

Fault Identification in Pipeline System Using Normalized Hilbert Huang Transform and Automatic Selection of Intrinsic Mode Function

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Abstract.

Pressure transient analysis have been widely studied for monitoring of pipeline healthy and condition assessment in water distribution systems. This technique has potential low cost, non intrusive nature and able to locate any uncertainties (leak, pipe fitting, blockage) at greater distance from measurement point. In this research the application of Normalised Hilbert Huang Transform (NHHT) as the method to analyse the pressure transient signal. However, this method has the difficulty in selecting the suitable IMF for the further data analysing method which is Normalised Hilbert Transform (NHT). This paper proposed to apply Integrated Kurtosis-based Algorithm for z-filter Technique (Ikaz) for that allows automatic selection of intrinsic mode function (IMF) that's should be used. This work demonstrates on 67.9-meter Medium High Density Poly Ethylene (MDPE) pipe installed with single artificial leak simulator with water pressure about 1-4 bar. The analysis results using Normalized Ikaz proven that the method can be apply as an automatic selection of intrinsic mode function (IMF) although the noise level ratio of the signal is lower. Normalized Ikaz is recommended and advised to be implemented as automatic selection of intrinsic mode function (IMF) through NHHT analysis..