

Structural Retrofit for Blast Mitigation

A RESEARCH EFFORT OF THE AIR FORCE RESEARCH LABORATORY, AFRL/MLQ

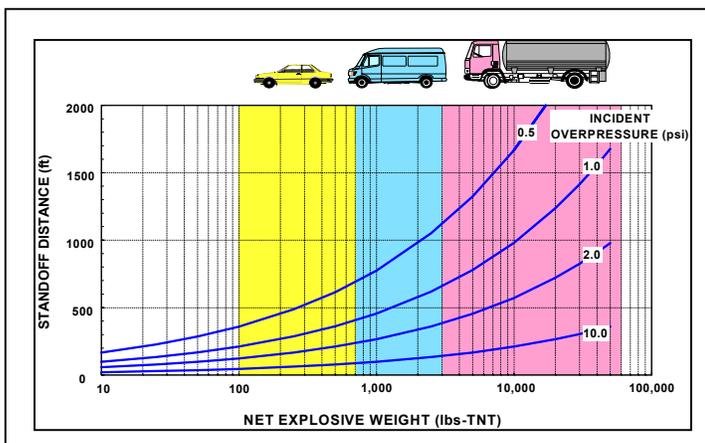
AIR FORCE PROTECTION NEEDS

The terrorist threat grows daily against United States targets around the world. Vital assets and personnel must be afforded the protection they need to survive a terrorist attack. One way to protect against the damaging effects of explosions is to harden a facility. Hardening can be anything from piling sandbags around the front door to building structures with 18-inch concrete walls and literally tons of reinforcing steel.

Some assets cannot be hardened in conventional ways due to economic or even political restrictions. To overcome these restrictions, the Air Force Research Laboratory, Materials and Manufacturing Directorate, Airbase and Environmental Division (AFRL/MLQ) is developing methods to retrofit existing structures with composites to prevent an explosion from damaging personnel within the structure.

GOALS

- ✓ Determine what reinforcement protects against various levels of blast.
- ✓ Determine the best construction techniques.
- ✓ Determine what reinforcement is the most practical to use, i.e. balance of easiest to construct versus reinforcement quality.
- ✓ Develop design charts for blast load versus reinforcement.



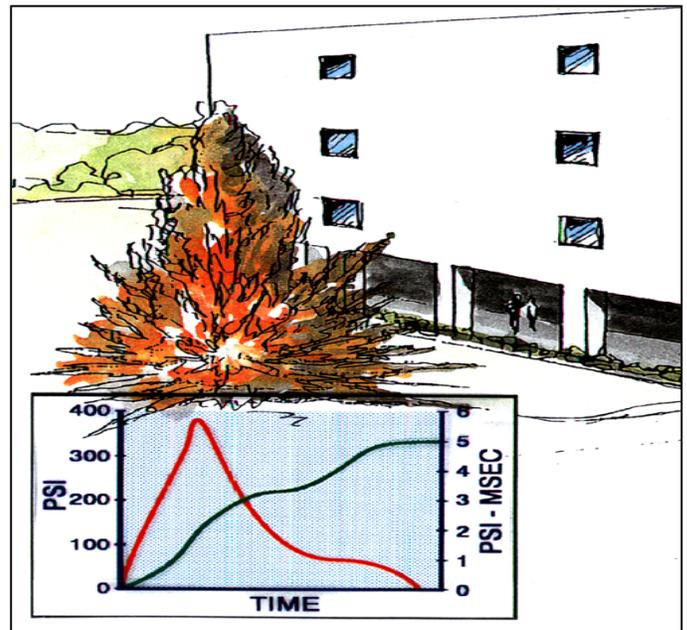
ACCOMPLISHMENTS

- ✓ Full-scale explosive tests conducted in 1997-1998 proved concept works
- ✓ Various materials/concepts demonstrated positive results



WITHIN THE NEXT YEAR

- ⇒ Extend experimental database with 3D dynamic finite element analysis
- ⇒ Develop methodology to assess level of protection provided by various retrofits against various threats
- ⇒ Develop design charts for retrofit techniques



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