

Damage effect of double-spaced aluminum plates by reactive material projectile impact

F.Y. Xu, Q.B. Yu, Y.F. Zheng, M.A. Lei, H.F. Wang*

*State Key Laboratory of Explosion Science and Technology, Beijing Institute of Technology, Beijing
100081, China*

Abstract: Damage effect of the double-spaced aluminum plates, impacted by the cold isostatically pressed and sintered PTFE/Al/W reactive material projectile with a density of 7.8g/cm^3 , was investigated by the ballistic impact experiments and the theoretical analyses. Three kinds of the double-spaced plates with the thicknesses of 3mm/3mm, 6mm/3mm and 6mm/6mm were used. The distance between the front and the rear plate was 200mm. The cylindrical reactive projectile with the mass of 8g was launched at the velocities of approximate 710m/s~950m/s to impact the target. It has been shown that the plugging damage pattern is formed on the front plate impacted by the reactive projectile. Moreover, damage to the rear plate is significantly influenced by the impact velocity and the front/ rear plate thickness. For mechanism consideration, the plugging damage to the front plate is caused by the kinetic energy impact of the reactive projectile. However, damage to the rear plate is caused by the kinetic energy impact of residual projectile and fragment cloud. The chemical release may also enhance the damage to the rear plate.

Key words: reactive materials; reactive projectile; ballistic impact experiment; double-spaced plates; damage effect

* Corresponding author. Tel: +008601068915676.
E-mail address: wanghf@bit.edu.cn.