

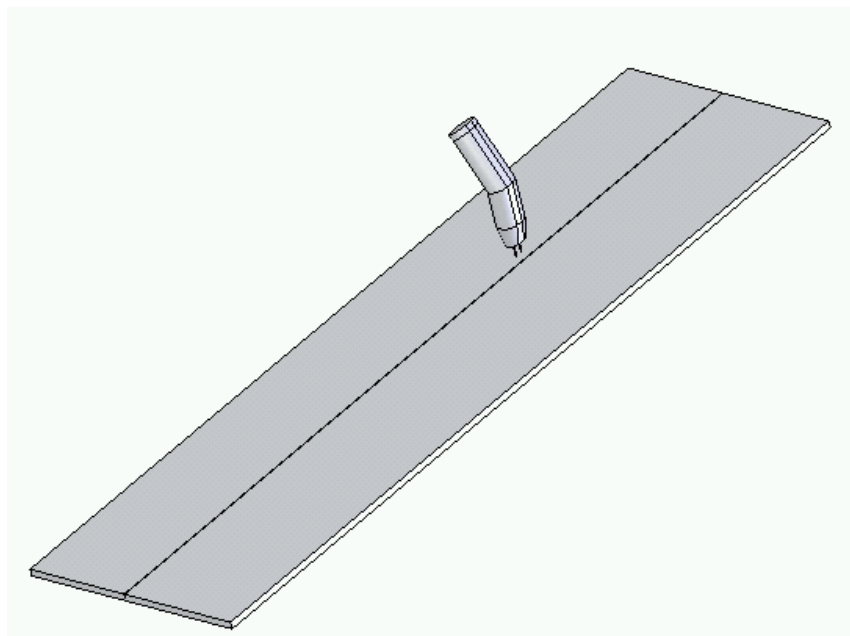
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**“Comparison of SAW and Tandem Electrode Gas Shielded Processes for Productivity, and Distortion in Thin Panel Butt Joints for Thin Panel Structures”**

Presented to NSRP SP7 Panel

Ketchikan Alaska

August 5<sup>th</sup> 2008



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**“Comparison of SAW and Tandem Electrode Gas Shielded Processes for Productivity, and Distortion in Thin Panel Butt Joints for Thin Panel Structures”**

Prime Contractor:

*Todd Pacific Shipyard*

Sub-Contractors:

*NASSCO Shipbuilding, CD-adapco , Weaver Engineering, Dwight Laboratories, Machinists Inc.*

Contributing Team Members:

*ESAB Welding and Cutting Products, Wolf robotics, Abicor Binzel Corporation*

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## **“Comparison of SAW and Tandem Electrode Gas Shielded Processes for Productivity, and Distortion in Thin Panel Butt Joints for Thin Panel Structures”**

### Concept Description:

This project will perform a series of weld tests to compare SAW with the TGS process in butt joints on 6mm and 12 mm, 36 ksi steel plate. Welding fluid solidification, and solid mechanics modeling of stress–strain and distortion will be developed for the comparison of SAW and TGS.

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## **“Comparison of SAW and Tandem Electrode Gas Shielded Processes for Productivity, and Distortion in Thin Panel Butt Joints for Thin Panel Structures”**

### Project Goals and Objectives:

1. To compare the SAW Process to TGS process. The metrics to be evaluated are: First time weld quality; Heat input; Travel speed, Penetration, and Measured distortion.
2. To adapt the casting solidification and solid mechanics developments in star-CCM+/STAR-CD software to the welding process and develop simulations for two processes to predict distortion. Further, simulations of the weld pool and solidification mechanics will attempt to characterize penetration.
3. Evaluate the distortion trends of TGS in comparison to SAW to see if there are benefits that can reduce rework.
4. Demonstrate that TGS can be qualified for Navy work.

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## **Deliverables and Benefits to the NAVY:**

For this project, the deliverable to the Navy will be:

1. Reporting of the results of the comparison with the SAW process for first time weld quality, heat input, travel speed, penetration, distortion, fit, and microhardness.
2. Benchmark results for solidification, stress-strain, and distortion simulation of the SAW and TGS process parameters for 6mm and 12mm panel thickness'. Assess the feasibility of penetration prediction based on process parameters
3. Report the benefits toward reducing man-hours for rework due to reduced distortion on panel structures 6mm to 12 mm in thickness.
4. PQR data performed in accordance with S9074-AQ-G1B-010/248 for a selected TGS weld with ½ inch DH-36 plate including charpy tests.

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# Thanks

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Tandem Gas Shielded Processes for this project are designated 'TGS'. TGS encompasses the process configuration with one or two tandem arc torches with a selection of GMAW, FCAW, and/or Metal Core filler metals. It provides two or four arcs in series with two or four separate power supplies.