## Abstract Submitted for the SHOCK11 Meeting of The American Physical Society

## Air Blast Characteristics for Laminate Al and Al-Ni Composites

FAN ZHANG, DRDC Suffield, Canada — Air blast characteristics of laminate Al and Al-Ni composites were investigated in a 23 m<sup>3</sup> closed chamber. 50 to 100  $\mu m$ thick Al-Ni or Al foils were rolled to form a cylindrical shell, which was then compacted to a density larger than 99% TMD through an explosive formation technique. Charges were prepared using 2 kg C4 explosive packed in the laminate metal shell to a metal-explosive mass ratio of 1.75. Pressure and temperature were measured through transducers on the chamber wall and pyrometry sensors facing the charge center. The pressure history showed a double-shock front structure with an accelerating precursor shock of high amplitude followed by the primary blast, suggesting considerable early-time reaction of small laminate fragments. Significant enhanced explosion pressure (QSP) was observed as compared with baseline charges in solid shell. Recovered residue showed fragments in flakes with a considerable fraction in the molten. The pressure and temperature results are further analyzed to distinguish the reaction properties between the Al-Ni (gasless reaction for them alone) and Al laminates as well as their effect on air blast. The results are also compared with previous investigations using various shell materials and compositing techniques.

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