Load-Carrying Capacity of Joints with Dowel-Type Fasteners and Interlayer

by

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Summary

The design rules for joints with dowel-type fasteners loaded perpendicular to their axis in the German design code DIN 1052 do not take into account an interlayer or a distance between the members to be connected although this may significantly influence the load-carrying capacity of the joint.

One example of a connection with an interlayer is a joist hanger attached at a shear wall. In this case, the load is transferred from the steel plate through the wood-based panel into the ribs. In these cases not considered by the design rules of DIN 1052 the structural engineers and the building authorities are uncertain about the joint's load-carrying capacity.

Although Eurocode 5 also does not consider interlayers or distances between members, the load-carrying capacity of timber-to-timber- or steel-to-timber-joints with an interlayer may be derived on the basis of the theory of Johansen which forms the basis of the design rules for dowel-type fasteners in Eurocode 5. A condition for this is the knowledge of the embedding strength of the different materials and the moment capacity of the dowel-type fasteners.

Within this research project the load-carrying capacity of single-shear timber-to-timber- and steel-to-timber-joints with an interlayer were derived according to the theory of Johansen. The theoretical values were verified by tests.