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Project S2784 – CNC Forming of Steel Plates Project POP March 2019 – March 2019 Process Change - Under Cognizance of Industry CRD 1501

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NSRP All Panel Review Review March, 2021

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Issue Description / Project Objective

Issue Description

Plate forming is a highly manual process dependent on hydraulic forming equipment, annotated paper sketches, wooden templates, and "tribal knowledge" of various steel behaviors.

This technology exists in other industries but has not been applied to submarine materials.

Project Objective

Utilize state of the industry forming equipment to increase thru put in steel processing to meet the demands of VIRGINIA Class Payload Module (VPM) and COLUMBIA Class Submarine platforms. Automate the steel plate forming process to improve accuracy and reduce labor/time costs.

MANTECH manufacturing technology program

Forming

To construct a submarine it is necessary to take flat plate and bend or form the plate to specific shapes.

This process is made more arduous due to the thickness and alloy type used in submarine construction.







Tech Approach

- The purpose of this project was to illustrate the value in utilizing state of the industry forming equipment to increase thru put in steel processing to meet the demands of VIRGINIA Class Payload Module (VPM) and COLUMBIA Class Submarine platforms.
- Automating the steel plate forming process will improve accuracy and reduce labor/time costs.
- Additionally, due to the elimination of weld joints, it will reduce fitting and welding costs.
- This project will implement CNC controlled forming equipment for Navy plate materials that require cold forming. Computer controlled forming will be predictable, repeatable, and provide faster first time quality formed parts.



- This project will implement CNC controlled forming equipment for Navy plate materials that require cold forming. Computer controlled forming will be predictable, repeatable, and provide faster first time quality formed parts using work package digital data (WPDD) derived from the design model. Final validation is still expected to require templates.
- The desired functionality of this equipment is for the machine to be able to read a Cad drawing and form the piece of steel to production needs.
- The CNC function of the equipment will be able to store the job and remember what is required to meet requirements.

Project Schedule



	er 2nd Quarter	3rd Quarter	4th Quarter	1st Quarte	r 2nd Quarter	3rd Quarter	4th Quarter	1st Quarter
Task Name	Mar May	Jul	Sep Nov	Jan	Mar May	Jul	Sep Nov	Jan M
CNC Forming								•
A Phase 1: Requirements Identification	•			V				
Task 1: Project Initiation								
Task 2:Selection of Formed Candidate Families								
Task 3: Document Forming Details and Requirements								
Task 4: Identification of COTS Technology								
Task 5: Commercial Partner Selection								
Task 6: Phase I Reporting				П				
Phase II: Develop CNC System Needs				•				V
Task 7: Develop CNC System Needs				Γ				
Task 8: System Solution Development and Testing				Г				1
Task 9: Final Reporting								

Testing of Equipment

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- This project will be concluded in March of 2021.
- The equipment was successfully tested in Italy.
 - The Team was able to view the Test via a zoom Meeting
 - During this test, this machine was able to form a piece of thick steel plating in ~15 minutes. This plate historically takes 2 shifts to form with EBs current equipment.
 - An unexpected advantage is that a big part of the time savings includes the ability of the equipment to automatically set up the plate before the forming action begins. Currently EB personnel need to spend hours squaring the plate to the rollers.
 - The EB materials lab tested the plate formed in that test to confirm that the equipment will be able to form the EB desired materials.

Testing











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Implementation









The 3 machines recommended to EB as a result of this project

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Implementation

- The Spatial Planning Department and the Facilities Department have been engaged to determine the best placement for the machines chosen. Locations for all 3 machines have been recommended.
- The IPT is working with the EB Facilities Group to secure capital funding to purchase/implement these tools in the near term.



Near-Term Activities

- Near-Term Milestones to be Addressed
 - Test Report
 - Implementation plan
 - Final Business Case
 - Final Report
- Technical Progress to be Accomplished:
 - N/A All technical goals have been achieved
- Risk Reduction Items to be Addressed
 - N/A Project is almost complete.



Backup

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Project Team (Organization Chart)





Paul Huang- Program Officer



Russ Hutchings – Project Lead Ned Kaminski – Technical Contact Dave Eubank – ManTech Project Manager John Iraci – ManTech Program Manager

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