

IGF Video recordings

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4th IJFatigue & FFEMS Workshop "Characterization of Crack Tip"



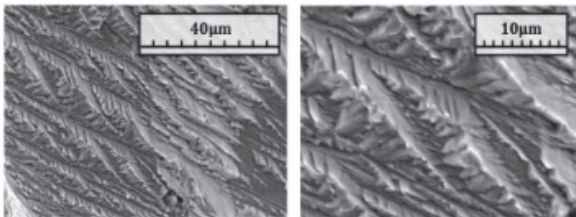
The 4th IJF & FFEMS Workshop “Characterization of Crack Tip Fields”

April 10-12, 2017 – Bonifacio, France

▶ AIM

This research workshop is intended to promote discussion and free exchange of ideas in areas of considerable interest to the fields of fracture and fatigue.

Invited participants will be expected to contribute through a 20 minutes presentation on a topic of close relevance to the workshop theme. These demonstrations will be followed by in-depth discussions of the ideas presented to identify fruitful avenues for future researches and collaborations.



▶ BACKGROUND

Single parameter characterization 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 maximized during cyclic loading. In the case of a parameter like stress intensity factor, K , which characterizes 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 an increasing number of authors and research groups, particularly in Europe, are working on the topic of characterization of crack tips using more than one fracture mechanics parameter. Attention has been directed, for example, 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 Mode II and III fracture mechanics parameters are also necessary. Alongside this, new analytical models have been proposed and advanced experimental techniques allow greatly improved measurement of 2D and 3D fields associated with the crack tip zone. Very successful workshops on this topic have been held in Forni di Sopra, Italy in 2011, in Málaga, Spain in 2013 or Urbino, Italy in 2015. The organizers of this unique workshop believe that crack tip characterization under load will benefit from opportunities for invited research scientists and engineers to present and exchange new data and cutting edge ideas related to characterization of crack/notch tip fields in an informal, interactive format at a conference venue in a beautifully scenic Corsican city.

VIDEO-PRESENTATIONS

Presentation title	Authors	DOI
On the use of length scale parameters to assess the static strength of notched 3D printed PLA	A. A. Ahmed, L. Susmel	https://doi.org/10.53255/IGFTUBE.WS2017_A.1
Stress Intensity Factor calculation from displacement fields	L. Patriarca, S. Beretta, S. Rabbolini	https://doi.org/10.53255/IGFTUBE.WS2017_A.2
Study of strain localizations in a polycrystalline medium in presence of a quasi static crack	L. Patriarca, P. Luccarelli, S. Foletti	https://doi.org/10.53255/IGFTUBE.WS2017_A.3
The effect of creep damage formulation on crack tip fields, creep stress intensity factor and crack	V. Shiyannikov, A. Tunmanov	https://doi.org/10.53255/IGFTUBE.WS2017_A.4
The heat energy dissipated in a control volume to correlate the crack propagation rate in stainless	G. Menegheti, M. Ricotta	https://doi.org/10.53255/IGFTUBE.WS2017_A.5
Variable mode mixity during fatigue cycles – crack tip parameters determined from displacement field	M. Vormwald, Y. Hos J. L. Freire, G. L. G. Gonzales J. G. Diaz	https://doi.org/10.53255/IGFTUBE.WS2017_A.6
Williams expansion based approximation of the stress field in an Al 2024 body with a crack from optical measurements	S. Seiti, L. Malikova, J. Sobek, P. Frantik, P. Lopez-Crespo	https://doi.org/10.53255/IGFTUBE.WS2017_A.7
A model to quantify fatigue crack growth by cyclic damage accumulation calculated by strip yield procedures	S. E. Ferreira, J. T. Pinho de Castro, M. A. Meggiolaro	https://doi.org/10.53255/IGFTUBE.WS2017_A.8
Analysis of fatigue crack growth based on plastic CTOD	F. Antunes, R. Branco, P. Prates	https://doi.org/10.53255/IGFTUBE.WS2017_A.9
Characteristics and mechanism of crack initiation and early growth of a titanium alloy in hcf and VHCF regimes	Y. Hong, H. Su, X. Liu, C. Sun	https://doi.org/10.53255/IGFTUBE.WS2017_A.10
Crack opening displacement, crack closure and crack tip strain field	S. Alshammrei, M. -L. Zhu, T. Wigger, C. Lupton, J. Tong	https://doi.org/10.53255/IGFTUBE.WS2017_A.11

Presentation title	Authors	DOI
Evolution of near tip strains of a growing fatigue crack during an overload	De- Qiang Wang, Ming-Liang, Zhu, Fu.Zhen Xuan, Jie Tong	https://doi.org/10.53255/IGFTUBE.WS2017_A.12
Experimental evaluation of CTOD in constant amplitude fatigue crack growth from crack tip displacement fields	J. M. Vasco Olmo, F. A. Diaz Garrido, F. V. Antunes, M. Neil James	https://doi.org/10.53255/IGFTUBE.WS2017_A.13
Experimental methodology for the quantification of crack tip plastic zone and shape from the analysis of displacement fields	J. M. Vasco Olmo, F. A. Diaz Garrido, M. Neil James, C. J. Christopher, E. A. Patterson	https://doi.org/10.53255/IGFTUBE.WS2017_A.14
Fracture toughness of rough and frictional cracks emanating from a re entrant corner	A. Carpinteri, A. Spagnoli, M. Terzano, S. Vantadori	https://doi.org/10.53255/IGFTUBE.WS2017_A.15
Impact of specific fracture energy investigated in front of the crack tip of three point bending specimen	J. Klön, J. Sobek, L. Malikova, S. Seiti	https://doi.org/10.53255/IGFTUBE.WS2017_A.16
Influence of forging conditions on the fatigue mechanisms of low alloy steels a 3D study	P. Lorenzino, C. Verdu, J. -Y. Buffiere	https://doi.org/10.53255/IGFTUBE.WS2017_A.17
Measurement and analysis of fatigue crack deformation at the micro scale	D. Nowell, S. J. O' Connor, K. I. Dragnovski	https://doi.org/10.53255/IGFTUBE.WS2017_A.18
Measurement and analysis of near tip in plane and out of plane sliding displacements during mode II+ III fatigue crack growth in a rail steel		https://doi.org/10.53255/IGFTUBE.WS2017_A.19
Mid thickness studies of the stress intensity factor in the bulk of bainitic steel	P. Lopez-Crespo, J. Vazquez-Peralta, T. Buslaps, C. Simpson, P. J. Withers	https://doi.org/10.53255/IGFTUBE.WS2017_A.20
Modeling crack tip plasticity in mixed mode conditions, how to deal with anisotropic materials	W. Tezeghdanti, Y. Guilhem, S. Pommier	https://doi.org/10.53255/IGFTUBE.WS2017_A.21
Modelling of interfacial transition zone effect on resistance to crack propagation in fine grained cement-based composites	H. Simonova, M. Vyhldal, B. Kucharczykova, P. Bayer, Z. Kersner	https://doi.org/10.53255/IGFTUBE.WS2017_A.22

Presentation title	Authors	DOI
Near tip strain evolution of fatigue cracks in dissimilar welded metals	T. Wigger, C. Lipton, S. Alshammrei, J. Tong, P. Earp, J. Marrow, T. Connolley, M-L Zhu, D-Q Wang	https://doi.org/10.53255/IGFTUBE.WS2017_A.23
On DIC measurements of DKeff to verify if it is the FCG driving force	J. A. O. Gonzales, J. T. P. Castro, G. L. G. Gonzales, M. A. Meggiolaro, J. L. F. Freire	https://doi.org/10.53255/IGFTUBE.WS2017_A.24
On short cracks that depart from elastoplastic notch tips	V. M. Machado, J. T. Pinho de Castro, M. A. Meggiolaro	https://doi.org/10.53255/IGFTUBE.WS2017_A.25
On the connection between mode II and mode III effective thresholds in metals	T. Vojtek, S. Zak, J. Pokluda	https://doi.org/10.53255/IGFTUBE.WS2017_A.26

