

# Reflection

A Campus for Timber Industry 4.0

Studio: Complex Projects

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## **Project description**

While robotics technology and digitalization prevail in the automotive industry, the timber industry still remains rather primitive. The timber industry is lagging behind in the era of Industry 4.0. However, in the foreseeable future, the demand for wood products will increase significantly in order to achieve carbon neutrality. Recognizing the urgency of modernizing the timber industry, this graduation project explores new modes of timber technology education through design. Aiming to bridge research and practice in the timber industry, I raise the question – how to inject how to inject classrooms into future factories.

The design is a carpentry school in Berlin that houses pioneering small carpentry ateliers, a timber technology lab, a sawmill, and a woodworking vocational training center under the same roof, creating a campus that integrates traditional craftsmanship and advanced technology.

## **What is the relation between your graduation project topic, your master track, and your master program?**

The motivation for conceiving a carpentry school is the awareness of the urgency of achieving 'carbon neutrality' in the construction sector, which is a central focus of the architecture track and the MSc AUBS. More specifically, it explores the architectural form shaped by the nature of the craft and the logistics of the material, which aligns with the Complex Projects Studio's interest in the complexity and functionality of large-scale buildings.

## **How did your research influence your design and how did the design influence your research?**

Research on the timber industry and Industry 4.0 forms the basis of the design. It not only results in the program composition of the design but also provokes a new spatial configuration that is different from its predecessors.

First, the study of the low transferability of innovations in timber technology suggests a shift in the responsibility of the school in the sector. The vocational training school should be both a place for imparting knowledge of long-established know-how and a place for experimenting with the latest inventions. Interpreted by the design, a spacious column-free hall with robotic installation on the ceiling becomes the key space.

Secondly, the investigation about the state-of-the-art technologies in the timber industry leads to an unusual configuration of the two main functional parts of the typology, namely, the classroom and the workshop. The case studies reveal that the vertical stacking of the

two parts is mostly used in the typology. There are also some of the cases that put the two parts in two different volumes. Both commonly adopted configuration suggests a clear distinction between the theoretical learning and craft. However, with the emergence of new digitalized modes of woodworking, the close connection between classrooms and workshops is necessary. For instance, unlike crafting a specific object which is a linear process from the classroom to the workshop, assembling a mobile robotic system requires a consistent iteration of discussion, programming, and testing, indicating an iterative crossover of classroom and workshop work. Thus, how to fuse the classrooms and workshops becomes the key design problem to be solved.

As the design phase begins, the design process leads to more detailed and exhaustive research, which in turn pragmatically frames the design. For instance, to determine the layout of the sawmill, research is conducted on different log sawing workflows. As a result, the design is subject to the spatial requirements of different types of machinery, preventing the design from falling into superficial pursuit for architectural form.

**How do you assess the value of your way of working (your approach, your used methods, used methodology)?**

Prior to the design phase, mapping and case studies were used to develop a design brief that encompassed the site, the client, and the program. This is a very pragmatic approach. On the one hand, it simulates the real architectural practice. Challenges are set by the interplay of the three parts of the design brief. On the other hand, its pragmatic nature kills criticism to a large extent. Under the guidance of the well-structured design brief, the design loses its evocative and imaginative venture.

**How do you assess the academic and societal value, scope, and implication of your graduation project, including ethical aspects?**

The project provides a design-based lens to rethink the vocational training space, which has been overlooked in architectural discourse. Unlike universities, vocational schools are often seen as functional. To some extent, the aspects of school, learning and teaching are eliminated in the typology. Admittedly, the university has more innovative activities that ultimately lead to progress in various industries. As the execution side of the chain, the vocational school should receive equal attention. In this thesis project, innovative forms of vocational training have been conceived, in which theoretical learning is fused with training to a greater extent. Meanwhile, the inclusion of the research lab could expose the trainee to more advanced ways of crafting.

As the project site is a vacant lot in an industrial area, it also sheds light on the production activity in the city and raises the discussion about production and habitat on an urban scale. The design integrates the housing with the school. By positioning the housing for students and starters on the large flat roof of the school, the connection between living and making is emphasized. The design presents a positive understanding of the industrial area in the city and embodies the potential of integrating living in an industrial context without compromise.

### **How do you assess the value of transferability of your project results?**

On the typological level, the design presents an unconventional configuration of classroom and workshop. The interlocking of the two responds to the new spatial requirements that accompany the new modes of production. In general, the digitalized method of woodworking implies a decrease in individual craftsmanship and an increase in collective effort. This does not deny the significance of knowing the way of traditional crafting, but it is meant to address the increasing importance of learning how to program the machine to do the craft and to collaborate with different specialists. The digital modes of woodworking need a space that connects the interactions between people and those between people and material. Thus, I believe that the relationship between classroom and workshop presented in this design can be inspiring for the design of future carpentry schools.

At the urban level, the design is located in a typical industrial area. It manages to resonate the student housing and some public functions with its non-living context. This raises a discourse about housing issues and the upgrading of the industrial area in the city. By transforming the viaduct into an elevated public corridor of the community, the design creates a second ground level dedicated to public activities of the inhabitants. However, due to the viaduct-based strategy, this design has limited relevance as an inspiration for the transformation of other industrial areas.