Re-Reed Architecture
A community centre for nature and neighbourhood

Reflection Paper
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The relation between my graduation project topic, my master track, and my master programme

The relevant connection between my graduation topic, the studio topic Architectural Engineering, the Architecture master track and the general MSc programme of Architecture, Urbanism, and Building Sciences at the TU Delft is evident in several layers of the project.

With the focus on the sub-studio *Harvest* of *Architectural Engineering*, the primary environmental issue addressed in this project is that of unsustainable building materials. The solution suggested for the problem is the use of the biobased material reed. Biobased materials become more and more an important topic. Not only for architecture but also for building technology. The architecture changes with the materials used and, thus, the importance of knowing the features of a material in depth cannot be underestimated. All scales serve the same goal of the mitigation of the human impact on the environment. But not only the building material in its application is of importance, but understanding how the material grows, how it is harvested and especially if it grows locally.

This is where the graduation project acts. Demonstrating the opportunities of one biobased material, the project is a positive outlook into a biobased future that needs to come rather sooner than later. Without regulations and policies, the project is free to explore all possibilities of a sustainable and local harvest and a biobased construction. In the end, it can lead to inspiration for further research, alternative design strategies and adds to the ongoing discussion of the reduction of emissions in the building sector which is not only lead at our faculty but also in the professional circles.

The relation between the research and the design and vice versa

The research led me deep into the biobased material reed and exposed all its qualities, possibilities, and challenges. It was a broad research about the whole lifecycle of reed as a building material. It helped me to set the scene. I planned to intervene in the Poelpolder, which is part of the green fringe of Haarlem. With the results of my research I managed to define the natural environment in which reed grows. The goal was to not exploit the newly planted reed but recognise and appreciate its benefits for the biodiversity, water quality and recreational opportunities. The Poelpolder water level would rise to create a wetland area in which the reed beds can flourish. This part of my research was important to find a starting point for my design. I calculated how much reed can be planted, how much time it would need to grow, and how and what I can build with the locally harvested reed. However, to design with reed as a guiding material proofed to be more difficult than expected. I researched the different possibilities to apply reed which led to a toolbox. This toolbox with different applications on how reed can be used did not seem to be easily put together like a puzzle. It seemed like a weak path to follow so I started to look for a building part which was more challenging to integrate reed to. Thus, the load-bearing structure caught my attention. With the aim to find the limits to the application of reed I researched more about the application of reed in structural parts of buildings. With comparisons of straw structures, bamboo interventions, and a company in Valencia that uses Spanish reed I decided to build my own reed beam and test it. This turned out to be my leading element in the building. It helped me to focus and strengthen my general concept and brought architecture, the material, and the context together. The testing and designing with reed beams gave me even more insight to the material that I gained beforehand in the official research part of the graduation. Moreover, the visit to the vakfederatie of the reedthatchers in the Netherlands gave me insight on how the existing reed business works today. I was told about the challenges, the import of Chinese reed, and the traditional craftsmenship of reed thatching. The facilities in which they are located gave me the idea for the programme of my intervention to give the reed thatchers a workshop place to experiment and develop the possibilities of reed further. The knowledge gained is valuable for further research into the construction with reed. This would lead from design back to research and shows the extraordinary force of research by design.

Assessment of the value of my working method

The research part of the graduation phase was informative and gave me almost too much insight on the construction with reed that it took me some time to find my own approach to a reed design. The concept of using locally harvested reed in the same polder where it would grow created a solid base for my design. The field trips to the area were also very interesting and shaped the programme of my intervention. It was clear to me what the intervention should include and how it should act in the neighbourhood but the translation to an innovative architectural approach was challenging. I realised that the toolbox that I created with my research was blocking me more than it gave opportunities. With the Open Design Workshop where we had to create a vision for the neighbourhood, I focused on using the locally grown materials in the neighbourhood. The discussion about my approach gave me confident that the toolbox is necessary for a future-proof neighbourhood but not for my architectural intervention itself. I decided to design the starting point of this integration of the material reed in the neighbourhood with a workshop facility and a case-study of reed and how it can be used in a building. It shows the people that reed is used and can be applied plentiful. And it grows just around the corner. After that point in the design process I was more determined on what my approach should be and it freed me from my limitations of a toolbox thinking. However, I still include my vision for the neighbourhood in my project as this is an evenly important part of my project and strengthens the purpose of the design.

The testing with an actual reed beam helped me understand the material further and gave me inspiration to go to the limits of reed. The visit to the vakfederatie made me understand that the current reed business in the Netherlands is only focused on reed thatch. Thus, my own innovation and testing got even more important. The ignorance of the application of reed in other building layers made it challenging for me to trust my construction ideas. However, in the end, the results of my research, testing, and talking to reed experts made the application of reed plausible and innovative.

Assessment of the academic and societal value, scope and implication of my graduation

The research about the lifecycle of reed as a building material is relevant in the current discussion about the application of biobased materials in the construction. As a proof of the importance, the abstract for my research paper got me invited to design an e-Poster for the EcoCity World Summit 2023 in London. I am excited to share my newly gained knowledge with other academics and people from around the world.

A table meeting with the city architect of Haarlem Willem Hein Schenk and Jeffrey Bolhuis who is also involved in Boerhaavewijk with his architecture office gave me confidence that my project is realisable on a social level. I address the necessity of the activation of the green fringe and promote its diverse use and productivity. My graduation project can be a leading example of the application of materials that grow right in the backyard of the city where they are applied. The functions of the two interventions with the reed workshop and the community programme highlight the dependence on the craftsmen and natural materials. But at the same time it demonstrates the social value of the community centre for a neighbourhood full of families that need a place to meet. The natural setting of the interventions adds to the health, activation of the green fringe, and the appreciation of local and traditional craftsmenship. It brings not only nature and neighbourhood but also innovation and tradition together.

Assessment of the value of the transferability of my project results

The realisation of my graduation project would be a challenging procedure that woud take more time into account than just a couple of years. The modification of a dried out Poelpolder into a flourishing wetland with reedbeds is already its own landscape architectural challenge. The execution is possible, however, the focus of the building sector and the politics need readjustment. This makes the project realistic with a foresight into the future of reed in construction in which there is still a lot to be defined. The whole lifecycle of reed needs a revalidation that comes closer again to the natural processes of the material itself. For example, the left over reed of the harvesting season does not need to be transported to a composting facility but can better be used as natural manure. The approach I chose, to see all benefits and challenges in the lifecycle, is valuable to lead the way into the discussion of the application of biobased materials in buildings. However, the growth of such materials need time and space. Thanks to Staatsbosbeheer, the wetlands on land which was intially traditional polder landscape are slowly becoming reality. And with such interventions, the step to natural building materials that are locally available is not that far anymore. A certain balance between natural reserves and harvesting fields need to establish itself. I show how it could be done in my graduation project. The material needed to only build out of biobased materials is not feasible in the Dutch landscape yet. The amount of reed needed for a good reed thatch is high which limits its broader application and use. However, the combination with other biobased materials can lead to better solutions which can be applied to existing neighbourhoods. For example using the reed thatch as an additional insulation layer on exisiting buildings or using reed partition walls for a biobased infill.

All in all, the graduation project is a positive outlook into a biobased future of building with reed as the guiding material. It shows the challenges and opportunities and sticks to the realistic solutions and implications of these construction methods.