

Study on Utilization of LVL Sengon (*Paraserianthes falcataria*) for Three-Hinged Gable Frame Structures

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Abstract

This study focuses on the utilization of non-prismatic LVL members of wood species Sengon (*Paraserianthes falcataria*) for three-hinged gable frame structures. This wood species matures in 6 to 8 years, and the innovative application as LVL product for these structures is evaluated. A full-scale model of a beam-column connection is produced and tested to validate the moment-rotation response predicted by the numerical study using ABAQUS. The FEM results showed a linear-elastic moment-rotation curve response up to a joint rotation of 0.015 radians which is in very good agreement with the experiment. This validated FE model for the beam-column joint was further utilized to generate predictions for the moment-rotation relation using different bolt diameters and configurations. The last part of this study presents an evaluation of the maximum load bearing capacity of three-hinged gable frame timber structures considering a rigid and semi-rigid beam-column joint model. If the load carrying capacity is governed by the yielding of the bolt, the gable frame structure with the rigid beam-column joint overestimates the load bearing capacity by 17% to 25%.

Keywords: bolted connection, finite element model, gable frame, LVL *Paraserianthes falcataria*

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