Threat Awareness and Risk Mitigation

AASHTO Technical Committee for Bridge Security and Hazards
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Hardwire Armor Protection Portfolio

Military: Vehicles, Aircraft, Boats, and Personnel

Armor supplier for the U.S. military and for Foreign Military Sales customers.

Infrastructure: Bridges and Utilities

Critical domestic and overseas infrastructure protection.

Police and Law Enforcement

Shields, clipboards, and ballistic protection panels for law enforcement officers and SWAT teams.

Schools / Commercial Buildings

Bulletproof Whiteboards and Bulletproof Advertising for schools and public places.

Hardwire Proprietary
Hardwire spans three facilities with over 130,000 ft² of manufacturing space in Pocomoke City, Maryland.
We have installed armor on 12 bridges in the US.

- Main Cable Shields.
- Suspender Rope Shields.
- Socket Panels.
- Underdeck Panels.
- Stay Cable Armor.
Focus on Cables
- Fire
- Cutting
  - Mechanical
  - Thermal
- Fragmentation
- Blast
  - Contact Charges
  - Stand-Off Charges
Fire

- Fire is the most likely event that could take down a bridge due to the fact that it could be planned or accidental.
- Consequences of heat on steel and concrete make bridges extremely vulnerable.

- Testing is performed onsite following the UL 1709 temperature curve in custom made ovens capable of testing full scale anchorages.
- Specifications vary significantly in time and strand temperature requirements.
Cutting

- Extremely effective way of inflicting damage to cables to create disproportionate collapse of structure.

  - Gas Powered Saws
  - Oxy Acetylene Torch
  - Thermal Lance.

- Testing is performed on site.

- Specifications vary significantly on duration, blade types and sizes.
• Fragmentations from blast events can be very destructive to cables.

• Ropes and hangers are susceptible to damage from high caliber rifles.

• Testing is performed on site in ballistic chambers with fragment simulating projectiles (FSP).

• Specifications vary significantly on size and velocity of FSP.
Blast

Contact Charges
- Terrorist Grade Shaped Charge
  - Whiskey Mixer
  - Soup Ladle
- Flexible LSC
- Diamond Charge

Standoff Charges
- Satchel Charge

- Testing is performed off site at a blast range.
- Typically strands are unstressed.
- Specifications vary on size and type of charge.
Blast: Whiskey Mixer
Blast: Soup Ladle

Hardwire Proprietary
Blast: Flexible LSC
Blast: Diamond Charge

Point of detonation
Hardwire Pro

Blast: Standoff Charge
What do we do?

- Create Standoff.
- Use deception.
- Use shielding that incorporates multiple materials that work together to defeat threats.
- If you can’t stop it – delay it. Make it harder and longer to accomplish their mission.
- Make them want to go somewhere else for their attack.
Challenges: Cost

Owner’s perspective:
• Cable armor costs for a new bridge typically run significantly less than a single percent of the total project budget. Some structures are still being built with no cable protection or only fire protection.

Supplier perspective:
• Testing cost is an ongoing cost that remains for mature designs that have been previously tested and installed.

• Specifications from bridge to bridge are inconsistent. Standardized specifications could help lower costs.
Where do we go from here?

Continue to work on:

1. Owner education.
   • Documenting the performance of unprotected cables.
   • Understand the threats.

2. Understand the application.
   • Developing products that will hold up to the tough environment on the bridge.
   • Work with contractors and owners to provide solutions that are easy to install and maintain.

3. Developing the best performing, lowest cost solutions for the market place.
   • Reduce the weight and footprint of the armor.
   • Improve the performance of our armor.
   • Work on ways to defeat threats, not just meet specifications.
Thank You.

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