Title: Seismic behavior and design of collectors in steel building structures and development of associated shake table testing methodology

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Abstract:

Collectors are structural components that play a critical role to transmit inertial forces in the floor diaphragms to the vertical elements of primary seismic-force resisting system in a building structure. Yet little research has been done on collectors. A three-phase experimental program was conducted on a half-scale, two-story steel building by using the NHERI@UCSD large high performance outdoor shake table (LHPOST) to investigate the inertial force paths in the floor diaphragms and the seismic behavior of collectors. Alongside with this test program, an innovative shake table testing methodology was developed such that the absolute acceleration history response of any floor in a multi-story prototype building could be simulated by using single-story specimen. In this presentation, the development of the testing methodology, seismic response of collectors and their connections, and design implications on seismic collectors will be presented.

Bio:

Dr. Li is a research engineer in the CoreBrace LLC, which is a famous manufacturer of buckling-restrained braces (BRBs) in the United States. He is conducting research and development work to improve the design procedures and modeling techniques for BRBs. He received his B.Sc. (2005) and M.Sc. (2007) from the National Taiwan University (NTU), and his Ph.D. from the University of California, San Diego (UCSD) in 2022. His research is focused on earthquake-resistant design and analysis of steel structures with an emphasis on large-scale structural testing. He had served as an assistant researcher in National Center for Research on Earthquake Engineering (NCREE) for 9 years prior to returning to graduate school to pursue doctoral studies in 2017. During his service in NCREE, his research was mainly focused on seismic research of steel building structures, especially on Steel Plate Shear Wall (SPSW) systems. For his participation in development of self-centering SPSW system, he received the Moisseiff Award from the American Society of Civil Engineers (ASCE) in 2017.

Dr. Li's doctoral research was based on a collaborative program among UCSD, University of Arizona, and Lehigh University to investigate the seismic behavior and design of collectors in steel buildings. He was in charge of conducting the experiments that utilized the unique outdoor shake table facility (LHPOST) in UCSD and the associated analytical studies. During his UCSD years, he was also involved with extensive service-to-industry testing and research-oriented projects on BRBs by using another signature shake table testing facility in UCSD – Caltrans Seismic Response Modification Device (SRMD) Test Facility. The BRB research that he did in UCSD include the development of a fatigue life assessment procedure for BRBs and the strain aging effect on seismic response of BRBs.