



6th Annual Cal Poly Pomona Student RSCA Conference

March 2, 2018

University Library (Building 15) and Building 9

Oral Presentations from 12 to 3:30 pm

Poster & Creative Works Showcase and Reception from 3:15 to 4:15 pm

Music Recital Hall (Building 24)

Performance Presentation, Alumni Panel, and Awards Ceremony from 4:30 to 5:30 pm

Project Title: Sesimic Energy and Friction Dampers

Presenter Names: Brent Wilder

Faculty Mentor(s): Giuseppe Lomiento and Felipe Perez

Presentation Type: Oral Presentation

Session Name: Engineering

Abstract: This study focuses on mitigation of earthquake induced pounding effects between adjacent buildings. Pounding is the event of two structures colliding with each other due to excessive horizontal sway. It can occur between adjacent buildings with significantly different dynamic characteristics, and when the distance between the two structures is less than the seismic separation set by design specifications. This is a concern as pounding can cause serious damage to the building, or even bring about complete failure and collapse. For example, in the Mexico earthquake of 1985 pounding was found in 40% of the 330 buildings that experienced structural failure [1]. In our experiment we investigate the ability of friction dampers to mitigate pounding effects between two model frames while being tested on a shake table to simulate earthquakes. Friction dampers utilize the Law of Conservation of Energy by translating the kinetic energy of the earthquake, into heat energy via friction in the damper. We use the device to compare and contrast changes in energy dissipation throughout the structure. Numerical analysis is performed to extend experimental results to a wider range of excitation levels. Also, our test shows the ability of friction dampers to decrease the likelihood of pounding. This research is still on-going and further conclusions and applications of friction dampers in multi-degree of freedom systems will be presented in the Spring of 2018 [1] Jeng, V., K. Kasai, and A. Jagiasi. "The separation to avoid seismic pounding." Proceedings, 10th World Conference on Earthquake Engineering, Madrid (Spain). 1992.