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Perforation of Thin Aluminum Alloy Plates by Blunt Projectiles - Experimental and Numerical Investigation[1] GANG WEI, WEI ZHANG, Harbin Institute of Technology — Reducing the armor weight has become a research focus in terms of armored material with the increasing requirement of the mobility and flexibility of tanks and armored vehicles in modern local wars. Due to high strength-to-density ratio, aluminum alloy has become a potential light armored material. In this study, both lab-scale ballistic test and finite element simulation were adopted to examine the ballistic resistance of aluminum alloy targets. Blunt high strength steel projectiles with 12.7 mm diameter were launched by light gas gun against 3.3 mm thick aluminum alloy plates at velocity of 90 $\sim$ 170 m/s. The ballistic limit velocity was obtained. Plugging failure and obvious structure deformation of targets were observed, and with the impact velocity increasing, the target structure deformation decrease gradually. Corresponding 2D finite element simulations were conducted by ABAQUS/EXPLICIT combined with material performance testing. Good agreement between the numerical simulations and the experimental results was found.

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