



Cross-Laminated Timber Fasteners Solutions for Tall Wood Buildings

<https://research.thinkwood.com/en/permalink/catalogue2197>

Organization: TallWood Design Institute
 Country of: United States
 Publication:
 Material: CLT (Cross-Laminated Timber)
 Application: Floors
 Shear Walls
 Walls
 Topic: Seismic
 Connections
 Keywords: Wall-to-Floor
 Wall-to-Wall
 Wall-to-Foundation
 Strength Properties
 Screw Connectors
 Research Status: In Progress
 Notes: Project contact is Arijit Sinha at Oregon State University

Summary:

Constructing buildings with CLT requires development of novel panel attachment methods and mechanisms. Architects and engineers need to know the engineering strength properties of connected panels, especially in an earthquake prone area. This project will improve knowledge of three types of wall panel connections: wall-to-floor, wall-to-wall, and wall-to-foundation. Testing will determine the strength properties of metal connectors applied with different types and sizes of screw fasteners. The data will be used to develop a modeling tool that engineers can use when designing multi-story buildings to be constructed with CLT panels.



Cyclic Response of Insulated Steel Angle Brackets Used for Cross-Laminated Timber Connections

<https://research.thinkwood.com/en/permalink/catalogue2765>

Author: Kržan, Meta
 Azinovic, Boris
 Publisher: Springer
 Year of Publication: 2021
 Format: Journal Article
 Material: CLT (Cross-Laminated Timber)

Application: Walls
Floors

Topic: Seismic
Acoustics and Vibration
Connections

Keywords: Angle Bracket
Sound Insulation
Insulation
Monotonic Test
Cyclic Tests
Wall-to-Floor
Stiffness
Load Bearing Capacity
Shear
Tensile

Language: English

Research Status: Complete

Series: European Journal of Wood and Wood Products

Summary:

In cross-laminated timber (CLT) buildings, in order to reduce the disturbing transmission of sound over the flanking parts, special insulation layers are used between the CLT walls and slabs, together with insulated angle-bracket connections. However, the influence of such CLT connections and insulation layers on the seismic resistance of CLT structures has not yet been studied. In this paper, experimental investigation on CLT panels installed on insulation bedding and fastened to the CLT floor using an innovative, insulated, steel angle bracket, are presented. The novelty of the investigated angle-bracket connection is, in addition to the sound insulation, its resistance to both shear as well as uplift forces as it is intended to be used instead of traditional angle brackets and hold-down connections to simplify the construction. Therefore, monotonic and cyclic tests on the CLT wall-to-floor connections were performed in shear and tensile/compressive load direction. Specimens with and without insulation under the angle bracket and between the CLT panels were studied and compared. Tests of insulated specimens have proved that the insulation has a marginal influence on the load-bearing capacity; however, it significantly influences the stiffness characteristics. In general, the experiments have shown that the connection could also be used for seismic resistant CLT structures, although some minor improvements should be made.

Online Access: Free

Resource Link

<https://doi.org/10.1007/s00107-020-01643-5>



Elevated Temperature Effects on the Shear Performance of a Cross-Laminated Timber (CLT) Wall-to-Floor Bracket Connection

<https://research.thinkwood.com/en/permalink/catalogue2106>

Author: Mahr, Kolton
Organization: Oregon State University
Year of Publication: 2019
Country of Publication: United States
Format: Thesis
Material: CLT (Cross-Laminated Timber)
Application: Walls
Floors
Topic: Fire
Connections
Mechanical Properties
Keywords: Fire Performance
Cyclic Shear Tests
Wall-to-Floor
Brackets
Thermal Degradation
Strength
Elastic Stiffness
Model
Temperature
Language: English
Research Status: Complete
Online Access: Free

Resource Link

https://ir.library.oregonstate.edu/concern/graduate_thesis_or_dissertations/4f16c850q



Hysteretic Behaviour of Metal Connectors for Hybrid (High- and Low-Grade Mixed Species) Cross Laminated Timber

<https://research.thinkwood.com/en/permalink/catalogue1659>

Author: Mahdavifar, Vahid
Barbosa, André
Sinha, Arijit
Muszynski, Lech
Gupta, Rakesh
Year of Publication: 2016
Country of Publication: Austria
Publication:

Format: Conference Paper
Material: CLT (Cross-Laminated Timber)
Application: Walls
Floors
Topic: Mechanical Properties
Connections
Keywords: Cyclic Loading
Wall-to-Floor
Language: English
Conference: World Conference on Timber Engineering
Research Status: Complete
Notes: August 22-25, 2016, Vienna, Austria
p. 3591-3598

Summary:

Cross-laminated timber (CLT) is a prefabricated solid engineered wood product made of at least three orthogonally bonded layers of solid-sawn lumber that are laminated by gluing longitudinal and transverse layers with structural adhesives to form a solid panel. Previous studies have shown that the CLT buildings can perform well in seismic loading and are recognized as the essential role of connector performance in structural design, modelling, and analysis of CLT buildings. When CLT is composed of high-grade/high-density layers for the outer lamellas and low-grade/lowdensity for the core of the panels, the CLT panels are herein designated as hybrid CLT panels as opposed to conventional CLT panels that are built using one lumber type for both outer and core lamellas. This paper presents results of a testing program developed to estimate the cyclic performance of CLT connectors applied on hybrid CLT layups. Two connectors are selected, which can be used in wall-to-floor connections. These are readily available in the North American market. Characterization of the performance of connectors is done in two perpendicular directions under a modified CUREE cyclic loading protocol. Depending on the mode of failure, in some cases, testing results indicate that when the nails or screws penetrate the low-grade/low-density core lumber, a statistically significant difference is obtained between hybrid and conventional layups. However, in other cases, due to damage in the face layer or in the connection, force-displacement results for conventional and hybrid CLT layups were not statistically significant.

Online Access: Free

Resource Link

<http://hdl.handle.net/20.500.12708/172> 



Mechanical Experimental Study on Tensile Bolted Connections of Crosslaminated Timber

<https://research.thinkwood.com/en/permalink/catalogue2450>

Author: Su, Chenxiao
Xiong, Haibei

Publisher: Tech Science Press

Year of Publication: 2020

Country of Publication: United States

Format: Journal Article

Material: CLT (Cross-Laminated Timber)

Application: Walls
Floors

Topic: Connections
Mechanical Properties

Keywords: Monotonic Loading
Cyclic Loading
Deformation
Failure Modes
Wall-to-Wall
Wall-to-Floor
Bolted Connection
Load-Slip
Bearing Capacity
Yielding Point
Stiffness
Ductility

Language: English

Research Status: Complete

Series: Structural Durability & Health Monitoring

Online Access: Free

Resource Link

<http://doi.org/10.32604/sdhm.2020.08221>



Modelling the Mechanical Behaviour of Typical Wall-to-Floor Connection Systems for Cross-Laminated Timber Structures

<https://research.thinkwood.com/en/permalink/catalogue1302>

Author: Izzi, Matteo
Polastri, Andrea
Fragiacomo, Massimo

Publisher: ScienceDirect

Year of Publication: 2018

Country of Publication: Netherlands

Format: Journal Article

Material: CLT (Cross-Laminated Timber)

Topic: Connections
Mechanical Properties

Keywords: Numerical Model
Wall-to-Floor
Joints
Shear Tests
Tension Tests
Failure Mechanism
Lateral Loads
Axial Loads
Steel-to-Timber

Language: English

Research Status: Complete

Series: Engineering Structures

Online Access: Free

Resource Link

https://www.researchgate.net/profile/Matteo_Izzi/publication/323342651_Modelling_the_mechanical_behaviour_of_typical_wall-to-floor_connection_systems_for_cross-laminated_timber_structures/links/5a9053b30f7e9ba4296b9708/Modelling-the-mechanical-behaviour-of-typical-wall-to-floor-connection-systems-for-cross-laminated-timber-structures.pdf



Structural Redundancy in Cross Laminated Timber Buildings

<https://research.thinkwood.com/en/permalink/catalogue1785>

Author: Lukacs, Ildiko
Björnfot, Anders
Tsalkatidis, Themistoklis
Tomasi, Roberto

Year of Publication: 2016

Country of Publication: Austria

Format: Conference Paper

Material: CLT (Cross-Laminated Timber)

Application: Shear Walls

Topic: Connections
Mechanical Properties

Keywords: Wall-to-Floor
Stiffness
Finite Element Model
Horizontal Loads
Vertical Loads

Language: English

Conference: World Conference on Timber Engineering

Research Status: Complete

Notes: August 22-25, 2016, Vienna, Austria
p. 5811-5818

Summary:

In high timber structures, cross-laminated timber panels are common structural elements. The wall and floor panels are typically connected with steel plates, angle brackets, hold-downs, and screws. Based on analytical research, it seems that panel-to-panel connections give additional stiffness due to structural redundancies resulting from...

Online Access: Free

Resource Link

<http://hdl.handle.net/20.500.12708/172> [↗](#)