HIGH IMPACT TECHNOLOGY

TECHNOLOGIES FOR PROTECTING CRITICAL INFRASTRUCTURE.™

INFRASTRUCTURE PROTECTION SYSTEMS™

ABSTRACT

Using battle proven technologies to protect key infrastructure for our energy grid provides the foundation for the continuous flow of energy that is critical to the US economy. Each site has unique requirements and assessing ballistic/blast threats are essential in understanding how to protect the components.

BALLISTIC RATED TO UL LEVEL 8,9,10

BLAST RATED TO IED'S AND VB-IEDS

WIND LOADS GREATER THAN 125 MPH

SELF HEALING EXTERIOR COATING FOR HOLDING VESSELS

FIRE RATED TO UL E-119

MANUFACTURED TO ALLOW FOR ONSITE ASSEMBLY AND DISASSEMBLY

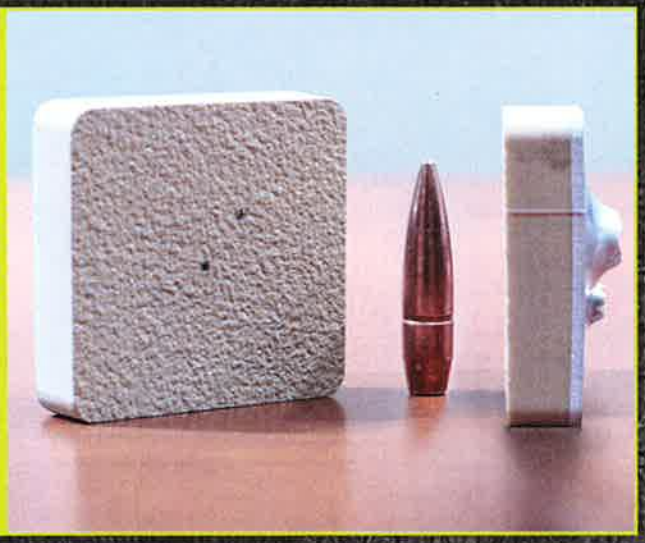
SYSTEM DESCRIPTIONS

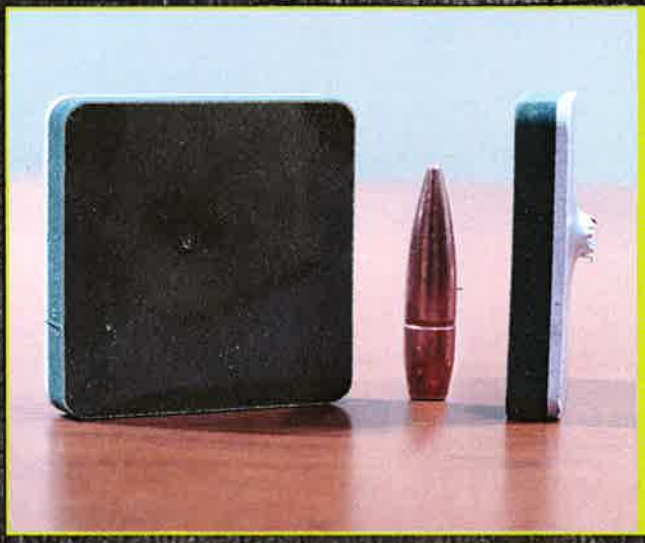
INFRASTRUCTURE PROTECTION SYSTEMS™ - HIGH IMPACT TECHNOLOGY, LLC

A dynamic menu of products has been developed to allow for a range of solutions to physically protect key infrastructure.

BATTLEJACKET™	RUGGEDIZED COATINGS	MULTIPLE HITS
FIRECAP™	EXTERNAL FIRE PROTECTION	PROTECTING SUBSTRATES
HEXTINGUISH™	FLASH FIRE PROTECTION	SNUFFS OUT FLAMES
DYNAMIC ARMOR™	BALLISTIC RATED SYSTEMS	EASY INSTALLATION
BATTLEGUARD™	BLAST PROTECTION	PHYSICAL STRUCTURES

CLASSIC





EXTREME CONDITIONS

PROUD RECIPIENT OF THE 2016 PRESIDENT'S EXCELLENCE IN EXPORTING "E" AWARD

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HIT
HIGH IMPACT TECHNOLOGY

TECHNOLOGIES FOR THOSE WHO PROTECT OTHERS™

BATTLEGUARD™ SYSTEM

AFFORDABLE BALLISTIC AND BLAST PROTECTION

EASY TO POSITION

MINIMAL PREPARATION

LOW MAINTENANCE

EMBEDDED ELECTRONICS CAPABLE

ABSTRACT

Due to the escalation of threats to people and infrastructure, High Impact Technology, LLC saw the need to create a new generation of barriers that have the ability to be put in place to protect key locations from a range of threats (IED, EFP, ballistic and blast). Extensive testing has been completed to validate the dynamic protections created with the use of the BattleGuard™ System.

FEATURES AND BENEFITS

BATTLEGUARD™ SYSTEM - HIGH IMPACT TECHNOLOGY, LLC

COMPONENTS

REINFORCED CONCRETE CAST INTO A DYNAMIC SHAPE

TANKSKIN® RESIN SPRAYED ON THE OUTSIDE STRUCTURE SURFACES

WIRING CONDUIT IMBEDDED INTO CONCRETE SHAPE

LIFTING RINGS OR FORK LIFTABLE POCKETS

IMBEDDED ELECTRONICS AND DEFENSIVE TECHNOLOGIES

APPLICATION

The design of the BattleGuard™ System allows protection for both structures and people. The ability to adapt to both industrial and military threats gives the BattleGuard™ System a wide range of markets including infrastructure, buildings, checkpoints and energy facilities. With the flexibility to create both passive and smart units, the capability of the BattleGuard™ system can be deployed in a wide spectrum of markets.

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TECHNOLOGY

High Impact Technology, LLC has designed a balance between mass and shape that redirects the blast energy as well as deflecting ballistic and fragment threats. The dynamic design redirects the leading edges of the blast wave and uses its own energy against the ensuing wave behind it. The ability to imbed smart technologies and defense technologies give this structure unique and innovative capabilities. The simple mass of the BattleGuard™ System can be used as a shield to stop vehicles. The BattleGuard™ System design offers options to customize the height of the system, providing solutions for a range of applications.

BATTLEREADY ARMOR SYSTEMS

A family of dynamic armor solutions that balances weight, thickness and cost against threat.

DYNAMIC COMPOSITE ARMOR™

DYNAMIC HARD ARMOR™

BATTLEGUARD™

An Oregon consortium works to fortify the electrical grid

registerguard.com/rg/business/32938839-63/an-oregon-consortium-works-to-fortify-the-electrical-grid.html.csp

Russ Monk

Today's Business stories

- An Oregon consortium works to fortify the electrical grid
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Between 1 a.m. and 1:30 a.m. on May 16, 2013, a well-coordinated assault was launched against an electrical substation in Northern California that supplies the Silicon Valley with power.

One or more people entered manholes at the Metcalf substation and cut fiber cables, knocking out communications, according to various reports. Then, the intruder or intruders fired more than 100 rounds from high-powered rifles into the substation, knocking out 17 of the 23 transformers. It took almost a month to repair the substation and bring it back online.

The event received little public attention at the time. A blackout was avoided when power was rerouted around the site and other California power plants ramped up production. The utility that owned the substation, Pacific Gas & Electric, downplayed the incident as vandalism.

Then, in December 2013, two things happened. Rep. Henry Waxman, D-Calif., brought up the attack on the power station at a congressional hearing on regulatory issues. And Foreign Policy magazine wrote an article about it, describing it as a "military-style raid" and noting that the FBI was investigating it. Within the next two months, the Wall Street Journal, CNN and a handful of other media outlets followed up with stories of their own.

In Oregon, Russ Monk watched the flurry of media activity with interest, but no surprise.

Monk, a partner in a small group of interlocking companies in Tigard and Salem, was well aware of the vulnerability of the U.S. energy grid. And, months before the attack on the Metcalf substation, he and his partners had begun working on a plan to protect critical parts of the grid by forming a consortium with other Oregon companies, mostly in the Willamette Valley, that had developed specialized skills and products.

Barrier technologies

The six companies that Monk and/or his three partners run are small. They collectively employ about 150 people; their combined annual revenues range from about $5 million to about $18 million.

What they do have is technology — the companies and their owners hold several dozen patents.

One of the companies, Barrier Corp., produces sound barriers, heat barriers, ballistic barriers and shock and blast mitigating foam. A spinoff from Barrier, High Impact Technology (HIT) produces a self-sealing coating that protects against leaks when vehicles' fuel tanks are hit by small-arms fire.

This sharply reduces the risk to military personnel in war zones, Monk said. Soldiers who formerly had the choice of remaining in a burning vehicle or leaving it and becoming a target for snipers could now continue driving as the fuel tanks absorbed bullets without leaking and bursting into flame.

The Department of Defense awarded a contract to HIT for its BattleJacket coating without seeking or accepting any other bids because, the department said at the time, "There is only one responsible source and no other supplies or service will satisfy agency requirements."

So Monk and his partners already had developed and patented some of the ingredients that would go into producing protection systems for power stations. The final push to move into that market came because of financial concerns.

Congressional gridlock in 2013 resulted in the sequestration that whacked federal spending, including defense spending.

The target market for the companies run by Monk and his business partners is first responders and the military: Barrier receives about 40 percent of its revenues from defense contracts, HIT, about 90 percent. So when defense spending was cut, they needed to find other customers.

They settled on protection for the U.S. power grid.

Most vulnerable

Much of the U.S. power system was built long before terrorism — foreign or domestic — was an issue, Monk said, so it hasn't been well protected.

Of particular concern are high-voltage transformer units, which make up less than 3 percent of transformers in U.S. power substations but carry 60 to 70 of the nation's electricity, according to a June 2014 study by the Congressional Research Service. The report noted: "HV transformers are also the most vulnerable to intentional damage from malicious acts."

Monk was well aware of this when he started building his consortium in 2013.

High Impact Technology had some but not all of the key ingredients needed to protect substations, he said.

Other Oregon companies could supply the missing ingredients, he said. He initially contacted about a half dozen companies, starting with concrete producer Knife River — "We needed cast concrete" — which in turn recommended other firms. Knife River has a precast-prestress factory in Harrisburg.

Forming a consortium meant that the companies could jointly offer a complete package to protect transformer substations against natural disasters and attacks, foreign or domestic, Monk said. And the market for these products was about to expand significantly.

After the attack on the Metcalf substation, two players — the electrical power industry and Congress — became concerned about power-grid vulnerabilities.

Oregon Sen. Ron Wyden and three other Democratic senators wrote to the heads of the Federal Energy Regulatory Commission, a federal agency, and the North American Reliability Corp., an industry nonprofit, on Feb. 7, 2014, seeking answers and assurances.

"This incident came uncomfortably close to causing a shutdown of a critical substation which could have resulted in a massive blackout in California and elsewhere in the West," Wyden and senators Diane Feinstein, Al Franken and Harry Reid wrote. What, they asked, were FERC and NERC going to do to make sure that the U.S. power system was secure.

FERC responded by issuing an order on March 7 to NERC, telling it to file proposed standards for the security of the power grid within 90 days. Last November, FERC approved the new standards put forth by NERC, and said it expects them to be in force in 2016.

Requirements unclear

While the standards have been approved, it isn't clear yet exactly what level of protection each utility will be required to provide, Monk said. Many utilities are waiting for more precise information before they take action.

But not everyone is waiting. A Midwestern utility, which Monk said does not want to be identified for security reasons, contacted the Oregon consortium in 2013 to ask about protecting one of its key installations. A contract was signed last year, Monk said, and "we designed, engineered, tested, produced, shipped and installed (the system) in less than five months," Monk said, "It is the most protected site ever."

The consortium shipped 88 truckloads of materials, he said. Knife River's new generation of ballistic-rated concrete, which incorporates one of HIT's formulas, is used in the walls around the substation, which also use fire-blocking technology, composite rebar that is twice as strong as steel, and HIT's self-healing BattleJacket coating. Another HIT product, a curved glass ballistic and blast shield dubbed BattleGuard, is also used in the project, Monk said. The completed installation can withstand blasts from a very large car bomb, he said.

The cost of the Midwestern project was over $5 million, Monk said.

Knife River Vice President Loren Later said there were three parts to that project. "There was the concrete component manufacturing, the coating for ballistic and fire protection and the onsite installation. We built all the concrete components for the job," he said.

It is a modular system, he said, with columns that have slots in both sides with shiplap panels that slide down between the columns. There are no visible joints that would allow a shooter to put a bullet through a seam, he said.

More demand

Later said he first encountered HIT several years ago when it approached Knife River about trial-casting pieces for a project HIT was working on. "We told them we had a precast/presstress division in Harrisburg," Later said. "They thought that was a splendid idea."

"Why would we want to build it, when they can do it better?" said Monk, who is director of operations for HIT.

Later said he anticipates there will be demand for more installations such as the one recently completed in

the Midwest. The federal government has already made clear that key infrastructure sites must be protected.

Wyden said last week that providing the highest level possible of protection for the country's infrastructure is "the highest priority" for him and that he has had productive meetings with HIT executives.

Monk estimates that there are about 600 major power sites in the country that need protection, "and about 55,000 in the next tier down," including facilities owned by regional or local utilities.

He estimates the size of the market at "$100 billion plus," and adds that the consortium would be happy with 1 percent of that. Monk also foresees the time will come when protection will be sought for other parts of the nation's critical infrastructure, such as oil refineries and water and sewage plants.

After the flurry of reports in early 2014 about the Metcalf attack, several other companies around the country advertised that they would provide protection to high-voltage transformers.

Monk said the Oregon group has a head start. However, eventually "the big boys will move in," he said, although he hopes there will still be opportunities for the Oregon consortium as subcontractors. In the meantime, what Monk is calling the Oregon "protective cluster" is growing.

Knife River, for example, recently suggested that Monk contact Mohawk Metal, a Eugene steel fabricator and laser cutter.

Mohawk CEO Tony Bloom is looking into the protective cluster and whether it would be a good fit for Mohawk. That the introduction to Monk came from Knife River, a trusted partner, is important, he said.

"We're excited about the project (Monk) is working on," Boom said, "We're hoping to find a way to be helpful."

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