



Innovative Composite Steel-Timber Floors with Prefabricated Modular Components

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Material: CLT (Cross-Laminated Timber)
 Steel-Timber Composite

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 Design and Systems
 Mechanical Properties

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Summary:

An innovative steel-timber composite floor for use in multi-storey residential buildings is presented. The research demonstrates the potential of these steel-timber composite systems in terms of bearing capacity, stiffness and method of construction. Such engineered solutions should prove to be sustainable since they combine recyclable materials in the most effective way. The floors consist of prefabricated ultralight modular components, with a Cross-Laminated Timber (CLT) slab, joined together and to the main structural system using only bolts and screws. Two novel floor solutions are presented, along with the results of experimental tests on the flexural behaviour of their modular components. Bending tests have been performed considering two different methods of loading and constraints. Each prefabricated modular component uses a special arrangement of steel-timber connections to join a CLT panel to two customized cold-formed steel beams. Specifically, the first proposed composite system is assembled using mechanical connectors whereas the second involves the use of epoxy-based resin. In the paper, a FEM model is provided in order to extend this study to other steel-timber composite floor solutions. In addition, the paper contains the design model to be used in dimensioning the developed systems according to the state of the art of composite structures.

Online Access: Free

Resource Link

<http://eprints.whiterose.ac.uk/109977/3/Innovative%20Composite%20Steel-Timber%20Floors%20with%20Prefabricated%20Modular%20Components.pdf>