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HJ1 Armor System

Breakthrough Body Armor Echoes 50-Million-Year-Old Design

NP Aerospace Develops Telescoping Plate System With S-2 Glass® Reinforcement

HJ1 Armor

For many years the people who dispose of explosive devices have had one common complaint about the equipment they use: They have to fight their protective suit before they fight the bomb.

Commonly known in the security industry as EOD suits, the body armor is made for Explosive Ordnance Disposal. With the unfortunate spread of terrorism and increased use of Improvised Explosive Devices (IEDs), the suits are seeing more frequent use, prompting demand for designs that are more comfortable and more flexible, allowing the wearer to move easily and focus on the threat.

NP Aerospace Ltd., Coventry, UK, a manufacturer of body armor for many years, addressed that need and came up with an answer that is both very old and very new. NP combined an overlapping plate design that evolved about 50 million years ago with S-2 Glass® reinforcements and the HJ1 Armor System[1] to come up with the most comfortable and flexible EOD suit on the market today.

NP Managing Director Roger Medwell says the new suit and its three-piece telescoping or overlapping frontal plate system is very flexible and articulates well, allowing the operator the freedom of movement and dexterity to quickly get in position to dispose of the IED.

The new EOD suit has a fabric covering over the frontal plates so most observers will not see that the plates overlap and resemble the shell of an armadillo. Medwell says the overlapping design is the key to both flexibility and protection.

"The operator can move easily with the overlapping frontal plates because they are not bumping into each other," explains Medwell. "At the same time, because the plates overlap, the joints are not a weak point. The plates give protection to the full width and height of the frontal shield."

[1] Used with great success in many military and commercial ballistic applications, the HJ1 Armor System is licensed by AGY.

Case History

HJ1 Armor System

The outer surface of the shell plates is made using the HJ1 Armor System. Behind that rugged surface are layers of closed-cell foam and aramid fiber. The entire plate structure absorbs blast energy while the HJ1 Armor System is intended to slow and deform bomb fragments. The aramid fiber fabric performs a catching function.

The shaped plates are cured in an autoclave and Medwell says they achieve about the same performance as if they were compression molded.

The new suit was developed for the UK's Ministry of Defense and is now in trials all over the world.

"We started shipping the new EOD suits in 2006," says Medwell. "Security forces in several countries have purchased small quantities to test the performance. Most of those countries have already trained with the new suits and are starting to deploy them now (in early 2007)."

The team at NP Aerospace is looking forward to seeing test results for a design concept that has actually been in the field for more than 50 million years.

MK V EOD Frontal Plates

- Outer layer of frontal shell made with the HJ1 Armor System incorporating phenolic resin and S-2 Glass® assembled roving (463-AA-250)
- Prepreg made by Primco Limited, an HJ1 armor system licensee recently approved for prepreg production.
- Fabric woven by Fothergill Engineered Fabrics (24 ounces per square yard with 5 by 5 construction (5 picks per inch)
- Inner layer of frontal shell made with aramid fiber (the ratio of glass and aramid fiber in the finished shell plates is about 50/50)
- The plates also incorporate a layer of closed-cell foam
- Composite material shaped to fit the mold and cured in an autoclave

NP Aerospace Ltd.
473 Foleshill Road
Coventry CV6 5AQ
U.K.
Phone: +44 (0)24 7670 2802
www.np-aerospace.co.uk

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WORLD HEADQUARTERS/AMERICAS
AGY
2558 Wagener Road
Aiken, S.C. 29801 USA
1.888.434.0945 (Toll free in US)
1.803.643.1501
1.803.643.1180 (Fax)

EUROPEAN OFFICE
AGY – Europe
163 Boulevard des Etats Unis
69008 Lyon, FRANCE
+33.4.72.78.1777
+33.4.72.78.1780

www.agy.com

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