

Wang, Y.-Y., Chen, Y., Gianetto, J., Tyson, W., Park, D., Shen, G., Quintana, M., Rajan, V., Panday, R., Fink, D., Weeks, T., Richards, M., and McColskey, D., Welding and Weld Integrity Assessment of High Strength Steel Pipelines, Proceedings of 18th Joint Technical Meeting of EPRG/PRCI/APIA, San Francisco, CA, USA, 2011, Paper no. 18

Abstract

High productivity girth welding processes, such as multi-wire GMAW, are increasingly being used in new pipeline construction projects. The high productivity is particularly important when the construction occurs in remote areas with limited seasonal access and high equipment and labor costs. This paper provides an overview of a research program co-funded by US DOT, Canada PERD and PRCI aimed at developing high-strength welding technologies and associated weld assessment and qualification procedures. The research program covers a wide range of topics, from linepipe specifications, weld testing, to welding essential variables and the correlations between the weld microstructure and mechanical properties. Some of the key outcomes of the program are (1) review of the range of viable welding options for high strength pipelines, (2) essential variables for selected welding processes, (3) weld test protocols, including all-weld-metal tensile, low-constraint toughness, and curved-wide-plate tests, (4) suggested revisions to the assessment procedures for stress- and strain-based designs, and (5) welding thermal and microstructure simulation tools. A summary of the key outcome is provided in the paper.

Keywords

High strength steel pipeline, X100, Welding, Weld properties, Weld integrity