

Reflection

Architectural Engineering, Harvest BK studio

“The Fungi Factory” by Sarah de Bruin

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Personal Information

Sarah Helena de Bruin

4197569

Main mentor: Anne Snijders

Second mentor: Martijn Stellingwerff

Third mentor: Engbert van der Zaag

External examiner: Arie Romein

Introduction

Within this reflection I will give a short explanation of my choice of research and design methods and the relationship between the research and design during my graduation process. Several aspects of the graduation process will be discussed: relation graduation chair and project topic, relation between the methodical line of approach of Architectural Engineering and my own research approach, relation between research and design, the relation between the project and the wider social context and ethical issues and dilemmas during the research and design process.

Relation between graduation chair and project topic

The Architectural Engineering chair is focused on the synergy between design and technology in order to solve societal issues. Within this chair, the Harvest studio is collaborated with Landscape architecture, an opportunity to work within an interdisciplinary team of students. The contextual site of this project is located in Parkstad, a region in the south of Limburg in the Netherlands. The main reason for choosing the Architectural Engineering chair and Harvest studio is the fact that it provides me the freedom to investigate my fascination for mycelium, bio-based materials and the circular economy on a larger scale. This has given me the opportunity to think outside of the box and gives me the feeling of contributing to a sustainable future.

Relation between the methodical line of approach of Architectural Engineering and personal research approach

“If innovation is the answer, what is the question?” is the motto of the Architectural Engineering Stuidio. This refers to the methodical line of approach of the studio that is starting with a thematic fascination as a basis for the research and the design question during the first semester (Msc3). During the second semester (Msc4) a location will be chosen to integrate this technical fascination into an architectural design project.

I can relate to this approach because I started from a technical fascination for mycelium-based materials, ecology and the circular economy. Within the Harvest studio we worked through all scales, from region to detailed objects. My objective was to research and design the possibilities of applying fungi though different scales within the build environment of the region Parkstad in Limburg. By making use of different organic waste streams of local industries in Parkstad, the “roots” of this living organism called mycelium, can transform this waste into valuable new building materials. This

way a symbiotic entanglement with the ecosystem can be arranged by literally implementing living organisms within the architectural design. By investigate the qualities of mycelium-based materials, the production process and growing a modular building objects that eventually can disappear back within the ecosystem after its use instead of harming the planet.

I translated this concept within two vacant steel construction halls located in Schinveld The goal of this project is to revitalize this abandoned industrial terrain into a "Fungi Factory": a factory for the production of mycelium-based materials. I tried to add a positive value to these halls by designing a factory and a place where people work, meet and learn about new innovations. The factory offers jobs and is financially feasible by the production of new building materials and other products. The factory is leaving a positive footprint on the environment because it is not depending on fossil fuels and it is closing organic waste streams within the region. This way I tried to create a balance between ecology and economy. Within the hall I designed a dynamic landscape of flexible units that can easily adapt to the growing scale of the production process and the demand of the users. The materialization of the design project will form a showcase of the variety of the applications of mycelium-based materials.

Relation between research and design

The first semester of the graduation project is mainly focused on the research. Starting from analysing the context of Parkstad and its problems and qualities and creating a vision towards this. At the same time, I studied my personal fascination for mycelium and from this point of view I tried to find solutions within the context. For this research I used a holistic approach through different scale levels. On the small scale I collected data about mycelium-based materials to get insight of the material: its production process, advantages and disadvantages, properties and applications. In relation to the design I structured this data into infographics and maps in order to communicate and analyse the data.

The knowledge gained through the research functioned as a guiding theme for the design, in which I tried to contribute to the implementation of mycelium-based materials. However, this process of translating the theoretical research into a physical design was challenging. Although there have always been ideas for the elaboration of a design in my mind during the research, the research itself did not provide clear tools for spatial/architectural design but rather the advantages and disadvantages and production process on small and big scale of the material. During the design phase, further research was needed in order to find answers for the spatial elaboration within the design of the "Fungi Factory" within the vacant construction hall that would fit a production of mycelium-based material within modular mycelium nurseries that can grow from small to big scale. The theoretical research resulted in a more practical design of the program within the factory. With adding a layer of the public spaces, I tried to create a more social aspect within the design. With the help of sketches and sketch models of volumetric blocks I studied this spatial and contextual aspects of the design. During the materialization I tried to incorporate the various applications of mycelium-based materials optimally within the design.

Relationship between the project and the wider social context

The main goal I strive to incorporate within the design is circularity by integrating the ecology within the existing built environment and society. As

an architect we need to be conscious and taking the responsibility for the environment and society. With the help of mycelium, I tried to design an example toward a sustainable future. The design project involves the transformation of two vacant buildings in Schinveld. Within the design the variety of applications of mycelium will be demonstrated and integrated. In a time of transition from a linear and pollution economy towards a circular sustainable, this is a relevant theme in our current society.

After the P2 I had some questions about ethical issues, how long will the materials last and how can you add extra social and economic value to the project rather than just being circular? How can I add value for people, profit and planet? How can the technical implementation of mycelium can add value to socio-economic dynamics? How to design an integral between natural and technical systems that deliver shared benefits at different scale levels.

Ethical issues and dilemmas during the research and design process
Starting from a holistic approached study, gave me structure during my research but in a way also during my design process. Sometimes the design process feels slow and I am misled by details and lose the overview as well as the main conceptional story line. It is important to always keep that story line in mind to substantiate your design decisions, but it can be hard within the complexity of all aspects you need to think of or could contradict with each other.

For example, the biological circularity was hard to integrate within every aspect of the building. So for the construction I choose the technical circularity by steel modular columns and beams. With the flexible and modular aspect of the construction the building can still be circular and even suits the industrial character of the context. Furthermore, the original idea was to mainly design the modular units within the halls. Soon it turned out that the existing roofs consists of asbestos. From a sustainable perspective (Jón Kristinsson: "Sustainability is everything that future generations want to inherit, use and maintain") I have decided to remove the asbestos roofs and to provide the halls with a new façade around the existing construction. This created an interesting in between space of social value outside the modular units.

Making maps and infographics helps to find the relationship between different aspects and clarifying your decisions. On the other hand, making nice infographics and maps takes a lot of time while hand drawings really helps the design thinking process. Drawings and models were an important design element to clarify my decisions. During the design process I frequently searched for inspiration in reference projects. After having an idea or seeing relevant references I often visualize these ideas within my project in my mind. These visualizations I tried to translate on paper, sketch models or on my laptop. I noticed that when I work on the computer, I often get lost in detail. While hand drawing was often faster and gave me more freedom to experiment with variants. Drawing in 3D on the computer gave more insight on how the volumes actually relate to each other in more detail. Creating sketch models by using blocks that represented the modular units also helped to get an overview of the design process. In the following design phase I made combinations of 3D drawing and 2D drawings where I edited drawings from the Revit model into better readable drawings. In the end I mainly focused on the factory hall and the modular system which I designed in more detail from 1:50 to 1:5, while the smaller hall and landscape was designed up to a scale of 1:100.

