Terminal Ballistic Performances of Spherical Tungsten Fragments under Explosive Loading

D. W. Tan, X. Zhang, R. Y. Cao

National Key Laboratory for Shock Waves and Detonation Physics, Institute of Fluid Physics, CAEP, Mianyang, Sichuan 621900, China

Abstract: Terminal ballistic performance differences between ideal spherical tungsten fragments and spherical tungsten fragments under explosive loading are studied in this paper. The results show that: (1) the mass loss and deformation relate with the size of fragments, the mass losses are around 6.1% and 7.4% for fragments with diameter 6.0 mm and 7.5 mm respectively, however the fragments are broken for 8.5 mm spherical fragments; (2) For ideal tungsten spherical fragments, velocity decay coefficient is constant, air drag coefficient linearly related with initial velocity range from 0.6 km/s~2.2 km/s; (3) For spherical fragments under explosive loading, velocity decay coefficient is not constant, air drag coefficient is a linear function of flight velocity; (4) perforation ability of tungsten fragments has decreased under explosive loading, however they are still suitable for fragmental warhead design.

Keyword: terminal ballistic performance; spherical tungsten fragment; air drag coefficient; ballistic limit