COMBINED BLAST AND FRAGMENT IMPULSE – A NEW ANALYTICAL APPROACH

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Key words : Impulse - Blast - Fragment – Fano - Equation

In his 1953 attempt to match an equation to WWII cased charge blast impulse data, E.M. Fisher was obliged to modify an earlier equation by U. Fano. However, the author has recently published an alternate equation which is more clearly derived from the original energy balance equation of R.W. Gurney. This and further derivations have opened up the field of blast and fragment impulse to new analysis. The estimation of the combined impulse from blast and casing fragments is vital to the design of structures such as containment vessels and chambers, where the blast wave duration is small compared to the target (i.e. containment) response time. Not only must the balance between blast gas and casing fragment momentum be determined, but also their different modes of target interaction must be understood. Consequently, experiments by Tan & Held on combined blast and casing fragment impulse, using momentum sleds and blocks, have been reviewed and successfully re-analysed in the light of the author's recent derivations. It is concluded that Held's original analysis, based on Fano's equation, led to significant under-estimation of the blast contribution and that Fano's equation must not be used in the analysis of any other experimental data.