



# Life Assessment & Damage Mechanisms in High Temperature Plant (Power, Petrochemical, and Refining Plants)

## Training Course

Kuala Lumpur 10 November 2010

**Presenter:** *Dr D Robertson, ETD, UK*

### Module 1: **Materials & Damage Mechanisms in High-Temperature Plant**

*0900 – 1300 h (with 30 minutes break)*

#### ***Objectives***

A key element for successful plant life management is to have a fundamental understanding of the type of damages occurring at high temperature that affect the performance of materials and thus influence the life of components. The factors that control material properties such as strength, toughness, creep and fatigue are examined and illustrated with common plant problems.

#### ***Specific topics will include:***

- Effect of failures on plant availability
- Property requirements of major components and typical materials of construction in power plant boilers, HRSGs.
- Property requirements and materials used in high-temperature refinery and petrochemical plant (reactors, heaters, crackers, reformers, etc)
- Mechanical damage mechanisms: creep, fatigue, creep-fatigue interaction, erosion
- Ageing and embrittlement
- Corrosion-related damage mechanisms in boilers and HRSGs

**Lunch      1300 – 1400 hours**

### Module 2: **Plant Life Management**

*1400 – 1700 hrs (with 30 min break)*

#### ***Objectives***

This part of the course uses the information gained from the preceding modules to establish how to develop plant life management strategies and perform remaining life assessment. Participants will be able to understand the main factors influencing component life, thereby allowing selection of the most appropriate analysis techniques for specific situations.

#### ***Specific topics will include:***

- Life assessment principles
- Analytical assessment methods; parametric models; damage fraction rules
- Standard inspection techniques (MT/PT, UT, etc)
- Metallographic replication and strain measurement methods
- Staged approach to life assessment
- Cost-effective management strategies
- Case study of life assessment applied to boiler headers (for example)