

Coming in 2021 – Wood Frame High Rise Construction

Growing, Growing, Gone

In January 2019, the International Code Council (ICC) approved a set of code changes to allow tall wood framed buildings. the 2021 IBC will include three new construction types—Type IV-A, IV-B and IV-C— which effectively will permit mass timber buildings to reach up to 18 stories (270 feet maximum height).

Over the last 10 years, there has been a growing interest and demand for taller wood-framed buildings. In the United States, such buildings have been constrained by prescriptive building code limits and concern for fire safety. Most projects were within the size limits of the current building code and were referred to as as ‘five (or six) over ones’ referring to a five (or six) story residential building over a one story concrete podium which is typically occupied by retail and parking spaces.

However, the growing interest in tall wood buildings, particularly constructed from new mass timber materials, prompted the ICC to research and approve code changes.

The two most common forms of wood timber construction are light timber framing and mass timber. Light timber framing is conventional “stick framing” in which lumber (2x4’s, 2x6’s, 2x8’s etc.) are nailed together in exterior and interior frames to enclose and support a building. Mass timber is factory made with products including glulam, cross-laminated timber (CLT), nail laminated timber (NLT), mass plywood panels (MPP), laminated veneer lumber (LVL), parallel strand lumber (PSL) and dowel laminated timber (DLT). CLT is possibly the most popular form of mass timber construction. CLT panels are made up of layers of cross bonded timber that is glued together in a press, which applies pressure over the entire surface area of the panel. CLT can be used for internal and external walls, roofs, floors and even stairs. It is normal practice for the building envelope to then be insulated and clad with other materials such as timber, brick, render or composite panels.

The code changes also include increases in non-combustible fire protection, increased sprinkler requirements, and specialty sealants at mass timber edges in fire-rated assemblies. In an unusual departure from typical prescriptive requirements, the Code also will increase Owners' Responsibility for having and maintaining an inventory of fire-rated construction for the building, including annual inspections and repairs, increased fire protection during construction, and increased noncombustible coverings on fire-rated occupancy separations.

Why the emphasis toward timber construction? Builders see it as a way to construct midrise structures faster and cheaper. City planners see a fast track that could help reduce housing shortages. Architects love its light weight and look. And some environmentalists tout its ability to combat climate change.

- Lighter construction which can reduce the costs of construction
- Reduced foundation work
- Prefabrication
- Less skilled onsite labor
- Faster construction times
- Environmental factors - Buildings constructed of wood material are said to have significantly lower carbon emissions and use less energy than those constructed using materials such as concrete. And wood is environmentally sustainable.
- Designers now will be able to challenge the norm, think outside the box, and design high-rises comprised mostly of wood.

Experts will stress that there is nothing unsafe about wood frame buildings, but experience in other countries has already shown that catastrophic fires will occur and will spread more quickly in wood frames (lack of external fenestration protection, deficiencies in interior compartmentalization, and most concerning, a lower standard of workmanship). Other consequences have included building movement, damage to interior finishes, susceptibility to moisture, and mold potential. And on the supply side, manufacturing defects have been reported in the new burgeoning CLT industry.

The code changes are not proposed to take effect until 2021, when the next edition of the IBC is published; then individual jurisdictions must adopt it. (Note: at the time of this writing, Washington State and Oregon have incorporated the new requirements into their existing codes. Similar adoptions are under consideration in Colorado and California.)

Sources:

"Tall Wood Buildings in the 2021 IBC *Up to 18 Stories of Mass Timber*" – *Wood Products Council, 2019*

"The Rise of the Wood Frame Skyscraper," NFPA, Janel Giarratano, ARM and Anil Jagaisi, S.E.

"Forget the log cabin. Wood buildings are climbing skyward — with pluses for the planet." *Washington Post*