Wang, Y.-Y., **Liu, M.,** Horsley, D., Salama, M., and Sen, M., Overall Framework of Strain-Based Design and Assessment of Pipelines, Proceedings of the 10th International Pipeline Conference, 2014, Calgary, Alberta, Canada, Paper no. IPC2014-33745

Abstract

Significant progress has been made in recent years in the development of tensile and compressive strain capacity models. These models, along with various methods of strain demand determination, form the basic building blocks for the strain-based design and assessment (SBDA) of pipelines. At the same time, gaps exist between the current industry practice and the data needed for the proper application of those models. Furthermore the current practice of independently determining the tensile strain capacity, compressive strain capacity, and strain demand may not accurately represent field conditions as these elements interact and influence each other as opposed to act independently.

Key elements related to SBDA are provided for the planning and execution of life-time integrity management of pipelines subjected to high longitudinal strains. The paper places emphasis on two aspects of SBDA: (1) overall framework and (2) considerations that are not adequately covered in the current general industry practices. The entire processes of SBDA, including but not limited to design, material specifications, construction, post-construction field monitoring, and mitigation are covered at high-levels to assist decision-making in practical projects. Detailed methodologies for executing components of SBDA are not covered in this paper, but can be found in the cited references.

Keywords

Pipeline integrity, Strain-based design and assessment (SBDA), Strain demand, Strain capacity