

Contents of Volume 2

INVITED PAPERS

Probabilistic application of fracture mechanics J. Dufresne	517
Propagation of damage in elastic and plastic solids H. D. Bui and A. Ehrlacher	533
Review of fracture micromechanisms and a local approach to predicting crack resistance in low strength steels A. Pineau	553

Theme 1

PRACTICAL APPLICATIONS OF FRACTURE MECHANICS

C. Initiation and Growth of Fatigue Cracks

Geometry and size requirements for fatigue life similitude among notched members N. E. Dowling and W. K. Wilson	581
Prediction of crack formation life in notched specimens T. V. Duggan and M. W. Proctor	589
Deriving a design fatigue resistance curve for analysing crack initiation C. Amzallag, J. L. Bernard, P. Rabbe and A. Pellissier Tanon	597
Initiation and propagation mechanics of low cycle fatigue cracks in bolts N. Makhutov, V. Zatsarinny and V. Kagan	605
Fatigue crack propagation from crack arrays W. J. D. Shaw and I. Le May	613
Fracture and fatigue crack propagation in bearing steels B. L. Averbach	623

D. Cracking from Surface Contact Loadings

- Fretting fatigue in a $3\frac{1}{2}$ NiCrMoV rotor steel
R. N. King and T. C. Lindley

631

- Application of the equivalent initial damage method to
fretting fatigue

J. A. Alic and R. A. Shaffer

641

- Fracture mechanics of spalling cracks in cold work rolls
T. Mizoguchi, K. Yoshikawa and S. Ohta

653

- On crack propagation in rock foundations of massive concrete
dams

A. A. Khrapkov and V. A. Seiliger

661

Theme 2

CRACK TIP SINGULARITY ANALYSIS AND COMPUTATION

C. Moving Cracks - Stable Crack Growth and Creep

- Some effects of inelastic constitutive models on crack tip fields
in steady quasistatic growth*

D. M. Parks, P. S. Lam and R. M. McMeeking

- Elastic-plastic fields in steady crack growth in a strain-hardening
material

G. Yu-chen and H. Keh-chih

669

- The growth of macroscopic cracks in creeping materials

H. Riedel and W. Wagner

683

- A finite element analysis of creep deformation in a specimen
containing a macroscopic crack

R. Ehlers and H. Riedel

691

- An incremental crack growth model for high temperature rupture
in metals

R. M. McMeeking and F. A. Leckie

699

Theme 3

PHYSICAL FRACTURE PROCESSES — STRUCTURAL ASPECTS

C. Effect of Microstructure and Brittle Fracture in steels

- Cleavage fracture in mixed microstructures

Y. Hagiwara and J. F. Knott

707

- On the effect of proeutectoid ferrite upon the fracture toughness
of weld metal

K. Eriksson

715

*Articles marked with an asterisk can be found at the end of Volume 5.

The effect of packet boundaries on the fracture toughness of a bainitic microstructure H. Kotilainen, K. Torronen and P. Nenonen	723
A comparison of brittle fracture behaviour of variously tempered martensitic and bainitic structures of secondary hardening Cr-Mo-V pressure vessel steel K. Torronen, H. Kotilainen and P. Nenonen	731
Resistance to brittle fracture of dual-phase steels H. Mathy and T. Gréday	739
Microstructure and fracture mechanisms in a high strength low - alloy martenistic steel G. Zouhar jr., M. Schaper, J. Eickemeyer and P. Finke	747
 <i>D. Polymers</i>	
Fracture mechanical studies of the strength resulting from polymer interdiffusion K. Jud and H. H. Kausch	755
Crack growth in thick walled tubes of low density polyethylene A. S. Boyce and B. S. Owen	763
Shear bands and fracture in crystalline polymers K. Friedrich	773
The effect of specimen thickness and morphology on fracture toughness of thermoplastic polymers E. Hornbogen and H. G. Schrader	783
 <i>Theme 4</i> ELASTOPLASTIC FRACTURE MECHANICS CRITERIA	
 <i>A. Damage - Preloading effects</i>	
The relation between microstructural fracture processes and macroscopic crack tip characterizing parameters during the stable growth of cracks E. Smith	793
Constitutive relations including ductile fracture damage. Application to cracked bodies G. Rousselier	803
Study of the fracture criteria for ductile rupture of A508 steel F. M. Beremin	809
On the effects of pre-loading on the fracture toughness of A533B-1 steel H. Nakamura, H. Kobayashi, T. Kodaira and H. Nakazawa	817
Numerical modelling of warm prestress effect using a damage function for cleavage fracture F. M. Beremin	825

B. Effect of Geometry of Specimens

Effects of specimen geometry on elastic-plastic R-curves for
Zr - 2.5% Nb

L. A. Simpson

833

Effect of specimen geometry on the characterisation of ductile
crack extension in C-Mn steel

S. G. Druce

843

The influence of specimen geometry on stable crack growth for
a high strength steel

H. J. Kaiser and K. E. Hagedorn

855

Experimental studies of stable crack growth

J. Carlsson, S. Kaiser, K. Markstrom, C. Wuthrich and H. Oberg

863

Effect of specimen size on J_{lc} for a Ni-Cr-Mo rotor steel in the
upper shelf region

B. Marandet, G. Phelipeau and G. Rousselier

871

The influence of specimen geometry on fracture of unwelded and
welded steel specimens: Comparison of experimental results
with FEM-calculation

H. Krafka, K. Wobst, J. Ziebs and D. Aurich

881

Theme 5

FATIGUE

C. Micromechanics of crack growth

An analysis of fatigue crack growth under yielding conditions

M. W. Brown, H. W. Liu, A. P. Kfouri and K. J. Miller

891

The effect of overloads upon fatigue crack tip opening displacement
and crack tip opening/closing loads in aluminium alloys

J. Lankford and D. L. Davidson

899

Fatigue crack propagation response in extruded and cast aluminium
alloys

R. W. Hertzberg, G. Miller, K. Donald, R. Stofanak and R. Jaccard

907

The metallography of fatigue in the high strength aluminium alloy
7010

K. J. Nix and H. M. Flower

915

The propagation of short fatigue cracks in 12% chromium steels

K. H. Friedl, R. B. Scarlin and V. Zelizko

923

D. Crack Closure Mechanisms

The use of the plastic crack tip opening displacement to correlate
fatigue crack growth data for a structural steel

W. D. Dover and F. D. W. Charlesworth

933

R ratio influence and overload effects on fatigue crack mechanisms

J. D. Bertel, A. Clérivet and C. Bathias

943

An improved methodology for predicting random spectrum load interaction effects on fatigue crack growth*

J. B. Chang, R. M. Engle and M. Szamossi

Low rates of fatigue crack growth in beta heat treated titanium alloy

M. D. Halliday

953

The influence of prior austenite grain size and stress ratio on near threshold fatigue crack growth behavior in high strength steel

R. Murakami and K. Akizono

963

Theme 6

INFLUENCE OF ENVIRONMENT ON FRACTURE TOUGHNESS

A. Stress Corrosion Cracking

Effects of the environment on stable crack growth in high-strength steels under static and cyclic loading

L. Hyspecká, M. Tvrď and K. Mazanec

973

The effect of martensite on the stress corrosion cracking of austenitic stainless steel

K. Takashima, N. W. Ringshall, Y. Higo, T. Obinata,
T. Nakamura and S. Nunomura

981

Hydrogen-induced fracture phenomena in a BCC titanium alloy

W. W. Gerberich, K. Jatavallabhula, K. A. Peterson and
C. L. Jensen

989

Caustic stress corrosion cracking in iron-chromium-nickel austenitic alloys

C. Barillec, M. Bonningue, D. Hocquellet and J. Y. Boos

999

Mechanism of SCC and hydrogen-induced delayed cracking

W. Chu, C. Hsiao and S. Li

1009

The implications of recent developments in elastic plastic fracture mechanics on the growth of stress corrosion cracks

E. Smith

1019

Theme 7

TEST TECHNIQUES

C. Dynamic Crack Propagation - Crack Arrest

Dynamic fracture toughness of a structural steel

Z. Bílek

1027

Some observations of crack propagation and arrest in a system with an increasing stress intensity factor

R. S. Gates

1035

Crack arrest methodology for thick sections

G. T. Hahn, R. G. Hoagland and R. D. Cheverton

1043

K-determination in mixed-mode crack problems by interferometry H. P. Rossmannith and D. C. Holloway	1051
The evaluation of the resistance against crack extension by instrumented high velocity impact on 3-points bend (drop weight tear test like) specimens in particular of linepipe steel in the ductile range using gasgun facilities H. C. van Elst	1059
<i>Theme 8</i>	
POLYMERS AND COMPOSITES	
<i>C. Non-Metallic Materials</i>	
Contiguity and the fracture process of WC-Co alloys S. B. Luyckx	1075
Fracture mechanics, sub-critical events and structure of polyphase ceramics R. G. Cooke	1091
Dynamic effects of liquids on surface crack extensions in glass T. A. Michalske, V. D. Frechette and R. Hudson	1083
Toughness of cellulose cement composites R. A. Tait and W. Keenliside	1099
Stress biaxiality effects on slow crack growth in Polymethylmethacrylate J. C. Radon	1109
Fracture toughness of brittle materials determined with chevron notch specimens J. L. Shannon Jr., R. T. Bubsey, D. Munz and W. S. Pierce	1127