

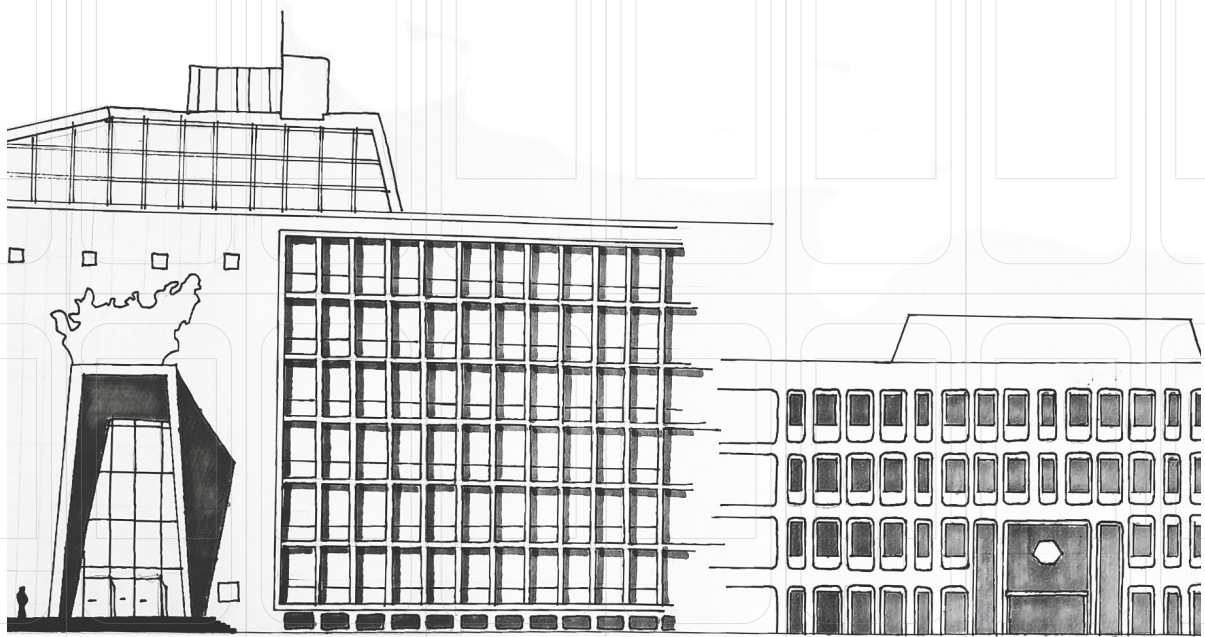
RESEARCH PLAN

Redesigning the post-war precast concrete façade

Vacant heritage - Police buildings

Ferran van der Klip

4454065



Mentors
Wido Quist
Joana Dos Santos Goncalves

AR3AH105 Graduation Studio Adapting 20th Century Heritage
AR3A010 Research Plan
Fall 2021
29-10-2021

Preface

Beginning in the late 18th century, advancements in technologies made possible the construction of free-standing skeletal structures. This resulted in structures with new shapes and larger scales. Architecture was no longer bound to walls and mass for structural support and delineation of form and as a result set the façade free from its structure (Conway, 1991).

I believe that the function of a structure is more meaningful than simply distributing the forces of the building. When a structure visually communicates the inherent structural logic of a building while also serving as a medium for artistic effect, a distinct identity is created (Al-Kodmany & Ali, 2016). In my own designs, this is what I try to aim for.

The police headquarters in The Hague caught my interest due to the presence of a precast concrete façade. This typical post-war façade marks the image and the structure of the building in the 1978 extension, perfectly fitting my personal fascination.

Index

Introduction	4
Problem statement	4
Aim	4
Relevance	5
Research question	5
Theoretical framework	6
Redesign strategies	6
Methodology	6
Value assessment	7
Touch & Feel link	7
Structure	7
Bibliography	8

Introduction

It took decades for reinforced concrete to become an accepted and celebrated architectural building material (Meloy, 2016). Vital to this acceptance was the development of architectural precast concrete, as it became a significant medium in the evolving palette of post-war Modernist architects (Pyburn, 2004). Besides, the aftermath of WWII left a substantial damage to cities. In order to rebuild lost buildings and tackle the immense housing problem, concrete was in high demand, resulting in a surge in the amount of orders (Stenvert & Zuijlen, 2018). The use of precast concrete façades flourished around the 1960's. This dynamic period was defined by the exploration of the boundaries of Modernism and supported by the more versatile precasting production technology. The structural and plastic qualities which were combined in concrete offered a design potential unavailable in any other material of that time (Pyburn, 2004).

Problem statement

Concrete is gaining more importance as a historic building material, representing the major changes in construction methods in the 20th century. In the last decades, the conservation of concrete has become an increasingly important task for heritage care agencies, not only in the Netherlands but internationally (Heinemann, 2013). However, the use of precast in the post-war period questioned the significance of workmanship and original material in comparison to more traditional buildings. The first wing of the police headquarters in The Hague is only listed as monumental due to the presence of artworks forming unity with the building and the building being a well preserved example of the 'Wederopbouw' (Monumentenzorg, 2018). This statement disregards the presence of its Schokbeton façade, thus overlooking possible scientific values connected to the building. As a result, some buildings may be overlooked in the process of listing heritage. This brings us to the core of the problem of this research: the 1978 extension of the police headquarters in The Hague is not listed as a monument and thus prone to demolition or other harmful changes.

Another problem was started in 2013. The police in the Netherlands was organized into a national police: an organization where larger teams would operate to make better use of the technological progression of the 21st century. This brought new requirements to its real estate due to the police needing fewer buildings to operate in and as a result divesting 700.000 m² of that real estate (Weessies, 2017).

This new increase in vacant real estate contributes to the architectural, societal and financial problems The Netherlands is dealing with due to most of the post-war office buildings also increasingly reaching the end of their functional lifespan. This is due to technological progress, outsourcing of office work, demographic and cultural changes and the change of accommodation needs of office organisations (Remøy, 2010). Fortunately, concrete is a very stable construction material. Most of the post-war office buildings can be stripped completely except for their structure, leaving a perfect grid and foundation for apartments or other fitting use. But what happens if this construction happens to be the façade, as is the case in the extension of the police headquarters in The Hague? The precast concrete façade was made to fit a certain architectural expression that is now literally cast in stone.

Aim

This research seeks to contribute to the preservation of post-war office buildings by addressing the scientific, historical and possible other values that could be connected to their precast concrete façades. Addressing the contribution of these façades is integral to the preservation of mid-century office buildings more broadly, but also more specifically on the topic of police stations. The police headquarters in The Hague are not the only police buildings that were built using precast façades: the police headquarters in Philadelphia were built with precast modules very similar to the 1978 extension in The Hague.

By writing a statement of significance for the 1978 extension in addition to the research paper, more attention can be generated for Dutch post-65' buildings. This might ultimately help listing it as a monument, to preserve important values linked to the building.

Relevance

This research is relevant on two societal problems The Netherlands is facing. The overarching problem is the major real estate challenge, dealing with societal, financial and architectural problems. The other problem is dealing with the listing of post-war office buildings as heritage. This research positions itself in the midst of this challenge by picking post-war offices with precast concrete façades as the research topic in order to create a better understanding of the police headquarters in The Hague. The results will generate starting points for this redesign. For example, more knowledge into the existing values results in preservation of important building elements, which will then open up possibilities for adaptive reuse.

This research can also be useful as an addition to scientific literature on post-war precast concrete façades, by providing extra insights into the topic through the study of the municipal archives of the police headquarters in The Hague. Besides, this research paper will offer a redesign strategy and solution for the police office building in The Hague. The redesign solution could be generalized to other buildings with similar façades and functions, but will nonetheless be helpful to the Atelier Politie Bouwmeester, which have to deal with the reality of this police station becoming vacant by 2023.

Last, with the advent of parametric design and advanced milling techniques for mold making, the possibilities of precast concrete in construction have exploded (Knudsen, 2020). The precast concrete façade is no more an element of the past, but is now being reinvented by the computer. The redesign conducted in this research paper could give another boost to the relevance of precast concrete in modern construction.

Research questions

This research revolves around the main research question:

To what extent do precast concrete façades in post-war office buildings influence our approach to redesign?

This question is based on my personal fascination and my problem explanation. In order to answer the main research question, the following four subquestions will help structure the research.

- What is the contribution of precast concrete to Modernist architecture?

This question gives insight into possible historic/scientific values associated with precast concrete.

- What are the character-defining features of precast concrete façades in post-war office buildings?

This question explores the possibilities in materialisation in precast facades

- Which design principles did the architects use when dealing with precast concrete façades in post-war office projects?

This question makes elaborates on the thinking of Modernist architects, and helps find design principles for the redesign.

- What redesign approach does the facade of the police headquarters in The Hague require?

This question will be central while redesigning the police headquarter in The Hague.

Theoretical framework

This research introduces the terms: precast, post-war and values.

Precast or prefabricated have a slightly different meaning. Although prefabricated is the general term for anything that is assembled in a factory rather than on-site, precast is specifically applicable to anything that is formed using a mold. Because this research studies concrete façade panels, the only way to create them is using a mold, thus precast is the correct term to use.

The post-war period can range very broadly. Although the 'Wederopbouw' period ended in the late 50's, this research will use a time frame of 1945 until 1980. This period is matched to the extension of the police headquarters in The Hague, which was built in 1978, in order for case-studies to be more representable to the main case.

Before determining what is a value in the value assessment, first the attributes have to be found. When determining the attributes, you ask the question: what is important? This is done through literature research such as archival research and historic research. To determine a value, you ask the underlying question: why is it important?

Redesign strategies

The research question requires an approach to a redesign. But what are the available options to choose from when dealing with redesign? Literature on redevelopment of architecture ((Alkemada et al., 2020) states eleven possible ways of intervention: Eliminate; Continue; Obscure; Reconfigure; Repurpose; Densify; Copy; Overlay; Reimagine; (Re)Start; Abstain. With these classifications I will structure the design research by following the intervention approach and compare the outcomes, in order to find the best working strategy.

Methodology

Groat & Wang (2016) describe seven research strategies. Each typical research strategy brings with it particular strengths and weaknesses. Many researchers believe that combining methods provide appropriate checks against the weak points in each, while enabling the benefits to complement each other (Groat & Wang, 2016). Therefore, an integration of multiple research designs is a fitting approach: the Two-Phase Design. This method combines two strategies in distinct phases.

Historic research is the first strategy used in this research, as it comes closest to the first sub-question, which deals with the contribution of precast concrete façades to history. The goal of this research is to find possible historic/scientific/architectural values connected to precast concrete, and use them for the value assessment. Relevant literature sources on this topic are retrieved from Heinemann (2013), Macdonald (2001) and Docomomo dossiers. In addition to literature, historical photos and drawings of the police headquarters in The Hague, found in The Hague's municipal archives, are analyzed and used to strengthen the research.

Case-study research is the second research strategy. The definition for case study is formulated as follows: an empirical method that investigates a phenomenon or setting (Yin, 2018, p. 45). This definition includes historic phenomena, which makes elaboration on research done in the first sub-question possible. The purpose of a case study is described by as follows: 'to understand a real-world case and assume that such an understanding is likely to involve important contextual conditions pertinent to your case' (Yin, 2018, pp. 45 – 46). The case-studies will be analyzed to answer the next two sub-questions. These case-studies have similar precast concrete façades and are thus literal replications (Groat & Wang, 2013) of the police headquarters in The Hague. The subject for study in the first sub-question in these cases is the materialization of the façade. More precisely, elements to be studied are: form, material, texture, composition, condition, structure and detailing. More elements worth studying will surely come across during research. The second sub question explains design choices and principles that architects used, to give a possible insight in design decisions in the police headquarters in The Hague. The time period of these cases will be the post-war period. Some interesting case-studies are the Philadelphia police headquarters in the USA, the Banque Lambert in Belgium, the Torrington factory in Belgium, the CBR office in Belgium and the CGER bank in Belgium. Literature and information on these cases is retrieved from Docomomo publications and Architectonic (Van de Voorde, 2011).

Structure

In accordance with the Vacant Heritage graduation studio, this research is linked to design by using the input from the research in the redesign for the police headquarters in The Hague. The conceptual framework in the design process, as described by Van Dooren et al. (2013), can be distinguished into five generic elements:

- experimenting
- domains
- frame of reference
- guiding theme
- laboratory or language

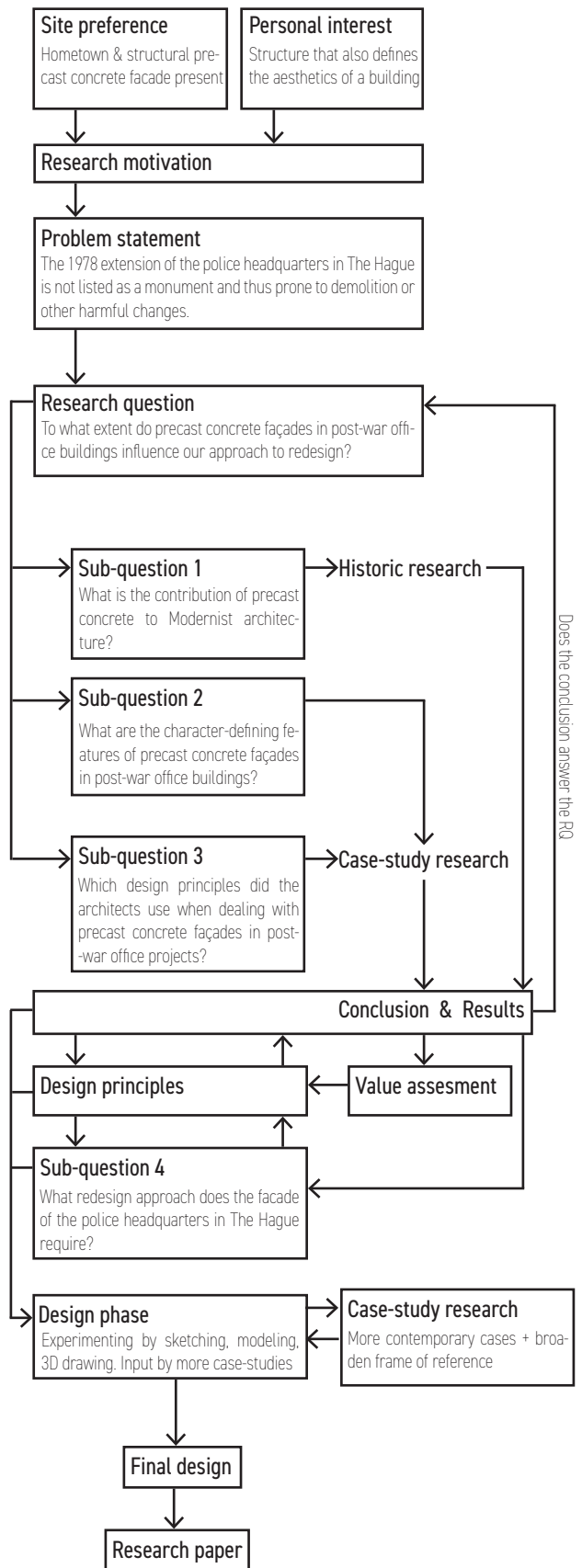
The design process is made explicit through this framework and will guide the design process in the second phase of this graduation project. At this stage, due to the previous research, all the generic elements will be present to start the design. The conclusion and results that are retrieved from the case-study and historic research are used to fuel the design process. The frame of reference created by the case-study research stimulates the creative process in the experimental research. As Kneller (as cited from Lawson, 2006) once said: 'One of the paradoxes of creativity is that, in order to think originally, we must familiarize ourselves with the ideas of others... these ideas can then form a springboard from which the creator's ideas can be launched.' The frame of reference is also further elaborated at this point, by bringing in more contemporary uses of precast façades as possible design solutions. An example of a more contemporary case study is Naturalis in Leiden. The design is further developed experimenting through sketching, modeling and drawing in 3D.

Value assessment

The value assessment can be split into two parts, due to the duality of the police headquarters in The Hague. The first wing, built in 1958, is a monument so the assessment is mainly based on information retrieved from the website of Monumentenzorg The Hague. The 1978 extension is not listed however. Based on historic research on precast concrete facades, values can be identified. This will form the starting point for future design strategies, as they are justified with full recognition of both irreplaceable heritage value and the need for continuity through carefully designed interventions (De Jonge & Kuipers, 2017).

Touch & Feel link

The Touch & Feel research line focusses on the materiality of the buildings, and aims at unveiling the hidden values (technical, aesthetical, historical, and others) of material attributes, and how they are perceived through the senses (Studio text, 2021). This research focuses on the materiality of the precast concrete façade and aims to unveil hidden values in the 1978 extension through historic research in order to list it for heritage.



Bibliography

Al-Kodmany, K., & Ali, M. M., 2016. An Overview of Structural and Aesthetic Developments in Tall Buildings Using Exterior Bracing and Diagrid Systems. *International Journal of High-Rise Buildings*, 5, p271-291. <https://doi.org/10.21022/IJHRB.2016.5.4.271>

Beton., 2019. Federatie van de betonindustrie, 246. <https://www.febe.be/frontend/files/userfiles/files/beton/Beton246/BETON246.pdf>

Callenbach, R., 2008. Het detail van ... Schokbeton. *DOCOMOMO*, 8, p15. <https://www.docomomo.nl/nieuwsbrieven--67.html>

Collins, J., 2019. A framework for coordinated models of architectural precast concrete façades. <https://smartech.gatech.edu/handle/1853/61215>

Concrete and Modernism: Technology and Conservation. 2018. *DOCOMOMO*, Minnesota, USA. <https://docomomo-us.org/news/concrete-and-modernism-technology-and-conservation-dossier>

Conway, H. M., 1991. Visible Structures. MIT. <http://hdl.handle.net/1721.1/65205>

De Jonge, W. & Kuipers, M. C., 2017. Designing from Heritage – Strategies for Conservation and Conversion. Delft: Delft University of Technology.

De Jonge, W., 2017. Restauratieve benadering van 'Monumentaal Beton'. TNO - NVMz study day historic concrete, Delft, The Netherlands. http://pure.tu-delft.nl/ws/portalfiles/portal/51466777/De_Jonge_2017_TNO_NVMz_studiedag.pdf

De Jonge, W., Meijers, L., Quist, W., Spoormans, L., Zijlstra, H., 2021. Studio Text. Delft, Delft University of Technology.

Groat L., & Wang, D., 2013. *Architectural Research Methods*. Hoboken, Wiley.

Heinemann, H. A., & Quist, W., 2017. Het Schokbetonarchief – voorbeeld van het afstoffen van prefab beton erfgoed. TNO - NVMz study day historic concrete, Delft, The Netherlands. <https://www.researchgate.net/project/Precast-concrete>

Heinemann, H.A., 2013. Historic concrete: From concrete repair to concrete conservation. Thesis, TU Delft, Delft. <https://repository.tudelft.nl/islandora/object/uuid%3A987fafd0-cd76-4230-be0e-be8843cae08e>

Knudsen, J., 2020. Klaas Toxopeus van Hibex verkent grenzen van prefab beton. Architectuur. <https://www.architectuur.nl/kennis/materialen/klaas-toxopeus-van-hibex-verkent-grenzen-van-prefab-beton/>

Lawson, B., 2006. *What designers know*. Oxford: Elsevier

Macdonald, S., 2001. *The preservation of Post-War Heritage*. Shaftesbury, Donhead.

Macdonald, S., 2003. *Concrete: Building Pathology*. Blackwell.

Meloy, Grace., 2016. *Architectural Precast Concrete Wall Panels: Their Technological Evolution, Significance, and Preservation*. University of Pennsylvania, Philadelphia, PA.

Monumentenzorg Den Haag., 2018. Alexanderveld 125/126. <https://www.monumentenzorgdenhaag.nl/monumenten/alexanderveld-125126>

Precast concrete façade panels. (n.d.). *Post-War Building Materials*. <http://postwarbuildingmaterials.be/material/precast-concrete-facade-panels/>

Precast/Prestressed Concrete Institute (PCI), 2007. *Architectural precast concrete* (3rd ed). https://www.enterprise-precast.com/uploads/Image/PCI_Architectural_Precast_Concrete_Manual.pdf

Pyburn, J., 2004. *The Role of Architectural Precast Concrete Technology in the Internationalization of Postwar Modernism*. Paper, *DOCOMOMO 8th International Conference*, New York, USA.

Remøy, H., 2010. *Out of Office: A Study on the Cause of Office Vacancy and Transformation as a Means to Cope and Prevent*. p14. Delft University of Technology.

Van de Voorde, S., 2011. *Architectonic 1958-1980. Façades en béton/Betongevels/Concrete walls*. Brussel: Atomium.

Van Dooren, E., Asselbergs, T., Van Dorst, M., Boshuizen, E. and Merriënboer, J., 2013. Making explicit in design education: generic elements in the design process. *International Journal of Technology and Design Education*. 24(1), p. 53-71.

Van Zuijlen, L., 2003. Schokbeton is superbeton. *DOCOMOMO*, 3, p16-19. <https://www.docomomo.nl/nieuwsbrieven--67.html>

Weessies, R., 2017. Politiebouwmeester gezocht. *Architectenweb*. <https://architectenweb.nl/nieuws/artikel.aspx?ID=41267>

Yin R.K., 2018. *Case Study Research and Applications. Design and methods*. California, SAGE Publications, Inc.

