

GRADUATION PLAN

Master of Science Architecture, Urbanism & Building Sciences

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Graduation Plan

Personal Information

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Studio

Name of studio: Architectural Engineering
Architecture mentor: Roel van de Pas
Research mentor: Pieter Stoutjesdijk
Building tech. mentor: Engbert van der Zaag

Title & Choice

Portable dwellings for temporarily unused areas

Studio motivation

Since I followed the minor Archineering at the faculty of architecture in Delft during my HBO building engineering study, I came to the conclusion that the integration of technical aspects and making use of structures aesthetically is something that truly inspires me. I believe that technology can push the boundaries in the search of alternative solutions that contribute to a circular and energy neutral economy by using your own fascinations. That's why I choose Architectural Engineering.

Graduation Project

Problem Statement

Most buildings cannot **adapt** to the future needs and to weather conditions that climate change brings. Therefore buildings are often being demolished before their lifetime or completely transformed to meet the current needs with a lot of lost material as a result.

In addition, **biological and technical materials** are often being mixed by the use of concrete, sealant or glues and after their use or lifetime neither of the materials can be reused or re- or upcycled. Some materials will therefore become scarce in the future next to the pollution that arises when replacing the built environment without thinking about future generations and their needs.

There is also a **housing shortage** in the Netherlands especially in large cities for students, starters and others with a relatively low income. There are **urgent seekers** ('spoedzoekers'), for example people in divorce or starters, that need a temporary dwelling until they have found a more suitable place, while there is approximately 40.000 hectares **temporarily unused area** in the Netherlands. These areas are often enclosed with fences or used as junk piles, which ruins the view of local residents for several months or even decades in some cases.

Objective

The research aims to the possibilities of remountable and adaptable building systems. The goal is to design a **portable housing system** that can adapt to a different context by carrying them from one temporarily unused area to another, without mixing biological and technical materials to reduce waste and preserve the materials as supplies for future generations.

The dwellings should leave a positive impression to the neighbourhood and the dwellings can even ultimately be used as a **showcase** to demonstrate the opportunities of portability and adaptability within the field of a circular economy.

Overall design question

With the problem in mind of the inadaptability of the built environment and the housing shortage for urgent seekers in the Netherlands, the following design question is formed:

"How can we build and place remountable and portable buildings for starters and students, which can adapt to site specific context on temporarily unused areas in Dordrecht, without mixing biological and technical materials?"

Thematic Research Question

The thematic research will be focussed on remountable seals, which result in the following research question and subquestions:

"Which types of seam seals are suitable to realize a remountable and portable housing system that can be rebuild at least twenty times?"

Subquestions:

- *How can the term remountability be defined?*
- *How can remountability be evaluated within the field of the built environment?*
- *Which types of seam seals are available and what purpose do they fulfil?*

Methodologies

Design assignment

A reference analysis of existing and conceptual remountable connections, dry build systems and portable solutions will be done. The reference projects will be focussed on criteria such as adaptability, remountability, size of elements, type of transport and period of placement. This analysis will be both useful for the overall design as the thematic research as a source of possibilities, opportunities and inspiration.

Several temporarily unused areas in the Drecht-cities will be analysed by looking at the past decade to find out which challenges are relevant to tackle. Information about material cycles, measurement systems in the built environment and the target group will be examined by doing literature research.

The design challenge will be explored by focussing on the balance between element standardization and freedom of form, besides the technical issues that portable dwellings bring.

Thematic research

The literature study in this research will be focussed on remountability. This specific topic is chosen, because it is expected that the seam connections will be the most critical and important detail to realize a remountable housing system.

This research can be divided into three parts. First the literature study will be focussed on the way disassembly can be evaluated, which will be translated into a method to test seams and nodes. This will be followed by testing several ways to seal a seam, which is used to design a suitable seam to realize a remountable and portable housing system by using the result of the research. This last phase will take place after the P2.

Approach

The design will be based on the findings in both the thematic research as the general research on temporarily unused areas and the references.

Remountability and adaptability are keywords in the design assignment to realize a portable housing system and this design will be focused on one location in Dordrecht, but some impressions will be made to prove that the system can be used in different situations.

Relevance

General

On ‘prinsjesdag’ (2019) is announced that 15.000 ‘flexwoningen’ (flexdwellings) will be built per year for urgent seekers on top of realizing 75.000 houses every year. There is an urgent need of dwellings for students, starters and others with a relatively low income.

This project can also contribute to fulfil temporarily unused areas within cities to tackle the housing shortage and make people aware of the environmental challenges.

Research

A little research have been done on design for disassembly (Güngör, 2006), which is mainly done in the field of product design and there is no method for evaluating remountability that can be used in the built environment. This research can therefore contribute to the circular economy by reducing waste and expending the lifetime of products, elements and materials.

Literature

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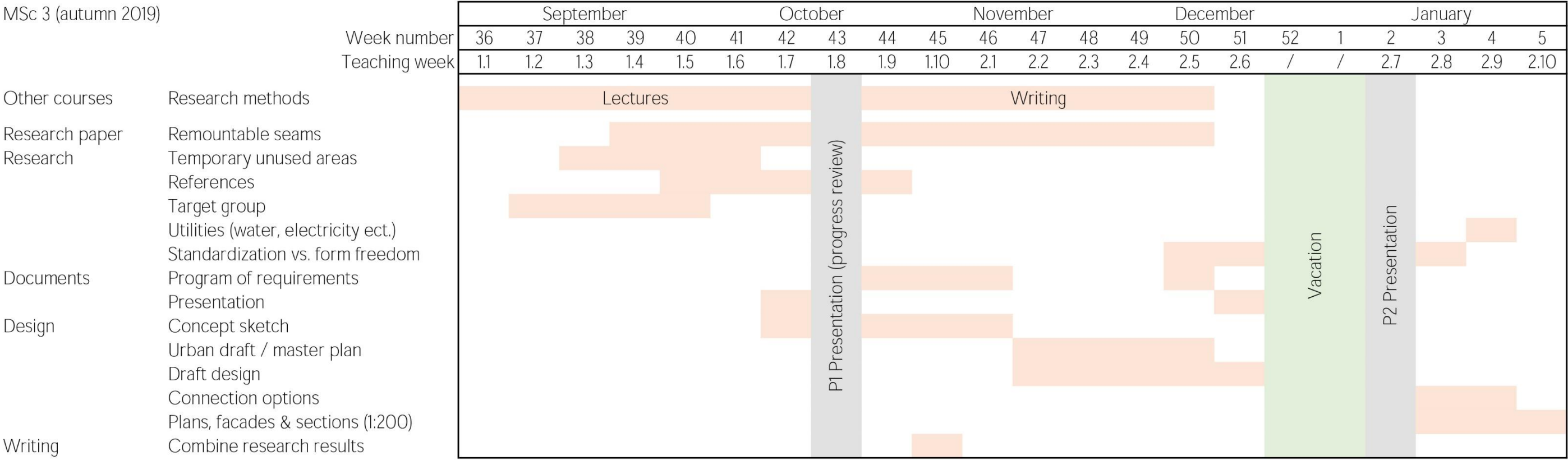
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Planning

MSc 3 (autumn 2019)



MSc 4 (spring 2020)

