

Leakage Identification Based on Hydraulic Transient Analysis

M.Y. Hanafi^{1,2}, M.F.Ghazli^{1,2,3}, M.F.M.Yusof^{1,2}, M.A.Pi Remli^{1,2}, AAS Sabri¹ and Sufian Sidek⁴*

¹Faculty of Mechanical & Automotive Engineering Technology, University Malaysia Pahang, 26600 Pekan, Pahang, Malaysia

²Advance Structural Integrity and Vibration Research (ASIVR), Faculty of Mechanical Engineering, University Malaysia Pahang, Pekan, Pahang, Malaysia.

³Centre of Excellence for Advanced Research in Fluid Flow (CARIFF) University Malaysia Pahang Lebuhraya Tun Razak 26300 Gambang Kuantan Pahang.

⁴WYETH Water Consultation, PT7199(G), Jalan BBN 1/2G Putra Nilai 71800 Nilai, Negeri Sembilan, Malaysia

*Corresponding author: fairusham@ump.edu.my

Abstract

Due to the ever-increasing degree of water loss, researchers and water utility corporations are becoming increasingly concerned about water leakage control. The purpose of this paper is to apply Empirical Mode Decomposition (EMD) and Synchrosqueezed Wavelet Transforms (SWT) as signal processing to locate leaks in pipelines. The objective of this study is related with to investigate leakage detection and signal processing methods, as well as to use them to detect and locate leaks. This paper explains how to run an experiment to visualize the most common types of leakage in a pipeline system. The experiment was set up that include a specific component of the piping system and leakage attached to it. This experimental test rig also attached with pressure sensor at the top of the solenoid valve. The piezoelectric pressure sensor is used in this experiment. The findings show that the method is superior to current signal processing methods for the conditions used. The recommendation is that research can be extended by running field test in order to observe the efficiency of the method used.

Keywords: Leak; Pressure transient; Hydraulic transient; EMD; Wavelet.