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DOORS AND HARDWARE®

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SELECT Hinges™ resist attacks

Life Safety/ADA

Blam! Blam! Bullets,

State Department puts unusual demands on hinges

BLAM! A HIGH-POWERED RIFLE REPORT echoes around the room.

BLAM! A high-caliber bullet pierces an aluminum hinge.

CLANG! Six athletic men attack the door opening. One beats it with a sledgehammer. Another jams a chisel and a wedge into the door seam and hammers it violently. Four others do their best to gain an access foothold. After a quarter-hour of intense pounding, beating, prying and straining, they take a needed break.

This isn't a terrorist attempt to break into a U.S. embassy overseas and kill or capture our citizens—but it could be. The men were testing the strength of an entrance system for the U.S. Department of State (DOS) to determine if it could resist such an attack. After resting for 15 minutes, they continued their assault—attack, rest, attack, rest—over a testing period that lasted eight hours. After all these attacks they hadn't broken through. The door and the hinge still functioned, protecting those on the other side.

Most builders and maintenance people don't have to prepare for attacks anywhere near this extreme. But with recent world events, the DOS must consider everything from sledgehammers and wedges to high-powered rifles, rocket-propelled grenades and car bombs when approving an entranceway for overseas embassies.

To ensure DOS facility entrances protect workers, the State Department's Bureau of Diplomatic Security demands doors, hinges and other entryway materials meet its rigid requirements, including the Forced Entry (FE) and Ballistic Resistance (BR) of Structural Systems tests (SD-STD-01.01).

These tests were conducted at H.P. White Laboratory, Inc. in Street, Md., an independent laboratory that conducts small arms and ammunition research, development and testing. The men worked on USSD3000 Ballistic/Forced Entry/Bomb-Resistant doors from United States Bulletproofing, Inc. (USBP), manufac-

Bombs & Brutal Attacks

turers of blast-, bullet- and forced-entry-resistant doors, windows and wall systems. The hinge mounting was an 85-in. SL27 HD hinge from SELECT Products, manufacturers of architectural-grade aluminum continuous gear hinges.

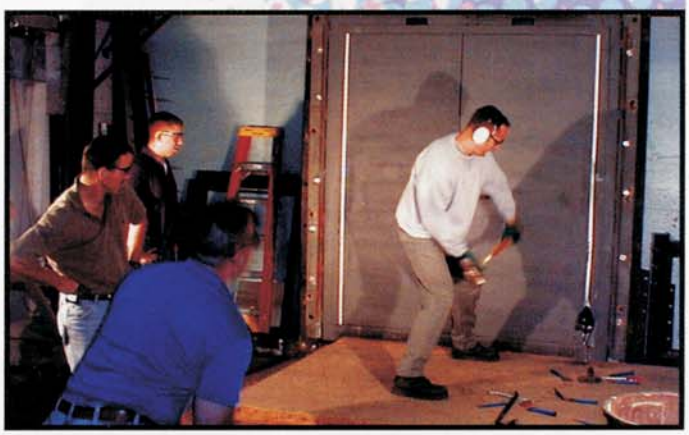
"Since our current independent durability testing on our hinge has reached 10 million cycles, we felt confident our hinge could withstand this aggressive assault, too," said Bob Cronk, SELECT National Sales Manager. "But this was an opportunity to prove it, and take part in this State Department certification.

"Holes for door-specific security pins were cut in the hinge, without changing the basic hinge structure," Cronk added.

A solid hour of abuse

The DOS uses a set of comprehensive procedures and standards for structures and structural subassemblies to FE and BR test an entrance system. Entrances are rated at a protection level based on the amount of time they withstand assault: 5 minutes, 15 minutes or 60 minutes. The USBP-SELECT test ran for the full 60 minutes with considerable focus on the hinge since it was the newest component of the door system. H.P. White Laboratory tested a set of double doors (single and double doors are tested separately).

"The actual test took eight hours," said Ken Sampson, USBP president, "because attackers tested different sections of the entrance for one hour each. This entrance will be used in places where we can stop an angry mob attacking one of our embassies overseas. Often there may not be adequate police protection. The door structure may be the only thing keeping employees safe."



Ballistic Resistance (BR) Test

In the first test, attackers stood 20 feet from the door and fired eight shots at a zero-degree angle directly at the hinge. They used high-powered military rifles with 5.56 mm and 7.62 mm ammunition (equivalent to .223 and .308 caliber). Testers sometimes fire a 12-gauge shotgun with No. 4 buckshot at passages in doors equipped with deal trays, louvers, speak-through devices or similar features. Additional shots are also fired into transparencies such as armored glass.

To determine bullet penetration or hinge/door debris scatter, testers held a 60-watt light behind a "witness panel"—a 0.02-in. thick aluminum sheet positioned 6 inches behind the door. All bullets were stopped, so the entrance was classified as "no penetration." To verify bullet velocity, they used a chronograph and velocity screens.

Forced Entry (FE) Test

For a solid quarter-hour, attackers used every means at their disposal—10- and 12-lb. sledgehammers, a 9 × 2½" wood-splitting wedge, 1" and ¾" cold chisels, a 2¼" masonry chisel plus other tools chosen from a list of 30—to do what they could to gain entry. After a 15-minute rest break, they went at it again. Then again. Then again.

This test always includes a "concentrated assault" to thoroughly test any part of the entrance seen as vulnerable. That assault focuses on edges and other critical locations, attempting to penetrate portions of the assembly or distort an edge in order to remove a fitting or device. The DOS even specifies attackers must be 18 to 34 years old and weigh between 160 and 250 pounds to make sure there is no shortage of physical stamina.

"They will get six men hanging from a pry bar working to crack your door open," Sampson said.

Any failure in the manufacturer's mounting hardware or any penetration big enough to permit a 12×12×8" rectangle or rigid 12×12" cylinder to pass through and the entrance is rejected.

Final results

The hinge withstood both attacks and the entrance earned 60-minute BR and FE certification. The hinge is now approved for use on all DOS doors since this durability represents the highest level of protection. USBP has chosen the hinge on all of its doors, including bomb-blast and forced-entry doors. USBP has also used it in other independent lab test on other bullet-resistant doors and earned UL 752, Level 1-8 ratings of Bullet Resistant Materials and has met NIJ Standard 0801.01 for Ballistic Resistant Protective Materials.

Applications

Most builders are not installing or replacing doors and hinges on embassies, but entrance systems that pass the DOS test will work well for many high-security buildings.

"The continuous gear hinge withstands this type of attack better than butt hinges," SELECT's Cronk said. "The continuous contact from top to bottom of the frame and the door with 50-plus fasteners [versus a butt hinge's three to four contact points and 18 to 32 screws] gives a security that's tough to beat."

As eight hours of bullets, bombs and brutal attacks have proved. D