

## CONTENTS

PREFACE	IX
LIST OF SPONSORS	XI
COURSE DIRECTORS, ORGANIZING COMMITTEE, LECTURERS	XIII
LIST OF PARTICIPANTS	XV

### PART I - FUNDAMENTALS OF FATIGUE

Short Fatigue Cracks by K.J. Miller	3
The Influence of The Microstructure on Fatigue by D. François	23
Modelling of Fatigue Crack Growth by A.F. Blom	77
Statistical Analysis of Fatigue Crack Growth by A.F. Blom	111
Fatigue Threshold Behaviour Part I: Modelling of FCG Near Threshold by J.C. Radon and L. Guerra Rosa	129
Part II: Theoretical Aspects and Open Questions by L. Guerra Rosa and J.C. Radon	141
Fatigue at Notches by K.J. Miller	157
A Review of Fatigue Life Prediction Models for the Crack Initiation and Propagation Phases by W. Schütz and P. Heuler	177
Environmentally Assisted Fatigue Crack Growth by R.P. Wei	221
Non-Propagating Fatigue Cracks: The True Fatigue Limit by J.R. Yates and K.J. Miller	253
Experimental Techniques to Observe and Monitor Short Fatigue Cracks by E.R. de los Rios	265
Mechanisms of Creep-Fatigue Interactions by A. Pineau	283

Elevated Temperature Life Prediction Methods by A. Pineau	313
Multiaxial Fatigue Failure by M.W. Brown	339
Multiaxial Fatigue Crack Propagation Behaviour by M.W. Brown	363
Analysis and Design Methods in Multiaxial Fatigue by M.W. Brown	387
A Review of Fatigue Predictive Methods in the Regime where Inelastic Strains Dominate by L.F. Coffin	403
Fatigue Crack Initiation at Notches: Techniques, Experiments and Interpretations by L.F. Coffin	417
Creep and Low Cycle Fatigue Analysis of Engineering Alloys - A Review by M.Y. Nazmy	445
The J Integral Approach in Elastic-Plastic Fatigue Crack Propagation by C.Q. Bowles	467
<b>PART II - ENGINEERING APPLICATIONS</b>	<b>489</b>
The SAE Round-Robin Fatigue Program with A356-T6 (A17 SiMg) Cast Aluminum Alloy by R.I. Stephens	491
Methodology of Variable Amplitude Fatigue Tests by W. Schütz	511
How to Improve Fatigue Strength of Vehicle Components Employing Different Test Methods by H.G. Naundorf	523
Fatigue Behaviour of Welded Joints by S.J. Maddox	539
Fatigue Design Optimisation in Welded Joints by S.J. Maddox	551
Fatigue Life Prediction Methods in Welded Joints: Case Studies by S.J. Maddox	569

Fatigue Analysis in Offshore Structures by H.P. Lieurade	585
The Damaging of Composite Materials: Mechanisms and Detection by C. Bathias	627
The Fatigue of High Performance Composite Materials by C. Bathias	659
Damage Assessment in Fatigue of Reinforced Structural Composites by M.O.W. Richardson	677
Mechanical Aspects Related to Fibre Fracture in ARALL 2 Laminates by R. Marissen	697
Development in Fatigue Design in Automotive Industry Using New Materials by L. Krüger and H. Naundorf	709
Damage Evaluation and Life Extension of Structural Components by L.F. Coffin	727
Optimization of Component Design by Fatigue Analysis and Testing by P.E. Irving	747
<b>PART III - RESEARCH CONTRIBUTIONS</b>	<b>763</b>
Cyclic Hardening and Softening of [001] Al Single Crystals by Marianne Videm and Nils Ryum	765
Fatigue Crack Growth of Short Cracks in an AlMgSi Alloy by K. Pedersen	773
Generalization of the Kitagawa Diagram to V-Notched Members by Y. Verreman, J.I. Dickson and J.P. Bailon	785
Separate Contributions of Corrosion-Product Induced and Roughness-Induced Crack Closure to the Fatigue Threshold of Al Alloys by S. Lalonde, J.I. Dickson, A. Baldantoni, J.P. Bailon and W. Wallace	799

Dynamic Analysis of Plasticity - Induced Fatigue Crack Closure by J. Llorca and V. Sanchez-Galvez	809
Fatigue Crack Growth in Textured Metals by J.Gil Sevillano and M. Fuentes Pérez	821
Inelastic Modelling for Engineering Design for High Temperature Conditions by P. Agatonovic and N. Taylor	835
Total Strain Energy Density as a Fatigue Damage Parameter by K. Golos and F. Ellyin	849
Fatigue Crack Extension, A General Mechanism by O. Helgeland	859
Interaction Between Fatigue Crack Growth, Yielding and Nonlinearly Viscous Material Response by M.P. Wnuk	867
Multiaxial Fatigue: Damage Mechanisms and Life Predictions by A. Fatemi and D.F. Socie	877
Cyclic Deformation Behaviour of a Fe-28Cr-4Mo-2Ni- Ø.43Nb Superferritic Stainless Steel by M. Nasarre, J.A. Planell and M. Anglada	891
Fatigue and Brittle Fracture in Tubular Joints - A Probabilistic Fracture Mechanics Analysis by H.H. Snijder and O.D. Dijkstra	905
Fatigue Investigation on Preloaded Welded Connections by H. Agerskov	919
Influence of Surface Treatment on Fatigue Resistance of Aircraft Alloys by L. Wagner and G. Lütjering	933
The In Service Multi-Axial-Stress Situation in an Uncooled Gas Turbine Blade by A. Fischersworing, G. Hellenthal and W. Koschel	947
Time Dependent Effects on High Temperature Low Cycle Fatigue and Fatigue Crack Propagation of Nickel Base Superalloys by F. Gabrielli, M. Marchionni and G. Onofrio	961
SUBJECT INDEX	973