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Experimental investigation on underwater trajectory deviation of high-speed projectile with different nose shapes[1] WEI ZHANG, WEI HUANG, YUBO GAO, YAFEI QI, Harbin Institute of Technology, HYPERVELOCITY IMPACT RESEARCH CENTER TEAM — Laboratory-scaled oblique water entry experiments for the trajectory stability in the water column have been performed with four different nosed-projectiles at a range of velocities from $20m/s$ *to* 250 m/s. The slender projectiles are designed with flat, ogival, hemi-sperical, truncated-ogival noses to make comparisons on the trajectory deviation when they are launched at vertical and oblique impact angles ($0^{\circ} \sim 25^{\circ}$). Two high-speed cameras that are positioned orthogonal to each other and normal to the column are employed to capture the entire process of projectiles' penetration. From the experimental results, the sequential images in two planes are presented to compare the trajectory deviation of different impact tests and the 3D trajectory models are extracted based on the location recorded by cameras. Considering the effect influenced by the impact velocities and noses of projectiles, it merited concluded that trajectory deviation is affected from most by impact angle, and least by impact velocities. Additionally, ogival projectiles tend to be more sensitive to oblique angle and experienced the largest attitude changing.

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