Final Reflection on Graduation P4 **Berend Schenk** **4529790**

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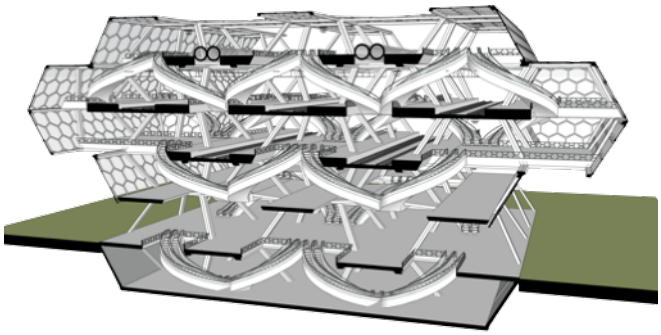
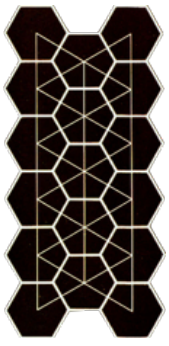
In order to help understand the research and design process a self-reflection on my graduation studio is written and handed in to give my tutors and delicate of the board of examiners a further understanding towards the final graduation design project. In my case the project is about designing of a Hyperloop transfer Hub for the future, or as I call it, a Hyperhub. Therefore, a lot of (high)speed train stations have been analyzed as well as international oriented transfer hubs, such as airports and terminals. Due to the position taken in the first stage of the design process, also significant research has been done in the way mother nature designs its structures, for example, the honeycomb, animal skins, cracks in stone, merging of bubbles, structure of snowflakes, and so one. Therefore, research and design had a close relationship between each other during the process. A lot of design decisions have been made by looking closely in to the research done during the past months, somewhat like the definition of research/evidence based design. Objectivity is an essential point to be able to state that a design can be used purely for research purposes. In practice, however, this rarely applies, certainly in architecture due to the fact that also my own approach is mainly evidence based design true the scope of the analysis of relevant reference case studies. The fact that this form of design research in no way describes what the absolute scientific reality is, corresponds with the position of the design studio project, which is about designing a masterplan for the year 2100. This naturally involves a lot of hypothetical questions and assumptions, where it is usually difficult to provide a substantiated argumentation reflecting your knowledge gained by research, but this is exactly why the focus of the studio is primarily on doing thorough research as much as possible. In addition, many impulsive or intuitive decisions were taken as expected, only the research done was mainly focusing on finding a narrative and a style in which to design a future mobility hub. A surprising observation is that there is a strong correlation between the process of research and design. Many elements from the case studies of other existing train stations and infrastructural nodes, therefore, arise almost simultaneously, between research and design. A fruitful interaction between the relatively 'objective' research and the more 'subjective' design process. Research based and evidence based design are research methodologies that can significantly influence design decisions in de whole process. In the Complex Projects studio, most people approach the problems and research questions in a very analytical and data driven way. This elaborates the fact that everyone has to thoroughly analyze, investigate and argue every aspect of the researched area and come up with lots of diagrams and data based drawings. So, one could say that evidence based designing, as it is for me, is more uncomplicated and optimal for this type of studio.

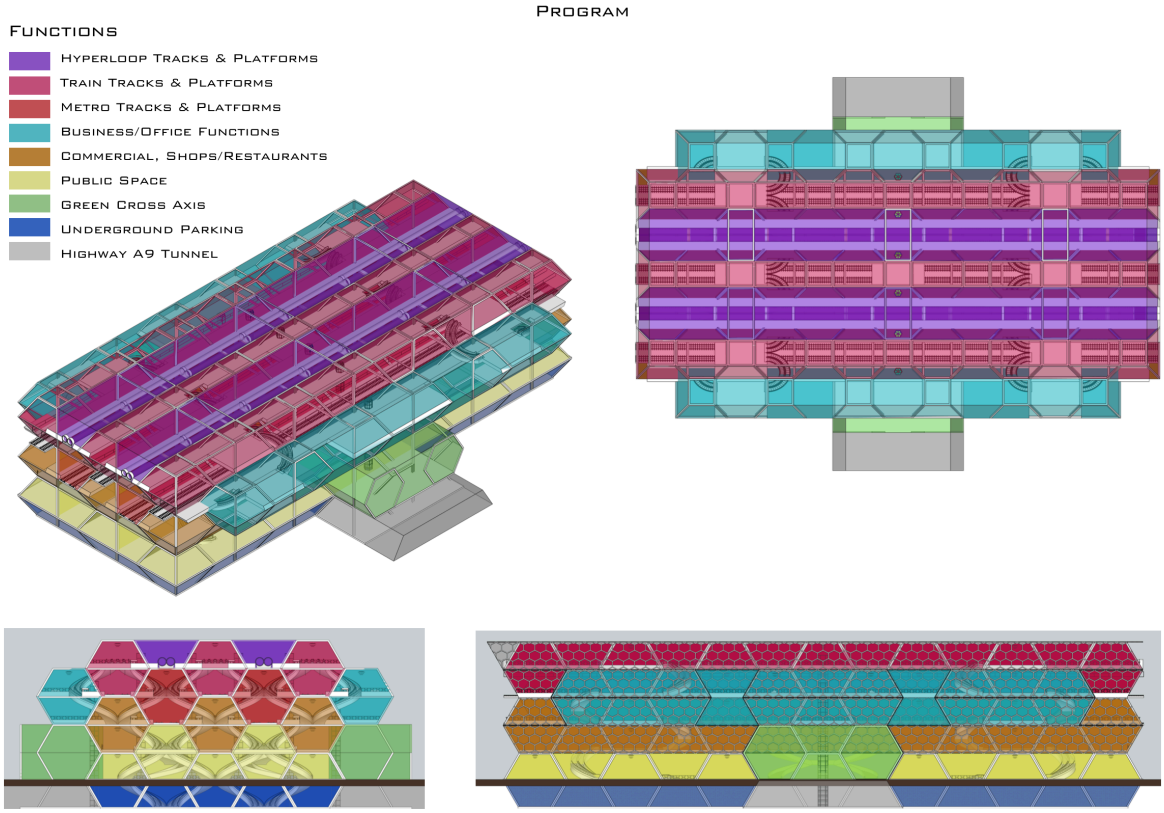


Logistic System



One could say that the first task for designing such a station would be the seamless layout of the infrastructural program such as train- and metro tracks Hyperloop tubes and their platform. Secondly, the construction and enclosure of the building would be designed around this scheme. By acknowledging the basic elements of ancient buildings and decomposing modern architecture, you can find interesting similarities, which will help you in understanding the very essence of architecture. For example, in my case the tradition or characteristics of the project area in Amsterdam Zuid-Oost, where the development of the ‘Bijlmerflat’s’, the first large scale high rise buildings in the Netherlands. This

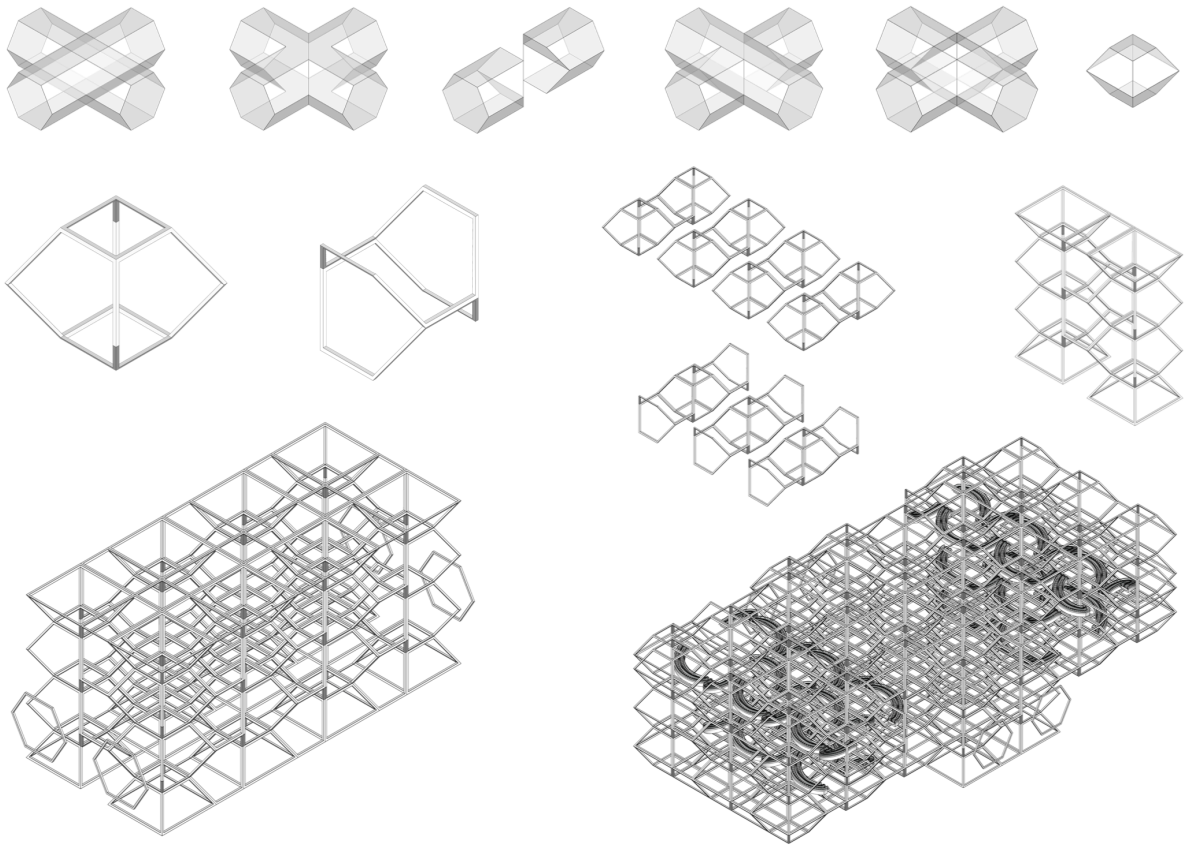
was a revolutionary project for its time, and even though it failed spectacularly, it can help to find a narrative for a futuristic design. The district layout of forming a honeycomb structure was very iconic. Besides this, it is also useful in the research process by seeking the purest forms of traditional cell structure in natures architecture, and seamlessly interacts with the masterplans most important point of symbiosis between nature and the urban environment in de area of Zuid-Oost.



The second task is to construct the necessary underlying construction. The final design has a 3D hexagon space frame woven through the whole building as a main construction, referring to the Bijlmerflat's. Beside this, as mentioned before, it is the strongest and most efficient cell structure nature has designed, for example shown in the honeycomb structure build by bees and in numerous other structures in nature. This interacts with the idea of a functional approach to the infrastructural challenges in the design of a mobility transfer hub such as a Hyperloop station. The first main focus should be the logistical challenges that come with combining multifunctional transportation types together in one building. Differently said, don't design a floorplan from the top down, but shape the spaces themselves. Another quality of this approach is the smart way of applying different floor heights, which can provide an interesting route true the building, and can smartly separate different mobility types without using only walls for the demarcation of different spaces.

The third argument to this design approach to the honeycomb structure and symbiosis of mother nature with cell construction, is the fact that this structure is very well feasible for modularity. So, the station can be extended, decrease or even completely removed and placed somewhere else, depending on the movement of the surrounding urban environment. This flexibility is important towards a sustainable future in the build environment. Also, the social aspects have strong collaboration with this vision, bringing people together, firstly from the urban environment surrounding the station, but more important, also the people traveling with the different types of public transport, and because of the Hyperloop, more internationally orientated. This interacts with the aim of complex studio, being a futuristic, innovative, sustainable and above all, very complex project.

Construction Setup, 3D Hexagon Space Frame



The fourth argument to this hexagonal approach throughout the whole design are the fact that this type of structure is very well feasible for 3D printing, which is as research has shown, the new type of constructing buildings in the future, especially in 80 years from now, where our hypothetical masterplan is aiming for. Of course, with the necessary assumptions and uncertainties, but with enough boldness. The masterplan for Zuid-Oost has been designed for a thrilling future, with a large park and business district along the public transport axis, running from north to south, can be called the Zuid-as 2.0, making a feasible innovation district to facilitate the necessary economic growing area for the coming decades. Boosting the development of the innovation district, is a new type of public transport, which is fast, aiming for long distances, yet very sustainable. The Hyperloop is about to take over continental aviation, seeking an alternative for mid-long-distance travel within continents at the same speed but powered with sustainable energy. The Hyperhub is planned in Zuid-Oost, as one of multiple new to be designed stations along the Schiphol corridor, to take pressure of the very busy airport. Looking closer to the project area, the Hyperhub is designed right on the crossing of the Schiphol corridor public transport axis, the already tunneled A9 highway and to be created green axis on top of this. This fusion of all those important transport axis is illustrated in the complex, yet very interesting 3D printed hexagonal space frame. The structure can be considered somewhat chaotic when looking from some angles, as a metaphor for the complex infrastructural node its build on. But it shows the district organized honeycomb structure when looking through the building form the head entrances on the green axis, and as well, when turned 90 degrees, seen from the transport axis, where the metro's, train's and Hyperloop drive into the station. Simply stated; order in the chaos.