

Development of Core Engineers Qualified to Cope With Intensifying Sediment Disasters

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1. Introduction

In recent years, sediment disasters have markedly intensified. Large-scale sediment disasters have occurred all over the country for different reasons: heavy rains in the 2014 Hiroshima Disaster, 2017 Northern Kyushu Disaster, and July 2018 Western Japan Disaster, volcanic eruptions in Izu Oshima (2013), Mt. Ontake (2014), and Mt. Motoshirane (2018), and major earthquakes in Kumamoto (2016) and the eastern Iburi region of Hokkaido (2018). Under such circumstances, in order to ensure proper initial response, personnel of the Regional Development Bureaus are required to have a wide range of technologies for responding to disasters and the ability to use them.

While new technologies to cope with sediment disasters are to be introduced in other NILIM reports, this paper introduces the continuing effort to train employees of Regional Development Bureaus since fiscal 2013.

2. Development / Support program for personnel of Regional Development Bureaus who engage in advanced sediment disaster response measures

Under the Act for Promotion of Measures to Prevent Sediment Disasters in Sediment Disaster Alert Areas, etc. ("Sediment Disasters Prevention Act"), revised in 2010, for debris flow caused by volcanic eruption and debris flow and flooding resulting from channel blockage (landslide dam), control of which requires particularly advanced technology, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) is required to conduct an emergency survey and provide information on the expected area and time of damage (sediment disaster emergency information) so that municipalities may properly determine whether to issue evacuation orders to residents, etc. However, volcanic eruptions and landslide dams rarely occur in areas under direct control of the Regional Development Bureaus. Therefore, the NILIM, which conducts disaster surveys all over Japan, appointed the manager and other responsible persons in the sediment disaster warning / evacuation subsection of each Regional Development Bureau as personnel who concurrently serve in the Sabo Planning Division of NILIM from April 1 to December 31 for each fiscal year, and has been implementing a program since fiscal 2013 to train Regional Development Bureau

personnel to implement emergency surveys, etc. and play the roles of (i) instructor of training, seminars, etc. offered to employees of their Regional Development Bureau in ordinary times and (ii) leader of the Regional Development Bureau employees who conduct emergency surveys in the event of a disaster. This program has identified the points of attention in conducting emergency surveys and issues concerning safety management, etc. in surveys, and organized measures to solve issues, in addition to providing classroom training in conducting emergency surveys, teaching about technologies in the field, auditing the response system of the Regional Development Bureaus in the event of a large scale disaster, and training in equipment use. The program for fiscal 2018 was planned with seminars to study "the most serious problems if a disaster were to occur tomorrow" and their solutions considering on-site measures.

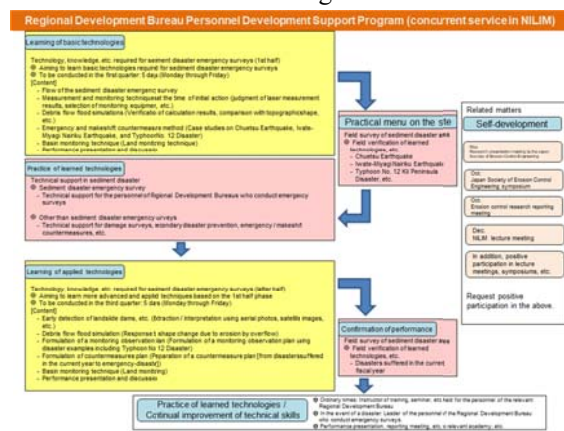


Fig. Regional Development Bureau personnel development support program

3. Contents of the FY2018 program and past results

In fiscal 2018, 9 subsection managers from the Hokkaido Regional Development Bureau and the Tohoku, Kanto, Hokuriku, Chubu, Kinki, Chugoku, Shikoku, and Kyushu Regional Development Bureaus participated in the program. They prepared reports after completing the orientation at Tsukuba, two lectures and seminars (for a total of 12 days), and practical field training in the control area of the Kii Mountain District Sabo Office (for 3 days). Contents of the current fiscal year's program are as follows.

- Lecture and discussion on key points and considerations about advanced technical guidance to

be provided to local governments, etc. in the event of a disaster.

- Lecture and seminar on the current technical development / research situation of emergency surveys, emergency measures, etc. by the NILIM and the Public Works Research Institute.

- Analysis and discussion on the issues and countermeasures in implementing emergency surveys and measures by each Regional Development Bureau, etc.

- Lecture and discussion on lessons and important points in future response considering actual emergency surveys and technical guidance.

- Implementation of waterway experiments on landslide dam erosion by overflow assuming the shapes of landslide dams and countermeasure works.

- Summarization of discussions and results concerning countermeasures for the issues arising in implementing emergency surveys and measures. The participants were classified into 4 teams to prepare reports for the following issues.

(1) Points of attention in emergency inspection of the areas vulnerable to sediment disaster and standardization of evaluation results.

(2) Preparations for welcoming the TEC-FORCE in the event of a large-scale sediment disaster.

(3) New technology effective in the survey of unfamiliar areas.

(4) Points of attention in helicopter surveys of sediment disasters, etc.

These four issues are based on what Regional Development Bureaus have noticed in responding to disasters. For example, for "Helicopter surveys when a landslide dam was formed," there was a proposal about preparation and survey method during flight through hearings from helicopter pilots because of insufficient experience in helicopter surveys, and for "New technology effective in the survey of unfamiliar areas," applications and devices were organized as a form of brochure so that they would be useful for localization in surveys of unfamiliar areas by the TEC-FORCE and Regional Development Bureaus. Thus, results very effective for practical operation were obtained.

In addition, results of the program have been shared systematically through presentation and discussion involving Sabo Control Department and leading members of Regional Development Bureaus in charge of erosion control in the human resource development program meeting held at the MLIT on February 5, 2019. Results of discussions are also posted on the NILIM intranet as "Answer book for large-scale sediment disaster response measures" so that they may be available to MLIT personnel.

Until now, a total of 48 persons completed the program and the personnel who concurrently served in the NILIM now serve as an instructor in emergency survey seminars and large-scale sediment disaster training held at each Regional Development Bureau,

work on the site of disaster surveys using the technologies learned, and report the status of use in the human resource development program meeting.



Photo 1. Training of laser distance measurement from the helicopter at the site of an actual landslide dam

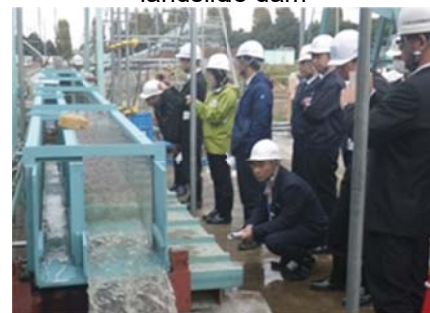


Photo 2. Experiment with a landslide dam overflow model

In addition, road management subsection managers from the Kinki, Shikoku, and Kyushu Regional Development Bureaus participated in the FY2018 program for the first time, and attended disaster survey training on Mt. Tsukuba, a lecture and seminar on landslide countermeasures, and a lecture on sediment disaster warning information. Some participants described their participation with comments like "The field training in disaster surveys was very helpful and would be useful for activities of the TEC-FORCE" and "It was a good opportunity to learn basic knowledge for carrying out inspections and other operations because there is almost no opportunity to learn about sediment disasters." NILIM has already been provided technical support to road departments of Regional Development Bureaus when disasters occurred. Henceforth, we intend to provide support for personnel of road departments to learn advanced sediment disaster response technologies, etc. so that they can contribute to the early recovery / restoration of disaster-stricken regions.

4. Conclusion

Since the risk of sediment disaster varies according to changes in climate, socioeconomic structure, etc., technical development for damage mitigation should be continued constantly. However, no matter what technology may be developed, its effect will be demonstrated only when there are human resources who can use it. We intend to continue our ongoing efforts for human resource development as well as technical development.