

Earthquake Simulator

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Motivation:

Many concepts in structural dynamics are best demonstrated through “hands-on” experiments. Instructional shake tables are an ideal tool for education and training within the field of earthquake engineering and structural dynamics (Dyke et al., 2000). Model structures can be designed and build, their structural responses observed and measured.

Background:

In spring 2008 an application was sent to the University of Iceland Research Fund to buy a ‘simple’ shake table, suitable for teaching purposes. A partial support was provided. However, the financial crisis in October 2008 diluted the value of the grant. In spring 2009 an application was sent to RANNIS, the Icelandic Centre for Research, and a grant was given. In hope for a strengthening of the Icelandic Krona the purchase was delayed until fall of 2009. At that time Quanser Inc. had introduced an advanced 6 degree-of-freedom ‘research’ shake table, Hexapod. Although the cost of this new Hexapod was somewhat more expensive than the simpler shake tables originally applied for, it was determined to invest in the more advanced technology, and the order was placed in December 2009. In June 2010 the Hexapod arrived in Iceland. Since then it has been tested at the Earthquake Engineering Research Centre in a variety of set-ups, including earthquake simulations and structural studies of buildings subjected to ground excitations.

The poster displays data from earthquake simulations, structural response to seismic excitation; furthermore, it illustrates how the shake table will be used in teaching structural dynamics and earthquake engineering at the Civil Engineering Facility of the University of Iceland.

References:

- [1] Dyke, S.J. et. al, Earthquake Engineering Education: A Modern Approach,” *Proc. of the ASEE Annual Meeting*, St. Louis, Missouri, June 18–21, (2000).
- [2] Quanser Inc. *Hexapod – 6 Degrees of Freedom, Unlimited Degrees of Application*. Quanser Academic Web Page. Retrieved 18.september 2010.

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Fig. 1. The Hexapod shake table supporting a two story structural frame model equipped with accelerometric sensors. In the back-ground are control and monitoring devices.