

ABSTRACT

A devastating flood disaster occurred at Kuala Krai, Kelantan on December 2014. Continuous heavy rain for over three days from the 21 to the 23 of December, 2014 was set a rainfall record of 1,295 mm, equivalent to the amount of rain usually seen in 64 days. As a result, the water levels of three major rivers, the Sungai Galas in Dabong, the Sungai Lebir in Tualang and the Sungai Kelantan in Jambatan Guillemard, rose above the dangerous water levels. The objectives of this study are i) to determine the maximum capacity of river channel ii) to determine the cumulative rainfall depth that cause inundation or flood iii) to determine the warning time of the flood and iv) to determine the best duration of mitigation in Kuala Krai, Kelantan. Flood occurrences at Kuala Krai from (1-31 December 2014) and design rainfall (2, 10, 50 and 100 year return period) was be an input data into HEC-HMS. The Arc-GIS is used to process the Thiessen polygon method in order to analyse the mean rainfall event before importing to the HEC-HMS model. The simulated flood hydrograph generated by HEC-HMS will be run by using HEC-RAS. This is because to analyse the hydraulic parameters in Kuala Krai. The flood hydrograph that generated by HEC-RAS will be used in order to analyse the time warning in Kuala Krai, Kelantan based on the design rainfall (2, 10, 50 and 100 year return period). The analysis's result of potential time warning in Kuala Krai, Kelantan is useful information that can help the authorities and the residents in order to make a mitigation decision. Based on analysis of the time warning, the maximum potential time warning is **68 hours**, while for detection time warning is **52 hours** with cumulative rainfall **705 mm**. The best mitigation time warning available in this study is **15 hours**. So all the evacuation procedure need to be response within the mitigation time warning. The expected benefit in this study is to provide information to local residents about the potential time of flood early warning. Also, the authorities can use the output from this study to make the precaution steps such as the alarm siren to give warning to the people for evacuate them self.

KEYWORDS: Flood Simulation, Flood Disaster, Arc-GIS, HEC-HMS Modeling, HEC-RAS Modeling, Kuala Krai and Kelantan Catchment