STRUCTURAL ENGINEERING IN HOUSE DESIGN	BUILDING BULLETIN
	Date: April 26, 2021
	Revised: n/a

Purpose

The purpose of this bulletin is to clarify when an engineer is required for design and supervision of construction of a house.

Background

Houses constructed to meet today's lifestyle tend to utilize cutting-edge technologies, including engineered structural elements such as Cross Laminated Timber (CLT) or Laminated Veneer Lumber (LVL) beams. These engineered structural elements often exceed the maximum prescriptive limits set out in Division B, Part 9 of the current British Columbia Building Code in relation to:

- structural loading;
- excessive clear structural spans; or
- structural support of increased number of floor levels.

Beams with point loads, girder trusses, trusses with spans greater than 12.2 meters and proprietary engineered products may exceed the scope of Division B, Part 9. Connection of these structural elements also tends to be complex. Additionally, foundations and/or footing sizes necessary for structural support may not fit within the parameters prescribed in the Building Code.

When the design parameters of a house exceed those set out in Part 9 of the BC Building Code (see Appendix A), it is necessary to engage the services of a Registered Professional of Record (RPF) - a professional engineer - to design and certify those structural components in accordance with the requirements of Division B, Part 4-Structural Design.

When an engineer designs components of a building, or the entire building structure, the BC Building Code requires the submission of plans bearing the seal and signature of the Registered Professional of Record along with the following Letters of Assurance:

i) Schedule B which is submitted with the building permit application; and,
ii) Schedule C submitted prior to final inspection and building occupancy.

If a house contains numerous Part 4 components, the scope of the Letter of Assurance may be required to include integrated structural design and field review for the entire building. The owner and engineer, in conjunction with Fraser Valley Regional District, should review requirements when such circumstances apply.

Implementation

When a house design incorporates structural components that do not conform to Part 9 of the BC Building Code, a Registered Professional of Record must design and conduct field reviews of all Part 4-Structural components.

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The following consolidation is for convenience only. You must consult the 2018 BC Building Code, including Division C, Subsection 2.2.7, to satisfy yourself that the proposed construction work complies with the FVRD Building Bylaw and Building Code requirements.

Appendix A

Generally, a Registered Professional of Record, a professional engineer, is required if the house design does not meet any of the following structural requirements of the BC Building Code:

a) Maximum specified live load on the floor shall not exceed 2.4 kPa.

b) Light-frame constructions whose wall, floor and roof planes are generally comprised of frames of small repetitive structural members, and where
   i) the roof and wall planes are clad, sheathed or braced on at least one side,
   ii) the small repetitive structural members are spaced not more than 600 mm o.c.,
   iii) the clear span of any structural member does not exceed 12.2 m,
   iv) the maximum deflection of the structural roof members conforms to Article 9.4.3.1.,
   v) the maximum total roof area, notwithstanding any separation of adjoining buildings by firewalls, is 4 550 m^2.

c) Columns used to support
   i) beams carrying loads from not more than 2 wood-frame floors where
      a. the supported length of joists bearing on such beams does not exceed 5 m, and
      b. the live load on any floor does not exceed 2.4 kPa (see Table 4.1.5.3.).

d) Beams or header joists carrying loads from not more than 2 levels of wood-frame balconies, decks or other accessible exterior platforms, or 1 level plus the roof, where
   i) the supported length of joists bearing on such beams or joists does not exceed 5 m,
   ii) the sum of the specified snow and occupancy loads does not exceed 4.8 kPa (see Sentence 9.4.2.3.(1) for the determination of load on platform-type constructions), and
   iii) the platform serves only a single suite of residential occupancy.

e) Footing width or area requirements shall apply to footings, where the footings support:
   i) foundation walls of masonry, concrete, or flat insulating concrete form walls,
   ii) above-ground walls of masonry, flat insulating concrete form walls or light wood-frame construction, and
   iii) floors and roofs of light wood-frame construction,
   iv) the span of supported joists does not exceed 4.9 m, and
   v) the specified live load on any floor supported by the footing does not exceed 2.4 kPa (see Table 4.1.5.3.).

f) Foundations are on stable soils with an allowable bearing pressure of 75 kPa or greater.

Need more information?

Contact the Fraser Valley Regional District Building Department at 604 702 5016 or building@fvrd.ca The BC Building Code is available online at bccodes.ca. Consult your designer, architect or engineer about the application of the BC Building Code to your specific construction.

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