

RESULTS OF PRECISION WALL TESTS USING CASED BOMBS WITH PRE-SCORED FRAGMENTS

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Reinforced concrete wall loading by blast and fragmentation effects caused by the Detonation of cased weapons has generally been unpredictable due to the uncertainties in case breakup, fragment size, and fragment pattern. This fact has made efforts to calculate wall response to combined blast and fragment loading using first-principles structural response computer codes extremely difficult. To mitigate this difficulty, half-size steel bomb cases were pre-cut according to a specific pattern and then filled with a typical aluminized explosive. Standard arena tests were conducted for each of two bomb types from which fragment size, weight, and velocity were obtained to within a few percent. Reinforced concrete walls similar to the interior walls of a concrete structure were also exposed to the combined blast and fragmentation environment in the arena tests. Subsequently, tests were also conducted within rooms of a buried, reinforced concrete structure in which interior reinforced concrete walls were subjected to the combined loading.

This paper discusses the arena test results, including fragment size, weight, velocity and pattern using standard arena test data collection techniques. The fragment loading of the reinforced concrete walls is also discussed, including fragment impact velocity, fragment pattern, and wall damage. Some preliminary results of the tests conducted within the buried structure are, also discussed. These results indicate that the fragment impact loading of the concrete walls was predictable, thereby aiding structural response analysts in predicting the overall response of the interior structural walls.