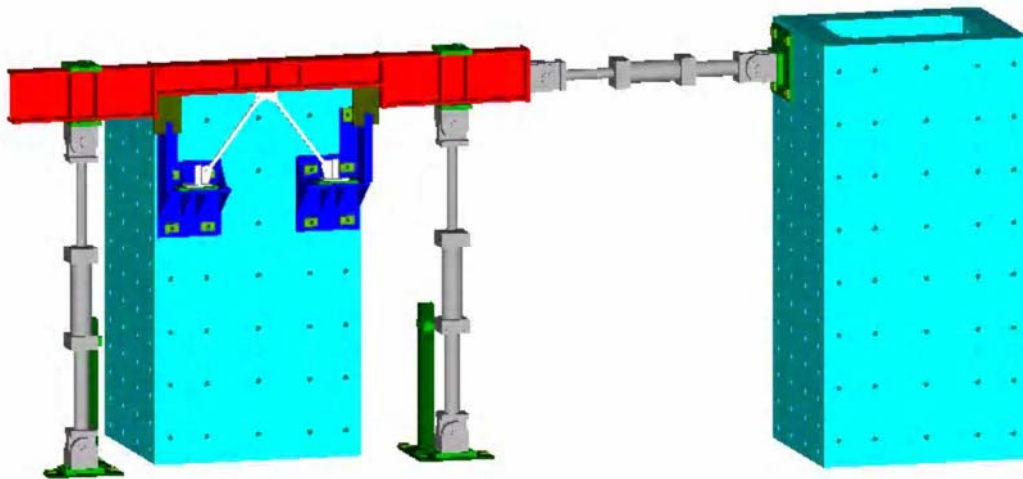


# Geographically Distributed Hybrid Simulation of Seismic Response of Steel Braced Frames with Innovative Bracing Configurations

Bozidar Stojadinovic, Professor, Jack Moehle, Professor and Tony Yang, Ph.D. student

University of California, Berkeley  
Department of Civil and Environmental Engineering  
NEES @ Berkeley



UC Berkeley work on the proposed zipper-frame concepts focuses on the application of NEES hybrid simulation methods to: (a) verify the analytical assumptions about brace behavior, used to design the structural system; and (b) examine the interaction of structural components in the zipper-frame structure to verify the fundamental design assumption. Facilities of the nees@berkeley NEES Equipment Site will be fully utilized to conduct geographically distributed multiply-substructured as well as conventional pseudo-dynamic testing will be used. The following tasks are ongoing or in preparation:

1. Development of the model for analytical simulation of hybrid simulation tests.
2. Evaluation and tuning of hybrid simulation test algorithms and incorporation of OpenSees models in hybrid simulation tests.
3. Sub-structured pseudo-dynamic tests of individual zipper-frame structural element that are expected to behave in an inelastic manner (braces) or dissipate energy (memory-shape alloy elements).
4. Geographically-distributed hybrid simulation. First, analytical-only simulations will be done to verify NEESgrid and laboratory ability to communicate during a geographically distributed test. Second, identical elastic and inelastic tests on a single-story model will be conducted to compare results. Third, a distributed test with the first story tested at Boulder and the second story at Berkeley will be conducted.
5. Analysis and comparison of results of various hybrid simulation tests. These comparisons will be conducted jointly with other participants in order to evaluate the accuracy of developed pseudo-dynamic testing algorithms, and effectiveness of different hybrid simulation methods, and, most important, the ability to perform geographically distributed pseudo-dynamic testing using the NEES infrastructure.