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ACCEPTED MANUSCRIPT

Study on the Performance of Ceramic Composite Projectile Penetrating into Ceramic Composite Target

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Abstract

In order to study the performance of ceramic composite projectile penetrating into ceramic composite target, the contrast test and numerical simulations of the penetration of standard projectile and the ceramic composite projectile into a ceramic composite target were conducted. The results show that the penetration performance of ceramic composite projectile is obvious superior to that of standard projectile for ceramic composite target. The ceramic nose of ceramic composite projectile fully destroys the ceramic panels anterior to its following armor-piercing projectile body, thus maintaining the penetration ability of the following armor-piercing projectile body.

Keywords: ceramic; composite projectile; penetration; composite target; test

1 Introduction

Ceramic composite armor as one of the most effective protection armors is widely used for various types of military vehicles protection. When penetrating into ceramic composite armor, the projectile body of active small - caliber armor - piercing projectile against light armor may be fractured and then crushed due to the influence of ceramic panel, and its posture may be deflected, leading to its inefficiency in armor penetration. Therefore, it is necessary to study the development of small-caliber armor-piercing projectile with lethal effect against ceramic composite armor.

Ceramic has long been used for projectile-proof protection, but has relatively less been studied as the penetration body. Nechitailo, et al. [2, 3] studied the penetration of AD-85 ceramic rods into aluminum plate, steel plate and tungsten plate, and the penetration of ceramic-steel composite components concrete through numerical simulation. Li, et al. [4] studied the performance of ceramic and alloy steel cylindrical components to penetrate into ceramic / composite targets, and indicated that the damage of the ceramic component to the ceramic / composite target is much greater than that of the alloy steel. Fu, et al. [5] compared the penetration abilities of ceramic

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