

1.3.23. AUTOMATED EVALUATION FOR TOFD

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Ultrasonic examination with Time of Flight Diffraction (ToFD) technique is widely used during construction, e.g. weld examination, but can also be applied for in-service inspection, like detection and sizing of root corrosion/erosion. Wall thicknesses typically vary from 6 mm (pipes) to over 200 mm (heavy wall vessels). Advantages of ToFD are direct height sizing capabilities and data storage for future reference.

The evaluation and interpretation of ToFD data is performed by the operator, supported by software tools (like hyperbolic cursors, depth calculations). The evaluation and interpretation is labour intensive especially when multiple indications are present or when many measurements need to be performed, e.g. remaining wall thickness in the case of root corrosion/erosion.

This paper will discuss a novel approach using dedicated algorithms to remove intrinsic effects of the measurements such as the hyperbolic tails of indications and the source signature. This is performed by applying multiple signal processing techniques such as deconvolution and sparse spike inversion techniques. The parameter settings for the developed algorithms are optimised for each ToFD data set with minimum operator interaction. The resulting image represents the actual shape and position of defects and also has a higher contrast. The output data, with easier defect recognition and sizing, can be evaluated by the operator but is especially suitable for automated evaluation, decreasing evaluation time. In this article, field experience and validation results will be presented.