



Fitness-for-Service Fracture Assessment of Structures Containing Cracks: A Workbook based on the European SINTAP/FITNET procedure

Uwe Zerbst, Manfred Schödel, Stephen Webster, Robert Ainsworth

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The purpose of this book is to facilitate the use of fracture mechanics based failure assessment procedures for the evaluation and design of structures and components. All practical structures contain flaws and the optimum combination of cost efficiency and safety whilst achieving the required capability, can only be realised by using state of the art methods such as that represented by the European flaw assessment method SINTAP/FITNET to analyse the safety risk. This book is written by practitioners with extensive experience in both the development and use of integrity assessment methods and provides comprehensive information on the basic principles and use of analytical flaw assessment. It provides an introduction to the method, its background, how it can be applied, its potential and, importantly, its limitations. The explanations are complimented by using a large number of worked examples and validation exercises which illustrate all aspects of the procedure. In addition, for students and engineers who are new to the subject, a comprehensive glossary of basic terms used in fracture mechanics based integrity evaluations is included.

The topics addressed include:

- Crack driving force (CDF) and failure assessment diagram (FAD) type analyses
 - Preparation of the input parameters (crack dimensions, stress-strain properties, fracture toughness, statistical aspects)
 - Determination of the model parameters, (stress intensity factor and yield load solutions)
 - Treatment of combined primary and secondary loading, together with residual stress effects
 - Analysis of the effect of constraint effects (treatment of small defects and section size effects)
 - Treatment of mixed mode loading
 - Consideration of the influences of strength mismatch
 - Reliability aspects
-
- Comprehensive description of the use of structural integrity methods to optimise cost effectiveness and safety
 - Detailed description of how to evaluate the integrity of structures containing cracks
 - Valuable background information for understanding the methods, their potential and limitations
 - Large number of worked examples, which demonstrate all aspects of the methods
 - Descriptive, readable writing style
 - Applicable to a wide range of interests, from the student (university or self study) to the expert who requires a 'state of the art' document

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