



Seismic Design of Multi-Storey Cross Laminated Timber Buildings According to Eurocode 8

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Summary:

Cross Laminated Timber (CLT) structures are nowadays increasingly used worldwide and mostly in Europe where the system originated. However, in spite of this diffusion which led to the construction of a great number of multi-storey buildings all over Europe, still Eurocodes are almost completely missing provisions for CLT designers, especially regarding the seismic design. Nevertheless, Eurocode 8 requires in most cases, due to the regularity criteria being not fulfilled for most of the buildings, the use of the modal response spectrum analysis method, i.e. the linear dynamic analysis. This method requires the correct estimation of the lateral stiffness of the building in order to accurately calculate the design seismic forces in the building, which may be significantly underestimated or overestimated depending on the size of the building and the shape of the design spectrum. This can be done by modelling each connection with different methods that are often based on available test results, which are not easily accessible by a practicing engineer. This paper provides a design approach for dynamic linear modelling of CLT structures using SAP 2000. Equations are proposed based on available design codes and literature references, and used to design a 3-storey case study building. Further provisions for the seismic design of CLT buildings which are not included in Eurocode 8 are also given. Finally, the proposed design model is also compared with the results of the shaking table tests conducted in 2006 in Japan by CNR-IVALSA on a three-storey CLT building.

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