## The application of SPH-GPU to the structure taxing on the water

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## Abstract

A strong splash phenomenon is produced because the water is affected by the great Fluid Structure Interaction (FSI) when the seaplanes taxing on the water. This splash would damage the propeller or cause the engine flame out, which threatens the aircraft safety. Therefore, it is significant to study the problem of the structure like seaplane taxing on the water. In this paper, the SPH (Smoothed Particle Hydrodynamics)-GPU(Graphics Processing Unit) program is used to analyze the large scale 3-D splashing phenomenon of the structure taxing in the still water. Firstly, the model of the seaplane is simplified, as shown in Fig.1, the wedge and water tank model is established. Then, the influence of the simulated parameters such as the artificial viscosity, XSPH and the turbulence resistance coefficient on water splash is discussed. A set of reasonable parameters is obtained according to the experiment. Moreover, based on the reasonable parameters, the effects of the particle spacing and the smoothing length on the form of the splash is researched. Finally, we compare the results with the experimental and software simulated values to validate the improved program by ourselves for the problem of the structure taxing on the water.



Fig.1 the wedge and water tank model

## **Keywords**: SPH-GPU, FSI, splash **References**

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