

HYBRID SIMULATORS THE BEST OF BOTH WORLDS

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The advantages of enclosed airblast simulators over open air simulations are substantial. These advantages are summarized, beginning with discussion on the two major existing types of enclosed airblast simulators. These two major simulators of airblast phenomenology are large cross-section shock tubes and throated large blast simulators. The strengths of these two types of simulators are summarized.

Airblast simulation facilities are typically driven by either explosive drivers or compressed gas drivers. A comparison of the two driver types is made in the constant cross-section shock tube. The implication of the driver type on the resulting waveform on the test station waveform and the simulation capabilities of the shock tube are discussed. the throated large blast simulators invariably use a compressed gas driver. Whether or not the simulation envelope could be extended for special cases by the use of an explosive driver is discussed.

Following this background discussion will be the introduction of a hybrid simulator concept that would incorporate the advantages of both types of simulators. The hybrid design includes the duration enhancement of the throated blast simulator and the simplicity and flexibility of the constant cross-section shock tube. The proposed design is aimed at small scale facilities such as the AFWL/NMERI six foot shock tube to enable it to be used as a preliminary test facility for both types of simulators. The discussion includes the impacts of the selected driver type on this proposed design as well as the impact on the quality of the waveforms in the test station area. Hydrocode calculations of these effects will be shown.