

Abstract Submitted
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Experimental and Numerical Study of Water-Filled Vessel Impacted by Flat Projectiles¹ WEI ZHANG, PENG REN, WEI HUANG, YUBO GAO, Harbin Institute of Technology — To understand the failure patterns and impact resistance of watertight vessel, a flat-nosed projectile was accelerated by a two-stage light gas gun against a vessel filled with water which was placed in an air-filled tank. The targets were the 5A06 aluminum which were installed on two opposite sides of the vessel. The penetration process was recorded by a digital high-speed camera. In order to compare, numerical simulations for the vessel with and without water impacted by projectiles were conducted by AUTODYN-3D. The material parameters of targets and projectiles used in the simulation were obtained from several previous studies. The result indicated that experimental and numerical results were in good agreement. Numerical simulations were capable to capture the main physical behavior. It was also found that the impact resistance of targets in the water-filled vessel was larger than that of the empty vessel. Tearing was the main failure models of the water-filled vessel targets which was different from that of the empty vessel where the shear plugging was in dominate.

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