Research content for the short video Ever-Use Utopia 2025

"IMAGINE a FUTURE...

where we use building materials forever"

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Ever-Use: Cutting edge research on material-centered architecture empowers the ever-use of materials.

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Integrity of solid wood components: A paradigm shift from reuse to ever-use

Wood construction in 2040 will be characterized by a paradigm shift toward a comprehensive circular economy. The "ever-use" strategy for solid wood components sets new standards in sustainability and resource efficiency. Component-centered approach: The key is to view components as products rather than buildings as a whole. The focus is on the component. Each element is treated as an integral, value-preserving product with long-term added value that fulfills its function over several building cycles. Geometrically intact components are treated as resources with long-term stable value.
Buildings as temporary material banks: Planning focuses on the reusability and value retention of wooden components over several building cycles. This results in an integrity-oriented construction method. Integrated material passports document the properties and enable the reuse of components. These are dismantled without damage and retain their value—the basis of an integrity-oriented construction method.

Innovative approaches

• Comparison of IOK and RK The integrity-oriented concept (IOK) shows that 90% of the wood mass remains intact. This reduces the amount of primary wood required and maximizes recyclability. Conventional timber construction (RK) does not achieve this level of efficiency.
• Material retention-driven design The geometry and mass of the components are protected to enable versatile reuse. This is achieved through detachable connection techniques and the use of a new tectonic design.
• Maximization of wood utilization: Local solid wood products with reduced wood losses (55% wood yield for solid wood compared to 36% for glulam/cross-laminated timber) are used, which maximizes resource yield. This allows wood to be used more efficiently than in industrial glued wood products.
Ecological and economic advantages

• CO_2 reduction through lower primary wood consumption and shorter transport routes.
• Value and resource stability through long-term preservation and reuse.
• Maximized efficiency: Wood remains in circulation longer and is only used in a cascading manner at the end of its life.

This integrity-oriented construction method fundamentally transforms timber construction. Buildings are no longer viewed as static units, but rather as dynamic resource stores—and that is a key step toward a truly circular economy.

Research at the site

- ***Institute of Timber Enineering and Wood Technology, TU Graz:*** ***https://www.tugraz.at/en/institutes/lignum/home***
- ***Holzcluster Steiermark:*** ***https://www.holzcluster-steiermark.at/en/***