# P74 Statistical Variation in Reflected Airblast Parameters from Bare Charges

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## Abstract:

Decades of explosive experimentation have repeatedly shown that measurements of airblast pressures from explosive events are subject to considerable statistical variation. Even in carefully crafted situations where measured airblast pressures should be identical (e.g., measurements at symmetric positions, measurements from separate tests of identical explosive charges, etc.), measured airblast parameters often exhibit substantial variability. This poses the experimentalist with at least two technical challenges: (1) quantifying the uncertainty associated with the measured airblast parameters, and (2) determining best practices for minimizing these uncertainties and their propagation into predictive algorithms. A companion paper by Ohrt and Dailey, presented in this conference, attempts to define the statistical variability in *incident* (free-field) airblast measurements from both bare and cased charge tests conducted under controlled conditions. This paper extends that analysis by considering *reflected* pressure and impulse data, but only from bare charges.

A series of 16 experiments were conducted by AFRL using bare cylindrical Composition B charges. Each test fielded five airblast gauges at the center of a rigidly mounted steel plate, and tests were executed at three different standoffs, resulting in a statistically significant body of measurements. Three parameters (time of arrival, peak pressure, and total positive-phase impulse) were evaluated from all these gauges, with the goal of defining the variability in measurements. The data was examined to confirm that minor differences in gauge position do not significantly affect the measurement. The data was then evaluated statistically to obtain confidence intervals on the three metrics of interest, and these uncertainties were then compared to those obtained by Ohrt and Dailey for incident measurements. The results are indicative of the relative levels of uncertainty in the two classes of pressure and impulse measurements and can be used as benchmarks of significance in quantifying blast load levels for design and assessment purposes.

## Notes: