

# **Design guideline for Rounded Dovetail Connections**

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A guideline for the design of Rounded Dovetail Connections (RDC) is presented. RDC are a versatile connection concept with a complex load transfer mechanism governed by its distinct geometric features. Significant developments of wood processing machines over the last decade made the cost efficient production of RDC possible and created great potential for their use in timber construction. A number of experimental studies on the RDC provided valuable insight into their structural performance which was found to be superior to end-notched lap joints. In consequence RDC are increasing in popularity despite the lack of knowledge of their structural performance, and thus making a specific design guideline based on reliable data necessary to expand their use in residential and non residential construction.

A previous design recommendation is discussed and a new design guideline based on results from a research project at the University of British Columbia (UBC) is proposed. A FEM model that includes geometrical parameters, such as the dimensions of the timbers and the contact between them, and physical parameters, such as mechanical properties of the timber, applied boundary conditions and external loads, was used to analyse the structural performance of RDC. Varying the model parameters within a realistic range, it was possible to fit the load deformation curves of experimental tests carried out at UBC. The validation of the model with further experimental tests showed that the model is reliable in predicting load displacement behaviour and can therefore be used together with a proposed failure criterion to predict failure loads.

The guideline has immediate application for the design of RDC. It was used to design RDC connections with previously not tested timber dimensions and connection geometries and to predict their capacity. Further experimental tests validated the predictions and showed that the proposed design guideline is suitable for a variety of applications in residential and non-residential timber structures and provides the engineering community with a new tool.

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