Chapter 9: Reflection

(Taochy, s.d.)
Reflection

In this chapter will be reflected on the research and design process of the graduation project. The choice for using biomimicry as a design methodology will be discussed, as well as the choice for the variable thermal mass concept. The relationship between biomimicry and the final design will be explained and the relationship between the project and the wider social context will be given.

Looking back, the choice to implement biomimicry in the design process was a good choice. Looking to nature for examples of heat management lead to new innovative ideas for an adaptive façade. Structuring the examples found in nature by physical mechanism helped structuring the design process. Because there were so many interesting examples and as an engineer you miss the biological knowledge about the organisms, selecting the usable examples was difficult. It was however very interesting to look to nature from an engineering point of view.

The choice to work out the variable thermal mass was the right one. The STAR-system has a big positive influence on the indoor climate. Looking at thermal mass as something that can be influenced instead of something stationary in the building was a new idea, given by nature, The system performs very good and uses little energy.

In the end product the relationship between biomimicry and the STAR-system is not clearly visible in the appearance of the system. This has been done on purpose, to prove that when using biomimicry not everything has to look very organic. It is about the ideas behind the design, not about the looks. Without using biomimicry I would never have gotten to the idea of varying the amount of thermal mass in a building.

The design process started with looking for inspiration to nature. Next to that research was done on heat management in buildings. This provided a good base for starting designing. Comparing different concepts helped determining each concepts strengths and weaknesses and prevented working out a concept that would not function in summer. The simulations provided proof of the positive effect of the STAR-system on the indoor climate. The simulations were also used as a design tool, by looking at the effects of using a bigger surface area of the installation and more or less slurry volume. Finally all the research came together in a design.

The relevance of the research in a wider social context is that the STAR-system provides a solution for a common problem in office buildings, the overheating of the building due to internal heat load. The STAR-system can reduce the energy used for cooling up to 99.8%. It is also not bound to the Dutch climate, in desert climates it would also work well. The research also shows that nature can form an inspiration for solving a technical problem. The STAR-system is an example of successfully using an organism as an inspiration for a technical design.