

**TRAINING COURSE**

# Power Plant Boiler Operation, Materials, Welds and Life Assessment

**Acronym: BLA Course (Boiler Life Assessment)**

**Dates: 7-8 December 2021**

The contents of the course will emphasise the current and latest understanding. Delegates will be provided with electronic copies of the course presentations in advance and will have the opportunity to submit questions for discussion during the course.

**We have added 30 mins. at the end of each day for discussion and answering questions.**

## **DAY 1 (Tues. 7<sup>th</sup>)**

**Join Zoom at: 0745h -- using the Zoom link provided before the course start date.**

Times shown are UK, please make sure that you know the right time in your zone.

(0745-0800h UK Time) **Welcome and Introduction to the Day's Proceedings**

### **Boiler Operation, Materials and Damage Mechanisms**

**0800-1130h (UK time) + 30 mins. optional at the end for discussion**

Understanding the life-influencing damage mechanisms and remedial actions is a key element for successful plant life assessment and extension. A detailed review will be made of the damage mechanisms, and how to recognise them. The factors that control material properties such as strength, toughness, creep and fatigue will be examined and illustrated with common plant problems. Various materials in use will be reviewed and their pros and cons discussed. Materials for the new generation of higher efficiency plant (such as T91, T92 steels) will also be discussed.

**Module 1:** (0800-0900h) Principles of boiler operation - Influence of operation on component life; Maintenance and inspection issues.

**15 mins. Break** (0900-0915h)

**Module 2:** (0915-1015h) Materials of construction – Traditional & new materials; Materials property requirements.

**15 mins. Break** (1015-1030h)

**Module 3:** (1030-1130h) Damage mechanisms in boilers and HRSGs - Creep (both short and long-term failures); Fatigue (especially important in the plants subjected to cyclic operation); Corrosion (steam side and flue side).

(1130 to 1200h) – **Optional: Discussion and Question /Answer Session**



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## DAY-2 (Wed. 8<sup>th</sup>)

**Join Zoom at:** 0745h (UK time)

(0745-0800h) **Welcome and Introduction to the Day's Proceedings**

### **Weldment Behaviour & Boiler Component Life Assessment**

0800-1130h (UK time) + 30 mins. optional at the end for discussion.

#### **Module 4:** (0800-0900h) **Weldment Behaviour**

The joining of components by welding is a fundamental element to component fabrication and plant construction. The complexity of weld structures will be examined both from the design and fabrication perspective, and influential factors such as welding procedures, weld microstructure, heat affected zone etc. will be discussed.

Service experience shows that most problems / failures in power plant components are associated with welds. Hence this session will focus on understanding the factors that influence weld performance and adversely affect the remaining life of welded components.

#### **Specific Topics**

- Metallurgy of Welds
- Material Properties Variations
- Defects in Welds
- Service Experience

**15 mins. Break** (0900-0915h)

#### **Module 5:** (0915-1130h) **Boiler Component Life Assessment**

*(with 15 mins. break -- 1015-1030h)*

This part of the course uses the information gained from the preceding modules to establish how to perform remaining life assessment for boiler components. This session will discuss the application of various inspection techniques and worked examples will show how analytical life assessment is performed for tubular components. Participants will be able to understand the main factors influencing component life, thereby allowing selection of the most appropriate inspection and analysis techniques for specific situations.

#### **Specific Topics**

- Life assessment principles
- Staged approach to life assessment
- Standard inspection techniques (MPI, DPI)
- Special inspection techniques (Replication, Strain Measurement)
- Worked examples
  - Life assessment of tubular components

(1130 to 1200h) – **Optional: Discussion and Question /Answer Session**

## COURSE PRESENTER

**Dr David Robertson**, Lead Metallurgist, ETD Consulting, UK



### **Experience**

Dr Robertson has over twenty years of experience of materials used in the power, petrochemical and other industries. Since 2004, Dr Robertson has been working for ETD Consulting on projects related to high-temperature plant integrity and life assessment, materials and welding issues, and root cause failure analysis. Through his work, Dr. Robertson has gained extensive experience of the materials used and damage/ failure mechanisms in high-temperature plants. He also has considerable experience in examination and interpretation of metallographic replicas and microstructures in order to assess metallurgical damage and degradation (creep cavitation, spherodisation, corrosion etc).

Boiler and HRSG component failure analysis and integrity/ life assessment is one of Dr Robertson's speciality and he has worked in this area for over 20 years.

Dr Robertson is internationally known in his field and has special experience with ASME steels P91 and P92 used in modern higher performance supercritical power plants. He has been instrumental in preparing various ETD Guidelines for Power Plant Boilers and HRSGs. He was the leader of the ETD compendium of procedures called 'e-Lifing' covering inspection, monitoring, repair and life assessment of boilers, HRSGs, and steam turbines. He is now leading the development of ETD software 'BLAS' – Boiler Life Assessment Software.

**Education:** Dr. Robertson gained his qualifications in metallurgy at Imperial College, London.

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**REGISTRATION FORM (Please email)**

Online Training Course

**Power Plant Boiler Operation, Materials, Welds and Life Assessment  
(BLA Course)**

BLA  
COURSE

**Dates: 7 – 8 December 2021**

**Registration Fee:** Covers delivery of the course & provision of presentations in pdf format (all fees shown are in GB Pounds). Please put ‘x’ in the relevant box and show the total payment.

Reduced Fee (Until 8 Nov. 2021)	Full Fee (From 9 Nov. 2021)
£300	£350
Please show here (no. of attendees <input type="text"/> x £ <input type="text"/> ): <b>Total Amount Payable = £</b> <input type="text"/>	

**How to Pay:** When paying please quote reference ‘BLA Course-Dec21’ and the ETD invoice number (if this was issued):

**1) By bank to bank transfer** to: European Technology Development Ltd.

*(ETD bank account details will be provided on request)*

**2) Credit Cards:** Payment information will be provided on request.

*When registering, please state here how you paid or intend to pay:*

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All Registration & Payment enquiries to: [enquiries@etd-consulting.com](mailto:enquiries@etd-consulting.com)

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**Attendee(s) Details**

Your **title** and **name**:

Company:

Job Title (optional):

Address:

Phone:

E-mail:

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**Address for Registration:**

Please email the required information/ completed form to: [enquiries@etd-consulting.com](mailto:enquiries@etd-consulting.com)