Presented at 17th International Symposium on the Military Aspects of Blast and Shock,
June 2002, Las Vegas, Nevada

Effectiveness of Frangible Barriers for Blast Shielding

David Bogosian
Karagozian & Case
625 N. Maryland Ave., Glendale, CA 91206
(818) 240-1919
bogosian@kcse.com

Dr. Dwayne Piepenburg
Science Applications International Corporation
1410 Spring Hill Road, Suite 400, McLean, VA, 22102
(703) 360-9551
dwayne.d.piepenburg@saic.com

ABSTRACT

Perimeter barriers are often used as a means of mitigating blast effects to protect buildings from an external detonation. Optimal mitigation is achieved using rigid, non-destructible barriers, yet the cost of these is often prohibitive as are the architectural implications of this type of construction. Using a barrier's mass instead of its strength to attenuate blast loads is a lower cost method of achieving the same objective, but this approach generally requires excessive amounts of mass and therefore very thick (and also architecturally unacceptable) barriers.

A recently conducted set of experiments demonstrates that significant mitigation of blast can be achieved using realistically sized mass-based barriers. Barrier materials utilized include CMU, thin concrete precast panels, and even water. The latter has the added benefit of not generating a debris hazard to the assets being protected.

The test setup included several tests using rigid concrete strength-based barriers and tests using frangible barriers. The peak pressure and impulse from each of the frangible barrier tests is compared to comparable data from rigid barrier tests. The results indicate that nearly identical reductions in pressure and impulse may be achieved by replacing rigid or massive barriers by thinner, lighter-weight barriers. Additionally, nearly the same effectiveness can be achieved by water as by other materials (e.g. CMU, concrete, soil).