

Vol. 48 (2005), No. 5 pp.314-318

[PDF (654K)] [References]

Three-dimensional Finite Element Analysis of Magnetic Flux Leakage Signals Caused by Transmission Pipeline Complex Corrosion

Liang Chen¹⁾, Peiwen Que¹⁾, Zuoying Huang¹⁾ and Tao Jin¹⁾

1) Institute of Automatic Detection, Shanghai Jiaotong University

(Received: March 2, 2005)

The most commonly used and cost effective method of transmission pipeline non destructive testing (NDT) utilizes the magnetic flux leakage (MFL) technique. The corrosion pits occur in many and complex shapes, so it is very difficult to research variety rules in MFL testing using experimental methods. Finite element analysis (FEA) has been used to study MFL signals. We used three-dimensional FEA to simulate the effect of complex corrosion on MFL signals from a steel plate in the absence of a geometrical defect. We derived the complex corrosion patterns from finite-element structural modeling of simulated defects. MFL for four complex corrosions was described and calculated using FEA. The results show that the relative position of the complex corrosion pits affects the magnitude of the MFL signal significantly. Better understanding of these effects will be helpful for interpreting the MFL signals in transmission pipeline NDT.

Keywords: Finite element analysis, Magnetic flux leakage, Non destructive testing, Transmission pipeline, Corrosion

[PDF (654K)] [References]





To cite this article:

Liang Chen, Peiwen Que, Zuoying Huang and Tao Jin, *Journal of the Japan Petroleum Institute*, Vol. **48**, No. 5, p.314 (2005).

doi:10.1627/jpi.48.314 JOI JST.JSTAGE/jpi/48.314

Copyright (c) 2005 by The Japan Petroleum Institute

