Geophysical Research Abstracts
Vol. 19, EGU2017-8861, 2017
EGU General Assembly 2017
© Author(s) 2017. CC Attribution 3.0 License.

A new debris flow monitoring barrier to measure debris flow impact/structure/ground interaction in the Gadria torrent

Georg Nagl and Johannes Hübl

Universität für Bodenkultur, Institute of Mountain Risk Engineering, Department of Civil Engineering and Natural Hazards, Vienna, Austria (georg.nagl@boku.ac.at)

Debris flow monitoring is a keystone in debris flow research. Based on the lack of investigations of the interaction of rapid mass movement and structural mitigation measures, a new monitoring system has been installed in the well monitored Gadria torrent in South Tyrol.
For design of active structural measures, like check dams, the engineering task is to come to an amicable solution of all necessary subjects. Starting with the estimation of parameters of the rapid mass movement itself to the design load and finally to the foundation of the structure. At all stages big uncertainties are given. The basis for accurate design is a comprehensive approach. For this reason, a new monitoring station was built in autumn 2016, to investigate the interaction of a debris flow with the structures and the ground.
Two structures unify the new monitoring system. The first, a transversal check dam, flush to channel bed, contain two weighing devices each equipped with a pore pressure sensor. One device is also able to measure the shear force additional in two directions.
The second barrier similar to a debris flow breaker but only with one singe wall centered on a foundation plate, is located downstream to the first one. 14 load cells are installed on the upward front of the structure to analyze the spatial force distribution of debris flow impact pressure. Nine earth pressure sensors under the foundation of the structure deliver the earth pressure distribution. The acceleration of the construction can be measured by a 3D accelerometer installed on the top. In case of a movement, two extensometers detect any displacement. Mounted strain gauges give insights of stresses in concrete and reinforcement. Each sensor has a sampling frequency of 2400 Hz. Furthermore it is planned to measure the flow velocity distribution over flow depth too.
The new monitoring station should help to acquire data for understanding the debris flow/structure/ground interaction to facilitate the improvement of standards for designing and numerical model adaptation.