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Interview: t-lab

Stephan Birk, Jürgen Graf for t-lab
interviewed by Eva-Maria Ciesla and Hannah Strothmann

Eva-Maria Ciesla, Hannah Strothmann | *How would you describe the work of the t-lab at Campus Diemerstein? To what extent is it an intervention in architecture as a research, teaching, and practicing discipline?*

Stephan Birk, Jürgen Graf | The global construction sector contributes significantly to global greenhouse gas emissions, waste generation, raw material, and energy consumption. Driven by the question of how the great potential of wood as a carbon-binding building material can be best utilized and expanded in the context of the climate crisis, we founded the research group »t-lab – timber architecture and wood-based materials« at Rheinland-Pfälzische Technische Universität (RPTU) Kaiserslautern-Landau in 2014/15. In several research projects, we have pursued the issues of resource-efficient, circular timber construction, always with the aim of quickly putting research results into practice. In 2018, we were provided with an area for experimental test buildings in Diemerstein, in the middle of the Palatinate Forest: the t-lab Campus Diemerstein. As an initial project, we implemented a fully circular workshop and research hall in a research-design-build process. The process and the result exemplify what is important to us: The planning was carried out with students and academics, in conjunction with ongoing research. The pilot project was implemented under our own management as part of several courses with the support of a few local companies. Special tools and wood fasteners were developed with industry partners for the specialized detailed training. All decisions made followed the principle of achieving maximum circularity on different levels.

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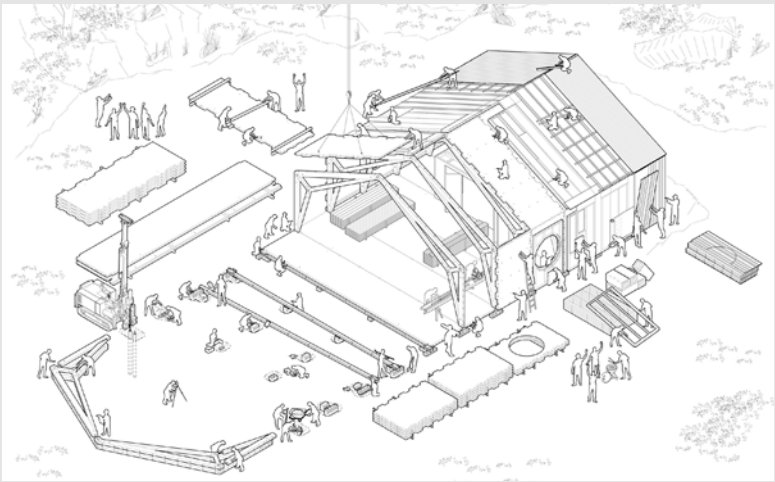
Can you tell us about some of the results of your interventions?

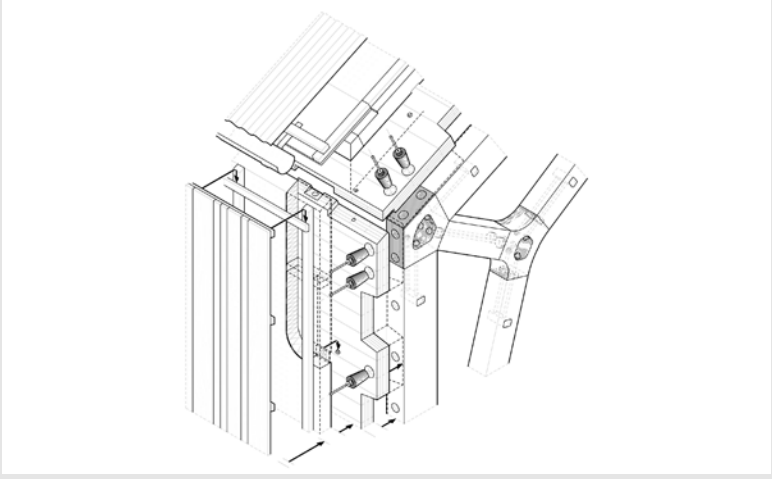
The workshop and research hall in Diemerstein demonstrates the feasibility of implementing the principles of circular construction on a 1:1 scale. In the completed research project »WANDELBARER HOLZHYBRID«, a circular spatial framework made of wood for the expansion stages of living, working, and parking, and in several subsequent publications, we have defined five levels of circularity in construction. These levels are the building, the building part, the building element, the component, and the material. The project in Diemerstein demonstrates this very clearly. The building is kept flexible, the floor plan allows for very different scenarios for use now and in the future. All parts of the main supporting structure, the floor, the outer wall, the roof etc. are designed in such a way that they can be dismantled and reused without being destroyed. This is made possible by especially developed connectors, junctions, and cone adapters made of pressed synthetic resin wood. The building part itself can also be dismantled into individual elements and components. The non-destructive separability of the layers was consistently considered during the planning process through the choice of fasteners. Traceability and accessibility are guaranteed and documentation is carried out via a digital twin. This enables simple reuse at various levels, with the aim of making optimum use of the renewable raw material, wood, and binding carbon for as long as possible. This brings us to the material level. At the end of the life of a building, structural element or component, the wood can be returned to the biological cycle, for example through thermal recycling. In our opinion, Diemerstein is a milestone on the road to transforming the construction industry, both in terms of the process (research-design-build) and the result (full circularity).

Where do you see the potential for collaboration between teachers, researchers, and students, as well as practitioners and experts from the construction industry? To what extent does this collaboration shape and influence your practice in particular?

In the context of the climate crisis, the challenges we face in the construction sector are so fundamental that we can only tackle them together, in cooperation with different stakeholders. The old recipes and approaches no longer work. If we are serious about transformation, then we must first fundamentally question our previous approach and review what was



1.
Campus Diemerstein, construction process. © t-lab.



2.
Campus Diemerstein, construction detail. © t-lab.

3.
Campus Diemerstein, interior. © Andreas Labe, Berlin.

4.
Campus Diemerstein, exterior. © Andreas Labe, Berlin.

previously considered established knowledge. This inevitably leads to a new architectural practice and to new teaching and learning.
Let's stay with the example of circular timber construction, our field of research. The renewable raw material wood can play a decisive role in the decarbonization of the construction industry, but this must not be done in isolation. The use of the raw material must be pursued in harmony with the preservation of biodiversity and changes in forestry, and ultimately also take social and economic challenges into account. Collaboration between research, teaching, planning, and construction is a matter of course, but a multidisciplinary approach is also required to think in a networked, holistic, and systems-based way. We are in a phase in which we need all ideas to bring about change. Openness and a culture of inquiry are a good basis instead of applying supposedly ready-made recipes.

What role does architectural knowledge play in your practice and interventions? Which techniques and instruments are important for your work?

According to the design theorist Horst Rittel and Melvin Webber, there are »tame problems« and »wicked problems«. Tame problems can be clearly described and there is always a solution. Wicked problems are different. Here, there is no definitive solution, no pre-determined path. Architectural design is a wicked problem per se. As architects, we have the expertise to solve such problems. By asking the right questions, generating and evaluating variants, weighing up decisions, and getting to the heart of complex relationships. We must also moderate processes within a multidisciplinary planning team and with third parties so we don't have to throw all the skills we have acquired overboard. We can use specific architectural knowledge, ingenious thinking, and inventiveness in the context of the climate crisis for the upcoming transformation, then architects will become pioneers of change! In universities, we need a culture of experimentation and collaboration to approach the wicked problems, a culture of questioning and evaluation. This applies equally to teaching and research content as well as teaching methods.

Where do you see the possibilities for transferring your ideas of intervention to everyday architectural practice of the building professions? What are the difficulties of transfer? What should change in the profession?

The basis for change in the profession is a consistent, knowledge-based willingness on the part of all those involved at various levels. The wonderful organization Architects4Future is working on this from the bottom–up. The transfer of knowledge through institutions such as the Chamber of Architects and universities, the dissemination of research findings and the implementation of exemplary pilot projects are also essential. We try to actively participate in this with projects such as Diemerstein. Our practical ideas for circular construction with wood have been published and we are working intensively on implementing the principles of the circular economy on a broad scale. Top–down initiatives are also required to further transform the construction sector. The framework for action and regulations must be revised regarding the preservation of existing buildings, the use of natural building materials, and the reuse of building parts, components, and materials. Finally, change is needed from within the profession itself. Beautiful is not (or no longer) enough in architecture. Beauty and the DIN conformity of a detail remain important architectural requirements, but others have long since been added, such as resource efficiency, circularity, and resilience.