2D Simulations of breaking wave impacts on a flat rigid wall

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ABSTRACT

Four different breaking wave impacts against a flat rigid wall are numerically simulated. The waves are generated and propagated along a wave canal by *FSID*, a non linear mono-fluid potential code [1]. For each wave, the last stage of the propagation and the corresponding impact are simulated by *SPH-Flow* software, after a restart from *FSID* calculation, with refined discretizations. *SPH-Flow*, developed by *HydrOcean* and *Ecole Centrale Nantes* (*ECN*), solves the compressible Euler equations for liquid and gas thanks to a Smoothed Particle Hydrodynamics (SPH) method. The four wave shapes before impact have been tuned in order to be representative of the shapes obtained during wave impact tests in flume tanks or during 2D sloshing model tests for low fills. A flip-through impact and three gas-pocket impacts with different sizes of the gas cavity have been selected.

The different assumptions and models are briefly presented for the four calculations. Results are shown in terms of pressure maps p(y, t), where y is the height of any point of the wall and t is the time. The time traces of the different components of the energy are also provided. The impact loads for the four waves are analyzed with regard to the wave characteristics and decomposed in Elementary Loading Processes (ELP) [2], showing common characteristics.

REFERENCES

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