A new D(K) relationship for EDC37

ALEXANDER HODGSON, BRIAN LAMBOURN, CAROLINE HANDLEY, AWE, HIGH EXPLOSIVES GROUP, AWE TEAM — The Detonation Shock Dynamics model (DSD) is widely used for the propagation of detonation wave-fronts in hydrocode calculations of polymer bonded explosives. In DSD, a detonation velocity vs. curvature relationship D(K) is used to determine the speed at which the detonation front propagates through the explosive. The D(K) relationship for an explosive is usually obtained from rate-stick wave-curvature data. Recently, Roeske et al. have fired a series of very small rate-stick experiments, using samples of the HMX-based explosive EDC37 machined with a femto-second laser. In this paper, this data is combined with the results of previous 1” and 2” rate-stick experiments, to obtain a new D(K) relationship for EDC37. A wave-shape analysis code is developed which uses weighted least-squares fitting methods which improve on current fitting methods.