



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Brian M. Smith	Project Number S0212
Project Title Don't Be Swayed: A Study of the Dampening Abilities of Viscous Dampers in Buildings	
Abstract Objectives/Goals Will the replacement of stiff cross-members by viscous dampers decrease the amount of acceleration that a building undergoes during an earthquake? My objective is to test two model buildings, one with stiff cross-members, and one with viscous dampers to determine the amount of acceleration that they are subjected to. Methods/Materials Materials: Wood of various sizes; balsa wood; MDF board; AC motor; drill; fax paper; screws; custom made measuring transparency; custom made drill bit Methods: 1) Create shake table and data tower to apply the same amount of shaking to the buildings. 2) Create two identical buildings with three floors. One will have stiff cross members one floor one, while the other will have viscous dampers on floor one. 3) Attach building to shake table and set the paper in place. 4) Turn on the shake table and the paper roller for exactly five seconds, then turn off. 5) Repeat procedure number four 200 times (100 per building). 6) Measure the period with the highest total displacement and count the number of periods. 7) Record data and use it for the necessary calculations. Results The building with the viscous damper had a much lower acceleration and displacement(1.10mm/s; 5.77mm) than the building with the stiff cross-member(1.29mm/s; 8.9mm). The calculations and results also proved to be extremely accurate with a standard deviation of 0.086. These results prove how well viscous dampers help to dissipate the effects of the seismic energy on a building's response during an earthquake. Conclusions/Discussion Viscous dampers substantially help to reduce the mount of displacement and acceleration that a building undergoes during an earthquake. By reducing the amount of displacement and acceleration, the building will have less stress on its structure and therefore is less likely to collapse.	
Summary Statement I tested viscous dampers vs. stiff cross members to measure the reduction of the amount of acceleration that a building undergoes during an earthquake.	
Help Received Mother helped for ideas on backboard display; Brother helped soulder wires; Father helped give tips on building the apparatus.	