



Improvements to the 6th Generation Seismic Hazard Model for Canada

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ABSTRACT

Natural Resources Canada's 6th Generation seismic hazard model for Canada (CanadaSHM6) forms the basis for the seismic design provisions of the 2020 National Building Code of Canada (NBCC 2020). Since the release of CanadaSHM6, two additional models and one dataset have been released to improve efficiencies and accuracy, and to provide additional information.

Conversion of CanadaSHM5 to CanadaSHM6 model resulted in unexpectedly large rupture lengths in some sources with very large maximum magnitudes in northwestern Canada. This resulted in conservative (higher) values in parts of northwestern Canada, particularly for long periods and regions of low seismic hazard. The first additional model corrects these sources to produce more realistic ruptures and to better reflect the constraints on the potential faults.

CanadaSHM6 as released for NBCC 2020 was composed of three regional sub-models (covering the southeast, northeast, and west portions of the country). A national model variant combines the sources of the three submodels while maintaining the relative weights of all sources. The second additional model is thus the change from a regionalized approach to a single national CanadaSHM6 model. This new approach allows for the calculation of hazard anywhere in the country with a single model. There is good agreement between the results obtained with the NBCC 2020 CanadaSHM6 and the national model variant.

Lastly, a dataset of hazard values for southwestern British Columbia (BC) has been released. In this region, hazard is generated from three tectonic environments – crustal, interface, and in-slab sources. Dividing the western portion of CanadaSHM6 into these three different types of sources isolates the contributions from each of the tectonic domains and provides additional perspective on the hazard in this area.

These three new products provide more reliable estimates of seismic hazard in northwestern Canada, represent a more simplified approach in calculating national hazard values and provide practitioners with additional information on seismic hazard in the complex tectonic setting of southwestern BC.

Keywords: National Building Code of Canada, seismic hazard