



NSRP All Panel Meeting

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The Navy Today (as of Sept 11, 2009)

- **Navy Personnel**

- **Active Duty:** 331,150 (52,136 Officers; 274,468 Enlisted)
- **Midshipmen:** 4,546
- **Ready Reserve:** 109,881 [As of 31 Aug]
 - **Reserves currently mobilized:** 6,547
- **Personnel on deployment:** 54,672
- **Navy Department Civilian Employees:** 192,961

- **286 Ships and Submarines**

- **Ships Underway (away from homeport):** 94 (33% of total)
 - **On deployment:** 104 ships (36% of total)
- **Subs underway (away from homeport):** 28 (51% of Sub Force)
 - **On deployment:** 25 (46% of sub force)

- **3700+ Aircraft**



Topics

- **FY 10 CNO Guidance**
- **Total Ownership Costs**
- **Document for Ship Cost Reduction**
- **Ship Design Tools Workshops**
- **Shipbuilding Engineering Education Concept**

CNO Guidance

www.navy.mil



- **Focus Areas include:**
 - **Maintain Warfighting Readiness**
 - **Inject discussion of TOC into all stages of program reviews**
 - **Use of common hull forms, common components, open architecture, automation and repeat builds**
 - **Leverage Science and Technology (human performance and protection, TOC, autonomy, power and energy)**
 - **Support STEM (Science, Technology, Engineering and Math) education and research**

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- Maintain Warfighting Readiness
 - Increased focus on TOC
 - Integrating TOC into all stages of Two-Pass Six-Gate Acquisition review process
- Alignment of Requirements, Resources and Acquisition Processes
 - Achieve accountability
 - Deliver the right capability on time & at optimum cost throughout Lifecycle
- TOC Includes
 - Manpower
 - Operating Costs
 - Total supporting infrastructure over a ship's or system's full lifecycle
- OPNAV N4 has been assigned as the Navy TOC Lead
- To Address TOC Reduction
 - Warfighting Enterprises have matured their role
 - Governance provided through Executive Committee Meetings
 - Vice CNO held Provider Forums on TOC Reduction
 - Opportunities to better define TOC drivers
- DCNO N4 including TOC & manpower costs into all aspects of PPBE process
 - Acquisition costs emphasized less
 - All resource decisions will consider full life cycle costs

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DSCR Approach

- Focus on “Top 10”, as arrived at by consensus with NSRP, MMA, and NAVSEA
- Address both Hull, Mechanical and Electrical (HM&E) and Weapon Systems considerations
- TWHs teamed with Industry to identify mutually acceptable changes- “walk the floor”
- Cost savings change proposals to specifications will be evaluated while maintaining mission requirements
- Risk assessment of the findings are presented to NAVSEA leadership for recommendations and acceptance
- NAVSEA CHENG seeks endorsement of the changes from National Shipbuilding Research Program (NSRP) and its member Shipbuilders (NSRP ECB, 9 June 2009)
- With NSRP concurrence, the documents will proceed into Revision Process.
- NAVSEA letters authorizing the DSCR changes will be issued prior to formal revision of the specifications to accelerate cost savings

“Find stuff we no longer need or can no longer afford”

Top 10 Cost Driving Documents

- **MIL-STD-777 Schedule of Piping, Valves, Fittings and Associated Piping Components for Naval Surface Ships**
 - TWH - Michael Felde SEA 05Z41
- **Naval Vessel Rules Part 8 relative to MIL-STD-1689 and MIL-STD-278 Fabrication Welding and Inspection of Ships Structure**
 - TWH - Gene Mitchell SEA 05P24
- **MIL-M-17060 Motors, 60 Cycle, Alternating Current, Integral HP, Shipboard Use**
- **MIL-DTL-16036 Switchgear, Power, Low Voltage, Naval Shipboard in conjunction with use of MIL-Spec circuit breakers (MIL-C-17587, MIL-C-17361)**
 - TWH - Khosrow Moniri SEA 05Z32
- **MIL-STD-167 Vibration Technical Area**
- **MIL-STD-740 Airborne and Structure Borne Noise**
 - TWH - Richard Taddeo SEA 05P12
- **MIL-STD-461E Electromagnetic Interference (EMI)**
- **MIL-STD 464A Electromagnetic Environmental Effects (E3) Requirements for Systems**
- **MIL-STD-469B / National Telecommunications Information Administration (NTIA) Chapter 5 Radar Engineering Interface Requirements, Electromagnetic Compatibility – Frequency Spectrum Guide for Radar**
 - TWH - Mark Johnson SEA05W43
- **MIL-S-901 Shock Technical Area**
 - TWH - Michael Winnette 05P13



DSCR Initial Results



- **MIL-STD-777**

- Commercial hoses in specific non/low pressure applications (\$50k savings /ship)
- Commercial plumbing in washrooms (\$100k savings /ship)

Piping

- **Naval Vessel Rules Part 8 relative to MIL-STD-1689 and MIL-STD-278 Fabrication Welding and Inspection of Ships Structure**

- Allow standard welding procedure specs/SY procedures for vendors. (Estimated \$5M/yr savings)
- Replace NACE (National Association of Corrosion Engineers) surface finish std (1000s rmm savings /ship)
- Expand weld procedure qualification waiver to include non-critical dissimilar metal welds (Estimated \$20k savings /ship)

Welding

- **MIL-M-17060 Motors, 60 Cycle, Alternating Current, Integral HP, Shipboard Use**

- Specification Revision G (Estimated 5-10% savings on ship set acquisition)

Motors

- **MIL-STD-167 Vibration Technical Area**

- Allow vendor self certification (\$7k/test savings)
- Eliminate testing of structural items or selected items with no moving parts (estimated savings of \$40K in test costs)

Vibe

- **MIL-STD-461E Electromagnetic Interference (EMI)**

- **MIL-STD 464A Electromagnetic Environmental Effects (E3) Requirements for Systems**

- **MIL-STD-469B**

- Best Practices Guide (0.5 man yr/yr savings per affected program)

EMI

- **MIL-S-901 Shock Technical Area**

- Deck Simulating Shock Machine, (Savings \$8.6 M/yr)
- Change from Grade A to Grade B for one system (\$43M)

Shock

SwGear

DSCR Summary

- **Eliminating unnecessary requirements**
- **Many cost saving recommendations have emerged**
- **Several changes have already been implemented, or are close to implementation**
 - **Motor Specification**
 - **Piping Standard**
 - **Welding Requirements**
 - **Shock Testing Requirement**
- **Looking towards the “end game”**
 - **Get “buy in” from NSRP and its member shipbuilders, a commitment to endorse the DSCR changes**
 - **Revising the specifications/standards/technical documents**
 - **Letters publicizing the DSCR spec changes to: Shipbuilders, PEOs, SUPSHIP, SEA 02C PCO, and RMCs to realize savings**
 - **With industry help we have made progress- Your continued assistance is vital to our ultimate reduction of costs.**

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Ship Design Tools Roadmap

DRAFT

Ser 05D / xxx
22 April 2008

Future Concepts and Surface Ship Design

SHIP DESIGN TOOLS ROADMAP



PREDECISIONAL
FOR OFFICIAL USE ONLY

PREDECISIONAL FOR OFFICIAL USE ONLY

- 1 Introduction / Background
- 2 The Role of Design Tools in the Ship Life Cycle
- 3 Ship Design Tools Life Cycle
- 4 Ship Design Tools Management
- 5 Ship Systems Engineering
- 6 Design Activity Characterization
- 7 Design Process Capability Measurement
- 8 Ship Program Demand for Tools
- 9 Design Tool Needs
- 10 Investment Priorities
- 11 Conclusions and Recommendations
- 12 Bibliography
- Appendix A: Design Activity Function Definitions
- Appendix B: Design Activity Transaction Data Definitions
- Appendix C: Tool Descriptions
- Appendix D: Design Activity Models
- Appendix E: Design Structure Matrix
- Appendix F: Design Tool Interoperability with Standards
- Appendix G: Design Tool Integration with LEAPS
- Appendix H: Verification, Validation, and Accreditation
- Appendix I: Ship Design and Analysis Tool Goals



The Ship Design Process Workshop Series

Organizational Cooperation and a Confluence of Opportunities:

OSD High Performance Computing Modernization Office in support of its Computational Research and Engineering for Acquisition Tools and Environment (CREATE) Program

NAVSEA in support of VADM Sullivan's Ship Design Tools initiative

ONR under the National Naval Responsibility for Naval Engineering (NNRNE) programs

Leading to :

A Series of workshops to support the development of modern ship design and assessment processes, materials and personnel that effectively and efficiently support national naval policy and acquisition decisions



Who has Participated?

Government

- *ONR*
- *Navy HQ*
- *NAVSEA*
- *CREATE*
- *CISD*
- *NSWCCD*
- *Others*

Academia

- *U. Michigan*
- *MIT*
- *Va. Tech.*
- *USNA*
- *Stevens Inst.*
- *Stanford*
- *FAU*
- *Ga. Tech.*
- *UCL*
- *UNO*
- *Others*

Industry

- *CSC*
- *Alion*
- *G&C*
- *Northrop*
- *Grumman*
- *Boeing*
- *Goodyear*
- *Raytheon*
- *Others*

Professional Societies

- *ASNE*
- *SNAME*

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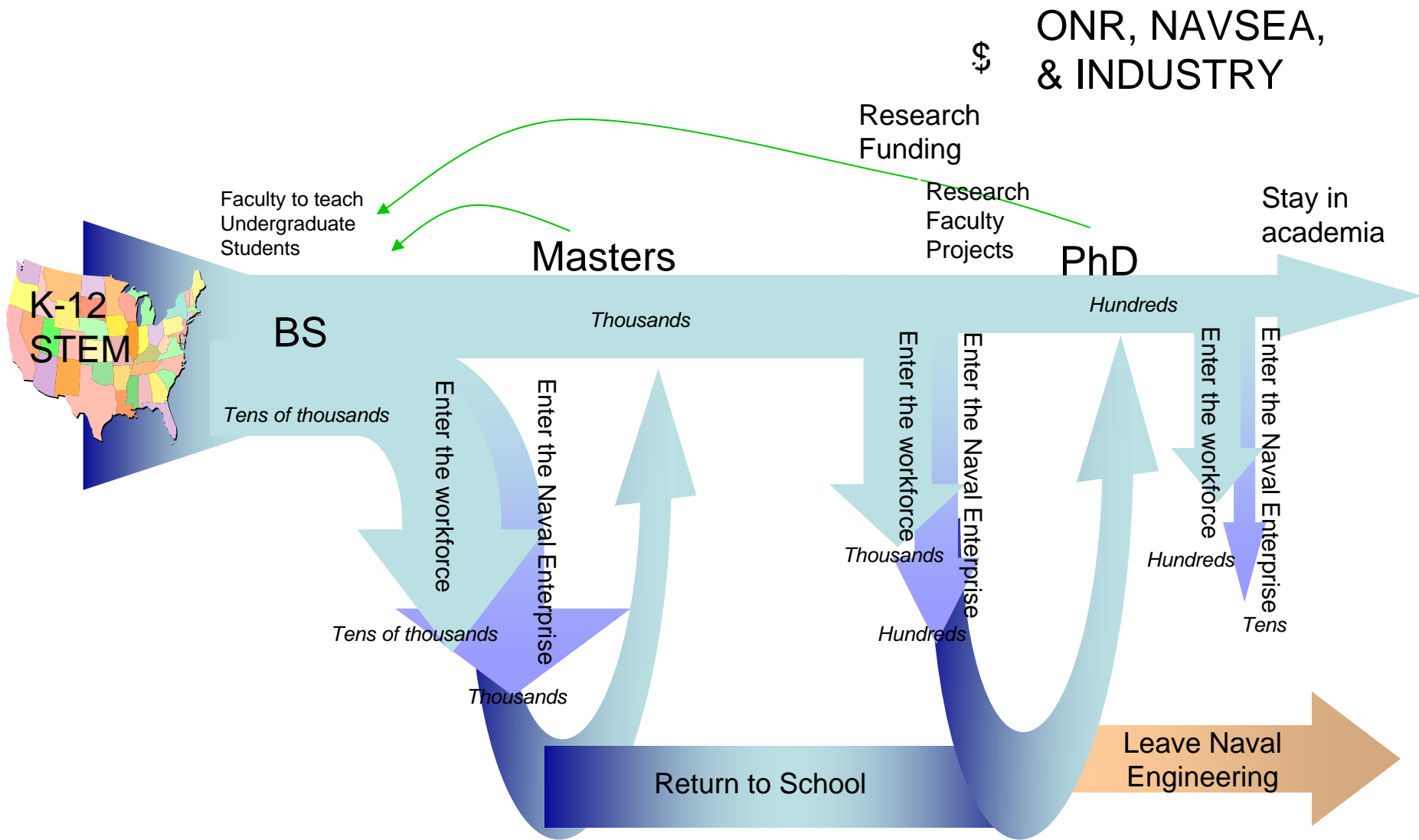
Shipbuilding Engineering Education Concept (SEEC) - Executive Summary

TASK: Develop an overarching concept strategy for educating engineers across the spectrum of engineers in NAVSEA and the shipyards. National Shipbuilding Research Program (NSRP) assigned to execute the study.

- **Findings and Assumptions**

- *Demand for Naval Engineers is greater than the supply*
- *Enterprise wide discussions have not occurred among government, industry and academia on naval engineering*
- *No single entity is coordinating the needed activities to the benefit of the naval shipbuilding enterprise*
- *To address this problem the Enterprise needs to understand and attack the following key areas:*
 - ***Marketing, Recruiting and Retention***
 - ***Employee Development***
 - ***Education***
 - ***Research***

Naval Engineering Value Stream



Problem & Solution

- Problem – Shortage of well prepared naval engineers
- Potential Solution
 - Improve Marketing and Recruitment
 - Improve Employee Development
 - Improve Interaction between the customer (Government & Industry) and the supplier (Academe)
 - Understand and communicate the role of Research in addressing this problem
 - Link and manage these efforts

SEEC Study Recommended

- A Consortia (Scalable)
 - Meeting regularly and tasked and funded to deliver
- Working Panels with Projects
 - Meeting regularly and tasked and funded to deliver
- Educational Programs
 - Regional and Local Universities
 - Naval Education Laboratory (NEL)
- SEEC Study report has been approved for public release and available from ATI



Questions

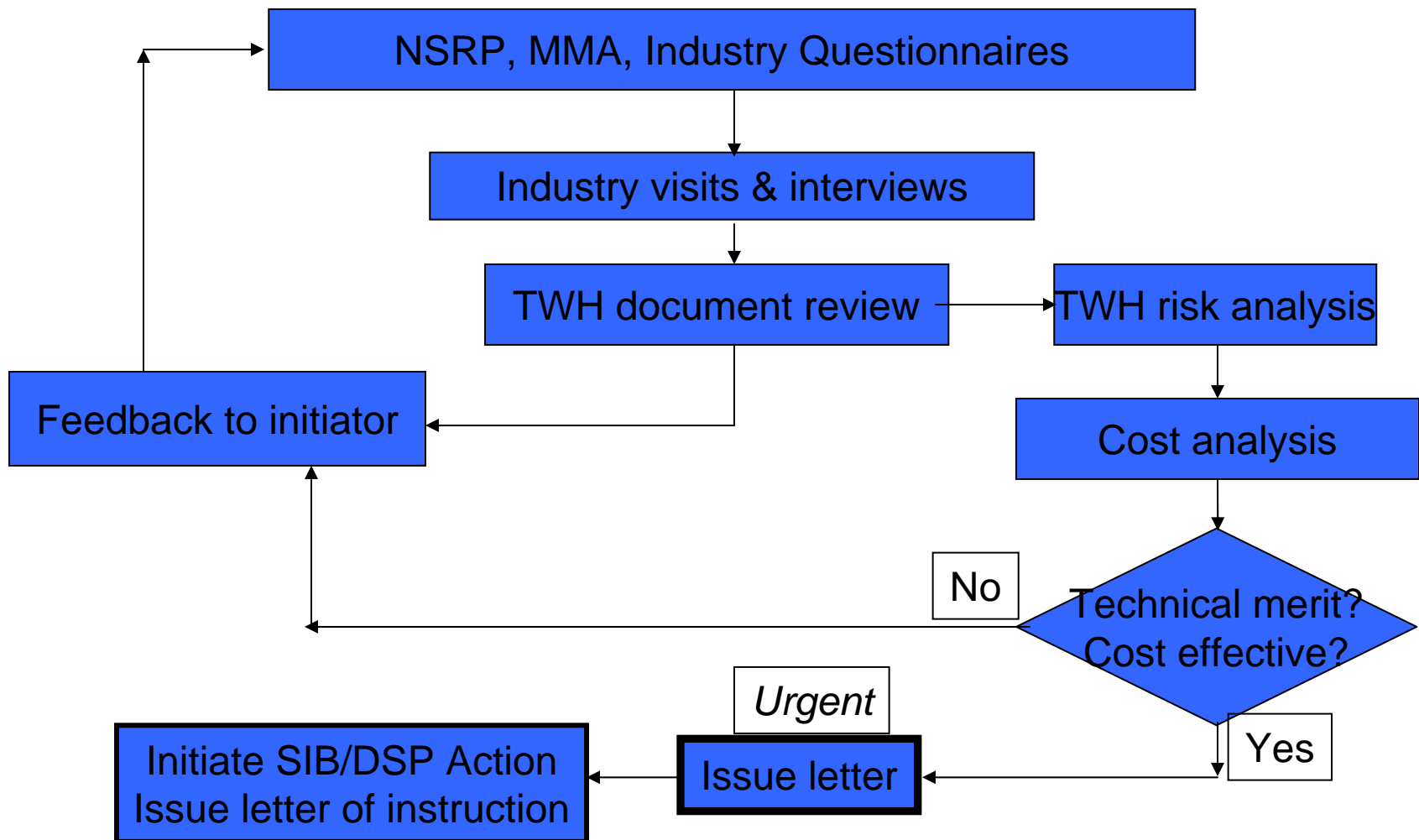
DSCR BACKUP

Documents for Ship Cost Reduction (DSCR): History



- The Documents for Ship Cost Reduction (DSCR) program came about as a result of the NAVSEA strategic planning process and Industry inquiry.
 - NAVSEA Strategic Plan Goal 1: Build an Affordable Future Fleet
 - Objective 4 to achieve this: Drive costs out of ship specifications and components
- Spring 2008 - NAVSEA 05 Technical Warrant Holders (TWHs) were tasked to identify the cost driving requirements
- NAVSEA requested the Marine Machinery Association (MMA) to solicit member companies to identify significant cost driver requirements for equipment specified in Navy shipbuilding programs with focus on inspection programs – report provided 9 April 2008
- NAVSEA also requested Naval Ship Research Program (NSRP) to review the list of cost driver specifications including the input from the MMA to provide insight as to what can be cut and estimates of the cost impact – report provided 24 June 2008
- Circulation and prioritization of these reports/lists through senior leadership of NAVSEA 05 resulted in the list of ten initial specifications to be reviewed for cost savings

DSCR Simplified Process Flow



MIL-STD-777 Schedule of Piping, Valves, Fittings and Associated Piping Components for Naval Surface Ships

- **Industry recommendations & what was done with them**
 - 5 SY, 3 design agents & 3 private shipyards provided comments
- **Done- MIL-STD-777 was revised, draft in review (Government & Contractor)**
- **Low Risk Industry Recommendations Agreed to by Fluids Systems TWH (FY09)**
 - Commercial fasteners for non-critical applications, cheaper, speed up production
 - Standard Navy valves in lieu of MIL-SPEC valves to achieve commonality, reduce inventory costs
 - Commercial hoses in specific non/low pressure applications, reduce cost (\$50k/ship)
 - Commercial plumbing in washrooms, simplify production, cheaper simplify assembly & reduce manpower (no fire watch) (\$100k/ship)
- **In hopper (1st qtr FY10)**
 - Vetting use of newly formulated Glass Reinforced Plastic (GRP) piping, in areas where it makes sense: cheaper, reduced maintenance
 - Use new offset Butterfly valves to replace more expensive gate and globe valves
 - Relax diametrical clearances for bell end fittings to reduce assembly time
 - Use Alloy 686 fasteners as substitute for K-Monel to reduce cost
- **Implementation of changes**
 - TWH letter invoking changes prior to specification publication
 - Change 1 to specification (ECD Jan. 11)
 - Initiate change action to GSO and NAVSEA Standard Item
- **Cost reductions**
 - Apply cost reductions to LHD-7 & DDG-51 restart
 - SCD, repair (put into GSO, NAVSEA Standard Item)

Naval Vessel Rules Part 8 (relative to MIL-STD-1689 and MIL-STD-278 Fabrication Welding and Inspection of Ships Structure)

- **Industry recommendations & what was done with them**
 - 38 SY & vendor comments, down-selected to 28, 10 dismissed as being unacceptable to USN
- **Done**
 - Allow hydrostatic testing of coated piping weld joints (new construction) (Large amt of mh/ship)
- **Ongoing work (FY09)**
 - NVR Part 8 revision
 - Allow standard welding procedure specs/SY procedures for vendors, eliminating individual vendor procedure qualifications and replacing them with AWS established procedures. (For more common materials, e.g., carbon steels and stainless steels) (Estimated \$5M/yr savings)
 - Reduce workmanship (not quality) recordkeeping requirements in non-critical applications. (Industry recommendation to reduce quality records was rejected as being unacceptable).
 - Replace NACE (Nat'l Assn of Corrosion Engrs.) surface finish std with a weld surface std that meets the application, eliminating the cost of unnecessary surface finishing (1000s mh/ship)
 - Do not require welding electrode diffusible hydrogen testing at Shipbuilder. Instead, rely on manufacturer QC tests of the manufacturer to eliminate the need for the shipbuilder to buy expensive test equipment and train personnel to run duplicate tests.
 - Expand scope of weld procedure qualification waiver to include non-critical dissimilar metal welds, eliminating need for additional qualification of procedures (eg., attach Stainless Steel name plate to a carbon steel bulkhead) (Estimated \$20k/ship savings)
- **Work in Hopper (FY10) (examples)**
 - Clarify/simplify requirements for duplex stainless steels to reduce cumbersome and confusing requirements and reduce the number of test welds
 - Not require requalification of second source weld joint ceramic backing. The ceramic backing is inert, and does not affect on the weld. Hence it is reasonable to use ceramic from a source other than the one originally qualified. This eliminates requalification for each different manufacturer's ceramic backing used.
- **Implementation of the changes**
 - NAVSEA letter 9830; Ser 05D/463; dated 9 Jan 2009 for hydrostatic testing of coated piping weld joints
 - Publication of revised ABS NVR Part 8 in Jan. 2010
 - Publication of revised ABS NVR Part 8 in Nov. 2011 (Revision is on a yearly cycle)
- **Cost reduction**
 - Hydrostatic testing (above) can be immediately included in existing contracts (DDG 1000, LCS, others)
 - LHA, LHD, & DDG-51 restart, SCD, repair



MIL-M-17060 Motors, 60 Cycle, Alternating Current, Integral HP, Shipboard Use



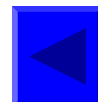
- **Industry recommendations & what was done with them**
 - Working group (SY, ISEA, TYCOM, industry) completed the rev G
 - Worked with 3 vendors and NSRP
- **Done- Specification Revision G (Estimated 5-10% savings on ship set acquisition)**
 - Clarify Motor applicability for essential (Service A) military applications and marine (Service C) applications to eliminate use of Service A motors where Service C will suffice, reduce costs (including repair)
 - Allow use of brushless motors - huge maintenance reduction implications
 - Removed unique coating and casting requirements, apply American Society for Testing & Materials (ASTM) standards, costing less than mil-std that were in some cases obsolete
- **Ongoing work (1st qtr FY10)**
 - Modify the Ship spec to define military (Service A motors with sealed insulated systems (SIS)) and marine motor applications and to permit selection for the appropriate service motor on the basis of location (environment) and criticality
 - Develop a matrix for Military and motor applications in Naval Ship Tech Manuals (NSTM) to advise personnel involved with selecting motors of the proper use of Service A and C motors.
- **In hopper (2nd qtr FY10)**
 - NSTM Revision action
 - Integrate Military (Service A) and Marine (Service C) motors into the Commonality program
- **Implementation of the changes**
 - Rev G issued in Jan 2009
 - TWH to send a NSTM ACN naval message once matrix for military and marine application is completed
- **Cost reduction**
 - Application of right motor (military vice marine) will result in savings
 - Reduced cost of motors, cost of repair, reduced inventory, reduced maintenance



MIL-STD-167 and MIL-STD-740 Vibration/Noise Technical Areas



- **Industry recommendations & what was done with them**
 - 19 SY & vendor comments via NSRP, promising items in hopper, 10 contractor visits
- **Low risk industry recommendation agreed to by TWH**
 - Allow vendor self certification to reduce lost contractor time when DCAS not available (\$7k/test savings)
- **Ongoing work (FY09)**
 - Eliminate testing for machinery with greater than 5 years in service without failures
 - Eliminate testing for select equipment that is low cost, has short service life, or is frequently replaced
- **Work in hopper (FY10)**
 - Allow the use of commercial, industry and/or classification society standards that satisfy our mission requirements (e.g. ISO 10055, ANSI S2.26-2001)
 - Reassess ship vibration data with regard to spec test levels
 - Eliminate testing of structural items or selected items with no moving parts
 - Elimination of testing will save an estimated average ROM of \$40K in test costs.
 - Allow tailoring of vibration requirements, reducing the frequency, testing amplitude and amount of testing time Highly variable \$ savings
 - Allow the use of random excitation criteria, using Acceleration Spectral Density instead of the sinusoidal vibration criteria (Highly variable \$ savings)
- **Implementation of the changes**
 - TWH letter for ongoing work
 - TWH letter for work in hopper
- **Cost reductions**
 - Reduce testing, eliminate testing, and reduce set-up costs



MIL-STD-461E , MIL-STD 464A, MIL-STD-469B - EMI Technical Area

- **Industry recommendations & what was done with them**
 - **Industry & other services** consider requirements fully appropriate. NSRP recommends that “EMI training packages should be developed and provided to suppliers”, which should reduce the number of applicable tests, avoid retests, and improper reporting. Seven contractor visits.
- **Done**
 - **Cancelled MIL-STD-469B Radar Engineering Interface Requirements, Electromagnetic Compatibility (9 May 2007)**
 - replaced by National Telecommunications Information Administration (NTIA) Chapter 5 Radar Engineering Interface Requirements, Electromagnetic Compatibility – Frequency Spectrum Guide for Radar
 - **E3 Specs recently updated (before DSCR), process of update done every 5 years**
- **Ongoing work (FY09)**
 - **Develop “Best Practices” manual to reduce level of E3 support needed & reduce retesting. Clarify submission, approval process for EMI tests**
 - **Develop on-line software & E3 tools to reduce level of E3 support needed & reduce retesting**
- **Work in hopper (FY10)**
 - **Make transition from beta version software to release software**
- **Implementation of the changes**
 - **TWH letter instructing use of Best Practices**
 - **TWH letter adopt use of software for E3 processes**
- **Cost reduction (0.5 myr/yr per affected program)**
 - **2nd quarter FY-10 as beta version transitions to software release**



- Industry recommendations & what was done with them
 - 30 Commercial & Gov't (SPAWAR, SOS) comments, 9 contractor visits
- Done- **Change from Grade A to Grade B for one System (Savings \$43M)**
- Ongoing work (FY09)
 - Deck Simulating Shock Machine, **(Savings \$8.6 M/yr)**
 - Navy must acquire rights to DSSM
 - Modest investment required
 - Shipbuilder Approval Authority - Northrop Grumman Shipbuilding, Newport News Engineering Agent Assigning Document with Delegated Approval Authority (NGSB-NN EAAD-DAA) for CFE Qualification in Final Draft
 - Reduce number of Floating Shock Platform (FSP) Shots and Lightweight (LW)-Medium weight (MW) Machine Hammer Blows
 - Two Test Facilities tasked to provide data to identify risk for equipment
 - NSWCCD task to identify risk of testing deficiencies
- In hopper (FY10)
 - ~20 FY10 MIL-S-901D Change actions under TWH evaluation
 - Pursue adoption of NGSB-NN Open Physical Architecture for Electronics Cabinets, reducing repetitive testing requirements
 - Develop Design Criteria for Large Machinery Rafts
- Implementation of changes
 - TWH letter granting shipbuilder approval authority
 - TWH letter authorizing reduced shots Cost reductions
 - Reduced application of FSP, once DSSM is in service



MIL-DTL-16036 Switchgear, Power, Low Voltage, Naval Shipboard



- Industry recommendations & what was done with them
 - 6 SY & vendor surveys received, promising items in ongoing work
- Ongoing work (FY09)
 - Vetting First Article Testing (FAT) requirements to reduce likelihood of need for FSP testing. (Reduced test costs)
 - Shock test at lower assembly level. (Reducing test costs)
 - Vetting changes to EMI test requirements
 - Modify FAT to reduce number of heat rise tests. (Reducing test costs)
- Work in hopper (FY10)
 - Specification revision to update testing requirements
- Implementation of the changes
 - TWH letter invoking revised test requirements
- Cost reduction
 - Reduced testing costs in acquisition

