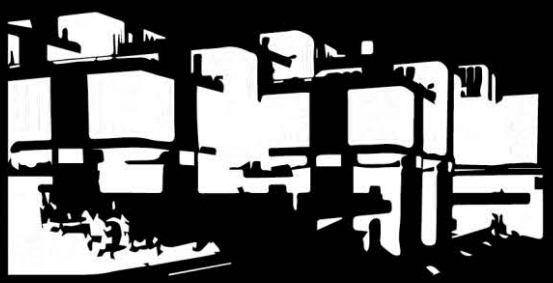
TIME FOR DIFFERENCE

a history thesis about
two postwar movements,
two architects,
two countries,
that both changed the perspective
towards architecture.



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TU Delft, MSc1 23/24
Architectural History Thesis, AR2A011
Drs. Marcel Teunissen
13 April 2024

Content

Abstract

After the second world war two movements evolved as a reaction to the developments the war brought into society and built environment. The comparison involves the movements metabolism and structuralism both from the lenses of the protagonists of these movements: Kenzo Tange and Herman Hertzberger respectively.

This thesis aims for an understanding of the core principles of each movement, the origin of these and how they translates themselves into the design of building through the lens of the protagonists of both movements. By doing a literature study, a case studies and a comparative analysis this thesis tries to understand how these movements relate to one another.

The research revealed that structuralism critiques the fast paced and functionalistic approach of the CIAM for the reconstruction of cities. It puts an emphasize on the human scale: in particular user experience and the personalisation of spaces.

Metabolism reacted to the scarcity in land parallel with the rapid growth of the population of Japan. It focusses on the future change of demand in space by allowing buildings to grow and adapt: unlimiting metabolism for biological organisms only.

The Centraalbeheer Achmea building shows the high level of thinking in detail for the user experience in contrast to the Shizuoka Broadcast Centre. Another contrary aspect is the direction of creating spaces in which one colonizes land while the other colonizes air by building higher. Both movements have their own experimental creative approach in which they question the way people thought about architecture.

By understanding the principles of these movements and how they translate into design, this thesis offers an insight on how different society and built environment can shape architecture differently.

Introduction

In the context of architecture, besides a lot of misery, the second world war brought some opportunities for the architecture of the future. After cities being bombed there was a lot of reconstruction needed, quick! It opened the eyes of few architects on how people perceive buildings and architecture. Two movements that stand out in this post-war reconstruction era were structuralism and metabolism. Both movements were challenging traditional principles in architecture and try to solve occurring issues in either society, building culture or built environment.

The aim of this thesis is to explore the origin, principles, and how these principles translates themselves into physical form of both structuralism and metabolism in the architectural context. By looking through the lens of key architects Kenzo Tange from the metabolism movement and Herman Hertzberger from the structuralism movement, this thesis aims to show a historic analysis following a case studies of the Shizuoka Press and Broadcast centre and the Centraalbeheer Achmea building designed by the mentioned architects respectively.

The choice of these movements arose from the fascination of the change in society, and the building culture after the second world war. Both movements were a respond to these changes, with each their own perspective towards architecture in a fast changing environment.

Methodology

To analyse structuralism and metabolism, a multidisciplinary approach is being used. It involves a combination of a literature review, a case studies analysis and a comparative analysis to discover the differences between the movements.

The research begins with a literature review about the movement and the respective protagonist of each movement. This is to gain more knowledge and historical and cultural context, which would further enhance the understanding of the meaning of existence for the movement. Scientific articles, books and historical documents are reviewed to explore the characteristics of the movements. This review provides the foundation to understand the case studies and further examine the differences of these movements.

After the literature review follows the case study analysis. Each case study derives from the protagonists and resembles the characteristics of these movements. Both buildings also offer the same functionality: they are both offices. This thesis ought to explore how much these buildings really correlate with the concept of the movements. For structuralism the Centraal Beheer Achmea Office by Herman Hertzberger is selected, and for metabolism the Shizuoka Press and Broadcasting Centre by Kenzo Tange is selected.

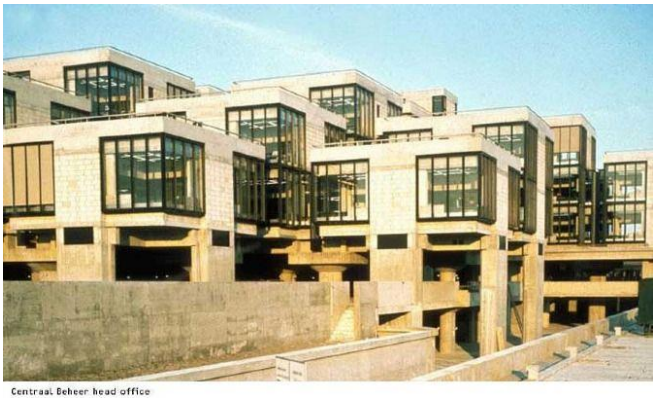


Figure 1 The Centraalbeheer Achmea in Apeldoorn (Gonçalves, 2009)

Figure 2 The Shizuoka Press and Broadcast Centre in Tokyo (Wakiiii, 2009)

Furthermore a comparative analysis will capture the contrasting and aligning characteristics of both movements. By comparing the movements and buildings, this thesis tries to find out what it is that makes these movements unique.

Metabolism

Who was Kenzo Tange?

Kenzo started his architecture study in 1935 in the university of Tokyo. As for architecture style he was in search of combining modernism with the traditional Japanese style.

Hiroshi Hara said in an interview with Rem Koolhaas (2011): “Tange stepped in and said he was going to create a new style of Japanese modernism by assimilating tradition. This led to experimentation in search for something new which we call metabolism.”

In 1946 he worked at the university of Tokyo as an assistant professor and organized the Tange Laboratory. This Tange lab is a place where design and research come together. The research about society forms the basis for the architectural design. This is also the birthplace of metabolism.

Figure 1 Portrait of Kenzo Tange (Varela, 2019)

Kenzo Tange is internationally well known because he was internationally involved in the world of architects. In 1959 he left to America to work as a professor at the MIT. He participated in the CIAM. He played a big role in the Tokyo world design conference in 1960. Furthermore he published the first photobook of traditional Japanese buildings intended for foreigners.

Why metabolism?

Metabolism was born during postwar Japan around the 1950s and 1960s which was a response to the need of reconstruction and renewal after the chaos Japan was left with because of the war. The war left a big part of Japan in ruins and this led to the possibility for rebuilding and perhaps rethinking the urban structures and architecture.

Next to that, Japan was running out of space to build on, and it endured natural disasters like earthquakes and tsunamis.

According to Rem Koolhaas (2011) Kikutake is one of Kenzo’s students and cofounder of metabolism. He said in the manifesto of Metabolism in “Metabolism 1960”*:* ‘the buildings still stand lower than the trees.. it is time to separate from the horizontal city.’

This led to the philosophy of Metabolism. Where the quality of design of urban planning and architecture is based on flexibility, adaptability and organic growth. Hence the name metabolism, referring to the biological process how cells grow. The buildings and urban structures should be able to withstand the changing needs and environments of the unknowing future.

This future proof building is not completely new since Japan has a strong tradition of building temporary structures. An example of this is the Ise shrine which is being rebuilt every 20 years.

Structuralism

Who is Herman Hertzberger?

Herman Hertzberger is a Dutch architect known for being one of the founders of the structuralism movement. He was born in 1932. After he finished his architecture degree at the TU Delft in 1958, he was bored to death by bricks, so he started working with concrete structures and flat roofs . He was also one of the editors of the architectural magazine “Forum”, who advocates for more human scale in urbanism and architecture. Next to being an architect and founder of the structuralism movement, Hertzberger was also involved in the education of future architects in the Netherlands. From 1959 to 1969 he was a teacher in Amsterdam. From 1970 to 1999 he was a teacher in Delft.

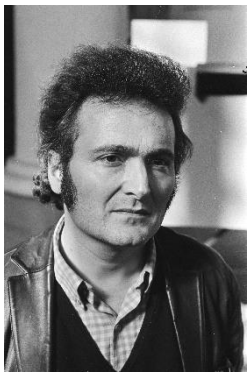


Figure 2 Portrait of Herman Hertzberger (Anefo,1970)

Why structuralism?

According to Zahle et al. (2012) in “Exponent van het structuralism” Hertzberger was one of the architects along with Piet Blom and Jan Verhoeven that were against the principles of rebuilding the city after the second world war. The method of rebuilding the city focusses on their opinion too much on functionality and economically feasible leaving behind the human scale and psychological needs of the users. This method was part of the CIAM organisation according to Martijn Haan (2021) and focused too much on functional separation instead of the spontaneous human interaction.

That is why Hertzberger became part of the magazine “Forum” to advocate his criticism. The editors started the organisation Team 10 and they were confronting the CIAM.

The typical design is usually based on a grid system. By using repeatable elements in a grid-system there is no hierarchy possible. This grid-system of repeatable elements allows the building to be adaptable and flexible. Besides that, human interaction and spaces left to personalize was also part of the characteristics of this movement.

In the Netherlands, structuralism got help to realize some innovative and reimagined projects through the experimental housing fund in 1968 initiated by the Dutch municipal government and financially supported by private companies. One of the first realised projects from this fund is the Diagoon dwelling from Delft realised by Hertzberger in 1971.

Building analyse

Figure 3 Centraalbeheer Achmea from above (BPD Cultuurfonds, 2022)

Centraal beheer Achmea Office by Herman Hertzberger

General information about the building

Location: Prins Willem-Alexanderlaan 651, 7311 NB Apeldoorn, Netherlands

Gross floor area: 30.536m^2

Height: +- 14 m

Design project date: 1967-1972

Building project date: 1977-1979

Architect: Herman Hertzberger

Figure 4 Parking lot of the Centraalbeheer Achmea building (Weltje, 2024)

Conceptual idea

“Create a working space where 1000 people feel at home. They have to feel they are part of the working community without losing themselves in the crowd. On the other hand the working human should not be isolated.” ~ Centraal beheer Apeldoorn according to Geheugen van Apeldoorn (n.d.).

Figure 5 Birds eye view of the Centraalbeheer Achmea (Sprangh, 2019)

The design of this building from the overall structure to the details and material choice, the choices are thought through to make a statement about architecture and show how architecture should be.

The main concept of this building is to make a city-like space that enhances the interaction between human beings, while housing freely adaptable (work) space designed for multipurpose. Furthermore the building focuses on accessibility and the balance between personalisation and collective functionality.

From concept to design

The feeling of a city is created by the layout and organisation. The building is designed with a modular approach, where spaces and sections are divided into islands. These islands are also dividable into smaller components, the actual workspaces. This is done to optimize the adaptability of the space if the usage or the organisation changes. The building consists of 56 office islands. Islands of 9x9 meters are to be divided into smaller workspaces. These are standard 3x3 meters but they are essentially customizable in size. Each workspace can overflow in the circulation areas to make it bigger. These islands were connected with bridges and surrounded by collective spaces that allow daylight into the building.

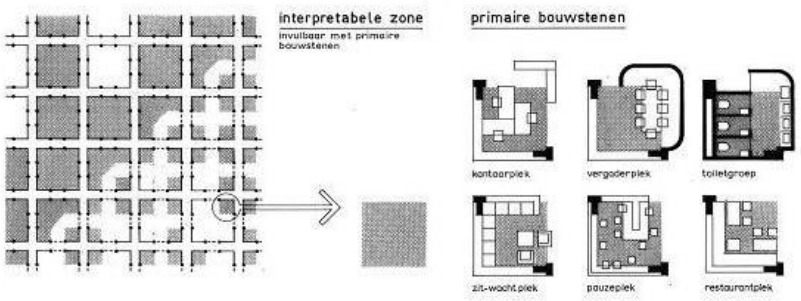


Figure 7 Base structure and interpretable zone principle (Vaumm, n.d.)

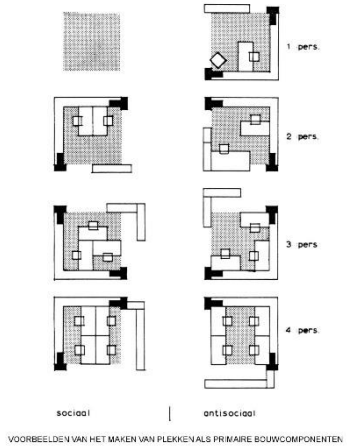


Figure 6 Example of possible organisation of the office spaces (Vaumm,n.d.)

The public accessibility is created through the many entrances and exits throughout the building. By making a structure based on small repeatable elements that are separated from each other by

Figure 8 View of the arcade with daylight (Naiveatlas. 2022)

arcades, the accessibility is optimised and one gets the feeling of a city like structure. The roof of the arcades being made out of the glass is like the icing on the cake, emphasizing the outside feeling.

By using the same tiles as people are accustomed to see outdoors, the arcades give a more street like feeling.

The focus on accessibility in the design can also be seen in the finish of the doors. If two equally public spaces are connected to these doors, the door is transparent. If the doors give access to a less or more private area, the doors are finished with a less transparent finish. By doing so the organisation is made clear for the users in a subtle way.

By using grey tones the architects tries to suggest the user personalises its own space.

The building as a whole is optimised for human interaction. Colleagues can even see each other on different levels thanks to the open design of the offices.

Ironically, designed to be adaptable, one of the reasons the company Achmea left the building is due outdated characteristics. Climate control is nearly impossible due to single glazing and the building did not comply to the rules for offices from the Dutch government according to Tim Habraken (2010). Brokers called the building outdated and economically unusable.

Figure 9 Open view of the office blocks (Kitsworld, 2006)

Relation with the movement

The criticism of structuralists towards the CIAM can be seen in this complex where the architect paid high attention towards its user experience and human scale. The recognizable grid system with repeatable elements of structuralism is inherently part of the design of what makes the base of this almost urban structure.

Shizuoka Press and Broadcasting Centre by Kenzo Tange

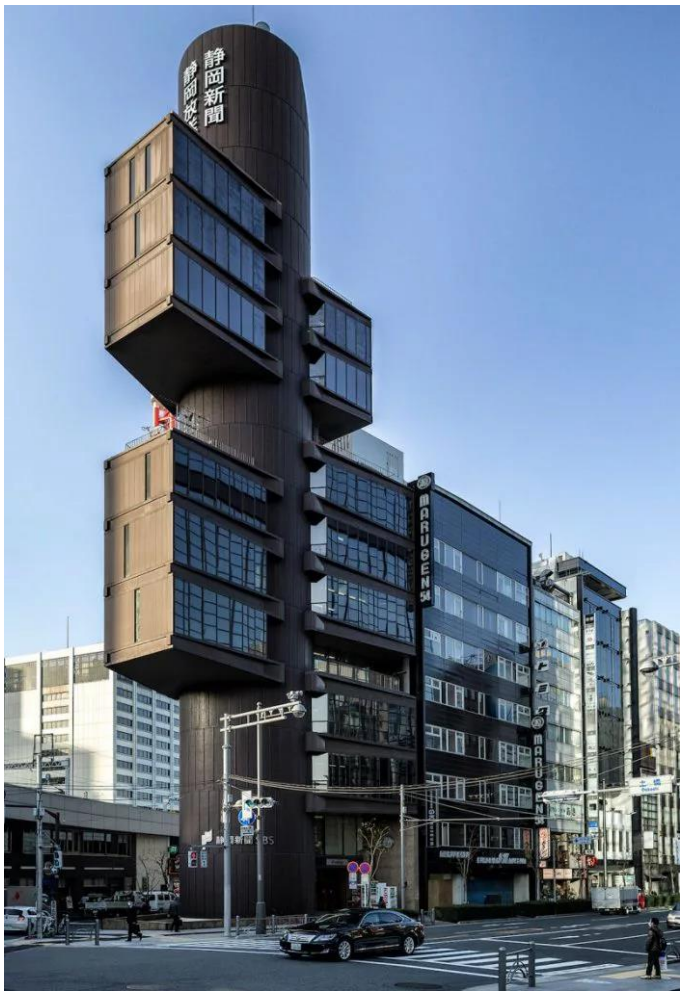


Figure 10 Façade view of Shizuoka Press and Broadcast centre (Savoie, 2012)

Figure 11 Shizuoka Press and Broadcast centre at night (Nrqarq, 2013)

General information about the building

Location: 8 Chome-3-7 Ginza, Chuo City, Tokyo 104-0061, Japan

Gross floor area: 189 m^2

Built-up Area: 1493 m^2

Height: +- 57m

Design project date: 1966

Building project date: 1967

Architect: Kenzo Tange

Conceptual idea

‘We are not going to accept metabolism as a natural process, but try to encourage active metabolic development of our society through our proposals.’ ~ Kenzo Tange (1960).

The main concept is to allow the urban scale into architecture. The building mimics the form of a tree, with branches to allow the ground to be as free as possible. As the city grows, the branches grow along. The trunk of this tree will function as a street while the branches represent the buildings along the street. By doing this the urban landscape is incorporated into architecture and more space will free on ground level. The building does this by making modular components which can be added or removed and replaced. According to Tange (1970), the small space to build the building on was a result of the increase in land prices. After an earthquake in 1923, Ginza developed as a shopping street where people would stroll to pass their time. Ginza became a popular street and land prices grew immensely. Therefore the only way to build is upwards.

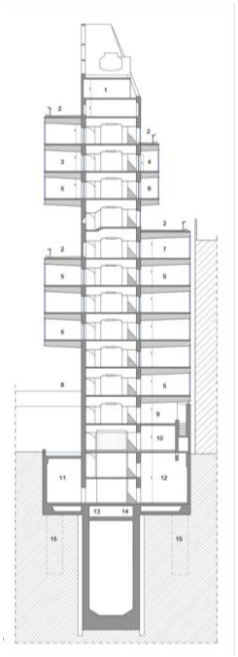
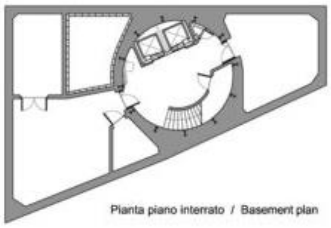
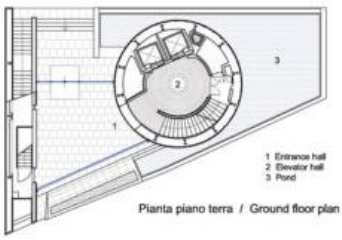


Figure 12 Section of the Shizuoka Press and Broadcast centre (Archweb, n.d.)

From concept to design





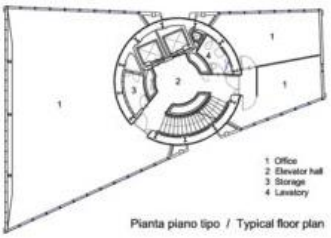


Figure 13 Floorplan of the Shizuoka Press and Broadcast centre (Archweb, n.d.)

The main principle is a building consisting a core, that gives access to the offices, which are plugged into the core. The core can be seen as a street in which the staircases and elevator reaches the offices, the buildings along the street. Next to the functions providing access, the core houses pipes and toilets. The core has a diameter of 7 meters and a height of 57 meters. By following this tree principle the building will reach a significant height, effecting the urban scale by being a landmark. This is also in the interest of the company that will house there, a tv broadcast. According to Naoyuki Shiono (n.d.) the initial plan was to have more of these trees, that will be connected in the air with each other, resulting into more space on ground level, and a more urban structure in architecture.

However if more of these type of buildings were being made, which was the intention but is not accomplished, will it still be a landmark? And how would these buildings than differ from each other making them unique? Or will it all be the same?

The site has a size of 189 m^2, but houses the total building of 1493 m^2 which shows the practicality of this building principle. The initial plan is that spaces were left open as terraces so the building can make sure that any future demand for more offices could be fulfilled. However the building stayed more or less static throughout the years and no modular components has ever been added.

Relation with the movement

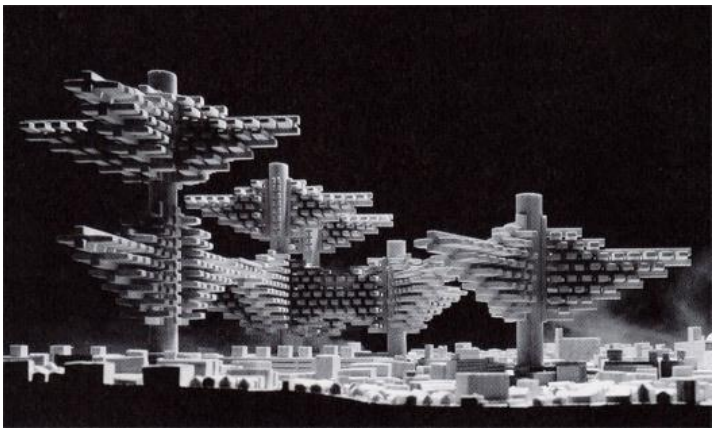


Figure 14 Concept of the city in the air by Arata Isozaki (Isozaki, n.d.)

The building is seen as one of the first and few Metabolists realisations. One of the principles that decide the visual experience of the building is the tree like joint core model. This characteristic can be found in the roots of metabolism. The shortage of land makes it that the metabolists attempt to colonize land, sea and air as a solution to the densed ground in Japan. The building therefore makes its way in the air maximizing the potential, while minimizing the space used on ground level. The small space given to Tange due to the high density in Ginza to realize an enormous office is exactly why metabolism was introduced. Besides that the metabolists focus on the future adaptability of their creations to make sure that changing needs will be fulfilled. This adaptability can be found in this building by the modular components that are intended to be added, replaced or remove. Spaces are left as terraces that are also intended for new components to be added.

Comparison

Movement comparison

Both movement came to existence after the second world war. However they were born differently. Structuralism was a movement replying the principles of the CIAM. A way where human scale and experience were both left behind and where the focus was more towards economically feasible and short build time. Metabolism started after scarcity in land arises and Japan was enduring natural disasters. New buildings should be future proof, adaptable for different needs.

In a certain way the two movements fulfil each other. Structuralism focusses more on the details for the user experience and user adaptability. Metabolism focusses more on the future change in demands of the market for more space. The need for adaptability of buildings and building into the air is therefore more the focus.

Even though metabolists focus more on future proofing buildings, structuralists took adaptability for future users in their design, which is future proofing in a way. However the two movements have each their individual approach to it. Structuralists try to leave space open so the user could fill the space in themselves. They can personalize the space themselves, and when the user or the preferences of the user changes, this can be changed easily.

They use the grid structure system so that new components can be easily added usually horizontally, making use of more ground. However the metabolists shape their building future proof by making modular components that can be detached and added without adding land. Modular components are for example full office blocks. They use very little plot size because of the scarcity in land. This difference is remarkable since the Netherlands is not a large country itself, but the building of Achmea spreads its surface more on the ground level. While one might think this might be because of the density of the country, the density in the Netherlands is actually higher. According to the Institution of Population Problems of Japan (1974) the density of Japan in 1970 is at around 280 people per square m^2, the 4^{th} highest of the world. This was explained by an exceptional birth rate and people coming back from the second world war. While in the Netherlands it is 313,86 people per m^2 according to Macrotrends (n.d.), who analysed the data from a research by the United Nations. This further reinforces the previously statement about the origin of the problem: scarcity of land to build on in Japan, mentioned in the chapter about metabolism. To conclude, structuralism puts an emphasize on the human scale, while metabolism focusses more on future architectural and urban needs.

Building comparison

Both office buildings want to be ahead of time by following new principles according to their movement. However both buildings have each their own focus points. One first difference between the two buildings is the way the offices are distributed across the project site. Both architects tried to include a certain level of urban scale, a city-like structure, into architecture, however in different ways.

While Tange tries to use the city in a more metaphoric way, Hertzberger tries to create a building which is literally like a city. By using arcades to enter each office unit that are similar as streets, and allowing natural daylight into these streets it complies to this city feeling. Multiple exits and

entrances throughout the complex adds to this feeling of an urban structure. The original plan was to make a railway next to the complex, reachable through the “streets” of the complex. The complex was originally also public accessible. The building connects in a more subtle way with the surrounding environment by increasing the height of the complex the further you go into the building.

The Shizuoka Press and Broadcasting centre takes the urban scale in a more metaphorical way. It rotates the urban structure 90 degrees so that more can be built on little space. Therefore the building is higher. The building was never publicly accessible though.

Furthermore the interior of the Shizuoka Press and Broadcasting centre has not been discussed quite in depth, because not a lot of information can be found about it. The Centraalbeheer Achmea building does have an in depth analyse of its interior. Possibly this emphasizes the difference of both movements: one focusses on the details of the human scale, while the other focusses on future proofing buildings.

Results

Metabolism and structuralism are both movements that replied to different social and cultural context with each their unique architectural principles.

Metabolism started after the second world war and reacted on the scarcity of land. The emphasize lies in flexibility and adaptability for future space demands by allowing organic growth of buildings. Structuralism however, was more a movement that confront the principles of the CIAM about rebuilding after the second world war. The emphasize lays more towards the perspective of the users, and therefore they focused on human scale, user adaptability and user experience. For example, they allow the possibility for personalisation of a building for the future owners.

The buildings that are built with the principle of their movement resembles quite well what each movement wanted to achieve in a physical full scale model. Both buildings have an irregular appearance finding its origins in the principle of the movement. The Centraal Beheer Achmea building with its grid system makes use of a lot of land and gives a city like feeling. Furthermore, the building emphasizes on the detail of human interaction and flexible, adaptable and personal office units.

The Shizuoka Broadcast centre makes use of the city as a metaphor in the design. It tries to maximise the use of land as much as possible and therefore uses its height to house the offices. For adaptability the emphasize lies more in the modular design, in which each office unit can be plugged out and more units can be plugged into. Altogether these characteristics visualise the principles of metabolism for organic growth and the changing needs of society.

The comparison of both movement and buildings, shows how architecture is a result of a different society and urban environment.

Conclusion

To conclude, Metabolism and Structuralism found their way as architectural movements, a response to changes in the social cultural as well as the urban context, which was a result of the second world war. Each movement has their own perspective on these changes which resulted

in the principles of these movements. By studying these, a better understanding is developed about the reason for these movements at this particular time.

In the post-war reconstruction period, the CIAM movement tried to establish a more functionalistic approach towards architecture. Due to lack of the human scale and experimental aspects of architecture, structuralism came into existence. It was a critique towards this cold post-war approach from the CIAM movement. The structuralists focused in their architecture more on incorporating the human scale, adaptability towards changing users and an environment with more human interaction. By using modular elements, grid systems, and by leaving spaces open for own interpretation in the design, structuralists tried to enable flexibility and adaptability in their design. Spaces are designed to be personalized and reconfigured according to individual or collective needs.

Even though metabolism arose around the same timeframe as structuralism, the metabolists faced a different challenge in post-war Japan. The economic development, rapid urbanization, and scarcity of land led to a demand of a more experimental architecture to fix these problems. Metabolism envisions architecture like a living organism: it should be able to adapt and grow just like biological organisms. These buildings are made adaptable and future-proof by modular components. This focus on adaptability should ensure that these buildings can evolve along with future changing societal needs. Due to the lack of land, the metabolists tend to build into the air, and therefore maximizing the use of land. One step too far was the incorporation of the urban scale into architecture by connecting these Metabolists buildings in the air.

Through the analysis of Herman Hertzberger and Kenzo Tange, key architects of these movements, and case studies, this thesis explored the progress and importance of metabolism and structuralism within architecture. Through their origin, the design principles of each movement, and how these principles translated into real buildings, one can see in what way architecture reacts to changes in society, culture and environment.

Both contrasting and aligning aspects has been found when comparing these movements with one another. Structuralism focusses more on the change of preferences of the users, and how they used the space. Besides that, it focusses on human interaction in architecture. The user experience plays an important role in this movement.

However metabolism emphasizes more on the adaptability of spaces to future change in society culture and environment. Furthermore the growth of a building and integration of the urban scale into architecture are main focus points within metabolism.

Regardless of the differences, both movements challenged main stream architecture in a creative and innovative way to their respective context. By understanding the principles of these movements, the role of architecture within society, culture and environment can be understood better.

Bibliography

Alberto, G. B., Rebeca, M. del R., & Julio, G. B. (2019). *Representing Time: Spatial Polyvalency in Diagoon Housing and Centraal Beheer, 24*(35), 168–181. https://doi.org/10.4995/ega.2019.9571

Diepraam, W. (n.d.). *Centraalbeheer hoofdkantoor, Apeldoorn* [photo]. AHH. Retrieved on January 23 2024, from https://www.ahh.nl/index.php/nl/projecten2/14-woningbouw/79-diagoonwoningen

Geheugen van Apeldoorn. (n.d.). *Centraal Beheer*. https://www.geheugenvanapeldoorn.nl/bijzondere-plaatsen/binnenstad/centraal-beheer/pointofinterest/detail

Haan, M. (2021). *Structuralisme is. . . .* Oostblog. https://oostblog.info/architectuur/wat-is-structuralistische-architectuur/

Habraken, T. (2010). Centraal Beheer Apeldoorn, Herman Hertzberger. *De Architect, 41,* 14–16. https://www.hertzberger.nl/images/media/deArchitect.pdf

Hertzberger, H. (2005). *Lessons for Students in Architecture* [Boek]. 010 Publishers.

Het Nieuwe Instituut (n.d.). *Structuralisme*. Retrieved on January 23 2024, from https://nieuweinstituut.nl/en/projects/jaap-bakema-study-centre/structuralisme

Institution of Population Problems. (1974). Supplement to “Population Problems in Japan”. Supplement to “Population Problems in Japan”. In *National Institute Of Population And Social Security Research*. Ministry of Health and Welfare Japan. Retrieved on april 1 2024, from https://www.ipss.go.jp/history/EnglishPamphletSeries/pdf/J000008761.pdf

Koolhaas, R., Obrist, H. U., 太田佳., & Westcott, J. (2011). *Project Japan: Metabolism Talks. . .* https://ci.nii.ac.jp/ncid/BB07364480

MacroTrends. (z.d.). *Netherlands population density 1950-2024*. https://www.macrotrends.net/global-metrics/countries/NLD/netherlands/population-density

MAT offices (n.d.). *Regeneration on Dutch structuralism masterpieces.* Retrieved on January 23 2024, from http://www.matoffice.com/research/regeneration-on-dutch-structuralism-masterpieces/

Moreno, L. (2021). *THE METABOLISM MOVEMENT - THE PROMISED TOKYO — Sabukaru*. sabukaru. Retrieved on January 23 2024, from https://sabukaru.online/articles/the-promised-tokyo

Ramchurn, R. (2020). *Revisiting Herman Hertzberger and the Dutch Structuralists.* The Architects’ Journal. Retrieved on January 23 2024, from https://www.architectsjournal.co.uk/news/revisiting-herman-hertzberger-and-the-dutch-structuralists

Söderqvist, L. (2011). Structuralism in Architecture: A Definition. *Journal of Aesthetics & Culture, 3*(1), 5414. https://doi.org/10.3402/jac.v3i0.5414

Stevenson-Brown, J., Spoormans, L., Willers, W., Meijers, L., de Ridder, A., Nevzgodin, I., Koopman, F., & de Jonge, W. (2018). *The future of structuralism*. TU Delft Research Portal. Retrieved on January 23 2024, from https://research.tudelft.nl/en/publications/the-future-of-structuralism

Tange, K. (1970). Difusora de TV y diario de Shizuoka –Tokyo. Informes de La ConstrucciónN, 23(222), 25–29. https://doi.org/10.3989/ic.1970.v23.i222.3544

Tange, K., Kikutake, K., Kurokawa, K., Maki, F., Otaka, M., Kawazoe, N., Asada, T., Otani, S., Sato, M., Kamiya, K., & Awazu, K. (1960). *Metabolism 1960: The Proposal for a New Urbanism* [Manifesto]. Bijutsu Shuppan Sha.

Zahle, M., Segaar-Höweler, D., & Prins, A. (2012). *Jan Verhoeven, exponent van het structuralisme, 1926-1994 / Mette Zahle: exponent van het structuralisme* [Boek]. Rotterdam : Stichting BONAS, 2012.

たてふろ, & たてふろ. (2021, 6 september). 「静岡新聞東京支社」は樹木のような不思議な形をしたビル | たてものフロンティア. たてものフロンティア - 観光名所・ロケ地の建築. https://tatefro.com/entry-9.html'

Information used for the movement

Haan, M. (2021, 2 september). Structuralisme is. . .. Oostblog. https://oostblog.info/architectuur/wat-is-structuralistische-architectuur/

Het Nieuwe Instituut (n.d.). *Structuralisme*. Retrieved on January 23 2024, from https://nieuweinstituut.nl/en/projects/jaap-bakema-study-centre/structuralisme

Koolhaas, R., Obrist, H. U., 太田佳., & Westcott, J. (2011). *Project Japan: Metabolism Talks. . .* https://ci.nii.ac.jp/ncid/BB07364480

MAT offices (n.d.). *Regeneration on Dutch structuralism masterpieces.* Retrieved on January 23 2024, from http://www.matoffice.com/research/regeneration-on-dutch-structuralism-masterpieces/

Moreno, L. (2021, 10 december). *THE METABOLISM MOVEMENT - THE PROMISED TOKYO — Sabukaru*. sabukaru. Retrieved on January 23 2024, from https://sabukaru.online/articles/the-promised-tokyo

Söderqvist, L. (2011). Structuralism in Architecture: A Definition. *Journal of Aesthetics & Culture, 3*(1), 5414. https://doi.org/10.3402/jac.v3i0.5414

Zahle, M., Segaar-Höweler, D., & Prins, A. (2012). *Jan Verhoeven, exponent van het structuralisme, 1926-1994 / Mette Zahle: exponent van het structuralisme* [Boek]. Rotterdam : Stichting BONAS, 2012.

Information used for the buildings

Alberto, G. B., Rebeca, M. del R., & Julio, G. B. (2019). *Representing Time: Spatial Polyvalency in Diagoon Housing and Centraal Beheer, 24*(35), 168–181. https://doi.org/10.4995/ega.2019.9571

Diepraam, W. (n.d.). *Centraalbeheer hoofdkantoor, Apeldoorn* [photo]. AHH. Retrieved on January 23 2024, from https://www.ahh.nl/index.php/nl/projecten2/14-woningbouw/79-diagoonwoningen

Geheugen van Apeldoorn. (n.d.). *Centraal Beheer*. https://www.geheugenvanapeldoorn.nl/bijzondere-plaatsen/binnenstad/centraal-beheer/pointofinterest/detail

Habraken, T. (2010). *Centraal Beheer Apeldoorn, Herman Hertzberger*. De Architect, 41, 14–16. https://www.hertzberger.nl/images/media/deArchitect.pdf

Hertzberger, H. (2005). *Lessons for Students in Architecture* [Boek]. 010 Publishers.

Koolhaas, R., Obrist, H. U., 太田佳., & Westcott, J. (2011). Project Japan: Metabolism Talks. . . https://ci.nii.ac.jp/ncid/BB07364480

Merin, G. (2021b, december 17). Shizuoka Press and Broadcasting Centre [picture]. ArchDaily. Retrieved on January 23 2024, from https://www.archdaily.com/422486/ad-classics-shizuoka-press-and-broadcasting-centre-kenzo-tange

Ramchurn, R. (2020, 11 juni). *Revisiting Herman Hertzberger and the Dutch Structuralists*. The Architects' Journal. Retrieved on January 23 2024, from https://www.architectsjournal.co.uk/news/revisiting-herman-hertzberger-and-the-dutch-structuralists

Tange, K. (1970). Difusora de TV y diario de Shizuoka –Tokyo. Informes de La ConstrucciÓN, 23(222), 25–29. https://doi.org/10.3989/ic.1970.v23.i222.3544

Zahle, M., Segaar-Höweler, D., & Prins, A. (2012). *Jan Verhoeven, exponent van het structuralisme, 1926-1994 / Mette Zahle: exponent van het structuralisme* [Boek]. Rotterdam : Stichting BONAS, 2012.

List of figures

1. Gonçalves, P. A. (2009). *Centraalbeheer Achmea building by Herman Hertzberger* [image]- Herman Hertzberger Edifícios escolares. https://hertzbergertca.blogspot.com/2009/10/herman-hertzberger.html
2. Wakiiii. (2009). *Shizuoka press and broadcasting centre, Tokyo* [image]. Flickr. https://www.flickr.com/photos/wakiiii/3353100849/in/pool-boss-architecture/
3. Varela, Á. (2019). *Portrait of Kenzo Tange*. [image] Arquitectura Viva. https://arquitecturaviva.com/articles/kenzo-tange-1913-2005-1/
4. Anefo (1970). *Portrait of Herman Hertzberger*. [image]. Nationaal archief. https://www.nationaalarchief.nl/onderzoeken/fotocollectie/aba5ff38-d0b4-102d-bcf8-003048976d84?searchKey=3ab2cdbf4e57cc10d8ec1ef50b0c4075
5. BPD Cultuurfonds. (2022). *Centraalbeheer Achmea from above.* [image]. bpdcultuurfonds.nl. https://www.bpdcultuurfonds.nl/actueel/nieuws/documentaire-herman-hertzberger/
6. Weltje, H. (2024). *Parking lot of the Centraalbeheer Achmea building*. [image]. LinkedIn. https://www.linkedin.com/posts/henk-weltje-a24a0528a_vanavond-was-er-op-npo2-een-erg-interessante-activity-7158562970317242368-umaW/?originalSubdomain=nl
7. Sprangh, M. (2019). *Birds eye view of the Centraalbeheer Achmea*. [image]. AD. https://www.ad.nl/apeldoorn/standbeeld-voor-architect-van-beroemd-cb-complex-in-apeldoorn~a9e94979/?referrer=https%3A%2F%2Flens.google.com%2F
8. Vaumm. (n.d.). *Base structure and interpretable zone principle.* [image]. Vaumm. http://vaumm.com/centraal-beheer-by-herman-hertzberger-1970/

9. Vaumm. (n.d.). *Example of possible organisation of the office spaces*. [image]. Vaumm. http://vaumm.com/centraal-beheer-by-herman-hertzberger-1970/
10. Naiveatlas. (2022). *View of the arcade with daylight*. [image]. Tumblr. https://jca-archive.tumblr.com/post/685249526620209152/naiveatlas-centraal-beheer-offices-by-herman
11. Kitsworld. (2006). *Open view of the office blocks*. [image]. Flickr. https://www.flickr.com/photos/kitsworld/330648266/
12. Savoie, J. (2012). *Façade view of Shizuoka Press and Broadcast centre*. [image]. Structurae. https://structurae.net/en/media/350050-shizuoka-newspaper-company-building
13. Nrqarq. (2013). *Shizuoka Press and Broadcast centre at night*. [image]. Tumblr. https://nrqarq.tumblr.com/post/49948469640
14. Archweb. (n.d.). *Section of the Shizuoka Press and Broadcast centre*. [image]. Archweb. https://www.archweb.com/en/cad-dwg/shizuoka-tower/
15. Archweb. (n.d.). *Floorplan of the Shizuoka Press and Broadcast centre*. [image]. Archweb. https://www.archweb.com/en/cad-dwg/shizuoka-tower/
16. Isozaki, A. (n.d.). *Concept of the city in the air by Arata Isozaki*. [image]. Archdaily. https://www.archdaily.com/912738/the-city-in-the-air-by-arata-isozaki