

9.

PERSONAL REFLECTION

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aspect 1:

The relationship between research and design.

The starting point of my graduation project was a design question, what would the design of a modular shelter for cars be when taken into account the integration of solar panels into the structure with maximum solar gain, different orientations and the image of the NS whilst keeping the function as a parking lot? Partly this question originated from the stakeholder, the NS. They wanted to know what was possible for a solar carport design that is applicable on every P+R parking plots without the restriction of cost.

The final solar carport design is a product of a research on PV technology combined with a research into the structural behavior of PV modules. The literature studied directly fed the design (research for design). During the pilot study, a design was used to study the impact of integrating the solar modules into the structure (research by design). The literature study, case studies, and pilot study formed guidelines for the conceptual designs, where creative ideas and knowledge from the researched combined into three designs. Segments of these conceptual designs formed the final design concept. This concept featured a mechanical connection between glass panels found in the literature. This connection was evolved to increase the transparency of the design.

At the beginning of this research, I always found it hard to connect research with design and visa versa. The main reasoning for this is that some design decisions are made from within. In this research decisions and how to give insight into these design decisions. The main misstep I made during this graduation was that I spend too much time researching and as a result, the time for designing was less than I would have liked.

aspect 2:

The relationship between the theme of the graduation lab and the subject/case study chosen by the student within this framework (location/object)

My graduation, the solar carport with structurally integrated solar panels, relates to the climate design and structural design chair of the sustainable graduation studio of the building technology track. Within the building technology track, there are four chairs, all of which are related to sustainability. Sustainability had a great influence on this graduation project. Within the project these topics touch upon sustainability: minimizing the required energy for the structure, generating energy in a sustainable manner and maximizing the structural use of materials. In addition, sustainability can also be found through material choice and designing with demountability of the design in mind to allow materials to be re-used in another life.

The building technology always has been focused around designing in combination with engineering. Due to my background in building engineering, I have always been more engineering-minded. During this graduation, I learned a lot about designing and this resulted in a more balanced interest in designing and engineering.

aspect 3:

The relationship between the methodical line of approach of the graduation lab and the method by the student in this framework.

Within the building technology master track, a lot of research is done through design. This was applied in the pilot study and the design stage of this graduation project. During the pilot study, design parameters were found for the designs. However, some elements of the research are based on research for design, which has the goal to supply enough knowledge which can be used to make a design. An example of this is the literature study at the start of my graduation process about PV technologies and the structural behavior of solar modules. This literature study fed the final design with the knowledge to create a relationship between research and design.

The misstep I made when setting up the framework is that I miss judged the time it took to do the pilot study. Although it gave me some relevant information, the usefulness can be debatable. The questions answered in the pilot study could also be answered during the analysis of the final design.

aspect 4:

The relationship between the project and the wider social context.

The energy transition is a social topic. To achieve the transition to sustainable energy, solar panels need to be integrated into the built environment. The placement of the solar carport design besides railway stations makes people aware of the energy transition that is needed to create a more sustainable planet. Besides the awareness the design creates for the energy transition, the design also acts as a showcase of how solar panels can strengthen a design instead of being an add-on onto a structure with no architectural impact. Showing passengers of the trains that there are other options regarding solar panels than the standard crystalline solar panels.

aspect 5:

Discuss the ethical issues and dilemmas you may have encountered in (i) doing the research, (ii, if applicable) elaborating the design and (iii) potential applications of the results in practice.

During the research a NEN norm was consulted. The only problem with this NEN norm is that it was outdated. The applicable NEN norm was out of reach. The media library of the TU Delft didnt have excess to this document.