Debris Flow Disasters Caused by Typhoon Wipha (T1326) on Izu-Oshima Island and Technical Support of NILIM TEC-FORCE

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1. Introduction

On October 16, 2013, Typhoon Wipha brought precipitation exceeding 800 mm over a 24-hour period to Izu-Oshima Island, Tokyo. As a result, simultaneous debris flows occurred on hillsides of the volcano, Mt. Mihara, resulting in 36 deaths and 3 missing (as of Jan. 15, 2014; Photo 1). The SABO (Erosion and Sediment Control) Division of the Research Center for Disaster Management at the National Institute for Land and Infrastructure Management (NILIM) and the Erosion and Sediment Control Research Group of the Public Works Research Institute (PWRI) implemented technical support for the Tokyo Metropolitan Government and Oshima Town Office from the moments immediately after the debris flow disasters to early in November to prevent secondary disasters and to implement emergency recovery.

Photo 1 Debris flows on hillsides of volcano Mt. Mihara

2. Characteristics of debris flow disasters on Izu-Oshima Island

The disaster was characterized by multiple shallow landslides of volcanic ash layer deposited on the hillsides. The ash was approximately 1 m deep and transformed into downhill debris flows. In addition, a huge number of trees, toppled by shallow landslides and debris flows, were carried downhill by the debris flows. The Motomachi-Kandachi district suffered serious loss of life and property damage from the direct impact of the debris flows. Downhill from the Motomachi-Kandachi district, blockage caused by driftwoods at bridges caused floods, resulting in more loss of life and property damage (Photo 2).

Photo 2 Blockage of driftwoods at Motomachi Bridge

On the contrary, the Motomachi district has sediment-related disaster prevention facilities (i.e. check dam) and these facilities protected residents or reduced damage by capturing debris flows and driftwoods (Photo 3).

Photo 3 Capture of debris flows and driftwoods by a sediment-related disaster prevention facility along Okanesawa River

3. Implementation of technical support

After the debris flows, weather forecasts predicted that Typhoon Francisco (T1327) would arrive in 10 days, creating the risk of secondary disasters in the stricken area.

The SABO (Erosion and Sediment Control) Division of the Research Center for Disaster Management at the NILIM and the Erosion and Sediment Control Research Group of the PWRI implemented technical support for the Tokyo Metropolitan Government and Oshima Town Office after the debris flow disasters, to prevent secondary disasters and to implement emergency recovery activities as the TEC-FORCE (Technical Emergency Control Force) over an 18-day period from October 16 to November 2, by dispatching personnel equal to 48 man-days in total.

The type of technical support NILIM provided was as follows.

- Emergency ground surveys to identify damage and prevent secondary disasters (Photo 4)
- Providing technical advice to the Tokyo Metropolitan Government on preventing secondary disasters and implementing emergency recovery activities
- Providing technical advice on selecting target areas and precipitation criteria for issuing evacuation advisories, orders and cancelation by the Mayor of Oshima
-Providing technical instruction to ensure safety during rescue activities

Moreover, NILIM provided advice on organizing results of emergency inspections of locations at risk of sediment disasters performed by the MLIT Regional Office TEC-FORCE immediately after the disaster (Photo 5).

Photo 4 Emergency ground survey

Photo 5 Providing advices to the MLIT Regional Office TEC-FORCE

4. Continuing technical support for Izu-oshima Island's recovery and future research plans

The Director of the Research Center for Disaster Management participated as an administrative member in the Izu-Oshima sediment-related disaster countermeasure planning committee that was tasked by the Tokyo Metropolitan Government with establishing a master countermeasure plan. The NILIM is continuing to provide technical support for Izu-Oshima Island's recovery.

NILIM has plans to implement research activities to analyze the mechanisms of the shallow landslides and debris flows of this disaster and to establish technologies for structural and non-structural measures against sediment-related disasters in volcanic regions.

[Sources]

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