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Development of Corrosion Depth Evaluation Method in Steel by Acoustic Emission Method

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Abstract

As steel pipes face the risk of leakage because of corrosion, it is necessary to evaluate their health regularly. However, current evaluation methods require considerable cost and time. This study aims to develop a method to evaluate the amount of loss due to corrosion in steel pipes by using the acoustic emission (AE) method. First, by generating pseudo AEs at different thicknesses along the edge of a steel pipe, it was confirmed that the intensity ratio of each mode of an elastic wave propagating in the cylinder changed depending on the AE sound-source depth along the cylinder's thickness. Next, the steel pipe was subjected to corrosion at different corrosion depths, following which its long-term AEs were monitored. Because of the AEs generated by the corrosion, the intensity ratio of the cylindrical wave mode changed depending on the corrosion depth, and a correlation was observed between the pipe's thickness reduction and the change in the intensity ratio. The results showed that the amount of corrosion reduction could be evaluated using the intensity ratio of the cylindrical wave mode of AEs propagating through a steel pipe.

Keywords: Acoustic Emission, Corrosion Reduction, AE monitoring, Cylindrical Wave ,