

Verification of Fire Protection of Shipboard Electric Cables Using Intumescent Coating

NSRP Sustainment Panel Meeting
Fleet Maintenance and Modernization Symposium

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Hepburn and Sons LLC

NSRP Panel Project

To support the continuing advances in fire protection and affordability, the project will provide initial screening of Specified Technologies Inc. (STI) Marine Cable Coating (MCC)



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Steve Gaschler	ATI
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William Jones	STI
Jacob Phelps	FMM
Karen Carpenter	SwRI
Wes Duchene	NSWCCD
Chris Mealy	NSWCCD
Ravi Singh	NSWCCD

Problem Statement:

Fires aboard US Navy ships have resulted in damages of more than \$4 billion from 2008 – 2022¹. Layered fire prevention, detection, and response efforts are necessary to reduce the risk.



Problem Analysis

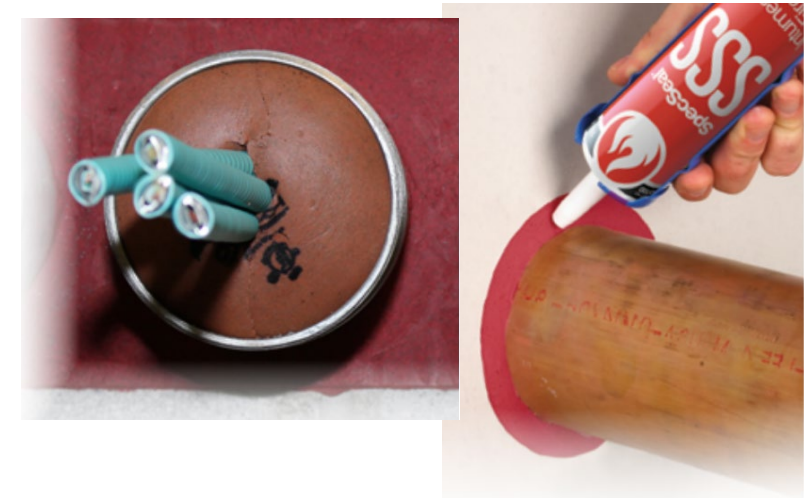
- Major Fires Review provided holistic evaluation of Navy fire prevention and protection systems
 - 12 significant issues addressed
 - 7 strategic recommendations
 - 56 corrective actions and recommendations for lasting impact



(2.B.3.a) Fund the assessment, implementation, and outfitting for both back-fit and forward-fit ships, of improved fire-prevention features and materials, and advanced firefighting equipment. The assessment should include but not be limited to: **(1) the use of intumescent paint (especially in the highest risk areas of ships); ... Improve the timeline of integration and installation of these systems as applicable shipboard and ashore.**

Intumescent Products

- Intumescent process releases gases as part of a chemical reaction triggered by thermal exposure
- Gas production with solid structure combines to form the char layer
- Char layer provides insulation and protection
- Products exist in various forms including sealants, paints, bricks, pillows and more.



Why Cable Coating?

“After flash over, the fire grew quickly in intensity by consuming secondary combustibles and spread to adjoining locations via wireways and outboard frame bays.”

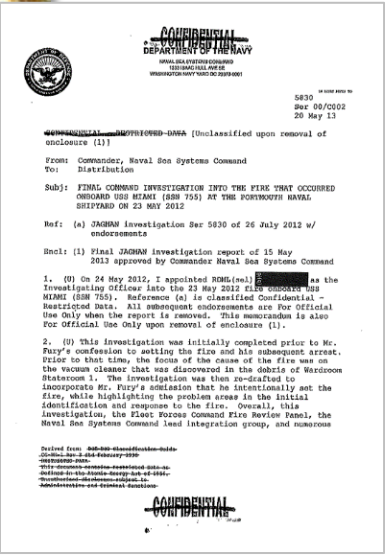
- COMNAVSEA ltr 5830 SER 00/C002 20 May 13, Page 51 para 14.

“Fire extensively damaged cables and cableways spanning the entire length of BONHOMME RICHARD” & “The entire 4 MILLION feet of combat systems and C5I cabling would require replacement.”
SECTION IX.

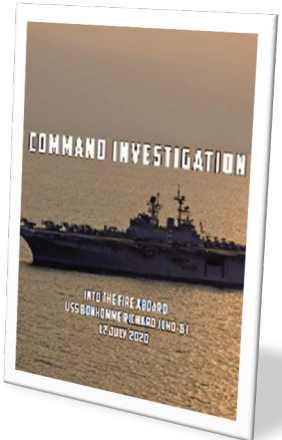
- RESULTING CONDITION OF BHR. Para 1044.

“The presence of an electrical ground resulted in the erroneous report by some watch standers that this was the cause of the fire. This electrical ground was more likely caused by the fire as it melted electrical cable insulation of live wires.”

- CHAPTER 3. SECTION I. A. 2. BHR Command Investigation



<https://www.navsea.navy.mil/Portals/103/Documents/FOIA-P11/ReadingRoom/201411130821.pdf>



Marine Cable Coating

Two critical functions:

- Protect the ship
 - Minimize flame spread
 - Provide additional time for coordinated fire response
- Keep systems operational
 - Prevent cables from shorting causing additional damage
 - Deliver power and communications to critical systems



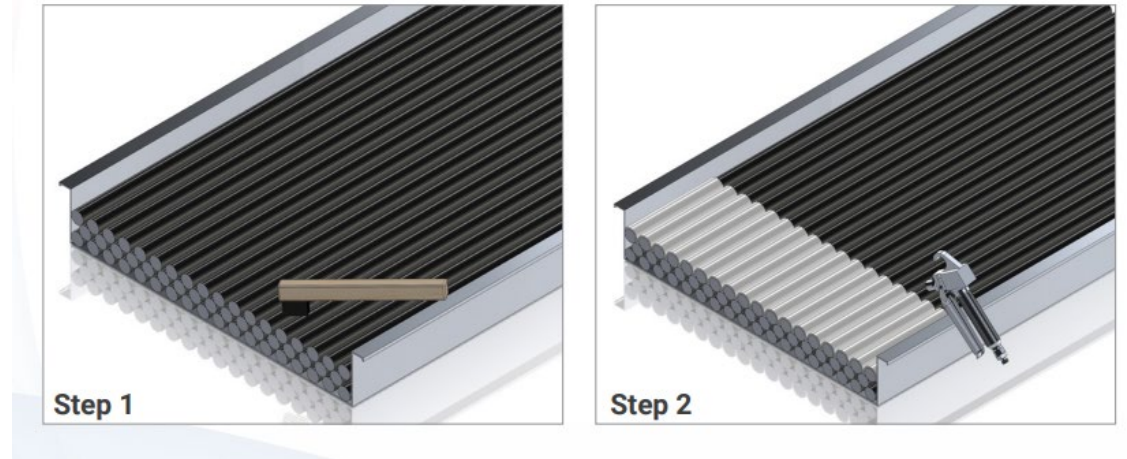
Helmet-cam view inside BHR published in Command Investigation into the Fire Aboard BHR



Damaged cableways published in Command Investigation into the Fire Aboard BHR

Specified Technologies Inc Marine Cable Coating (MCC)

- STI provides a suite of fire protection systems
- Intumescent products used throughout product line
- MCC can be applied using standard painting equipment
- Application can be completed by shipyard workers, contractors, or ship forces



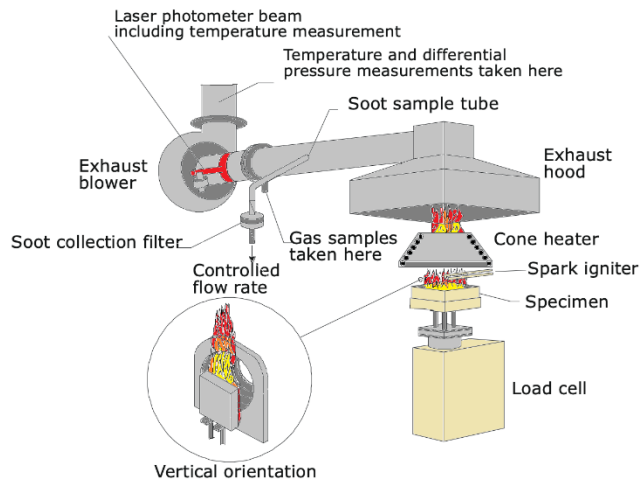
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Testing Overview

NAVSEA Cone Calorimetry Testing:

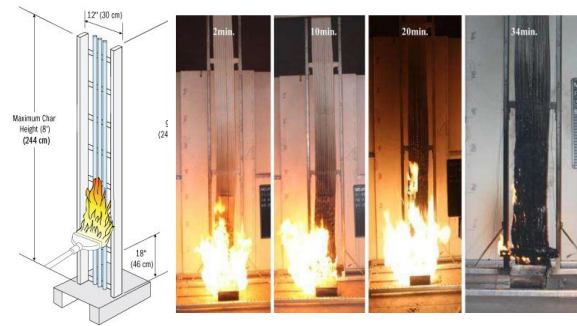
- Evaluate MCC for Heat Release Rate, Smoke Release rate, Mass Loss Rate
- Compare combinations:
 - Uncoated (baseline)
 - MCC
 - Paint
 - Paint + MCC
 - MCC + Paint



ASTM D613 Testing:	
Test Configurations	5
Tests per Configuration	2
Estimated Amount of Cable per Test (ft)	3
Total Cableage	30
Cable needed with overage (10%)	33

SwRI Modified UL 1666 Testing:

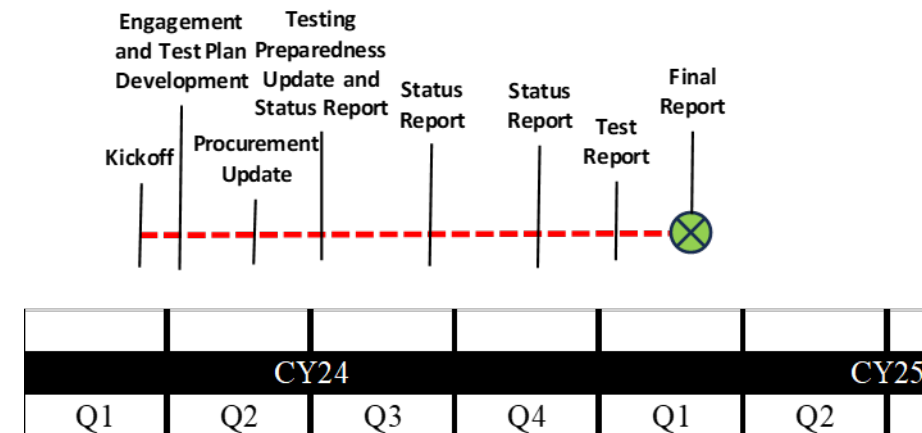
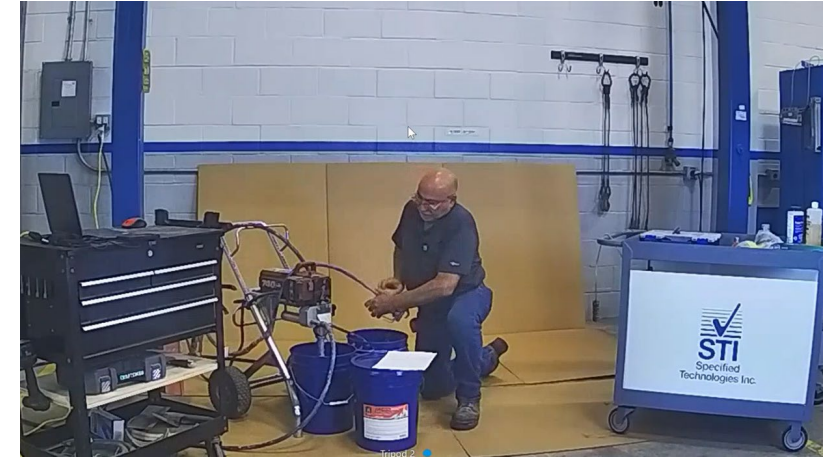
- 154 kW fire exposure
- Vertical orientation of samples representing 2 story run
- Considered worst case scenario for flame spread
- Baseline and coated only



UL1666 Testing	
Number of Array Types to Test	2
Tests Per Type	2
Length of Cable Array (ft):	17.5
Number of Cables per Array:	7
Total cableage:	490
Cable need with Overage (10%)	539

Current Status

- All subcontracts executed (STI, FMM, SwRI)
- Test scope defined and reviewed with SwRI and NSWCCD
- FMM has procured the approximate 600 feet of cable necessary for test execution
 - LS2SWU-12
- STI has delivered MCC to FMM
- STI has provided virtual training on recommended equipment configuration and application
- FMM establishing paint crew availability and schedule



Path Forward

- Once coated, cables will be distributed to testing sites and evaluated against baseline
- Project team will review data and recommend next steps in transitioning MCC for shipyard application
- Establish risks, benefits, and costs associated with implementation across shipyards

Questions?

