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Impact of Fine Sediment on TSS and Turbidity in Retention Structure

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Abstract

A study of the impact of fine sediment on various water quality parameters in retention structure such as sediment basin was conducted on stagnant and flowing condition. 7 water quality parameters (pH, TSS, turbidity, DO, BOD, COD, ammonium nitrogen) were measured and classified according to the Interim National Water Quality Standard (INWQS) for Malaysia. Results show higher fine sediment concentration causes higher TSS and turbidity. Besides, results show TSS and turbidity were influenced by soil type for the same amount of fine sediment. Soil Siri Rasau 1 showed highest TSS and turbidity value followed by soil Siri Bungor and soil alluvium. A good positive correlation of TSS versus turbidity and has been investigated in this study. Multiple nonlinear regression analysis revealed that parameter TSS is dependent on time, total soil mass, fine soil mass and flow rate.

Keywords

Fine Sediment, TSS, Turbidity, Water Quality

1. Introduction

Nowadays, Malaysia faces many challenges in controlling the quantity and quality of stormwater runoff. Stormwater runoff is the major contributor to river pollution (Nazahiyah et al., 2007). One way of controlling increased runoff due to urbanization and social-economic development is to build stormwater management facilities, such as retention/detention ponds. A retention basin is a part of drainage system to control water flow and trap those contaminated solid particles along with the water flow (Lee et al., 1997).

The primary removal mechanism of the retention ponds gravitational settling of those contaminated solid particle especially those with nutrients will affect the biological activity in the pond. Previous study showed that freshwater wetland interaction with sediment affect surface water quality (Johnston, 1991). Most of the retentions ponds are suffered from water pollution problems such as siltation, sedimentation, accumulation of toxic material, algae bloom and so on. Such a condition can also cause a number of social, health and environmental problems, such as odour smell, disease, poor aesthetic value in the surrounding area.

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