

# Performance-based Seismic Design of Tall Reinforced Concrete Buildings

Earn .7 Continuing Education Units / 7.0 Professional Development Hours

## The Abstract

This course covers detailed information from the conception to the final design of a Reinforced Concrete Shear Wall building using a performance-based seismic design (PBSD) approach. It will include hands-on experience in the application of PBSD on several building projects on the West Coast of USA. This course will go over the concept of PBSD, its development and key aspects of the general approach. It will continue with an overview of the latest PBSD guidelines currently used and a brief review of current code requirements and how they differ from the PBSD approach.

PBSD is based on a series of performance checks. The first performance check is at the building service level under both earthquake and wind loads. This performance measure is easy to implement as it is similar to a code-based modeling approach with some important modifications to modeling and acceptance criteria. The second performance level is to reduce the chances of collapse of a building under a major earthquake. This major event is defined in the ASCE 7-10 as the Maximum Credible Earthquake or MCEr. This second performance is well understood in the research environment but still proves a challenge for the engineering practice.

This course will go over key modeling steps of both linear and nonlinear components, processing the input and output information, design aspects that could potentially be improved during the analysis, and detailing aspects that differ from a code-based seismic design.

## The Content

- 1.PBSD Criteria
  - Current Regulations
  - Performance Objectives
  - Earthquake Hazards
  - General Modeling Aspects
  - Performance Criteria
  - Deliverables
  - Review Process
  - Instrumentation
- 2.Service Level Check Example
  - Modeling Aspects
  - Performance Check
- 3.Collapse-prevention Check Example
  - Modelling Aspects (Nonlinear components and Fiber Elements)
  - Typical responses
    - Shear in Walls
    - Hysteresis loops for coupling beams
    - Slab-Column rotation
    - Diaphragm actions
    - Deformations
    - Deformations
  - Performance Checks
  - Post-processing – the future of PBSD

## The Instructor

**Freddy Pina, Ph.D., P.Eng.** is the President of PBRV Consulting Ltd., a Canadian company that offers professional services to local structural engineering firms with the main focus being in the seismic design of tall buildings using a performance-based design approach and in the assessment of the potential risk of failure or damage of existing buildings in BC. Dr. Pina has been involved in the seismic design of more than twenty tall buildings in the west coast of the USA and Canada, as well as in the seismic risk assessment of several existing buildings in BC and California. He is also an Adjunct Professor at the University of British Columbia teaching courses related to the structural design of steel buildings and dynamic analysis of structures. Freddy serves as an active member of the SEABC Certificate program, teaching and coordinating several courses related to earthquake engineering.



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## Venues

**VANCOUVER** - January 22, 2019  
**Sandman Vancouver City Centre**  
 Ballroom  
 180 West Georgia Street  
 Vancouver, BC V6B 4P4  
 604-681-2211

**CALGARY** - January 24, 2019  
**Sandman Calgary City Centre**  
 Great Room 2  
 888 7<sup>th</sup> Avenue SW  
 Calgary, AB T2P 3J3  
 403-237-8626

**EDMONTON** - January 25, 2019  
 Engineering Teaching and Learning Complex  
 ETLC E2-100 Solarium East  
 University of Alberta  
 9107-116 Street  
 Edmonton, AB T6G 2V4

**TORONTO** – February 14, 2019  
**Sandman Toronto Airport Hotel**  
 Longbranch A Room  
 55 Reading Court  
 Toronto, ON M9W 7K7  
 416-798-6771

**OTTAWA** – February 15, 2019  
**Holiday Inn Ottawa East**  
 Franklin Room  
 1199 Joseph Cyr Street  
 Ottawa, ON K1J 7T4  
 613-744-1060

**MONTREAL** – February 18, 2019  
**Plaza Garden Inn**  
 Salle James McGill ABC  
 380 Sherbrooke Ouest  
 Montréal, QC H3A 0B1  
 514-842-4123

**QUEBEC** - February 19, 2019  
**Hôtel Quartier**  
 Salle Quartier 1  
 2955, boulevard Laurier  
 Québec, QC G1V 2M2  
 418-650-1616

## Fees and Registration

Please click to register online: <https://csce.ca/en/product/performance-based-seismic-design-of-tall-reinforced-concrete-buildings/>

**7:45 Registration-8:30 Start of Session-10:00 Coffee Break-12:00 Lunch-15:00 Coffee Break-16:30 End of Session**

	By January 3, 2019		By January 19, 2019	
	BC	AB	ON	QC
CSCE Members	\$450 + T = \$504.00	\$450 + T = \$472.50	\$450 + T = \$508.50	\$450 + T = \$517.38
New Members	\$640 + T = \$716.80	\$640 + T = \$672.00	\$640 + T = \$723.20	\$640 + T = \$735.84
Non-members	\$650 + T = \$728.00	\$650 + T = \$682.50	\$650 + T = \$734.50	\$650 + T = \$747.33
Students	\$120 + T = \$134.40	\$120 + T = \$126.00	\$120 + T = \$135.60	\$120 + T = \$137.97

	After January 3, 2019		After January 19, 2019	
	BC	AB	ON	QC
CSCE Members	\$500 + T = \$560.00	\$500 + T = \$525.00	\$500 + T = \$565.00	\$450 + T = \$517.38
New Members	\$690 + T = \$772.80	\$690 + T = \$724.50	\$690 + T = \$779.70	\$690 + T = \$793.32
Non-members	\$700 + T = \$784.00	\$700 + T = \$735.00	\$700 + T = \$791.50	\$650 + T = \$747.33
Students	\$120 + T = \$134.40	\$120 + T = \$126.00	\$120 + T = \$135.60	\$120 + T = \$137.97

- **Group Rates** (3 attendees and more) are available upon request.
- **Newly enrolling members** pay a special introductory membership fee of \$110 plus tax and obtain a discount on all future CSCE events. The fee is \$530 + \$110 + tax and \$580 + \$110 + tax.

**Cancellation & Substitution** Cancellation requests received more than 14 calendar days before the start of the course will receive a full refund minus a \$50.00 administration fee.

Cancellation requests received within the 14 days prior to the start of the course will be non-refundable.

The CSCE reserves the right to cancel any course and will, in such event, fully refund all registration fees.

Any registrant may substitute another person eligible for the same fee at any time prior to the start of the course.

