Canada Earthquake Model

Region specific innovations in hazard and vulnerability

Earthquake Risk in Canada

Canadian earthquake risk is a tale of two sides. Areas of highest risk are within British Columbia in the west, but the June 23, 2010 earthquake in Ontario served as a reminder of the non-trivial risk that also exists in eastern Canada. The model integrates updated building codes and construction practices with the latest science and engineering to produce a state-of-the-art Canada earthquake risk model.

CoreLogic®'s Canada earthquake cat model solution keeps clients up-to-date with the latest view of consensus-based hazard, combining the latest science from the:

- Geological Survey of Canada (GSC) 6th generation Seismic Hazard Model for the National Building Code of Canada (NBCC 2020)

- USGS (U.S. Geological Survey) 2018 National Seismic Hazard Model (NSHM)

With over 133,000 stochastic events combined in RQE's High-Fidelity 300,000 year simulation model, and new updates to engineering science—this provides a complete understanding of earthquake risk to aid in more robust risk management and pricing capabilities.

Key Features

- Time-Dependency captured on Cascadia Subduction Zone (CSZ), Time Independent view also available

- Sophisticated modeling of Georgia basin, affecting Vancouver and Victoria hazard

- Explicit modeling of River Leech and Devil's Mountain faults, affecting Victoria

- Explicitly models damage due to earthquake-induced liquefaction and landslide

- Fire Following and Sprinkler Leakage captured as sub-perils, including sub-peril insurance conditions

- Multi-parameter vulnerability providing more robust capture of modeling for timber frame structures

Key benefits

- **True to the latest science**
  Most up to date view of peer-reviewed science on the market allows users to more appropriately measure risk

- **Portfolio specific**
  Offers a competitive advantage with sophisticated capture of Correlation and Uncertainty at the portfolio and site level

- **Regulatory Support**
  RQE® advanced and transparent modelling capabilities with a full documentation suite, observes the Earthquake Exposure Sound Practices Guideline B-9 and Stress Testing E-18, as published by the OSFI

- **Local knowledge**
  25 Years' experience in Canada earthquake Cat Model solutions

Consistent Results Across the U.S. Border

Canada and U.S. earthquake models from CoreLogic use identical event definitions for events affecting both countries to allow coherent analysis and aggregation of international portfolios. Maintaining our principle of incorporating specialized local knowledge when available, our Canada hazard module integrates and captures recent insights from the latest hazard from GSC and USGS.

High-Fidelity Financial Modelling

Detailed hazard and vulnerability models need High-Fidelity financial modelling to fully unlock their benefits. CoreLogic®'s 300,000 Year simulation offers robust capture of loss and uncertainty in tail-risk events, crucial to assess clients' risk tolerance, allowing low-frequency events to be sampled multiple times in the simulation set, from the mega-events of Cascadia Subduction Zone affecting Western Canada, to the rare shallow events affecting Eastern Canada.

Vulnerability

Vulnerability curves in the model are well-honed from thousands of seismic studies conducted by CoreLogic® over the last 30 years from first-hand observations of 90 earthquakes worldwide. For timber frame structures, most common in residential buildings in high-hazard areas, the vulnerability is represented using a three-dimensional surface that accounts for the long duration of earthquake shaking, which is characteristic of the Cascadia subduction zone. Three-dimensional vulnerability captures the phenomenon of 'damage acceleration'—the more damage that occurs during a given quake, the more vulnerable a building becomes—and reduces uncertainty by more closely reflecting the reality evidenced by data from thousands of claims.

Canada specific vulnerability

With a full suite of structure types representative of Canadian construction and the National Building Code of Canada (NBCC), and dozens of occupancy categories for each line of business, the model differentiates risk across hundreds of combinations. Our technical documentation provides guidance on structure type selection.
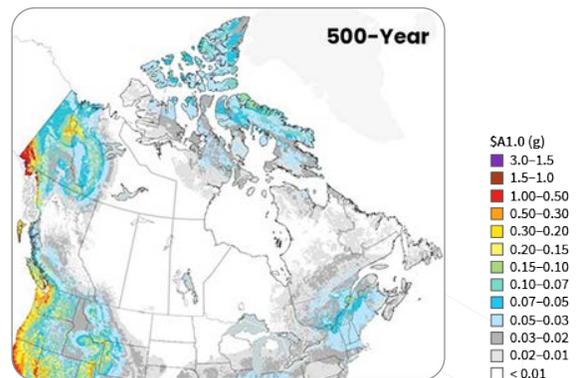
High Resolution Hazard Analysis and Soil Data

Variable resolutions of hazard generation are based on population density and range between 0.01 and 0.1 degrees. High resolution soil model in key urban areas set at 30m resolution, key for allowing differentiation of risk according to soil differences that can quickly change over small distances owing to local geologies of urban areas, from Vancouver in the west to Quebec City in the east.

Demand Surge

The model incorporates a rational approach to demand surge, based on the demand and supply for construction materials and labor in the affected region.

500-Year

SA1.0 (g)
- 3.0–1.5
- 1.5–1.0
- 1.00–0.50
- 0.50–0.30
- 0.30–0.20
- 0.20–0.15
- 0.15–0.10
- 0.10–0.07
- 0.07–0.05
- 0.05–0.03
- 0.03–0.02
- 0.02–0.01
- < 0.01

Why Consider CoreLogic?

Increasing catastrophic events are challenging the P&C insurance industry to revisit existing catastrophic risk management and loss adjustment strategies by improving the overall understanding of all-natural hazards. CoreLogic is dedicated to the science of understanding natural hazard risk and focused on delivering decision support data and products to the insurance industry. With a staff of Ph.D.-level scientists and engineers, we have taken risk assessment a step further by developing a proprietary methodology that enables a more granular level of risk management control and reporting. Catastrophe risk management from CoreLogic offers a comprehensive look at risk by evaluating probable events, and verifying current and post event impacts.

**For more information, please call 866-774-3282
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