

A non-invasive air-coupled v-type ultrasonic leak detection system

ABSTRACT

New method for non-attached ultrasound PVC pipe monitoring is proposed for vibration and pressure leak detection systems. The advantages of this method is that it can provide a quick and accurate means of detecting leakage in between each pair of sensors while transmitting results wirelessly. The selected PVC pipeline aims to present an example to fill the fundamental gap for monitoring the plastic water pipelines. The monitoring system is a modified V-type ultrasonic air-coupled and a redesign of circuitry to bring low power consumption to 2.5mw in full functionality. The operation is tested and verified in laboratory in which the system is able to recognize leakage up to 0.4mm in diameter with 94.97% accuracy even for water pressure (less than 1 bar). System alarming is also designed in a way to ignore pipe vibration as a result of changes in pressure and reduce false error significantly.

Keyword: Ultrasonic leak monitoring; PVC water pipeline; Air-coupled transducers