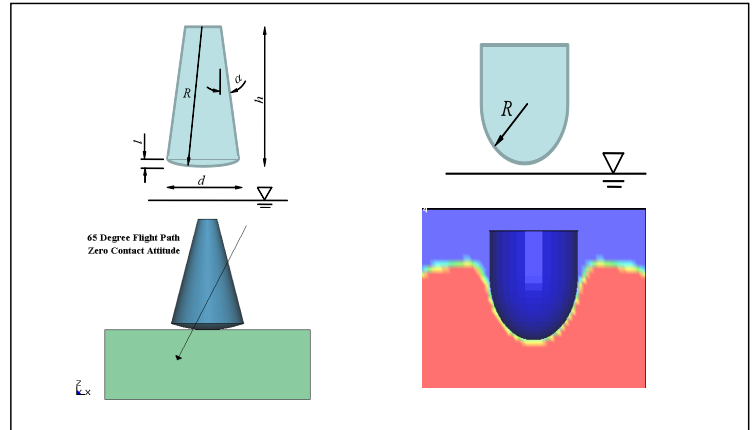


Multiphysics Modelling of Water Impact on Aerospace Structures

Objective

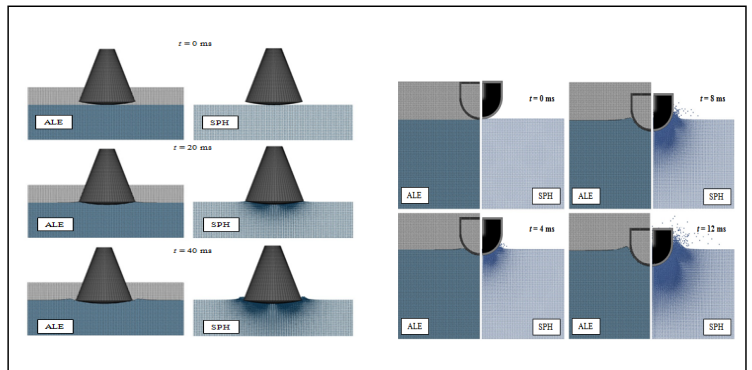
❑ To understand and analyse the underlying transient dynamic & fluid-structure interaction of the aerospace structures subjected to water impact with the aim to determine correctly the accelerations and velocities of the impacting objects.



Methodology

❑ Fluid structure interaction based numerical study of impact loading for a hemispherical structure upon water and a space capsule water landing were carried out.

❑ Smoothed Particle Hydrodynamics (SPH) and Arbitrary Lagrange-Eulerian (ALE) methods were used to simulate the behaviour of the fluid (water) under impact conditions.



Outcome

❑ Motion of the water for the ALE model is more realistic than the equivalent SPH method since it was being damped by the air, whereas in the SPH method it was not.

❑ SPH and ALE methods are suitable for the study of fluid-structure interaction problems, which have strong potential to assist the aerospace industry with future design, certification and accident investigation of water impacting objects.

