HISTORICAL FLOOD-CONTROL TECHNOLOGY AND FLOOD FLOW ANALYSIS IN THE KOTSUKI RIVER, JAPAN

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Mr. Sangoro Iwanaga and his masonry group led the way in constructing the flood-control measure of the Kotsuki River in Kagoshima City, Japan in the 1880s. Five famous masonry bridges were constructed on the lower reaches of the river. And a flood control basin was set up in combination with masonry bridges in the midstream. Take Bridge, the longest bridge in Japan with five spans was destroyed by the flood on August 6, 1993. This heavy rain hit the urban drainage of the Kotsuki River. About 13000 houses were flooded. The monthly precipitation recorded 1054.5 mm in July, 1993 according to the Kagoshima local meteorological observatory, and broke the previous record. As a result the Kotsuki River overflowed the banks and flew down the roads to the downtown of Kagoshima City. After the flood disaster, we investigated the overflowing period and the direction and depth of inundation flow. Howevers, the hydraulic behavior of the overland flood flow remained unknown.

We have computed the behavior of flood flow. The overflow began around 17:30 and finished around 22:00. The overflowing water was mostly from the left side of the bank. The computed time-shift results of water profiles showed a close agreement with the observed data at Iwasaki Bridge and Shinkan Bridge. Through this study, we learned about the Iwanaga's wisdom of flood control technology more than a century ago.

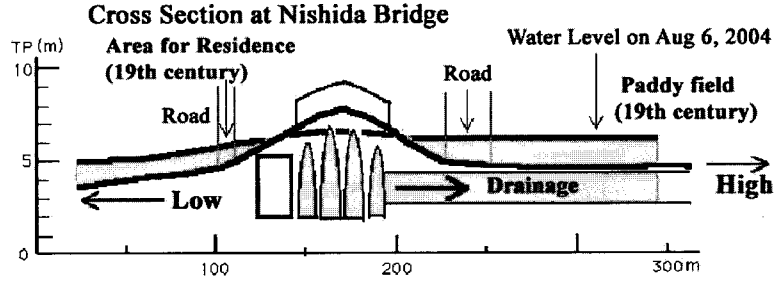

Fig. 1 Water mark of Flood at Nishida Bridge (*Nishidabashi, 3rd*)

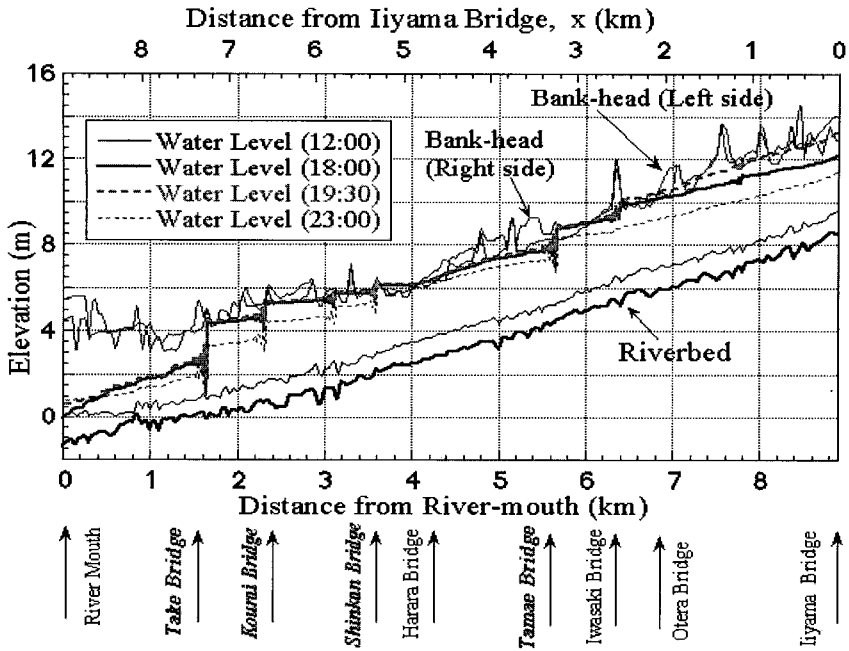

Fig. 2 Time-shift of calculated water profiles in the Kotsuki River on Aug. 6, 1993