

Effect of Explosive/Tungsten Powder Mass Ratio for LCD Ammunition on Dispersal Characteristics of Tungsten Powder

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Abstract: To study the effect of explosive/ tungsten powder mass ratio on dispersal velocity of tungsten powder for low collateral damage (LCD) ammunition, a model describing the theoretical relation of initial dispersal velocity of tungsten powder and explosive/ tungsten powder mass ratio was established based on the related theory of explosion mechanics. To analyze the axial velocity of tungsten powder, seven plans of explosive/ tungsten powder mass ratio from 0.0335 to 0.3636 were numerically simulated by ATUODYN-3D software. The axial dispersal velocity of tungsten powder under different plans was analyzed and compared. To verify the theoretical model of initial dispersal velocity of tungsten powder and mass ratio and simulation results of initial dispersal velocity of tungsten powder with different explosive/ tungsten powder mass ratio, the experiments of three LCD simulated projectile with mass ratio as 0.0335, 0.0875 and 0.2113 were performed. Results show that the relationship of initial dispersal velocity of tungsten powder and explosive/ tungsten powder mass ratio is nonlinear increasing. Increasing the explosive/tungsten powder mass ratio can effectively increase the velocity of tungsten powder, but when the explosive/tungsten powder mass ratio is greater than 0.1734, the promotion effect on the velocity of tungsten powder will began to decrease. The simulated results and the theoretical calculation results of initial dispersal velocity of tungsten powder are in better agreement with the experimental ones under same mass ratio.

Key words: low collateral; explosive/tungsten powder mass ratio; tungsten powder; dispersal velocity

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