



CIVA
N·D·E | 11

Simulation Software for Non-Destructive Testing

Application Example N°5

Train and prepare your staff

Background

The **human factor** plays an essential role in successful inspections.

Insufficient preparation and a unique problem can result in an erroneous or false diagnosis.

The **consequences** of a misdiagnosis can be extremely detrimental resulting in a stoppage of work or unnecessary repairs, damaging your reputation.

Benefits

Using CIVA allows your team **to prepare in advance** to determine the most advantageous inspection procedure, thereby reducing the risk of misdiagnosis.

- **Train your team** to understand the underlying physical principles, to learn how to interpret images and to recognize defects and other indications.
- **Prepare your operators** for what they will encounter in the field by performing diagnostics on simulated images.
- **Prepare your staff for challenging inspections** through simulation: create models of complex geometries and defects, simulate results and learn how to interpret realistic images.

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Case study

Analyze planar defects in an external wall

THE PROBLEM

Even for very simple geometries, recognizing defects and correctly interpreting images can be challenging.

For example, **planar defects** cause different echoes depending on whether they are internal or intersect the surface, making them difficult to analyze.

Tip diffraction, corner echoes, creeping waves and indirect reflections can make signals and images **difficult to interpret**.

The risk: **a misdiagnosis**.

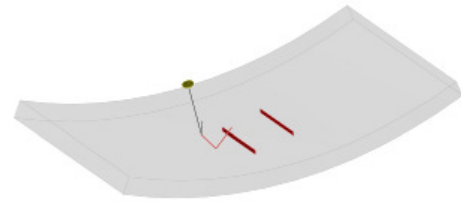
CIVA'S CONTRIBUTION

CIVA is able to **accurately simulate** the effects of these planar defects taking account of: materials, specimen and defect geometry, defect location, size and orientation, and complex interactions including diffraction, mode conversion, indirect reflections, creeping waves, and specular reflections.

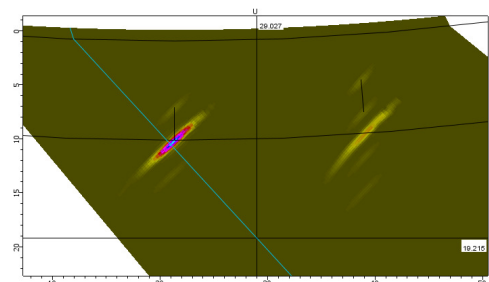
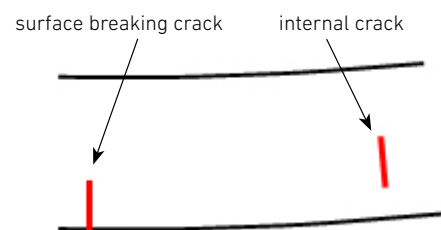
By studying B-scan images that incorporate some of these phenomena, operators are able to **determine the origin** of each echo, as well as the **influence** of different parameters and interactions on the final image.

In so doing they **familiarize** themselves with the images they will face in the field.

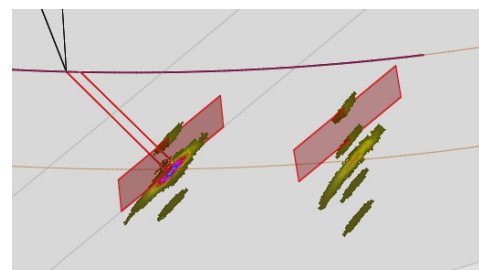
Result: greatly improved preparation, increased operator confidence, and a more accurate diagnosis.



Specimen with two planar defects: a surface-breaking crack and an internal crack.



As is evident in the B-scan image, the results obtained are not the same for the two defect locations. Both diffraction and corner echoes differ in shape and amplitude for the surface-breaking and internal cracks.



The 3D representation of the data allows the user to easily determine the origin of the echoes. Having the opportunity to view and analyze images that are representative of what will be encountered in the field is significant added value for your company.