The use of transmission line modelling for detection of leakage in pipeline

A. Malik Hamat[1], M. Fairusham Ghazali[2], Gigih Priyandoko[2]

[1] Faculty of Mechanical Engineering, Universiti Teknikal Malaysia Melaka (UTeM), Hang Tuah Jaya, 76100, Durian Tunggal, Melaka, Malaysia

[2] Faculty of Mechanical Engineering, Universiti Malaysia Pahang, 26600, Pekan, Pahang, Malaysia

ABSTRACT

Transmission Line Modelling (TLM) is a technique, computationally very efficient and versatile, for solving variety of engineering application regarding to wave and diffusion phenomena. This paper implemented a TLM modelling to detect and locate leak in pipeline networks. The original data from the TLM modelling were analysed using time-frequency representation (TFR). A well-known and established signal processing method of TFR based wavelet transform was chosen for the data analysis. The results presented two different cases; pipe network without leak and the second one with existing of leak. From the study, features in the pipe networks such as inlet, valve, leak and outlet were successfully detected and located using TLM and wavelet analysis.

KEYWORDS

Transmission line modelling; Leakage; Pipeline

ACKNOWLEDGMENTS

The support from the Ministry of Higher Education Malaysia via FRGS grant RDU 130111 is gratefully acknowledged. The authors would like to thank the team members of Advanced Structural Integrity & Vibration Research (ASIVR) group under Faculty of Mechanical Engineering, Universiti Malaysia Pahang for their support and beneficial idea to improve the content of the paper.