

DATA ANALYSIS OF SUSPENDED SEDIMENT
FOR RIVERS



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by

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ABSTRACT

Data analysis of suspended sediment was made based from data taken from three rivers namely Sungai Lui, Sungai Semenyih and Sungai Langat in Selangor. The data were measured from four gauging stations namely Kajang and Dengkil along Sungai Langat, Kg. Lui along Sungai Lui and Kg Rinching along Sungai Semenyih. Observed river stages during the study were between 3.87 m and 77.36 m. Data covers flow discharges ranging from 2.053 m³/s to 87.792 m³/s. Observed velocities were between 0.411 m/s and 1.422 m/s with range of flow depths between 0.302 m to 3.227 m. Measured suspended load for the rivers were between 0.046 kg/s to as high as 118.305 kg/s. From this study it revealed that suspended load constitutes a large fraction of the total load. Thus it can be concluded that total load is dominated by suspended load in most rivers. The concentration of suspended sediment in relation to flow depth is established.

1 INTRODUCTION

In natural rivers where fine sediments constitute a large fraction of the river bed, suspended sediment comprised most of the total sediment load. Thus suspended sediment is more dominant to bed load. Prediction of sediment transport rates is useful in rivers and environmental assessment. The amount of sediment that moves in suspension depends on various factors. The capability of water to hold sediment is known as the stream power (Yang) and this prevents the sediment from settling. Other factors include the amount of sediment discharge into the upper reach, the velocity of flow, the depth of flow, the viscosity of water, size of sediments, the fall velocity of sediments and the cross-section of flow. The viscosity of water is said to increase if the concentration increases. Particle size is another factor that determines the amount of suspended sediment discharge. Sediments are said to be in suspension if it moves within the water surface to a depth at a distance two times the grain size from the bed.

The transport of sediments in streams or rivers plays a major role in affecting the engineering applications and water quality. Generation of local scour around bridge piers and other hydraulic structures, aggradation and degradation problems downstream from dams and the occurrence of sedimentation in reservoirs require an in-depth understanding of the transport process of sediments. The ability to predict suspended sediment concentrations has a measurable effect in understanding the water quality dynamics and the biological process in water bodies.

Sedimentation has become a major problem due to the increased in surface runoff resulted from the rapid development in most part of the country. With the vigorous activities ongoing it is believed that the finding from the research will benefit not only

the river engineers but it can also be applied to sedimentation problems in the coastal region.

1.1 Objectives of research

The aim of this research work is to analyse the suspended sediment data in terms of the sediment properties and the hydraulic characteristics of the rivers under study.

1.2 Significance of the research works

The results obtained will help to eliminate some of the problems faced by the hydraulic engineers dealing with river engineering applications and water resources development.

This project is viable to the country as it allows:

- (i) prediction of suspended sediments in streams or rivers that enables mitigating measure to be undertaken.
- (ii) The assessment of water quality in rivers as suspension of sediments would elevate the concentration levels. The knowledge on this is important as the aquatic life population can be improved by proposing certain preventive measure.
- (iii) The characterisation of sediments and contaminants in the water bodies which lead to further research by post graduate students.
- (iv) Improvement of the recreational quality and overall appearance of our lakes, rivers and reservoirs.
- (v) An in-depth study of their impacts on structural development and urbanisation.