



Failure Analysis of CLT Shear Walls with Opening Subjected to Horizontal and Vertical Loads

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Author: Yasumura, Motoi
Kobayashi, Kenji
Okabe, Minoru

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Summary:

CLT wall panels having an opening were subjected to horizontal loading and the failure process of CLT around the opening was compared with the simulation by Finite Element Method. Three types of CLT wall panels of 3500mm length and 2700mm height had an opening of 1500mm length and 900mm to 2000mm height at the center of the wall panel. During the racking test of wall panel cracks appeared at the corner of the opening. The wall panel was modelled with three models. One included a single orthotropic plane element calculated from the mechanical properties parallel and perpendicular direction of lamina layout (Model I). Another included two orthotropic plane elements crossed each other and connected at each nodal point based on the mechanical property of lamina composing the panel (Model II). The third model included laminae of 30-by 120mm cross section arranged vertical and horizontal directions (Model III). The simulation by each model predicted comparatively well the initial shear stiffness of CLT wall panels and the initiation of cracks at the corner of opening.

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