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MODELING SOCIETAL IMPACTS OF EARTHQUAKES: PROGRESS AND CHALLENGES FOR CANADA

Stephanie E. Chang
Professor, University of British Columbia, Vancouver, BC., Canada
stephanie.chang@ubc.ca

ABSTRACT: In recent decades, considerable progress has been made in understanding the societal impacts of earthquakes. Earthquakes cause a broad range of interrelated consequences to society, including not only human casualties and the costs to repair damaged buildings and infrastructure, but also displacement of people from their homes, psychosocial impacts, and economic disruption to businesses. As understanding of how earthquakes impact society becomes more sophisticated, researchers have tried to capture these impact mechanisms in computational models in order to depict what can be expected in future earthquakes. This allows studying how those expected impacts might differ depending upon what societal decisions are undertaken; for example, regarding seismic retrofit policies, preparedness planning, or long-term urban development. Ultimately, it is hoped that such models will help support decision-making regarding seismic risk reduction.

This presentation provides an overview of progress in modeling societal impacts of earthquakes, with an emphasis on implications for Canada. Since relatively few models have been developed for Canada, it is important to consider the degree to which models developed in other countries such as the U.S. can be applied here. In particular, what makes Canada different, from the perspective of potential societal impacts of earthquakes?

This presentation focuses on three distinctive aspects of seismic risk in British Columbia. First, compared with other urban centres in developed countries, B.C. cities are relatively new. The built environment reflects recent rapid growth, with construction practices and predominant building types that are somewhat distinctive. Second, the sociodemographic profile in B.C. cities also differs from many other places in North American; in particular, the rapid growth of immigrant populations residing in seismically hazardous areas of poor soil, such as Richmond. Third, the geographic setting of the B.C. coast, where many communities are highly dependent on marine transportation for conveyance of people and goods, is also distinctive. This creates a unique type of vulnerability that is only beginning to be understood. For each of these distinctive aspects, examples of modeling research are used to explore seismic risk in the Lower Mainland of British Columbia. Implications for high seismic risk areas in Eastern Canada are also considered. The presentation concludes with a summary of research needs.