Reflection on graduation product, process and planning

Faculty of Architecture
Delft University of Technology
Architectural Engineering studio

Graduation Committee
Main Tutor: Thijs Asselbergs
Second Tutor: Engbert van der Zaag
Third Tutor: Ben Bronsena
Board of Examiners delegate: Salomé Bentinck

Author
Peter Swier
4020820
Delft, Tuesday 26 November 2015
Aspect 1  The relationship between research and design

It was the furrow believe of myself that the EWF concept can bridge the gap between architects and engineers that inspired me to graduate on this topic. With the three Responsive Building Elements of the EWF concept, climate control systems – often regarded by architects as a necessary evil, and thus hidden in shafts and ceiling voids – become integral elements of a building, having been designed by the architect. In order to help myself and other architects and engineers applying this new approach I wrote my research paper. The paper was a way to get a better understanding of the system and its design possibilities. This helped me to achieve my overall design goal to create a showcase for EWF in which the climate control technology is no longer subordinated to architecture, but it is architecture, on an equal footing with the load-bearing structure of the building.

My graduation project was split up into a generic exploration and a specific model in which I have tested the results of the generic part in a design. In my (generic) research paper I explored what designers have to take into account when applying the EWF concept on vacant office buildings in the Netherlands. In order to find a specific solution, which I could apply on a vacant office building in the IBA Parkstad region, I first investigated the limitations and possibilities of the existing stock for the EWF concept and visa versa. Furthermore I created a list of design criteria, databases of possible design variants based on 102 student projects of the master course Delft Seminars of Building Technology in which EWF was applied on existing buildings. Besides that I investigated what buildings need after refurbishment in order to comply with changing demands of tenants over time and how EWF could contribute to this. The tools I developed during my research helped me with the choice of a building, to inspire me, to guide my design process and to finally develop the showcase.

So, looking back at my approach I can say that it was effective and led to the desired results. There was a clear mutual influence between the research and the design. The research led to design choices and at this moment in my graduation process I can say that the design led to new insight for the research. That is to say, designing with EWF offers a lot of possibilities. In order to see these possibilities, designers have to know the limitations of EWF, because that limitations are the foundations for design choices. For this reason I think that my research paper could be of help for designers. Besides that I experienced that during the process there was always the danger of getting lost in the climate technology aspects and forget that I am a designer. When dealing with EWF you naturally become an architectural engineer, because during the design process you get sucked into both worlds. I believe that I have succeeded in creating a synthesis between the two. An example of this is that I made the alteration of the ducts visible in the façade.

Figure 1. Alteration of the ducts is made visible in the façade with a subtle twist.
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).

In the educational material about the Architectural Engineering studio I read: “Research in the field of technology leads to all kinds of improvements in architecture. This also works the other way around: improvements in architecture help inspire research and innovation.” In the Architectural Engineering studio, architecture is a complete design discipline in which technical possibilities are an inspiration and an important contribution to the architectural design. In my case my technical fascination is the EWF concept, which by applying it on a case study (the municipality office of Heerlen), plays a crucial role in the regeneration of Parkstad Limburg. In my project the technology influenced the design to a great extent, but I hope that my design also helps to inspire research and innovation in the field of EWF and will bring the EWF research further.

The location is interesting for the aE graduation lab. Since the mining industry left and leftovers were destroyed, Parkstad Limburg is a vast transforming area in the Netherlands dealing with a decrease of inhabitants, obsolescence and missing identity. In order to regenerate this environment an Internationale Bauaustellung (IBA) is organized. There is a need for renewal and something to be proud of. They need a ‘durable mine’ that exploits the energy of the place. In my design I used one the potentials that this location brings, the minewater in the former mine shafts, to heat and cool the building and for the natural airconditioning system. In this way the mines could be of use again and the inhabitants could be proud of the unique characteristics of their area.

In retrospect I believe my design has a very clear architectural and engineering component in it. The essence of the design is the utilitarian power of the showcase I created. Due to the technological innovation the building uses its environment and by doing so it is connected to it. Besides that the technology has led to a distinct architectural expression. The building becomes an autonomous object that claims its space besides other autonomous objects in the city centre of Heerlen like the Raadhuis and the Glaspaleis of Peutz. Together these building are an ensemble of beacons within the city centre and Parkstad as a whole. Peutz was always searching for something new and in that way he contributed to the evolvement of this area. In line with that approach this building could be seen as a wink to Peutz. It is a building for the inhabitants of which they could be proud and that helps to evolve the area again.

Figure 2. Left: the Retraitehuis designed my Peutz. Right: my design for the new Municipality Office of Heerlen seen from the roof of the Glaspaleis.
Aspect 3  The relationship between the methodical line of approach of the graduation lab and the method chosen by the student in this framework.

I consciously chose for the aE-studio since it is together with Explore Lab a studio that offers a lot of freedom within in the graduation process. Freedom both in the choice for a subject as in the way you want to research and design. By starting with a technical fascination and the allotment of capable and passionate tutors students can find an intrinsic motivation and a great amount of freedom to excel in the way they want.

The freedom gave me the opportunity to create my own resonance group that worked as a tool to gain more, relevant and practical feedback on my design decisions. In this way I was able to take more into account which brought me further in my design process than I would normally have. The fact that the group worked separate from the fixed methodical line of approach was refreshing and of great value.

![Graph](image)

**Figure 3.** Visualization of my idea behind the resonance group. It worked out as I expected. I used it as a tool to examine my design decisions and it helped me to take more things into account. In that way it initially had a divergent effect on my design process. In the weeks after this meeting I focused on converging this new insights.

During my graduation process I had no fixed assistance moments with Ben and Thijs. They were very flexible which was perfect for me. I already have an intrinsic motivation and I will always do my work. So I don’t need assistance to keep me going, I need assistance to bring me further and that is exactly what happened. Furthermore the assistance moments were a way to show my progress.

I did have fixed assistance moments with Engbert which was useful since it was quite a while unclear what I wanted to produce for my P4. Looking back it might have been useful to create an overview a few weeks earlier, but I did not succeed in it due to my RSI-problems. The RSI-problems taught me one important lesson before I will start working. I have to listen to my body and have more attention for it. My drive helps to bring me further when it comes to results but it can also bring me problems when I don’t listen to my body or head. Due to this experience I now have tools to deal with this.
Aspect 4  The relationship between the project and the wider social context.

The society needs knowledge innovation in scientific research and integrated design solutions for subjects like sustainability, climate change, energy efficiency, shrinkage, transformation, reorganization and healthcare. As a future architect I want to prepare myself for these challenges and with my graduation project I did.

“A building with a high score on sustainability and energy efficiency may have neglected the most important aspect of architecture, namely providing a pleasant, healthy and productive workplace, a combination of well-being and design quality.” (Chen et al 2001)

This was the reason why I got fascinated by Ben Bronsema’s Earth, Wind and Fire concept, because this could help to create this combination of well-being and design quality. So when we put this system in existing buildings these buildings could be upgraded. There still is a demand for high quality office space, though I believe we should not make “office spaces” but pleasant, healthy and productive “work environments” with a great deal of flexibility. My graduation project is such a workplace of the future. It is a showcase for the refurbishment of the existing stock into architectural attractive, low energy, healthy, comfortable, productive and durable work environments.

In the end I believe that my graduation project provides architects and engineering with a new refurbishment strategy that can solve many of the current problems, such as oversupply, greenhouse gas emissions, vacancy, and the social problems of redundant offices.