

Momentum Loads from Cylindrical Explosive Charges with Different Casing Thicknesses

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Formulae exist for computing the equivalent explosive weight of cased charges, with smaller equivalent explosive weights for thicker casings, as more explosive energy is expended to break up thicker casings. It is inherently assumed that the fragment effects of the casings are secondary. A series of field trials was conducted by detonating explosive charges with an L/D ratio of 5, and varying the thickness of the casing (starting with a bare charge - zero case thickness). Momentum loads from the combined blast and fragments of these cased charges were measured at varying stand-off distances. The loadings were obtained by using momentum plates positioned to capture the bulk of the fragments in the radial direction, with respect to the longitudinal axis of the charge. Under these conditions, all the cased charges imparted larger momentums to the target plates compared with the bare charge. Furthermore, the loads increased with casing thickness. This study suggests that, for certain weapon-target configurations, using an equivalent bare charge to assess the effects of cased weapons may result in underestimates of the actual impulse loads and consequent damage to targets.