

Abstract Submitted
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The reverse edge-on impact test: a small scale experiment to study non-shock ignition DIDIER PICART, DAVID DAMIANI, MICHEL DOUCET, CEA, DAM, Le ripault — Low velocity impact response of HMX-based high explosives is still a challenging domain for researchers and engineers. Studies are focused on the characterization of mechanical behavior and the determination of accurate dynamic mechanical constitutive laws, the numerical simulation of highly localized fields and the determination of the hot-spot formation mechanism. This last topic mixes phenomenological assumptions at the microstructural level, about the dissipation mechanism (crystal plasticity and/or friction of micro cracks lips), to more or less empirical rules relating the macroscopic mechanical quantities to the fields of stress, strain and strain rate at the microstructural level. To contribute to this study, the punch test applied in 1998 by the Los Alamos team to a high explosive has been revisited. A reversed edge-on impact test has been designed. It enables real-time recordings of ignition at the macroscopic level, post-mortem observations as well as numerical simulation at the mesoscale. The talk will give details about the experimental set-up, the main results obtained for various impact conditions and a first attempt to simulate the heterogeneous pressure and strain rate at the mesoscale.

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