

Determination of Sediment Deposition Speed in Slide Plane and Mitigation Efforts

ABSTRACT

Landslide disasters generally occur in areas with steep slopes. When rainwater hits the slopes, it will saturate the soil-rock mass covering the slopes. This mass will disintegrate, slip away, and be dragged by the water down the slopes because it is influenced by gravitational force. During a slip, the water leaves the debris mass, and the debris mass follows the water down the slopes until it finally settles. Some settle along the way, and some reach under the slopes and even downstream of the river to the sea. So during the movement of the mass of debris dragged by the water flow, it experiences resistance with the water and slip slopes. The research aims to formulate a theoretical equation model to determine the settling speed of sediment grains in landslide areas. The research seeks to develop a theoretical equation model to determine the settling speed of sediment grains in landslide areas. The research results obtained two-equation models to determine the settling speed of sediment grains, namely the slip equation model for dragging debris/sediment in the form of a rigid sliding ball and a rigid slab. The deposition of sediment grains in the rigid sliding ball and sliding slab models has a fast time at high speed. This shows that there is a buildup of sediment in the landslide area. Meanwhile, sediment that has not yet settled (fine-grained and slightly coarse) will move along with the water down the slope until it finally settles on a flat surface below the foot of the slopes. Mitigation efforts carried out to prevent or control the entry of surface water into landslide and landslide-prone areas are by creating water toll roads adjusted to topographic conditions and planting vetiver grass in landslide areas.

Keywords: deposition speed, sediment, slip plane, mitigation efforts

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Session Classification: Parallel Session

Track Classification: Environmental, Conservation and Biodiversity