Signal-Injection for Building POD Qualification and Sizing Performance Data Sets

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ABSTRACT

Qualification of eddy current techniques can be a costly and complex endeavour; however, the use of signal injection can reduce these costs and can be applied in most situations. This process allows for field and laboratory data to be combined and incorporated into qualification exercises, and provides a well-controlled data set that is suitable for round-robin testing with lower subjectivity.

This presentation compares the signal-injection method for generating data, needed to produce probability of detection (POD) curves and estimate flaw-sizing performance, to that of conventional laboratory or field-based methods. POD curves and sizing error calculations were used to compare the methods and determine if signal injection is a valid method for conducting performance demonstrations. In this case study of fretting wear at support plates, it was found that the signal injection method produced similar results, with the differences ≤ 1% of the steam-generator tube-wall thickness and well within the uncertainty and repeatability of eddy current measurements.