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Reflection Paper

Master of science Architecture, Urbanism & Building Sciences

Personal information

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Studio

STUDIO: AR3AE100 ARCHITECTURAL ENGINEERING GRADUATION STUDIO

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Graduation project

TITLE: BRIDGE THE GAP

LOCATION: JULIANA VAN STOLBERGLAAN, THE HAGUE, THE NETHERLANDS

REFLECTION

Summary

The method within the entire design and research process is to first dive into depth and then to take steps back to see what the effects are. The reasoning for this is the believe that the smallest detail can have the greatest impact on the desired overall impression. By mastering the smallest detail in early stages, the consequences will be less significant in the overall process and a complete end product will be the result. First, personal goals are set to give direction. The goals are as follows: Energy neutrality because of its relevance in today's society that is still dependent on fossil fuels, flexibility for future-proof building and the ability to involve the resident in his own building process, reuse of the existing building stock to combat vacancy and generalisation of the design in order to serve as a case study for other projects to combat the same problems.

A preliminary study on the idea of Open Building and the SAR in MSc 1 makes it possible to start with an in depth research focus. Due to the fact that installations often hindered flexibility in Open Building projects, a deeper exploration in this regard is desirable. In addition, the architect often reserves space for installations, as it is a black box for him missing the right knowledge. By offering depth in this area, it becomes possible to formulate a fitting solution to several design issues. Within the research, achieving depth is possible by doing the official NZEB calculation for several vacant office building typologies in the Netherlands, after finding similarities within these buildings through analyses. Within the design, the same methodology is applied by first focusing on climatic and structural solutions in the smallest detail before determining the architectural appearance. For this reason, efficiency and repetition becomes characteristic for the appearance of the building and the developed facade modules.

During the graduation process, there were several feedback moments, each with its own influence on the final design. The research tutor, for example, encouraged to set goals in the beginning on what the end result of the project should contain. This led to the decision to solve different problems in the facade without affecting the existing open floorplans. Later in the process, the research tutor ensured that the facade product should not only focus on efficiency and layout, but also reflect on its building process and material. This is expressed in the design by the extensive use of wooden materials that store CO2 and are in line with the goal of being energy neutral. Thinking about the building process also gives the idea of thinking in repetitive components rather than complete turnkey solutions. The building technology and architecture tutor both enhance the scope to solve the design in a more professional manner. By questioning the chosen approach by zooming out into different scales and letting go when a solution causes more problems than it can solve. One of the consequences is that the innovative facade module system is switched from a floor-to-floor

based module to a complete vertical facade module that works coherent. This co-operation strengthens the climatic advantages of the new facade with passive rather than active installation solutions: wintergardens and solar chimneys. This zooming out also provides a facade principle with a rhythmical grid applicable for several office typologies. This generates a harmonious facade while the openable sliding doors, wintergarden screens between the different apartments, and sunshades provide variety within the overall composition the whole year round.

This indicates that specialising in specific design components, in this case installations and the thinking process of Open Building, is a good approach to set preconditions for the design from the very start. However, the desired end result and the cohesion of the project as a whole should not be lost out of sight, which will happen when focusing only on the smallest scale. Switching between the various scales and disciplines remains important within the profession of architecture. However, the knowledge gathered in this project is a strong and relevant addition that can be built on and can again be of value in new projects.

The relationship between research and design

There is a strong and clear relationship between the research and the design. Research focuses on the similarities between existing vacant Dutch office buildings and open building principles. This research makes it possible to find out how these buildings could not only be transformed into open buildings with a new function, but also what is needed to make these office buildings energy neutral. The innovative part of this research is to solve this transition from an existing empty building to a new lively apartment complex by means of a facade module. For this study, NZEB calculations were used, which are currently used for new buildings. Due to the shortcomings of the calculation programme in terms of flexibility, units within the existing dimensions of vacant office buildings are applied. This led to the conclusion that it is not possible to solve everything in the façade, mainly energy generation. Nevertheless, as a result of this research, an energy module emerged with the necessary installations required to create an energy-neutral building. This also resulted in certain preconditions for the design, such as the determination of RC-values, space reservations for the installations per unit and the amount of solar panels that would be needed in total. All these elements play a constant role in solving the problem within the design and could be seen as a helpful tool for every designer.

The relationship between graduation topic, studio topic, master track and master programme

A connection within mass production, Open Building and energy neutrality, is found within all the above-mentioned topics. The new concept of converting an existing empty Dutch office building into an apartment complex by means of facade modules is in line with the studio architectural engineering and the task of 1 million homes. These facade modules can take care of the necessary extra installation distribution and passive add-ons to make it an energy neutral building. By also adding spatial wintergardens the architectural values of the building will increase. The relation between all these points creates an overarching whole that ties in with the master programme.

Elaboration on research method and approach chosen by the student in relation to the graduation studio methodical line of inquiry, reflecting thereby upon the scientific relevance of the work.

The approach is to find a new method in solving the current office vacancy envelope within the Dutch borders. This involves acquiring as much information as possible about Open Building. Next, it was time to research the principles of contemporary installation based on newly established regulations. When it came to the design, useful tools emerged from the research that could be taken into account and also provide guidance for the design itself. By zooming in and out between the different scales and questioning the established energy module, the idea of combining the active installations with a passive design strategy emerged. The combination of the Open Building design approach and the installation strategy creates a design that is scientifically relevant and can influence today and the future. Due to the new way of looking at the building and wanting to solve everything in the facade, the method is often one step forward and then two steps back in order to continue achieving the goals within the project.

Elaboration on the relationship between the graduation project and the wider social, professional, and scientific framework, touching upon the transferability of the project results.

Because the research does not focus specifically on one building in the Netherlands, but on different typologies of vacant office buildings in the Netherlands, the concept can easily be transferred to other vacant office typologies. This can boost to the current market for making existing buildings energy neutral. The focus here is not only on an energy-neutral building after it is transformed, but also on the possibility of continuing to adapt these buildings in the future without rigorous renovations, thanks to the concept of Open Building. In the social sphere, these new types of housing will offer the choice to everyone in society to make their own home without having to spent all of their life savings. This is due to the combination of mass production and freedom in the infill.

Discuss the ethical issues and dilemmas you may have encountered in doing the research, elaborating the design and potential applications of the results in practice.

During the course of the study, several dilemmas have emerged. This starts with the research itself when the UNIEC tool was used for the NZEB calculations. This tool contained little or no room for flexible housing, as addressed by the Open Building approach. This not only means that conclusions were taken hastily, but it also raises the questions about the new regulations. The entire building industry has to change to CO2-neutral buildings, nowadays the focus is on the moment of completion. However, if we look further into the future with flexibility but especially the concept of Open Building, many more problems can be prevented. Furthermore, the NZEB calculation tool focuses on installations that actively use electricity or fossil fuels, while passive inventions were not mentioned. Therefore, the project shows that the entire Energy Module assembly can be placed to create an energy-neutral building. These Energy Modules do help but can be applied in smaller sizes if passive

interventions are taken into account. To notice the difference with adding passive installation technique the whole facade should be built and tested in practice.