Verification of Fire Protection of Shipboard Electric Cables Using Intumescent Coating

Sustainment Panel

24 September 2025

Presented By: David Rice

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)

FINCANTIERI MARINETTE MARINE

GD Bath Iron Works

SwRI Southwest Research Institute

STI Specified Technologies Inc.

ATI Advanced Technology International

NAVSEA Warfare Centers Carderock

Problem Statement:

Fires aboard US Navy ships have resulted in damages of more than $4 billion from 2008 – 2022[1]. Layered fire prevention, detection, and response efforts are necessary to reduce the risk.

1- GAO-23-105481, April 2023

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

DEPARTMENT OF THE NAVY

5830
Ser 00/C002
20 May 13

From: Commander, Naval Sea Systems Command
To: Distribution

Subj: FINAL COMMAND INVESTIGATION INTO THE FIRE THAT OCCURRED ONBOARD USS MIAMI (SSN 755) AT THE PORTSMOUTH NAVAL SHIPYARD ON 23 MAY 2012

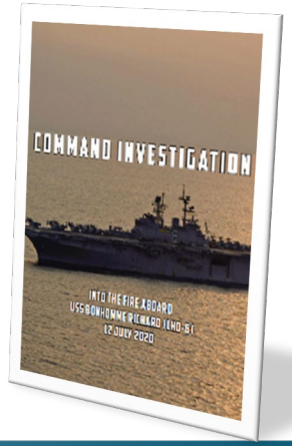
Ref: (a) JAGMAN investigation Ser 5830 of 26 July 2012 w/ endorsements

Encl: (1) Final JAGMAN investigation report of 15 May 2013 approved by Commander Naval Sea Systems Command

1. (U) On 24 May 2012, I appointed ROML(sel) [redacted] as the Investigating Officer into the 23 May 2012 fire onboard USS MIAMI (SSN 755). Reference (a) is classified Confidential - Restricted Data. All subsequent endorsements are For Official Use Only when the report is removed. This memorandum is also For Official Use Only upon removal of enclosure (1).

2. (U) This investigation was initially completed prior to Mr. Fury's confession to setting the fire and his subsequent arrest. Prior to that time, the focus of the cause of the fire was on the vacuum cleaner that was discovered in the debris of Wardroom Stateroom 1. The investigation was then re-drafted to incorporate Mr. Fury's admission that he intentionally set the fire, while highlighting the problem areas in the initial identification and response to the fire. Overall, this investigation, the Fleet Forces Command Fire Review Panel, the Naval Sea Systems Command lead integration group, and numerous

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



Marine Cable Coating

Two critical functions:

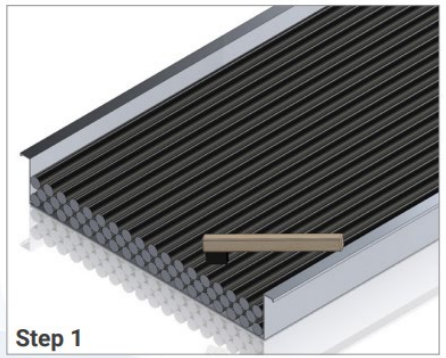
- Protect the ship
  - Minimize flame spread
  - Provide additional time for coordinated fire response
- Keep systems operational
  - Prevent cables from shorting causing additional damage
  - Continue to deliver power and communications to critical systems

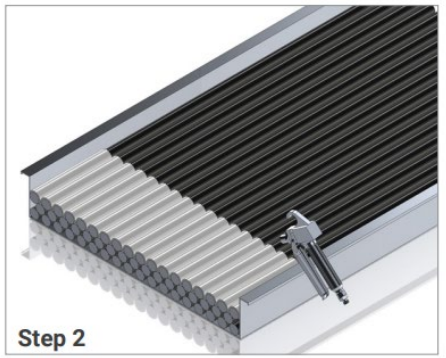
Helmet-cam view inside BHR published in Command Investigation into the Fire Aboard BHR

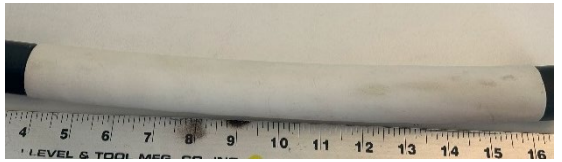
Damaged cableways published in Command Investigation into the Fire Aboard BHR

Specified Technologies Inc (STI) Marine Cable Coating (MCC)

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







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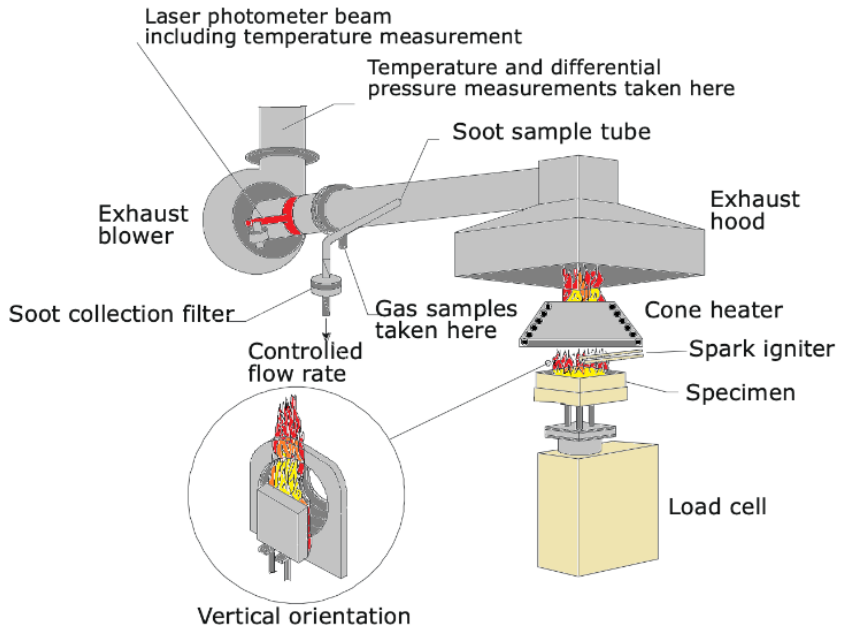
Specified Technologies Inc.
STI We engineer peace of mind.

Testing Overview

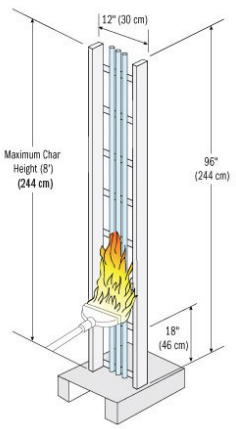
NAVSEA Cone Calorimetry Testing (ASTM D6113):

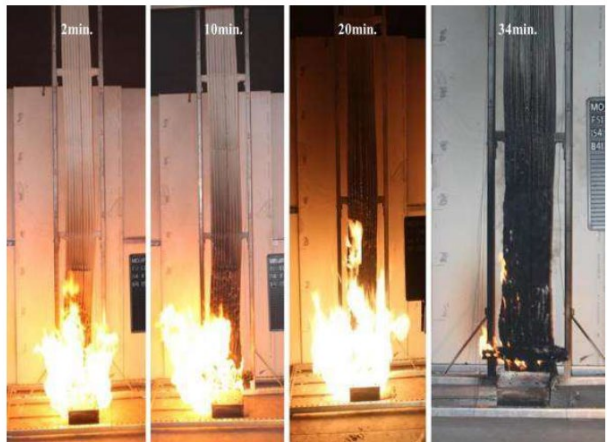
- Evaluate MCC for Heat Release Rate, Smoke Release rate, Mass Loss Rate
- Compare combinations of coatings on cables:
  - Uncoated (baseline)
  - MCC
  - Paint
  - Paint + MCC
  - MCC + Paint



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 cables for comparison





FMM Coating Process

- FMM procured approximate 600 feet of cable necessary for test execution
  - LS2SWU-12 per MIL-DTL-24643/33G
- STI delivered MCC to FMM, provided virtual training on recommended equipment configuration and application and had personnel on site during coating process.
- FMM established internal coating instructions, QA procedures, and shipping plans.
- Cables were coated during the week of 16 April.

Cables Delivered

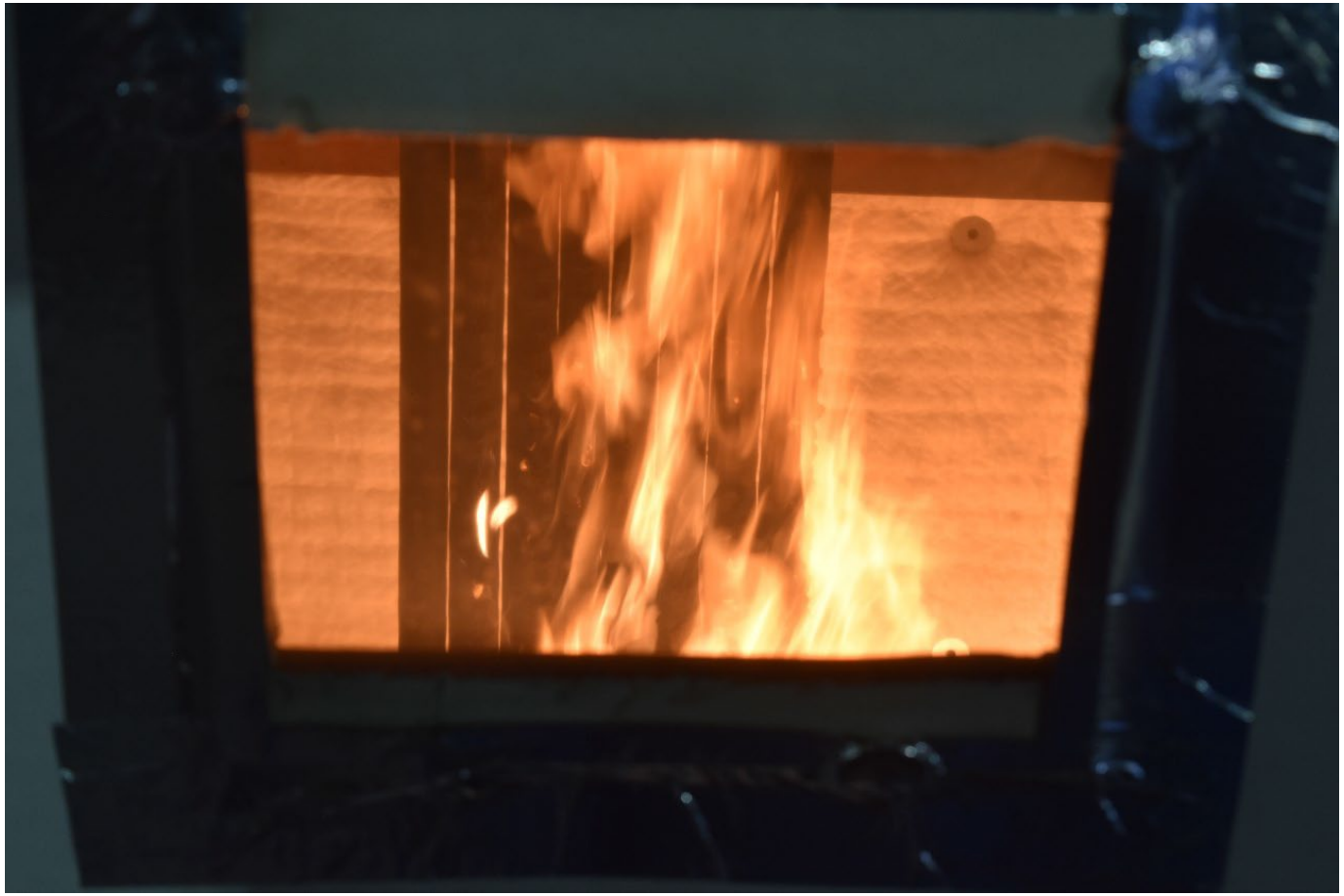
- Test Cables were shipped to both SWRI and NSWCCD during the week of 20 June.

Preparation for Fire Testing at SWRI

STI had personnel at SWRI to inspect and repair coated cables from any damage from shipping during the week before testing. (20 August)

SWRI prepared the Fire Chamber for testing

Fire Testing at SWRI



Bare Cable Setup and Test

Fire Testing at SWRI

Coated Cable Setup and Test

SWRI Results

- As of 19 September, SWRI had not provided their Report and Findings to Hepburn.
- From the pictures received from SWRI, it appears the coating system did not perform as expected.
- Final determination of coating performance and comments will be made once the SWRI information has been received and reviewed. Results will be provided in the project's Final Report.

Testing at NSWC CD

- Cone Calorimetry testing at NSWC CD has been delayed due to broken equipment. The needed parts have been ordered and awaiting delivery.
- Concerns have been raised regarding the coating application quality from NSWC CD personnel.
- Once testing is completed, NSWC CD personnel will provide their report to Hepburn. Results will be included in the Final Report.

Status

- Due to delays in cable procurement, cable coating and testing, Hepburn requested and received a NCE until 24 October.
- SWRI completed their fire testing 28 August. Awaiting their report and findings.
- NSWC CD is awaiting delivery of test equipment parts to complete Cone Calorimetry testing. Once testing is complete, their report and findings will be sent to Hepburn.
- Hepburn with develop the Final Report, with findings, and provide to NSRP.

Questions?

NSRP
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Taking Shipbuilding and Repair to the Next Level