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November 2021 Seminar

MULTICRITERIA AND MULTILEVEL FRAMEWORK FOR SEISMIC RISK MANAGEMENT OF EXISTING PSPC BUILDINGS IN CANADA

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| Date: | Friday – November 19, 2021 |
| Time: | 5:20 PM join on Zoom, followed by presentation at 5:30 PM |
| Presenter: | Dr. Reza Fathi-Fazl, PhD, Adjunct Professor at University of Ottawa and Carleton RO at NRC & Seismic Resilience Team Lead at the Construction Research Centre |
| Cost: | Free to all. Non-Members may register as GUEST |
| Virtual Meet: | Zoom link will be emailed on registration Registration is required: seabc.ca/seismic-risk |

A multi-criteria and multi-level seismic risk management framework has been developed by NRC to ensure an acceptable and consistent level of risk for existing buildings in Canada with a focus on minimizing threats to life safety. The framework consists of three levels: (1) Level 1: preliminary seismic-risk screening tool (PST); (2) Level 2: semi-quantitative seismic-risk screening tool (SQST); and (3) Level 3: seismic evaluation and upgrading guidelines (SEG). Level 1 (PST) was developed based on a number of key criteria (seismicity, benchmark code edition, consequences of failure, and remaining occupancy time) to assist in exempting existing buildings from further assessment without the need for a site visit. Level 2 (SQST) consists of three key components:

1. structural scoring system that quantitatively assesses the structural seismic risk based on the probability of collapse;
2. non-structural components scoring system that qualitatively evaluates the seismic risk of non-structural components based on the seismic demand of critical non-structural components; and
3. ranking procedure that prioritizes buildings with potentially unacceptable seismic risk for the Level 3 (SEG) based on structural and non-structural components priority indices.

The Level3 (SEG) aims to identify the building deficiencies that lead to unacceptable seismic risk for existing buildings and to mitigate the identified deficiencies.

NRC SEISMIC RISK SCREENING TOOLS

Link to archived documents in NRC Publication Archive
<https://nrc-publications.canada.ca/eng/home/>

- Level 1 – Preliminary Seismic Risk Screening Tool (PST) for Existing Buildings (English and French)
 1. Level 1 – PST (Part 1)_English
<https://doi.org/10.4224/40001929>
- Level 2 – Semi-Quantitative Seismic Risk Screening Tool (SQST) for Existing Buildings (English and French)
 2. Level 2 – SQST (Part 1)_English
<https://doi.org/10.4224/40001931>

Link to the web-based application for SQST
<https://nrc.canada.ca/en/research-development/products-services/software-applications/semi-quantitative-seismic-risk-screening-tool-sqst>

Journal Publications on NRC Seismic Risk Screening Tools Links to published journal papers

- [Multicriteria and Multilevel Framework for Seismic Risk Management of Existing Buildings in Canada](#)
- [Semi-quantitative classification of consequences of failure for seismic risk management of existing buildings](#)
- [Development of a preliminary seismic risk screening tool for existing buildings in Canada](#)
- [Methodology for seismic risk screening of existing buildings in Canada: Structural scoring system](#)
- [Methodology for seismic risk screening of existing buildings in Canada: Non-structural component scoring system](#)
- Benchmark NBC editions for seismic risk management of existing buildings in Canada

Dr. Reza Fathi-Fazl has a M.Sc. in structural engineering from IUST (Iran University of Science and Technology) and a Ph.D. from Carleton University. He is a senior research officer at the National Research Council Canada (NRC) and is currently leading the Seismic Resilience Team (SRT) in the Construction Research Centre (CRC) of NRC. Dr. Fathi-Fazl is an adjunct professor and lecturer at the University of Ottawa, as well as Carleton University, and has authored and/or co-authored over 50 research papers and technical reports. Since 2008, he has collaborated with several structural consulting firms in Canada in the area of structural design, seismic upgrading, rehabilitation and renovation of several residential, commercial, recreational, heritage and specialty projects.

