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From the Editor's Desk

by Tuna Onur

CAEE's Distinguished Webinar Series continues in the New Year with "Seismic behaviour and design of modern masonry buildings: current status and future needs" by Dr. Svetlana Brzev. You can find more details in the News section of the Newsletter.

This quarter, the Earthquake Waves column covers a past damaging earthquake in eastern Ontario, reminding us that damaging earthquakes happen in the east of Canada as well as the west.

One of the major changes in the upcoming NBC2020 is the incorporation of the 6th Generation Seismic Hazard Model for Canada, or CanadaSHM6.

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The Code Corner column discusses this model and its implications across Canada.

We hope everyone is staying healthy, and as always, we encourage you to share short articles, news or other items related to earthquake engineering to be published in our Newsletter. Please send your contributions to secretary@caee-acgp.ca

Earthquake Waves: The Cornwall, Ontario Earthquake of 1944

by John Cassidy

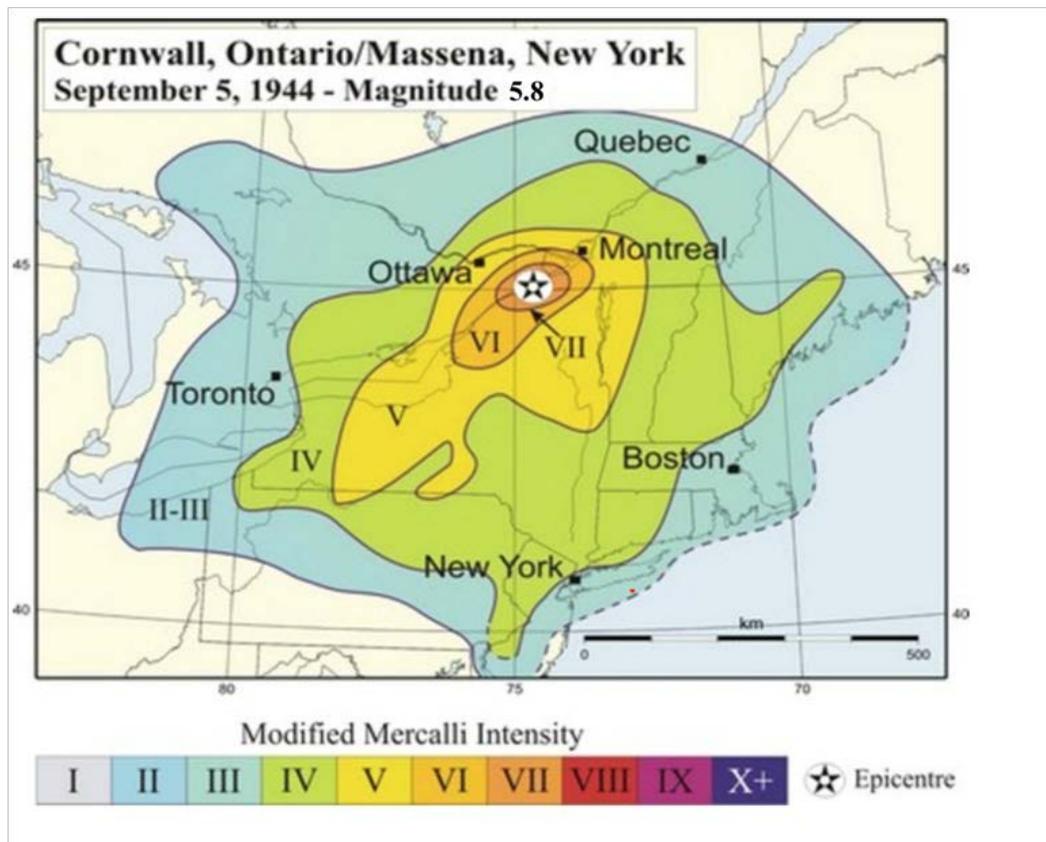
Canada has remained quiet in terms of significant earthquakes during the past few months. As a result, this column highlights a significant historical Canadian earthquake – this one in eastern Ontario, near the St. Lawrence River.

At 12:38 a.m. (Eastern Time) on September 5, 1944, a damaging Mw5.8 earthquake occurred between Cornwall, Ontario and Massena, New York. Shaking was felt from Quebec City to Toronto to New York City to Lake Michigan (and most points in between). Pictures and dishes came crashing down, water pipes broke, plaster walls cracked and many cemetery headstones were rotated (these rotation patterns were later used to study the location and faulting style of this earthquake). This earthquake caused an estimated \$10–\$15 million (in 2021

dollars) of damage in and within ~50 km of Cornwall, ON (where about 2,000 chimneys were damaged in this community of ~15,000 people at the time), and also caused significant damage in nearby Massena, New York (where 90% of the chimneys were damaged or destroyed). Substantial damage occurred at the Collegiate and Vocational School, a two-storey brick building in Cornwall. The out-of-plane failure of a top-floor unreinforced masonry wall was surprising, given the moderate magnitude (Mw5.8) of this earthquake, but a clear reminder of the risk (especially to older buildings) in the seismically active areas of eastern Canada.

Much of the damage coincided with structures built in areas underlain by the Leda Clay (ancient glacial lake sediments) of the St. Lawrence River valley.

Earthquake Waves... *Continued from Page 2*



There were numerous impacts to these soft soils (e.g., fissures, liquefaction, water well effects – with some drying up and others overflowing) – a clear reminder of the importance of geological engineering here, and in all earthquake-prone regions. This earthquake was followed by numerous

felt aftershocks, reminding us that effects and impacts of a significant earthquake will last for days, weeks or sometimes even months.

For additional information on this earthquake, see Bruneau and Lamontagne (1994).

cdnsiencepub.com/doi/pdf/10.1139/194-065

Code Corner: New Hazard Model for NBC 2020

by Michal Kolaj, Natural Resources Canada, Canadian Hazards Information Service

In support of the proposed 2020 National Building Code of Canada (NBC 2020), a new seismic hazard model was developed for Canada (6th Generation Seismic Hazard Model for Canada, or CanadaSHM6). The model includes: recent advancements in

understanding of the recurrence of great subduction earthquakes; revisions in the geometry of deep, slab earthquake sources; the adoption of new ground motion models; and the addition of newly-discovered potentially-active faults.

Code Corner... *Continued from Page 2*

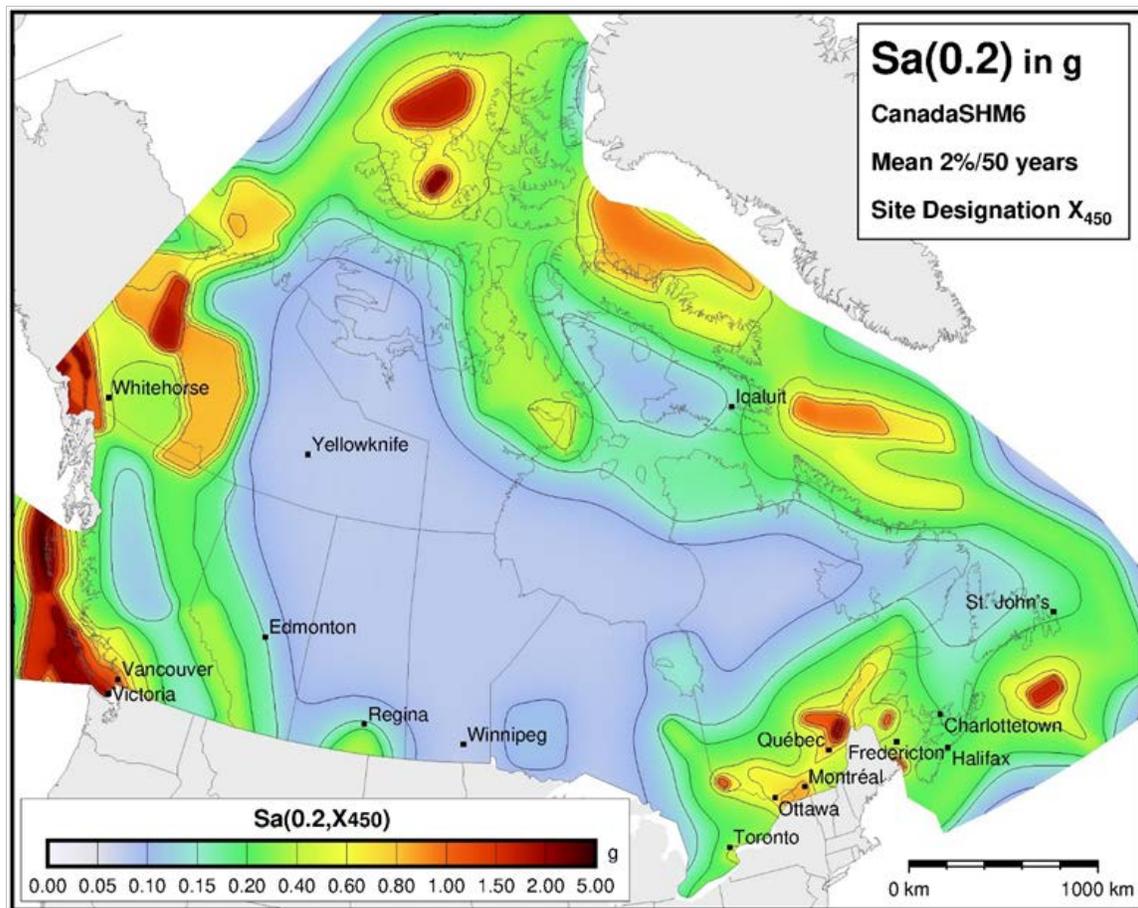
For the first time in Canada, seismic hazard will be provided directly for various site designations. End users have only to enter their specific V_{s30} (in the range of 140 – 3,000 m/s) or their Site Class (E–A) to determine their seismic hazard values. This approach improves the reliability of the results and simplifies the way end users will determine seismic design values, because it removes the need for separate site amplification (i.e. foundation factor) look-up tables in the building code. Users will be able to simply supply their location and site designation to the web-based hazard tool provided by Natural Resources Canada to determine seismic hazard values.

The improved understanding of: a) seismic sources in southwestern British Columbia, b) median ground motion models, c) aleatory uncertainty, and d) site amplification has led to significant changes in estimated hazard relative to NBC 2015 values based on CanadaSHM5.

The interplay between changes in source, ground motion, aleatory, and site amplification models is complex, but, in general, the new estimates of seismic hazard values in many regions across Canada (see figure below) are higher than those used in NBC 2015. Read more at:

earthquakescanada.nrcan.gc.ca/hazard-alea/recpubs-en.php

This is NRCan contribution number 20210460.



Map of the CanadaSHM6 short-period (0.2s) 5%-damped spectral acceleration at a 2% in 50 years probability of being exceeded for a Site Designation of X_{450} (i.e., with a V_{s30} of 450 m/s, equivalent to Site Class C in NBC 2015).

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News

Next Meeting in CAEE's Distinguished Webinar Series Coming up on February 9th!

CAEE is continuing to host the Distinguished Webinar Series in Earthquake Engineering and Seismology. The next webinar in the series is by Dr. Svetlana Brzev on February 9th, and the title is:

Seismic Behaviour and Design of Modern Masonry Buildings: Current Status and Future Needs

More information on this webinar and registration details can be found in the following link:

<https://www.caee.ca/svetlana-brzev/>

News and Upcoming Events

While the COVID-19 pandemic caused a shift towards online events globally, some conferences are gradually switching back to in-person format. Below, we provide information on upcoming events of both formats.

Upcoming events

ASCE UCLA Lifelines Conference: Understanding, Improving & Operationalizing Hazard Resilience for Lifeline Systems

31 January – 4 February 2022

Los Angeles, CA

samueli.ucla.edu/lifelines2021-22/

Seismological Society of America (SSA) Annual Meeting

19 – 23 April 2022

Bellevue, WA

meetings.seismosoc.org/

8th Canadian Conference on Geotechnique and Natural Hazards

12 – 15 June 2022

Quebec City, QC

geohazards8.ca/

3rd European Conference on Earthquake Engineering and Seismology

19 – 24 June 2022

Bucharest, Romania

3eceeds.ro/

12th US National Conference on Earthquake Engineering (NCEE) and 2022 EERI Annual Meeting

27 June – 1 July 2022

Salt Lake City, UT

12ncee.org/