



Planar Shear and Bending Properties of Hybrid CLT Fabricated with Lumber and LVL

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Author: Wang, Zhiqiang
Fu, Hongmei
Gong, Meng
Luo, Jiayan
Dong, Weiqun
Wang, Ting
Chui, Ying Hei

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Summary:

Planar (rolling) shear properties in cross laminated timber (CLT) is an important factor that should be considered for CLT structural components with short span or openings. The planar shear properties of SPF (Spruce-pine-fir) dimension lumber and laminated veneer lumber (LVL) were measured using a modified approach in this study. The failure modes in planar shear tests were investigated by visual inspection and optical microscope. Hybrid CLT (HCLT) was fabricated using lumber and/or LVL, and its bending properties (in major strength direction) were evaluated. It was found that SPF had higher planar shear strength and modulus than LVL. The failure mode of HCLT with LVL as cross layer in planar shear test was shear failure along the glue line direction, however, the typical failure modes of HCLT with SPF as cross layer in planar shear test included rolling shear failure along the growth ring direction, shear failure along the wood ray direction and shear failure along glue line direction. The bending properties of the generic CLT had been improved by using LVL as parallel layers and been reduced by using LVL as cross layer. The planar shear failure of cross layer in the zone between loading point and support point was the typical failure mode of CLT and HCLT in bending test.

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