

MASS TIMBER CONNECTORS

Connectors join mass timber elements together with joinery or mechanical connections. The available structural benefits of individual mass timber elements depend on how well the connectors transfer load.

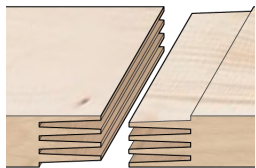
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About Connections

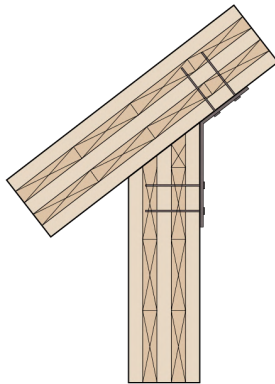
Mass timber products are engineered and manufactured from small elements of wood using a variety of methods and materials. Traditional joinery methods – such as finger joints – use cuts made in timber elements to securely fit and laminate them together [1].

In mass timber, traditional joinery is often used within elements comprising a product while connections between products are mechanical. Lamellae (boards) in CLT are commonly finger jointed (see below) to the correct length before being glued and/or laminated and then trimmed to size [2].

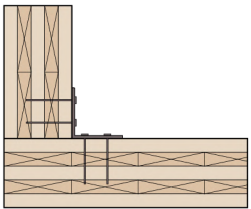
Mechanical connections use additional tools to join the timber elements. These include metal screws, bolts, nails, and occasionally, split rings, shear plates, and rivets [1]. Proprietary connections are also available depending on the manufacturer [1]. Examples of CLT connections using screws and metal brackets are shown below.



Finger Joint



CLT Wall to CLT Roof [2]



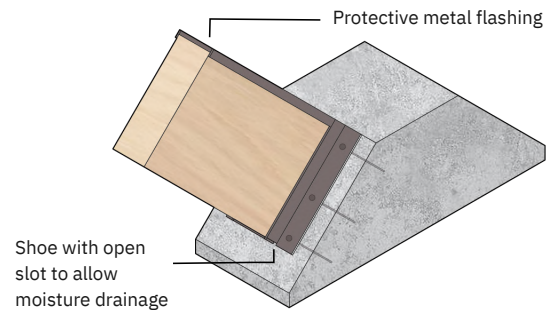
CLT Wall to CLT Floor [2]

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Things to Consider

Manufacturing and CNC time varies by the connection design and manufacturer. No design is optimal for all manufacturers; each has their own optimum.

Proper connection design is essential for strength of mass timber elements. Strength can be affected by the *group effect* of fasteners [3]. Durability can be extended by protecting wood grain from moisture. Exterior applications for example, would use with end caps and flashing [4,5]. The direction of the grain and the shrinkage of wood as it dries over time must also be considered in connection detailing [4,6].



Glulam column to base connection with consideration for managing moisture. Based on a diagram by the American Wood Council, pg 87 [4].

Resources

Connection requirements vary by the joint type (ex. wall to floor, wall to ceiling) and the type of mass timber product (ex. CLT, Glulam) [1]. To find the structural requirements of a certain application, one can refer to

CSA 086:19 Engineered Design in Wood [7]
Canadian CLT Handbook (2019) [2]
Wood Design Manual (2017) [8]

Manufacturers will also offer specifications on field drilling to help ensure connections in mass timber products do not alter them in ways that damage their strength.

References and Further Reading

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6. Mohammad, M. (2019). Connections in cross-laminated timber buildings. In E. Karacabeyli & S. Gagnon (Ed.), *Canadian CLT handbook*. FPInnovations. <https://web.fpinnovations.ca/clt/>
7. CSA Group. (2019). *Engineering design in wood* (CSA 086:19).
8. *Wood Design Manual 2017*. (2018). Canadian Wood Council.

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