

Comparison of Predictive Methods and Experimental Data to Forecast Blast Clearing

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Abstract

The recent increase in public awareness of terrorist activities, particularly in North America, has resulted in a marked increase in the demand for blast hazard mitigation products. For example, the windows in many high profile government buildings are being retrofit with polyester films to reduce the glass shard hazard from terrorist bomb attacks. Before awarding the retrofitting contracts, building owners are demanding to see film performance specifications, including test results. In the United States, the General Services Administration (GSA) has written a set of standards relating to window film performance under blast loading, and requires that film suppliers demonstrate compliance with these standards before their product is used on government buildings.

To demonstrate this compliance, film manufacturers are being required to perform arena tests, subjecting their product to blast pressures and impulses as specified in the GSA standard. Testing of this nature is both time consuming and expensive, thus the ability to be able to predict blast pressures and impulses on structures is essential, to ensure compliance with the standard and avoid the expense of re-testing. Thus it is imperative that the predictive tool is accurate, particularly as these tests are performed by various agencies, using an assortment of explosives, different test structures and under varying conditions.

This following paper compares reflected impulse measurements from three different test programs, using explosive charges of 5 grams to 1135 kg of nitromethane, with the reflected impulse values predicted using CONWEP and a method proposed by Smith and Rose. It was found that CONWEP, and the Smith and Rose predictions were within approximately ten percent of the experimental data. It was felt that the difference between the predicted values and the measured values was more likely related to the assumed value of TNT equivalency of nitromethane than a reflection of the accuracy of the predictive methods.

The paper ends with a brief discussion on the topic of measuring and predicting reflected impulse and some of the possible errors that may be encountered in this process.