



**CIVA**  
N·D·E | 11

Simulation Software for Non-Destructive Testing



Application Example N°2

# Optimize your radiographic inspection

## Background

Specifying the primary parameters for a radiographic inspection to ensure an interpretable image is often difficult. Before taking X-rays, it is necessary to:

- Select the appropriate **X-ray** source.
- Determine the best **position and orientation** of the source with respect to the test specimen.
- Specify the correct **exposure time** to ensure a usable image.

An incorrect setting for any of these parameters almost always requires additional shots.

## Benefits

Using CIVA for radiographic inspections, you can a priori identify the **key parameters** and specify their values for each source.

For example, it is possible to predict **the optical density** of the image obtained on the radiographic film, and thus defect visibility.

CIVA allows you to **reduce the number of experimental trials**, thereby reducing **operator exposure to radiation**.

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# Optimize your radiographic inspection

## Case study

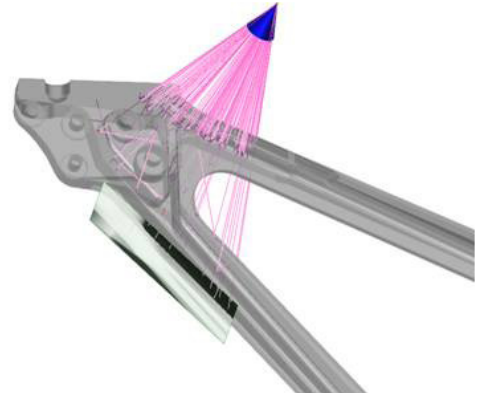
### Select the most suitable source for radiographic inspection

#### THE PROBLEM

The **thickness** and **density of the test specimen** are the primary considerations in choosing the X-ray source that will be used for the inspection.

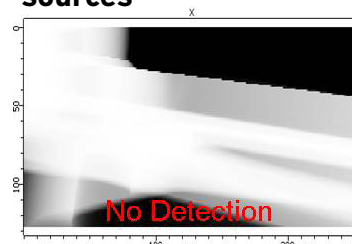
Use of a source that is **too powerful** results in an unusable saturated image.

In contrast, a source with insufficient energy prevents the photons from traversing the specimen.

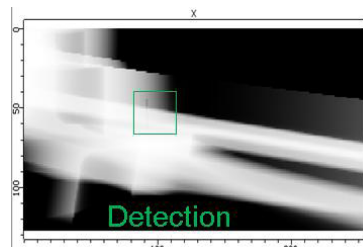


CIVA estimation of photon paths through the test specimen from the source to the detector.

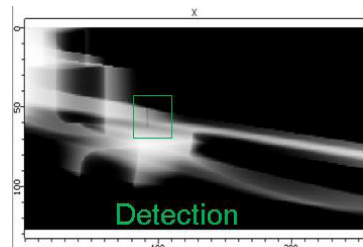
#### Results obtained for three different RT sources



Case 1 - Source 140kV / 5mA  
The defect is not detected.



Case 2 - 200kV Source / 5mA  
The defect is detected, but contrast is poor.



Case 3 - 300kV Source / 5mA  
The defect is easily detected.

#### CIVA'S CONTRIBUTION

CIVA allows you to optimize your RT inspection strategy and protocols:

- **Test X-ray sources** to determine which yields the best result.
- Determine the **effect of radiation** on the inspection result.
- Analyze **detection sensitivity**.
- **Choose the source** and configuration that provides the optimal result.

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