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Model Development for Solving 3D Landslide Generated Tsunami.

Shun-Kai Hu (1) and Tso-Ren Wu (2)

(1) Graduate Institute of Hydrological and Oceanic Sciences, National Central University,Taoyuan City, Taiwan (104626008@cc.ncu.edu.tw), (2) Graduate Institute of Hydrological and Oceanic Sciences, National Central University,Taoyuan City, Taiwan (tsoren@ncu.edu.tw)

Landslide generated tsunami often caused severe damage in the near-source coastal area. However, the dynamics of the wave generation between landslide and tsunami has not been well studied. In this paper, we explored the generation process numerically. Surface-piercing rock slide was one of the focuses. The kinematic of the rocks was described by the newly developed egg-shape Moving-Solid-Algorithm (MSA). The egg-shape, including ellipsoid-shape and sphere, was divided into four curvatures. Discrete-Element-Method (DEM) will be adopted to calculate the solid motion. The result was coupled with a fluid dynamic model, Splash3D, by solving the full Navier-Stokes equations. The violent breaking waves was described by Volume-of-Fluid (VOF) method with Piecewise-Linear-Interface-Calculation (PLIC) surface reconstruction algorithm.

In this study, we present a series of numerical experiment to validation the accuracy of MSA. Cases of floating block and landslide box were performed. Good comparison results can be seen. As for the egg-shape MSA, the case of water entry sphere was chosen for validation. Very good results in terms of the displacement and the shape of air cavity can be seen. The characteristics of landslide tsunamis were presented. At the end, the boulder pushed by high-energy waves will simulated and discussed.