

Investigation of flooding streams caused by heavy rain disaster in the Northern Kyusyu

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1. Introduction

In July 2011, torrential rain disasters occurred in the Northern Kyusyu area of Japan, hitting the wide area from Fukuoka Prefecture to Kumamoto Prefecture. In this disaster, the highest water levels ever observed were recorded in some rivers, causing overtopping and flooding in many places. Although investigations on flood marks of the past inundations that occurred in the areas protected by levees were conducted so far, behaviors of flooding streams had been never investigated. However, it has been pointed out that taking appropriate actions corresponding to the behaviors of flooding stream is important in a flood disaster. Therefore, it is important to grasp the actual behaviors of flooding stream in conjunction with improving inundation analysis techniques. In this study, observations and inquiring surveys were conducted after the flood disaster, and to grasp the behaviors of flooding stream qualitatively.

2. Flooding courses at basins of Kagetsu-gawa River and Yamakuni-gawa River

Heavy rains and flooding hit Hita City of Oita Prefecture where the Kagetsu-gawa River stretch of the Chikugo-gawa River system flows and Nakatsu City of Oita where the Yamakuni-gawa River flows twice on Jul 3rd and 14th. The following shows the results of the situation of flooding that occurred on July 3rd.

2.1 Kagetsu-gawa River (Miyuki-bashi Bridge ~ Kagetsu-gawa Bridge downstream)

This area is a district widely damaged by inundation. According to the inquiring surveys, we have heard residents in this area saying “overflowing water poured into the residential street from the street along embankments and the waterways inside the levees”. Based on which, it is suggested that not only configuration of the ground but also arrangement of spaces or roads and waterways will greatly impact on flooding streams (Figure-1). What is more, concrete block walls of Showa Gakuen High School were collapsed on a large scale by driftwood (Photo 1). This was an extremely large damage compared to other facilities around the area, leading to the assumption that fluid dynamic force increased substantially by flotsam. At the same time, there were a large number of lumber mills in the upper river and dam-up and facilities damage caused by drifting woods were seen in many places.

2.2 Yamakuni-gawa River

Although the Yamakuni-gawa River is an entrenched channel, overflow on levees were found here and there

due to dam-up caused by rubbles adhering to bridges. Figure-2 shows the situation of inundation in the Hida district. Controlled bridges of the Yabakei Bridge and the Arase dam were blocked by driftwood and there was overflowing in the scarp. Additionally, flooding water passed through the road in a community as its main course and the water level inundating houses at the mountain side was higher than that at the river side.



Figure-1 Study results of flooding stream of Kagetsu-gawa River

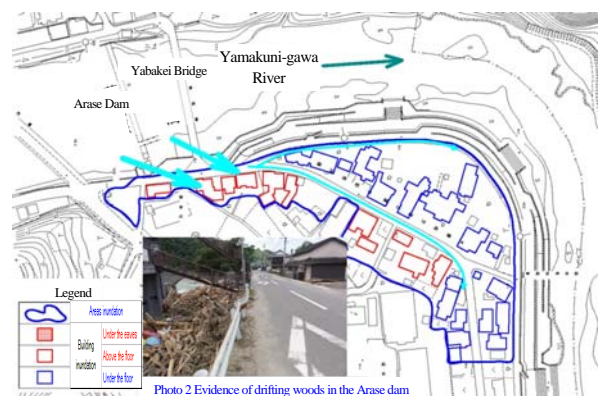


Figure-2 Study results of flooding stream of Yamakuni-gawa River

3. Conclusion

We showed one example of investigating results of behavior of flooding stream causing flood disasters. In the future, we will conduct a swift field-survey after occurring flood disaster and accumulate obtained data systematically for the purpose of contributing to consideration of risk-management measures and verification of inundation calculation accuracy based on the characteristics of flooding stream.