

Numerical Investigation of Wave Run-Up on Curved Dikes

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Abstract : Due to the climatic change and the usage of coastal areas, there is an increasing risk of dike failures along the coast worldwide. Wave run-up plays a key role in planning and design of a coastal structure. The coastal dike lines are bent either due to geological characteristics or due to influence of anthropogenic activities. The effect of the curvature of coastal dikes on wave run-up and overtopping is not yet investigated. The scope of this research is to find the effects of the dike curvature on wave run-up by employing numerical model studies for various dike opening angles. Numerical simulation is carried out using DualSPHysics, a meshless method, and OpenFOAM, a mesh-based method. The numerical results of the wave run-up on a curved dike and the wave transformation process for various opening angles, wave attacks, and wave parameters will be compared and discussed. This research aims to contribute a more precise analysis and understanding the influence of the curvature in the dike line and thus ensuring a higher level of protection in the future development of coastal structures.

Keywords : curved dikes, DualSPHysics, OpenFOAM, wave run-up

Conference Title : ICCEM 2019 : International Conference on Coastal Engineering and Modelling

Conference Location : Dubai, United Arab Emirates

Conference Dates : January 30-31, 2019