NSRP – MCI Alternate Deck Wear Surface Evaluation & Qualification July 17, 2025

NEWPORT NEWS SHIPBUILDING
A DIVISION OF HII

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Milwaukee Composites Inc. (MCI) Alternate Wear Surface Evaluation & Qualification

- Integrated Project Team:
  - Lead – HII-Newport News Shipbuilding:
    - Harold Howard
    - Ify Amene
    - Jolene Garner
    - Madelyn Mendenhall
  - Contractor – Milwaukee Composites Inc.
    - James Desing
    - Brian Latz
  - Participants – HII-Ingalls Shipbuilding:
    - Jason Farmer
    - Ronald McClellan
  - NAVSEA O5P2
    - David Owen (Howard Castle – Acting)
    - Luis Moreno
  - Program Technical Representative
    - Perry Haymon – HII-Ingalls Shipbuilding

Project Background

- False decks and raised walking platforms are utilized extensively on all classes of Navy ships. The false decking provides:
  - Personnel access to machinery or systems for maintenance and inspection
  - Walking platform over through services routed above the true deck

- Traditionally, Combat Systems spaces utilize false decks with Electric Grade Sheet (EGS) deck coverings to meet dielectric requirements in accordance with ship specifications
  - The EGS most often used is Lonmat

- Lonmat is used on Navy Platform today because it meets the dielectric requirements of MIL-DTL-15562, however, deck panel suppliers have experienced the following issues:
  - Procurement cost increases
  - Color/gloss inconsistencies
  - Long lead-times
  - Material weight = 1.0 lbs./sq. ft.
  - Available roll widths generate significant scrap in production

Background (Cont.)

- ManTech Project S2723 (False Deck Panel Improvement) successfully implemented two new deck panels:
  - Aluminum Honeycomb core with a Lonmat wear surface
  - Phenolic Infused Balsa Wood core with a Lonmat wear surface

- Note, both new panels utilize a Lonmat wear surface, as no new wear surface material was identified in the above ManTech project
  - Several new wear surfaces were tested with none passing the requirements for shipboard use
  - Fire/ Smoke/ Toxicity (FST) was proven the most challenging requirement in the comparison of alternative materials

Project Purpose

- This project is evaluating the new MCI wear surface as an alternative to Lonmat and pursuing the following advantages:
  - Reduce cost
  - Improve material availability
  - Reduce overall weight of raised deck panels
  - Provide the capability to color match existing wear surface
  - Reduce scrap rate associated with EGS pre-cut roll sizes
  - Capability to repair vs. replace

- Weight reduction offered by MCI Tough Coat moves the subject panel to areal weight 1 IAW MIL-PRF-32664
  - Areal Weight 1 – for lightest deck panels where weight is most critical (**none currently exist**)
  - Warfare Systems spaces are often higher in the ship where weight is more critical

Project Tasks

- Project Tasks:
  - Collaborate with NAVSEA stakeholders to address all concerns necessary to gain Navy Shipboard approval
  - Fabricate test articles and perform material testing IAW MIL-PRF-32664, and document test results with NAVSEA
  - Perform a small scale demo of the panel to evaluate the wear surface ability to withstand modifications during construction & maintenance, and its performance under foot-traffic onboard ship
    - Evaluate panels for modifications utilizing standard shipyard tools (chop saw, skill saw, hole saw, angle grinder, etc.)
    - NSWCCD will install panels onboard an in-service ship to capture panel capability to perform under foot-traffic

Project Status

- Current Status:
  - The IPT has engaged with NAVSEA O5P2 (TWH Materials - Non-Metallic - Ships) to determine the Objective Quality Evidence (OQE) necessary to approve the new MCI wear surface for shipboard use

    - Engage NAVSEA O5P5 (TWH – Fire Protection Systems - Ships) upfront to address FST requirements as these requirements will prove to be the most challenging to meet from a shipboard approval standpoint

  - NAVSEA O5P5 (TWH – Fire Protection Systems - Ships) provided the IPT with the following direction to produce OQE that meet FST requirements for shipboard approval:

    - the novel wear surface provides equivalent or better performance when compared to Material ID 1929 and/or the test standard (e.g., 32664) *(Front-Side, see next slide)*
    - verify that the increased balsa core thickness does not exacerbate the already high CO and IDLH index values measured in previous testing. *(Back-Side, see next slide)*

Project Status

Description	Test Method		Fire Parameter	MIL-PRF-32664 Limits and IDLH Limits Criteria	Phenolic Infused Balsa Core With Tough Coat Wear Surface (Front) Passed?	Phenolic Infused Balsa Core With Tough Coat Wear Surface (Back) Passed?
Flame Spread	ASTM E162		Flame Spread Index (I_s)	25 (max)	Yes	Yes
			Melting / Dripping / Flaming Droplets	Not allowed	No	Yes
Smoke Density	ASTM E662		Maximum Smoke Density, Ds (non-flaming/flaming)	200 (max)	Yes	Yes
			Melting / Dripping / Flaming Droplets	Not allowed	Yes	Yes
Toxicity	ASTM E800	CO	*Non-Flaming*	MIL PRF is 600 ppm IDLH limit is 1200	Yes	Yes
			Flaming		Yes	Yes
		CO_2	*Non-Flaming*	IDLH limit is 40,000 ppm	Yes	Yes
			Flaming		Yes	Yes
		HCN	*Non-Flaming*	MIL PRF is 30 ppm, IDLH limit is 50 ppm	Yes	Yes
			Flaming		Yes	Yes
		HCl	*Non-Flaming*	MIL PRF is 30 ppm, IDLH limit is 50 ppm	Yes	Yes
			Flaming		Yes	Yes
		NO_2	*Non-Flaming*	IDLH limit is 13 ppm	Yes	Yes
			Flaming		Yes	Yes
		H_2S	*Non-Flaming*	IDLH limit is 100 ppm	Yes	Yes
			Flaming		Yes	Yes
		HF	*Non-Flaming*	IDLH limit is 30 ppm	Yes	Yes
			Flaming		Yes	Yes
		SO_2	*Non-Flaming*	IDLH limit is 100 ppm	Yes	Yes
			Flaming		Yes	Yes
Immediately Dangerous to Life or Health	IDLH (MIL-PRF-32664	I_{IDLH}	*Non-Flaming*	< = 1.0	Yes	Yes
			Flaming		Yes	Yes

Fire Smoke Toxicity Test Results

Project Status

- The IPT has engaged NAVSEA O5P2 on one MIL-PRF-32664 requirement in which the intent is believe to be misinterpreted:
  - 3.6.9 Wear resistance. The false deck panels shall resist wear and shall not show wear characteristics exceeding 0.001 ounce (30 milligrams) loss due to abrasion when tested in accordance with ASTM D4060 (see 4.5.5.9).
  - 4.5.5.9 Wear resistance. Wear resistance shall be tested in accordance with ASTM D4060 using a CS-17 wheel, 1,000 cycles, and 2.2-pound (1-kilogram) load (see 3.6.9)

- The IPT contends that MCI Tough Coat material is classified as a plastic wear surface that provides dielectric capability, and as such it should follow the test parameters invoked on insulating floor coverings for electronic spaces, which require a minimum mil thickness loss ILO mass loss in abrasion testing.
  - The IPT and NAVSEA are currently collaborating to define the proper abrasion resistance test method for MCI's Tough Coat material for shipboard use
  - MCI will lock-in the material formulation once abrasion requirements are defined and testing is performed and confirmed to meet requirements

Project Status

- MCI continues to optimize the production process in manufacturing test coupons to meet the requirements of MIL-PRF-32664 (False Deck Panels, Composites);
  - Discontinued screeding production process
    - More challenging to control parameters in manufacturing process
    - Availability of meter-mix machines in industry are limited
  - Adopted injection molding production process
    - Better homogeneity/ no air pockets
    - Higher consistency in applied thickness over entire panel surface
    - Good control of surface finish
    - More control over production schedule

- HII-Newport News Shipbuilding will evaluate and identify any concerns with modifying the new panels utilizing standard shipyard tools and practices
- NSWCCD will work to identify an in-service platform and evaluate the new material under foot-traffic in a shipboard environment

MILWUAKEE COMPOSITES INC. STATUS

Discussion / Questions

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