

## Nested Material Manufacturing Technology Improvement

### *National Steel and Shipbuilding Company's (NASSCO) Re-Engineered Pipe Shop Producing Significant Savings*

CNST had high expectations for this General Dynamics (GD) NASSCO-led project from the outset, but its recent completion and implementation have produced even better results than had been anticipated. The project's objective was to develop an automated planning and control system in the NASSCO Pipe Shop that would enable the efficient handling of pipe spool fabrication in a flexible manufacturing environment. Though only recently implemented, NASSCO has already observed several performance benefits, including reduced planning labor (\$44K/year), reduced scrap remnants (\$1M/year), and increased production efficiency (\$300K/year).

*"What used to take us a whole week now gets done in a day-and-a-half." – Pipe Shop Planner*

The shipbuilding industry is unique in that production is typically for a limited number of ships at a time and each ship is composed of thousands of specialized parts and assemblies. As shipyards continue to pursue more efficient fabrication processes, especially pipe fabrication, they gravitate more toward automation. However, automation alone does not solve the problem. Traditional planning and routing procedures are insufficient because they are labor intensive and do not take into account the variables of individual process time, work station capacities, emerging engineering design, schedule changes, and shop level loading considerations.

Recognizing the need to solve this problem, NASSCO began with a benchmarking analysis of pipe spool fabrication practices and software application at the Kawasaki Heavy Industries' shipyard in Sakaide, Japan, a major international shipyard known to have successfully implemented dynamic pipe nesting procedures. The NASSCO team recognized that integrated work planning tools would increase production and reduce material requirements in the pipe spool fabrication process. They developed a detailed specification for a Pipe Shop Management System (PSMS) that would enable them to implement an automated, dynamic, work flow planning and pipe nesting process. Once the specification was complete, the initial production implementation plan was developed and included in the design. Software application testing followed and the project culminated with a six month pilot implementation of the PSMS on NASSCO'S T-AKE Program and was completed in February 2008.

The performance of the PSMS exceeded initial expectations by not only planning work, but also accomplishing it significantly faster and more accurately than the production managers had previously experienced. The system is now fully implemented in NASSCO's current pipe shop operations. It is also planned for production implementation in their new pipe shop facility in June 2008.

#### **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](http://www.cnst.us).

