



A Study on the Sound Insulation Performance of Cross-laminated Timber

<https://research.thinkwood.com/en/permalink/catalogue2837>

Author: Lin, Jui-Yen
Yang, Chieh-Ting
Tsay, Yaw-Shyan

Organization: National Cheng Kung University

Editor: Savaidis, Georgios

Publisher: MDPI

Year of Publication: 2021

Format: Journal Article

Material: CLT (Cross-Laminated Timber)

Application: Walls

Topic: Acoustics and Vibration

Keywords: Transmission Loss
Acoustic Performance
Predictive Model
Numerical Simulation

Language: English

Research Status: Complete

Series: Materials

Summary:

Cross-laminated Timber (CLT) has become an emerging board material of wood construction that is strong enough to sustain a high-rise building. However, many wooden congregate housing units overseas that utilize CLT have poor sound environments because the low mass of such wood influences sound insulation performance. In this research, we explored the effect of different CLT walls on sound insulation performance and integrated applicable sound insulation simulation tools to simplify the process of designing a CLT wall structure. This research aimed at a double wall and CLT combined with a gypsum board as the research object. The sound insulation performance test was carried out in a laboratory, while the sound insulation performance of the structure was predicted through simulation tools and prediction models and then compared with the measured values to verify the applicability of the simulation tool. The CLT with a double wall and CLT with gypsum board (CLT + GB) achieved R_w of 50 dB. The numerical simulation had better prediction performance than INSUL at the double wall, while the double wall with cavity structure was close to the measured result via mass law calculation. The INSUL-predicted CLT with a gypsum board at 500 Hz~3150 Hz was close to the measured value.

Online Access: Free

Resource Link

<https://doi.org/10.3390/ma14154144>