Coffee Break Training - Fire Protection Series

Building Construction: Heavy Timber Construction (Type IV)

No. FP-2013-22 May 28, 2013

Learning Objective: *The student shall be able to describe the elements that identify heavy timber construction (Type IV).*

Building codes classify different methods of construction into five "types" for the purposes of establishing requirements for size, height, fire resistance, life safety, occupancy and fire protection. (See Coffee Break Training FP-2009-45 for a summary.)

One of these categories is known as heavy timber construction (Type IV) due to its reliance on heavy solid or laminated wooden components in the structural framing. Typically, heavy timber construction buildings have noncombustible (usually masonry) exterior walls, but the model building codes allow fire-retardant-treated wood framing in exterior wall assemblies with a two-hour fire-resistance rating or less. Where a horizontal separation of 20 feet (6096 millimeters) or more is provided, wood columns and arches conforming to heavy timber sizes are permitted to be used on the weather side of exterior walls.

Concealed spaces (such as drop ceilings, roof/ceiling assemblies, floor/ceiling assemblies or other enclosed spaces where fire could hide) are not permitted.

The thick wooden columns, beams, girders and floor deck are common elements of heavy timber construction (Type IV) that is noted for its slow burn times.

For fire-resistant properties, heavy timber construction is desirable because the inherent thickness of the wooden elements resists fire impingement. Furthermore, as these thick wooden elements are exposed to flames, a surface layer of char builds up that acts like a layer of insulation and slows the burning rate.

The following table describes the **minimum** sizes of various construction elements that enable a structure to qualify as heavy timber (Type IV).

Element	in (W x D)*	mm (W x D)*
Columns (sawed or glued laminated):		
— supporting floor loads	8 x 8	203 x 203
— supporting roof and ceiling loads only	6 x 8	152 x 203
Floor framing (sawed or glued-laminated beams and girders)	6 x 10	152 x 254
Arches that spring from the floor line and support floor loads	8 x 8	203 x 203
Framed timber trusses supporting floor loads	8 x 8	203 x 203
Roof framing that springs from the floor line or from grade and does not support floor loads:		
— Lower half of the total height	6 x 8	152 x 203
— Upper half of the total height	6 x 6	152 x 152
Floors (sawed or glued-laminated planks, splined or tongue-and-groove): — 3 inches (76 mm) nominal in thickness when covered with 1-inch (25 mm) nominal dimension tongue-and-groove flooring — 0.5-inch (12.7 mm) particleboard or planks not less than 4 inches (102 mm) in width and covered with 1-inch (25 mm) nominal dimension flooring or 15/32-inch (12 mm) wood structural panel or 0.5-inch (12.7 mm) particleboard		
Roofs — sawed or glued laminated, splined or tongue-and-groove plank not less than 2 inches (51 mm) nominal in thickness — 1 1/8-inch-thick (32 mm) wood structural panel (exterior glue) or — planks not less than 3 inches (76 mm) nominal in width		
Partitions — solid wood construction formed by not less than two layers of 1-inch (25 mm) matched boards or laminated construction 4 inches (102 mm) thick or — one-hour fire-resistance-rated construction		

*(Width x Depth)

For additional information, refer to the *International Building Code*, Chapter 6, or National Fire Protection Association 5000, *Building Construction and Safety Code®*, Chapter 7.