

Duebendorf und Lausanne, 11th October 2005

Earthquake simulations in a disused house

The Empa-Shaker rattles masonry in the cause of research

For the first time ever an experiment is being conducted to investigate how a typical Swiss house behaves during an earthquake. Powerful oscillation-generators, so called Empa-Shakers, will create movement in the building structure similar to those induced by earthquakes.

At the end of October the Empa will begin an experiment in a condemned, soon-to-be-demolished building in the town of Monthey in Canton Wallis. Two shakers, which are also use to induce oscillations in bridges and hydroelectric dams, will be placed on the second floor of the old, detached house and their individual 1000kg masses will begin vibrating. The precisely calculated motion will be generated by a clever hydraulic servo system. Sensors to measure the house's behavior have been distributed throughout the building, which is built using techniques widely used in Switzerland – a structure of mixed reinforced concrete load-bearing members and masonry walls, supported on a concrete foundation. The measured data will later be evaluated by researchers at the Empa and the EPFL, the Swiss Federal Institute of Technology, Lausanne, and will show the effects of the artificially induced vibrations on the building. This will allow more precise forecasts to be made on how detached houses react to earthquakes and provide researchers with more details on how much energy is absorbed due to damping effects.

A unique simulation shakes the house exactly as an earthquake would

In order to characterize the dynamic behavior of buildings, mathematical models must first be created. To this data is added that obtained from experiments using microseismic excitation, which uses the oscillations generated by natural earth movements. Since the scientists can now use the shakers to set a building in temporally stable oscillation, they are able to verify the results from the microseismic excitation tests. They can thus also determine if dynamic characterization of small houses using this technique is sufficiently accurate.

The Empa is contributing the scientific know-how and the technical infrastructure to this unique earthquake simulation project, and is carrying out the field measurements in cooperation with the

EPFL. The work is being scientifically and financially supported by the Coordination Center for Seismic Risk Mitigation of the Swiss Federal Office for Water and Geology (BWG).

Media Demonstration:

How the Empa-shakers rattle the walls of the condemned house will be demonstrated for the media in Monthey on **Thursday October 27th 2005, 14:00.**

Please register by emailing martina.peter@empa.ch before Tuesday October 25th.

Editing / Media coordination

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One of the two oscillation generators (shakers) in Empa's construction hall before being installed.



The condemned house in Monthey, in which the Empa and the EPFL will conduct dynamic tests at the end of October.

These images are available in digital form from martina.peter@empa.ch