• Newport News Shipyards Digital Thread Focus Continues: Developing an Electronic Weld Record System

• Ingalls Sees Lifting Strategy Improvements through ManTech ‘Optimized Lifting and Handling’ Project

• Newport News Shipbuilding Developing a New Process for Resolving and Capturing Growth Work

• Bath Iron Works is ‘Tracking’ Material Handling Process Savings using RFID Technologies
Welding processes at Huntington Ingalls Industries—Newport News Shipbuilding (NNS) require over 25 different forms, including Non Destructive Testing (NDT). All of these forms are manually filled out, and then signed by hand. Information recorded on the forms must be captured and retained to meet internal procedures and associated government requirements. The current NNS process for recording information on weld/NDT forms consists of physically routing paper forms from department to department obtaining signatures and Objective Quality Evidence (OQE). At the end of the paper process, as required by the ship’s and U.S. Navy technical publications, the records are filed and stored for record retention. This cumbersome and time-consuming process leads to hand-written errors, difficulty interpreting hand written data, missing data fields, misplacing records, and laborious efforts in tracking, reviewing and certifying records for accuracy and completeness, also impacting U.S. Navy audits and system testing.

To address this legacy process, Navy ManTech and NNS are executing the Electronic Weld Record project, an effort that is developing an electronic weld record system to eliminate the paper records and replace with a completely digital process. The electronic system is envisioned to be web-based and accessible by all users (e.g., welders, auditors, managers, U.S. Navy representatives, fitters, inspection personnel) through the NNS network using a desktop, mobile device (e.g., tablet), or kiosk. During Phase 1 of this project, NNS has mapped out the current state process, outlined the future state process, defined the technical requirements and developed an electronic prototype. The electronic prototype example helped in determining the welding, NDT, inspection, and IT software/hardware requirements. The project’s second phase is underway, focusing on the system development, which includes coding, testing, evaluating, verifying, validating that the software works, as determined to meet the end customer and business requirements. The culmination of the project will be a stakeholder demonstration of the developed system, involving both internal and external customers. Upon successful and timely completion of the Electronic Weld Record ManTech project and acceptance of the technology and associated business case by the acquisition Program Office, the results will be transitioned to the NNS facility. This technology, once implemented, could potentially save an estimated $1.5M per VIRGINIA Class submarine hull (VCS), potentially leading to as much as $30M in savings to the VCS Program.

Newport News Shipyard’s Digital Thread Focus Continues: Developing an Electronic Weld Record System

Where will NSAM be?

NSAM will be attending DMC2018 on December 3-6, 2018 at the Nashville Music City Center located in Nashville, TN. They will be in booth #217.

The NSRP All Panel Meeting will be held on March 12-14, 2019 at the Francis Marion Hotel located in Charleston, SC. NSAM will be in attendance.
Ingalls Sees Lifting Strategy Improvements through ManTech

Previous lifting and handling processes, procedures and equipment utilized by Huntington Ingalls Industries – Ingalls Shipbuilding (Ingalls) evolved to address the specific requirements of each step, without regard for the entire process as a whole. Controlling documentation for each organization was seldom coordinated, at times inconsistently applied, with unclear roles and responsibilities and caused conflicts. As a result, costs rose sharply as ship complexity and process steps increased.

The Optimized Lifting and Handling project studied the lifting and handling process across all organizations and platforms to understand the key cost drivers that needed to be addressed to reduce costs. The project developed organizational and technical solutions that targeted cost drivers and developed a ‘Decision Matrix Guide’ for lifting and handling. This guide provides coordinated guidance and any relevant lessons learned to all involved organizations; and will also establish methods of lifting and handling units that are optimized for the entire construction and erection process. This project addressed gaps with lifting process optimization pertaining to moving and maneuvering of production material and units shipyard-wide. Addressing this challenge, Ingalls studied and baselined the entire lifting and handling process across all organizations and platforms in order to identify the processes, procedures, and inconsistencies across multiple programs.

The ‘Optimized Lifting and Handling’ project surveyed all areas of the shipyard and found the major cost driver to be the use of temporary structures and padeyes. As a result, the implemented process improvements focused on reducing the use and consequent costs associated with temporary structures and padeyes. The Ingalls Project Team applied the ‘Decision Matrix Guide’ as they vetted each new concept for feasibility and final disposition. Another key finding was the innovative insertion of permanent lifting lug points, approved as a new ship design element. The implementation of these new technologies and processes will reduce cost associated with lifting and handling activities, which translates into a potential 5-year cost savings across the Ingalls facility of nearly $10.3M across the Ingalls built US Navy and USCG platforms.

Newport News Shipbuilding Developing a New Process for Resolving and Capturing Growth Work

Newport News Shipbuilding (NNS) processes nearly all un-scope work during an execution the same way. Worker error, vendor error, material condition reports and growth work are all resolved using one system, the Inspection Report system. The Inspection Report system is not effective at separating and identifying growth work. This growth work can be some of the most costly work performed during the execution phase of a program.

Growth (unplanned) work is repair activities not identified, and therefore not budgeted for, during planning. Growth work associated with carrier programs is inconsistent and causes major disruptions to cost and schedule goals. Knowledge about this growth work is not properly retained, and is lost between individual programs and team members. Retaining knowledge related to growth work resolutions, and using that knowledge to develop best practice solutions, can provide significant future savings from reuse. Savings could multiply when shipyards share knowledge and best practice solutions. Newport News is seeking to develop a process that will reduce both immediate and future costs associated with growth work.

The Digital Problem Resolution effort will develop a process for capturing and retaining growth work items using digital information capture technologies. It will create a Knowledge Base to store identified resolutions for each growth work items. Engineering and Planning personnel will contribute growth work resolutions, as best practice solutions, to the Knowledge Base. NNS will develop processes to exploit development of laser scanning solutions developed from the CVN Reality Capture ManTech project to increase fidelity of applicable growth work resolutions. Additionally, NNS will evaluate other forms of digital capture technologies during the project. This includes digital photographs and digital videos, to provide engineers and planners capability to identify an appropriate level of fidelity required for specific resolutions. The focus of the project is developing a process that will digitally capture growth work items for use and evaluation by problem resolution teams across In-Service Carrier (ISC) and New Construction (NC) aircraft carrier contracts.

Once proven, NNS will have a new process that will improve Navy shipbuilders’ performance. NNS will have a methodology and tools for the digital capture, storage, and access of growth work items. Using digital information capture methods to identify growth work will help all stages of the resolution process, improving cost and schedule performance. Building a Knowledge Base environment to retain identified growth work and associated solutions will help shipyards identify design issues for correction and develop best practice solutions. It will also provide a resource for future best practice and complete solutions. The Digital Problem Resolution process improvements is estimated to provide a 5 year savings of $3.3M for Ford Class Aircraft Carrier across the ISC, NC and refueling and complex overhaul (RCOH) work.

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Recent studies indicate the two main issues resulting from material tracking inefficiencies are related to excessive paper-based documentation required of material tracking processes and ineffective statusing of materials. Both of these two key drivers of material handling inefficiencies are being addressed by General Dynamics - Bath Iron Works (BIW) through the RFID Part Delivery Tracking and Visibility project by integrating RFID tracking into material handling processes and incorporating material statusing and location details into BIW’s MRP system. The utilization of RFID to provide material status and location details available through the MRP system at BIW is expected to significantly reduce material location requirements imposed in the current processes and better enable BIW to meet production schedules as future shipbuilding demands continue to increase.

Accounting for an estimated 50% of total construction costs, material management activities are one of the key cost drivers in shipbuilding construction processes. Additionally, difficulties in capturing equipment status and the absence of real-time location information frequently leads to errors that further disrupt delivery efforts and commonly result in downstream delays of production schedules. Capturing, maintaining and utilizing material and equipment location data is a complex process within the shipbuilding environment due to a variety of factors, including severe weather conditions, constantly shifting priorities, and limitations on vacant storage areas within the shipyard. These and other challenges frequently result in the need for materials, planning and production organizations to assign unplanned labor to properly status and locate material throughout the shipyard.

Through the RFID Part Delivery Tracking and Visibility project, BIW plans to demonstrate the effectiveness of utilizing RFID technology to capture material location and status information, and also identifying opportunities where integration of the technology can be applied to best optimize material locating and delivery processes. The incorporation of RFID technology into shipyard facilities as well as shipboard spaces is expected to result in a 30% reduction of both statusing/locating as well as repeat fabrication/procurement activities. Following full implementation in late 2020, the optimized material handling process at BIW is anticipated to produce a per-hull savings of $1.56M per DDG-51 hull and a 5-year savings of nearly $6.01M.

To date, NSAM project efforts have led to over $500M in total savings, measured as “per hull” cost reductions across several U.S. Navy platforms.