

Abstract Submitted
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Strength effects in an imploding cylinder with constant mass-to-explosive loading MATTHEW SERGE, OREN PETEL, JASON LOISEAU, ANDREW HIGGINS, McGill University — High explosives were used to implode thin-walled metal cylinders of different strengths (6061-T0, 6061-T6, mild steel, and stainless steel) at a constant mass-to-explosive (M/C) ratio. The velocity history of the inner surface of the imploding cylinder was recorded via Photonic Doppler Velocimetry (PDV). The time histories and peak velocities were compared to imploding Gurney models and LS-DYNA hydrocode simulations. A model for the acceleration of the wall using a detonation pressure-based time constant gave good agreement with both the experiments and simulations. The deceleration caused by strength effects was modeled from high-strain rate theory and was used to predict the entire velocity history.

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