Geophysical Research Abstracts
Vol. 20, EGU2018-4645-1, 2018
EGU General Assembly 2018

Large-scale Physical Modelling of Debris Flow Impacting an L-shaped barrier

Haiming Liu (1), Clarence Choi (1,2), Charles Ng (1), and Hengdou Liu (1)

(1) Department of Civil and Environmental Engineering, the Hong Kong University of Science and Technology, Hong Kong SAR, China, (2) The HKUST Jockey Club Institute for Advanced Study, Hong Kong SAR, China

Rigid reinforced concrete barriers offer the advantages of a long service life, low maintenance and a predictable impact response. In the past decades, miniaturized tests have been carried out to study debris flow impacting rigid barriers. However, due to the scale-dependent nature of debris flow behaviour, miniaturized tests cannot holistically capture the dynamics of field-scale debris flow. Therefore, large-scale tests, which more closely capture the absolute stress state of the granular assembly, timescale for pore pressure diffusion, and degree of viscous shearing, are necessary to verify the impact mechanisms observed from small-scale experiments. In this study, a new large-scale flume facility, constructed by the Hong Kong University of Science and Technology (HKUST) in Hong Kong, was used to study debris flow impacting a reinforced-concrete barrier. The large-scale channel has a length of 28 m, is 2 m in width, and 1 m in depth. An instrumented L-shaped reinforced-concrete barrier was constructed and installed within the channel to elucidate the impact mechanisms between saturated mixture of sand and gravel, and the rigid barrier. This paper discusses details on the construction and instrumentation of the barrier, test preparation, and test results of the impact process.