

https://dspace.org/

Implications of bed load transport mode on flushing flows in smooth pipe

Collinge, Sarah Lyn

2015-03-25
http://hdl.handle.net/10539/18566

Downloaded from a DSpace repository. https://dspace.org/

ABSTRACT

The mode of sediment transport in a pipe has important practical implications on self-cleansing flows. The two transport modes; discrete and collective, have significantly different active storage volumes and effective grain velocities. Excessive deposition of sediment occurs in the collective mode and can have harmful environmental, social and economic effects. The conditions under which each mode prevails and their effects on self-cleansing flows are explored in this research report through laboratory investigation. Supply-limited bed load experiments were performed resulting in two new relationships being developed to predict the prevailing transport mode and the volume of active storage in a pipe under certain conditions. A recommended methodology and a set of new design graphs are presented as amendments to the current design guidelines for the prediction of flushing flows rates and corresponding minimum durations for sediment transport in a smooth pipe.