TIME DEPENDENT BLAST WAVE PROPERTIES FROM SHOCK WAVE TRACKING WITH HIGH SPEED VIDEO

J. G. Anderson[1], S. L. Parry B[1], D. V. Ritzel[2]

[1]*Weapons and Combat Systems Division, Defence Science and Technology Group, PO Box 1500, Edinburgh, SA, 5111, Australia*
[2]*Dyn-FX Consulting Ltd. 19 Laird Ave N, Amherstburg, ON N9V 2T5, Canada*

ABSTRACT

When assessing damage to a target, due to the blast produced from the detonation of a high explosive, it is necessary to determine not only the peak pressure produced by the blast but also the pressure as a function of time (pressure history). Pressure transducers are commonly used to determine pressure histories at discrete locations in an experiment. Often many transducers are required to accurately characterise the blast from a charge, since transducers only measure what happens at a particular point and there may be many variances and irregularities in the flow field. High speed video (HSV) tracking of shock waves is a complimentary approach to using transducers which provides continuous data from relatively close in to the charge out to large distances. The current work uses analytic equations presented by Sadek and Gottlieb [1] to calculate peak overpressure and characteristic decay time from shock tracking with HSV. By assuming that the overpressure history of the primary shock wave has the form of the modified Friedlander equation [2] , it is shown that shock wave tracking can be used successfully to calculate the overpressure history for the duration of the positive phase.