Crack and Corrosion Monitoring of Pipelines Using Multi-Sensors

Masoud Nouparast¹ --- Solmaz Shakuri² --- Ali Movaghar³ --- Abolghassem Zabihollah⁴

¹,²,³,⁴School of Science and Engineering, Sharif University of Technology, Int'l Campus, Iran, Kish Island

Abstract

The present work investigates the structural health monitoring of pipelines using multi sensors for early detection of cracks to prevent possible failures during operation. Presenting cracks in the pipe wall may significantly alter the stiffness of the pipes. Changing the flow in pipelines results in changing the pressure, and thus, the deformation of the pipe's wall. Pipe's wall deformation leads to changing the electrical voltage generated in PVDF sensors, which is used as an indicator for possible failure in the pipeline. Most of the available works in this field are based on the single sensing which may provides significant errors in the size and location of the cracks. In order to detect the size and location of the cracks and damage, one may needs several sensors mounted at different locations close to the defected region. In this paper, four PVDF sensors are mounted at the defected area of the pipelines to achieve an accurate estimation of the size and location of the damage. It is observed that using multi sensors may provides an efficient method to detect the damage and to predict the possible failure in the pipeline structures.

Keywords: Pipelines, Multi-sensors, Signal processing, Crack detection