



Racking Resistance and Ductility of CLT Shear Walls Under Horizontal and Vertical Loads

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Summary:

The determination procedure of the failure mechanism of CLT shear walls due to the failure of joints was presented in the 45th CIB-W18 meeting in Vaxjo1. It showed that the reliability based analysis based on the ultimate capacity of fasteners predicted quite well the failure process of shear walls when a rigid loading beam was applied. However, the failure process due to the failure of hold-down connectors was not very clear when the flexible loading beam was used. Therefore additional lateral loading tests were conducted by using flexible loading beam as shown in Fig.1 with different procedures to determine the failure mode. This new procedure based on the yield strength of shear plates and the ultimate capacity of hold-down connectors showed better determination of the failure mechanism of CLT shear walls without conspicuous slips between CLT panels.

This paper shows the racking test results of CLT shear walls with different failure modes. The failure modes of shear walls were designed by using reliability analysis considering the failure of the hold down connections at the bottom end of shear wall and that of the joints connecting two CLT panels at the centre of the wall. It was shown that the design of joints with the yield capacity P_y for the central joints SP and the ultimate capacity P_u for the hold down connection HD (Mode III) determined well the precedence of HD failure without slips in SP and showed high capacity, while Modes I and II failure showed higher ductility than Mode III failure.

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