WORKSHOP 2 - ASSIGNMENT

CONSTRUCTION SOLUTIONS FOR A GIVEN PROJECT

Task formulation:

The students continue to work on the projects from the first intensive course in Vienna, going deeper into the structural systems and Eurocodes, timber technology, connections, detailing of different building elements, solutions for fire protection, acoustics, durability, sustainability, and thermal insulation.

The initial phase of the workshop assignment involves conducting a comprehensive static analysis of the projects. This analysis encompasses various aspects such as explaining the structural grid, understanding the transmission of vertical and horizontal loads through primary and secondary constructions, considering the bracing concept, examining the foundation and roof system, and evaluating the spanning capabilities. Based on the findings of this assessment, the chosen timber technology was reassessed, leading, if necessary, to adjustments in architectural plans and building element dimensions.

Following this, informed decisions should be made concerning the building systems. This includes selecting roof systems (warm roof vs. cold roof) and wall systems (bar-shaped, flat components, and mixed forms). The utilization of prefabricated elements and modules, as well as constructive moisture protection, should also be considered. These decisions are to be guided by a sustainability concept that prioritizes temporary approaches, combinability, and the potential for future dismantling of the building.

The final subtask of the assignment is to develop a superstructure catalogue (details). It should outline the connections between exterior wall-roof, exterior wall-ceiling, interior wall-ceiling, plinth (exterior wall), interior wall-roof, and cantilever components. These details are to be created at a scale of 1:10 or 1:5, taking into consideration important factors such as thermal insulation (u-value) and thermal envelope, seals and thermal breaks, impact, and airborne sound insulation (Rw, Lnw), and moisture protection.

The students should elaborate the following task components:

A. Load bearing structures

Components of the analysis

- Plans with the structural grid (static system)
- Explanation of the vertical and horizontal load transfer (primary and secondary constructions, bracing concept, spanning (e.g., which roof system), foundation.
- Timber technology, connections (adjustment of architectural concept, if needed)

B. Construction system

Components of the analysis

- Assembly, joining technology, prefabrication, modularity.
- Assembly sequence from the foundation to the roof in chronological order

- Sustainability concept: temporary approach, combinability, recyclability, and deconstructability (dismantling)

- **Components:** construction system from foundation to roof
  - Roof system explanation: Warm roof vs. cold roof/ventilated structures
  - Wall system explanation: bar-shaped or flat components, mixed forms, bracing, prefabricated elements and modules, constructive moisture protection
  - Facade design with energy aspects
  - Cantilevers (construction system)

C. Building Physics

- **Superstructure catalogue (Details):**
  - **Exterior wall-roof:** detail 1:5, 1:10 (material selection, thermal envelope, constructive moisture protection, noise protection concept)
  - **Exterior wall-ceiling:** detail 1:5, 1:10 (material selection, impact sound insulation and airborne sound insulation, wet/dry screed)
  - **Interior wall-ceiling:** detail 1:5, 1:10 (material selection, wet/dry screed, impact sound insulation and airborne sound insulation)
  - **Plinth (exterior wall):** detail 1:5, 1:10 (material selection, constructive moisture protection)
  - **Interior wall-roof:** detail 1:5, 1:10 (material selection,
  - **Cantilevers:** detail 1:5, 1:10 (material selection, sealing, waterproofing and thermal separation)

Aspects to be considered:

- Thermal insulation (u-value) - thermal envelope, seals, and thermal break
- Sound insulation (Rw, Lnw) - noise control concept (impact sound insulation):
  - Interior wall-ceiling
  - Interior wall-roof
  - Exterior wall-ceiling
  - Plinth (exterior wall)
  - Exterior wall-roof
- Constructive moisture protection
- Concept node/connection details (sound insulation / structural engineering)
- Separating components between utilization units

Type of assessment: Group work (international teams, group of 6 students)

Prerequisite: Course 1

Learning materials: Course 2 and Course 3

Number of hours: 50h

Learning Outcome: The learning outcome of the assignment is the students' in-depth understanding of the physical and constructive properties of timber. They deepen their competency by effectively incorporating concepts related to sound, heat, fire, and

moisture protection into their projects and successfully integrating these aspects into the detailed construction plans.

Applied during: O4 intensive course in Cracow, Poland (Mai 2022, Host University: CUT)

Riga, Latvia (March 2023, Host University: RBC)