

Adapting brutalist buildings

A historical research how brutalist buildings evolved after their completion



AR2A011 – Architectural History Thesis (2022/23 Q3)
MSc Architecture, Delft University of Technology

Nolan van Haren

5057248

Date: 16-4-2023
Mentor: Dr. I. Nevzgodin

ABSTRACT

Brutalist buildings have, until recently, been loved by few. As a result, many Brutalist buildings have fallen into disrepair, and some have even been demolished. Nowadays, many suggestions are made about how these brutalist buildings can be restored and future-proofed. This research looks at Brutalist buildings that have been transformed since their construction to ensure their survival. This will provide the inspiration needed for future renovations of brutalist buildings.

The main research question of this thesis is: “How did brutalist buildings adapt after being built over time?”. Using the Aula of the TU Delft as the case study project, this question is answered. The Aula by Van den Broek en Bakema, a Dutch architecture firm, since its completion has seen two major renovations. Once in 1991 by Evert Kleijer, and later by Mecanoo in 1998. These two alterations vary in size, impact, and success, which makes it a perfect project to analyse.

These alterations have had an impact on the brutalist essence of the building. The first one altered the exterior view, but through the usage of similar materials, and gravitating towards original design ideas, had minimal negative impact on the brutalist feeling of the Aula. The second alteration, on the other hand, destroyed key design concepts in the interior whilst also clashing with the original materials, shapes, and construction methods and caused major damage to the brutalist essence of the building. The research highlights the importance of respecting the original design concepts and the essence of a building when making alterations.

CONTENT

4	Introduction
6	Chapter 1 - Getting acquainted
6	1.1 Brutalism
7	1.2 The early design process of the TU Delft Aula
8	1.3 The architects
10	Chapter 2 - Before the alterations
10	2.1 Functions
11	2.2 Design features
13	Chapter 3 - First alteration
13	3.1 The new addition
15	Chapter 4 - Alterations by Mecanoo
15	4.1 The foyer update
17	Chapter 5 - The Aula nowadays
17	5.1 New technologies
18	5.2 Clutter through usage
18	5.3 Surroundings
29	5.4 Safety interventions
20	Conclusion
21	Discussion
22	Bibliography

INTRODUCTION

“Brutalism is not a style, but an attitude, an approach to materials and form that values honesty and directness above all else.” - Paul Rudolph (De Alba & Rudolph, 2003, p. 25)

After years of disdain and mistrust, falling out of favour, and being blamed for a variety of societal problems, which led to a return to the comfortable architecture of traditionalism, brutalist structures largely languished in obscurity. Nonetheless, a review of brutalist structures was in effect by the late 1990s, and more voices endorsing these structures could be heard (Reading, 2018). A mix of nostalgia, an uncertain global political climate, and the visual appeal of the buildings on social media has resulted in a revived interest in brutalism (Blanthorn 2019). With the brutalist period ranging from the 1950s until the late 1970s (Niebrzydowski, 2019) and ever-changing needs, standards, and policies, how much of the original essence of these brutalist buildings remain visible?

This paper, therefore, analyses the alterations made to brutalist buildings throughout their lifetime, with the main research question being: How did brutalist buildings adapt after being built over time? For the scope of this paper, the Aula of the TU Delft by the Dutch architecture firm Van den Broek en Bakema has been used as a case study project. Since its completion in 1966, the Aula has undergone two major alterations of varying sizes and by different firms. That makes it a suitable candidate to aid in answering the main research question of this thesis.

Although there has been a revived interest in brutalism, not everyone is as fond of the brutalist approach. Most of the existing research thus investigates what can and has to be done to save brutalist buildings and informs on the values and qualities of these impressive structures. There however, is a lack of research into the changes that have already been made to brutalist buildings to keep them from becoming unusable and if these changes have respected the core values of Brutalism. This paper hopes to inform and inspire future architects tasked with redesigning brutalist buildings to create the necessary changes without losing the essence of the building.

An approach that combines fieldwork, archival research, and literature studies has been used to compose this paper. Secondary resources, such as literature and papers about Brutalism, have been used to support and explain findings from primary resources. These include documents like floorplans, elevations, and sections obtained from the archive of Het Nieuwe Instituut in Rotterdam. The fieldwork has resulted in an image analysis that compares pictures of the original situation of the case study project with its current state.



Fig 1. The Aula of the TU Delft by Van den Broek en Bakema. (Dukker, n.d.)

This paper will start with a general review of the brutalist architectural movement, including its historical context, distinguishing features, key figures, and ideologies. An introduction of the TU Delft Aula (Fig. 1), chosen for its architectural significance in the Netherlands and a clear depiction of Brutalism, will follow.

The first part of the study will concentrate on the time immediately following the Aula's construction, from its first design in 1958 to its completion in 1966, looking at how this brutalist structure was initially utilized and maintained. This will include a careful evaluation of the architectural design, building materials, construction techniques, and intended use of the structure from this period.

In the second part, the alterations made to the Aula following the redesign of Evert Kleijer will be analysed, including changes to its structure, use, and upkeep. This will contain a look at how shifting societal, cultural, and technical influences may have impacted the needs for this building.

The third part analyses the second round of alterations made to the Aula as designed by Mecanoo, looking into the same aspects as in the previous part.

With the information from the previous segments, it can be determined whether the intended essence of the building and the brutalist methodology remains visible. Or that it has been lost or diminished due to the alterations. This will inspire future architects on how to redesign and future-proof brutalist buildings with respect for their essence.

CHAPTER 1 - GETTING ACQUAINTED

This chapter explores the Brutalist architectural movement and how it was incorporated into Van den Broek en Bakema's plan for TU Delft's Aula. The examination of the Aula is placed in the context of the broader Brutalist movement by providing an outline of the history and aspects of Brutalism in the first section of the chapter. While giving a precise definition of Brutalism is not the goal of this chapter, understanding this architectural movement will help contextualize our examination of the Aula. In the second segment of this chapter, a history of the early design process of the case study will be laid out. This will provide a better understanding of some of the design choices for the Aula. The chapter will finish with a short overview of the people who created its design.

1.1 Brutalism

Brutalist architecture emerged in the mid-twentieth century as a response to the cultural, social, and political changes that followed in the post-war era. The brutalist period spanned from the 1950s until the late 1970s, reaching its peak in the 1960s (Niebrzydowski, 2019). Over this period, Brutalism developed and evolved, causing brutalist buildings to be quite diverse. That has something to do with the uniqueness and originality that architects tried to achieve (Niebrzydowski, 2019), although the core principles of the movement remained visible.

Le Corbusier is often regarded as the founder of, and the biggest contributor to Brutalism (Niebrzydowski, 2019), as he coined the term "béton brut" (raw concrete), one of the sources from which the title "Brutalism" derives (Snyder, 2019). This Corbusian concept refers to the utilization of raw materials, notably exposed concrete finishes (Reading, 2018). Le Corbusier glorified any faults of texture, arguing that they provide a certain substance and humanize the architecture (Niebrzydowski, 2019), as opposed to the machinelike modernist finishes. The textures were intended to humanize architecture by demonstrating a turn away from machinelike aesthetics and toward the creations of human hands (Niebrzydowski, 2019). Where Modernism was poised and polite, often incorporating white plaster walls and walls that concealed the building's internal logic, Brutalism evolved into something bold and confrontational, its heavy, rugged forms forged of new industrial materials that disguised nothing at all (Snyder, 2019). Raw and ordinary materials typical for Brutalist buildings like concrete, but also lesser known materials such as brick, wood, stone, and sheet metal symbolize sincerity, truth, and modesty (Niebrzydowski, 2019), these being key characteristics in Brutalism.

The second major reason for the uprising of brutalist architecture was the British architectural program called New Brutalism (Niebrzydowski, 2019), a theory created by architects Alison and Peter Smithsons. The Smithsons opposed New Humanism, a decorative modernism that was the prevailing trend in building. They, like Le Corbusier, valued raw aesthetics and basic forms while emphasizing the ethical values of honesty and truth in architecture (Niebrzydowski, 2019). British scientist Reyner Banham later popularized the theory in a 1955 essay entitled *The New Brutalism* (Snyder, 2019). In this essay, he defined the fundamental ideas of the theory as follows: '1, Memorability as an Image; 2, Clear exhibition of Structure; and 3, Valuation of Materials "as found".' At first glance, these fundamentals may sound like style aspects. However, if you seek deeper within you will find they describe similar attitudes or values as Le Corbusier and the Smithsons held.

1.2 The early design process of the TU Delft Aula

During the time that the then-named Technische Hogeschool Delft was still housed in buildings scattered throughout the inner city of Delft with no or very simple laboratories (Meurs et al., 2018), a 15th-century chapel named the Hippolytuskapel was used as its Aula (*Geschiedenis – Sint Hippolytuskapel Delft*, n.d.). In 1948 a campus expansion plan was created that resulted in the campus as we know it today. Jo van den Broek was assigned the design of the campus buildings on the east side of the Mekelweg (Meurs et al., 2018), including the faculty buildings of Architecture and Civil Engineering and a new Aula.

The Aula was to become the main building and focal point of the campus (*Technische Hogeschool Delft Aula*, 1966). It was obvious to place a building with a function like this in a central location between the Jaffa cemetery and the building for Applied Physics (Van den Broek, 1963), where a space of fairly limited dimensions remained (Fig. 2). This came with the added value that it was directly connected to the Mekelweg, the central axis of the new TU Delft campus expansion plan (Meurs et al., 2018).



Fig 2. On the left, there is a fairly narrow open plot between the building for Applied Physics and the out-of-frame Jaffa cemetery. (Meurs et al., 2018)

In 1958, the president of the board of trustees, Dr. Van der Leeuw, asked Van den Broek, the architect he had appointed for the construction of the auditorium if he saw a chance to house the building on the front part of the site. On the back of an old envelope, Van den Broek then sketched the half-hexagon of the floating auditorium with the outer corridor, the stairs, and the hall behind it. This part has remained the same throughout all designs and has served as the starting point for the current design (Máčel et al., 1994).

It is interesting to note that the Aula was not only intended for use by the T.H. Delft itself but also as a conference centre and conference hall for others. That is because of outside investment of half a million guildens from het Koninklijk Instituut voor Ingenieurs (KIVI) and de Vereniging van Delftse Ingenieurs (now merged into KIVI), who had this condition tied to the investment (Meurs et al., 2018). The four necessary lecture halls for applied physics were also to be accommodated in this building since there wasn't enough space on the site for two separate buildings (Máčel et al., 1994). In addition, for a certain period, it was considered whether general facilities, such as the central library and student canteen, could also be included in the Aula (Van den Broek, 1963). This idea was later scraped since the building program of the T.H. Delft was out of space, and because of the limited site space (*Technische Hogeschool Delft Aula*, 1966).

A plan was later developed in which a high-rise building for management and administrative services was built on top of the auditorium building. The excessive costs have led to this plan being abandoned (*Technische Hogeschool Delft Aula*, 1966). A section of how this would have looked can be seen in Figure 3.

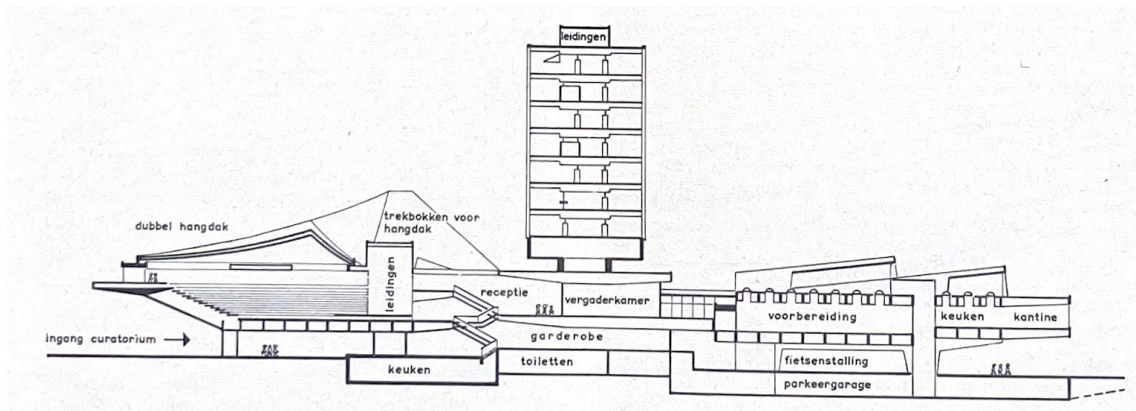


Fig 3. Section of a second-generation design for the Aula, including a high-rise building for management and administrative services. (*Het Nieuwe Instituut*, n.d.)

In 1960, a design for the auditorium in a more concise form with a budget of 10,500,000 guildens was finally approved (*Technische Hogeschool Delft Aula*, 1966) (Fig. 4). The smaller volume was now doable because the reception hall/foyer would now also be used as a student canteen. A function that was originally projected at the back of the building on the ground floor.

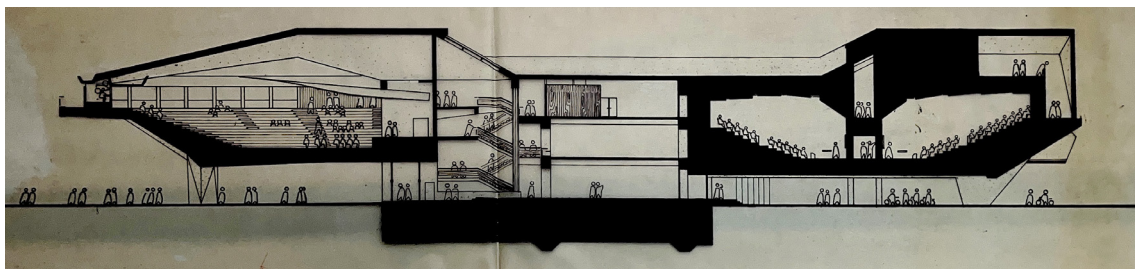


Fig 4. Section of one of the final designs for the TU Delft Aula. (*Het Nieuwe Instituut*, n.d.)

The simplicity of the final design, which seems self-evident at first impression, was created in the elongated process of designing, meeting, and modifying, led by Van den Broek (Mácel et al., 1994).

1.3 The architects

Rotterdam-based architecture firm Van den Broek en Bakema, currently known as Broekbakema, took the lead in designing the Aula. The office of architects Johannes van den Broek and Jaap Bakema, both TU Delft Alumni (Haan, 2021), was one of the biggest and most important architecture firms in the Netherlands. Notable for Van den Broek and Bakema was the functional architecture using contemporary building techniques and materials like glass and concrete (Erfgoedbekeken.nl, 2023). Architecture firm Van den Broek en Bakema has delivered many brutalist buildings like the town hall of Terneuzen, the faculty building of Civil Engineering and Geosciences, and the burned-down faculty building of Architecture of the TU Delft. However, the auditorium can be seen as the pinnacle of brutalism in the Netherlands (Erfgoedbekeken.nl, 2023) and a highlight in the extensive oeuvre of Van den Broek and Bakema (Mácel et al., 1994).

The design, however, is not the work of one person. Many contributed to it: Van den Broek with the general layout, the assembly hall, stairs, and the folding roof; Bakema in

the band structure of the facades and the extension of the folding roof to the rear; J. M. A. De Groot developed the ideas from meetings and the scribbles into a building and in the location and shape of the sky bridge, ir. Engel of the Government Buildings Agency designed the concrete construction and, in particular, the two stabilizing pipe shafts at the rear of the auditorium (Máčel et al., 1994).

CHAPTER 2 - BEFORE THE ALTERATIONS

This chapter prepares for a comparative analysis of the building's later modifications by providing a comprehensive grasp of the Aula's initial architecture and features. Since it was built, the Aula has undergone two major renovations that reflect both the university's changing demands and historical changes in architectural styles. In later chapters, a comparison of the Aula's current form to its original state will follow. This provides insight into how the building has adapted to changing circumstances and allows for an evaluation of the remaining brutalist essence.

2.1 Functions

The T.H. Delft had been given an auditorium with many possible uses. In addition to official openings of the school year, senate meetings, inaugurations, promotions, and lectures, the auditorium would also be used for conferences, international receptions, demonstrations, student festivities, and concerts. The building can be divided into three completely different parts, both structurally and functionally (Meurs et al., 2018), the floating auditorium in the front, the floating lecture halls in the back, and the central part that consist of the stairways, the senate hall, and foyer, onto which the other parts are connected. Actually, the roof can be identified as a fourth component of the building. After all, this was created independently and is the most striking aspect of the construction (Meurs et al., 2018).

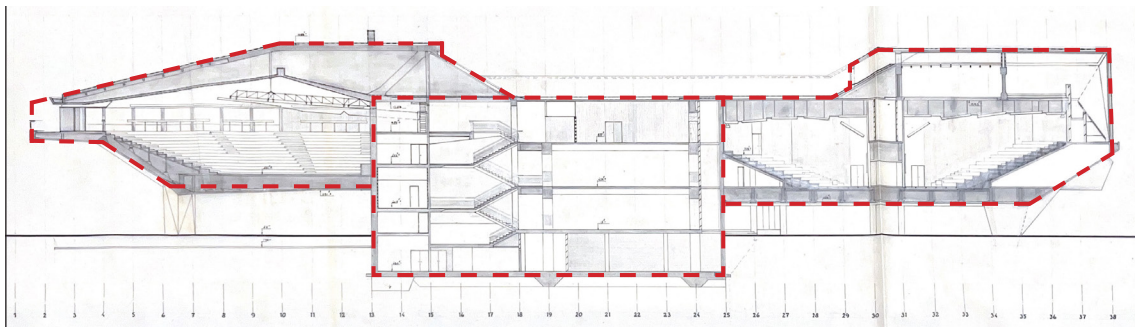


Fig 5. The three parts of the TU Delft Aula. Adapted by author from (Het Nieuwe Instituut, n.d.)

The fusion of functions is one of the building's key characteristics. This applies not just to the enormous auditorium, which may be used for a variety of functions, but unquestionably also to the traffic areas. For instance, both the stair landings and the stairways in the large open atrium, are a part of the cafeteria. In this way, the stairwell's two primary uses, walking and climbing, were enlarged to include conversing, leaning, sitting, looking, and drinking coffee. The stair and landing handrails have been made broader than usual to provide flat surfaces that are suitable for use as tables. Van den Broek and Bakema have consequently added more value to traffic and traffic space (Meurs et al., 2018).

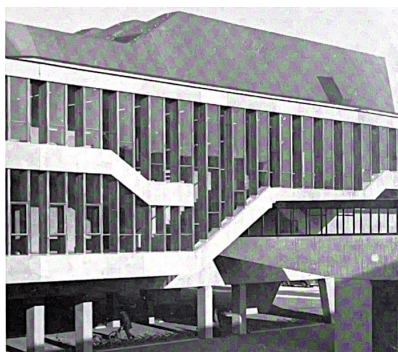


Fig 6. The floating volume in the back, which houses the four lecture halls. (Het Nieuwe Instituut, n.d.)



Fig 7. The floating auditorium in the front. (Het Nieuwe Instituut, n.d.)

2.2 Design features

However, one of the most important design features has to be the floating volumes in the front and back of the building. The auditorium on the front side of the building was raised one floor level to keep the ground floor visually and functionally clear and unobstructed (Meurs et al., 2018). From the exterior of the building, the function on the inside is immediately visible, a key aspect of Brutalism. Partly due to this design, the building forms the gateway to the Campus of the TU Delft (Máčel et al., 1994). A different rationale was used for placing the rear volume, which contains, among other functions, four lecture halls, on the first floor.

A sky bridge connects the lecture halls to the Applied Physics building. The first floor's height and the location of the building on the site have been determined according to this sky bridge (Máčel et al., 1994). This also creates two separate ground-floor entrances, but because of the bicycle parking spaces in the back, most students would not use the main entrance that faces the Mekelweg. The complicated interior layout is bound together by the circular galleries and stairwells along the principle of a continuous line (Máčel et al., 1994), which has created a well-working flow within the Aula.

The placement of windows, or more in particular how natural lighting enters through them, plays a crucial role in the composition of the Aula's interior. Natural light can have a profound effect on the ambiance and composition of the interior space of any building. Natural light can throw shadows and reflections that combine with the building's materials, textures, and colours to illuminate a space in a distinctive way. The Aula exhibits this interaction of light and shadow, which heightens the interior space's visual attraction and fosters a lively and welcoming ambiance.

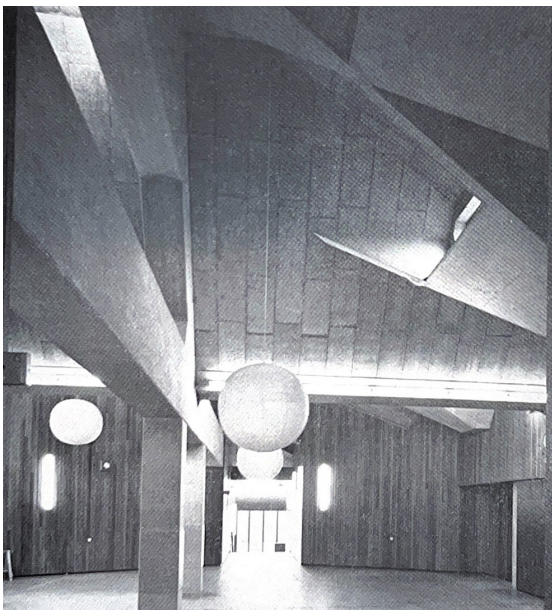


Fig 8. Student walkway between lecture rooms. (Het Nieuwe Instituut, n.d.)

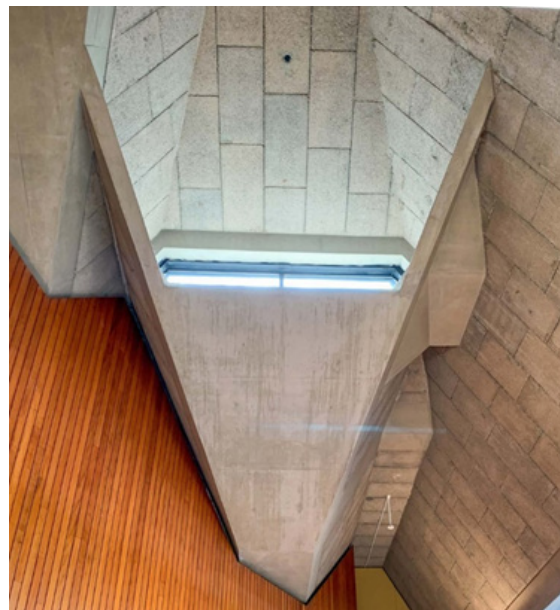


Fig 9. Skylight and roof connection visible in the top right of Figure 8.

One place where natural lighting plays a key role is visible in Figure 8. Shown is the connecting hallway between the lecture halls on the second floor, which is mainly intended for student usage. This area is lit by several means, but mainly by the large windows on either side of the hallway. These windows, of which one is visible in the centre of Figure 8, are however not the most interesting lighting in this location. A long line of tubular lamps has been neatly fitted along the inner fold of the intricate roof structure. This line of light highlights the shape and intersecting direction of the roof. The other lamps in this area, spherical balls hanging from the ceiling, and cylindrical wall lamps do not stand out

due to their simple shapes. In this way, the emphasis is precisely placed on the intended areas, the Aula itself. All lamps in the Aula have been carefully designed with this same reasoning (Fig. 10).

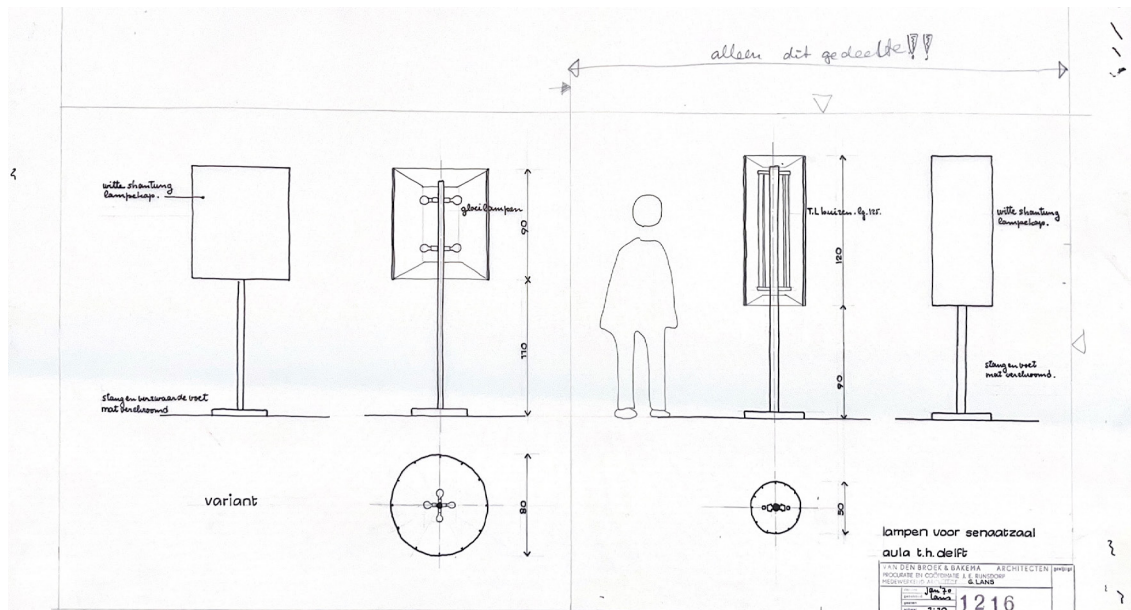


Fig 10. Lamp designs for the senate hall. (Het Nieuwe Instituut, n.d.)

Another way the craftsmanship that has gone into the roof has been emphasized is through a sleek set of narrow windows in the roof. These well-placed windows (Fig. 9) pull a visitor's eyes to a place one normally would not look. Having a small source of light placed directly on an intricate connection in the roof enhances the visual interest of this space. Through careful consideration of the placement, shape, and size of these windows, the natural light's potential is maximized, while limiting any detrimental ramifications, such as glare or heat gain.

Brutalism brought many innovations using raw concrete without ornaments and decorative elements (Imani & Imani, 2021). The Aula does however have a few ornaments, the most important of which can be seen in Figure 11. To make the large cantilevered volumes possible, prestressed concrete was used. That is concrete, in which part of the reinforcement is prestressed, which is present in the concrete under a tensile force (*Voorgespannen Beton*, 2018). The ends of the reinforcement threads used in the Aula are spread out to look like a flower, sunken into the concrete structure, and left exposed for all visitors to see.



Fig 11. Prestressed concrete threads turned into ornaments.

Although the usage of decoration is inconsistent with the brutalist aesthetic, it also makes clear to everyone the methods that were utilized to build the Aula. In brutalism, this honesty is essential.

CHAPTER 3 FIRST ALTERATION

A canteen for university students was opened on Oude Delft in 1952 by Dr. Theo Rutten, the Dutch minister of education. The so-called Mensa provided hot meals that were made in-house. These were sit-down meals and required proper attire for guests (Purkayastha, 2017). Due to the competition from the dining tables of the student associations, the canteen turned a loss (Mcmullin, 2000), and people began looking for a better location.

It was suggested in 1983 to house the Mensa in the Aula due to its convenient location, in part because the TU planned to dispose of the old Mensa building. Initially, it was planned to incorporate the canteen into the already-existing structure on the first level, where the foyer was located. However, because there wasn't enough room, architect Evert Kleijer was commissioned to create a conceptual design for the university restaurant that would be located at the front, underneath the auditorium. Kleijer has researched a variety of options both in the front and back of the Aula. In the end, it was agreed to build the restaurant in the back, where the old bicycle storage had been. At the end of 1991, the university restaurant was opened under the Aula. This was the largest renovation since the completion of the Aula (Meurs et al., 2018).

3.1 The new addition

The addition of the new Mensa in the back of the Aula on the ground floor meant that one of the most important design features of the Aula has been altered. With the addition of this new restaurant function, a new curtain wall has been placed between the load-bearing columns. One might think that this addition completely destroyed the floating effect of the rear volume. As can be seen in Figure 12, this is not the case.



Fig 12. The aula shortly after completion as seen from the Mekelweg. (Het Nieuwe Instituut, n.d.)

The decision to use a glass curtain wall to frame the restaurant has the advantage that the floating effect of the volume above is still somewhat preserved due to the transparency of the glass and the minimal style thickness of the frames. In addition, by implementing materials that have also been used in other parts of the structure, it is guaranteed that the building's earlier impression of unity has not been lost.

Furthermore, it can also be argued that the floating effect was mainly created by the protruding volumes in which traffic areas and the commission rooms were located. These areas under the protrusions are not part of the restaurant and are still left clear. Taking all previous arguments into account, it can be concluded that the floating effect is largely maintained, at least from front and side views (Fig. 13).



Fig 13. The aula nowadays as seen from a similar angle as fig 12. (Google, October 2022)

One of the key benefits of the restaurant's development is that the back door is no longer needed. Therefore the main entrance is now truly used as the main entrance. In line with its original purpose, the forecourt now serves more of the residential and traffic functions (Meurs et al., 2018).

As discussed in chapter 1.2 of this paper, in one of the penultimate designs, the canteen would be located where it is placed in this design alteration. The design by Evert Kleijer has clearly found inspiration in earlier design intentions for the Aula. With this Kleijer shows immense respect for the original design intentions and ideas.

Van den Broek likely had few, if any, issues with the Aula's newest addition. He has never objected to the addition of the four lecture halls to the original design. The fact that it could be used for a variety of purposes, in his opinion, enriched the architectural concept and assured that it wouldn't turn into an ominous monument that was mostly unused.

CHAPTER 4 - ALTERATIONS BY MECANOO

The canteen on the ground floor was altered in 1998/99 by Mecanoo. Before the Aula alteration, they also realized the adjacent library (www.architectuur.org, n.d.). With the redesign of the Aula, Mecanoo was responsible for the layout organization and interior design of the ground floor area that comprises the cafeteria (E. Felicio, personal communication, February 22, 2023). Since this alteration is probably a relatively small project for Mecanoo, they don't share a lot of details about it. However, with the aforementioned minimal information from Mecanoo itself and by comparing the building after the previous adjustments with the current state, we can get a reasonable picture of what has been done in this second major alteration.

4.1 The foyer update

Figures 14 and 15 can be used for an easy comparison of the foyer of the Aula. As the previous redesign of Kleijer only added the ground floor Mensa, and since the foyer is part of the ground floor area that Mecanoo said was part of their redevelopment, most major differences that can be spotted in Figure 14 and 15 are most likely made by Mecanoo.



Fig 14. Foyer shortly after completion of the Aula. (Het Nieuwe Instituut, n.d.)

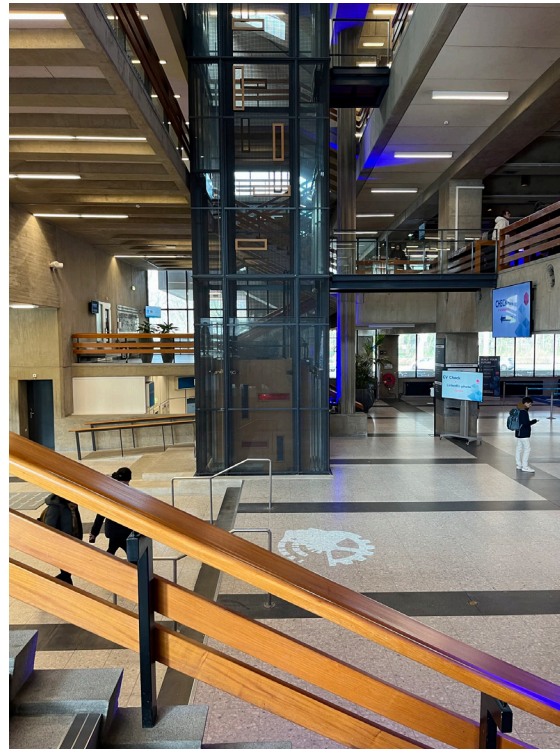


Fig 15. Foyer in 2023.

The changes easily spotted can be classed as accessibility updates. Some small changes include handrails for the two steps staircase and a wheelchair ramp. The largest change however is the elevator, which is placed almost centrally in the foyer's atrium. This visually dominating structure impairs the previously unobstructed atrium and hides some amazing architectural elements that can be found in this space. Like the skylights, a well-thought-out feature in the original design of the Aula. Figure 16 shows how one of the four central skylights above the atrium (six in total) is completely blocked by the new elevator shaft, thus altering the way the light highlights the construction and certain spaces in this area.

Where the other alterations in this space, like the small handrails, are minimalistic and barely noticeable (they do, however, introduce a new galvanized, not raw/honest, material), or like the wheelchair ramp, use similar materials and are placed to the side, the elevator is a massive thorn in the eye in the centre of the space. By adding a couple of randomly placed decorative rectangles on the sides of the elevator shaft, the alteration doesn't even try to assimilate in the previously brutalist environment.

Since images of the new restaurant under the lecture halls, after being completed but before the alterations of Mecanoo, could not be found during the research and writing of this paper, it is not possible to make a comparison. So this will be left out for now.



Fig 16. New elevator shaft by Mecanoo blocking one of six skylights in the foyer.

CHAPTER 5 - THE AULA NOWADAYS

In addition to the two major changes to the Aula, minor changes have also been made over the years. These changes are due to new technologies, new needs, or requirements. However small or large they may be, they still influence the brutalist appearance of the building.

5.1 New technologies

Technology has advanced significantly during the past few decades. Great progress has been made in areas such as quality, durability, and general ability. Updates must be made throughout time to prevent obsolescence if a building is to remain usable. Whereas previously, writing was done on chalkboards nowadays beamers and interactive whiteboards are widely used in education. For instance, at the Aula, information-display TVs and speakers with music or for broadcasts have been installed in the lobby, as can be seen in Figure 18. Emergency exit signs and smoke detectors have also been installed for safety reasons.



Fig 17. Foyer shortly after completion of the Aula.
(Het Nieuwe Instituut, n.d.)



Fig 18. Foyer in 2023.

Obsolescence also meant the replacement of some technologies in the Aula. The Frans van Hasseltzaal, the former hallway between the four lecture rooms has gotten a new function and has thus been remodelled (Fig. 19&20). The long line of tube lights along the inner fold of the intricate roof structure has been removed and replaced with a lighting rig that dominates the upper part of this room. Where the intricate roof design would previously take centre stage, this is no longer the case. The tubular and spherical lamps have also been replaced by cone and cube shapes, both now hanging from the ceiling. New wall lamps have also been added. These are at least more subtle than the new lighting rigs. The changes have caused this area to lose part of its former brutalist character.

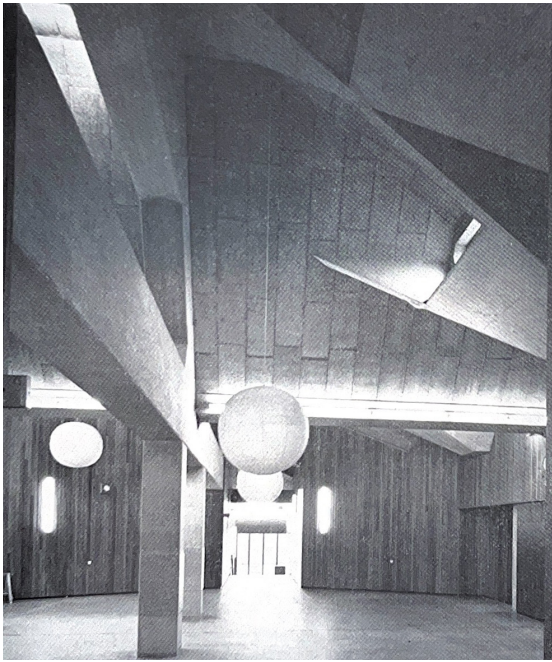


Fig 19. Hallway between lecture halls shortly after completion of the Aula. (Het Nieuwe Instituut, n.d.)



Fig 20. Hallway between lecture halls (now Frans van Hasseltzaal) in 2023.

Chalkboards had the great aspect that they didn't require a power source. Most of the added or improved technologies do, however. These power wires are hard to hide when fitted in a mostly concrete building. As is the case with the Aula, these wires are left visible. On the one hand, this is a shame, since it does take away from the, in general, clean image of only heavy and rugged forms. Leaving them exposed, however, is in line with the non-machinelike, honest brutalist ideas.

5.2 Clutter through usage

Most historical images included in this thesis have been taken shortly after the completion of the Aula. That means that aside from some predetermined furniture, most of the rooms in these pictures look and feel quite empty. The lack of furniture, however, ensures that there is no distraction from the main protagonist in these images, the Aula itself. With Brutalism, you get large contrasting surfaces that, in this case, together generate an imposing image of the Aula.

As is natural, with years of usage, users make the building their own, and these spaces slowly started to get filled with furniture. All these new objects do dilute the brutalist interior image. It would, however, be hard to, after nearly six decades of usage, still impose limitations on the furniture without compromising the multifunctionality of the Aula.

5.3 Surroundings

Like the visual clutter on the interior of the Aula, which was discussed in the previous chapter, there has also been an increase in the clutter on the outside. The Aula as seen in Figure 21, had a visually strong brutalist appearance since it dominated the still relatively free campus area it was standing in. The Aula has been nicknamed *the UFO* (www.architectuur.org, n.d.), and looking at this historical image it is easily understood why. With its sharp lines and bold 'floating' form on a minimal support structure, the Aula looks like an outer-worldly spacecraft that has just landed on the TU Delft Campus.



Fig 21. The Aula on the TU Delft Campus shortly after its completion. (Het Nieuwe Instituut, n.d.)

When you look at the current surroundings of the Aula, the building is less visually dominating in the landscape. A lot of added greenery and buildings in front and behind it now also attract the eye. In comparison with the previously paved area around the Aula, the grass softens the massive volume and sharp lines of the Aula.



Fig 22. The Aula on the TU Delft Campus in 2023. (Google, October 2022)

5.4 Safety interventions

Where we previously shortly touched upon some safety interventions like emergency exit signs and smoke detectors, there were also some bigger interventions for safety reasons. The walkway around the outside of the auditorium, including the exterior stairs has been closed off to the general public, somewhere after its completion. Where this area used to be a public balcony that looks out over the entire campus, it is now only accessible as an emergency exit route. That means the flow, a key design concept previously present in the building, is now largely confined. Looking at the extensive usage of the neighbouring Library rooftop, especially in summer, with some reasonable certainty, it can be said that the Aula's balcony would also be used if it were open. Whilst the closing of the walkway around the outside of the auditorium is not necessarily detrimental to the brutalist essence of the Aula, it does affect one of the key design aspects of the building.

CONCLUSION

In conclusion, the T.H. Delft Aula is a great case study of a brutalist structure that has evolved to meet changing demands and accommodate new purposes. The fusion of different functions and the emphasis on traffic areas have added more value to the building's design. The Aula has a smooth flow because of the floating volumes, circular galleries, and continuous lines. The Aula's strategic window placement and natural lighting add to the building's unique atmosphere. Despite the minimal use of decorative elements (as is common per the brutalist idea), the Aula has a few ornaments that serve to highlight the building's construction methods, a key feature of brutalist architecture.

The new Mensa addition in the back of the Aula on the ground floor was a significant alteration to the building's original design, but it has not destroyed its brutalist essence. Although the volume in the back is now connected to the ground floor, the floating effect has not been destroyed. The transparency of the new glass curtain walls between the load-bearing construction helped to maintain the floating effect, whilst using similar materials to the pre-existing structure helped to maintain the building's earlier impression of unity. The design of the university restaurant by Evert Kleijer demonstrates his profound respect for the Aula's original design goals and concepts.

Mecanoo made adjustments that improved accessibility, including installing railings, a wheelchair ramp, and an elevator. However, the elevator's central location in the atrium blocks the skylights, and other key architectural elements and its design is in stark contrast with the original brutalist essence of the Aula. Although accessibility improvements are important and necessary, it is crucial to carefully evaluate the placement and design of new additions to maintain the integrity of the original design. It seems that this has been an afterthought for Mecanoo.

The minor changes made to the Aula have been driven by new technologies, changing needs, and new safety requirements. These changes are necessary to ensure the usability of the building but seem to be made with less consideration. However, they can have a similar impact on the overall look of the building.

Overall, the T.H. Delft Aula demonstrates how brutalist buildings can and need to be flexible and adaptable whilst simultaneously retaining their original design principles. The building has, for the most part, successfully integrated new functions over time, while mostly maintaining the intended essence and the brutalist methodology of the building. However, careful consideration and a healthy amount of respect have to be included in the redesign process.

DISCUSSION

The results of this paper might be questioned since only one case study project has been used. It indeed would have been optimal to use more projects. These could then differ on a wide range of aspects, such as location, architects, size, and the general state of the building. That could have resulted in a broader and more grounded foundation for this research. However, for the allotted time and expected size of this thesis assignment, that would have been too much work.

Furthermore, the Aula of the TU Delft was designed by one of the biggest architecture firms in the Netherlands at that time, which was well respected for its brutalist work. With two major alterations, that varied in their goals and success, this was the perfect case study project for this thesis.

Information about the case study project was widely available, but there was only limited information about the two alterations. The changes made by Evert Kleijer were somewhat documented and commented on by established people. The work by Mecanoo, sadly, was not.

The basis for chapter 5 is thus mostly speculative, also because Mecanoo wasn't too keen on providing any type of information about their redesign for the Aula. For further research on their intervention, more information would be optimal. Sadly, not a lot is publicly available.

That was also the case for the alterations by Evert Kleijer. Perhaps most architects or architecture firms think a redesign for an already existing building is not worth mentioning in their public portfolio. In my opinion, this is unwise since the future of architecture lies in repurposing and transforming. More future research, to learn from past successes and failures, would, for that reason, be advisable.

BIBLIOGRAPHY

Literature

Banham, R. (1955). The New Brutalism. *The Architectural Review*, 354–361. <https://www.architectural-review.com/archive/the-new-brutalism-by-reyner-banham>

Blanthorn, J. S. (2019). Review on Atlas of Brutalist Architecture. *Canadian Architect*, 57–58. <https://www.canadianarchitect.com/book-review-atlas-of-brutalist-architecture/>

De Alba, R., & Rudolph, P. M. (2003). *Paul Rudolph: The Late Work*. Princeton Architectural Press.

Erfgoedbekeken.nl. (2023, January 5). *Van den Broek en Bakema - Erfgoed Bekeken*. Erfgoed Bekeken. Retrieved March 16, 2023, from <https://erfgoedbekeken.nl/beroemde-architecten-nederland/van-den-broek-en-bakema/>

Geschiedenis – Sint Hippolytuskapel Delft. (n.d.). Retrieved March 9, 2023, from <https://www.hippolytuskapel.nl/geschiedenis/>

Haan, M. (2021, November 9). *Brutalisme in Nederland: de Aula van de TU Delft*. Oostblog. Retrieved March 13, 2023, from <https://oostblog.info/2020/05/24/brutalisme-in-nederland-de-aula-van-de-tu-delft/>

Imani, E., & Imani, S. (2021). Brutalism: as a preferred style for institutional buildings in modern architecture period. *E3S Web of Conferences*. <https://doi.org/10.1051/e3sconf/202123104001>

Mácel, O., Schutten, I., & Wegner, J. (1994). *Architectuur-archief Technische Universiteit Delft*.

Mcmullin, D. (2000, February 10). *Noem ons alsjeblieft geen mensa*. Noem Ons Alsjeblieft Geen Mensa I TU Delta. Retrieved March 22, 2023, from <https://www.delta.tudelft.nl/article/noem-ons-alsjeblieft-geen-mensa>

Meurs, P., Van der Graaff, G., Van Doorn, J., & Zwarteveen, B. (2018). Technische Universiteit Delft Cultuurhistorisch Onderzoek. In <https://docplayer.nl/115872102-Technische-universiteit-delft-cultuurhistorisch-onderzoek.html>.

Niebrzydowski, W. (2019). From “As Found” to Bush-Hammered Concrete – Material and Texture in Brutalist Architecture. *IOP Conference Series*. <https://doi.org/10.1088/1757-899x/471/7/072016>

Purkayastha, D. (2017, June 2). *[Historical video]: Mensa opening in 1952*. [Historical Video]: Mensa Opening in 1952 I TU Delta. Retrieved March 22, 2023, from <https://www.delta.tudelft.nl/article/historical-video-mensa-opening-1952>

Reading, B. (2018). *Brutalism*. Amberley Publishing.

Snyder, M. (2019, August 18). Concrete Jungle. *New York Times Style Magazine*, 190–197.

Technische Hogeschool Delft Aula. (1966). drukkerij meinema delft.

Van den Broek, J. H. (1963). Het auditorium voor de Technische Hogeschool te Delft (I). *Cement: Vakblad Voor De Betonwereld*, 15(12), 730–732.

Voorgespannen beton. (2018, October 15). Beton Lexicon. Retrieved April 10, 2023, from <https://www.betonlexicon.nl/V/Voorgespannen%20beton>

www.architectuur.org. (n.d.). *Auditorium Technische Universiteit, Delft, Van den Broek en Bakema I Architectuurgids*. Architectuur.ORG. Retrieved March 22, 2023, from https://www.architectuur.org/bouwwerk/132/Auditorium_Technische_Universiteit.html

Figures

[Frontpage] Het Nieuwe Instituut. (n.d.). *The TU Delft Aula* [Photograph]. zoeken. hetnieuweinstituut.nl. <https://zoeken.hetnieuweinstituut.nl/nl/archieven/details/BROX/path/1777>

[1] Dukker, G. (n.d.). *Overzicht aula - Delft* [Photograph]. Wikimedia Commons. https://upload.wikimedia.org/wikipedia/commons/b/bf/Overzicht_aula_-_Delft_-_20389925_-_RCE.jpg

[2] Meurs, P., Van der Graaff, G., Van Doorn, J., & Zwarteveen, B. (2018). *T.H.-Neighborhood before the Aula* p. 32 [Photograph]. Technische Universiteit Delft Cultuurhistorisch Onderzoek. <https://docplayer.nl/115872102-Technische-universiteit-delft-cultuurhistorisch-onderzoek.html>.

[3] Het Nieuwe Instituut. (n.d.). *Second-generation design Section* [Photograph]. Het Nieuwe Instituut, Rotterdam, Zuid-Holland, The Netherlands. <https://zoeken.hetnieuweinstituut.nl/nl/archieven/details/BROX/path/1777>

[4] Het Nieuwe Instituut. (n.d.). *Final design section* [Photograph]. Het Nieuwe Instituut, Rotterdam, Zuid-Holland, The Netherlands. <https://zoeken.hetnieuweinstituut.nl/nl/archieven/details/BROX/path/1777>

[5] Adapted by author from: Het Nieuwe Instituut. (n.d.). *Final design structural section* [Photograph]. Het Nieuwe Instituut, Rotterdam, Zuid-Holland, The Netherlands. <https://zoeken.hetnieuweinstituut.nl/nl/archieven/details/BROX/path/1777>

[6] Het Nieuwe Instituut. (n.d.). *Floating volume lecture halls* [Photograph]. Het Nieuwe Instituut, Rotterdam, Zuid-Holland, The Netherlands. <https://zoeken.hetnieuweinstituut.nl/nl/archieven/details/BROX/path/1777>

[7] Het Nieuwe Instituut. (n.d.). *Floating volume auditorium* [Photograph]. zoeken. hetnieuweinstituut.nl. <https://zoeken.hetnieuweinstituut.nl/nl/archieven/details/BROX/path/1777>

[8] Het Nieuwe Instituut. (n.d.). *Hallway between lecture halls* [Photograph]. Het Nieuwe Instituut, Rotterdam, Zuid-Holland, The Netherlands. <https://zoeken.hetnieuweinstituut.nl/nl/archieven/details/BROX/path/1777>

[9] Author's own figure

[10] Het Nieuwe Instituut. (n.d.). *Lamp designs for the senate hall* [Photograph]. Het Nieuwe Instituut, Rotterdam, Zuid-Holland, The Netherlands. <https://zoeken.hetnieuweinstituut.nl/nl/archieven/details/BROX/path/1777>

[11] Author's own figure

[12] Het Nieuwe Instituut. (n.d.). *The TU Delft Aula* [Photograph]. zoeken.hetnieuweinstituut.nl. <https://zoeken.hetnieuweinstituut.nl/nl/archieven/details/BROX/path/1777>

[13] Google. (2022, October). *Christiaan Huygensweg* [Photograph]. Google Maps. <https://www.google.com/maps/@52.0023649,4.3724849,3a,75y,123.12h,92.71t/data=!3m7!1e1!3m5!1stEsDIW-aZw1ryHogfoG-gg!2e0!5s20190301T000000!7i13312!8i6656>

[14] Het Nieuwe Instituut. (n.d.). *Foyer atrium Aula* [Photograph]. zoeken.hetnieuweinstituut.nl. <https://zoeken.hetnieuweinstituut.nl/nl/archieven/details/BROX/path/1777>

[15] Author's own figure

[16] Author's own figure

[17] Het Nieuwe Instituut. (n.d.). *Foyer Aula* [Photograph]. zoeken.hetnieuweinstituut.nl. <https://zoeken.hetnieuweinstituut.nl/nl/archieven/details/BROX/path/1777>

[18] Author's own figure

[19] Het Nieuwe Instituut. (n.d.). *Hallway between lecture halls* [Photograph]. Het Nieuwe Instituut, Rotterdam, Zuid-Holland, The Netherlands. <https://zoeken.hetnieuweinstituut.nl/nl/archieven/details/BROX/path/1777>

[20] Author's own figure

[21] Het Nieuwe Instituut. (n.d.). *The Aula in the T.H.-neighborhood* [Photograph]. zoeken.hetnieuweinstituut.nl. <https://zoeken.hetnieuweinstituut.nl/nl/archieven/details/BROX/path/1777>

[22] Google. (2022, October). *1 Mekelweg* [Photograph]. Google Maps. <https://www.google.com/maps/@52.0024195,4.3717829,3a,75y,123.67h,93.74t/data=!3m6!1e1!3m4!1sTfBZ0IIYqYICG3M2oa-wMw!2e0!7i16384!8i8192>

Archives

Het Nieuwe Instituut - BROX.110415882 Collegezalencentrum met groot auditorium; Delft, 01-09-1958

- BROXd1216 documentatie;
- BROX1216t1 Tekeningen - Collegezalencentrum met groot auditorium; Delft / 1958 – 1958
- BROX1216t2 Tekeningen - Collegezalencentrum met groot auditorium; Delft / 1958 – 1958