

Peerapon Kaewnon 2012: Channelization Due to Seepage Erosion in Three Dimensions.
Master of Engineering (Water Resources Engineering), Major Field: Water Resources
Engineering, Department of Water Resources Engineering. Thesis Advisor:
Miss. Wandee Thaisiam, Ph.D. 136 pages.

Seepage of groundwater causes soil piping at the scarp which results in the instability of the scarp and finally leads to the mass failure. If the mass failure at the scarp proceeds continuously, the channel could be developed. The purpose of this study is to investigate the channelization and channel characteristics due to seepage erosion. A three-dimensional laboratory experiment of channelization is performed in a chamber of 1.00 m x 2.20 m x 0.225 m. Two sizes of cohesionless soil ($D_{50} = 0.56$ mm and 0.86 mm) are employed in this study. The experiments are conducted in order to explore the effects of bed slope and groundwater head to seepage erosion and channelization process. Our results show that larger grain size displays more influence on the circularity of the channel than smaller grain size does since there is a bifurcation for large grain size only. In addition, the continuation of mass failure caused by seepage flow also results in a prolonged retreat of channel head and becomes rather steady with time. Moreover, the groundwater head and the increasing slope of channel bed allow greater flow for underground water. Consequently, the channel is wider while the depth of downstream channel becomes shallower as time passes because of the occurrence of alluvial fan at the downstream channel.

Student's signature

Thesis Advisor's signature