Reflection of Graduation Process by Wessel de Jong

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Summary
This graduation year, I set myself as a goal to design a project which gives citydwellers a local alternative to goods that are currently produced far away. This is a vague goal, but it swiftly concretized into the reuse of black water and organic waste into fertilizer for the growing of crops. At first, I aimed to grow tomatoes in a rooftop greenhouse, but after months of research I concluded that this was not feasible for food safety concerns. So I switched to a radically different approach: scale up tremendously and grow a park from hemp, flax and other non-edible crops. Once designing, I found it difficult to find the ideal form for such a novel program which did not interfere with the location itself. In this process, I was mainly hindered by my own capability to recognize poor design decisions and improve upon that. I kept cherishing design aspects that weeks later would prove to be fundamentally flawed, until my tutor showed me the flaws and finally recognized them. This caused a limitation of design iterations the design went through. However, in the end, a satisfactory form was found and a design was made in which the theme of the project resonates in all scales.

Choosing a Topic
I am deeply fascinated by both pristine nature and by bustling megacities. As megacities focus human activity, they leave space for nature, making those two a good combination. However, cities need huge volumes of goods every day to fulfill their resident’s needs, causing both great pressure on the surrounding land to provide these goods, and on the infrastructure, to actually get it there. What if megacities could be independent? What if we could make an urban ecosystem, in which all waste is resource, just like in nature, which consequently can thrive undisturbed. This is an absurdly ambitious goal, but I decided to try to find a tiny part of the solution and take one ubiquitous waste flow and convert it into something useful. This concretizes for modern day people in the fact that currently all that is around them, comes from an unknown world, far far away. The buildings they live in are made from concrete, glass and steel from across the country, the salad they eat consists of ingredients from across the globe. They are unaware of the journey their toilet water takes after flushing. It is impossible for this consumer to actually know its impact in a globalized world. With local waste reuse and resource production, this would change. They would be invited and challenged to understand the working of this urban ecosystem and for a change be able to tell the life story of the product they are buying. Make an ubiquitous urban resource into a product locally, and make the people aware of this process. That was my goal.

Research
Pretty quickly I decided to focus upon the production of food out of black water and organic waste, by digesting the latter into fertilizer and feeding this fertilizer into a rooftop greenhouse. It seemed reasonably possible and currently it is an underused waste flow. So I dived into research. I read dozens of papers on a huge variety of subjects, as the making of an completely circular urban farm requires intensive knowledge of agriculture, of energy management, of water treatment, of urban farming business models and many more topics. This made the research scope extremely wide. Which hindered me from
structuring the research clearly, both because of the width and because of insufficient keeping track of work done, which resulted in not being able to cite references and in lost work, as I decided not to use a subresearch for clarity reasons in the final report. After months of trying to find solutions for all the challenges I encountered, I accepted that growing food on black water is non desirable for the high heavy metal concentrations that this waste water contains. This conclusion had great consequences for my graduation, as I had focused on an urban rooftop greenhouse and this plan became completely unfeasible as food production was no possibility. This was a difficult conclusion to make, as it invalidated huge parts of my research, but I am happy I did it, as it makes sure that my design is as feasible as possible and it made for a more interesting design assignment as I changed it.

Link Research and Design
So radically I changed the design into a plantation of tens of thousands of square meters, in which building materials are grown. This increase in scale also resulted in the fact that the installations, needed to facilitate the process of water treatment and crop processing, increased in scale, becoming objects from architectural proportions. Thus these would be the primary focus of the coming design process. The link between the research and the design is, however, weakened significantly, as large amounts of acquired knowledge, for example, about greenhouses, energy management etc. became irrelevant to the new design. Only the biggest of four parts: the treatment of waste water into biogas and fertilizer, served further, becoming not much more than a simple list of figures, being my list of requirements for the design. This led to the design being not as thoroughly supported by research as I would have liked, but with little extra research done I feel it has been sufficiently supported to hold itself up.

The Design Process
As I started to design, I had very little to begin with, as the idea was still very fresh. Yet the design assignment was rather complicated, literally going through all scales, and all scales being equally important to the story. Besides of that, the urban context was very vague, making everything possible, not limiting me to anything, nor providing a clear compass on what decisions where right or wrong. This resulted in me having difficulties to acquire a final form. I spent a lot of time working on forms that I would later abandon because they did not work in one way or another. Because I was not as able as I would have liked in recognizing flawed design aspects, I kept working on them for too long, until I encountered the hard way that they were flawed and I had to kill them of. Every time I did this, the design became much stronger, but it took much time in the process. A faster acknowledgement of the design flaws and swift adjustments to overcome them would have increased the effectiveness of my labour incredibly. The final form I settled with is so simple that it seems a miracle that it took me so long to get there. Other aspects have been going quite well, I feel. Once the rough volumes had been decided on, a lot of other parts fell into place automatically.

Link graduation studio and graduation project
Architectural Engineering as a graduation studio has a very wide focus, all kind of projects are done, depending on the wishes of the students, yet they all share a common denominator: a central role for technology. My graduation project is, I feel, a very technologically oriented project, yet it is also about much more, therefore it matches the criteria well.

Social Relevance
In the end, the design has changed tremendously from the initial plans. It went from a rooftop greenhouse to a factory/warehouse in the middle of a plantation/park. However, even though the external form
has changed so much, it still very much addresses the initial issue: providing a locally produced, circular alternative to the ubiquitous global goods. People are stimulated to see and understand each step in the production process without the location losing value for the end user, contrary, the setup of the production process is what gives the location its unique qualities. However, I hoped to achieve a commercially viable project, which I did not. The factory is on such a small scale that it can obviously not compete with truly industrial complexes. However, the added value is not in the product, but in the awareness it generates for the value of waste and sustainable building materials.

Conclusion

My graduation was a year with many ups and downs. Downs when I knew that my current track was a dead end, an up when I found a solution out of it. Examples for this are the research that resulted in the conclusion that my goal was unfeasible, or the many times I have spent working on a design that I abandoned weeks later because it was unsatisfactory. Doing this made me bolder in my design process, more willing to abandon the work I have as soon as I found a different approach that worked better. I clearly have experienced the fact that this will make the design clearer. I am happy to be able to say that despite these often and radical changes, the core of the design remained the same: reusing waste locally into an useful product. However, I should have done this much quicker. I was inadequately slow to recognize that a form was unsatisfactory, and thus I was slow in deciding to change the form into another one. In future projects, I hope to be much more able to recognize this timely. Finally I am very happy with my forced exploration of bio-based building materials. It has opened up a wide knowledge of bio-based building materials and has taught me their merits. I have felt their pleasant appearance in projects I visited and all their other ecological benefits. These materials combine well with my usual palette of high tech building materials, because of their contrast. This will quite likely become a characteristic of my designs for the years to come, as I am very much pleased with the effect it had in this design.

After I failed my P4 in December, I was let down. I was looking forward to being done with the project after one year of tough struggles. However, after being able to spend a few more months with the project, I can now say that I feel much more convinced of the architecture. It really feels much more finished and I am happy that I will not leave this behind as a project which I am not too happy to look at, even though it cost me a few months extra.