

Flowsliding in volcanic ash slope during heavy rainfall: A Case Study of 2013 Izu Oshima Landslides

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On Oct. 16, 2013, catastrophic shallow landslides were triggered on a wide area of the west-side hill slopes in Izu-Oshima Island, Japan, by the heavy rainfall accompanying Typhoon No.26 (Wipha). The displaced landslide material traveled long distance with rapid movement, resulting in 35 dead, 4 missing, and 46 buildings being completely destroyed on the downstream area of Motomachi area. To understand the initiation and movement mechanisms of these shallow landslides, we took sample from the source areas and examined their shear behavior under partially drained or undrained condition. We performed flume tests to trigger landslides by rainfall, and examined the variation of soil moisture, pore-water pressure and landslide movement. Test results showed that high pore-water pressure could be built up and maintained within the displaced landslide material, resulting in rapid flowsliding movement, irrespective of the nature of very shallow sliding mass. Results obtained from the simulation of landsliding shows that the high mobility resulted from liquefaction failure of displaced landslide materials. Field observation also revealed that wind load to the trees on steep slopes might have played key role on the triggering of the slope failure on wide areas.

Keywords: Flowslide, heavy rainfall, volcanic ash slope, wind load, trees