

Abstract Submitted
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Application of Heterodyne Velocimetry and Pyrometry as Diagnostics for Explosive Characterisation¹ JAMES FERGUSON, PETER TAYLOR, Hydrodynamics Department, AWE, Aldermaston, Reading, Berkshire, RG7 4PR, UK — The results of four cylinder tests performed on two batches of an HMX based explosive using a new suite of diagnostics are described. Heterodyne laser velocimetry (hetV) and pyrometry were fielded for the first time on cylinder tests within AWE. Pyrometry gave a measurement of the temperature of the detonating HE of 2600-3000 K. Sixteen channels of HetV were fielded and provided high fidelity expansion data at distances of up to 30 mm. High speed framing camera images were obtained and show no signs of cylinder break up or spalling until distances greater than 35 mm. The expansion data has revealed the elastic pre-cursor in the cylinder wall and made it possible to resolve up to 8 shock reverberations in the wall as it expands. The expansion of the cylinder wall was recorded both before and after steady state detonation has been reached and the results compared. HetV probes were fielded at different angles to the expanding cylinder wall allowing both the vertical and horizontal expansion velocity to be determined. The extra information that these cylinder tests yielded will allow for more accurate code validation and determination of the equation of state.

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