

SECTOR:  
LAND SYSTEMS

OFFERINGS:  
ENGINEERING SIMULATION  
SERVICES

TECHNOLOGY:  
FLUID DYNAMICS

## FLOATATION OF FUTURISTIC INFANTRY COMBAT VEHICLE USING SPH

India is embarking on design and development of Futuristic Infantry Combat Vehicle (FICV). One of the major tasks in the design of FICV is making the vehicle amphibious i.e. to make it float and travel forward in water. First part of the design focuses on the vehicle volume to have adequate buoyancy. Redistribution of loads is done such that any perturbation in the floating position leads restoring moment, hence stability. Internal research project was undertaken to simulate FICV when it suddenly enters water.

FICV was modeled as an outer geometry that interacts with water. Internal subsystems were modeled as lumped masses in their respective CG positions with the total mass being ~15 tons. To test severe conditions, the FICV was dropped in fresh water body from a certain height as opposed to real case where it enters smoothly. Simulation aimed to capture the sloshing of water and the time varying orientation of FICV. Water is modeled as 70K particles and it took 4 hours of parallel GPU computing time to simulate the problem.

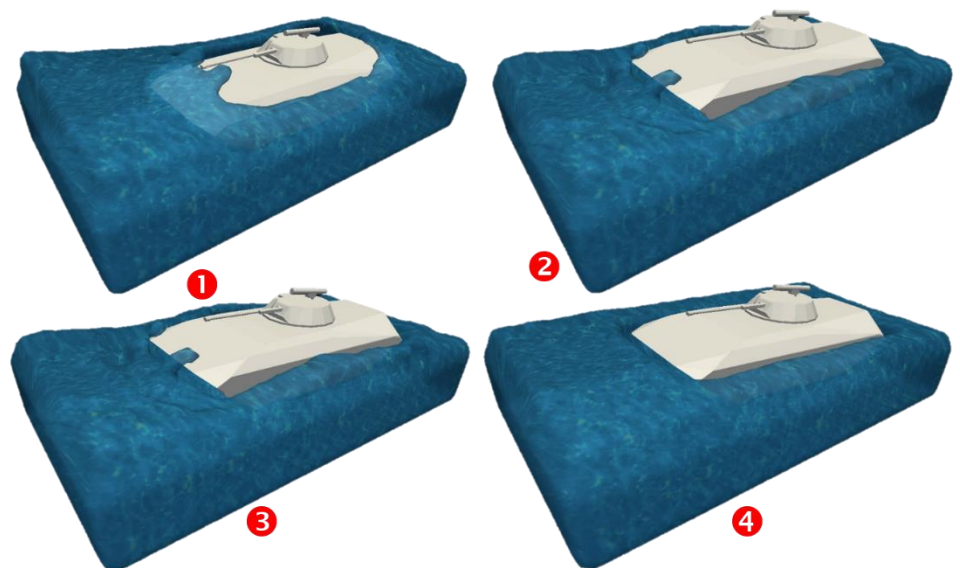


Figure 50: FICV in different positions

Few cases were tried with same outer shape but different mass distribution with the stable version shown here. The vehicle is dropped from small height that made it go inside water and then come out. After some perturbations, the vehicle rested stably in water as seen in part 4 of the figure. Same technology has been used in simulation of ships too.