

The levee-breaching and scoured region characteristics of the Kinugawa River and some rivers in Ibaraki Prefecture at Kanto& Tohoku heavy rain in September 2015

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To clarify the levee breaching process at large flood event is very important for flood protection and mitigation countermeasures. Especially, scoured characteristics at levee toe by overflowing water from embankment is closely related to the enlargement of the breaching length and total flood volume to the hinterland. At the breaching point of the Kinugawa River in Kanto& Tohoku heavy rain in September 2015, very complex scoured region was generated. The scouring process is supposed to be related to the ratio of overflowing water depth and levee height, and breaching length in streamwise direction. The objective of this study is to elucidate the breaching phenomena not only for the Kinugawa River but other rivers in Ibaraki Pref., Miyato River, Nishinizure River, and Hachikenbori River, and relates the breaching length and the depth of the scoured region with the hydraulic parameters.

For the objective, post flood survey and flume experiment were conducted after the September flood. The characteristics of the breaching is that the overflowing water depth is small compared with the levee height, and half of the levee is scoured before breaching. The condition was set in a flume with 1/100 scale with two wooden levee. The levee shape were selected as the full shape and the half-scoured levee shape. Clear water scour condition was set at the downstream of the levee, and the scoured characteristics were measured.

The number of scoured region for the two-type levee condition were around 6, and is similar to the actual situation at the breaching point of the Kinugawa River. The scoured depth for half scoured levee shape was 1.5-1.8 times larger for full-size embankment case. The breaching widths for Miyato, Nishinizure, and Hachikenbori River, were relatively small, but was similar to the initial breaching width of the Kinugawa River. Initial breaching width is assumed to be closely related to the embankment height, but final breaching width is related to the flood duration, thus it is related to the river width.

Keywords: levee breach, scoured region, back water effect