Abstract Submitted
for the SHOCK17 Meeting of
The American Physical Society

A ballistic performance study on multiphase particulate systems impacted by various projectiles CHRISTIAN COMTOIS-ARNALDO, OREN PETEL, Carleton Univ — The present study investigates the complex multiscale dynamic response of particulate composites, in an effort to link the bulk material behavior to strain-rate activated microstructures. These investigations involve multiphase systems containing micron-sized ceramic particles integrated into a siloxane elastomer to create flexible nanocomposites with varying inclusion properties. In particular, the effects of varying particle morphology, strength, volume fraction, and density are under investigation. The experimental focus of the study concerns the ballistic penetration of the nanocomposite targets. The targets are impacted by fragment simulating steel projectiles of constant mass and varying nose shapes (i.e., flat, ogive, and chisel-nose) to identify variations in the penetration mechanics. The projectiles are accelerated in a single-stage gas gun to velocities ranging from 200 m/s to 900 m/s prior to impact. The results for each projectile type are compared to analytical penetration models in order to shed light on the dominant penetration mechanisms and their relationship to the microstructure of the nanocomposites.

Christian Comtois-Arnaldo
Carleton Univ

Date submitted: 10 Feb 2017 Electronic form version 1.4