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High Pressure Oblique Shock Interactions in NATO Fragment Impacts KEVIN MIERS, NAUSHEEN AL-SHEHAB, DANIEL PUDLAK, US Army CCDC Armaments Center — Efforts are ongoing to design munitions to pass the NATO Insensitive Munitions Fragment Impact (FI) test. The NATO FI projectile is a 14.3mm diameter, L/D 1, 160 degree conical nosed mild steel fragment which impacts the munition under test at 2530 m/s. Yawed impacts of this projectile are commonly observed. Hydrocode calculations for these scenarios consistently predict regions of high pressure behind the oblique shock emanating from the contact point in the initial impact, in excess of that which would be expected for 1D planar impacts at the same velocity. We believe these predictions are physical. The theory of Walsh [1], describing steady oblique impacts and the onset of jetting, is reviewed and applied to typical impact conditions. It is calculated that pressures up to approximately twice the 1D shock pressure can be generated by an oblique shock for the same impact velocity. This is verified with hydrocode calculations. Such pressures are relatively localized and transient, but do arise and may contribute to the input shock for thin cased munitions. References: [1] Walsh, J. M., Shreffler, R. G., Willig, F. J. "Limiting Conditions for Jet Formation in High Velocity Collisions". Journal of Applied Physics 24, 349 (1953)

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