

Substance akin to one used by Marines

MILITARY RESEARCHERS STUDYING SPRAY-ON COMPOSITE TO ARMOR VEHICLES

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Military researchers are testing an improved type of “explosive-resistance coating” that can be sprayed on a vehicle to enhance its survivability.

The substance, a ceramic-polymer-metal composite, could be ready as early as November, but details about the product remain close hold, according to a Navy scientist.

The substance will be similar to one the Marine Corps began using in May as a stop-gap solution to harden humvees in Iraq, said Raymond Gamache, the scientist who works for the Naval Surface Warfare Center Dahlgren Division.

The new substance under development, however, is anticipated to be heavier and provide better protection than the one that Marines sprayed onto humvees in Iraq.

In April, a month that experienced an uptick in violence in Iraq, the Marine Corps identified an urgent need for greater survivability. Marines preparing for deployment were leaving with humvees that lacked standard armor plates, and used a less survivable type of “high-hard steel” instead. While the high-hard steel provided more protection than a humvee without armor, they looked for a way to improve survivability.

During a House Armed Services Hearing that month, Chairman Duncan Hunter (R-CA) praised the Marines’ resourcefulness in quickly locating high-hard steel in the absence of standards armor kits. Hunter contrasted the quick solution with the Army’s efforts to deliver armored kits for humvees to Iraq, which he said was taking too long.

Behind the scenes, a team of officials from Dahlgren, the Air Force Research Lab, the Marine Warfighting Laboratory and a component of the Homeland Security Department were responding to the call to beef up the high-hard steel kits. They put out a call to companies that made polyurea products that would be capable of fielding enough of the material to equip 3,000 vehicles by May 15.

Two companies responded, and Specialty Products Inc. was chosen for a type of polyurea explosion-resistance coating after tests in the labs measured its ability to prevent the surface from breaking, its

weight and its ease of application.

The substance, called “Dragon Shield” by Marines, is heated within a container until it can be sprayed on the vehicle in coats of about one-sixteenth of an inch. Each coat dries within seconds, and eight to 10 coats are applied until the material becomes about three-quarters of an inch thick on the outside of the steel. It costs less than \$20 per square foot at that thickness, Gamache said.

The substance was used by the Air Force during the 1990s. Officials sprayed the substance behind walls in an attempt to protect against blasts. “Lo and behold, it did a beautiful job in terms of helping the wall to stay intact after the blast,” Gamache said. “It was almost like if you were to keep a giant sheet of rubber behind the wall, and it would allow the wall to kind of break out, but then it would keep it together.”

On humvees, the substance is sprayed on the outside of the vehicle to help destroy the bullet before it reaches the metal armor.

“The beauty of it is, it performs as well as kits that are out there, but it’s lighter,” Gamache said, adding that its greatest strength is its ability to stop large fragments.

The explosive-resistance coating, which is not affected by heat, has had other applications as well. In Iraq, Marines were burning their arms on the inside of the hot metal doors. “They’d literally have to go to the hospital [because] their burns were so severe,” Gamache said. By spraying one coat on the inside of the vehicle, the Marines protected their arms.

The substance has not been widely used, however. According to Gamache, Marines in the field have reported difficulty in applying it. Marines have been applying the coating to steel plates inside tents in Iraq, where the temperature is hot. Spraying a heated substance makes it even hotter.

That discomfort could be eliminated if the coating was applied to steel before it was shipped to Iraq, Gamache said.

The Army has worked with the Office of Naval Research on explosive-resistance coating products, sister publication *Inside the Navy* reported in spring. An Army spokesman declined to respond to questions about whether the Army is studying the substance, saying that no unclassified information on this subject is available.

The Army recently set up a display of add-on armor kits at the Pentagon; the spray-on coating technology was not included. -- *Jen DiMascio*

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