

Bed Load and River Bed Pattern at Lebir River after Extreme Flood Event in 2014

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Abstract:

Lebir River is the main river that joins Sungai Galas to form Sungai Kelantan at Kuala Krai. In December 2014, it had faced extreme flood event. The situation has led to the introduction of changes and movement of sediment along Lebir River. This study was done to determine a bed load discharge and deposition of bed load at river bed after this flooding. Five locations have been identified to be used as the sampling location. Three different methods were used to determine the bed load discharge; Meyer-Peter Muller, Schoklitsch and Duboys. Results of the study shows, the size of the sediment in Lebir River is between 0.75mm to 5.0mm and an average velocity is 0.224m/s up to 0.599m/s. From the analysis, it shows that Meyer Peter Muller is suitable to predict bed load in Lebir River. The Meyer-Peter and Muller formula obtained from experiments with relatively sediment and formula has been used frequently to estimate rates of bed load discharge. It suitable for uniform sediments with specific gravity that are varying from 1.25 to 4. The particle size range for the Meyer Peter and Muller is between 0.4–28.65mm. This method give better prediction compares other two methods and it is suitable for coarse sands and gravel. The river profile in selected point was identified to determine the river bed pattern cause by deposition of sediment at Lebir River after facing an extreme flood event in 2014.

Keywords: bed load, extreme flood, Lebir River, Meyer-Peter Muller, river pattern

Introduction

Each year, usually flood is often to occur in Kelantan. In year 2014, it can be considered as one of the worst flood and Lebir River is one of the most affected areas in Kelantan by flood. Erosion of sediment is one of main cause that begins the process of sediment transport which also can cause bed load in river to increase.

Sediment can be transported by a flow of water. Sediment transport can be in the form of bed-load and suspended load, which are depending on the size of the bed material particles and the flow conditions. Some factor which influence the sediment transport are flow conditions, sediment size and sediment density. Usually, the greater the flow of water, the more sediment will be transported while the movement of sediment will control the size and shape of bed forms. The most important property of the sediment particle or grain is its size (Arman and Mohammad, 2013).

This study was done to determine a bed load discharge of Lebir River using selected method and deposition of bed load at Lebir River bed after 2014 flood. The study will focus at 5 points at Lebir River. Figure 1 shows the location of 5 sampling point at Lebir River since there are 5 hydrological stations nearby the Lebir River. The amount of sediment that is carried by a stream will past the gauging station that will be as reference point.