MABS 18
September 27 - October 01, 2004, Bad Reichenhall, Germany

A STUDY OF THE EFFECT OF CASING MECHANICAL STRENGTH ON AIRBLAST FIELDS A CASED CHARGE

Dr. Alan Ohrt, Mr. Torsten Lindner, Dr. Seung Lee

Air Force Research Laboratory
Munitions Directorate
101 W. Eglin Blvd, Suite 309, Eglin AFB, FL, USA

Experimental data and predictive methods are widely available for estimating airblast pressures from bare explosive charges of simple shapes, such as spheres or cylinders. The introduction of a casing material surrounding the explosive charge complicates both the measurement of the airblast pressure as well as the prediction of the airblast environment from the cased charge. The typical approach for estimating airblast from a cased explosive charge is to model it as a bare sphere of explosive having a reduced "equivalent" mass. The casing mass/explosive mass ratio is often the only parameter considered to estimate an appropriate bare equivalent explosive charge. Airblast characteristics for the bare equivalent sphere are then used in predictive methods to estimate the airblast pressure environment. Since this methodology is based on sparse data, and does not directly consider other parameters such as explosive type, casing material properties, etc., confidence levels in predicted airblast environments for cased charges tend to be undesirably low.

A key objective of this study was to create an experimental condition that would test the commonly held belief that case mass/explosive mass was the only casing parameter that needed to be considered to predict airblast from a cased charge. Special charges were designed and constructed that had the same case mass/explosive mass ratio as previously characterized steel-cased ones, but were fabricated from a case material that had much lower mechanical strength. Experiments were then conducted with each type of cased explosive charge on the Air Force Research Laboratory instrumented blastpad at Eglin AFB, Florida. Detailed airblast fields were successfully measured for both types of cased charge and compared in a subsequent analysis effort. Any observed differences between the airblast fields from the special charges and the baseline steel-cased charges would be attributable to the differing mechanical properties of the casing. This paper describes these experiments and discusses the results.