



Out-of-Plane Tensile Properties of Cross Laminated Timber (CLT)

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Glulam (Glue-Laminated Timber)

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Summary:

A systematic investigation is still lacking for tension out-of-plane in cross laminated timber (CLT), as a planar timber construction product. The objectives of the present study are the determination of the tensile properties of CLT made of Norway spruce, the identification of essential product-specific influencing parameters and a comparative analysis with glulam. For this purpose, seven test series were defined, which allowed the determination of the tensile properties on board segments and thereof produced glulam and CLT specimens by varying the number of layers, layer orientation and number of elements within a layer. The orthogonal laminated structure of CLT led to between 50% and 70% higher tensile properties out-of-plane, which is explained by the different stress distribution compared to glulam; the regulation of 30% higher properties than for glulam is suggested. In addition, the lognormal distribution turned out to be a more representative distribution model for characterizing the tensile strength out-of-plane than the Weibull distribution. This was also confirmed with regard to the investigated serial and parallel system effects, in which a clearly more homogeneous behavior was found in CLT compared to glulam, which in turn can be attributed again to the different stress distributions.

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