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Numerical Simulation and Experimental Study on Flight Characteristics and Penetration Against Spaced Targets of EFP in Water

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Abstract: Aiming at the applied problem in underwater munitions of explosively formed projectile(EFP) warhead, the rule of velocity attenuation, mass loss and penetration ability against spaced targets under different distance conditions of EFP in water was simulated and studied by the LS-DYNA finite element software. The test verification was carried out by a high-speed photography. Results show that the configuration of EFP after entering water is unstable. The mass of EFP is sharply decreased, even leads to fragmentation. With increasing the traveling distance of EFP in water, the mass of EFP is reduced to $1/3 \sim 1/5$ of initial mass. The velocity of EFP in water decreases linearly at first and then decays exponentially. The EFP of traveling the 2.5 times charge diameter distance can penetrate the 5 mm target plate, but the EFP of traveling the 5 times more than charge diameter distance has no penetration ability.

Key words: explosively formed projectile(EFP); water medium; penetration; numerical simulation; flight characteristics

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更正

本刊 2017 年第 3 期 227 页图 1 的注释有误,更正为:

1,6—电雷管, 2,7—传爆药柱, 3—电探针, 4—参试药柱, 5—圆筒, 8—光源弹, 9—高速相机

1,6—electric detonator, 2,7—booster, 3—electric probe, 4—sample, 5—cylinder, 8—lamp-house bomb,

9—high-speed video camera