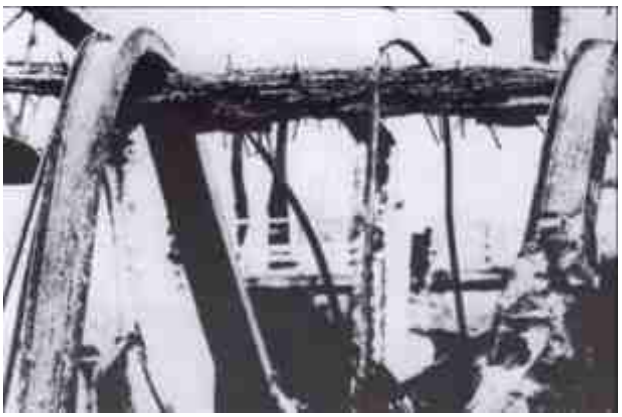
GLULAM in Fire

MOELVEN
Moelven Laminated Timber Structures

Timber is Predictable Effect on Size
The charring rate of timber exposed to fire is predictable. BS 5268: Part 4 sets out the criteria by which the strength of the residual section may be assessed following specified periods of endurance. This enables designers to ensure that the required fire resistance can be achieved.

Design Criteria Bond Strength
The load bearing capacity of whitewood Glulam beams over 70mm thick is calculated based on the residual section and stresses of 2.25 X long term dry stress. Permissible deflection (at clear span/20) is not normally relevant unless gross distortion might de-stabilise other elements of the structure.

Charring Rates
For periods of 15 to 90 minutes a charring rate of 20mm in 30 minutes is used for beams and columns with one concealed face. This rate relates to most coniferous species (except Western Red Cedar - 25mm in 30 minutes). The nominal rate for a specified range of hardwoods is 25% slower at 15mm in 30 minutes. When all faces are exposed as with columns and tension members the charring rate is increased by 25%.



Steel beams have melted and collapsed over charred Glulam beam which, despite heavy damage, remains in place.

These Glulam portal frames maintained their integrity in a magnesium-fed fire. The metal walls and roof of the building melted and collapsed

Permissible Loads
The load to be supported is "either the maximum permissible design load or the load which the member is required to support in normal service".
It has become custom to interpret this apparent ambiguity to suggest that full snow load would be unlikely under these circumstances and to reduce the imposed load by two thirds accordingly.

Effect on Size
In practice Glulam beams 90mm thick and over will usually endure a 30 minute fire without modification. Longer periods will probably lead to an increase in thickness although this may be partially offset by a reduction in depth.

Bond Strength
Glulam supplied by Moelven LTS is manufactured using adhesives which comply with class 1 of BS EN301, is not flammable and does not lose its integrity when exposed to prolonged elevated temperatures.

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