

Ultralight Welder Project Reaches Successful Completion

In June 2007, the General Dynamics Electric Boat Corporation (EB), teamed with Lincoln Electric Company, successfully completed a project to develop a lightweight, man-portable system for pulse, gas metal arc welding (GMAW-P). The project was funded by the Office of Naval Research and sponsored by Navy ManTech's Center for Naval Shipbuilding Technology (CNST).

The team's objective was to specify, build, test and production prove a light-weight, man-portable welding system. EB needed this system to reduce excessive set-up costs associated small welding jobs such as hanger and tack welding. The labor associated with equipment relocation and setup can be a large part of the total cost of welding; simple welds that take minutes to perform may take several days to set up.

The welding system was designed by Lincoln Electric around the needs identified by EB tradesmen. Extensive testing of prototype and 'Alpha' manufacturing machines performed by both Lincoln Electric and EB refined the original design and validated the performance, usability, and welder appeal for use in the demanding shipyard fabrication environment.

The project's final results and major accomplishments include the following:

- The successful development of power supply and wire feeder technology to produce a 40-pound man-portable welding system capable of high quality all-position pulse gas metal arc (GMA) and shielded metal arc (SMA) welding of naval ship structures.
- Improved safety attained by using 220V single-phase power in place of 460V 3-phase power.
- The successful development of two light-weight gas metal arc welding torches that allow improved accessibility to maximize use of gas metal arc welding in place of shielded metal arc welding.
- The successful approach/equipment developed to allow quick changeover between the shielded metal arc and gas metal arc processes that allow the use of a single machine to do all hanger welding with a minimum of effort.
- The developed welding system is capable of reducing welding costs for applications where it is advantageous to use a small, man-portable machine and pulse GMA welding can be used in place of SMA welding.

Based on the production trials and consideration of projected workloads, savings are estimated to be approximately \$400K per submarine.



About CNST

CNST is a Navy ManTech Center of Excellence, chartered by the Office of Naval Research (ONR) to identify, develop and deploy, in U.S. shipyards, advanced manufacturing technologies that will reduce the cost and time to build and repair Navy ships. For additional information on this and other CNST projects, please visit www.cnst.us.