

Mid-rise Product & Assembly Advice

Prairie Wood Solutions Fair

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Fire-Resistance-Rated Floor/Ceiling Assemblies

Architects generally have two options when choosing the gypsum board in a 1-hour fire-rated floor/ceiling assembly: a “single-layer”, or 2-layers of gypsum. This decision has a major impact on the options available to structural engineers when they specify I-joist members, and can significantly affect the cost of the framing package. These differences underscore the importance of adding this topic to the drawing-coordination process between Architect and Engineer.

Proprietary Listings for I-joist Assemblies can be found at the links below:

Intertek Testing Services http://www.spec-direct.com/Pages/BP_Search.aspx

UL / ULC <http://www.ul.com/canada/eng/pages/>

PFS <http://www.pfscorporation.com/directory.php>

Single-Layer, 1-hour Floor/Ceiling Assemblies

Most I-joist types are not permissible in this type of assembly. It requires larger flanges (2x4 nominal size), 7/16” webs, mineral wool and Type C-branded 5/8” gypsum ceiling.

A sample specification is indicated below:

Intertek® listing WNR FCA 60-07

Double-Layer, 1-hour Floor/Ceiling Assemblies

Since it is easier to achieve a 1-hour fire-resistance rating with 2-layers of gypsum board, most of the restrictions mentioned above are not in place for a 2-layer assembly. Designers are still advised to review the specific requirements of each assembly

A sample specification is indicated below:

Intertek® listing WNR FCA 60-03

Evaluating Rim Board Alternatives

LSL rim board is valued for its dimensional stability, fastener properties and ability to perform as both a beam and rim board function. It is widely recognized as one of the best-performing, cost-effective rim board materials on the market.

Where alternative rim board materials are being proposed on a project, the following items should be provided to the structural engineer of record for their consideration:

Diaphragm Capacities

In determining the lateral load capacity of floor diaphragms, the supporting members (joists, rim board) will determine whether Structural Engineers can use the diaphragm capacities associated with “D.fir”, or use other lower-capacity species. LSL rim board has an equivalent specific gravity of 0.50 (equivalent to D.fir) for lateral nail resistance in both the face and edge of the product. Not all rim board materials have this capacity.

Nail Spacing

1-1/4” 1.3E LSL rim board allows nails to be spaced as close as 4”. Some manufacturers of 1-1/8” conventional OSB rim board products advise that nails be spaced at 6” centres. If tighter nail spacing is required, 1-1/2 and 1-3/4” LSL products can permit spacing as close as 3”, with options for multiple rows. It is recommended that suppliers of alternative rim board materials be asked to provide clear information on allowable spacing to ensure the building’s requirements can be met.

2-ply Rim Board vs 1-piece Thick Section Rim Board

In mid-rise buildings, many specifications call for 3-1/2” thick rim board to accommodate lag screw connections from upper wall plates. While a 3-1/2” thickness can be accomplished with 2-ply of thinner 1-3/4” material, locating a lag screw near the joint between the plies may not provide an adequate connection. Substitution should not be permitted.

1-piece Beams vs Multi-Ply Beams

Engineered Lumber Beams produced in thicknesses from 3-1/2" to 7" eliminate the time, costs and challenges associated with bolting and nailing thinner members together.

Material and Assembly Costs

Builders can spend a significant amount of time and money on sourcing the right hardware, reviewing instructions, then connecting multiple plies of beam material together. Insufficient nail- or bolt-patterns can lead to rejected inspections, or slippage of individual members, and can reduce the buckling stability of members.



One Less Thing to Inspect

Engineers who specify thick-section beams appreciate that they don't have to check the suitability of bolt-pattern designs, or rely on framing crews to accurately bolt, nail or screw multiple beam plies together.

High Loads Create Challenges for Bolted Connections

Projects with long spans or with multiple levels (like mid-rise buildings) can produce large concentrated loads that can make bolt or screw patterns impractical if not impossible. Solid section Parallam® PSL ensures the whole beam acts as one

Qualifying Suppliers on a Mid-Rise Project

Not only are the building costs and design loads bigger in a mid-rise project, the stakes are higher too. It's important that everyone involved has the experience, knowledge and procedures in place to ensure the right products are in the right place at the right time. Here are a couple of considerations when selecting your materials and your supplier on a Mid-rise project:

Experience Matters

Consider adding the following to your specification to help identify qualified suppliers:

- List years experience,
- List training, skills and qualifications of design staff,
- Provide examples of layout drawings/ testimonials from clients

“Supply Only”? Or Component Sizing Services?

Clarify what type of shop drawing services you require

- Do you need any member design services, or just a material list?
- Do you value a check that loads transfer from level to level, and that components are checked for their capacity to support upper-level loads?

Revisions

Changes happen on large projects. Does your supplier have the expertise, resources and track record to respond accurately and quickly?

Be clear what you want in terms of products and performance

Just as no one writes “concrete grade by supplier” on their structural plans, consider writing specific minimum product sizes and grades on your plans, or a floor performance standard to ensure your project's needs are met.

More clarity in your instructions on loading and design expectations leads to lower chance of errors in the material supply and installation.