

Fire Laboratory

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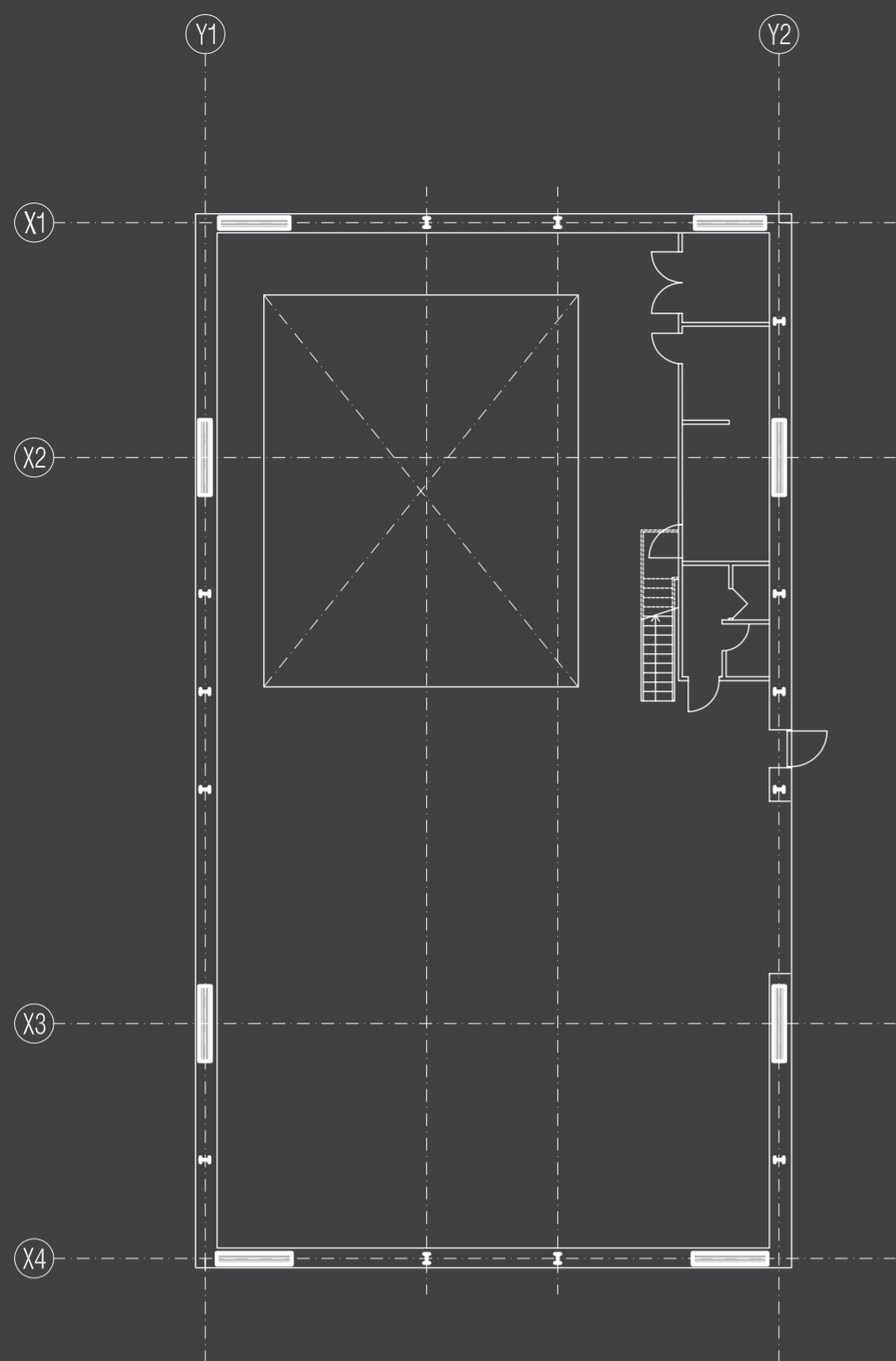
Top/ Pres-Lam walls create a large open space for the placement of fire testing equipment.

Bottom Right/ Manufactured in New Zealand from New Zealand grown Laminated Veneer Lumber; prefabrication was a key to the building's design with significant value added in New Zealand before shipping.

What better way to dispel fears regarding the performance of mass timber buildings in fire than to design your own fire laboratory in timber? This is exactly what Sumitomo Forestry Co. LTD have done with their new Fire Laboratory at Tsukuba Science City, Japan.



Sumitomo Forestry Co. LTD



A design collaboration between Tsukuba Research Institute of Sumitomo Forestry, Japan and PTL Structural Timber Consultants based in Christchurch, the building has a definite New Zealand influence using Laminated Veneer Lumber manufactured and fabricated at Nelson Pine Industries. A further Kiwi influence can be seen in the use of Pres-Lam as the structural system, invented and developed at the University of Canterbury, the system combines the use of post-tensioned steel cables with large timber members to provide resistance and robustness to the structure. This building is only the second overseas application of Pres-Lam.

The strength of Pres-Lam walls and the lightness of timber creates the large open space required for the testing hall with eight walls providing lateral and vertical support for the timber roof, all from New Zealand grown LVL. With manufacture in New Zealand for overseas construction, tolerances were required to be to the millimetre, precision that CNC machined LVL can provide. Japanese design restrictions meant that long narrow sections had to be used so the team opted to also add external reinforcing to the top wall connection; this created portal action between the walls and the roof beams, limiting deflections, a solution not used before for Pres-Lam walls.

Top Left/ The connection strength created by the Pres-Lam walls meant that the 390 m² open space was supported by only 15m of wall, 18% of the building perimeter and 1% of the total area.

Bottom/ The Tsukuba Fire Laboratory - Japan's first Pres-Lam structure provides strength with added damage avoiding seismic technology.





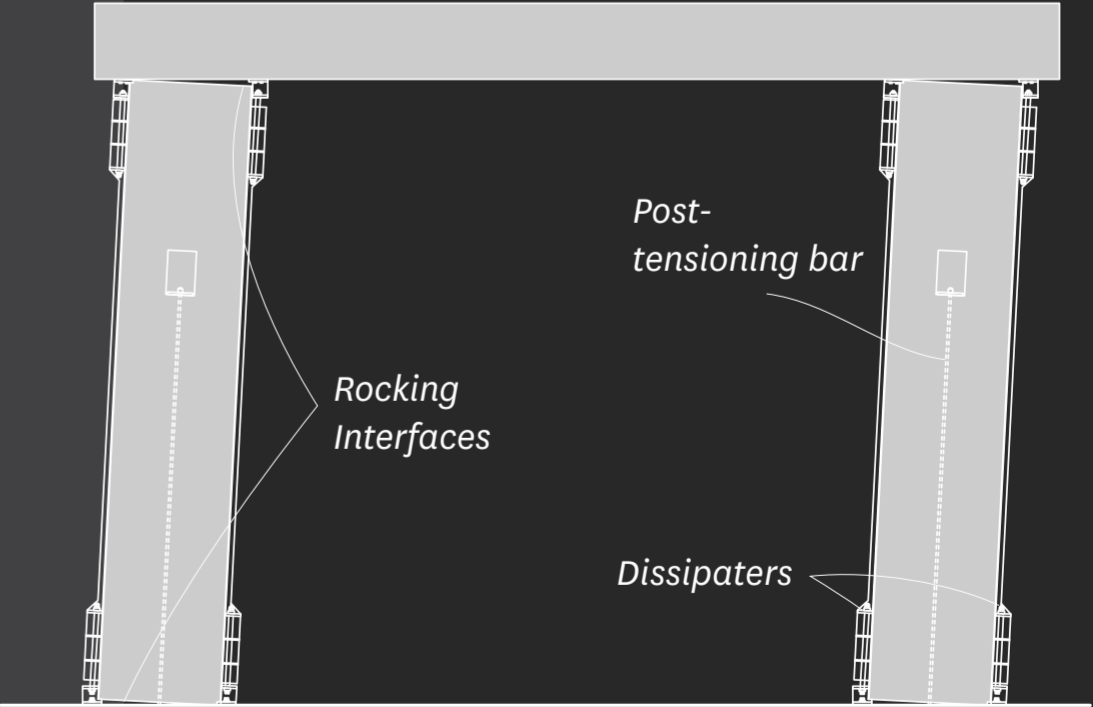
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Top Left/ Each wall and top-beam set was assembled on the ground and lifted into place. This was highly efficient and only possible due to the prefabricated nature of the Pres-Lam elements and the lightness of timber.

Top Right/ Economic to make and easy to replace, a turned down mild steel bar is encased in a tube restraint which deforms and releases energy like a car damper during an earthquake.

Bottom Left/ Viewed from the observation platform, the Fire Laboratory also contains a work space area for specimen construction and auxiliary testing.

Bottom Right/ Similar to New Zealand, Japan is a highly seismic region. Under an extreme seismic event the walls rock against their foundation limiting the seismic force the building experiences. Following the event and its aftershocks the only damage will be in the dissipative devices, which can be replaced.



Project Name: Fire Laboratory - Tsukuba Research Institute of Sumitomo Forestry
Project Location: Midorigahara Tsukuba City, Ibaraki Prefecture, Japan
Client: Sumitomo Forestry Co. Ltd.
LVL supply, manufacture and fabrication: Nelson Pine Industries, New Zealand