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Non-Destructive Testing of Metal Pipes with Ultrasonic Sensors Based on Determination of Maximum Ultrasonic Frequency

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Abstract : In this research, the non-invasive ultrasonic transmission tomography is investigated. In order to model the ultrasonic wave scattering for different thickness of metal pipes, two-dimensional (2D) finite element modeling (FEM) has been utilized. The wall thickness variation of the metal pipe and its influence on propagation of the ultrasonic pressure wave are explored in this paper, includes frequency analysing in order to find the maximum applicable frequency. The simulation results have been compared to experimental data and are shown to provide key insight for this well-defined experimental case by explaining the achieved reconstructed images from experimental setup. Finally, the experimental results which are useful for further investigation for the application of ultrasonic transmission tomography in industry are illustrated.

Keywords : ultrasonic transmission tomography, ultrasonic sensors, ultrasonic wave, non-invasive tomography, metal pipe
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