Hydrodynamic Modeling for Better Understanding of Flood and Manmade Interventions in the Sungai Sarawak

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Abstract

Kuching city is the state capital of Sarawak. It is located on the Sungai Sarawak, where parts of the city are susceptible to river flooding from fluvial and tidal events. Several structural solutions were built to control and prevent the damaging effects of Sungai Sarawak flooding; however, such hard intervention change the flow regime and causing a dynamic change of flooding behaviors as well. An understanding of the flood behaviors is possible with the assistance of hydrodynamic flood models. This paper reviews the river modeling case studies of the tributaries of Sungai Sarawak system, namely the Sungai Maong, Sungai Sarawak Kanan and Sungai Sarawak Kiri to reflect the risk of flooding changes imposed by the major hydraulic structures like the Kuching Barrage and Batu Kitang Submersible Weir.

***Keywords**: Flood; Hydraulic structures; Kuching city; Hydrodynamic modeling; Sungai Sarawak*

Introduction to Sungai Sarawak

Sungai Sarawak system (see Figure 1), rising in the Bungoh Ranges to the south of Kuching city at the border to Indonesia, meanders across a wide coastal floodplain and through the capital city before discharging to the South China Sea at Muara Tebas. The Sungai Sarawak basin has an area of approximately 2375 km and the river length is about 120 km which consists of two principal tributaries, namely Sungai Sarawak Kanan and Sungai Sarawak Kiri. The two tributaries meet near Batu Kitang, some 34 km upstream of Kuching.

On the eastern of the city, Sungai Sarawak divides and prior to 1998, there were two exits to the sea, one on the Sungai Sarawak (about 30 km to the sea) and one on the Sungai Santubong (about 20 km to the sea). The Kuching city is very flat and low lying, therefore is subject to significant tidal actions. Parts of the city are susceptible to flooding from fluvial and tidal events. The average annual rainfall in the catchment is about 3800 mm. During the wet season, known locally as the Landas season, lasts from October to March has a mean monthly rainfall between 400 to 500 mm. In the drier season, the rainfall is typically between 200 to 300 mm per month.