

Graduation Plan

| Personal information | |
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| Studio | |
| Theme | Hyperbody: NS&IA |
| Teachers | Henriette Bier, Nimish Bioria |
| Argumentation of choice of the studio | <ol style="list-style-type: none"> 1) This studio is challenging in the sense of not only generating amazing architecture but also making it realizable. 2) Due to the complexity of contemporary architectural design and the pursuit of high-quality architecture, it is of great importance to know the way to launch design with the aid of digital tools. |
| Title | |
| Title of the graduation project | Climatic Ecologies- Urban Lobby of Huanshi East CBD |
| Product | |
| Problem Statement | |
| <p>Guangzhou is the third largest city and one of the most important trade centers of China. The Huanshi East CBD (central business district) is an old CBD of it. In recent years, because of the development of other areas of Guangzhou, the Huanshi East CBD is facing fierce competition. What's worse, this CBD has some inborn weakness when compared to the other CBD due to some urban planning mistakes. The first one is that the core of this CBD is divided into two parts by a busy road. The buildings in this area are disconnected. People who want to go to the other sides of the CBD have to walk for a long time or experience the anxiety space under the Huanshi East Road. Besides, people in this area also lack space for recreation and public activities. The aforementioned factors decrease the attractiveness of this CBD.</p> <p>The government tried to improve this area twice. But both of the attempts failed. The first one was to create a square by sinking the road during the construction of the metro line in 2004. This solution was appreciated by most of the citizens. However, this project was shelved due to political reasons. The second solution was to keep the current situation of the Huanshi East road and connect the buildings on both sides of the CBD with an underground plaza. This proposal was opposed by the citizens and urban planners because the underground space does not work well in Guangzhou (hot and humid). Finding another solution to improve this area is becoming increasingly urgent.</p> <p>The aforementioned information raises the question: "How can I deal with the information of this complicated site and get a high-quality design that can fit to the conditions of this area?"</p> | |
| Goal | |
| <p>The objectives are improving the living environment and competitiveness of the Huanshi East CBD by solving the aforementioned problems. The project will be built above the ground. And it consists of a CBD information center, a senior club, a multi function hall / room, some exhibition spaces, some</p> | |

commerce space, some connecting paths to the urban network and some landscape space. And the design should perform well in terms of adapting to the local climate and surrounding context.

Process

Method description

The design will be based on the in-depth analysis of the surrounding urban context and local climate condition. The program of the design will be defined based on the analysis. Also, from these analysis, vital elements and factors will be extracted and work as the parameters for the design phase.

To deal with the huge amount of information of the site efficiently, the application of advanced digital tools and design methodology will become important part of the design exploration. More precisely, combined with the outcome of urban analysis and climate study, a system that refers to the concept of self organizing system / agent based modeling will be built for simulating the function arrangement and initial form – finding. By analyzing the results of these simulations, conclusions can be made with regard to public/private zones, topology and location as well as morphological translations. After that, in the design development stage, with the aid of advanced analysis tools and modeling tools, different aspects of the design such as form and openings can be optimized according to the parameters, context and the programs by applying the Genetic Algorithm (an advanced optimization method) to the design. Finally, the research will focus on the fabrication – producing building components with the method of mass-customization.

State of the art digital research tools will be used such as Grasshopper, Processing and Ecotect.

Theoretical and practical references

Bier, H. and Knight, T., Digitally--driven Architecture, Stichting Footprint, 2010

Oosterhuis, K., Towards a New Kind of Building - A Designers Guide for Nonstandard Architecture, NAI, 2011

Oosterhuis, K. and Bier, H., Robotics in Architecture, Jap Sam Books, Heijningen, 2013

DeKey, M., Systems Thinking as the Basis for an Ecological Design Education, School of architecture, Washington University, St. Louis

Ednie-Brown, P., All-Over, Over-All: Biothing and Emergent Composition

Weinstock, M., Evolution and Computation, p. 27-43

Kristinsson, J. and Dobbelsteen, van den A., Integrated Sustainable Design (Volume 1), Delftdigitalpress, 2012

Reflection

Relevance and output

As mentioned above, the main goal of the project is to improve the living environment and competitiveness of the Huanshi East CBD by solving the aforementioned problems. Firstly, the project will improve the internal connection of the buildings in this CBD. Secondly, the project also provides some recreation space for the people working around and the local citizens. Thirdly, the enterprises in the CBD can get the space for showing their products and introducing themselves to the public and the businessmen from the hotel. In addition, the project also provides space for private interface, which also improve the chance of doing business. Last but not least, the unique shape of the building and the landscape area attributed to it also provide people of the surrounding buildings with good sceneries. To sum up, with the project, both the business environment and the living quality will be improved a lot. The Huanshi East CBD will become much more appealing to different users such as enterprises,

citizens and businessman. The technical relevance lies mainly in exploring the various state of the art design tools as well as the translation to a (CNC) component(s) to materialize/construct the building. Further, there is a theoretical research on using generative approach for architectural field. All the research outcomes will be translated into the architectural result that embodied in the graduation design.

Time planning Scheme of the division of the workload of the graduation project in the 42-week timeframe (P1-5). Compulsory in this scheme are the examinations at the middle and end of the semester, if required, the minors you intend taking and possible exams that have to be retaken. The submitted graduation contract might be rejected if the planning is unrealistic.

P1: October 2013

- initial concept
- + Thematic and theoretical research.
- + Situation and statistical research of the general area.
- + Problem statement and exploration of the tools to address it.
- + Computational tool development to understand the optimal location and characteristics of the project according to the distinct dataset

P2: 2014/1/22

- Defining the approach
- Schematic design
- + Architecture:
 - Location plans (Urban draft) - 1:1000 / 1:500
 - Plans, façades, sections and basic volumes (Draft Design) – 1:200 / 1:100
 - + Project functional requirements.
 - + Process overview of the parametric model determined by generative system and genetic algorithm that manages the morphological changes of the building according to the topological mutations required by the program..
 - + Preliminary climatic research.
 - + Graduation plan.
 - + Theoretic and thematic support of design and research to frame the position of the project within The Non-standard and Interactive Architecture domain.

P3 :March 2014

- Defining the project (architecture).
- + Determine the final design by critically improving the previously created tools for P2.
- + Architecture:
 - Location plans (urban scale) - 1:1000 / 1:500
 - Plans, façades, sections - 1:200 / 1:100
 - Plans and cross-cuts of relevant sections of the building - 1:50
 - Façade fragment - 1:20
 - Details - 1:10 / 1:5
- + First structural and climatic results.

P4: May 2014

- Refining the building (construction).
- + Architecture:
 - Location plans (urban scale) - 1:1000 / 1:500
 - Plans, façades, sections - 1:200 / 1:100
 - Plans and cross-cuts of relevant sections of the building - 1:50
 - Façade fragment - 1:20
 - Details - 1:10 / 1:5
- + Structure and materialization design for the Rapid Prototyping and CNC fabrication process.

- + Rapid Prototyping and CNC production of the physical model as a proof of concept of construction system.
- + Modification and further refinement of the architectural design due to the structural and climatic results.

P5 : June 2014

- Wrap-up presentation

+ Architecture:

Location plans (urban scale) - 1:1000 / 1:500

Plans, façades, sections - 1:200 / 1:100

Plans and cross-cuts of relevant sections of the building - 1:50

Façade fragment - 1:20

Details - 1:10 / 1:5

+ Perspectives and orthogonal views of the design.

+ Physical model by means of Rapid Prototyping and CNC production.

+ Interactive presentation showing concept, information models, and behavioral diagrams.

Attention

Part of the graduation (especially in the MSc 4) is the technical implementation of the building design. Therefore a Building Technology teacher will be involved in the tutoring team from the P2 presentation on. This should be taken into account when writing the study plan / personal graduation contract, with respect to the time planning as well as in the relation to the content (e.g. statement, method and /or relevance).