Engineering Requirements for I-Joists, Structural Composite Lumber, and Plated Trusses

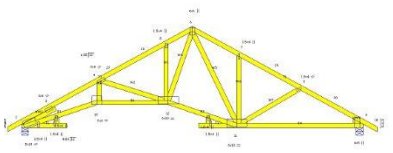
When considering sealed calculation requirements for residential projects, it is important to note the significant differences between I-joists, structural composite lumber, and plated trusses. Certain characteristics justify different approaches, as recognized by Code agencies across Canada.

A comparison is provided below; note that references to the National Building Code of Canada (NBCC) apply equally to the corresponding clause in the provincial Building Codes, where applicable.

I-Joists and Structural Composite Lumber

- Structural members achieve compliance with the building code by satisfying Division A, Article 1.2.1.1 of NBCC.
- For Weyerhaeuser Engineered Wood Products (EWP) (e.g. TJI® joist, Microllam® LVL, TimberStrand® LSL, Parallam® PSL), the Canadian Construction Materials Centre (CCMC) or an alternate certification agency issues a code evaluation report confirming the product to be an alternative solution that meets minimum performance requirements as required by Division A, Clause 1.2.1.1.(1)(b) of NBCC.
- Each code report references established design properties, pre-engineered span and sizing tables, and standard installation details which have been reviewed by the certification agency for compliance with Division B, Part 9 of NBCC. The result is design provisions similar to what is published in the building code for sawn lumber.
- By complying with Division A, Clause 1.2.1.1.(1)(b), it can be resolved that Weyerhaeuser EWP do not require an engineer's seal for applications that fall within the scope of the code evaluation report.

Plated Trusses



- Plated trusses are composed of several individual components designed for site-specific span and loading conditions.
- Design properties and pre-engineered span/sizing tables do not exist for plated trusses in NBCC nor do there exist code evaluation reports confirming such information.
- Plated trusses must comply with CSA O86 *Engineering design in wood* and Truss Plate Institute of Canada (TPIC) *Truss Design Procedures and Specifications for Light Metal Plate Connected Wood Trusses*.
- Designs typically require an engineer's seal.

"Layout" Drawings

Permit and construction drawings in Canada require details about the structural design of the building indicating the design loads, framing pattern, supports, foundations, member types, and sizes. The requirements for certification of the building's overall structural design varies across the country, with some jurisdictions requiring engineers or architects, others requiring qualified and insured designers (see section on next page).

Suppliers of Weyerhaeuser EWP typically provide additional "layout" drawings (otherwise known as general arrangement drawings or placement plans) to help the builder identify where various products are to be installed. While these drawings may be useful in summarizing the design criteria used for design of the EWP components, these plans are essentially a copy of the structural framing pattern established by the designer of record and are not truly design documents. The Association of Professional Engineers of BC (APEGBC) provide clarification on this matter in *Professional Practice Guidelines – Shop Drawings v2.0 2015*; stating that it does not consider general arrangement drawings that follow the structural drawings a "design document". As such, APEGBC's position is that they do not require engineering certification.

Provincial Code Positions on EWP Component Design

Alberta Building Code

Alberta Municipal Affairs Building Code Interpretations 06-BCI-015 describes a process by which a Safety Codes Officer (SCO) may accept the use of manufactured structural components as an alternative to the need for the direct involvement of a professional engineer in each specific project.

Ontario Building Code

Ontario maintains a unique qualification system for design practitioners (other than Architects and Professional Engineers) that would typically require the designer of record of a residential project to be qualified and registered as a designer under Section 3.2 of Division C of the Ontario Building Code (OBC) 2012. As a result, building designers will typically submit plans for the full structure bearing both their individual and their company's Building Code Identification Number (BCIN) as evidence of the required qualification.

However, individuals whose design activities relate only to the construction of pre-engineered elements of the building are clearly exempt from the requirement for qualification and registration, as indicated in Clauses 3.2.4.1.(l) and 3.2.5.1.(h) of OBC 2012. This would apply to the majority of EWP design technicians, who select appropriate sizes of pre-engineered products to match the structural pattern of the building established by the registered building designer.

The Ministry of Municipal Affairs and Housing (MMAH) provided a branch opinion further supporting this exemption at the time these provisions came into effect in the 2006 code; the language in these two clauses remains unchanged in the current version of the OBC.

Ontario also requires Minister's Rulings for use of innovative building products in the province. These are available for Weyerhaeuser products as covered by the CCMC reports mentioned above

If you have any questions, please contact your Weyerhaeuser representative.