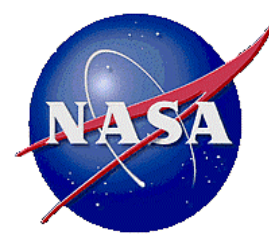


# USS IWO JIMA Mishap

## A Set-up for Failure



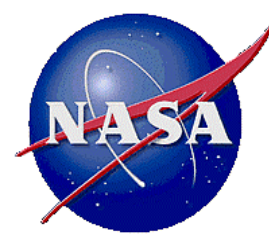
**Bryan O'Connor**  
Chief,  
Office of Safety and Mission Assurance  
NASA Headquarters, Washington, DC  
OSMA POC, Brian Hughitt (202) 358-1572



## What Happened

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- **October 1990: USS IWO JIMA Amphibious Assault Ship Deployed to Persian Gulf, Operation DESERT SHIELD**
- **Docked at Bahrain shipyard for emergent repairs**
- **As ship was leaving port- one hour after propulsion plant brought on line- bonnet fasteners for a 4" valve supplying steam to Ships Service Turbine Generator failed catastrophically**
- **850 degree superheated steam at 600 psi escaped into manned compartment**
- **Nine sailors killed instantly, one more fatally injured**



## Proximate Cause

**Unauthorized substitution of black oxide coated brass fasteners (BOCBF) for high strength steel fasteners in the valve**

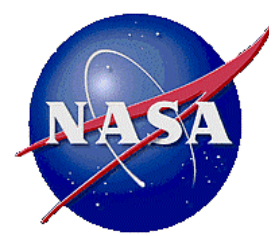


Alloy Steel Nuts



Black Oxide Coated Nuts

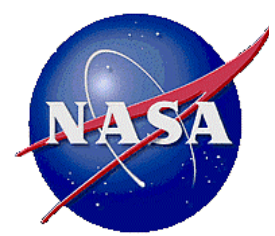
(not actual BOCBF)



## The Set-Up

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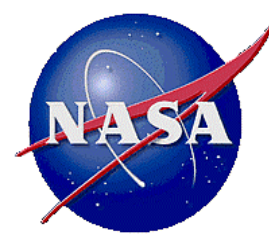
- **BOCBF are virtually identical in appearance to high strength steel fasteners. Coating served no functional purpose, but was applied in order to standardize common parts**
- **Fasteners are readily available and easily interchangeable**
- **Brass exhibits significantly diminished strength properties from steel under elevated temperatures**
- **Manufacturer Logo on BOCBF box: “Fasteners for High Strength Applications”**
- **Work performed by Foreign nationals with limited English**
- **Result: Failure to install Level I fasteners (required for superheated steam applications)**



## Contributing Factors

- Repair specifications did not identify fastener part numbers
- Ships Force did not provide contractor Standard Parts List
- Inadequate supervision for installation of Level I material
- No evidence that Government hold point inspections were performed
- Inadequate knowledge of Level I material requirements
  - Segregation from non-Level I
  - Segregation of look-alike parts
  - Markings
  - Color coding
  - Documentation





## Corrective Actions/Lessons Learned

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- Identified all BOCBF substitution hazards on Navy ships
- Mass inspection of in-service fasteners (scrape or magnet)
- Purged stocks & replaced with shiny brass or monel fasteners
- Revise parts lists to flag Level I fasteners and include warning notes
- Training curricula modified to include Level I awareness (engineers and mechanics)
- Fastener Selection training video disseminated Navy-wide