

# Non-destructive Testing (NDT)

## Avoiding unexpected machine damage

### ■ Degradation affects production

It is always a major setback when a component fails in an industrial installation. Inevitably, it involves a loss of production. Not only that, but an unexpected break can pose a threat to safety. Nonetheless, we have to live with the fact that equipment ages and will finally degrade over time. Then again, new components can sometimes have construction flaws. And so it is highly recommended to regularly check the integrity of critical components in equipment such as heat exchangers, steam turbines, gas turbines, diesel engines...

### ■ NDT gives a picture of the degradation

Non-destructive Testing uses a collection of techniques to establish the extent and nature of material degradation in components with the minimum of disruption to your production processes. This knowledge gives you an understanding of the reliability of the installation and provides a factual basis for deciding whether or not to replace a component. Furthermore, a sound understanding of the condition of the equipment enables you to work out an optimal maintenance schedule.

### ■ Specialist work

There is a vast range of NDT techniques on the market, but it is not always easy to make the right choice. Moreover, some components do not lend themselves to an NDT solution, because, for example, they may be difficult to access. In cases like this it is often advisable to develop a specific technique. Interpreting the results and devising an optimal maintenance schedule can also be a specialist task in many cases. At Laborelec we have experts who are familiar with all aspects of NDT, no matter how complex they may be. The end result is an optimal material inspection from an economic and technical point of view.



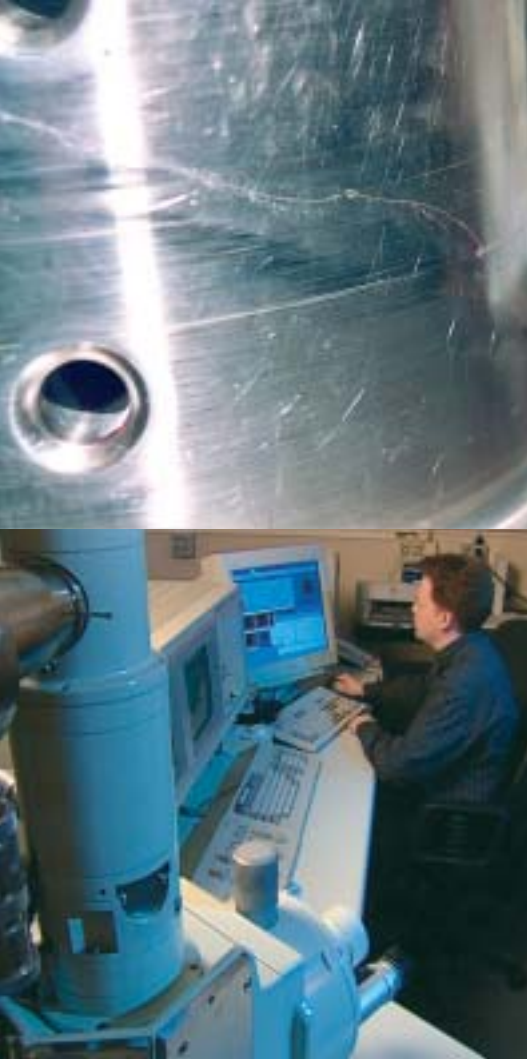
## An expert partner

### ■ NDT is particularly recommended...

- if you suspect degradation, in old equipment or after a long stoppage, for example, or when a plant is used under conditions other than those stipulated in the design
- to trace the development of known degradation
- for a new plant, to check whether there are any construction defects
- if the standards demand a regular NDT
- after an incident, to trace any degradation in similar components
- after an incident, to determine the agent of the damage (see product file entitled 'Machine Damage')
- to assess the residual life and draw up a predictive maintenance plan (see product file entitled 'Residual Life')



The technical Competence Center  
in energy processes and energy use.  
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We will gladly help you to maximise the reliability of your plants and installations and keep the maintenance costs to a minimum.

### ■ The Laborelec approach

Laborelec has extensive experience with NDT on heat exchangers, steam turbines, gas turbines, diesel engines, pipelines ... For more than 15 years we have been conducting NDT of the primary circuits of the Belgian nuclear power stations.

We carry out NDT as follows :

- 1) We choose the best technique, taking into account the technical performances, the cost of the measurement equipment and personnel, and the duration of the testing.
- 2) We check whether there is a sensor for this technique on the market and if there is, whether there is a supplier who carries out measurements with this sensor. In the latter case, we assess this supplier and decide whether or not to co-operate with them on the actual measurements. If there is no sensor on the market, we develop one of our own for the task.
- 3) We co-ordinate the measurements or carry them out ourselves. We ensure that they are taken as quickly as possible and that any hindrance to your production is kept to a minimum.
- 4) We perform a correct analysis and interpretation of the measurement data and give recommendations on the further operation of the plant. If required, the NDT can be used as the basis for a precise residual life assessment of a given component (see product file entitled 'Residual Life').

### ■ A variety of techniques

We detect and characterise surface degradation and internal degradation. We may be dealing, for example, with tears, corrosion, erosion, loss of material, inclusions, etc. In so doing, we use the following techniques:

- Electromagnetic measurement techniques: Eddy Current (traditional, or using a multi-elements sensor), Remote Field, Magnetic Flux Leakage
- Ultrasound measurement techniques: traditional or Phased Array
- Metallographic analysis of surface samples (replica)
- etc

We identify the material composition by means of

- an alloy analyser
- an EDS system of electronics microscope.



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### Assets Intelligent Diagnosis and Advice

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