



Innovative Welding Processes for Small to Medium Diameter Gas Transmission Pipelines

DTRS56-05-T-0001

PHMSA ACCOMPLISHMENTS

Pipeline and Hazardous Materials Safety Administration

Pipeline Safety Research and Development

Technology Development for Improved Welding

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Project Abstract

The project aims to develop innovative welding processes and technologies for single-sided pipeline girth welding. Root pass welding techniques will be emphasized since they have the greatest potential to improve pipeline integrity and facilitate the use of new and existing GMAW fill pass techniques. Advanced automation techniques will be used to improve weld quality, process control, seam tracking, and robustness.

PHMSA Funding: \$ 399,989

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NET Improvement

The project developed and demonstrated Root Pass Welding Techniques, Improved Root Pass Techniques, and Process Control Systems for Pipeline Girth Welding with the CRC-Evans pulsed gas metal arc welding (GMAW-P) technology (P-450 & P-260) as described below:

- 1) Communication software was developed to control a mechanized welding bug through RS232 communication.
- 2) Automated torch travel angle control hardware was developed and integrated with the mechanized bug system.

- (3) Automated torch travel angle control software was developed and integrated with the mechanized bug system.

- (4) Spin Arc (GMAW-RE) torch hardware was integrated with the mechanized bug system.

- (5) A control system was developed for the Spin Arc torch and integrated with the automated torch travel angle control.

- (6) A building block for real time quality measurement (RTQM) was developed and data gathered for future analysis with data acquisition from a cost-matched project.

- (7) An automatic control system was developed using the RTQM data acquisition system for measuring mean welding current and using this to maintain a user specified contact tip to work distance (CTWD) during welding.

- (8) The welding demonstration deployed the developed Spin Arc welding parameters.

Commercial Partner

CRC-Evans

<http://www.crc-evans.com/>

