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Crooked Wood: Finding Potential in Local Hardwood

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Abstract : A large part of the Principality of Liechtenstein is covered by forest. Three-quarters of this forest is defined as protective due to the alpine landscape of the country, which is deteriorating the quality of the wood. Nevertheless, the forest is one of the most important sources of raw material. However, out of the wood harvested annually in Liechtenstein, about two-thirds are used directly as an energy source, drastically shortening up the carbon storage cycle of wood. Furthermore, due to climate change, forest structures are changing. Predictions for the forest in Liechtenstein have stated that the spruce will mostly vanish in low altitudes, only being able to survive in the higher regions. In contrast, hardwood species will experience a rise, resulting in a more mixed forest. Thus, the main research focus will be put upon the potential of hardwood as well as prolonging the lifespan of a timber log before ending up as an energy source. An analysis of the local occurrence of hardwood species and their quality will serve as a tool to implement this knowledge upon constructional solutions. As a system that works with short spam timber and thus qualifies for the regional conditions of hardwood, reciprocal frame systems will be further investigated. These can be defined as load-bearing structures with only two beams connecting at a time, avoiding complex joining situations. Furthermore, every beam is mutually supporting. This allows the usage of short pieces of preferably massive wood. As a result, the system permits for an easy assembly but also disassembly. To promote a more circular application of wood, possible cascading scenarios of the structural solutions will be added. In a workshop at the School of Architecture of the University of Liechtenstein in the Sommer Semester 2024, prototypes in 1:1 of reciprocal frame systems using only local hardwood will help as a tool to further test the theoretical analyses.

Keywords : hardwood, cascading wood, reciprocal frames, crooked wood, forest structures, climate change
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