





## Finite Element Modeling for Vibration Transmission in a Cross Laminated Timber Structure

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### Summary:

This paper deals with a certain type of C.L.T. (Cross Laminated Timber) construction, in a residential building in Fristad, Sweden. The objective is to study impact noise transmission, at the lower frequency range (10-200 Hz), where wooden dwellings perform inefficiently, in terms of acoustic quality. The vibrational behavior of lightweight structures and specifically a multilayered floor separating two vertically adjacent bedrooms are investigated. A numerical model of the multilayered test plate, which includes sound insulation and vibration isolation layers, is developed using the Finite Element Method (F.E.M.) in commercial software. The design process, the analysis and improvement of the calculated outcome concerning accuracy and complexity are of interest. In situ vibration measurements were also performed so as to evaluate the structures dynamic behavior in reality and consequently the validity of the modelled results. The whole process from design to evaluation is discussed thoroughly, where uncertainties of the complex F.E.M. model and the approximations of the real structure are analyzed. Numerical comparisons are presented including mechanical mobility and impact noise transmission results. The overall aim is to set up a template of calculations that can be used as a prediction tool in the future by the industry and researchers.

Online Access: Free

### Resource Link

<http://hdl.handle.net/20.500.12708/172>