

Abstract Submitted
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Developments and analysis of pulse correlation reflectometry for the characterisation of shock and detonation waves CALLUM PRYER, Atomic Weapons Establishment — Pulse Correlation Reflectometry (PCR) is a simple and robust new technique to measure the position of shock and detonation waves in a quasi-continuous manner by measuring the transit time of an electrical pulse in a coaxial electrical sensor. Experiments were performed to test the performance of different coaxial sensors with diameters from 0.36 mm up to 2.8 mm with a range of pulse repetition rates from 27 MHz to 71 MHz. The experiments were performed using a trackplate with the PCR sensors in contact with the explosive. Piezo pins were fielded to validate the measurements made. The data shows the thin coaxial cables perform well, with the velocity of detonation within 2 % of those obtained from piezo pins. A new approach to the analysis was developed which allows the frequency of pulses to be increased, thereby increasing the number of datapoints. This high frequency analysis has been validated with both synthetic data and experimental data which produces velocity of detonation results that fit within errors of data captured using lower frequencies. ©British Crown Owned Copyright 2019/AWE

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