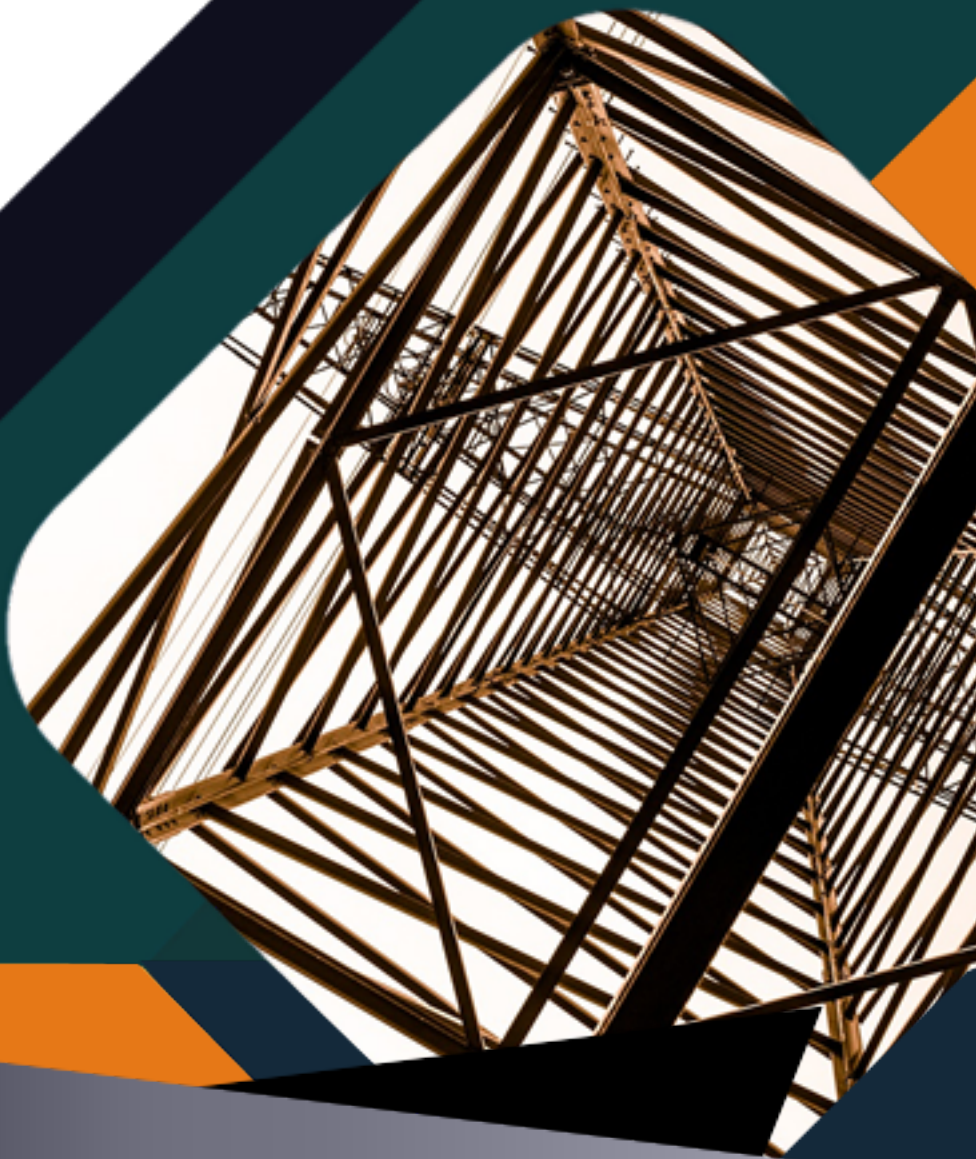
IGF Video recordings
ISBN: 978-88-31482-26-4



1st IJFatigue & FFEMS Joint Workshop

ESIS
European Structural Integrity Society

Workshop
First IJFatigue & FFEMS Joint

March 7-9, 2011 - Forni di Sopra (UD), Italy

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Fatigue & Fracture of Engineering Materials & Structures

FIRST IJFATIGUE & FFEMS JOINT WORKSHOP

Characterisation of Crack Tip Stress Fields

Forni di Sopra (UD)
www.fornidisopra.it
7-9 March 2011

BACKGROUND

During the course of their journal work, it has become apparent to Professor M Neil James (Co-Editor of the International Journal of Fatigue, published by Elsevier) and Professor John R Yates (One of the Co-Editors of Fatigue & Fracture of Engineering Materials & Structures, published by Wiley-Blackwell), that an increasing number of authors and research groups, particularly in Europe, are working on the topic of characterisation of crack tip stresses using more than one fracture mechanics parameter.

Single parameter characterisation of the crack/notch tip field using fracture mechanics parameters like K, J or CTOD has been extremely powerful in advancing predictive technologies for critical or sub-critical crack growth. It has also become clear over the last 40 years that single parameter approaches have limitations particularly in dealing with crack growth phenomena arising from crack tip shielding, often resulting from the plastic enclave surrounding a crack. Influences of this enclave on the crack tip stress field ahead of the crack are maximised during cyclic loading. In the case of a parameter like stress intensity factor, K, which characterises the crack tip field via an elastic approximation, it is not surprising that any set of plasticity-induced circumstances which perturb the size of the plastic enclave and its associated strain field lead to predictive difficulties. Over the last 30 years, notable areas of activity related to such difficulties include short cracks, plasticity-induced closure, variable amplitude and multiaxial loading and notch effects.

Thus attention has been directed towards incorporating the T-stress into life prediction methods. The T-stress is the second term in a Williams-type expansion of the crack tip stresses and it affects the extent and shape of crack tip plasticity. It would therefore be expected to be influential in plasticity-related crack growth phenomena and a number of publications have demonstrated this to be true. The situation is further complicated where a crack experiences multiaxial loading and Modes II and III fracture mechanics parameters are also necessary. Alongside this, other groups have focussed attention on incorporating additional elastic fracture mechanics parameters into crack/notch tip characterisation, which describe the effects of an Eshelby-type 'plastic inclusion' on an elastic stress field.

The organisers of this unique research seminar therefore believe that the fatigue and fracture community in Europe would benefit from an opportunity for invited research scientists and engineers to present and exchange new data and cutting edge ideas related to characterisation of crack/notch tip stress fields in an informal, interactive format at a conference venue in a beautifully scenic area.

VIDEO-PRESENTATIONS

Presentation title	Authors	DOI
Two parameter FCG driving force successive blocking of the monotinic and cyclic plastic zones at microstructural barriers	C. Vallellano, A. Navarro, J. Dominguez	https://doi.org/10.53255/IGFTUBE.WS2011_A.1
A finite fracture mechanics approach to the asymphtotic behavior of U-notched structures	A. Carpinteri, P. Cornetti, A. Sapora	https://doi.org/10.53255/IGFTUBE.WS2011_A.2
A unified stress based approach to a asses failure in solids and liquids	R. Brighenti, A. Carpinteri	https://doi.org/10.53255/IGFTUBE.WS2011_A.3
An elastic solution for the stress field at the tip of a mode II propagating fatigue crack	M.W. Brown	https://doi.org/10.53255/IGFTUBE.WS2011_A.4
An engineering approach to fatigue analysis based on elastic-plastic fracture mechanics	J. Eufinger, A. Heinrietz, T. Bruder, H. Hanselka	https://doi.org/10.53255/IGFTUBE.WS2011_A.5
Characterizing mixed mode brittle fracture using near crack tip stress fields	M. Ayatollahi, D. Smith, M. Pavier	https://doi.org/10.53255/IGFTUBE.WS2011_A.6
Comparing improved crack tip plastic zone estimates based on t-stress and on complete stress fields	J. Tupiassu Pinho de Castro, R. Araujo de Souza, A. A. de Oliveira Lopes, L. F. Martha	https://doi.org/10.53255/IGFTUBE.WS2011_A.7
Comparison between Mode I and Mode III propagation under pure shear and RCF conditions	S. Berretta, S. Foletti, M.G. Tarantino, J. Lai	https://doi.org/10.53255/IGFTUBE.WS2011_A.8
Constraint parameters along a three dimensional crack front stress field	Yu.G. Matvienko, V.N. Shlyannikov, N.V. Boychenko	https://doi.org/10.53255/IGFTUBE.WS2011_A.9
Crack growth modes in inhomogeneous materials: analysis of bi- and multi-material interfaces	K.M. Mroz, Z. Mroz	https://doi.org/10.53255/IGFTUBE.WS2011_A.10
Crack path of titanium alloy Ti-6Al-3Mo-0.4 in high- and very-high-cycle-fatigue regime after tempering and gardening procedures of	A.A. Shanyavskiy	https://doi.org/10.53255/IGFTUBE.WS2011_A.11

Presentation title	Authors	DOI
smooth and notched specimens		
Crack tip shielding effects, Part 1: direct measurement of the plastic enclave	E.A. Patterson, N. James, Y. Du, A. Patki, M. Pacey, M. Crimp, Y. Tong, C. Chirstopher	https://doi.org/10.53255/IGFTUBE.WS2011_A.12
Dislocation based model of crack tip shielding effects	J. Pokluda	https://doi.org/10.53255/IGFTUBE.WS2011_A.13
On effective stress parameters close to stess singularities	R. Tovo, P. Livieri	https://doi.org/10.53255/IGFTUBE.WS2011_A.14
Experimental and numerical analysis on elastic-plastic strains and stresses ahead of a growing fatigue crack	Buczynski Andrzej, Glinka Grzegorz	https://doi.org/10.53255/IGFTUBE.WS2011_A.15
Fatigue crack closure from LCF to small scale yielding	Reinhard Pippan, W. Grosinger, C. Motz, C. Zelger	https://doi.org/10.53255/IGFTUBE.WS2011_A.16
Gradient elasticity theories and finite element implementations for static fracture	Harm Askes	https://doi.org/10.53255/IGFTUBE.WS2011_A.17
How mode I stress intensity factor is affected in fatigue by plastic dissipation in heat at the crack tip: the case of an infinite plate with semi-infinite crack	N. Ranc, T. Pallin-Luc, P.C Paris	https://doi.org/10.53255/IGFTUBE.WS2011_A.18
Influence of non singular higher order terms on the stress field of thin welded lap joints and small inclined cracks in plates	F. Berto, P. Lazzarin, C.J. Christopher adn M.N. James	https://doi.org/10.53255/IGFTUBE.WS2011_A.19
Measurement and modelling of near tip displacement fields for fatigue cracks in 6082 T6 aluminium	D. Nowell, M.E, Kartal, P.F.P de Matos	https://doi.org/10.53255/IGFTUBE.WS2011_A.20
Measurements of crack tip fields with DIC	Y.H. Tai, J.R. Yates	https://doi.org/10.53255/IGFTUBE.WS2011_A.21
Multiaxial stress versus stress intensity fractor based approaches to estimate short crack arrest in fretting fatigue	J.A. Araujo, F.C. Castro	https://doi.org/10.53255/IGFTUBE.WS2011_A.22
Non linear fracture mechanics, a novel approach for quasi-brittle materials	E. Morice, S. Pommier, A. Delaplace	https://doi.org/10.53255/IGFTUBE.WS2011_A.23

Presentation title	Authors	DOI
Non proportional mixed mode plasticity, crack tip fields from digital image correlation	S. Pommier, P.Y. Decreuse	https://doi.org/10.53255/IGFTUBE.WS2011_A.24
Overload effects on local fatigue crack-tip strain fields in plane stress (and plane strain) samples	P.J. Withers, H. Dai, P. Lopez-Crespo, A. Steuwer, F. Yusof, J.F. Kelleher, T. Buslaps	https://doi.org/10.53255/IGFTUBE.WS2011_A.25
Ratcheting strain as a crack driving force for crack growth	J. Tong, L.-G. Zhao, B. Lin, C. Cornet	https://doi.org/10.53255/IGFTUBE.WS2011_A.26
Sharp Notch Roots: The length scale implicit in the solution	D. A. Hills, D. Dini	https://doi.org/10.53255/IGFTUBE.WS2011_A.27
Study of through thickness effects by means of the stress intensity factor	A. Gonzalez-Herrera, J-Garcia-Manrique, D. Camas, P. Lopez- Crespo	https://doi.org/10.53255/IGFTUBE.WS2011_A.28
The crack modelling method and critical distance approaches	D. Taylor, .L. Susmel	https://doi.org/10.53255/IGFTUBE.WS2011_A.29
The plastic inclusion as a bridge between local crack plasticity and the global elastic field	M.N. James, C.J. Christopher, Y. Lu, E.A. Patterson	https://doi.org/10.53255/IGFTUBE.WS2011_A.30