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Experimental Study on Characteristics of Inundation in Flood Area due to Levee Breach

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This study was carried out to provide the fundamental data for establishing the evacuation system against the flood inundation due to levee breach. Hydraulic experiments were conducted basically to investigate the floodwater behavior in floodplain. The relation of levee breach width, breach time, water level and velocity in channel with the flood wave velocity, the maximum water depth in floodplain and free surface profiles at the time of the levee breach are described in this paper. The experimental set-up consists of a channel and a flood plain separated by a gate-fitted wall. The channel was 30 m long and 5 m wide, while the flood plain was 28 m long and 24 m wide. The beds of both the channel and flood plain are horizontal and made of cement mortar. The floodplain has the open boundaries on all sides. The gate is 4 m wide and 0.6 m high, which is located in the center of the channel. The channel has an initial depth, while the floodplain is initially dry. The opening speed of the gate can be regulated from 0 to 18 cm/sec and the gate is a sliding door. Water depth in inundation area is measured continuously by water level gauge at the target points. In this study, the experimental results were described for the flood wave propagation due to the river levee breach. In order to investigate these phenomena, the experiments were conducted on conditions of the several levee breach widths such as 0.5, 1.0, 1.5, 2.0 and 3.0m. To find the only the influence of the levee breach width, the conditions of the initial water depth and the slope and roughness of flood plain etc. were fixed. It was found that the wave front velocity has little concern with the levee breach width. It has known widely through the previous study that the wave front velocity has a strong relation with the initial water level in the reservoir or channel and that wave front velocity has relation with conditions of breach width and time. The maximum water depth become lower as the distance from breach point is far and decreasing abruptly near the breach point of levee. In relation to levee breach width, the wider the width of breach was, the deeper the water depth became. But, the deepest depth in each measurement point is not likely to be affected by discharge of the channel. Fig.1 and 2 show representative results in this experiment. The wave front velocity is varied with the breach width and the duration time. Fig.1 Propagation distance and wave front velocity (Propagation distance) Fig.1 Propagation distance and wave front velocity (Sectional wave front velocity) Keywords: flood inundation, levee breech, duration time, experiment,