Mechanical Characterization of an Innovative Connection System for CLT Structures

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Year of Publication: 2016
Format: Conference Paper
Material: CLT (Cross-Laminated Timber)
Topic: Connections
Mechanical Properties
Keywords: Self-Tapping Screws
Monotonic Tests
X-RAD
Conference: World Conference on Timber Engineering
Research Status: Complete
Notes: August 22-25, 2016, Vienna, Austria
p. 3581-3590

Summary:

This paper presents the numerical-experimental analysis of an innovative connector for CLT structures. The connection system, named X-RAD, has generated a new approach to CLT constructions, characterized by precision and effectiveness. Thanks to the possibility of assembling the X-RAD connectors directly within the factory, the CLT panels can be lifted during the production phases, transported to the construction site and assembled by the use of a sole element represented by the steel elements placed at the corners of the different panels. The X-RAD components in fact are meant to be pre-assembled in the factory by using all-threaded self-tapping screws, so that the system could act as a lifting point for the positioning operations. Several experimental tests are presented and analysed: tests on screws and monotonic tests on different load configurations. The test outcome lead to the mechanical characterization of the connector. X-RAD has been studied also with an analytical approach: the different load configurations have been solved “at limit” condition by the use of equilibrium. The experimental and analytical approach permitted to define respectively the experimental and the analytical capacity domains. Finally a method to verify X-RAD loaded by a generic external load is proposed.

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