



UNIVERSITY OF
BIRMINGHAM

Module Name:	Design Against Failure II
Module Code:	04 21947
Presenter(s):	Professor Paul Bowen
Credit Rating:	10
Venue:	School of Metallurgy & Materials, University of Birmingham

Description:

This module takes the Structural Integrity approaches outlined in Design Against Failure (1) on further within a risk assessment framework to full scale components and structures (such as gas turbine discs and nuclear pressure vessels). Theory explained previously is utilised in specific case studies, including: pipe-line flanges (gas and oil); fatigue crack growth and total life (aerospace); and transition behaviour estimation using sparse data (nuclear). Topics included are: risk assessment of components in the aerospace industry; risk assessment structures in the nuclear industry; probabilistic and deterministic approaches to life management; the micromechanisms of ductile, brittle and transition temperature behaviour; elastic-plastic fracture mechanics and J testing; the use of Weibull theory to model failure.

Learning Outcomes: By the end of the module the student should be able to:

- Understand the risk [assessment](#) of components in the aerospace industry;
- Describe risk assessment structures in the nuclear industry;
- Take probabilistic and deterministic approaches to life management;
- Describe the micromechanisms of ductile, brittle and transition temperature behaviour;
- Undertake J testing for elastic-plastic fracture mechanics;
- Use the Weibull theory to model failure

Assessment:

Written Assessment: Worked examples (assessment tutorial) during course presentation