

# Electrical Technologies Panel

June 18, 2009

Alexandria, Virginia

## Composite Electrical Enclosures

**National Shipbuilding Research Program**



**Advanced Shipbuilding Enterprise**

# Composite Electrical Enclosures

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**Why the focus on composites?**

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# Composite Electrical Enclosures

## PROS

- ◆ Maintenance Cost Reduction
- ◆ Corrosion Resistance
- ◆ Weight Savings (~ 40%)
- ◆ Reduced Cost (potential)
- ◆ Installation Criteria

# Composite Electrical Enclosures

## CONS

- ◆ Not readily available in all sizes and configurations
- ◆ Installation Practices
- ◆ Cost
- ◆ EMI Hardened
- ◆ Shock & Vibration Requirements Satisfied
- ◆ Potential UV Issues

# Composite Electrical Enclosures

- ◆ Composite presentation during the Panel Meeting in San Diego by D. Michael Bergen of NAVSEA.
  
- ◆ General Composite Focus
  - some discussions regarding Electrical Applications
  
- ◆ Some of the slides regarding Electrical Applications follow....

# Composite Electrical Enclosures



## CURRENT ENGINEERING for REDUCED MAINTENANCE FLEET COMPOSITE APPLICATIONS

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Structures and Composites Division,  
Criteria & Assessment Branch, Code 654

NSRP Conference, May 6, 2009 • San Diego, CA

# Composite Electrical Enclosures



## Composite IC & Electrical System Enclosures



### Objective

- Eliminate chronic internal & external corrosion issues
- Develop technologies that are corrosion free by eliminating galvanic couples internally & to the surrounding areas
- Product is fire hardened & provides extended service life from current systems
- Eliminate current antiquated designs

### Payoff

- Mounting scheme employs 316L CRES studs that stand-off of the side-shell or bracket
- True watertight design and reduced thermal cycling reduces internal moisture
- Eliminates the solar thermal cycling that is problematic of steel, brass, and titanium boxes
- Spring loaded lid design adds to corrosion and water resistance
- Greater system reliability and significantly reduced maintenance (happy sailors)
- Evaluate installations on CVN, DDG, CG & LSD classes

# Composite Electrical Enclosures



## Composite LED Lighting Enclosures



### Objective

- Eliminate chronic corrosion issues
- Develop technology that eliminates incandescent lighting
- Reduce maintenance
- Significant reductions in line loads
- Multicolor lighting including

### Payoff

- Corrosion free mounting scheme eliminates antiquated mounting design
- No more water filled glass globe found on SYM-92
- Greater system reliability and significantly reduced maintenance (happy sailors)
- x100 life cycle of LED technology and x100 power reduction
- Switched LED technology for duplex colors & NODs compatible
- Unique heat dissipating ULTEM® composite

# Composite Electrical Enclosures



## Composite Stern Gate Panel



### Before & After



### Objective

- Eliminate chronic corrosion issues
- Develop technology that surpasses the performance of the legacy brass box
- Reduce maintenance
- Increase system reliability

### Payoff

- Mounting scheme is modular to the support structure
- Corrosion free enclosure & mounting
- High solid epoxy as anti-corrosion coating on structure
- Eliminates the solar thermal cycling that is problematic of steel, brass, and titanium boxes
- Greater system reliability and significantly reduced maintenance (happy sailors)
- Configuration control across 41 & 49 classes

# Composite Electrical Enclosures

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**OK....**

**What do we need?**

**What is next?**

**DISCUSSION**

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# Composite Electrical Enclosures

## What do we need:

- ◆ Panel involvement
- ◆ Vendor involvement
- ◆ NAVSEA involvement
- ◆ Shipyards involvement


# Composite Electrical Enclosures

## What is next:

- ◆ A mini-product team established to start gathering the information on current composite enclosures / products
- ◆ Develop a list of vendors with their products
- ◆ Categorize the enclosures / products by size, configuration, and which requirements are satisfied (Shock, Vibration, EMI, Weather Tightness, and Installation)
- ◆ Request a presentation by NAVSEA on their issues, concerns, and findings
- ◆ Request vendors participate in team
- ◆ Analyze current available boxes and determine which best satisfies our industries needs and share with the vendors.
- ◆ Where there are needs, solicit vendor development (could there be panel funding?)

# SUMMARY

- ◆ Composite electrical enclosures / products are a major growth area in our industry.
- ◆ We have the opportunity now to not only shape what we as an industry use in the future but dictate how well it functions in our environment.



# DISCUSSION