REFLECTION

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Graduation project description

For my graduation project in the Architecture Studio Architectural Wood, I explored how timber facades can last longer in a sustainable and environmentally friendly way. Timber is a renewable and visually appealing material, but it is sensitive to weather conditions like sun, wind and rain. Replacing damages timber facades requires time, money and materials. Conventional preservation methods often rely on chemical treatments that are harmful for the environment. This research and design therefore focused on the architectural potential of untreated timber, supported by material selection and design strategies that enhance durability. The study involved an analysis of European wood species. As an alternative to tropical hardwoods, which require long transport and have a higher environmental impact. Furthermore, I investigated various fastening ways of cladding and how impacts the durability of timber cladding.

The knowledge gained from this research was applied in the design of a residential building placed on top of an unused building – a method known as “optoppen”. The existing façade was removed and reused on the new volume. Central to the design is the use of overhangs, which serve to shield the timber from rain, wind and sun. The depth of these overhangs varies according to orientation. The result is a layered, dynamic façade composed of diverse timber species and ways of cladding.

Process, methodology

Driven by a personal fascination with timber facades, I began researching how timber can be applied more sustainably in architecture. During the P1 phase, we were asked to define our research topic and present as research plan. I received positive feedback, with tutors noting that I had chosen a relevant subject. With this in mind, I had a clear vision of what I wanted to research further. I continued by investigating various European wood species and their durability classes. I deliberately limited my research to species from Europe, as many durable woods from outside Europe require long distance transport, which negatively impacts the environment.

I studied both naturally durable species – like Robinia and sweet chestnut – and less durable species that can be treated sustainably. While I preferred to use untreated timber with a high durability class on the whole building, these species are expensive and less available due to slow growth, making them less realistic for use across an entire façade. Therefore, I am using timber species which are widely available and can be installed untreated on the façade underneath an overhang.

Following my research, we immediately moved into the P2 phase. Having spent most of my time on the research, I had to develop a design proposal last minute, which led to failing my P2 presentation. Because it was the first time ever I had to do a retake I was very disappointed. I quickly shifted my focus to the retake, where I successfully integrated my research into a design proposal centered around protecting untreated timber façade. I passed the retake and received a GO for the remainder of the graduation process.

From that point on, I worked steadily each week, developing my design through sketches, a few models, calculations and digital studies. By exploring various aspects such as materiality, structure, construction, climate, user experience, program and the volume of the building all at the same time, I gained strong control over my concept and decisions. Each design choice was deliberate and tested through multiple iterations.

For the P3 presentation I displayed many sketches and design studies to clearly communicate my process and the choices I made and why. I explored my concept on multiple scales, from urban form to individual dwelling lay-outs. I believe a good design comes from testing various options and basing your choices on those different options. Weekly feedback sessions with my tutors were very valuable, often evolving into discussions rather than evaluations. These sessions helped me reflect, refine and move forward – also in moments when I felt stuck.

Project and research - design

The studio assignment focused on urban densification trough optoppen with timber. During the site visit, I targeted on a low-rise building located on a corner between taller buildings. This seemed like the perfect opportunity to add to the urban fabric by topping up this structure. Typically, optoppen involves adding one or two floors to an existing building. My challenge was to add several floors.

Of course, the existing structure could not carry this new load, so I designed a separate table structure above the existing building, allowing the new construction to be structurally independent. I also wanted to give meaning to the resulting in-between space. Personally, I find it fascinating when users can experience and see a buildings' structure – especially when building with timber. For this reason, I chose to visually blend the new and old structures, even though they are structurally separate.

The results of my research strongly influenced my design decisions. I wanted to take the material wood as a staring point, and using untreated wood required strategies for protection against wind, rain an UV sunlight. My research showed that in the Netherlands, the prevailing wind comes from the southwest, leading to more wind driven rain on that façade. Consequently, the southwest overhangs are larger that the overhangs on the east façade.

Larger overhangs reduce daylight access, so I performed daylight calculations using reduction factors. This led to slightly larger windows on the southwest façade to compensate, and slightly smaller windows on the east façade where the overhang is smaller. Due to occasional storms, the east façade – where exposure is higher – features a partially demountable cladding system. Only the lower section of each floor is demountable, as the upper part is protected by the overhang.

Making the entire façade demountable would require excessive use of aluminium for cladding systems, especially where it is not needed. Therefore, I optimized material use. On the southwest façade, I increased the depth of each overhang from bottom to top, allowing each floor to shield the one below. Structurally, I used beams and columns to support the cantilevering balconies, with extra timber columns which work on tension, transferring loads downward and thicker beams above to absorb these forces.

Relevance

My graduation project holds both academic and societal relevance through its focus on the sustainable application of untreated timber façades in urban densification. Academically, the project contributes to the architectural discourse on material use, climate adaptive design, and circularity. By combining material research with architectural detailing, structural strategy, and climate data, I explored how untreated timber – normally considered less durable – can be used responsibly through design rather than chemical treatment. This opens up new avenues for environmentally conscious façade design, contributing knowledge to both architectural education and professional practice.

On a societal level, the project responds to the urgent need for sustainable densification in cities. By opting to topping up an underused low-rise building, the design demonstrates how existing urban structure can be reactivated instead of demolished, reducing material waste and preserving embodied carbon. The use of local or European wood species further reduces environmental impact by avoiding long-distance transportation of tropical hardwoods.

Ethically, the project engages with issues of environmental responsibility, resource scarcity, and long-term material performance. The decision to avoid harmful chemical treatments, minimize the use of aluminium to where it if functionally necessary, and design for selective replacement of façade components reflects a commitment to material honesty and lifecycle thinking. Next to that, the architectural expression intentionally reveals the construction system, promoting transparency and awareness of how buildings are made – especially relevant in an era where material origin and impact matter more than ever.

By addressing environmental, functional, and aesthetic considerations within the context of densification, this project positions itself at the intersection of sustainability, ethics and innovation.