

7. **Development of Wooden-Based Hybrid Floor for Sound Insulation**

- Study of Floor Impact Sound Reduction Measures in a Full-Scale Timber Structure Building Specimen -

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This study concerns a method for improving the heavy-weight floor impact sound insulation performance of timber flooring through the development of a high-stiffness hybrid panel consisting of carbon fiber reinforced plastic (CFRP) and wood-based materials. This panel is intended to be incorporated into the upper layer of a floating floor system.

We propose a floating floor system that mitigates the heavy-weight floor impact sound of timber flooring by distributing impact forces across the floor structure rather than them being concentrated directly at the point of impact. The panel, consisting of laminated CFRP sheets and plywood, exhibits a bending stiffness approximately seven to eight times greater than that of the upper layer of a conventional floating floor. Experimental results obtained using a full-scale timber structure building showed that the panel effectively redistributed impact forces and improved the heavy-weight floor impact sound insulation by a reduction of approximately 22 dB at 63 Hz compared to before the improvement measure. The study also found that sound measurement points must be randomly distributed to minimize any measurement bias caused by room modes.

To verify effectiveness under real-world conditions, our company plans to incorporate these panels into a floating floor system in an actual timber building.

Keywords: timber structure, floating floor system, floor impact sound, impact force