

Technical Assistance to Restoration and New Challenges Based on the Damage Caused by the Heavy Rain Event of July 2020

Road Structures Department

The heavy rain event of July 2020 caused road-related damage in many areas from the Tohoku to Kyushu Regions.

We conducted a field survey in cooperation with the Regional Development Bureau and other organizations to provide technical support for restoration in the future. Based on the results of this survey, we are conducting the development of damage risk assessment methods, which is introduced in this paper.

Social background and issues

- In recent years, heavy rains have caused road-related damage every year, and at the request of local communities, we have conducted field surveys and provided technical advice on restoration. On the other hand, some parts of the road have been entirely closed for a long time.
- Because a wide range of damage was caused, including the loss of the superstructure / substructure of bridges, loss of roads and shoulders along the river, and slope failure, it is required to analyze the causes of the damage, identify the structures that require countermeasures based on the results of the analysis, and select the priority structures for countermeasures.

Survey and research contents

Damage assessment and emergency technical support immediately after the disaster

After the heavy rain event of July 2020, NILIM, in cooperation with the relevant departments of the Public Works Research Institute (PWRI), has been conducting damage surveys and emergency technical support, as well as continuing technical study and assistance for recovery and restoration.

As for personnel dispatch to the site, we participated in local responses at various fields as an expert and a member of the advanced technical guidance group of the MLIT's Technical Emergency Control Force (TECFORCE), and conducted various surveys by organizing independent survey teams.

Road sections that were entirely closed to traffic due to the road-related damage caused by this heavy rain amounted to 16 lines in expressways, 29 sections in national highways under direct control, about 120 sections in national highways managed by the prefectural government, and about 600 sections in prefectural roads, etc.

In the area of roads, the personnel of NILIM were dispatched to the affected areas about one month from July 5 to August 5, totaling 30 man-days

They quickly conducted on-site surveys and provided technical support for emergency opening and permanent restoration methods and countermeasures at the request of local communities.



Okitsuru Bridge Survey (July 10)



Survey on the Slope Failure in Nagasaki Prefecture (Aug. 4)

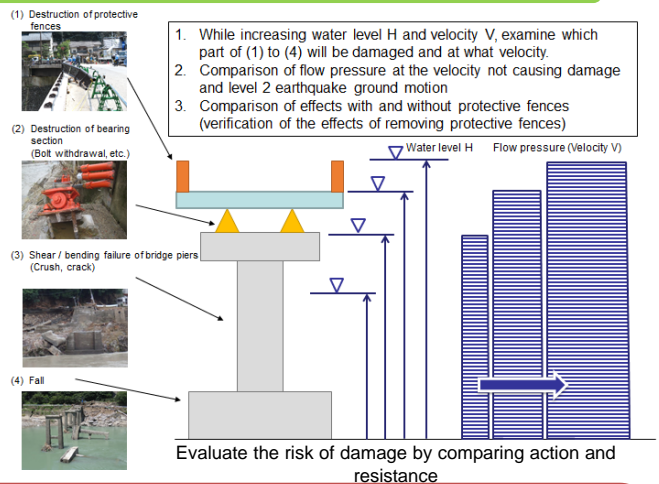
Activities to analyze the causes of the disaster and develop damage risk assessment methods

In recent years, heavy rains have caused many traffic closures due to the destruction of various bridge components, damage to retaining walls in sections parallel to rivers, and landslides and slope failure that occurred outside the road area.

For example, bridges crossing the Kuma River and its tributaries were damaged in various ways, as shown in the Figure on the right. We are developing damage risk assessment methods by analyzing the resistance of protective fences, bearing section, and bridge piers against destruction and the resistance of foundation against falling, which are caused by the action of flowing water.

We are also developing damage risk assessment methods for road earthwork structures, etc.

Through the analysis of the condition and collapse mechanism of structure, we are conducting analysis focused on the degree of impact on road functions (road closure period, emergency opening period, etc.).



Minimize the duration of road closures due to heavy rain and support early opening to emergency transportation during disaster and general traffic.