

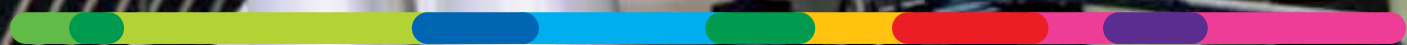


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# Material Services for Coal & Gas fired Power Plants

Analyze today to anticipate tomorrow

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## Material Services for Coal & Gas fired Power Plants

Analyze today to anticipate tomorrow

Unavailability is a major concern for most of the conventional power plants nowadays. Since many plants feel the pressure to operate with either maximum load or maximum flexibility, failures should be well addressed to maximise availability. Laborelec has already more than 50 years of experience in material related problems for the power industry. The goal is not to stick to a laboratory or theoretical point of view, but to provide the customer with practical solutions that can be implemented on-site. To get an idea of what Laborelec can offer, an overview of our typical services is given.



On-site replica inspection

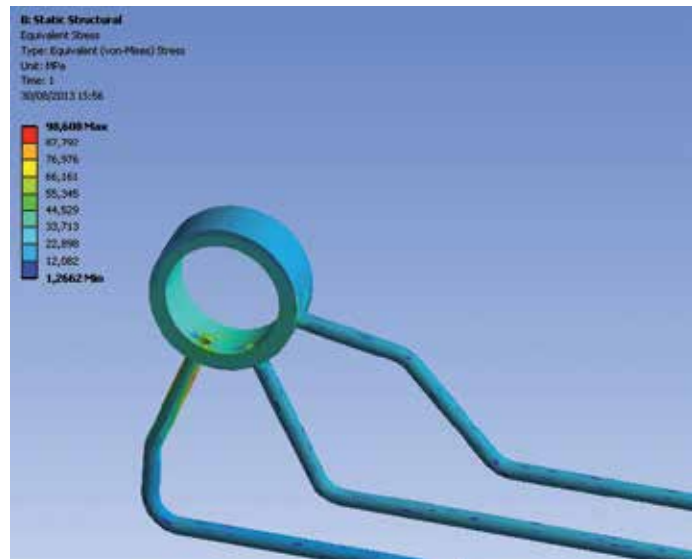
### Support for on-site inspections

Thanks to the unique combination between material and NDT expertise, Laborelec can offer support you with:

- ✔ Setting up inspection plans for boilers, turbines, piping, condensers... This inspection plan will describe in detail which locations to examine, which NDT techniques to apply and which inspection intervals to respect.
- ✔ Reviewing inspection procedures of NDT contractors
- ✔ Follow-up of inspections giving technical support to contractor and plant
- ✔ Performing specific (non-routine) on-site inspections

### Fitness for purpose assessment

Once a crack or defect is detected, the typical question is: what do we do with it? Replace, repair, monitor...? To answer this question, Laborelec combines its material knowledge and NDT capabilities with finite element modelling (FEM) to assess the integrity of the part and to select the most suitable option. This is especially useful for evaluating the condition of thick walled components or more complex shapes such as headers, pipe connections and valves.



Finite element modeling of tube to header connection

## Remaining lifetime assessment

In order to make decisions on repair/replacement on the short or long term, a remaining life assessment of representative components can provide useful information. The first step will be a theoretical calculation based on available information and the standard properties of the material. If results are critical for the intended service life, the real properties can be determined by means of tensile tests and accelerated creep tests. Lifetime assessments can be done case by case or can be part of a global ageing study of the plant.

## Failure root cause analysis

Why did this failure occur? Are more failures to expect in the near future? Based on the chemical composition, fracture morphology, microstructure, oxidation, design and operational data etc., the Laborelec experts can help you to determine the root cause and to avoid similar failures in the future.

## Chemical cleaning advice for boilers

Low quality internal oxide layers increase the risk of tube failures and oxide spallations can even cause damage on the first turbine blades. To restore a good internal protection layer, a chemical cleaning procedure can be applied. Since chemical cleaning is a very delicate process, Laborelec offers on-site and off-site support.

When tube samples are provided, Laborelec can evaluate the need for cleaning based on microscopy and a deposit removal test. The deposit removal test will not only allow to quantify the deposit load on the tubes, but also to visualize the condition of the bare metal of the tube and the efficiency of the cleaning chemicals. This test is in line with the VGB R513 guideline.



*Laborelec's own creep testing facility for accelerated creep tests*



*Evaporator tube sample before and after deposit removal test*



*Compressor blade failure due to fatigue*

## QA and advice on welding and repair

Laborelec offers you the support of highly qualified international welding engineers that have long term and first-hand experience in dealing with hot topics such as T24, P91 and dissimilar weld failures. Revising and improving welding procedures, giving input in root cause analysis, performing quality follow-ups on-site or assessing weldability of new or aged materials are just some of the many services which we can provide in collaboration with our laboratories and partners.



*Dissimilar weld failure between T91 and 347H material*

### How did it start?

The concept of Ageing projects was initially set up for Belgian nuclear power plants. Later on it has been transposed to Electrabel's conventional power plants including coal fired, biomass and CCGT plants.

With the experience gained throughout these projects, it was possible to improve the inspection methodologies and to identify the necessary maintenance actions and/or investments to tackle

### Training sessions

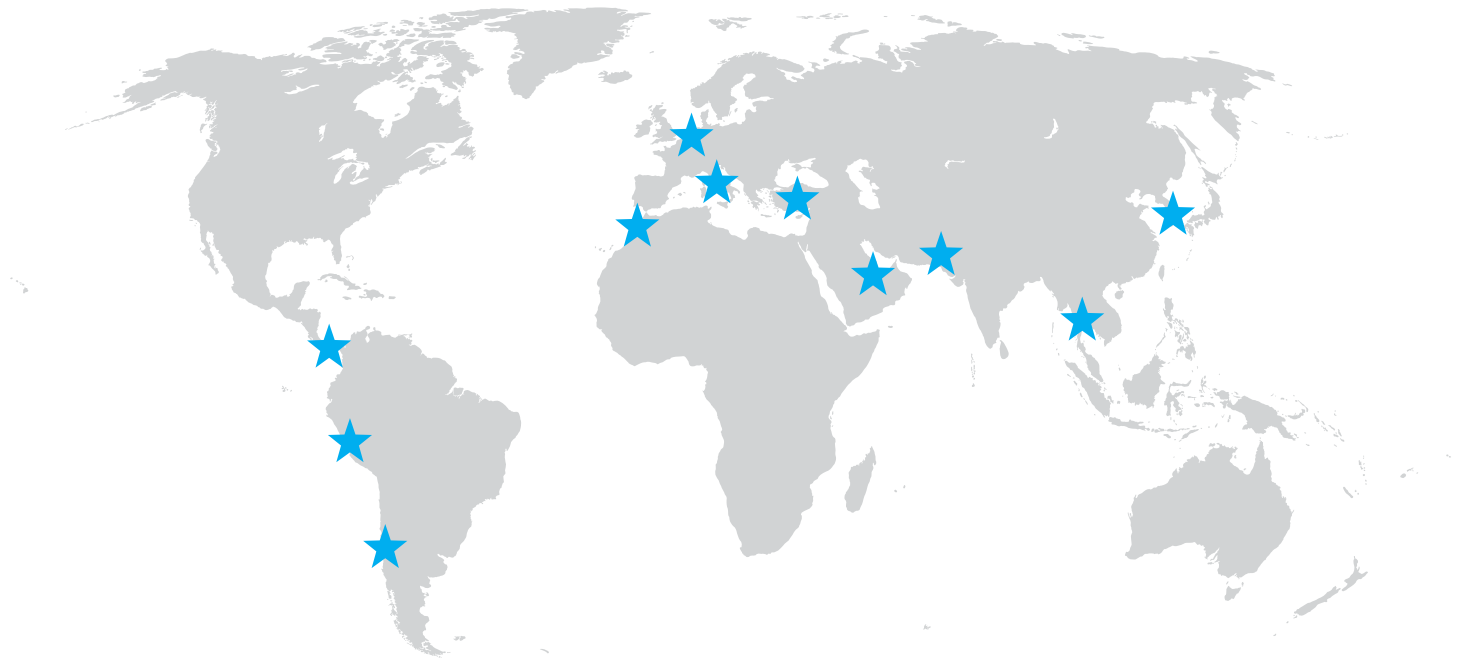
Laborelec offers the opportunity to increase your personal knowledge during practical training sessions, tailored to meet the exact needs of our customers.

The trainings are given on site or at Laborelec and can be given in English, French or Dutch. Other languages (Spanish, German) can be negotiated.

Our training courses cover a wide variety of domains. Among others:

- ♥ Material Technology in Conventional Power plant, Nuclear Power Plant or Gas Turbine applications
- ♥ Introduction to Non-Destructive testing
- ♥ Fundamentals of Welding Technology
- ♥ Water-Steam Cycle Chemistry
- ♥ Corrosion and corrosion prevention
- ♥ Flow-Accelerated corrosion
- ♥ Hydrogen Embrittlement
- ♥ Fundamentals of Coatings and Paints





## World-wide experience

### Recent international services

- ♥ **Thailand:** Life extension on gas turbine blades and vanes
- ♥ **Morocco:** RCA on steam turbine blade failure
- ♥ **Saudi Arabia:** RCA on P91 steam piping failures
- ♥ **Germany:** Assistance for hydro power rotor weld repair
- ♥ **Turkey:** Quality assessment of P92 bending and welding shop
- ♥ **UK:** Quality audit of hot gas path turbine component repair shop
- ♥ **South Korea:** Quality assessment of boiler component supplier
- ♥ **Italy:** RCA on corrosion of gas turbine piping system
- ♥ **Panama:** RCA on diesel engine crankcase failure
- ♥ **Poland:** RCA on aged piping failure and assistance on welding procedures for repair



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## Five reasons for you to choose Laborelec

- Wide range of technical competencies in Electricity Generation, Grids, and End-Use
  - Increased profitability and sustainability of your energy processes and assets
  - Unique combination of contract research and operational assistance
  - Independent advice based on certified laboratory and field analyses all over the world
  - More than 50 years of experience
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### Training needs?

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