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Data Fusion Approach for Improving the Reliability of Radiographic Testing and other Complementary NDT Techniques

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Non-negligible uncertainty and imprecision in defect detection and defect sizing exist when only using one single Non Destructive Testing (NDT) technique. To increase the reliability and reduce the uncertainty of defect detection and defect sizing, the complementarity and redundancy of radiographic and ultrasonic testing data is exploited. The reliable concept to improve the detection and characterization of defects is by combining the data sets of these NDT techniques. This goal is achieved by employing mathematical Data Fusion techniques [1][2]. These are techniques allowing for simultaneously taking into account heterogeneous data coming from different sources in order to get an optimal estimation and evaluation of defects under investigation. The present study focuses on the development of a data fusion approach based on the evidence theory (Dempster-Shafer theory) [3][4] in order to merge a large number of data sets, in a suitable manner, and obtain more reliable results of localization and characterization of defects inside a component. The proposed method is validated by a real ultrasonic and radiographic NDT data of different industrial components.

References:

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