



**CIVA**  
N·D·E | 11

Simulation Software for Non-Destructive Testing

Application Example N°7

# Simulation to ensure successful implementation

## Background

Implementing an NDT procedure in the field introduces **more variables that can degrade performance** than are encountered during laboratory experiments.

Among the many parameters that can **influence performance** are:

- Mechanical systems including scanners and probe heads.
- The data acquisition system.
- Post processing and data-analysis software.
- Environmental conditions including temperature, dust, noise and vibration.
- The human factor.

These and many other factors are to take into account while drawing up the efficiency level.

## Benefits

With CIVA you can perform parameter sensitivity studies allowing for systematic evaluation of sources of variation.

This reduces the **amount of testing** required, and makes it possible to focus on the parameters most likely to impact performance.

CIVA allows a **much more extensive study** than could be performed in a laboratory, as well as allowing study of conditions that could not be duplicated in a laboratory.

Although some laboratory testing is advisable, CIVA studies complement testing by providing guidance on what tests will be most beneficial, while reducing expenditures by **limiting the number of experiments that have to be performed**.

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# Simulation to ensure successful implementation

## Case study

### Define acquisition parameters to optimize detection sensitivity

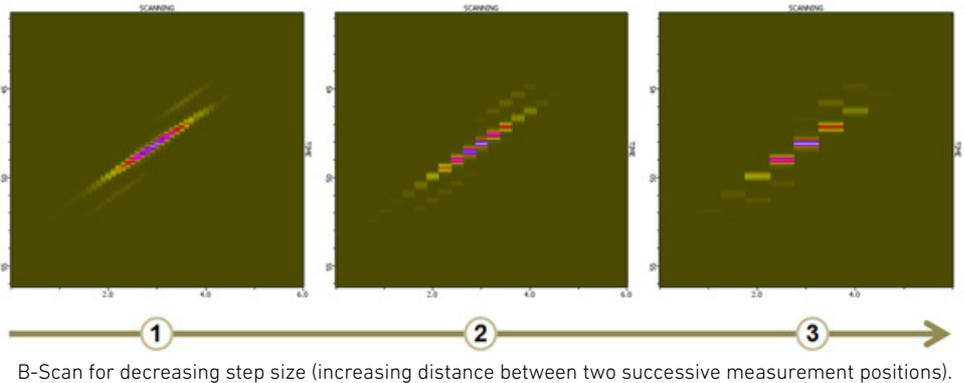
#### THE PROBLEM

Operating conditions can impose constraints on data acquisition. For example:

- The **measurement parameters** including the scan rate and step size must be compatible with the required inspection speed.
- **The acquisition settings** including the sampling rate must be consistent with the rendering of the physical phenomena we are looking for.

As shown in the example beside, **echo-dynamic** curves can be reconstructed in CIVA.

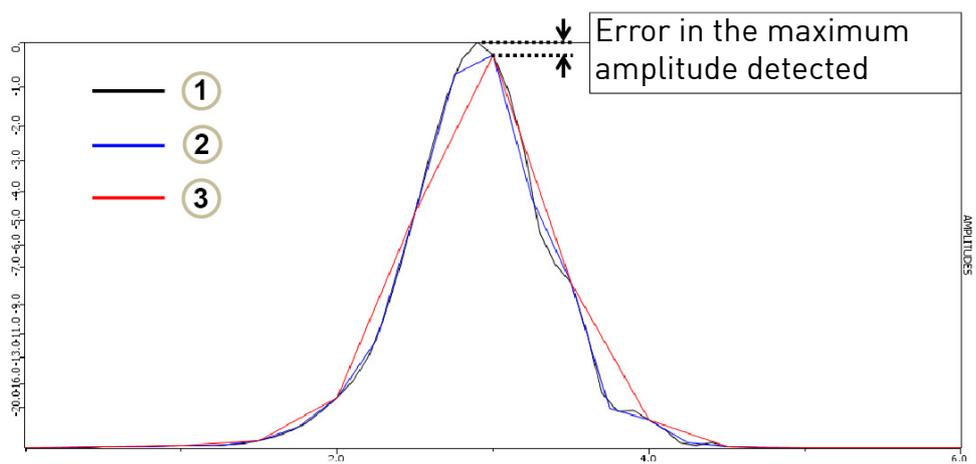
By comparing echo-dynamic curves obtained for different step sizes, it is possible to **quickly see the error** in maximum amplitude introduced by acquisition step.



#### CIVA'S CONTRIBUTION

CIVA greatly improves implementation readiness by making it possible to:

- Easily perform detailed sensitivity studies for key parameters including multivariate analyses.
- **Design** robust inspection procedures for optimal performance.
- **Be prepared** for variability in the field.
- **Significantly** reduce costs by greatly reducing the testing required, and obtain results for conditions that are not feasible to test in a laboratory.



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