Verification of a VOF-based two-phase flow model for wave breaking and wave-structure interactions

Hieu P.D., Tanimoto K.
Department of Oceanography, Hanoi University of Science, VNU, 334-Nguyen Trai Str., Thanhxuan, Hanoi, Viet Nam; Graduate School of Science and Engineering, Saitama University, Sakura-ku, 338-8570, Japan

Abstract: The objective of the present study is to develop a volume of fluid (VOF)-based two-phase flow model and to discuss the applicability of the model to the simulation of wave-structure interactions. First, an overview of the development of VOF-type models for applications in the field of coastal engineering is presented. The numerical VOF-based two-phase flow model has been developed and applied to the simulations of wave interactions with a submerged breakwater as well as of wave breaking on a slope. Numerical results are then compared with laboratory experimental data in order to verify the applicability of the numerical model to the simulations of complex interactions of waves and permeable coastal structures, including the effects of wave breaking. It is concluded that the two-phase flow model with the aid of the advanced VOF technique can provide with acceptably accurate numerical results on the route to practical purposes.
Author Keywords: Numerical simulation; Porous breakwater; Submerged breakwater; Two-phase model; Wave breaking
Index Keywords: Coastal engineering; Computer simulation; Mathematical models; Two phase flow; Water waves; Porous breakwater; Submerged breakwater; Two-phase flowmodel; Volume of fluid (VOF); Wave breaking; Wave-structure interactions; Breakwaters; Breakwaters; Coastal engineering; Computer simulation; Mathematical models; Two phase flow; Water waves; breakwater; coastal engineering; computational fluid dynamics; flow modeling; numerical model; two phase flow; wave breaking; wave-structure interaction

Year: 2006
Source title: Ocean Engineering
Volume: 33
Issue: 12-Nov
Page : 1565-1588
Cited by: 5
Link: Scorpus Link
Correspondence Address: Hieu, P.D.; Department of Oceanography, Hanoi University of Science, VNU, 334-Nguyen Trai Str., Thanhxuan, Hanoi, Viet Nam; email: hieupd@vnu.edu.vn
ISSN: 298018
DOI: 10.1016/j.oceaneng.2005.10.013
Language of Original Document: English
Abbreviated Source Title: Ocean Engineering

Document Type: Article

Source: Scopus

Authors with affiliations:

- Hieu, P.D., Department of Oceanography, Hanoi University of Science, VNU, 334-Nguyen Trai Str., Thanhxuan, Hanoi, Viet Nam
- Tanimoto, K., Graduate School of Science and Engineering, Saitama University, Sakura-ku, 338-8570, Japan

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