



Vibrational Behaviour of Cross Laminated Timber Floors in Residential Buildings

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Summary:

This paper will discuss the relevancy of different boundary conditions that relates to the dynamic behaviour of CLT floors to show the opportunities of adopting the findings for the verification of the serviceability limit state. Based on a literature research and measurements in the laboratory and in situ in different objects the evaluated boundary conditions are different static systems, supporting conditions, non-load bearing internal walls, flexible carriers, joints between CLT elements, elastomers and floor constructions. Furthermore a theoretical investigation on the low frequency behaviour of floating screeds was conducted. Abstracted from the results it can be stated that elastomers can generally be neglected in their influence on low frequency vibration modes except when the partial clamping due to the load of superimposed storeys at the supports should be taken into account. The effect of partial clamping on low frequency vibration can be calculated adequately but is lowered if elastomers are used to improve the building physics. A big influence was observed at non-load bearing internal walls as they are able to change the eigenmodes of a floor into ones with higher frequency. Overall the laboratory measurements agreed well with the analytic solutions while differences in comparison of calculations with in situ measurements rise with the complexity of the boundary conditions.

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