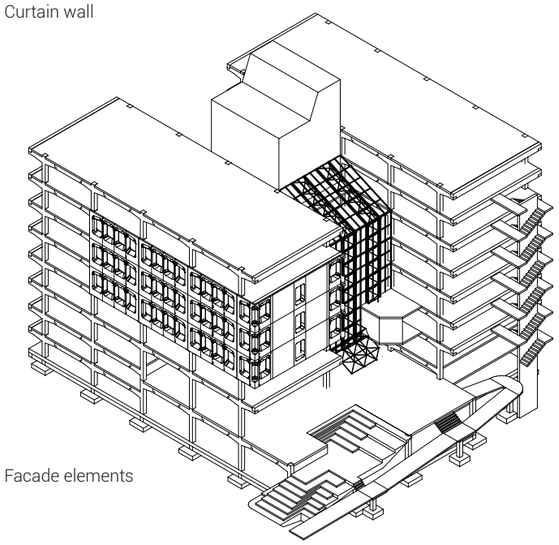
Curtain wall



2nd parking layer



Standard floors



Facade elements

Figure 2.3.10 Construction process (Author, 2018)

TYPICAL PREFABRICATED UNIT

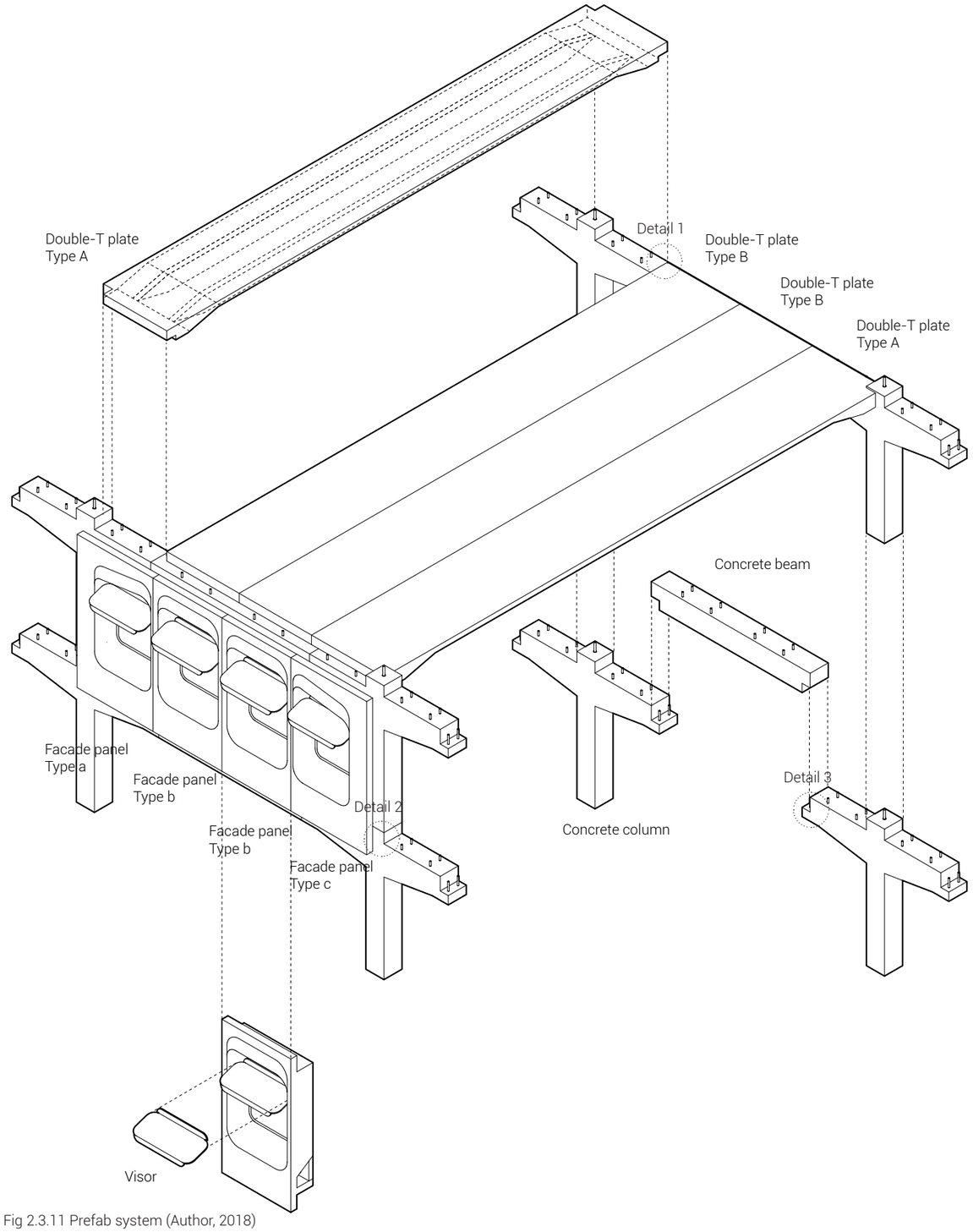


Fig 2.3.11 Prefab system (Author, 2018)

STRUCTURAL UNIT

Both the facade elements and structural elements are prefabricated. For the structural parts, the connection of floor plates and columns and beams is clear and precise.

Double-T plates

A double tee or double-T plate (Fig 2.3.15) is a load-bearing structure that resembles two T-beams connected to each other side by side. The strong bond of the flange (horizontal section) and the two webs (vertical members, also known as stems) creates a structure that is capable of withstanding high loads while having a long span. The typical sizes of double tees are up to 4.6 m for flange width, up to 1.5 m for web depth, and up to 24 m or more for span length.(Gurley & Hanson, 2014)

Double tees are pre-manufactured from prestressed concrete which allows construction time to be shortened.

Double tee dimensions are based on many factors (efficiency, usage, fire regulations, transportation regulations).

The connection of floor plates and the columns and beams

Prefabricated columns connect with the beams, and then the floor plates further lay on the beams. (Fig2.3.12,13,14)

To sum up, the structural unit (Fig 2.3.11) shows clearly the consistency in the design of structure system. The T-columns and the beam together bear the load of floor plates, and the joint details are well designed and precise. The shape of T-columns influences the design of different facade panels, thus achieving coherence of inside and outside of the building.

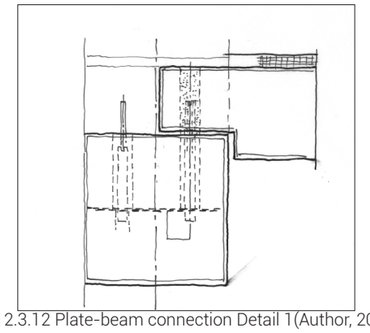


Fig 2.3.12 Plate-beam connection Detail 1(Author, 2018)

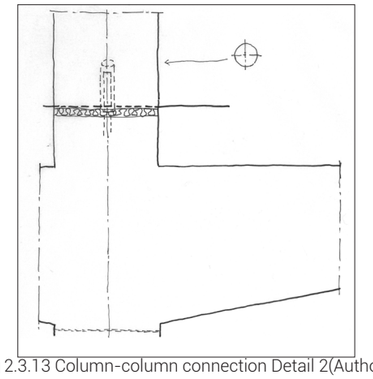


Fig 2.3.13 Column-column connection Detail 2(Author, 2018)

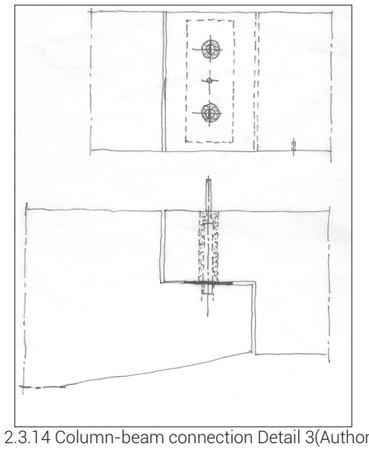


Fig 2.3.14 Column-beam connection Detail 3(Author, 2018)

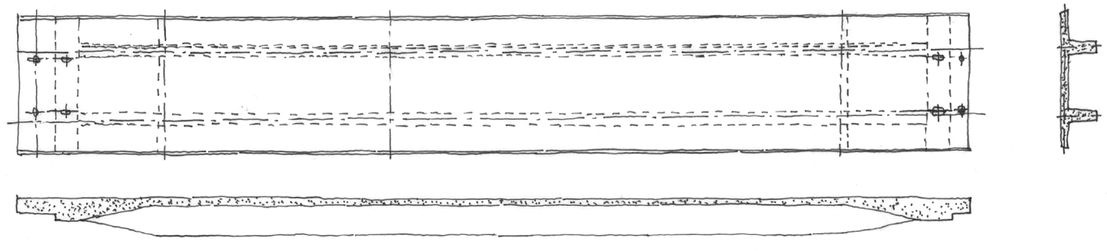


Fig 2.3.15 Double-T plate (Author, 2018)

GLASS PART

The main facade elements of the building includes prefabricated facade panels, the sandwich walls as well as the glass part.

The glass part in the north
In the north of the building, between the two wings there is a glass canopy that starts from the ground floor and vertically covers all the floors until the roof. The structure material used here is steel. The steel trusses are arrayed to carry the glass elements. (Fig 2.3.16)

The glass part in the south
The glass canopy in the south is in between the two wings, and it starts from the entrance awning. Two steel trusses are covering from the top to the end in the glass canopy. The end of the steel trusses is the entrance awning.The way the trusses is connected to the floor plates is shown in the detail drawing. (Fig 2.3.17, 18, 19)

In a word, the design of the glass part enables a good atmosphere for people to meet and communicate in the central part of the building. However, the steel trusses are not consistent with the construction logic of the main structure and it's not adding to the stability of the curtain wall.

The observatory
There is an observatory overlooking the entrance in between two wings on the 1st floor. This observatory is not within the main structure system, and there is no columns carrying the weight of it. The weight of the observatory is most likely to be carried by the neighboring beam.

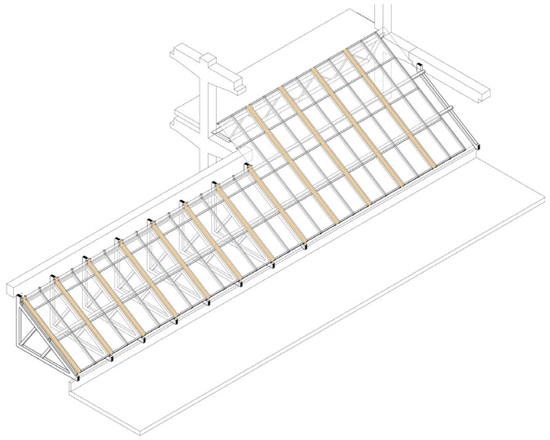


Fig 2.3.16 Canopy in the north(Author, 2018)

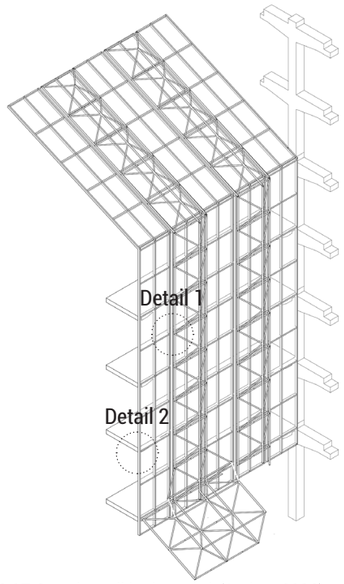


Fig 2.3.17 Curtain wall in the south(Author, 2018)

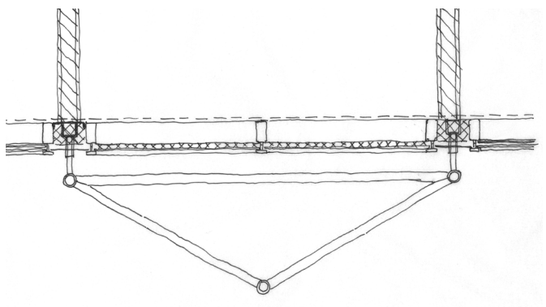


Fig 2.3.18 Curtain wall horizontal section detail 1 (Author, 2018)

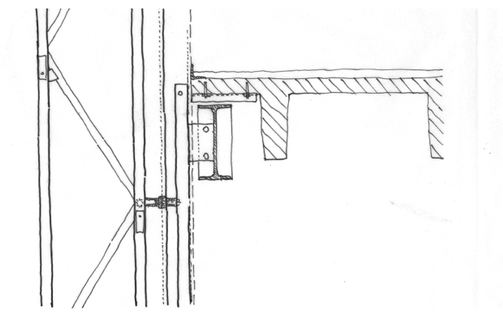


Fig 2.3.19 Curtain wall vertical section detail 2 (Author, 2018)

THE STABILITY CORE

The floor and wall of the stability core are prefabricated, and the connection of these elements are also different with that of the columns and beams.(Fig 2.3.20, 21, 22,23)

The prefabrication principle is applied to the stability core, and with a limited amount of element types, the core can be constructed. This again shows the consistency of the structure logic.

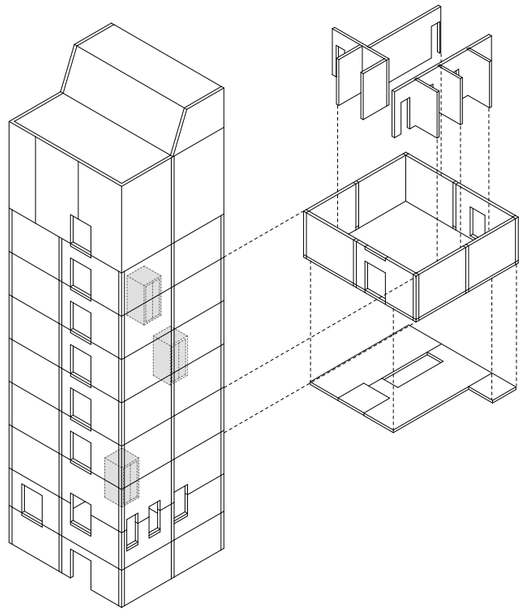


Fig 2.3.20 Stability core structural scheme(Author, 2018)

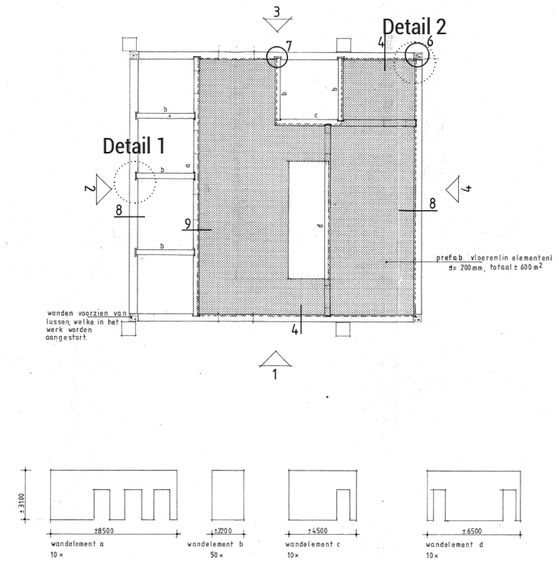


Fig 2.3.21 Prefabrication scheme of core elements(Author, 2018)

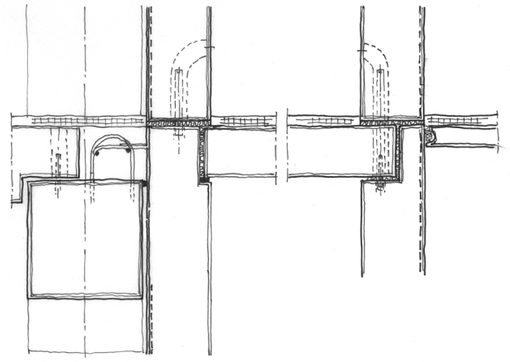


Fig 2.3.22 Detail of core 1(Author, 2018)

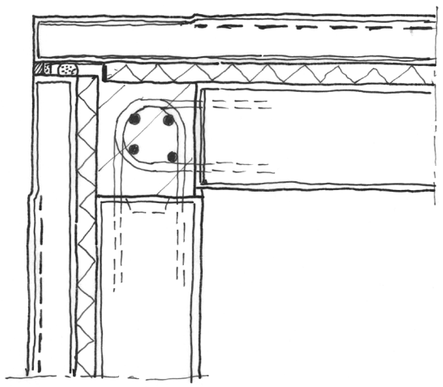


Fig 2.3.23 Detail of core 2 (Author, 2018)

CONCLUSION

Coherence of Structure, space and facade

Instead of being the subordinate of space design, the design of the structure is also put high emphasis on. Firstly, high-quality prefabricated Schokbeton concrete elements are chosen, and structural engineers collaborated with the design process to ensure the coherency between structure and design. Secondly, the dimensions of columns and floor plates are carefully determined to ensure construction efficiency. Thirdly, the structure has influenced facade elements, which shows coherence of inside and outside.

Furthermore, the prefabricated columns have a distictive shape which repeats on different floors and forms a unique rhythm. This shape, when exposed to the exterior, can be an important element for the space. The south-east corner of the ground floor of the building is a portico space which shows the feature of the structure elements. (Fig 2.3.24)

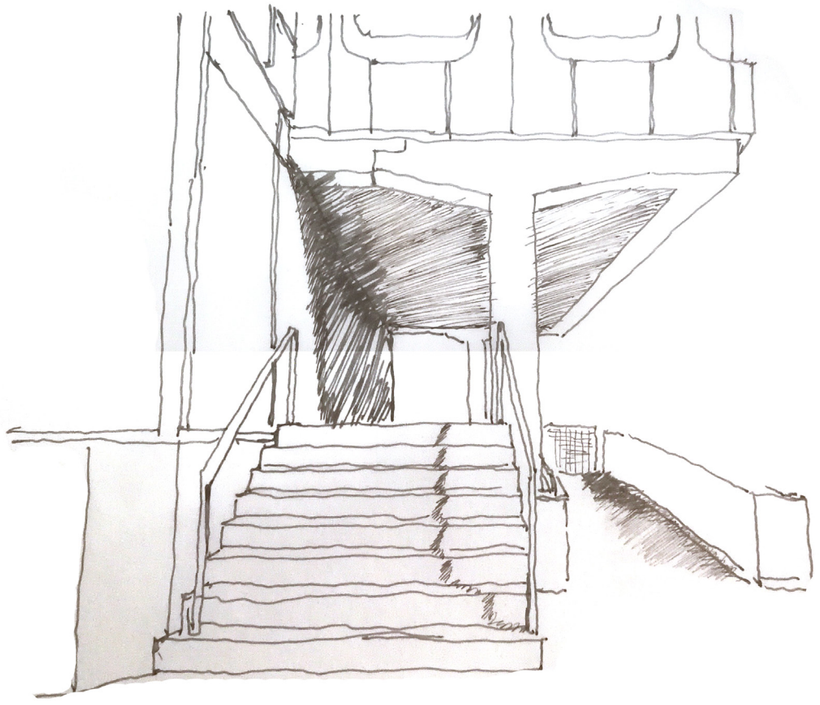


Fig 2.3.24 Structure and the space(Author, 2018)

The structure elements have a good quality, both in its strength and finish, and thus they can be displayed. So, the structure itself, with a unique identity, can be a part of the space and can be exposed when necessary.

OPPORTUNITY AND CHALLENGE

The structure of the SCHOKBETON prefabricated system has lots of possibilities but as well many limitations.

The load bearing structure is still in a good condition, and due to the fact that the design emphasized constructive principles, the structure still allows potential and possibilities for further functions. Despite the great flexibility provided by the structure, the floor height might pose a threaten to some new programs. Based on the analysis of the connection of floor panel and beam, a small proportion of double-T plates might be removed if needed for further renovation, however, removing too much floor panels is likely to influence the stability of the building as the floor panels are also connected to the core. As the building has relatively thinner columns, adding floors might not be possible in the future. The facade elements are still in good condition, however, most of them can be removed. The facade elements on the north and south end of the two wings would better be kept as they work as the shear wall.

OPPORTUNITIES

- Good condition to reuse
- Flexibility within the floor plan
- Possible opportunity to remove few floor plates in the floor
- Good thermal and acoustic performance of original facade

LIMITATIONS

-Relatively low floor height of 3.3 m
-According to Mr. Richard, there is little possibility to add floors


Fig 2.4.1: Interior of Beursgebouw (author, 2018)

2.4 SPACE PLAN

How does Beursgebouw achieve to be a flexible office building,
and what does it mean in further intervention?

This chapter is about the space plan of the Beursgebouw. De Beurs was designed to be a flexible office building with assistant of structure, façade, service, climate design and so on. This chapter explains history context of working apace at first, then the plan and program idea of De Beurs will be illustrated, then, it follows the interior and exterior space experience is introduced. In the conclusion, the attitude towards Beursgebouw's flexibility as an office building and potential to contain other functions will be made clear.

OFFICE TREND DEVELOPMENT

Maximum freedom of office space layout is one of the most important goals for the Beursgebouw. (Stichting Projektonwikkelings bureau, n.d.) To understand the intension of flexible plan and its meaning for today, we can trace history of office development.

Started from the early 1900s, the earliest modern office trend, so called 'Taylorism', (Fig 2.4.2) was remarkable for its scientific approach and the adoption of a rigid, regimented office layout that resulted in workers sat at endless rows of desks with managers located in encircling offices and observed. It tried to maximise industrial efficiency and gain maximum productivity from their staff, while, forgetting to care for human and social elements. (K2space, n.d.) Afterwards, as skyscrapers and large commercial buildings were developed, the workplace became spacious spaces with a mix of private offices and open plan workplace, with dedicated staff kitchens or canteen. Frank Lloyd Wright designed this kind of open plan space to increase productivity, but also included completely new elements such as bright lights, warm spaces and cork ceilings. Private and social experience in working space was noticed and focused this time.

In the early 1960's, workplace started to change with the adoption of a more socially democratic layout to encourage human interaction. This office design style, known as 'office landscape', advocated a less rigid approach to office layouts and focused more on the needs of the workforce. Workplace became a social affair with collaboration between teams. Staff of different managerial levels began to sit and work together, and as such, office landscape is often referenced as the principle of modern office design. De Beurs built in 1981 is an example, which provided possibilities to have both office landscape and cell offices layout. During and after 1980s, the Cubicle Farm (Flig 2.4.2) became popular for profitability reasons. It was acknowledged as one of the more depressive (if not, the most) periods in office development history.

Nowadays, as the way people work becomes more mobile, they could work anywhere with a laptop and internet. Also, leisure areas and creative spaces with pinball machines, beanbags and dart boards become popular. The modern workplace starts to take inspiration from the home now, through the use of warm colours, intimate lighting and soft seating. The comfort and wellbeing of staff is always the focus, as companies become aware that the office is an important tool to be used to attract and retain the best talent in a competitive marketplace.

So, the Beursgebouw followed the trend in 1980s and worked well then, but it seems not enough to just be flexible to fulfil market's needs today.



Fig 2.4.2: office space design development (images from internet and diagram by author, 2018)

OFFICE SPACE DESIGN

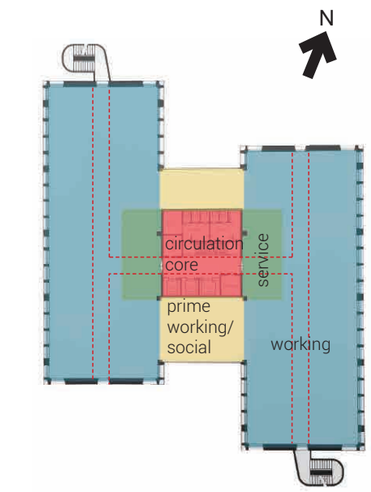
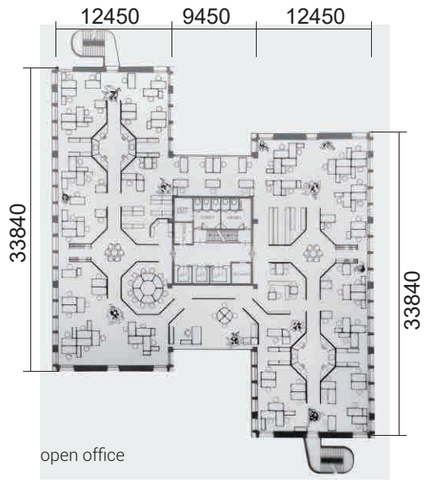


Fig 2.4.3: Floor function layout (author, 2018)



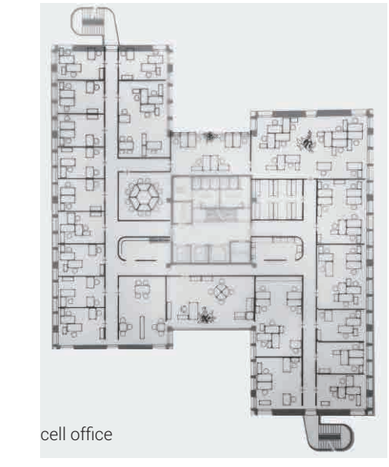


Fig 2.4.4: Two types of working space layout (Stichting Projektonwikkelings bureau, n.d.)

According to design idea of De Beurs, a maximum layout freedom was requested. (Stichting Projektonwikkelings bureau, n.d.) And the efficiently sized office floors, 12×32m net, are applied on both sides of the central core. As Fig 2.4.3 shows, the office floor layout is clear and logical. The core is in the centre with two corridors leading to two working zones. Main working spaces are on both sides, with each has a service zone where kitchen and cloakroom were placed if needed. Between two working zones, there are two prime working space with good views and sometimes two-floor high, they were designed to be big office rooms or open office based on original drawings.

Two possible layout samples, pattern "room-corridor-room" and "office landscape", were provided by architects to show flexibility of Beursgebouw. (Fig 2.4.4) In the description of the design, a field of 1.8×4.8m, is the smallest functional working unit in De Beurs, and always oriented east or west. The unit measurement study depends on natural lighting effect and office furniture. (Stichting Projektonwikkelings bureau, n.d.) The depth of the working zone is determined by this working unit as shown in Fig 2.4.5, total depth of 12m net is the dimension of two working units and one corridor. Also, the height is functional for working area, while, probably is low and oppressive used for other functions, such as an apartment.

So, the floor plan and space height design are consistent with and based on its function. In another word, De Beurs was tailored for an office building. Nonetheless, the flexibility of floor layout is based on the fixed premise that it should be a working space, otherwise the dimension and circulation are to be reconsidered.

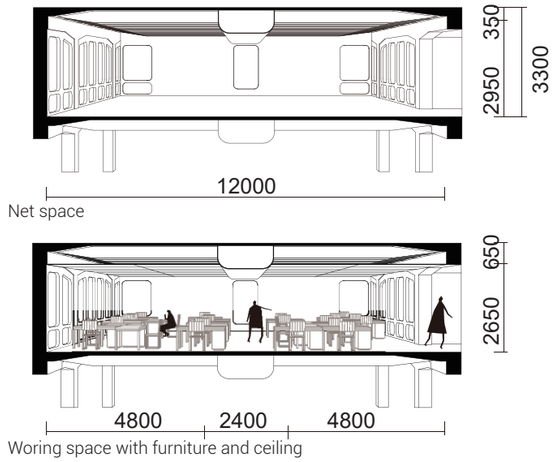
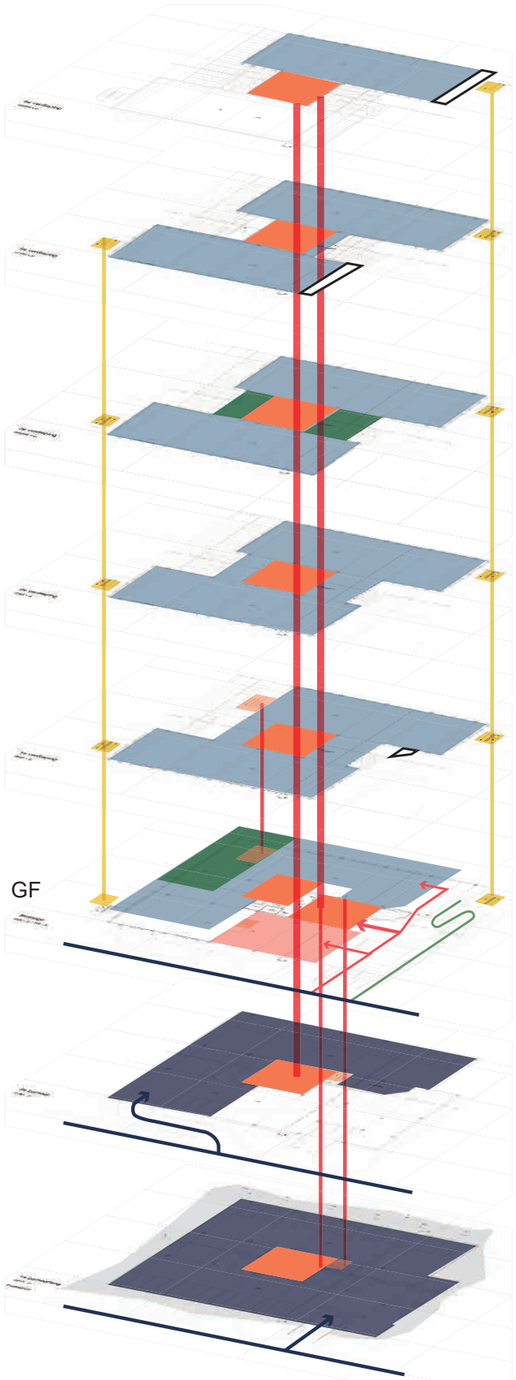


Fig 2.4.5: Working space section (author, 2018)



Staff canteen
Working space
Garage
Virtical circulation core
Stairs
Double height space
Fire stairs
Balcony

Virtical circulation
Fire escape
Bike & wheelchair circulation
Car circulation & entrance
Main entrance
Secondary entrance

Fig 2.4.6: Virtical circulation and program (author, 2018)

PROGRAM AND CIRCULATION

De Beurs has 2 floors of garage underground with separate car entrances each floor. (Fig 2.4.6) On the ground floor, there are three openings of the building, (Fig 2.4.7) the middle one is the main entrance directly connected to elevators and stairs down to garage. The one in the staff canteen is a sub-entrance, and the opening towards working space is a fire escape exit. As mentioned in former chapter, bicycle path meets its end in front of the building entrance.

Circulations inside of De Beurs is simple, central core contains three elevators, one of which runs down to garage, and a staircase running through the whole building. Some double-height spaces in the building located mostly besides the core, except for the one on ground floor which was meant to have a staircase connected to 1st floor, but the staircase was removed. Two balconies are located on top floor of two wings towards the city centre on the south. Two hanging fire staircases are placed on southeast and northwest of the building.



Fig 2.4.7: Original rendering of entrance (Stichting Projektonwikkelings bureau, n.d.)

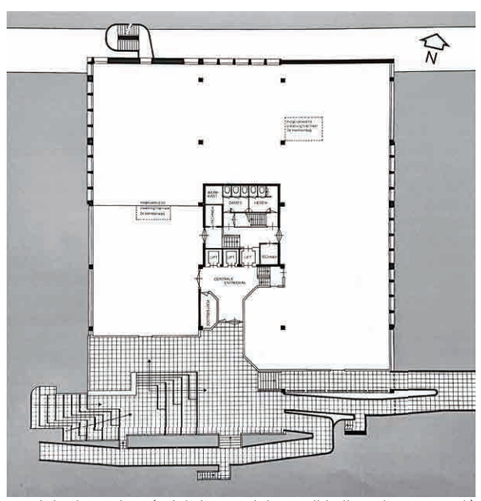
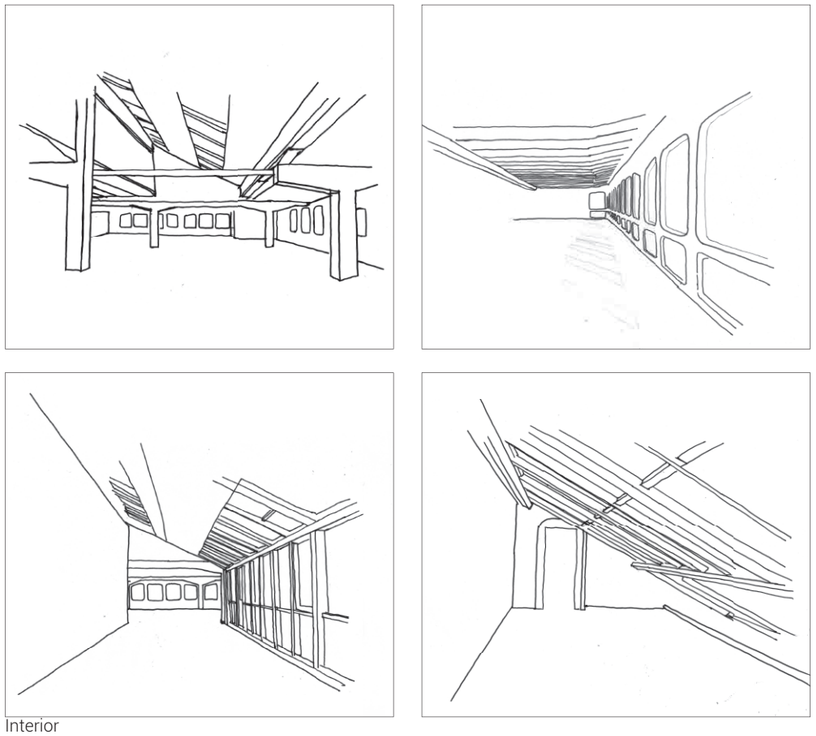
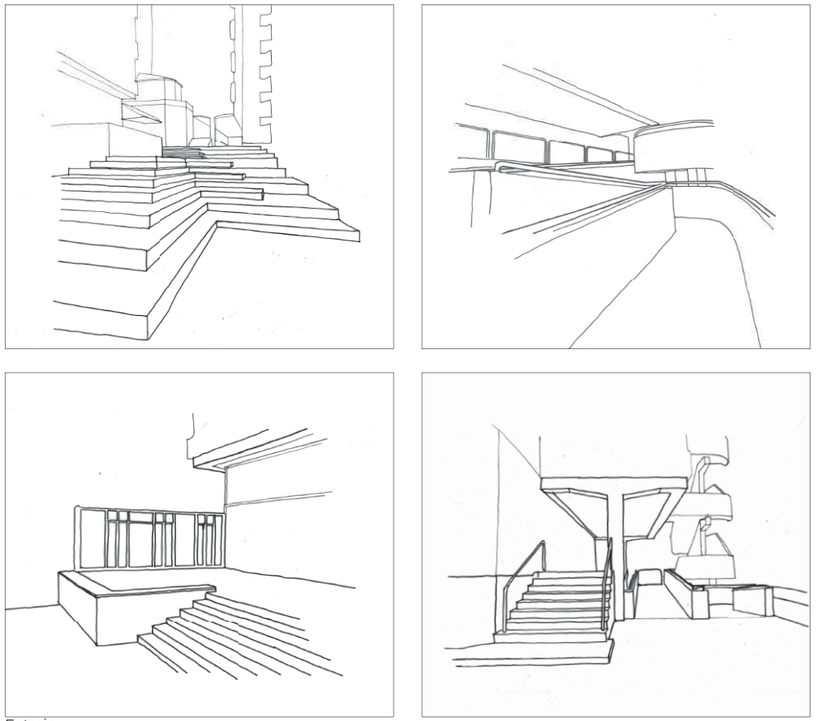


Fig 2.4.8: Original GF plan (Stichting Projektonwikkelings bureau, n.d.)

SPACE EXPERIENCE



Interior



Exterior

Figure 2.4.9: Space sketch (author, 2018)

INTERIOR

Sense of order and structural domination is the feeling De Beurs's interior gives. The interior is shaped by structural and façade elements, as well as facilities beneath floor, if broken pipes are not taken into account. Well, these elements were not meant to shape the space, but to serve the office and all of them has a functional reason to be there.

EXTERIOR

Complex and sense of fragment could be the key words for exterior experience. There also four elements defining this area, which are detoured staircase, ramp, terraces and an overhead corner. They were very well defined with so many details which disharmony with the empty and undefined environment as well as its interior.

CONCLUSION

The Buersgebouw was tailored to be an office building with flexible layout, which was achieved by collective efforts of skin, structure and service. And the design was conducted in a consistent and logical way, so all these elements and systems just cooperated well.

However, these helpful aspects were designed to serve the office, so in this term, De Beurs is restricted by its office function to certain level, and we could meet its limitation, such as its layout dimension and floor height, during further intervention.

Therefore, De Beurs is a combination of flexibility and constraint where both its opportunities and challenges derive.

CHALLENGE AND OPPORTUNITY

The space plan provides both flexibility and restriction to the building. The free-column floor plan offers opportunity for flexible layout. But it is a challenge to fit the interior space dimension for other functions.

The height different spaces inside provides opportunity to enrich interior space experience and introduce different functions.

The entrance area could be an opportunity, since it already has its own feature and plays an important role at site, further modification and intervention could strengthen or enrich its characteristic.



Figure 2.5: Heat wheels on the building roof (Author, 2018)

2.5 SERVICE

What is the role of the service system in energy conservation and reuse in the Beursgebouw?

This chapter is about the service of the Beursgebouw. 'What is the role of the service system in energy conservation and reuse in the Beursgebouw?' is emphasized in the research and answered in the conclusion. At the beginning of the study, there is a brief introduction of the service system in De Beurs and the public attitude towards energy and sustainability since 1980s. Heat recovery system (heat wheels), piping position, climate scheme, lighting, supplementary energy devices design, drainage, problems and opportunities are discussed. These researches are composited by literature study, interviewing, field research, making diagrams and hypothesis. As the result of the study, the initial question is answered in the conclusion.

INITIAL IDEA OF SERVICE DESIGN

Since the Club of Rome released its first report: "The Limits to Growth" in 1972, a growing amount of people became gradually aware of the lack of resources as a global problem. The society has experienced the development from being influenced by crises, facing the crises to the later developing measures to prevent crises to reoccur. Architecture has also evolved from unconscious design to designs including energy saving (sustainable) strategies.

The Beursgebouw was designed by architects from E.D. Partnership and engineers from Amersfoort in 1979 and the construction completed in 1981(Figure 2.5.1). It was announced to be designed by the constructive initial ideas: realize 60 - 70% lower energy consumption than the contemporary office buildings (Network - Den Haag, 1981). Whether it is the designers' pure desire for energy conservation, or the call for the corresponding social requirements, De Beurs can be a quality case of development of sustainable architecture in that era.

The building mainly uses the two energy methods: heat recovery and wall insulation to achieve the energy saving goal. Due to some reasons, maybe the 2008 economic crises, De Beurs has been vacant for already 10 years (Figure 2.5.2). Most of the devices in the building were removed, but it still can be known that a part of the indoor height was still occupied by the ventilation pipe system when the indoor height was lower than the average, which contributed the depress feeling of interior. Refer to the "energy efficient" tag of De Beurs, actually parts of the newly built buildings current days have reached a level of 0 – energy consumption, which means De Beurs is not efficient anymore and needs to be updated. These will be discussed in detail in this chapter later.



Figure 2.5.1: History photo of the Beursgebouw (Almere archive, 1981)



Figure 2.5.2: Train view of the Beursgebouw (Author, 2018)

OVERVIEW OF THE SERVICE SYSTEM

The service system of the Beursgebouw is well arranged and is positioned in a simple and highly efficient way. There are mainly four service systems (Figure 2.5.3) arranged from the roof to the ground and all the layers of the central core, which make it possible for the users to make an easy access to the toilets and stairwells, though you have to first across the staircases to reach the toilet. In terms of function, except the ground floor, the functions of each layer are roughly the same: two main office volumes with a service core in the middle. Escape stairs are located on the north and south façade of the building.

The service design for energy saving is reflected in various aspects of the building. It is the heat recovery system that is the most "obvious" and contribute to the largest proportion of energy cut down. According to the official brochure of the project, the Beursgebouw can restore 400 kwh/m2 by this heat recovery system each year (Network - Den Haag, 1981). Secondly, the façade of the building was designed through light and material analysis which made it possible to let in fewer direct sunlight and reduce thermal exchange between inside and outside. There is another difference in the Beursgebouw is that the number of lights in the building is not always the same, by a component called Bodair-koppelprofiel that users can remove the artificial light as well as some wires when there is no need here.

According to the observation above, it can be concluded that the architect or engineer tried to minimize the energy consumption by the service system. It is the fundamental part of the building, the heat wheels are placed on the roof of the building, which can clearly see on the train, were not camouflaged. The exposure of service, such as heat recovery machines, escape stairwells and drainage pipes are all in keeping the idea of constructive design of the architect. The Beursgebouw is a building started from energy saving service system design.

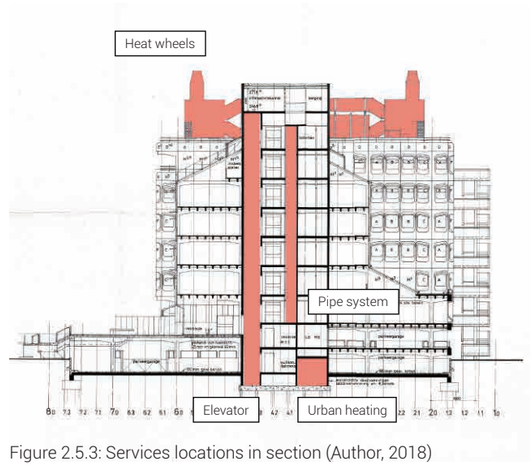


Figure 2.5.3: Services locations in section (Author, 2018)

CENTRAL CORE

The Beursgebouw is a building started from energy saving service system design. There are two energy service systems serve in the building: VAV system with heat wheels (Figure 2.5.4) and urban heating system (Figure 2.5.5) . which were linked or placed in the central core with other service systems like cables and signals. The only exception are the garage layers, thought connected to the central core, because they were semi-closed or just fully opened, the services like air supply, ventilation and heating were just ended on the ground floor.

Main components of the central core:
a. Two heat wheels with a work efficiency of 400 kwh/m2/year (Network - Den Haag, 1981) (Figure 2.5.6), a type of energy recovery heat exchanger positioned within the supply and exhaust air streams of an air-handling system or in the exhaust gases of an industrial process, in order to recover the heat energy (ASHRAE, 2004).
b. Control room for city water heating, a system for distributing heat generated in a centralized location through a system of insulated pipes for residential and commercial heating requirements such as space heating and water heating (Levihn, 2017) .
c. Air volume control machines for all working spaces.

From the perspective of cultural value, the central core of the Beursgebouw and the service systems inside of it are of high economical value, due to their excellent performance on energy saving. From the perspective of reuse, the piping system and heat wheels are both of use value as well.

However, according to field research, it can be seen that the central core has reserved two big rooms for the ventilation system on each layer. Only a small part was used in these rooms, which is very wasteful. At the same time, whether the heat wheels are still efficient in contemporary use is also needed to be confirmed. There is basically no natural ventilation in the building. Is there any need to sacrifice parts of energy efficiency to pursue natural ventilation?

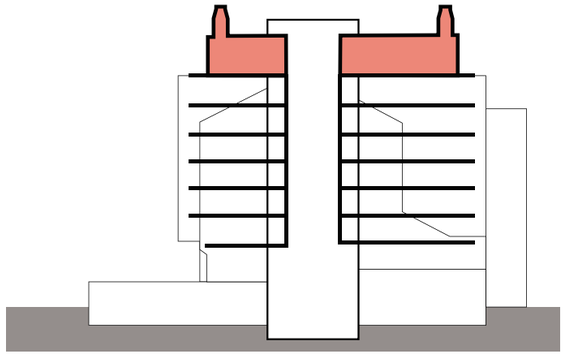


Figure 2.5.4: Ventilation system and heat wheels (Author, 2018)

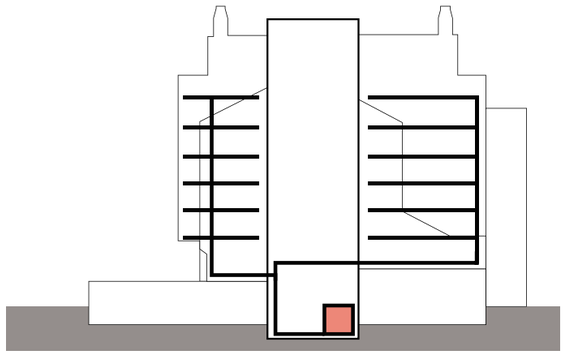


Figure 2.5.5: Urban heating system powering routes (Author, 2018)

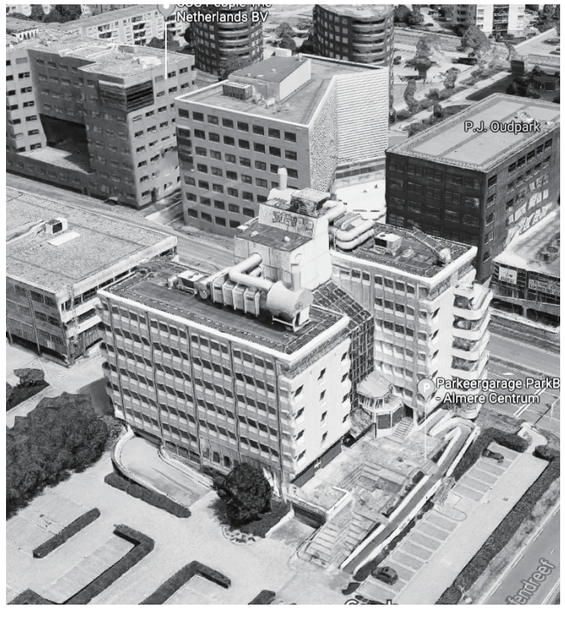


Figure 2.5.6: Heat wheels on the roof (Author, 2018)

PIPES IN THE VOLUMES

As shown in the drawing (Figure 2.5.7), the pipes are mainly placed north-south in the middle of the volumes and connect to the two control rooms in each layer. The end pipes are placed under the ceiling boards between the two beams of the double tees, while the main ventilation pipes are below the level of the ceiling vertical to the beams. The route arrangement is simpler in the parts between the two “massive” volumes. There is only one layer of pipe: the suction pipe and the inlet pipe are both in a L-shape and enclose the space together. The pipes emphasize the sense of indoor depth and deliver fresh air to all parts of the building efficiently.

However, the beams of the floor slabs are in one direction made it impossible for the main ventilation pipes hide inside of the floor structure (Figure 2.5.8, top). The pipes and the cables need to be placed under these beams that reduce the height of the interior space. Another problem is that there are some double-storey spaces inside the is that there are some double-storey spaces inside the building, and the ventilation pipes are just directly pass through these spaces (Figure 2.5.8, bottom), which affects the feeling and decoration of these spaces.

CLIMATE SCHEME

Although the Beursgebouw is a building started from energy saving service system design, all the service designs are restricted under the basic requirements of comfortable physical climate for office. From the past users of the building, it can be known that the interior physical climate is pleasant, while there are few natural ventilations inside of the building. Thus, a huge air ventilation system and a heating system are projected. The cooling design is minimized by the façade design. The sandwich façade of the building reduces the thermal exchange between exterior and interior and the direct sunlight.

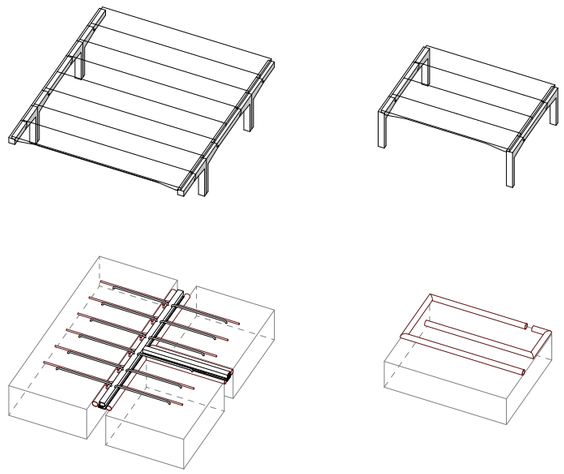
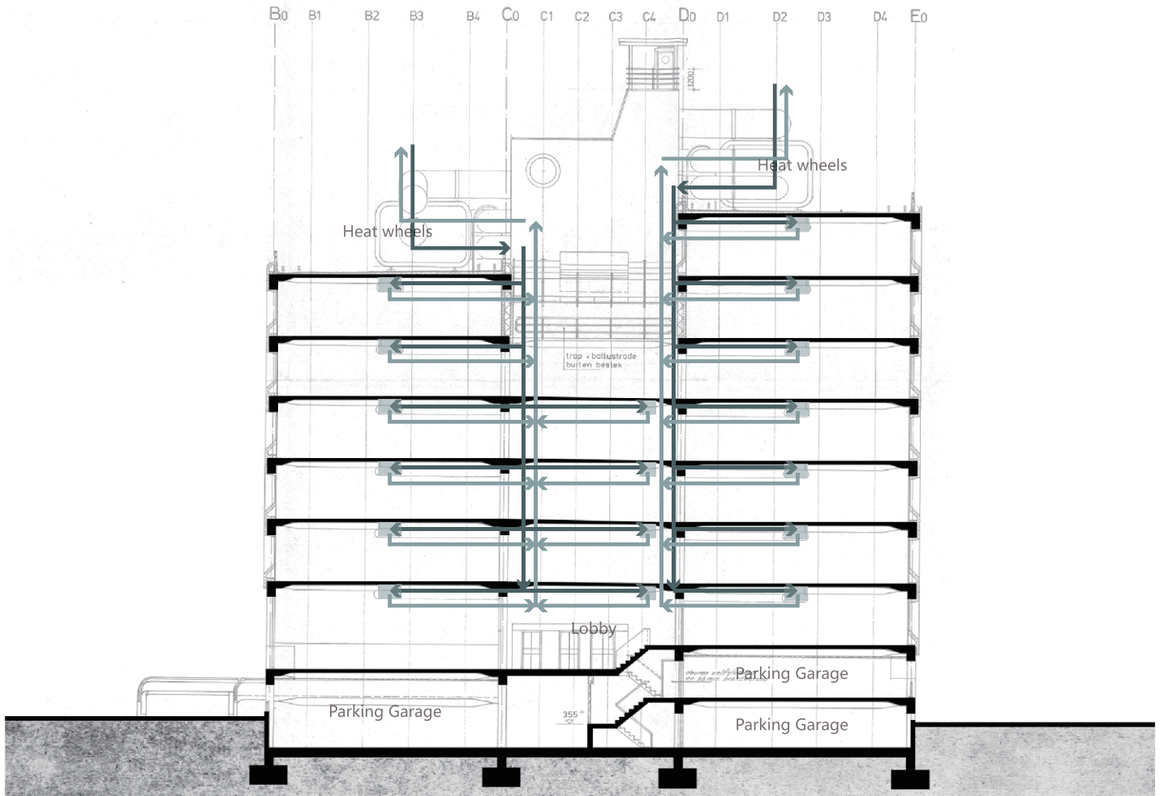


Figure 2.5.7: Positioning of the pipes (Author, 2018)



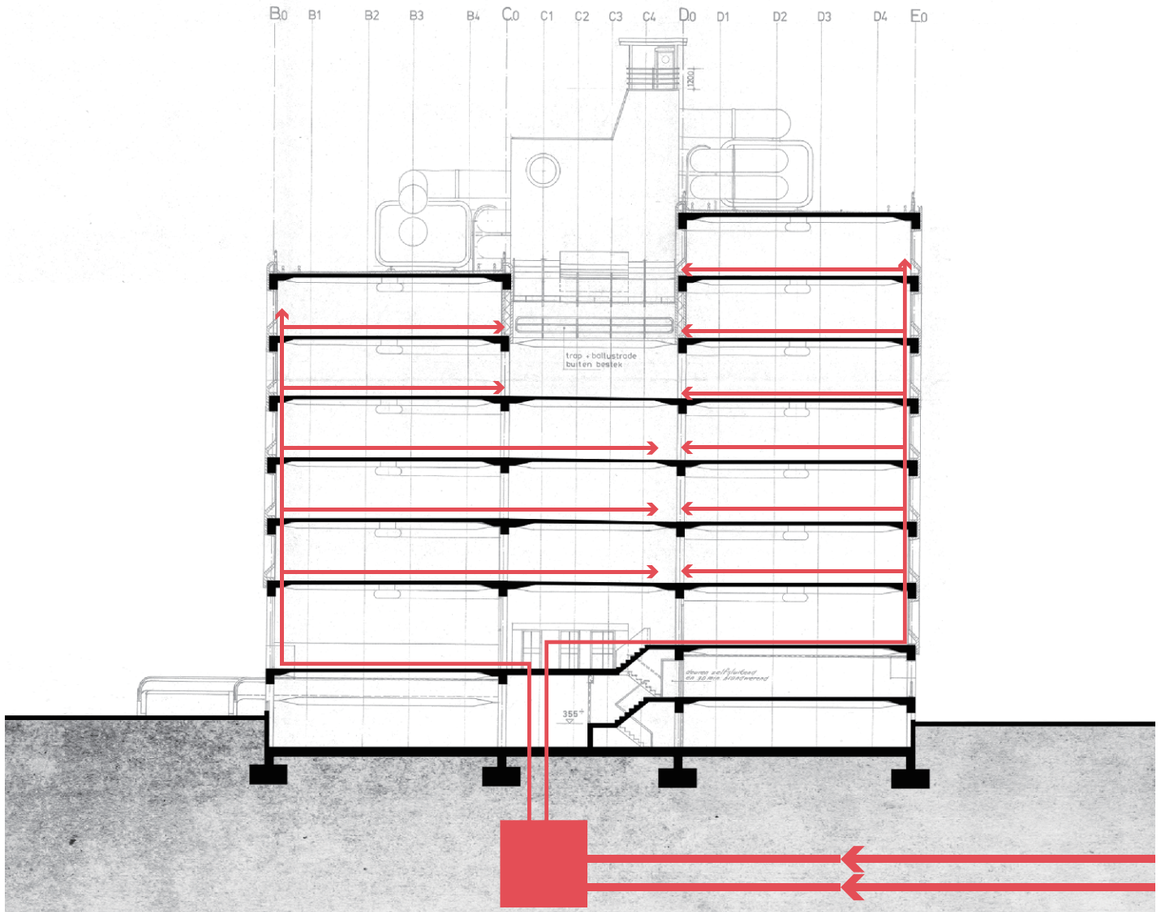


Figure 2.5.8: Positioning of the pipes2 (Author, 2018)



The ventilation control systems are made up by two kinds of pipes: the suction pipe and the inlet pipe, which are main placed under the ceiling panels. These pipes are linked to the main pipes and leaded to the heat wheels on the roof to make used of the remaining energy in the exhaust air to heat/cool the fresh air. After this procedure, it takes less energy from the radiators and has a better heating performance.

Figure 2.5.9: Ventilation system (Author, 2018)



The radiators are placed along the façades as one part of the façade components use water as a medium to heat indoor air. The hot water comes from a centralized location in somewhere of Almere(-Stad). There “glass parts” of the building are placed with further heating to ensure the equality of the climate, as the large glass surface and the thin sandwich panels will have a lot of trouble from the cold fall in winter.

Figure 2.5.10: Heating system (Author, 2018)

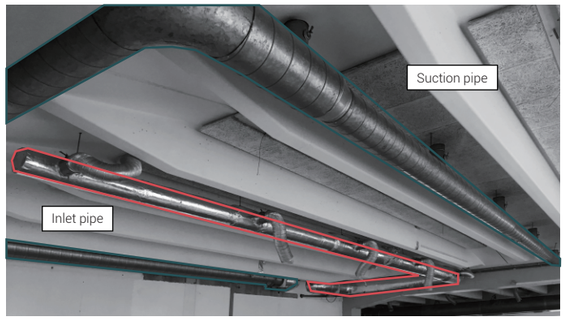
It is known that the climate concept is designed by an engineer, and it is not surprise that they are strongly integrated together. The Beursgebouw is the first office building built in Almere-stad and served as the office for constructors nearby in the very beginning and was later occupied by an engineering company called Oranjewoud.

Due to the vacancy for ten years and gradual decline in social status, there is little background information about the building. But what is certain is that the indoor environment of the building is very pleasant.

According to the drawings (Figure 2.5.9),(Figure 2.5.10) it shows that the whole “massive” volumes are more or less in the same climate situation, which means, whatever route you chose to go through the building, you will never go through different climate zones. This also greatly contribute to another design concept of the building: maximum flexible layout. No matter the working space is arranged in cell office or office landscape, staffs in all corners of the office can experience the same high-quality indoor environment. It improves working efficiency to some extent.

However, the building is empty for 10 years and the engineering company Oranjewoud doesn't exist anymore. Although the local guide Maria said that the sense of use is pleasant, nothing is perfect. As a result of the lack of interviewees, it is hard to know the problems of this climate scheme.





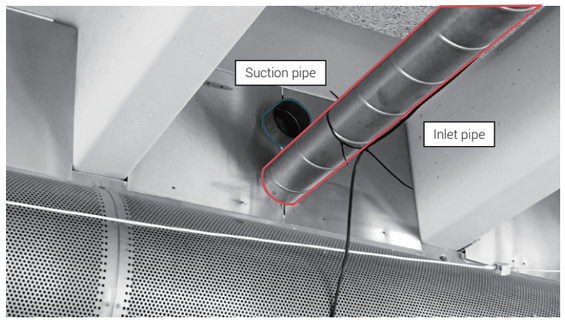


Figure 2.5.11: Air supply and ventilation components (Author, 2018)

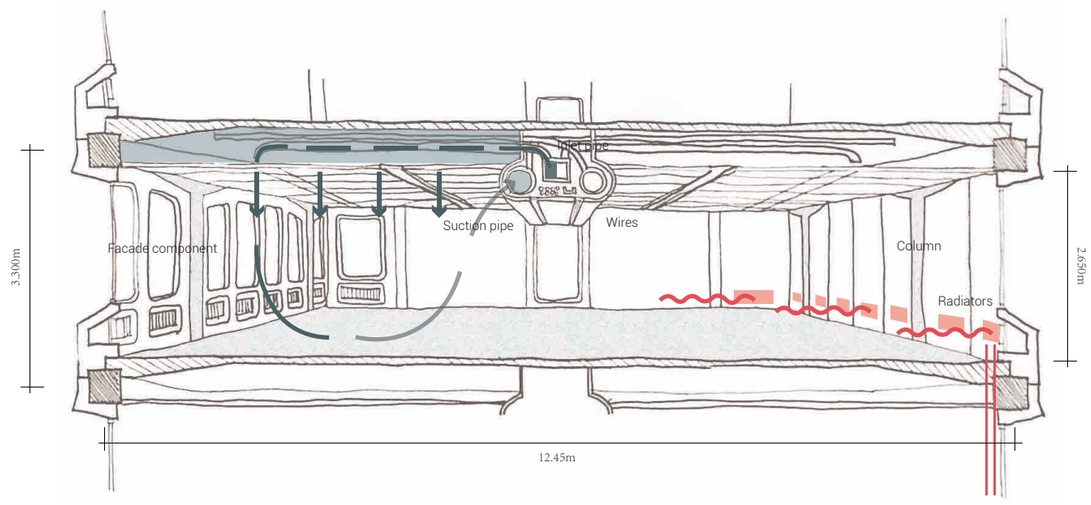


Figure 2.5.12: Ventilation and Heating in massive volume (Author, 2018)

AIR AUPPLY AND VENTILATION SYSTEM

The operation process of the air supply and ventilation in the Beursgebouw is: supply to four main areas, diffuse by the end tubes (Figure 2.5.11, top). As the diagram (Figure 2.5.12) shows that the fresh air supply comes from the heat wheels on the roof, after the pretreatment, the hot/ cold air goes into the main pipe and is assigned to the branch pipes place between the beams of double tee. Then the air blows out of the ceiling from the fans arranged on it (Figure 2.5.11, bottom), thus motivate indoor air circulation and replacement.

The ventilation system used in the building called VAV: Variable Air Volume System, it is a system is an air conditioning method of the all air system. It controls and adjusts the temperature of an air conditioning area by changing the air supply volume instead of the air supply temperature, thereby adapting to the change of the air conditioning area load. The entire system is energy efficient and combined with confined indoor space, the airflow in the two volumes are well arranged in a circular way.

The system is conspicuous in terms of visibility. Though the branch pipes are covered by the ceilings that is invisible in the interior, the main pipes just drop down from the ceiling make the indoor height decrease to only 2.65 meters. The treatment of the ventilation pipes responds







Figure 2.5.13: Radiators (Author, 2018)

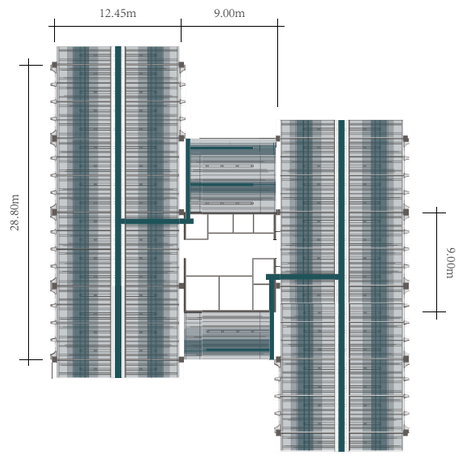
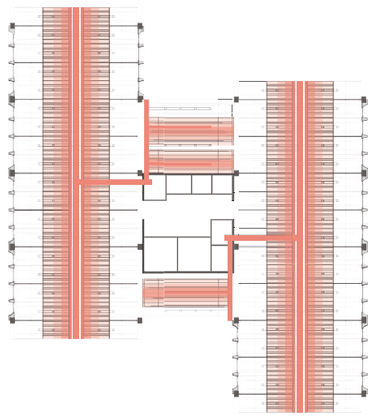


Figure 2.5.14: Ventilation and Heating plan (Author, 2018)



to the initial idea of the design, and the exposure of the processing method is one important way the engineer used to indicate his design idea.

HEATING SYSTEM

The heating system completely detaches from the ventilation that the heat medium directly comes from a centralized location in somewhere of Almere(-Stad). As the supplied air is already heated/" cooled" that the radiators are mainly for additional heating.

The diagram (Figure 2.5.14) shows the wall window ratio in the working space. Thought the building orients east-west, there is still overheating happen in the summer in the southern façade. The engineer solved this problem from the façade design rather than using ventilation as a solution, he used the sandwich-walls and sun visor to reduce excessive sunlight injection. So, the cooling design in the building is minimized.

Thought the radiators are one important component of the prefabricated façade elements (Figure 2.5.13), it is easy to combined the heating and cooling system with the ventilation system that it can be hided under the ceiling to make the interior looks more concise. And the wall of the façade can be made into hollow that has even better insulation performance.

LIGHTING SYSTEM

The building makes well use of daylight that minimize the artificial light using. The façade design, especially the design of window frame reduces the excessive sunlight injection in the noon and increase the amount of the diffused light. As far as the individual work-space is concerned, the minimal working unit in the Beursgebouw is 1.8 × 4.8 meters. The façade design makes it possible for the 80% of the 3-meter zone from the façade can be work with daylight and needs very modest artificial light supplement (Network - Den Haag, 1981).

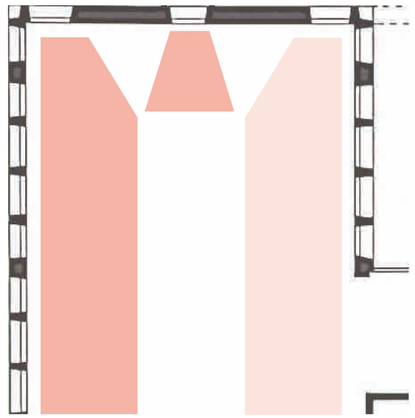


Figure 2.5.15: Natural daylighting area (Author, 2018)

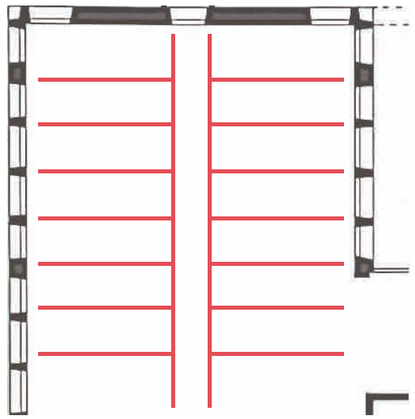


Figure 2.5.16: Bodair-koppelprofiel system (Author, 2018)

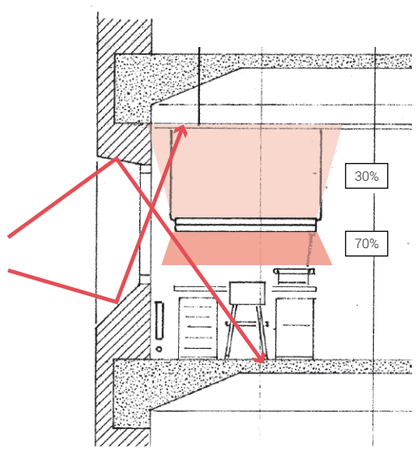


Figure 2.5.17: Bodair-lamp and diffused light (Author, 2018)

The energy saving on the lighting is not fulfilled by the lighting system arrangement, but the integrated design from the inside out. Firstly, the small depth of the construction makes it possible to more space in the building can be reached by the sunlight (Figure 2.5.15).

Except façade design, the interior devices like Bodair-koppelprofiel (Figure 2.5.16) and the Bodair-lamp (Figure 2.5.17) make made a huge contribution to the energy reduction. Bodair-koppelprofiel ensures the workstation itself decides on whether or not use the lamp. And the Bodair-lamp is place low above the work space, cast 70% of the light to the table and 30% to the ceiling and surrounding (Network - Den Haag, 1981).

Though the Bodair-koppelprofiel is a fundamental way to reduce the number of lamps, thereby cut down the energy using, it can not exist without ceiling. One big problem of the ceiling is it takes up a lot of indoor height that only left 2.65 meters to the users. For the visual part, as the Bodair-lamp is dropped to the table, it may make people feel the interior space more crowded than it should be with that amount of furniture.

THE SOUND LEVEL

Although the building is located next to the high way and the railway track, which is the source of noise, the acoustic environment in the room is still in a good performance. The performance can be achieved by:

a. Insulation material filled in the hollow part of the prefabricated façade components and walls (Figure 2.5.18).
b. Sound absorbing panels arranged in the middle of the beams.
c. Unopenable window

However, for the “glass” parts of the building, due to the envelope's materials, larger proportion of glass part and openable windows, the acoustic environment is not very optimistic. It results in an unequaled acoustic environment throughout the building.

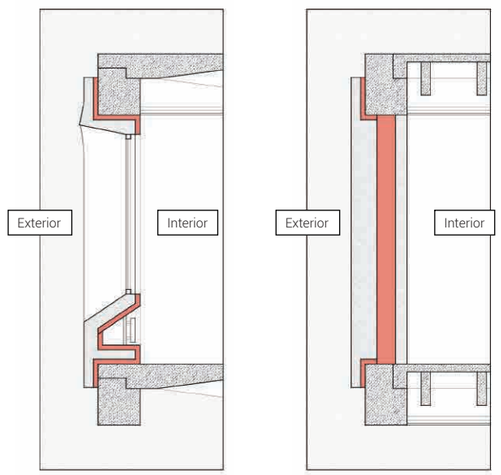


Figure 2.5.18: Facade components (Author, 2018)

DRAINAGE SYSTEM

The drainage system (Figure 2.5.19) echos to the façade design of the building. It is an architectural expression of the design idea: all the designs are closely corresponded to each other and contribute to the building's better performance. From the diagram it can be known that the water is firstly gathered in the edge of the roof, then drained to the ground by the downpipe and poured into the groundwater system.

The drainage system is intuitive and aesthetic. As the building program is simple, the downpipes meet the basic drainage requirements, the more important, they serve as linear decorative elements appear on the main façade. The drainage pipes have use and aesthetic values.

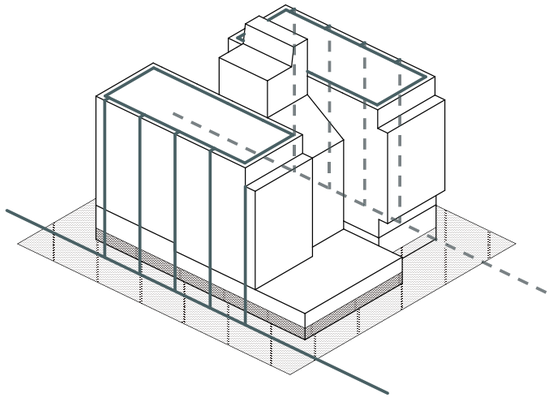


Figure 2.5.19: Drainage system (Author, 2018)

CONCLUSION

The service system plays the most important role in the energy conservation and reused in the Beursgebouw.

On the one hand, in term of use (economic value). It used appropriate ventilation system to make a full use of the remaining energy of the exhaust air, the water heating system is only for additional heating. The Bodair-koppelprofiel ceiling system and light system it uses reduce the energy using from the fundamental. It cuts down 60-70% of the non-essential energy on lamps and lighting (Network - Den Haag, 1981). However, these effects cannot be fulfilled without the design of the façade.

On the other hand, in term of aesthetic value. Not like the ordinary office building, services are hided and invisible, the service systems in the Beursgebouw are exposed and actively serve as part of the ornamentation appearing inside and outside the building.

In general, the climate scheme, drainage system and external stairwells have both use and aesthetic value. All of them contribute to the high performance of the building.

CHALLENGE AND OPPORTUNITY

Though the building performs well in energy. There are still some problems in the service system of this building.

Some problems of the service system in the building are related to time. The traffic problem in the garage is formed by the changes in people's commute preference. Emphasis on environmental protection and health makes more and more people choose to commute by public transportation and by bicycle. But obviously, the site and garage design didn't count that in.

Secondly, the exposed ventilation system including pipes and wires occupy too much indoor height. After ceiling extrusion, the indoor height is only left 2.65 meters to the users. Not to mention the “corridor” space under the main pipe, it is too low for people to stay. It can be said that the exposed facilities sacrificed the quality of indoor spaces.

Thirdly, it is a question or curiosity: is the heat wheels still efficient enough compare to the technology of our time? It is known that we step into an architecture era of “beyond sustainability”, which mean a new built building can reach a nearly zero energy. Compare to these kinds of building, the Beursgebouw is no longer an efficient building that can have a 60-70% less energy consumption.

The problems can lead to opportunities. It has been almost 40 years since the building was completed. During this time, the technology is developing at a high speed. There is a great potential in the glass part of building that has the space to apply some high-tech facilities to bring the building to a higher energy saving level.



Figure 2.6: Hemisphere Lamp on the entrance wall (Author, 2018)

2.5 STUFF

How the stuff corresponud to the initial idea of the the Beursgebouw?

This chapter is about the stuff of the Beursgebouw. 'How the stuff correspond to the initial idea of the the Beursgebouw?' is emphasized in the research and answered in the conclusion. As the building has been vacant for 10 years, most of the stuffs in the building were removed. There are almost no photos left over at the time of use. This chapter is mainly basic on authors' own observations and hypothesis. As the result of the study, the initial question is answered in the conclusion.





Figure 2.6.1: Chamfered railing (Author, 2018)





Figure 2.6.2: Round railing component (Author, 2018)

CHAMFER AND CIRCULARITY

Due to the 10-year vacancy, almost all the interior stuffs had been removed that only some basic elements. It is these “legacies” show the unified design of the whole building from basic structure to the detailed stuffs.

The stuffs in the building are well designed and can be divided into two main style: chamfer and circularity. Chamfers are mainly appearing on the design of line elements like handrails, fences, door handles and frames. The circularity expresses on some body blocks, such as lamps and outdoor "stopper".







Figure 2.6.3: Chamfered door handle (Author, 2018)



Figure 2.6.4: Ball like lamp (Author, 2018)

CHAMFER

From the photos (Figure 2.6.1), (Figure 2.6.2), (Figure 2.6.3), (Figure 2.6.4), it is hard to not notice the chamfers at each turn. These curves echo the window shape of the building façade and abstract it in to language of lines. These detailed design makes the whole building more holistic.







Figure 2.6.5: Round decorative appliance (Author, 2018)



Figure 2.6.6: Partial sphere outdoor "stopper" (Author, 2018)

CIRCULARITY

The circularity makes all things that should have a right angle become smooth (Figure 2.6.5), (Figure 2.6.6). The round shape makes the lamps and “stoppers” more like a part of architecture design rather than a casually bought goods. These stuffs as well the light color they use all together create a cheerful and positive atmosphere inside and outsider of the building.

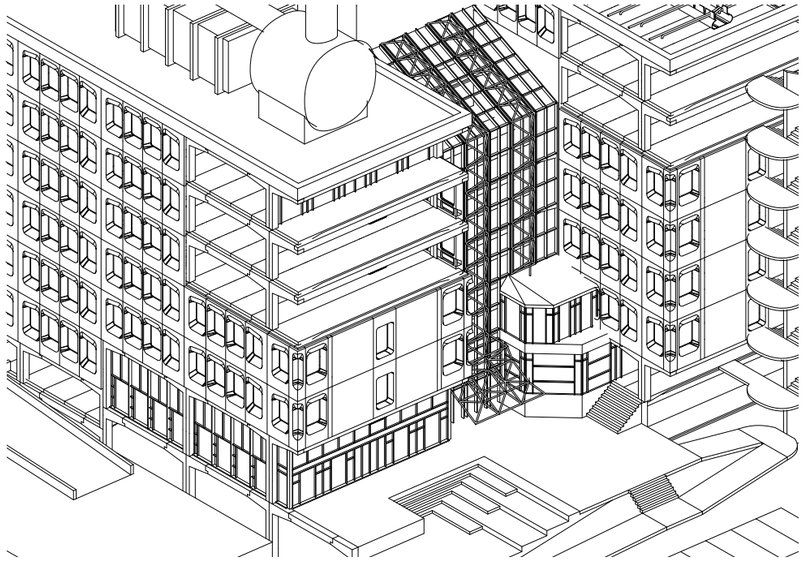
CONCLUSION

All the stuffs show a unified design of the Beursgebouw. Though sometimes, these stuffs are too detailed or daily that can be ignored easily, they create the cheerful and positive atmosphere for the building all together.

However, most of the stuffs are broken and out of use. During the innovation process, which is a unified design as well, they need to be replaced and redesigned. These things are just a memory of past life that don't have much value, which can be recorded in the photos rather than retained in same place.

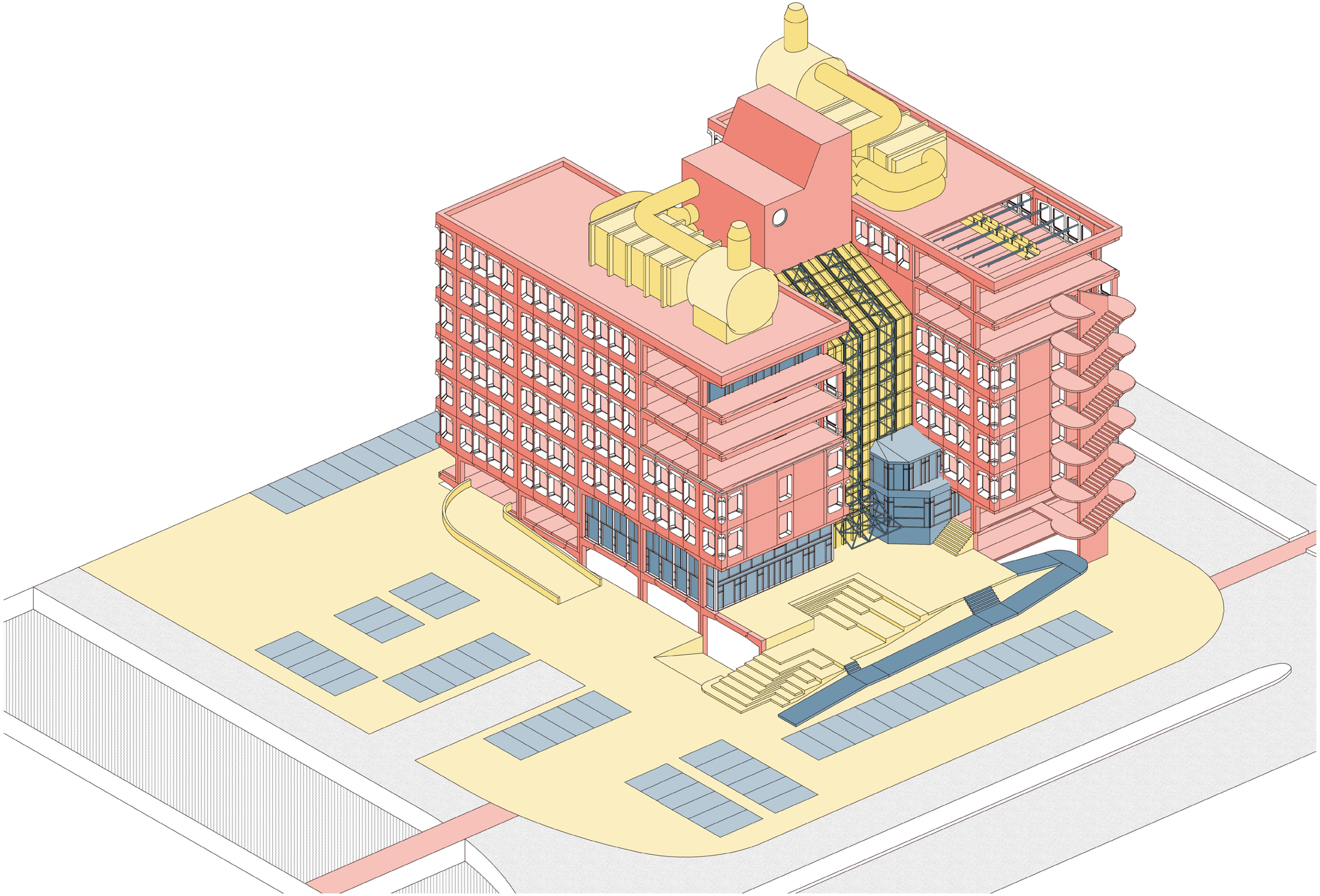
CHALLENGE AND OPPORTUNITY

Architect's design corresponds to time and need. There is no need always to follow the original design and the principle that refuse to develop future designs, because the need of people and the function of the building is still needed to be defined. This is an opportunity to apply new principles and stuffs to the building. The challenge is the new designed stuffs can still echo to the remain parts of the building.



3 CULTURE VALUE

HIGH VALUE AVERAGE VALUE LOW VALUE	HISTORICAL VALUE	AESTHESTIC VALUE	USE/ECONOMIC VALUE	SOCIAL VALUE	NON-INTENTED COMMEMORATIVE VALUE	RARITY VALUE	ARCHITECTURE VALUE
SITE AND SURROUNDING	The Beursgebouw was one of the very first building in Almere Stad, and is a witness of Almere's growth.		The location of the Beursgebouw is of great advantage in terms of accessibility and economy value. Parking lot at the site serves the nerighbourhood well.	The site location makes it have high potential to be a social place for the neighbourhood.	Because it was firstly built in Almere Stad, some people know this building a lot and it becomes a common memory of the city.		
SKIN	As the first office building in Almere stad, the skin represents the city impression	The form of the skin is unique and refined. It gives the sense of sculpture. Also, the skin shows the contrast of material	The prefabricated concrete panels are easy to reuse. The thick concrete wall serve as thermal mass and sound buffer. The design of opennings encourages to the interior light performance and can save energy to some extent				The façade is accordance with inner function. It shows the authenticity of architecture.
STRUCTURE			Main structure still functions well nowadays, and the prefabricated elements can be easy to replace.				Structure system enables large span, and it influences the design of the facade elements.
SPACE PLAN			Column-free working space fit well the need for office. Space with different height and entrances offers use value as well.	Exterior space on the entrance provides social opportunities as a use value.		The integration of building and urban infrastructure.	
SERVICE	The unhidden heat recovery devices on the building roof that already became the icon of De Beurs to remind people its presence.	The elegant shape of the heat wheels echoes the elevation curve element	The heating pipes and radiators are in good condition that have the potential to be reused. The heat wheels on the roof needs to be tested whether the machine still has the capacity to work.				
STUFF		The stuffs echo to each other's by using chamfers and circularities, these round shapes together with façade show a unified design of the Beursgebouw.	Most of the stuffs have been removed or seriously damaged. The remained ones can be put back reused but the design and the material is outdated.				



SITE & SURROUNDING

HISTORICAL VALUE

The site has historical value because the Beursgebouw was once the first office building in Almere Stad and was built even before most of the residence buildings. So, De Beurs is the witness of Almere's growth, and we define it as high value.

NON INTENDED COMMEMORATIVE VALUE

Because that the Beursgebouw has been standing at the joint of two main roads in Almere Stad since the beginning of this city, some of citizens who live here for a long time know well about De Beurs and its history. The building is a common memory of the city.

USE VALUE

The location of the Beursgebouw is of great advantage in terms of accessibility and economy value as it is at edge of the office area and city centre area.

SOCIAL VALUE

The site location makes it have high potential to be a social place for the neighbourhood, as was firstly designed to be.

SKIN

HISTORICAL VALUE

As the first office building in Almere stad, the building witness the city development. People arrive the Almere can firstly see the building. The skin always represents the first impression of Almere. It contributes to the historical value of De Burs.

AESTHETIC VALUE

The form of the skin is quiet unique and refined. It gives people the sense of sculpture. The whole building skin style is consistent: the machine on the roof, the external staircases and ramps echo with the curved form. In addition, the contrast between mass of concrete and lightness of glass is strong. It shows the contrast between permanence and temporality.

ARCHITECTURE VALUE

The façade is accordance with inner function. It shows the authenticity of architecture.

USE VALUE

The prefabricated concrete panels of the skin are easy to change and reuse. The thick concrete wall serves as thermal mass and sound buffer. The area of openings provides enough daylight. It leads to less use of artificial lighting which save the energy. The recede windows result from a sun / shadow study. It leaves as little direct sunlight and heat as possible, reducing the need for cooling.

STRUCTURE AND SPACE

The structure of the building features prefabricated elements. The main load-bearing structure is composed of prefabricated columns, beams as well as floor plates.

USE VALUE

The structure works well until now, and it has high use value. However, as all the elements are prefabricated, should there be any single element that is not working, it might be a big problem to replace it. Furthermore, all the structural elements are strongly connected, they can be hard to be removed.

ARCHITECTURAL VALUE

The structure is a crucial element of this building and it is the representation of the constructive design principle, meaning that the structure has high architectural value.

The structure system enables large span, thus allowing flexibility in the floor plan. As this building is intended to be an office building, the large column-free space makes various plan layouts possible: including the cellular office and open office. Furthermore, the space can be divided freely to accommodate future new programs.

Furthermore, the shape of the column influences the shape of the facade element, which leads to a rhythmic and distinctive facade. The structure, in terms of the shape of its elements, has high architectural value.

SPACE PLAN

USE VALUE

The interior space has use value. On the ground floor, height difference and three different entrances provides people with various social contact possibilities within the building or between interior and exterior. Garage floors underground are necessary for car users of De Beurs. The upper working space is relatively flexible and the floor's width dimension fits well with working units and need for natural light. And the circulation is clear and efficient.

SOCIAL VALUE

As for the exterior space, it has less use value, but it serves as a social space for people using the building.

RARITY VALUE

The exterior space in front of the entrance is unique, mainly because it was meant to be part of urban infrastructure and urban social space, although it never achieved. This integration of building and urban infrastructure is the first one in Almere Stad.

SERVICE

HISTORICAL VALUE

The unhidden heat recovery devices on the building roof is of medium historical value.

Being placed in a conspicuous position for almost 40 years, the pizza oven – heat wheels already became the icon of De Beurs to remind people its presence.

USE VALUE

The service system is of medium use value, while the pipe system is of low value.

The climate system in De Beurs is made up by ventilation and heating system that used separate pipe system. Due to the 10-year vacancy, almost all the ventilation pipes were removed with only main pipes left. The heating pipes and radiators are in good condition that have the potential to be reused. The heat wheels on the roof are of medium use value, because the abandon that it needs to be tested whether the machine still has the capacity to work. The more important, there are plenty of new techniques that are able to help building to achieve better energy performance. So is it economical to retain the original installation than demolish it? If it requires more money to restore the heat wheels and ventilation pipes than install new ones, the economic value of the climate system will be low. For now, it is uneconomical to continue using it.

In the central core, two rooms are reserved and used as the control rooms for ventilation. The ventilation pipes only occupied little space in the two rooms, so it still has capacity to accommodate new installations in future. The building has a relatively low indoor height that install the new facilities inside of the ceiling or under the floor may damage to indoor space quality. So, it is better to store the new installations in the central core and on the façade wall.

The external staircase is of high use value that there isn't enough space in the central core of the building to place a fire stairwell. It is necessary to arrange two fire stairwells in order to meet escape needs.

AESTHETIC VALUE

The service system is of medium to low aesthetic value, especially in the interior.

The external stairwell serves as a decorative element that increases the layering of the building facade. The half circle platform of the stairwell helps shape the curve outlook of the building.

As mentioned in the use value part, the ventilation pipes damage the space quality of interior that it is of low value.

STUFF

USE VALUE

The stuff is of low use value.

Due to the 10-year vacancy, most of the stuffs have been removed or seriously damaged. They can be put back reused but the design and the material is outdated and closely connected to the original design that may unable to well-integrated with the new design. While the stone pillars in the outdoor parking lot still have basic use value.

AESTHETIC VALUE

The stuff is of medium to low aesthetic value.

The stuffs remained have distinctive era characteristics. The design of stuff has a close connection to the time period that is outdated and no longer meet the aesthetic needs of modern people. Not to mention in subsequent designs, they will conflict with the later design ideas.

CULTURE VALUE

CONCLUSION

The Beursgebouw is the first office building in Almere-Stad and it is a part of the city memory, which means a high historic value. The repetitive façade panels create a rhythmic outlook, and the materialization of concrete show a sculpture-like feeling. Furthermore, the windows in façade indicate the interior space, and the construction of façade panels show good thermal and acoustic performance. In a word, we give the façade elements a high value. As to the glass parts, although they also indicate the meeting space of this building, they have degraded through time and the design of steel trusses contradicts with the main design language of this building, so we value them less than the concrete part of façade.
The original design emphasized the design of structure system and service system. We give a high value to the structure system for 2 reasons. Firstly, the use of Schokbeton technique shows that the structural elements are of premium quality, and the main structure system is still functioning quite well nowadays. Secondly, the structure system fits well with the space design and façade design, which shows a clear and coherent design logic. As to the service system, we value it less than the structural system. The heat wheel on the top of the roof used to be an important part of the whole image of the building to show the confidence of energy performance. However, nowadays there are more advanced technologies, and the big icon on top of the roof does not fit well with a changed context. Some parts of the service system are still functioning well, like the radiator and heating pipes, yet others are degrading and need improvement.
We give the external staircases a high value. On the one hand, esthetically the design of them echoes that of the main façade. On the other hand, it adds to the stability of the building. As to the entrance platform, we value it less. Although the platform provides meeting space for people, it weakens the accessibility of the building. We give the entrance ramp a low value, because the original design intention of it is never realized.

CONCLUSION

-The essential quality of the Beursgebouw lies in the high consistency throughout the design of this building. (Fig 4.1)

First of all, the design uses rounded corner as its architectural language repetitively and coherently, which shows a uniform and harmonious appearance. The two wings of the building, as the most outstanding part of the façade, holds to the rounded-corner language very strictly. Not only does every two adjacent faces fillet their corner, but also all the windows in the façade have rounded corner. As an important element of the volume, the two external staircases also have the rounded corner from ground floor to the top. The ramp in front of the main entrance sticks to this principle as well. Furthermore, the heat wheels on top of the whole building, which has always been a very strong gesture, also has a round shape with a round bar stretching upwards. Last but not least, the rounded-corner form is consistent from the big to the small, and from the outside to the inside. It is applied to the doors in the central core, and it also can be seen from very small elements as the rails, the road lamp as well as the shape of parking element.
Secondly, the design connects the space, the structure, the façade as well as the service system of this building and further makes them an integrated whole. The coherence quality is the essence of this building, because it is the unification between all these systems that ensures a clear and consistent logic of this building, from the outside to the inside, and from the service to the served. This story starts from the requirement of space. As a prevailing trend of office design back at the time of 1970s, open office was the pursuit of the designers. One major goal of the design is to achieve a large column-free space as flexible office area, which is possible for various different office layouts. To meet the requirement of space, prefabricated structure system is selected. However, instead of being the subordinate of space design, the design of the structure is also put high emphasis on. On the one hand, high-quality prefabricated Schokbeton concrete elements are chosen, and structural engineers collaborated with the design process to ensure the coherency between structure and design. On the other hand, the dimensions of columns and floor plates are carefully determined to ensure construction efficiency. The consistency of the design logic continues with the design of the façade. The shape of the façade elements represents the shape of the columns, and it helps to create a unique pattern in the outside, which turns out to be a distinctive identity of the building. Furthermore, the division of façade panels and the way windows are placed show coherency with the requirement of office units. In a word, the design of façade is highly consistent with structure and space. Except from the coherence of structure, space and façade, the design of service system is also an important part of the whole story. The radiator panels are combined well with each façade panels, and the ventilation pipes follow the track of each double-T floor plates. Furthermore, the Bodairprofiel lighting system fits well with the needs of office units. The heat wheel on top of the building has always been a manifesto of the building which shows its technology. All in all, the service system and the served part make a complete whole.
Thirdly, in the construction of the building, prefabrication principle is applied from the inside to the outside. Except from the prefabricated structure elements, including the columns, beams and floor plates, the façade panels are also prefabricated. This construction principle continues further with the stability core, external staircase and the ramp in front of the building.

-The major challenge that the Beursgebouw is now facing is a degradation in itself as well as among its surrounding. (Fig 4.2)

As the first office building in Almere-Stad, the Beursgebouw developed its distinctive identity from the very start and it used to be an important building for the image of Almere. However, nowadays it is losing its identity and being isolated from the surrounding. The reason for the degradation of Beursgebouw is two-fold, one is the development of the city, while the other is degradation of the building itself.
On the one hand, over time, the urban context changed significantly. In the city scale, Almere is seeking a new identity in the past decades. Instead of sticking to its original intention of being a subordinate to Amsterdam, Almere is trying to find its own position. There are new thoughts as well as new principles about how Almere should be like in the future, including sustainability and individualism. As to new buildings, there are new designs with more global ambition. In all, the city kept on growing over time, while the Beursgebouw almost stays the same, which cause a contrast between this building with its surroundings. In the neighborhood scale, the accessibility to this building has dropped. In the start, the Beursgebouw is located in the junction point of two main roads, and there is a ramp in front of the building that is linked to the city bicycle way system. However, as the road network has changed, the building has lost its vital role in the transportation system. Furthermore, the green belt between the building and the roads is making the building even more isolated. Last but not least, the new offices around this area are designed with new styles, either the high-rise WTC or the UWV building with an outstanding rainbow façade is more eye-catching. Compared with the new buildings, the Beursgebouw appears old-fashioned. Nevertheless, the urban context offers many new interesting starting points as well. Restoring the negative contrasts and create cohesion between the building and its context again, are aspects that need to be considered.
On the other hand, the building in itself is undergoing some degradation. Firstly, many glass parts are either aging, scratching or broken. These parts result in a look of disrepair. Secondly, although the ventilation system used to be an important part of the design and enabled energy efficiency, nowadays it's not so advanced compared with new technologies. The question has come about whether it's appropriate for the heat wheel to still occupy such a critical space of the building. Last but not least, the original design of office building highly emphasized flexibility, which means this building welcomes new programs. However, the space is so suitable for the office that other programs might not be easy to fit. What's more, the flexibility lies mainly in the plan of the two wings for office, yet other aspects are defined, like the core and the entrance. The floor height might also be a problem for new functions.
In conclusion, the research has found the essential quality of the original design of the building. Furthermore, the major problem of the current situation is studied. The opportunities and threats of the building will set the base for new intervention strategies in the next phases.

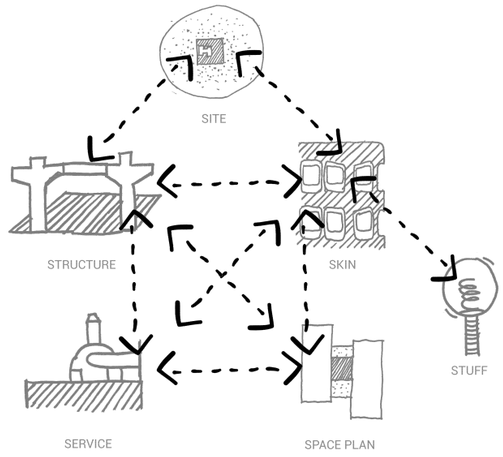


Fig 4.1 Interrelationship of different layers (Author, 2018)

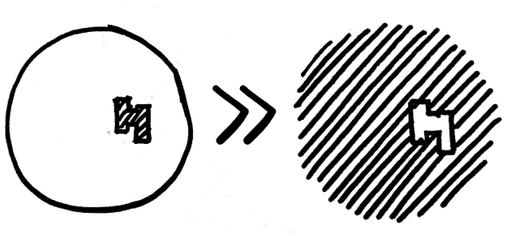


Fig 4.2 The degradation of the Beursgebouw(Author, 2018)

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