



## **BULLETIN RB06-034**

(Updated 2015 Dec 18)

### **EARTHQUAKE DESIGN**

**Reference: Article 1.3.3.3., Article 1.1.3.1., Subsection 4.1.8. and Sentence 9.4.1.1.(3)**

**Article 1.3.3.3.** "Application of Parts 9, 10 and 11"

**Article 1.1.3.1.** "Climatic and Seismic Values"

**Subsection 4.1.8.** "Earthquake Load and Effects"

**Sentence 9.4.1.1.(3)** "Location-specific information for structural design, including snow and wind loads and seismic spectral response accelerations, shall be determined according to **Subsection 1.1.3.** (See **Appendix A**)"

#### **Question:**

For buildings coming under Part 9, which criteria should be used for earthquake design?

#### **Commentary / Relevant Facts:**

The only explicit treatment of structural loads in Section 9.4. is for gravity; wind and earthquake loads are dealt with implicitly in **Part 9**. There is, therefore, a tendency to assume that wind and earthquake loads do not need any particular consideration in the design of **Part 9** buildings.

In most cases this is true: the majority of low-rise, wood-frame buildings have a great deal of structural redundancy and continuity and have more than enough capacity to resist lateral loads due to wind and earthquake. For example, in a traditional house configuration, even if there are a few large openings in the exterior walls for windows and sliding doors, the many interior partitions act as braced or sheathed wall panels and provide adequate lateral stability.

However, not all **Part 9** buildings have configurations or details that will provide adequate resistance to lateral loads. For example, newer houses may have few interior partitions and very large openings in the exterior walls. Mercantile buildings might be long and narrow with almost entirely windowed walls and few structurally attached interior partition. In such cases, wind and earthquake loads do have to be taken into consideration.

**Conclusion:**

Calgary comes under horizontal spectral acceleration values and peak ground acceleration values, which are among the lowest for any location in Canada.

In Calgary the 5% dampened horizontal spectral acceleration values are as follows:

Seconds	Spectral Acceleration
0.2	.15
0.5	.08
1.0	.04
2.0	.02

Horizontal peak ground acceleration value 0.09 (2% probability of being exceeded in 50 years) is among the lowest value for any location in Canada.

As noted in the Appendix Note, the majority of low-rise, wood-frame buildings constructed under **Part 9** have more than enough capacity to resist lateral loads due to wind and earthquake. In the case of unusual buildings with few interior partitions and very large openings in the exterior walls, we may ask for confirmation that wind and earthquake loads have been taken into consideration.

The structural design of buildings coming under **Part 4** of the Code shall be done by professional engineers who will be responsible for conforming to **Subsection 4.1.8**. "Earthquake Loads and Effects".

Chief Building Inspector

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