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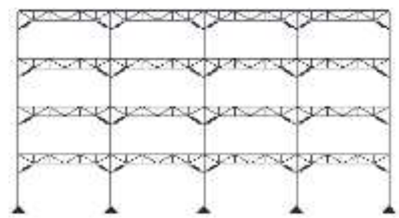
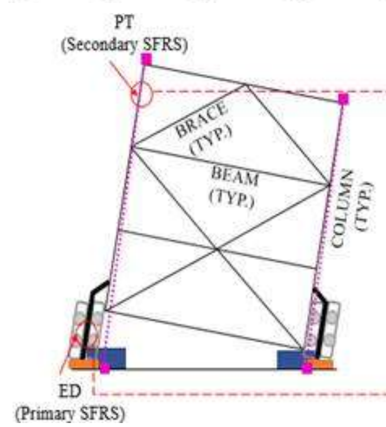
January 2020 Seminar

DEVELOPING HIGH-PERFORMANCE STRUCTURAL SYSTEMS FOR SEISMIC APPLICATIONS

Date:	**Wednesday - January 22, 2020**
Venue:	**Theatre C300, UBC Robson Square @ 800 Robson Street, Vancouver**
Time:	**Refreshments at 6:00pm, followed by presentation at 6:30pm**
Presenter:	**Prof. Tony T.Y. Yang, Ph.D., P.Eng., University of British Columbia, Vancouver**
Cost:	**Free for SEABC Members and $85 for non-members**
	Registration is required: https://seabc.ca/EEDP

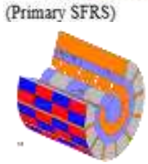


Recent earthquakes in Japan and New Zealand have shown that even the most developed countries with modern building codes still vulnerable to strong earthquake shaking. Does the issue lie in our fundamental approach to absorb the earthquake energy through inelastically deformation of the structural components? This design approach leads to unrecoverable structural damages and hefty social and financial losses.



The loss due to earthquakes can be minimized by *high-performance earthquake resilient structures*, instilled with designated structural fuses, analogous to electrical fuses, to dissipate the sudden surge of seismic energy. This design philosophy can achieve higher performance by allowing the structure to recover efficiently and economically after strong shaking. Innovative earthquake resilient structures have been developed in the past and its practical design procedures need development at the practise level.

In this presentation, a novel design procedure named E*quivalent Energy-based Design Procedure* (EEDP) for fused structures in earthquake applications will be presented. EEDP allows practicing engineers to select their structure's performance objectives at different levels of seismic shaking intensities. With this methodology, engineers can efficiently select their structural member sizes to achieve the desired structural period, strength and deformation with simplified hand calculation without iteration thereby making it very practical and useful for the seismic engineering design communities. Two innovative earthquake resilient structural systems - Linked Column Frame (LCF) and Fused Truss Moment Frames (FTMF) shall be presented using EEDP. Nonlinear dynamic analyses that were conducted to examine the performance of these two innovative fused structural systems shall be comparatively reviewed to summarize how the proposed EEDP methodology is able to achieve the engineer-defined performance, and thereby making this an ideal design procedure for practicing engineers.



For more information visit … http://smartstructures.civil.ubc.ca/

Prof. Tony Yang received his B.Sc. (2001) and M.Sc. (2002) from the University of Buffalo, New York, and his Ph.D. from the University of California, Berkeley in 2006. His researches focus on improving the structural performance through advanced analytical simulation and experimental testing. The ATC-58 team in US has adopted his performance-based design guidelines. He has developed advanced experimental testing technologies, such as hybrid simulations and has developed risk-based simulation models used in North and South America and the Global Earthquake Model (GEM) for South East Asia. Tony actively contributes on several national and international code committees: In Canada, he is a member of the S16 committee for seismic design provision of steel structures and a voting member on the Standing Committee for Earthquake Design for the 2020 NBCC. In the US, Prof. Yang is an active member of the Tall Buildings Initiative Project responsible for seismic design guidelines for tall buildings in the Western USA. Prof. Yang's work has been well recognized by his colleagues; he is the recipient of the 2014 CISC H.A. Krentz Award and the 2011 Kwang-Hua Professor Title from Kwang-Hua Foundation, China.