

## **Numerical Modelling of coastal structure using SPH-based DualSPHysics model.**

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### **ABSTRACT**

Coastal structures are implemented along the coasts as measures to counter coastal erosion and the detrimental effects caused by sea waves. In order to maximize the efficiency of these structures, sea conditions during extreme events should be taken into consideration as to avoid the occurrence of wave overtopping, erosion and thus leading to structure failure. This study with the objective to identify the force exerted on several coastal structures and overtopping occurrence under a variety of wave conditions will be compared with the numerical results done by Dang et al., (2021). This study, however, focuses on three different structures; the vertical wall, the trapezoidal wall and the stepped wall, and is simulated using DesignSPHysics, a new addition to the open-source code named DualSPHysics. A simulation with no coastal structure is also presented in this study. The cases take damping systems into account, particularly active wave absorption system. Furthermore, overtopping simulations were conducted as to assess the various structures under the chosen wave conditions. Results signifies that, the stepped wall has the least overtopping occurrence in comparison to the other structures. The simulation presented in this study well replicates that of the study done by Dang et al., (2021).

### **Keywords:**

Coastal Structures, Overtopping, DualSPHysics, Smoothed Particle Hydrodynamics, Numerical Modelling

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