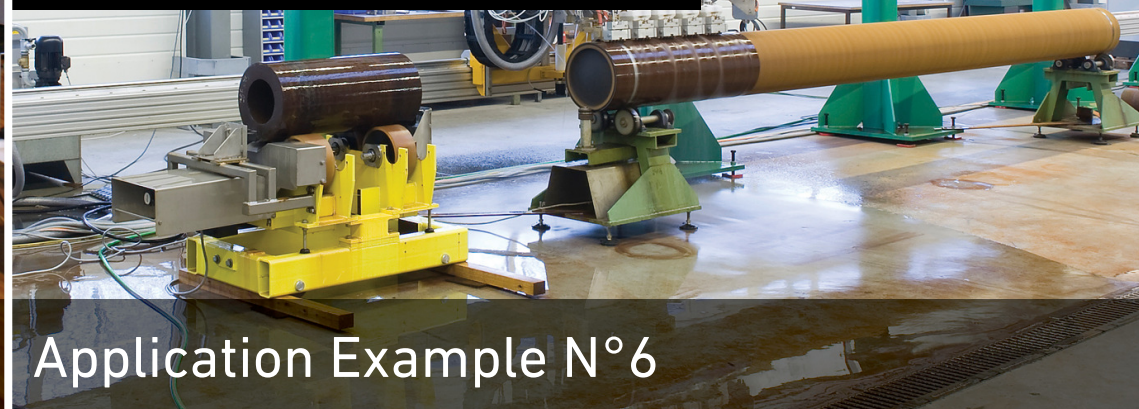# CIVA
N·D·E | 11

Simulation Software for Non-Destructive Testing

Application Example N°6

Validate inspection procedures

Background

As **the responsible party** for applying **stringent inspection protocols**, you must:

- Control and/or monitor the operational process carried out.

- Validate the inspection procedure to be confident that results will meet requirements.

- Provide clear feedback to the operator including alarms.

- Fabricate calibration specimens to test the adequacy and effectiveness of procedures.

- Anticipate the full range of operating conditions and know when variables are outside the acceptable bounds.

Benefits

Using CIVA, it is possible to verify that inspection procedures will meet requirements **without having to bear the expense of extensive testing**.

CIVA is able to simulate complex inspections, making it possible to examine a much **wider range of parameters and conditions** than is possible with laboratory testing. For example, CIVA has extensive material libraries and allows detailed specifications for defects.

In addition, CIVA can **simulate different failure scenarios** and allows **evaluation of their impact** on inspection performance.

As a result of these capabilities, you are much better prepared for **unexpected conditions** encountered in the field and you can easily justify the acceptance (or not) of the result.

EXTE N·D·E CIVA

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Validate inspection procedures

Case study

Verify defect detection capability

▌ THE PROBLEM

Laboratory experiments are typically used to verify that procedures meet the client's requirements.

However, on-site implementation often presents unforeseen challenges, for example causing **hardware degradation** that **impacts performance.**

Consider the case of a **sensor array**. Degradation or failure of one or more elements may or may not be acceptable. Evaluating the impact on performance is difficult to achieve without conducting a large-scale experimental study.

With CIVA, however, it is possible to **evaluate and compare results for different degradation scenarios**, and determine under what conditions acceptable results can still be achieved.

▌ CIVA'S CONTRIBUTION

• Determine the **loss of sensitivity** resulting from degradation of hardware.

• Manage the effects of **degradation and malfunctioning hardware**.

• Perform sensitivity studies and easily extract and compare variables for a wide range of scenarios.

• **Avoid** expensive, tedious and time-consuming testing.
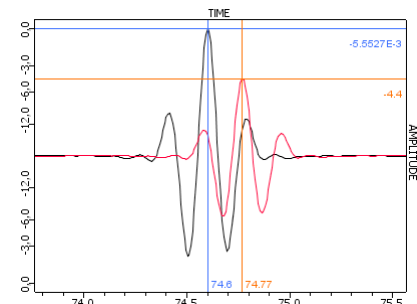
• Help determine acceptance criteria.

Simulation results illustrating the degradation in performance resulting from failed elements in a phased array
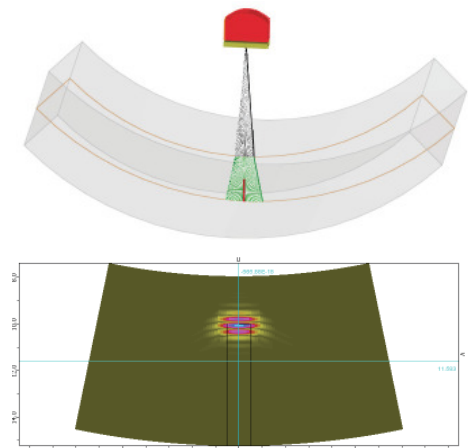
Example 1: All elements of the array are functioning
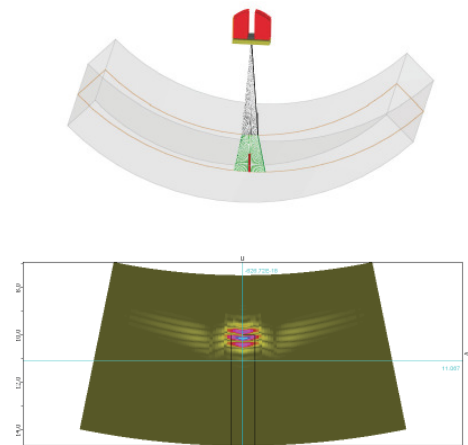
Example 2: A subset of array elements are defective

Defective elements affect signal amplitude and time of flight, degrading performance and detection capability

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