Graduation plan

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Graduation Plan for AE students

Personal Information

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Studio

Architectural Engineering + Technology Graduation Studio

Teachers
Architecture teacher: Job Schroën
Building technology teacher: Maarten Meijs
Thematic research teacher: Leo Gommans

Studio motivation
After a couple of years of studying at the Faculty of Architecture in Delft I found that I am quite good at properly working out a design in detailed drawings. I really enjoy the process of sorting out how to assemble a (part of a) building and in past projects I did not need too much assistance to reach a proper result. I figure that I like the art of designing, but I am also interested in the technical aspects of a design that make it real. Instead of addressing technique in second instance and ‘add’ it to the building after the design is made, for my graduation project I would like to give the art and the technique the same priority. I am convinced that the Architectural Engineering Graduation Studio is really suitable for this.

Project title

Wood for all: the environmental and atmospheric value of all-wood architecture.

Graduation Project

Problem statement
Parkstad Limburg, an area of eight municipalities with more or less small villages and cities in the south of The Netherlands, is in need of change because of population shrinkage, vacancy, an aging population and absence of sustainable energy solutions. By organizing an Internationale Bau Ausstellung (IBA) Parkstad
aims to become more flexible and able to deal with future changes.\textsuperscript{1} IBA is a renowned German tool for regional transformation.\textsuperscript{2}

The population of Parkstad is shrinking as people move to more popular areas in the country. Consequently, a part of the housing stock becomes vacant. Some of these unoccupied dwellings are not suitable for redevelopment and have been or will be demolished. But what to do with the resulting empty land? In Kerkrade, one of the municipalities of Parkstad Limburg, the population shrinkage is particularly manifest. In an attempt to balance the housing market HEEMwonen, a local social housing association, demolishes a part of her building stock. This has already happened in Heilust, a residential area in Kerkrade-West. Currently, the site is just an empty piece of green without any type of (recreational) function. How can the development of this land be part of the IBA and help empower Parkstad?

\textbf{Objective}

This graduation project’s objective originates from IBA goals on the one hand, and personal architectural interests on the other.

Within the IBA organisation in Limburg two ways to go are visible. The first aims to revitalize the region by making it more attractive for tourism. Increased tourism can give a strong economic impulse. The second focusses on making the region more pleasurable for its current inhabitants, which increases their living quality and decreases the stream of young people that leave Parkstad to find their luck elsewhere.

This project adheres to the first view, when making a development plan for the previously described vacant land in Heilust. There are some plans already to transform the empty spot in Kerkrade-West into a public park in the coming years. I will make a design for this park and include a restaurant and watch tower increase the park’s value for visitors of the IBA in 2020 and tourism in general.

The architecture of the new programme in the park will be based on a great variety of state of the art but also ancient wood applications. The reason for this is the region’s aim to stimulate investment in renewable energy and materials. Because of its regrowable character, ability to capture and store CO\textsubscript{2}\textsuperscript{3}, numerous applications (including fibre insulation and paper), local availability and functionality of energy source, wood is a very suitable material.

Next to its environmental advantages, the choice for wood as predominant material is a result of my personal fascination with monotone materialisation in architecture and its exceptional effect on a building’s atmospheric perception. Limitation to a single material enforces repetition and very careful material application when aiming to create qualitative architecture and can lead to an atmosphere of perceptual silence; a place for contemplation. Atmospheric design will be a guiding principle for the architecture of this graduation project and the challenge lies in achieving this with the careful application of wood.

Altogether, this graduation project can be a valuable IBA project by attracting tourists as well as by exhibiting the potential of wood as a sustainable building material.

\textbf{Overall design question}

“How to design a sustainable restaurant and watch tower that can be a model for future wood construction in Parkstad?”

\textsuperscript{1} IBA Parkstad website: http://www.iba-parkstad.nl/
\textsuperscript{2} An example of an earlier and successful IBA project: http://www.iba.nrw.de/main.htm
Thematic research question
"Which lesser known and lesser used applications can be adopted by European wood construction to further all-wood architecture?"

Sub question 1:
What is all-wood architecture?

Sub question 2:
What is the relevance of wood construction for modern architecture?

Sub question 3:
Which applications of wood as a building material are missing or rarely used according to an analysis of state of the art wood-based architecture projects in Europe?

Sub question 4:
Which lesser used and lesser known applications can be adopted to further all-wood architecture?

Methodologies
Design analyses (in Dutch: plananalyse) - In order to get an overview of the variety of wood applications in state of the art architecture and, more importantly, missing or rarely used applications, this research analyses twelve architecture projects. The selection criteria for these projects are the following:

1. A clearly visible focus on wood application for both structural and finishing purposes;
2. Deployment of wood as an alternative for less sustainable resources;
3. Taking into account northern European climate conditions;
4. Having a contemporary character and an appealing appearance.

Literature study - Additionally a literature study is to be performed about wood technologies and product manufacturing, in order to fill the gaps in current wood construction with old and modern existing solutions and also to give shape to an argument about the relevance of wood construction.
Relevance
The relevance of this graduation project lies mainly in the world’s need to deal with depletion of fossil fuel and material resources. Many researches point to wood when assessing sustainable building materials. This graduation project is a follow-up of recent wood-based research and tries to find out what are the possibilities when using wood as a sole building material. Being the result of the study after the maximum sustainability potential of wood construction makes this project a valuable IBA project that stimulates sustainable building in a region that has to catch up in this field.

The material research done for this project gives a generic insight into wood application in Europe. Since especially Germany, Scandinavia and Finland are forerunners in wood technology, the most outstanding projects can be found in the North-European region. Consequently, the scope of the research is limited to European climates, which makes it well applicable for Parkstad, but not applicable worldwide.

Literature
Context


Sustainable energy, performance and materials


Projects


BudaFactory, Kortrijk, Belgium - 51N4E

Werkraum Bregenzerwald, Andelsbuch, Austria – Peter Zumthor

And more.

Atmospheric design

