

Abstract Submitted
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Projectile penetration in granular material and high strain rate response of sand¹ DAYAKAR PENUMADU, AASHISH SHARMA, University of Tennessee — Penetration depth is the most important parameter in terminal ballistics. Here only projectiles penetrating granular medium is considered. Laboratory and field tests have shown that projectile characteristics such as mass, size and nose shape, and target characteristics such as strength and density determine the depth of penetration. In order to better understand the influence of projectile nose shape and placement density, a suite of laboratory projectile penetration tests was performed at different impact velocities without altering the size and mass of the projectile. These projectiles were instrumented with G-Rec, a combination of high-performance accelerometer and autonomous data recorder. G-Rec provided a unique opportunity to record acceleration-time history of the entire flight of the projectile. These tests have revealed very high decelerations and forces at impact along with extensive particle fracture along the path of the projectile. Additionally, in order to understand the strength and particle crushing under dynamic loading, high strain rate tests were performed in Split Hopkins Pressure Bar (SHPB). These tests show that high strain rate behavior is influenced by specimen density, saturation, particle shape and compliance of the confining boundary.

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