XLAM GENERAL NOTES AND TYPICAL DETAILS FOR STRUCTURAL ENGINEERING DOCUMENTS (AUSTRALIA)

Version 1.0

Date Modified: 07.09.2018

Limitations: These general notes and typical details do not take into account project specific details, and have been provided by XLam as a guidance document only. These notes and details are intended to be used in conjunction with the design and documentation of XLam CLT panels only. The project structural engineer needs to take appropriate steps to ensure these details are suitable for their project, and carry out calculations before incorporating on their documentation. If required, .doc version of these notes and .dwg or .rvt version of these details can be provided on request, subject to the same limitations.

What is DFMA?

DFMA ("Design for Manufacture and Assembly") is a universal term, but in the case of XLam CLT, the word "assembly" can be used interchangeably with "installation", "Design for Manufacture and Installation".

The architect, structural engineer and other consultants have significant influence on the manufacturing and installation complexity of a given building through the design process. For CLT, the most significant factor that influences DFMA is the detailing of connections, and XLam realise that it is critical to educate our clients in how they can best economise their building cost by understanding how they can carry out design with DFMA in mind.

Appropriate consideration of DFMA will reduce the complexity and cost of a project, and the risk and delivery timeframe onsite.

Why have these details and general notes been prepared?

These structural engineering typical details have been prepared to provide clients and their consultants with typical details that have been scrutinised by our team for DFMA from both a manufacturing and installation point of view.

A significant cost in the manufacturing process of CLT is in the CNC machining time, and this document is intended to provide details that are efficient to machine whilst also considering the installation complexity.

We encourage clients to consider these details, as deviation to more complex details can increase costs significantly. For example, detail B1 is a 50mm wide half lap joint. If an 80mm wide half lap joint was specified in a CL3/105 panel, the router would need to pass along the panel twice instead of once and hence it would almost double the CNC machining time for this connection, and hence increase costs significantly.

It should be noted that the project structural engineer is responsible for carrying out the required calculations to verify the capacity of these connections for the specific project, and to consider durability and robustness before specifying these details on their drawings.

Useful Links:

XLam Australia	www.XLam.com.au
XLam NZ	www.XLam.co.nz
Rothoblaas	www.rothoblaas.com/
Spax	www.spaxpacific.com/
Simpson Strong Tie	www.strongtie.com.au/

General Notes:

These general notes are intended to form a basis for the structural engineer's general notes sheet, however the structural engineer is to verify these notes for applicability to their project and modify and add to these notes as appropriate to suit their design.

1 The manufacture, supply and installation of CLT panels shall comply with Australian Standard AS1720 and the manufacturers requirements.

2 CLT panels shall be manufactured by XLam Australia Pty Ltd or XLam NZ Ltd unless noted otherwise

3 All CLT panels to be shop drawn by the manufacturer and submitted to the engineer for review prior to manufacture. The contractor is to allow appropriate review time in their program prior to fabrication commencing.

4 Outer lamellas to have a minimum young's modulus of 8000MPa. Internal lamellas to have a minimum young's modulus of 6000MPa.

5 All panels are to be non visual grade panels and untreated unless noted otherwise by the architect or structural engineer

6 Refer to architectural and structural drawings for all finishing requirements for the CLT.

7 If on-site storage is required, panels should be evenly supported clear of the ground on timber bearers placed at max 2m centres and protected from the elements on all sides. Any factory applied wrappings should be maintained until immediately prior to placement. The main contractor is responsible for the storage and protection of panels once delivered to site, and for protection of panels from weather, impact and other construction activities once erected.

8 Ponding of water on floors and roofs should be prevented. Where ponding does occur, it should be immediately broomed from the surface.

9 All panels to be supplied with a factory applied water-repellent sealer to the end grain of the panels

10 Termite protection is to be provided in accordance with AS3660

11 The contractor onsite is to refer to both the structural engineers drawings and the CLT manufacturers shop drawing during construction to inform panel setout, arrangements, connections, etc.

12 A temporary works engineer is to be engaged to provide advice on panel lifting, installation and propping.

13 All lifting fixings and equipment (lifting points and slings) to be supplied by the CLT supplier and used in accordance with relevant Australian Standards and the manufacturer's recommendations. No other lifting equipment is to be used without prior approval of the engineer

14 All penetrations and trimmed edges to be protected from moisture during construction.

15 Connections to be installed as per the engineer's drawings. No substitutions or alternative products to be used without approval by the engineer.

16 All screw fixing spacings to comply with edge spacing requirements in AS1720, or the specifications of the screw supplier as appropriate.

17 Tolerances to all connections to be coordinated at the shop drawing phase between the contractor, manufacturer and engineer. It is the contractors responsibility to ensure that all panels are set out on site in accordance with the project documentation. The contractor is to allow for timber shims to the base of walls to ensure the panels can be installed to the shop drawn tolerances.

18 CLT panels to be manufactured to the following tolerances U.N.O.:
± 2.0mm in length and width
± 4.0mm in squareness (measured along diagonal)
± 2.0mm in thickness

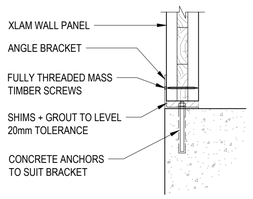
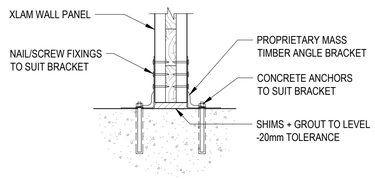
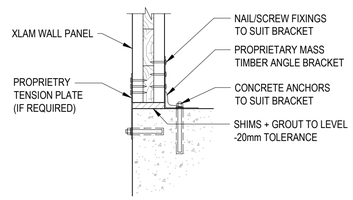
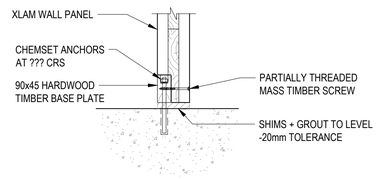
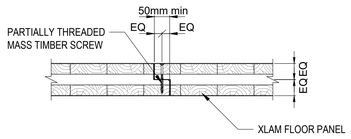
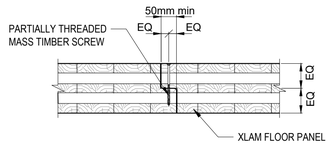
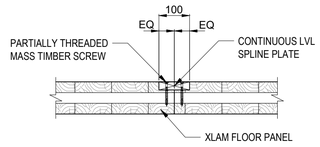
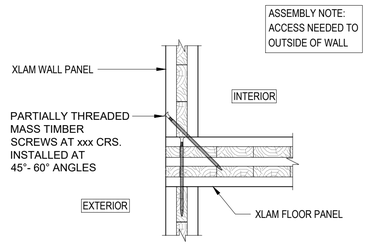
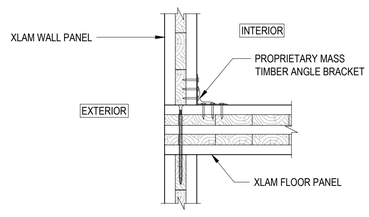
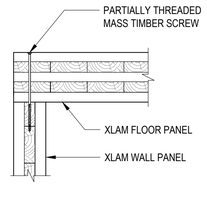
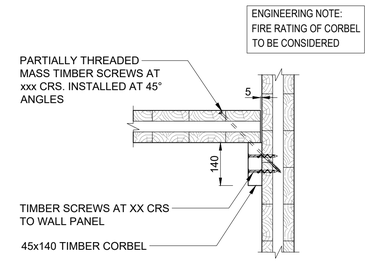
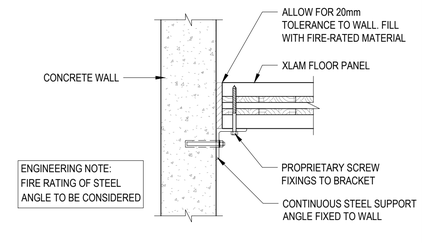
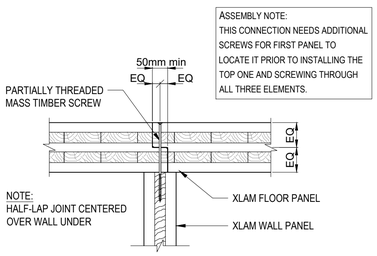
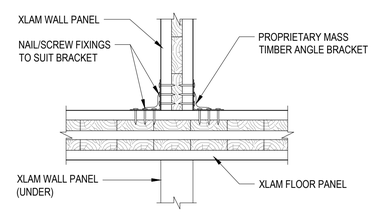
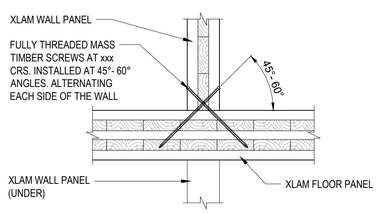
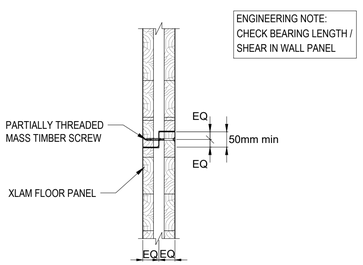
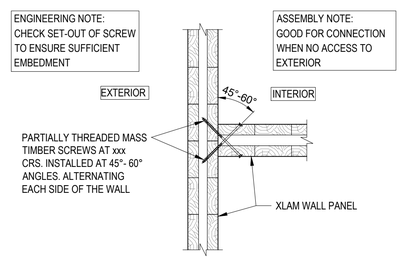
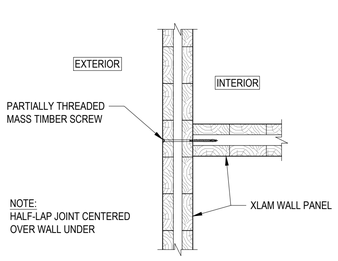
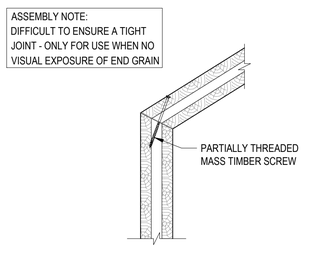
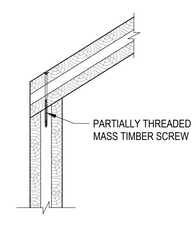
19 All reasonable efforts are to be made by the contractor to ensure that building elements connected to the CLT are constructed to tolerances as close as possible to the CLT.

20 Do not repair or patch damage to XLam CLT panels without written approval from the superintendent.

21 For all fire rating requirements and details refer to the fire engineer's report and requirements

22 All penetrations for services are to be approved by the engineer. Cutting, routing, drilling, chases or penetrations are not to be cut onsite without written approval from both XLam and the structural engineer.

23 The contractor must not rely solely on the structural engineer and architects review of shop drawings, they must conduct their own review of shop drawings to ensure they are satisfied with sequence, installation details, dimensions, setout, etc

	1	2	3	4	5
A WALL TO CONCRETE FLOOR CONNECTION	 MANUFACTURING ★★★★★ INSTALLATION ★★★ XLAM WALL TO CONCRETE FLOOR CONNECTION	 MANUFACTURING ★★★★★ INSTALLATION ★★ XLAM WALL TO CONCRETE FLOOR CONNECTION	 MANUFACTURING ★★★★★ INSTALLATION ★★ XLAM WALL TO CONCRETE FLOOR CONNECTION (AT EDGE)	 MANUFACTURING ★★★ INSTALLATION ★★★ XLAM WALL TO CONCRETE FLOOR CONNECTION (BOTTOM PLATE)	
B FLOOR TO FLOOR CONNECTION	 MANUFACTURING ★★★ INSTALLATION ★★★★★ XLAM FLOOR TO FLOOR HALF-LAP CONNECTION 3 LAYER PANEL	 MANUFACTURING ★★★ INSTALLATION ★★★★★ XLAM FLOOR TO FLOOR HALF-LAP CONNECTION 5 LAYER PANEL	 MANUFACTURING ★★★★ INSTALLATION ★★★ XLAM FLOOR TO FLOOR HALF-LAP WITH SPLINE PLATE CONNECTION		
C WALL TO FLOOR EDGE CONNECTION	 MANUFACTURING ★★★★★ INSTALLATION ★★★★★ XLAM WALL TO FLOOR CONNECTION (EDGE)	 MANUFACTURING ★★★★★ INSTALLATION ★★★ XLAM WALL TO FLOOR CONNECTION (EDGE)	 MANUFACTURING ★★★★★ INSTALLATION ★★★★★ XLAM FLOOR TO WALL CONNECTION (OVER WALL)	 MANUFACTURING ★★★★★ INSTALLATION ★★★★ XLAM FLOOR TO WALL PANEL CONNECTION (CORBEL SEAT)	 MANUFACTURING ★★★★★ INSTALLATION ★★★ XLAM FLOOR TO CONCRETE CONNECTION
D WALL TO MID-FLOOR CONNECTION	 MANUFACTURING ★★ INSTALLATION ★★★★ XLAM FLOOR TO FLOOR HALF-LAP CONNECTION (OVER WALL)	 MANUFACTURING ★★★★★ INSTALLATION ★★ XLAM WALL TO FLOOR CONNECTION (OVER WALL)	 MANUFACTURING ★★★★★ INSTALLATION ★★★★ XLAM WALL TO FLOOR CONNECTION		
E WALL TO WALL CONNECTION	 MANUFACTURING ★★★ INSTALLATION ★★★★★ XLAM WALL TO WALL HALF-LAP CONNECTION (PLAN VIEW)	 MANUFACTURING ★★★★★ INSTALLATION ★★★★ XLAM WALL TO WALL BUTT JOINT (INCLINED SCREWS) (PLAN VIEW)	 MANUFACTURING ★★★★★ INSTALLATION ★★★★★ XLAM WALL TO WALL BUTT JOINT (PLAN VIEW)	 MANUFACTURING ★★★ INSTALLATION ★★★★ ANGLED XLAM WALL TO WALL MITRE CUT CONNECTION	 MANUFACTURING ★★★ INSTALLATION ★★★★ ANGLED XLAM WALL TO WALL BUTT-JOINT CONNECTION	

TYPICAL DETAILS (AUSTRALIA)

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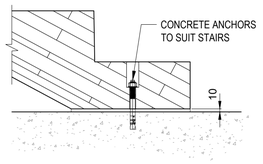
SCALE 1:10 REV 0

XLam

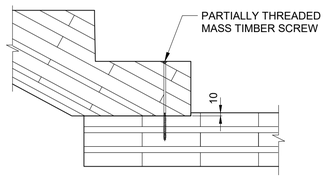
F

STAIR CONNECTIONS



MANUFACTURING ☆☆
INSTALLATION ☆☆☆

XLAM STAIRS TO CONCRETE FLOOR/SLAB CONNECTION



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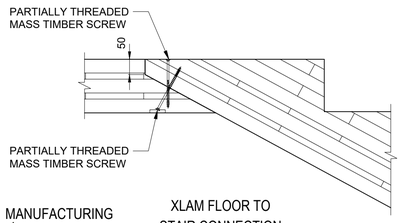
INSTALLATION ☆☆☆☆☆

XLAM STAIRS TO LANDING CONNECTION

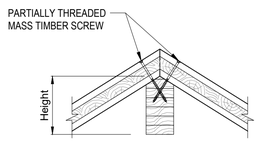


MANUFACTURING ☆
INSTALLATION ☆☆☆☆

XLAM FLOOR TO STAIR CONNECTION

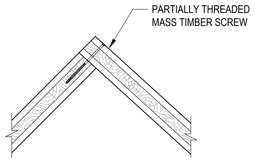
G

ROOF CONNECTIONS



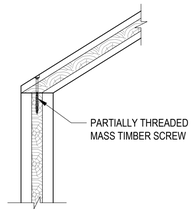
MANUFACTURING ☆☆☆
INSTALLATION ☆☆☆

XLAM ROOF TO ROOF CONNECTION (RIDGE BEAM)



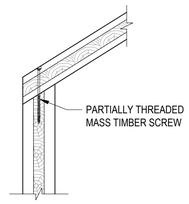
MANUFACTURING ☆☆☆☆☆
INSTALLATION ☆☆☆☆

XLAM ROOF TO ROOF CONNECTION



MANUFACTURING ☆☆☆
INSTALLATION ☆☆☆☆

XLAM WALL TO ROOF CONNECTION

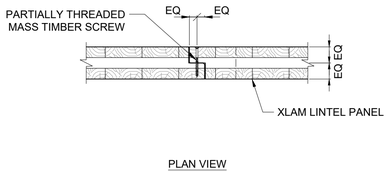


MANUFACTURING ☆☆☆
INSTALLATION ☆☆☆

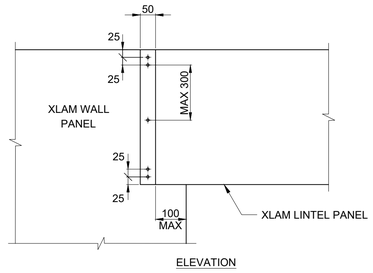
XLAM WALL TO ROOF CONNECTION

H

LINTEL CONNECTIONS



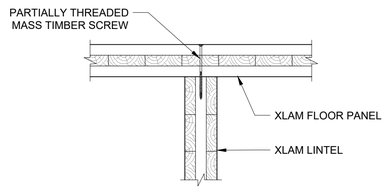
PLAN VIEW



ELEVATION

MANUFACTURING ☆☆☆
INSTALLATION ☆☆☆☆☆

XLAM LINTEL TO WALL PANEL (PARALLEL) CONNECTION

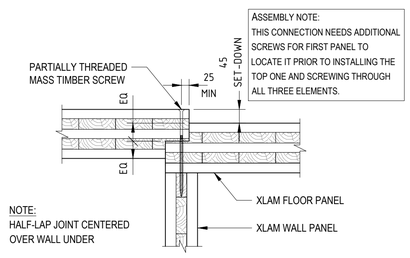


MANUFACTURING ☆☆☆☆☆
INSTALLATION ☆☆☆☆

XLAM FLOOR TO XLAM LINTEL CONNECTION (STANDARD XLAM LINTEL UNDER)

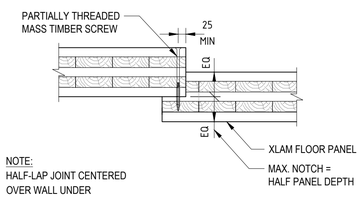
J

SET-DOWN CONNECTIONS



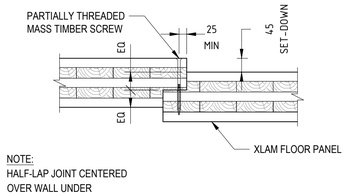
MANUFACTURING ☆☆☆
INSTALLATION ☆☆☆☆

XLAM FLOOR TO FLOOR SET-DOWN & HALF-LAP CONNECTION (OVER WALL)



MANUFACTURING ☆☆☆☆
INSTALLATION ☆☆☆☆☆

XLAM FLOOR TO FLOOR SET-DOWN & HALF-LAP CONNECTION

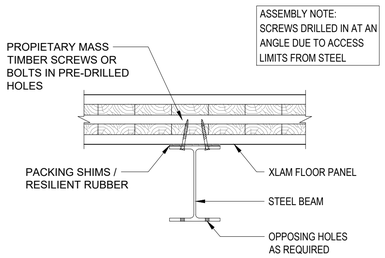


MANUFACTURING ☆☆☆
INSTALLATION ☆☆☆☆☆

XLAM FLOOR TO FLOOR SET-DOWN & HALF-LAP CONNECTION

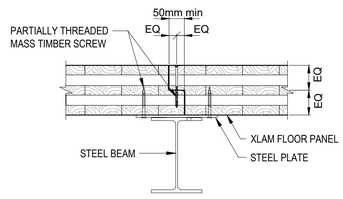
K

STEEL CONNECTIONS



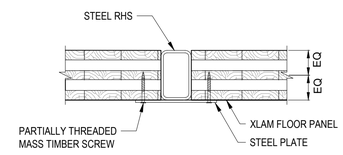
MANUFACTURING ☆☆☆☆☆
INSTALLATION ☆☆☆

XLAM FLOOR TO STEEL BEAM CONNECTION



MANUFACTURING ☆☆☆
INSTALLATION ☆☆☆☆

XLAM FLOOR TO FLOOR HALF-LAP CONNECTION



MANUFACTURING ☆☆☆☆☆
INSTALLATION ☆☆☆☆

XLAM FLOOR TO FLOOR HALF-LAP CONNECTION

TYPICAL DETAILS (AUSTRALIA)

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SCALE 1:10 REV 0

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