Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Personal information

Name: **Michał Kasperski**
Student number: **5318270**

Studio

Name / Theme: **Architectural Engineering / Harvest**
Studio mentor: **Annebregje Snijders**
Research mentor: **Gilbert Koskamp**
Argumentation of choice of the studio: Because of its practically-oriented, grounded yet often experimental design approach and an expertise within tutoring group in areas of circular design, manufacturing, material flows as well as focused research group supporting my fascination in contemporary timber structures.

Graduation project

Title of the graduation project: **Rural Transformation - Exploring the potential of circular timber tectonics and holistic, regenerative design to revive European countryside.**

Location: Budachów village, Lubusz Region, Poland

Problem Statement: This project addresses the problem of increasing rural-urban divide and explores unique opportunities for transforming the countryside to drive transition towards circular economy and energy transformation in Europe. It also addresses the minimal use of renewable materials in construction despite resource depletion by reflecting on architectural tectonic culture.

Overall design question: How can we integrate circular design principles in contemporary timber design and manufacturing workflow to drive rural revitalisation in forested areas of central Europe through holistic architectural interventions within existing communities?

Thematic research question: How the advancements in manufacturing processes and design workflows could inform a new circular tectonic language of contemporary timber architecture?

Design assignments in which these result: The overall objective of the graduation project is to develop a model for revitalisation of rural areas in central Europe using regenerative design principles. This will be approached by focusing on a detailed study of Budachów village with an attempt to re-imagine an underused plot of land and prove its potential through holistic design approach at an intersect of culture, technology and ecology.
Within that overall objective a research focus will be put on evolution of timber tectonics - as a widely available regenerative resource in the area - within a contemporary design workflow. The research paper act as a foundation to deeply understand the potential of the material focusing on tools and manufacturing processes as drivers of change and how they translate into architectural design. Those techniques will be critically evaluated by their potential to meet the needs of transition towards circular economy.
The design goal is to envision an inspiring use of timber as a primary construction material across different scales and building types of a multifunctional development. It will include an adaptation of an existing building and a new public facilities, housing activities at an intersect of education, care, dining and ecology, complemented by guest-houses for visitors. The idea is for the programme to amplify local qualities and potential of the place and community development.

Process

Method description:
The research framework is built upon a periodisation model proposed by Christoph Schindler which describes the evolution of timber construction in three phases: a 'hand-tool technology', a 'machine-tool technology' and an 'information-tool technology'. Thus, it provides a useful lens to investigate a changing timber tectonic as it focuses on the evolution of manufacturing technology and its relation to material, energy and information. The thematic research paper by means of a literature study and focused case studies analysis reflects on the consequences this evolution has on timber tectonic thinking in relation to circular economy.
The design will be informed by detailed context analysis involving in-person site visits and detailed survey of existing historic buildings by the means of photogrammetry and 3d scanning as well as analysis of broader spatial site conditions. Local material cycles will be analysed focusing on the potential of regional forestry through statistical data analysis and local manufacturing potential.

Literature and general practical preference:

The research framework is based on *Christoph Schindler's periodisation model* and builds upon recent research programmes at CINARK - *Centre for Industrialised Architecture at KADK* – and the work of *Anne Beim in the area of Ecology of Tectonics*. The understanding of rural condition is based on a detailed report from an exhibiton prepared by PROLOG for Polish pavilion at 17th Venice Biennale called *Trouble in Paradise*. Some of the key literature studied includes: *Wood Urbanism - From the Molecular to the Territorial*, *Systems in Timber Engineering & Countryside: a report*. Some of the key case studies shaping the project include: Study of local timber tectonic traditions based on *XVIII century Wine Tower and traditional barn structures* in Lubusz Region in Poland and critical analysis of some of the *Rural Revitalisation proposals by Xu Tiantian in China*. A key built design precedent is the *Centre for Alternative technology CAT in Wales*, *UK* - both in terms of concept, scale, programme, cultural and social significance.

Reflection

Relation between your graduation project, studio and your master track
My graduation project falls under the Harvest studio theme as it investigates local resource management and building traditions and the ways in which they could inform the regenerative design strategies for the chosen site in the light of circular economy principles. Driven by a fascination with tectonics of timber structures and both methods of design and manufacturing the project is rooted in architectural engineering aspects - an overall focus of the studio. By tacking a wider issue of rural planning and resource management in circular economy down to technical and cultural specificities of a chosen real location, the project deals with and combines elements across different scales and specialities characteristic for the faculty of Architecture, Urbanism and Building Sciences.

Relevance of the project
The main value of the graduation project in the larger social and scientific framework will come from an attempt to develop a model for revitalisation of rural areas in central Europe - one of the development goals and key policies highlighted by European Commission – with the aim do so through holistic architectural intervention. The rural-urban cohesion is of existential importance for the future of both communities and broader ecosystem. The countryside is often unconstrained by systems in place and therefore presents a potential for redefining the future models of social and economical value creation. Although very site-specific, the project will aim to develop a replicable methodology and guidelines for similar interventions across Europe.

The focused research objective will critically evaluate the evolving role of timber in contemporary construction industry looking at it through the lens of changing design tools and manufacturing processes and attempt to define rules for emerging tectonic language for new circular economy – a significant and urgent challenge set out by New European Bauhaus initiative. The project will result in building know-how and vision for wider implementation of renewable materials in construction - quest which can only be successful if integrated with contemporary industrialised workflows and manufacturing techniques and taking into consideration wider implications of increased timber use on global ecosystem.