Use of Nanotechnology-Based Fire Boundaries on U.S. Navy Ships

John Heeseman
Huntington Ingalls Industries – Newport News Shipbuilding

Problem/Opportunity

- Manual installation of insulation, and particularly fire zone insulation, is an extremely complex and cumbersome work practice.
- This task requires significant:
  - Labor Hours
  - Cost
  - Material
  - Time



Objective

- Find an alternative system that can meet or exceed the performance of the current fire boundary system while reducing the overall cost and/or time spent
- Eliminating the hot work & rework associated with shooting studs, including time consuming repairs

Source: https://nanotechmaterials.com

Introducing Nanotech Materials

- Create high-performance coatings for challenges in energy efficiency and fire mitigation
- Applications include piping, wooden structures, tanks, roofing, valves, buildings, energy loss prevention and more
- Based in Houston, TX





NANOTECH MATERIALS





Source: https://nanotechmaterials.com

How Nanotech Solves the Problem

- Nanotech products contain a patented Insulative Ceramic Particle (ICP) additive meant to reject, contain, or slow the transfer of heat
- Our team is exploring Nanotech's Refractory Shield for replacing the current Hangar Bay insulation system and/or Fire Zone Bulkhead coatings



Source: https://nanotechmaterials.com

Nanotech Materials Data

Refractory Shield

- Refractory Shield is NanoTech Materials' custom fire protection solution
- Designed for high temperature protection applications in industrial settings
- Withstands extreme temperatures and thermal insult for extended periods without significant temperature gain
  - This has been demonstrated in previous testing of the material
- Refractory Shield provides outstanding resistance to thermal cycling and erosion by forming a durable ceramic matrix



Project Progress

- Investigation of Hangar Bay fire protection insulation system and Fire Zone Bulkhead coatings
  - Reviewing drawings, specifications, MIL standards and requirements that were used to qualify both systems
- Conversations with shipbuilding personnel that hold or manage the requirements for both systems
- Compilation of this data into a concise checklist of requirements that the potential Nanotech Materials coating must meet for this specific application

Future Plans

- Seek and add any additional requirements to our checklist that Nanotech materials will need to meet for this application
- Perform a side-by-side comparison between the current systems and Nanotech coating with the current data
- Collaborate with NanoTech to compile a list of tests and road map for qualification of the Nanotech product for future stages of the project
- Pursue investigation of other potential areas of application for NanoTech products identified

Future Plans – NSRP 2027

- Additional plans to pursue NSRP funding for new applications identified in shipbuilding during current project
- NanoTech has presented a string of potential products that can be useful in shipbuilding
- Plan is to pursue submarine applications of fire and smoke protection systems, similar to the current project
  - Currently, there are no systems on submarines that concurrently protects for both of these.
- Potential for efficient investigation due to relationships built in current project

Questions?