

## PROPOSAL OF DESIGN STRENGTH FOR GLUE-LAMINATED TIMBER BEAMS WITH A CIRCULAR THROUGH-HOLE

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In the present, the design of timber beams with a circular through-hole is impossible. Because there are no guidance and no standard for the design of timber beams with a through-hole. In addition, several studies on the strength estimation of a timber beam with a through-hole have been reported, but the practical design equation is not shown.

The biggest achievement of this article is suggestion of the practical design equation of the strength of glue-laminated timber beams with a circular through-hole. The proposed equation is simple, easy and superior. The strength is calculated by the diameter of the hole, the beam height and strength of the beam without hole. In addition, the calculated strength is always safer than the strength of experiment. This proposed equation is based on the evaluation method of a new idea that the strength of timber beam with a hole is decided at the time of crack outbreak on a surface of the hole. This new idea came out of a result of a large number of experiments and analyses.

This article contributes a lot for the establishment of a rational design method for the timber beams.