

Volcanic glass makes trashcans bomb-resistant

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NEW YORK (AP) - To contain the force of an exploding bomb, you need steel plate or concrete, and lots of it, right?

Not according to a **BlastGard** International Inc., a startup in Clearwater, Fla., that makes a blast-dampening material out of volcanic glass, sealed in food-packaging plastic.

The material, called BlastWrap, already lines the insides of 192 trash cans in the Washington Metro system.

According to **BlastGard**, the cans can withstand the explosive force of more than 12 pounds of high explosives without coming apart. That's eight times as much explosive as steel-reinforced trash cans regularly sold as blast-resistant.

BlastWrap is filled with grains of perlite, a volcanic mineral much like pumice. When perlite is heated, water trapped in the grains makes them expand, "popping" them like popcorn. These expanded pellets are used in potting soil, because they both aerate the soil and retain water.

BlastWrap takes advantage of another useful property of expanded perlite: it's kind of like the crumple zone of a car. When crushed, it yields a bit, but still stands up to more crushing.

"It will offer resistance till it's literally crushed to talcum powder," says Jack Waddell, president of **BlastGard**.

The principle of using "crushable beads" to absorb explosions is not entirely novel. The military puts live ammunition in containers that are packed with pumice, another volcanic material. If one round goes off, the pumice will absorb the blast and keep the other rounds from going off.

"People have known about crushable beads for a long time, but it's another thing to bring it to market," says Bert von Rosen, an engineer at the Canadian Explosives Research Lab in Ottawa, which is unaffiliated with **BlastGard**.

The other component of BlastWrap is a flash-suppressing substance like boric acid. Again, this is not a particularly exotic material -- it can be bought as roach killer at the hardware store for \$5 a pound. It contains water, but loses it when heated, a reaction that absorbs energy very quickly.

The effect is dramatic, as seen on slow-motion videos provided by **BlastGard**. A trash can with a large charge and no BlastWrap is engulfed in a gigantic fireball that lasts a fifth of a second. If the can is lined with BlastWrap, the fireball is much smaller, and lasts just 4 milliseconds, fifty times shorter than the undampened blast.

Since the fireball is so brief, it has less chance of setting fire to other materials, Waddell says.

In another demonstration, **BlastGard** simulated a land mine detonation with 5 pounds of explosives under a car. The car was blown 20 feet into the air, and its interior was completely mangled -- sure death for any riders.

Another car had its undercarriage covered in BlastWrap. The car was totaled by the explosion, but the damage was far less. Its windows remained intact, meaning anyone inside would have a good chance of survival.

With U.S. vehicles in Iraq under daily attack from improvised explosives devices, the military has taken note. The Marines recently tested BlastWrap for its Humvees at Camp Lejeune, N.C.

Made of cheap materials and produced on meat-packaging machines, a one-inch layer of BlastWrap costs just \$16 per square foot.

However, it's not as if vehicles and buildings can be completely clad in BlastWrap to protect them from explosives.

The material needs to be close to the detonation to absorb its force. It also doesn't protect against shrapnel or the narrowly focused blasts produced by rocket-propelled anti-tank grenades, or RPGs.

BlastGard now hopes to be one of the companies that's called on to repopulate subway and trains platforms with trash cans. Most rail systems removed regular trash cans after the Sept. 11, 2001 terror attacks.

Since last year, the Transportation Security Administration requires rail and subway systems to use trash cans that are either bomb-resistant or made of clear plastic.

Most of the bomb-resistant cans are made by The Mistral Group, an Israeli company. Those cans are made of two layers of steel, with an absorbing material between them. They are designed to direct the explosion upward -- generally an unsatisfactory design for subway systems, where a blast aimed up can damage the ceiling or even reach the street above.

The Washington Metropolitan Area Transit Authority announced in September that it had begun installing the **BlastGard** cans. It would not say why it chose **BlastGard**, other than that they met specifications.

"These trash cans on steroids thwart terrorists while meeting our riders' needs," Metro Chairman Dana Kauffman said in a statement.

The system paid about \$4,000 per can, about twice the cost of a heavy-duty non-blast-resistant model. It already had about 400 blast-resistant cans from another supplier.