Abstract Submitted
for the SHOCK17 Meeting of
The American Physical Society

Effect of Explosive Charge Geometry on Shockwave Propagation CATHERINE JOHNSON, Missouri University of Science and Technology, PHILLIP MULLIGAN, Dagaz Technologies, KELLY WILLIAMS, MARTIN LANGENDERFER, JEFFERY HENIFF, Missouri University of Science and Technology — The shape of an explosive charge has an effect on the shock wave propagation. Several efforts have been made to model the shock wave from a high explosive detonation. Due to the rapid rate and high variability of a detonation reaction the characteristics of detonation are difficult to predict accurately. Detonation of 15 PETN-based primasheet charges in the spherical, cubic, cylindrical, and tetrahedral configurations have been examined in this study. Qualitative data was collected through the use of high-speed photography to examine the shockwave and fireball production macroscopically. Quantitative pressure data was collected in the near and far field of the detonation reaction using free-field pressure probes, recording data both normal to charge faces as well as along charge vertices. In the near field a lower pressure zone is created along charge vertices. In the far field, pressures along these bisecting axes increase as the shock front from adjacent facets intersect. These results shed a new light on the effect an explosive charges shape has on its ability to perform work on its surroundings. This paper will describe the methodology and findings of this study as well as examine the causality and implications of its results on our understanding of the detonation phenomena.

Catherine Johnson
Missouri University of Science and Technology

Date submitted: 24 Feb 2017 Electronic form version 1.4