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A strategic research cluster dedicated to the safety of civil engineering structures subjected to extreme effects induced by natural hazards, climate change and human activities

Earthquake Engineering Research Institute

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Characteristics, seismic performance and retrofit of existing tall steel framed buildings

Speaker | Conférencier

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Senior Principal

Degenkolb Engineers

San Francisco, California

Date, Time | Heure

27 Feb. 2024, 11:45 - 13:15

Room | Salle

J-1035 (Pav. JAB, Polytechnique Montréal)

Link | Lien

https://polymtl-ca.zoom.us/j/83247899462

Abstract | Résumé

The 30th anniversary of the 1994 Northridge, California Earthquake, highlighted the potential vulnerability of older tall steel-framed buildings to large earthquakes in California. Articles in the New York Times raised concern about the potential vulnerabilities of buildings of this type in San Francisco, citing results reported in the "Haywired" Scenario reports published by United States Geological Survey. This presentation will focus on the seismic performance of a large number of actual tall steel framed structures in San Francisco designed between 1960 and 1990. The presentation will discuss how the structural design and detailing of these buildings evolved due to changes in construction technology, architectural considerations, engineering design techniques, and analysis software. Seismic studies were done on more than thirty such buildings, with about half using nonlinear response history procedures specified in ASCE 41-17 to evaluate the seismic performance of each building. The presentation will discuss detailed modelling techniques used to simulate the potential for fracture of both the welded beam-to-column connections and the partial joint penetration column splices and how analysis and modeling techniques can drive analytical results. Evaluation of the results clearly demonstrated that it is difficult, if not impossible, to draw broad conclusions about the seismic performance of this entire class of buildings. However, these detailed evaluations allowed for comparison between the different seismic performance features of these buildings and provide the ability to make some observations about the individual building performance characteristics. An example of the seismic retrofit of one of these buildings will also be presented.

Short bio | Brève biographie

James O. Malley, S.E., is a Senior Principal of Degenkolb Engineers. He received both his Bachelors and Masters Degrees from the University of California at Berkeley. Mr. Malley has over 40 years of experience in the seismic design, evaluation and rehabilitation of building structures. He was responsible for the analytical and testing investigations performed as part of the SAC Steel Project in response to the Northridge earthquake damage. In 2000, AISC presented Mr. Malley its' Special Achievement Award. Mr. Malley is Chair of the AISC Specifications Committee and the Past-Chair of the AISC Seismic Subcommittee. He was named the 2010 T.R. Higgins Lectureship Award winner for his work on the AISC Seismic Provisions, and in 2012 was presented with a Lifetime Achievement Award by AISC. Mr. Malley is also a member of the AWS Subcommittee on Seismic Welding Issues. Mr. Malley was also one of the authors of the PEER Tall Buildings Institute "Guidelines for the Performance-Based Seismic Design of Tall Buildings" and is involved in the peer review of numerous tall building projects in areas of high seismic risk. He has served as a member of the SEAONC and SEAOC Board of Directors, and was President of SEAONC in 2000-2001 and SEAOC in 2003-2004. Mr. Malley was named a SEAOC Fellow in 2007 and an Honorary Member of SEAONC in 2014. He was a member of the Board of Directors of NCSEA, serving as President in 2010-2011. Mr. Malley also served as a member of the Board of Directors of EERI and was President of the Applied Technology Council Board of Directors in 2020. He was elected to the National Academy of Engineering in 2021 for his contributions to seismic design.