

4.5.22. SIMULATION BASED POD EVALUATION OF NDI TECHNIQUES

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The reliability of non destructive inspection techniques for specific applications can be assessed thru the determination of Probability of Detection (POD) curves. Such probabilistic approaches take into account the uncertainties that appear during inspections and that are responsible for the output variability. Usually, the determination of the POD curve requires a costly and time consuming process that is based on statistical analysis of inspection data obtained during dedicated round robin programs.

Over the years the role played by simulation in the NDI field has been continuously increasing. One important application of simulation tools is to contribute to the performance demonstration of inspection techniques to complement the validation experiments. Until recently, this contribution was limited to deterministic approaches where simulations are run for a set of nominal input values. The numerical performances of current modeling tools such as those proposed by the software CIVA make it now possible to perform intensive computational campaigns. Thus, a new trend consists in applying simulation in the context of probabilistic approaches in order to replace some of the experimental data required to determine the POD with simulation results. This paper describes the methodology that was adopted and the tools that were implemented in the software in order to determine simulation supported POD curves. Applications of the methodology to UT and ECT inspections are also described.