

PROPAGATION OF AIRBLAST THROUGH FAILING WALL SURFACES—SINGLE ROOM TESTS

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Detonation of a weapon or other explosive inside a typical building produces blast waves that propagate throughout the building. For most office-type interior construction, that propagation requires the failure of the lightweight partition walls generally constructed of wood or metal studs with gypsum sheathing. In the course of that failure and subsequent interaction of the blast wave with the wall materials, the wave is distinctly altered.

To study these phenomena, a series of shock tube tests were conducted in which light, low-strength interior partition walls were subjected to blast loads far beyond their strength levels. A non-responding room was positioned behind the wall, and the resulting infiltration of blast pressure into that room was measured with multiple gauges at several locations. In some cases, the wall included a door, while in others there were simply openings in the wall. The resulting pressure and impulse value from these gauges behind the wall was then compared to the pressure and impulse applied to the front of the wall in an effort to gauge the effect of the wall (and the opening and/or door) on the transmissibility of the pressure pulse.

The results indicate that even these lightweight walls have a profound effect on reshaping and modifying the blast wave. Inclusion of a door did not produce significantly different results from those with a solid wall; however, the presence of an opening greatly affected the blast measured in the downstream room. The results were tabulated over a wide range of applied blast loads.