

Residential Floor System Facts

- Floor systems with unfinished framing (unfinished basement ceilings or typical crawl spaces) will fail / collapse much faster when a fire occurs below.
- When ½” sheetrock (gypsum board) is applied, taped, and finished on the bottom surface of a floor system, damage to the floor system from fire is deterred fire for 15 minutes (According to the American Forest & Paper Association).
- PLEASE NOTE: Fire will only be deterred with ½” sheetrock IF THERE ARE ABSOLUTELY NO OPENINGS OR PENETRATIONS in the sheetrock barrier such as; recessed light fixtures, unrated access doors or panels etc.
- When 5/8” Fire Rated Sheet rock is installed, taped, and finished it can provide 40 minutes (according to the American Forest and Paper Association) of resistance to the spread of fire to the floor system. FIRE WILL ONLY BE DETERRED AT THE 5/8” SHEETROCK BARRIER AS LONG AS THERE ARE NO OPENINGS OR PENETRATIONS, such as recessed light fixtures, unrated access panels, or any other breach in the fire barrier.
- It is common knowledge that large wood framing such as post and beam frames and 1 ½” floor decking provide fire fighters more time to work in, on, and around a building than buildings built with lighter framing members.
- Homes with solid wood floor joist, and with a ¾” or 1” sub-floor and additional finish flooring, historically will burn for 30-45 minutes or longer before reaching the point of collapse. Plaster/lathe or sheetrock on the bottom surface of the floor

joist, the rate of fire spread has been longer. The time will vary depending on the thickness of plaster, penetrations, etc.

General Wood “Fire Consumption” History Notes:

Depending on the source of the fire, wood is consumed at about the same rate in each type of floor systems however the materials used in homes will vary dramatically.

- Older homes (1800s and early 1900s can be framed with heavy timber members, beams of several inches thick to full 2” thick floor joist and wall studs, with fairly slow fire consumption time.
- During the late 1940s and 1950s lumber milling manufacturers began to finish plane framing lumber from 2” nominal thickness to 1 5/8” thick, providing smooth and somewhat lighter lumber with fairly long fire consumption time.
- During the 1960s lumber milling manufacturers began to cut and plane lumber to 1 1/2” thickness in widths as noted, with somewhat reduced fire consumption time:
 - 4” lumber to 3 1/2” - wall studs, plates, and bracing
 - 6” lumber to 5 1/2” - rafters
 - 8” lumber to 7 1/2” - floor joist or rafters
 - 10” lumber to 9 1/2” - built up beams and floor joist
 - 12” lumber to 11 1/2” for floor

Engineered Floor Systems (Wood I-Beams – TJI®)

- Since the introduction of light weight engineered floor systems such as; laminated wood web and flange (TJI, also know as wood I-beams) floor systems, and wood floor trusses with metal gusset plates firemen have noticed their response time prior to collapse to have been significantly reduced. The reduced time before light weight floor system collapse is related directly to the dramatically reduced thickness of the wood web. (The wood between the top and bottom flanges which typically is a nominal 3/8” thick rather than the thicker solid wood framing systems of the past.)
- Current testing by Underwriters Laboratories in Chicago will be providing time estimates for various types of floor systems both unprotected and protected. These tests should be completed in late summer of 2008.
- Light weight engineered floor systems using laminated wood I-beams, with *laminated top and bottom flanges* and / or *laminated webs, or solid wood top and bottom flanges with laminate web or oriented strand board (OSB) webs* provide straight, flat, and squeak resistance floor systems.
- Light weight engineered floor systems using laminated wood I-beams, with *laminated top and bottom flanges* and / or *laminated webs, or solid wood top and bottom flanges with laminate web or oriented strand board (OSB) webs*: Also typically use light weight a 3/8” web of plywood or OSB.
- New light weight engineered floor systems using wood flanges and OSB webs with large openings will likely increase the rate of fire spread both due to less material and due to the potential for flame spread between joist members.