

LARGE BLAST AND THERMAL SIMULATOR (LBTS)

Mr. Anil Verma, Mr. Garrett Renon

*Defense Threat Reduction Agency
DTRA/CXTN, 1680 Texas St. SE, Kirtland AFB, NM 87117*

ABSTRACT

The Large Blast and Thermal Simulator (LBTS) at White Sands Missile Range (WSMR), New Mexico is operated and maintained by the Defense Threat Reduction Agency (DTRA). The simulator includes a 550-ft-long (165 m) tunnel with a semi-circular cross section with a radius of 32.8 ft (10 m). This facility is used for the survivability testing of Department of Defense (DOD) equipment to the combined effects of thermal radiation and blast from low height-of-burst nuclear detonations. In addition, the LBTS capability was expanded to conduct anti-terrorism testing using high explosives detonation cords. The blast simulation is produced by sudden release of heated, pressurized nitrogen gas into the tunnel from pressure vessels (driver tubes) at the closed end. Eight thermal jets located just before the target section of the LBTS produce thermal effects. These generate intense flames by combusting powdered aluminum in liquid oxygen spray. By using the thermal simulation, a target is exposed to extreme radiant heat before the shock wave arrival, simulating the heat generated by a fireball from a detonated nuclear weapon. Thus, the synergistic effects of properly time-phased thermal and blast loading on the test article can be evaluated.

For anti-terrorism testing, a curtain of detonation cord is hung from the ceiling inside the tunnel a specified distance from the target which simulates the blast from a terrorist bomb. Customers test wall systems and windows to determine the survivability of material used for the outside walls of buildings. By testing these "curtain walls" data is collected and analyzed to give the customer an idea of how well a building and its occupants will withstand a bomb blast.

This paper updates a somewhat similar one presented at MABS conference in 2004 and includes the current air blast, curtain wall and thermal capabilities of the LBTS, and a typical analysis of the results from a series of tests. As part of the presentation, a recently produced eight (8) minute DVD featuring LBTS capabilities and test footage also will be shown to the audience.