

Abstract Submitted  
for the SHOCK13 Meeting of  
The American Physical Society

**Deformation and Fracture Behavior of Steel Projectiles Impact AD95 Ceramic Targets-Experimental Investigation<sup>1</sup>** GANG WEI, WEI ZHANG, Harbin Institute of Technology — The deformation and fracture behavior of steel projectile impacting ceramic target is an interesting investigation topic. The deformation and failure behavior of projectile and target was investigated experimentally in the normal impact by different velocities. Lab-scale ballistic tests of AD95 ceramic targets with 20 mm thickness against two different hardness 38CrSi steel projectiles with 7.62 mm diameter have been conducted at a range of velocities from 100 to 1000 m/s. Experimental results show that, with the impact velocity increasing, for the soft projectiles, the deformation and fracture modes were mushrooming, shear cracking, petalling and fragmentation (with large fragments and less number), respectively; for the hard projectiles there are three deformation and fracture modes: mushrooming, shearing cracking and fragmentation (with small fragments and large number). All projectiles were rebound after impact. But, with the velocity change, the target failure modes have changed. At low velocity, only radial cracks were found; then circumferential cracks appeared with the increasing velocity; the ceramic cone occurred when the velocity reached 400 m/s above, and manifested in two forms: front surface intact at lower velocity and perforated at higher velocity. The higher velocity, the fragment size is smaller and more uniform distribution. The difference of ceramic target damage is not obvious after impacted by two kinds of projectiles with different hardness at the same velocity.

<sup>1</sup>National Natural Science Foundation of China (No.: 11072072)

Gang Wei  
Harbin Institute of Technology

Date submitted: 27 Feb 2013

Electronic form version 1.4