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REVISITING THE APPLICATION OF CASING EFFECTS FORMULAE TO CASED EXPLOSIVE CHARGES

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Prediction of airblast pressures from explosives surrounded by metallic casings is necessary for the assessment of potential damage from cased munitions, terrorist or criminal pipe bombs, or various forms of industrial accidents. Airblast environments from cased explosive charges are often estimated through the use of various formulae which provide an equivalent bare explosive weight to represent the cased explosive. These formulae are typically based upon energy partitioning considerations which attempt to account for the kinetic energy of casing fragments and detonation gases, assuming that the remaining explosive energy is available to produce airblast. Several assumptions are inherent to the casing formulae methodology, and accordingly, much debate has taken place regarding the optimum coefficients and form for these formulae. Another point of contention includes their overall sufficiency for estimating airblast pressures for cased explosives.

At the 21st MABS, a paper was presented which utilized measured airblast pressures from AFRL blastpad experiments to evaluate classic casing formulae from the public literature. This paper revisits the analysis from the earlier paper, and augments the analysis with a) more recent experimental results, b) additional equivalent explosive weight analysis, c) additional formulae discovered in the public literature, and d) corrections of minor errors in the previous paper. Results from this paper will assist analysts in the selection of casing effects formulae, and illuminate strengths and weaknesses in bare charge equivalent weight approaches for estimating airblast pressures from cased explosive charges.