

Identification of wall thinning of steel pipe using PEC spectrum Analysis

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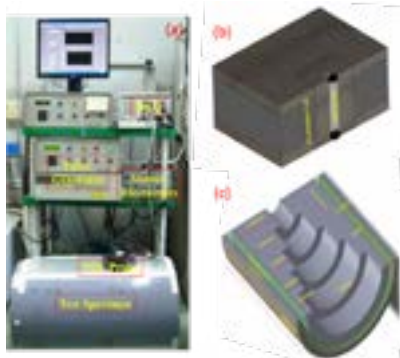
The pulsed eddy current (PEC) system enables to detect the wall thinning and defects without removing the insulation, but the resolution is poor and data analysis is not easy. In this study we developed PEC system to detect wall thinning of Ferro magnetic steel pipes, which is capable of decimating the thickness change of pipe line through 95mm fiber glass thermal insulator and 0.4mm Aluminum (Al) cladding. Peak amplitude and time to peak of the PEC signals obtained from various thickness regions of the test sample were analyzed in time domain. Results show a very good change corresponding to the sample thickness. In addition to time domain analysis, wavelet based signal processing technique was applied, in specific wavelet packet analysis based algorithm that utilizes the encoding technique was developed in MATLAB platform. Results were visualized and well accords with the time domain analysis.

Figure1: PEC experimental setup (a), rectangular bipolar current pulse generated from Pulse Amplifier in connection with a high current dc power source was used to drive the PEC, (b) a rectangular shaped bobbin was wound by a rectangle cross sectional copper coil, and two hall sensors in differential configuration were placed at the center of the coil using a specially designed hall sensor holder. (c) Cross section of the sample which used in the PEC experiment. The signals obtained from different thickness regions of the test sample while scanning the differential PEC probe along the length of the tube.

Biography

Kyung-Ho Kim has his expertise in the development the technology of materials properties measurement. He concentrated his passion in the nanotechnologies, which produce magnetic nano particle and its applications. He developed the technology to weld dissimilar metals using special filler materials. He also interested in the commercialization of technology, and served as a manager for this department in the Korea Atomic Energy Research Institute.

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