



1-DAY COURSE

Boiler Materials Failures: Mechanisms, Inspection & Prevention

When boiler components fail in service the consequence can have the potential to be catastrophic for human safety & well-being and the environment and / or continuity of occurrences can include the requirement to reschedule production, execution of emergency repairs and unplanned outages.

The impact of plant failures is undoubtedly negative for plant operators, however, understanding the types of failures that can occur and ways to prevent them is critical to the continual improvement of plant safety, performance, availability, and reliability, whilst reducing maintenance costs.

With over 1,000 failure investigations conducted, R-TECH Materials have an extensive library of case studies across a wide range of materials, failure mechanisms and applications.

This course aligns with the UK-SPEC Chartered Engineer (CEng) competency framework.

17th Sept 2026
9am – 4:30pm

NMC Venue,
47 Birmingham Road,
West Bromwich
B70 6PY

£695+VAT
PER DELEGATE

By the end of the course, attendees will have a clearer understanding of the failure mechanisms that can affect boiler materials and the steps that can be taken to identify, monitor and reduce the risk of failure.

The course is designed to support improved plant safety, reliability, performance and availability, while helping to reduce unplanned downtime and maintenance costs.

Full-day curriculum – three technical modules.

PART A

Waterside damage mechanisms

This section will cover the following mechanisms:

- Water formed & Steam formed deposits
- Caustic embrittlement
- Chloride stress corrosion cracking
- Caustic gouging & hydrogen embrittlement
- Acid phosphate corrosion
- Oxygen corrosion
- CO2 Corrosion
- Erosion Corrosion

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PART B

Fireside damage mechanisms

This section will cover the following mechanisms:

- Graphitisation
- Spheroidisation
- Sigma Phase Embrittlement
- Sensitisation
- Creep and stress rupture
- Short term overheating-stress rupture
- Decarburisation
- Stress relaxation cracking (Reheat cracking)
- Acid dewpoint corrosion
- Polythionic Acid Stress Corrosion
- Cracking
- Fuel-ash corrosion
- Fire-side erosion
- High temperature alkali salts corrosion

PART C

Materials damage mechanisms

This section will cover the following mechanisms:

- Thermal Fatigue
- Corrosion Fatigue
- Cavitation
- Welding Defects
- Liquid Metal Embrittlement
- Temper Embrittlement
- Incorrect material & defects
- Repair



CPD
RECOGNISED

Mechanism identification, prevention & case studies

For each relevant failure mechanism, the course will provide:

- A description of the failure mechanism and critical contributing factors
- Guidance on how to identify the mechanism
- Typical locations affected by the mechanism
- Material types commonly affected
- Recommendations on how to prevent the damage mechanism, including inspection and monitoring considerations
- One or two supporting case studies

Register your place

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Real impact.

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