

Abstract

Commercial construction has witnessed a new enthusiasm in the use of timber as primary structural material. Engineered wood products such as glued-laminated timber and cross-laminated timber (CLT) play an important part in this development. These products allow wood construction to reach new heights. However, certain gaps in knowledge need to be filled to attain the full potential of wood construction, especially with regards to connections. First, current equations for dowel embedment strength and withdrawal resistance of fasteners in sawn timber and glued-laminated timber are deficient. Secondly, no design methods are provided for dowel embedment strength or withdrawal resistance of fasteners in cross-laminated timber in the 2009 edition of Canadian standard for engineering design in wood CSA O86-09 (2009). For these reasons, the goals of the research project are established in three main objectives:

- Develop a design equation for withdrawal resistance for threaded fasteners in sawn timber and glued-laminated timber;
- Evaluate the performance of dowel embedment equations for sawn timber and glued-laminated timber from different international standards, and determine the influence of variables on their accuracy;
- Develop equations for dowel embedment strength and withdrawal resistance of fasteners in cross-laminated timber.

After the compilation of results and analysis of withdrawal and embedment tests with threaded fasteners on sawn timber, glued-laminated and cross-laminated timber, the most accurate design models for each product were proposed. Each proposal includes an impact study showing the influence of the proposed design models, in case of adoption in the next edition of the CSA O86 standard.