



United States Department of State

Washington, D.C. 20520

Bureau of Diplomatic Security
Physical Security Division
Research and Development Section
Blast Tests of April 2008

On April 2, 15 and 17 the Bureau of Diplomatic Security's, Research and Development Section conducted blast testing in support of its Solutions to Protect Against Terrorism (SPAT) program. The testing was conducted in conjunction with the Air Force Research Laboratory (AFRL) at Tyndall AFB in Panama City, FL. This program develops blast mitigating retrofit construction systems intended to protect occupants of existing concrete or steel framed structures. The SPAT program's work is predicated on defeating credible VBIED threats at realistic standoff distances. Specifics of the testing protocol are sensitive but will be shared on a case-by-case basis.

Of the six individual experiments investigated in the blast tests, four were proof of concept designs utilizing large laminated glass panels incorporating DuPont's Sentry Glass Plus (SGP) interlayer. One experiment was a refinement of a previous design for a strip window retrofit that attaches a 3/8" PVC strip (similar to what you find at a supermarket separating cold storage from the rest of the store) to a steel frame which is, in turn, supported by steel rods. The final experiment was a retrofit technique employing chain link fence material, attached to structure at the floor and ceiling, deployed over an existing interior window/wall condition. All of the experiments except the chain link fencing material retrofit were successful at stopping the window/wall debris and limiting internal pressure levels.

The SGP based retrofits all incorporated pre-drilled glass panels which were attached in different methods to steel framing elements. These experiments were particularly encouraging and will serve as a basis for continued refinement of this approach.



ABOVE: Pre-drilled SGP laminated glass panels attached to horizontal steel tube members and supported by steel rods. The rods were then mechanically anchored to steel plate clips at floor and ceiling.



ABOVE: Pre-drilled SGP laminated glass sheets attached to steel frame members to make individual panel frames. These frames are then mounted on clips fabricated from steel channel section which were welded to steel tube supports



ABOVE: Pre-drilled SGP laminated glass panels attached to steel frame members and bolted to tube structure. Steel rods were introduced to determine their effect on the performance of the retrofit design. While effective they were found to be unnecessary.



ABOVE: 3/8" PVC material attached to steel frame and supported by steel rods. The rods were then attached to steel plates at the floor and ceiling by clevises.

For additional information regarding these tests please contact the Research and Development Section staff.

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