





# Comparison of Bending Stiffness of Cross-Laminated Solid Timber Derived by Modal Analysis of Full Panels and by Bending Tests of Strip-Shaped Specimens

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## Summary:

The design of cross-laminated solid timber (CLT) as load-bearing plates is mainly governed by serviceability criteria like maximal deflection and susceptibility to vibration. Hence, predicting the respective behavior of such plates requires accurate information about their elastic properties. According to product standards, the bending stiffness of CLT has to be assessed from 4-point bending tests of strip-shaped specimens, cut from the CLT panels. By comparing elastic properties of CLT derived by means of modal analysis of full panels with the results of bending tests on 100 mm and 300 mm wide strip-shaped specimens it is shown, that by testing single 100 mm wide strip-shaped specimens bending stiffness of full panels cannot be assessed correctly, whereas single 300 mm wide strips or averages of 5 to 6 100 mm wide strip-shaped specimens lead to acceptable results. Hence, strip-shaped specimens should only be used in the course of factory quality control or when assessing the bending stiffness of parts of CLT panels used as beam-like load-bearing elements but not to derive bending stiffness of gross CLT panels. Verification by carrying out static bending tests of gross CLT panels under different loading situations showed that alternatively to tests on strip-shaped specimens or estimations with the compound theory, the overall stiffness properties of CLT can be derived directly by a modal analysis of full-size panels.

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