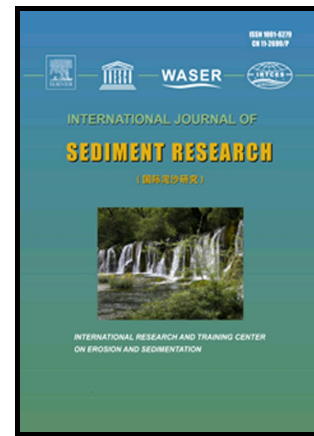


Author's Accepted Manuscript

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PII: S1001-6279(16)30138-X
DOI: <https://doi.org/10.1016/j.ijsrc.2018.04.010>
Reference: IJSRC179

To appear in: *International Journal of Sediment Research*

Received date: 7 December 2016
Revised date: 8 January 2018
Accepted date: 20 April 2018

Cite this article as: Chung Rak Song, Jinwon Kim, James Tyler Kidd, Alexander Cheng and David Admiraal, Effect of thickness of planar nozzles on erosion depth of levee soils subjected to plunging water, *International Journal of Sediment Research*, <https://doi.org/10.1016/j.ijsrc.2018.04.010>

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Effect of thickness of planar nozzles on erosion depth of levee soils subjected to plunging water

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ABSTRACT

In this study, the effect of the thickness of a planar jet on the erosion depth when the jet impinges on a surface composed of cohesive soil was analytically and numerically evaluated. The results showed that the erosion depth was practically independent of the nozzle thickness for erosion depths shallower than the potential core length (i.e. the region of the jet in which the central flow velocity is the same as the nozzle velocity). The relation between nozzle thickness and erosion depth was non-linear with continuously variable slope for erosion depths deeper than the potential core length. Finally, the relation was approximately linear when the erosion depth converged to the equilibrium erosion depth. The findings of this study indicate that direct and fast prediction of the erosion depth in the field is possible using the data from a small scale soil erosion test with similar flow velocities.

KEYWORDS

Nozzle thickness; Levee erosion; Erosion depth; Plunging water; Planar nozzle

1. Introduction

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