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A Study of SDT in an Ammonium Nitrate (NH_4 NO_3) Based Granular Explosive MALCOLM BURNS, PETER TAYLOR, AWE — In order to study the SDT process in a granular non ideal explosive (NIE) an experimental technique has been developed that allows the granular explosive to be shock initiated at a well controlled "tap density". The granular NIE was contained in a PMMA cone and a planar shock was delivered to the explosive through buffer plates of varying material. A combination of piezoelectric probes, ionization pins, PVDF stress gauges and a high speed framing camera were used to measure the input shock pressure and shock and detonation wave positions in the explosive. Four trials were performed to characterize the run to detonation distance versus pressure relationship (Pop plot) of the granular NH_4 NO_3 explosive. Input pressures ranged from close to the 4GPa predicted CJ pressure of the granular explosive down to 1.4 GPa, giving run distances up to 14mm for the lowest pressure. The data indicates a steady acceleration of the input shock to the detonation velocity, implying significant reaction growth at the shock front. This is in contrast to the behaviour of most high density pressed PBXs which show little growth in shock front velocity before transit to detonation. The experimentally observed initiation behaviour is compared to that predicted by a simple JWL++ reactive burn model for the granular NH_4 NO_3 explosive which has been fitted to other detonics experiments on this material.

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