

Graduation Plan

Personal Information

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Choice of Studio

Name of studio: Architectural Engineering
Tutors: Tutor of Architectural Design: Anne Snijders
Tutor of Technical Research : Pieter Stotjesdijk
Tutor of Building Technology: Maarten Meijs

Argumentation of Choice of the Studio

Interested in how technology could change the workflow of architecture design and wanted to discover how digital fabrication could provide solution to the need of fast construction are the main reasons why I chose this studio. Besides, this studio attracts me a lot for the professional consultancy on technology, details and design based on each student's own fascination.

Project Title

Creative Asylum Seeker Community

Graduation Project

Problem Statement

Context & Programme

At this very moment, the number of refugees who swarm into Europe is raising at a very high speed. The explosion of the refugees causes a lot of social and political problems. The number of asylum seekers in Netherlands was 13000 in April, by now, this number is increasing rapidly. Every local authority is required to set aside housing for refugees but many argue that they do not have enough social housing to meet their quota. The need for new AZC also means more facilities to be build. But if an extension is made to the existing AZC, then a lot of energy could be saved

Technique

Wood has been used as construction material for a long time, in a traditional way, workers need to pay a lot of energy and time into one building, but now, as digital fabrication develops, wood become a fresh new material for fast construction. Through CNC milling and other digital fabrication techniques, wood construction work could be designed, manufactured and assembled at the same time, which makes the building period quite short. Also the material could be recycled and reuse or reconstruct on the other site. In this way, a lot of money and time could be saved to create more and better asylum seeker centers to solve the shortage of housing for the asylum seekers.

Objective

| | |
|-----------------|--|
| Efficiency. | To be constructed in a short time to meet the urgent need of housing for refugees. |
| Privacy. | To provide privacy for each residents. |
| Flexibility. | To provide flexibility for families so they can stay together. |
| Affordability. | To lower the budget to save money and space. |
| Quality. | To provide a good atmosphere for the residents |
| Durability. | To be used as a temporary housing for 15 years. |
| Sustainability. | To be environmentally friendly. |

Overall design question

How to create an asylum seeker community by making extension of the AZC in Heerlen with the help of transformable room system?

Context: Existing AZCs

Program: A Community for Asylum Seekers

Technique: CNC milling

Thematic Research Question

The main research question is:

How to create a fast constructed transformable room system for asylum seeker community?

It could be defined in several sub-questions according to a scale from small to big:

How to create a transformable room?

How to combine and separate rooms easily?

How to create a better community space within the same space size?

What production techniques are suitable for creating the system?

What kind of furniture system could be used to support the system?

Methodologies

Literature study

- Scanning technique
- Digital fabrication
- Timber Structure and wood joint
- Factory Renovation
- Refugee Report

Interview

- Refugee current situation
- Refugee's need

Case study

- Heritage renovation done by scanning tech
- CNC milling projects

The research on existing AZC is done by literature research and making analysis of the centers. By visiting the existing AZCs, interviewing the officer, talking with the residents in the center, the existing situation is mapped and analyzed. From the analysis, the basic needs of the asylum seeker housing and where the improvement should be done can be listed. The final design objectives are decided in this way.

The objectives can be supplemented with research done on how to design a transformable room system. The research is done by design, from small scale

to large scale. By using typology as the main design method, all the possibilities are listed.

After the research of the transformable room system is done by design, the next part is to construct the system. This technical part is mainly done by literature study and case studies. By comparing all the possible construction solutions, the technical support for the transformable room system is analyzed.

Combining the system research done by design and technical research done by analysing, together is the start of a new building system for asylum seeker centers. In the conclusion part, the research is briefly examined according to the design objectives.

With the research of the Transformable Room System, the next step is to implement it in a special site. The site is chosen and analyzed. Strategy should be chosen to extend the old AZC in a proper and more detailed way. The connection should be carefully designed and tested in physical models. The basic design element should be taken into consideration, public and privacy, view and experience, and the physical needs such as the sunlight, ventilation, water, electricity, acoustic, heating and cooling.

Relevance

The research on the Transform Room System which could be applied in a general way, for social relevance, it is a fast solution for receiving and provide the refugees in a fast but comfort way, which could solve the problem of refugee housing in a short period, but also could develop into a community for refugees in the coming future. For architecture design relevance, it could also be a totally new system which could be applied in the whole Europe to make smart housing for the student housing, hotels and so on with a low cost and construct in a short period.

Literature

“Material Strategies in Digital Fabrication”

Christopher Beorkrem, Routledge, 2013

“Digital Fabrications Architectural and Material Techniques”

Lisa Iwamoto, Princeton Architectural Press

“Factory Renovation”

Newman, Alexander, Structural Renovation of Building, 2001

Materializing design: the implications of rapid prototyping in digital design

Larry Sass, Department of Architecture, Massachusetts Institute of Technology.

Automatic BIM component extraction from point clouds of existing buildings for sustainability applications.

Chao Wang, Yong K.Cho, Changwan Kim School of Civil and Environmental Engineering, Georgia Institute of Technology.

“Digital Processes”

Hauschild, Moritz; Karzel, Rüdiger, Birkhäuser, 2011

“Digital Vernacular”

James C. Stevens, Ralph Nelson (2015). Routledge.

Central Organ Asylum Seekers (2015). Procedures . *Rijswijk.*

Central Organ Asylum Seekers (2015). About-COA. *Rijswijk.*

Asylum Trends. Monthly Report on Asylum Applications in The Netherland and Europe.

Ministerie van Veilighei en Justitie. (July 2014.)

“Public Space”

Carr, S. Cambridge: Cambridge University Press, 1993.

Schedule of Graduation Project

| Autumn Semester | Mon | Tue | Wed | Thu | Fri | V.en | Workflow |
|-----------------|-----|-----|-----|-----|-----|------|--|
| Sep | | 1 | 2 | 3 | 4 | | Workshop and Reading for Graduation Plan |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 14 | 15 | 16 | 17 | 18 | | |
| | 21 | 22 | 23 | 24 | 25 | | |
| | 28 | 29 | 30 | 1 | 2 | | Refugee research and Analysis |
| Oct | 5 | 6 | 7 | 8 | 9 | | Site Selection and Analysis |
| | 12 | 13 | 14 | 15 | 16 | | Data Collection- Technique |
| | 19 | 20 | 21 | 22 | 23 | | Programme and Settings |
| | 26 | 27 | 28 | 29 | 30 | | P1 presentation |
| Nov | 2 | 3 | 4 | 5 | 6 | | Digital model development |
| | 9 | 10 | 11 | 12 | 13 | | |
| | 16 | 17 | 18 | 19 | 20 | | |
| | 23 | 24 | 25 | 26 | 27 | | |
| Dec | 30 | 1 | 2 | 3 | 4 | | Evaluation and optimization |
| | 7 | 8 | 9 | 10 | 11 | | |
| | 14 | 15 | 16 | 17 | 18 | | Research Paper |
| | 21 | 22 | 23 | 24 | 25 | | Design Draft |
| | 28 | 29 | 30 | 31 | 1 | | Preparation for P2 |
| Jan | 4 | 5 | 6 | 7 | 8 | | Reflection |
| | 11 | 12 | 13 | 14 | 15 | | |
| | 18 | 19 | 20 | 21 | 22 | | |
| | 25 | 26 | 27 | 28 | 29 | | |

| Spring Semester | Mon | Tue | Wed | Thu | Fri | V.en | Workflow | |
|-----------------|-----|-----|-----|-----|-----|------|---|-----------------|
| Feb | 1 | 2 | 3 | 4 | 5 | | P2 presentation | |
| | 8 | 9 | 10 | 11 | 12 | | Structural design | |
| | 15 | 16 | 17 | 18 | 19 | | | |
| | 22 | 23 | 24 | 25 | 26 | | Community design | |
| | 29 | 1 | 2 | 3 | 4 | | | |
| March | 7 | 8 | 9 | 10 | 11 | | Detail design and development | |
| | 14 | 15 | 16 | 17 | 18 | | | |
| | 21 | 22 | 23 | 24 | 25 | | | |
| | 28 | 29 | 30 | 31 | 1 | | | |
| April | 4 | 5 | 6 | 7 | 8 | | Extension of Design system | |
| | 11 | 12 | 13 | 14 | 15 | | | |
| | 18 | 19 | 20 | 21 | 22 | | Drawing making and detail design | |
| | 25 | 26 | 27 | 28 | 29 | | | |
| May | 2 | 3 | 4 | | 6 | | model making and drawing improving ppt making | |
| | 9 | 10 | 11 | 12 | 13 | | | |
| | 16 | 17 | 18 | 19 | 20 | | | P4 presentation |
| | 23 | 24 | 25 | 26 | 27 | | | |
| Jun | 30 | 31 | 1 | 2 | 3 | | P5 presentation | |
| | 6 | 7 | 8 | 9 | 10 | | | |
| | 13 | 14 | 15 | 16 | 17 | | | |
| | 20 | 21 | 22 | 23 | 24 | | | |
| | 27 | 28 | 29 | 30 | | | | |