



VOC-emission optimized Cross Laminated Timber

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Cross laminated timber (CLT) is one of the most popular engineered wood products. The main species used for this product is spruce. To respond to the strongly increasing demand of CLT, it will become necessary to also investigate additional raw material resources for its production. Pine – having in mind its availability, mechanical properties and ability to grow even in regions with poor growth conditions – could offer a high potential to serve as a new material for CLT in the future.

The first phase of the study comprises the characterization and quantitative evaluation of VOC emissions from spruce and pine in order to draw conclusions about the variability of VOC emissions. A comparison of kiln-dried and green wood provided a sound basis for further investigations. Furthermore, different CLT variants were tested in order to compare their emission levels.

The second phase covers the optimization of the CLT manufacturing process regarding VOC emissions. Based on findings from the first phase, process parameters such as drying and gluing, as well as storage time were modified.

In the final project phase, long-term tests in model rooms constructed of different types of CLT are being carried out, enabling evaluate the influence of various building materials regarding indoor air quality in reality-close scenarios.

Results showed a significant influence of drying temperature and drying time on VOC-emission from pine. Additionally, the gluing step in CLT production as well as a combination of wood species (pine, spruce) used, resulted in a considerable VOC-reduction in the final product.

Keywords: cross-laminated timber, process parameters, VOC, pine wood, model room, indoor air quality