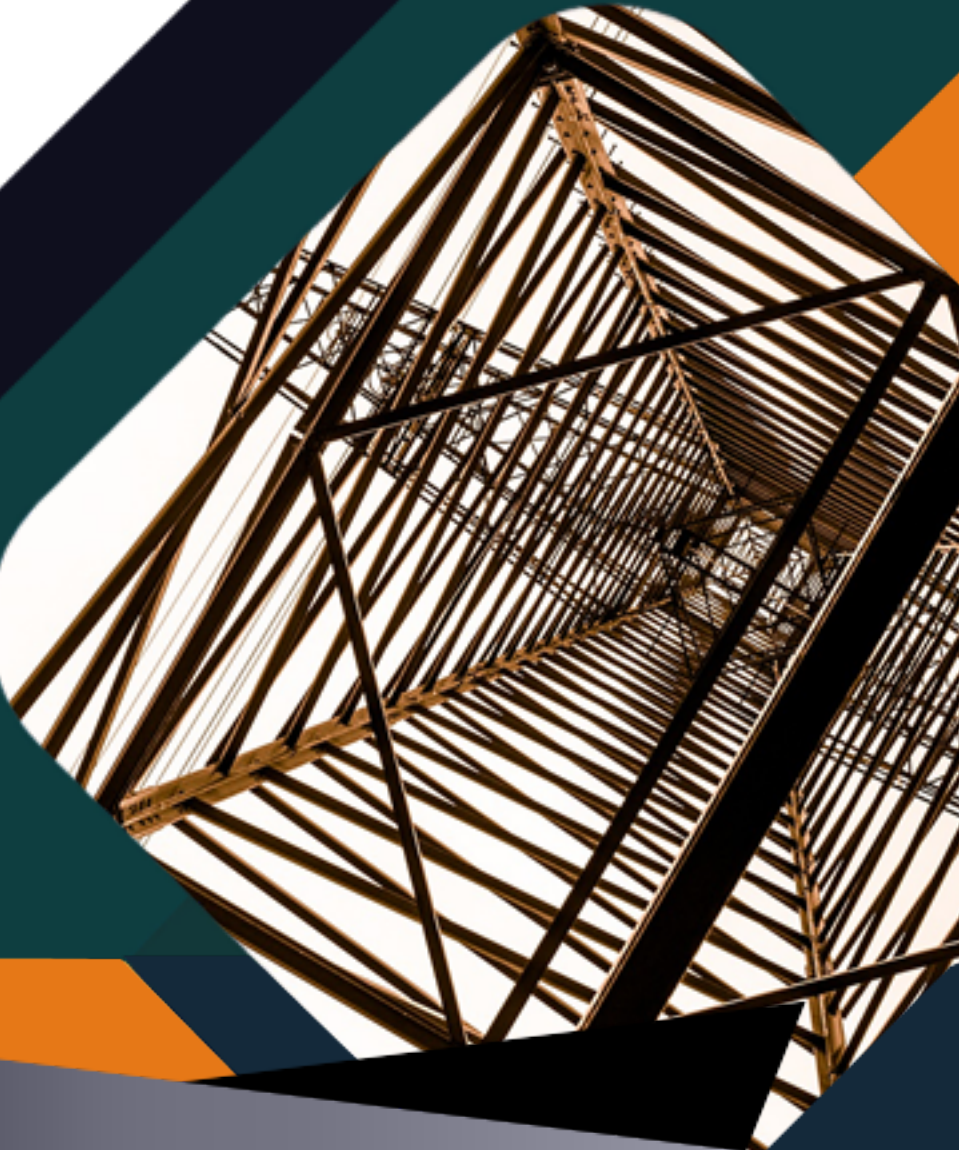


# IGF Video recordings

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## Third IJFatigue & FFEMS Workshop "Characterization of Crack Tip"



# Third IJFatigue & FFEMS Workshop “Characterization of Crack Tip Fields”

April 20 - 22, 2015 – Urbino, Italy



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**THIRD IJFATIGUE & FFEMS  
JOINT WORKSHOP**

## **Characterisation of Crack Tip Fields**

Urbino, Italy

[www.turismo.pesarourbino.it/en.html](http://www.turismo.pesarourbino.it/en.html)

20-22 April 2015

### **BACKGROUND**

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 an increasing number of authors and research groups, particularly in Europe, are working on the topic of characterisation 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, Udine, Italy in March 2011 and Málaga, Andalusia, Spain in April 2013.

The organisers of this unique workshop believe that crack tip characterisation under load will benefit from opportunities for invited research scientists and engineers to present and exchange new data and cutting edge ideas related to characterisation of crack/notch tip fields in an informal, interactive format at a conference venue in a beautifully scenic Italian city.

## VIDEO-PRESENTATIONS

Presentation title	Authors	DOI
Spherical particles formation under biaxial cyclic loading due to mesotunneling effect	A. Shanyavskiy	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.1">https://doi.org/10.53255/IGFTUBE.WS2015_A.1</a>
Stain mapping the fracture process zone in a eterogeneous brittle material (polygranular graphite) by synchrotron X-ray diffraction, computed tomography and image correlation	L. S. Mora, S. Barhli, D. Collins, M. Mostafavi, C. Reinhard, Y. Vertyagina, T.J. Marrow	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.2">https://doi.org/10.53255/IGFTUBE.WS2015_A.2</a>
Stress intensity factor and the effect ofn plastic dissipation in heat at the crack tip of a fatigue propagating crack	T. Palin-Luc, N. Ranc	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.3">https://doi.org/10.53255/IGFTUBE.WS2015_A.3</a>
Synchrotron 3D characterization of arrested fatigue cracks initiated from small tilted notches in steel	P. Lorenzino, J.Y. Buffiere, S. Okazaki, H. Matsunaga, Y. Murakami	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.4">https://doi.org/10.53255/IGFTUBE.WS2015_A.4</a>
Three dimensional effects on cracked components under anti plane loading	F. Berto, A. Campagnolo, L. P. Pook	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.5">https://doi.org/10.53255/IGFTUBE.WS2015_A.5</a>
2D mapping of plane stress crack tip fields following an overload	P.J. Withers, P. Lopez Crespo, M. Mostafavi, A. Steuwer, J.F. Kelleher, T. Buslaps	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.6">https://doi.org/10.53255/IGFTUBE.WS2015_A.6</a>
3D Analyses of Crack Propagation in Torsion	D. Shiozawa, I. Serrano Munoz, S. Dancette, C. Verdu, J.Y. Buffiere	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.7">https://doi.org/10.53255/IGFTUBE.WS2015_A.7</a>
3D thickness effects around notch and crack tip stress/strain fields	R.C.O. Goes, J.T.P. Castro, M.A. Meggiolaro	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.8">https://doi.org/10.53255/IGFTUBE.WS2015_A.8</a>
A numerical study of non linear crack tip parameters	F.V. Antunes, R. Branco, L. Correia, A.L. Ramalho	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.9">https://doi.org/10.53255/IGFTUBE.WS2015_A.9</a>
A quantitative threedimensional in situ study of a short fatigue crack in a magnesium alloy	M. Mostafavi, T. Hashimoto, G.E. Thompson, T.J. Marrow	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.10">https://doi.org/10.53255/IGFTUBE.WS2015_A.10</a>

Presentation title	Authors	DOI
Can $\Delta K_{eff}$ be assumed as the driving force for fatigue crack growth?	J.T.P. Castro, M.A. Meggiolaro, J.A.O. Gonzalez	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.11">https://doi.org/10.53255/IGFTUBE.WS2015_A.11</a>
Characteristic Dimension of Crack Tip for Very-High-Cycle Fatigue of high strength steels	Y. Hong	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.12">https://doi.org/10.53255/IGFTUBE.WS2015_A.12</a>
Crack tip fields and mixed mode fracture behavior of progressively drawn pearlitic steel	J. Toribio, B. Gonzalez, J.C. Matos	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.13">https://doi.org/10.53255/IGFTUBE.WS2015_A.13</a>
Damage Evolution in Freeze Cast Metal/Ceramic composites exhibiting lamellar microstructures	C. Simpson, T. Lowe, P.J. Withers, S. Roy, A. Wanner	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.14">https://doi.org/10.53255/IGFTUBE.WS2015_A.14</a>
Effective stress assessment at rectangular rounded lateral notches	E. Maggiolini, R. Tovo, P. Livieri	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.15">https://doi.org/10.53255/IGFTUBE.WS2015_A.15</a>
Estimation of the crack propagation direction in a mixedmode geometry via multi-parameter fracture criteria	L. Malikova, V. Vesely, S. Seitl	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.16">https://doi.org/10.53255/IGFTUBE.WS2015_A.16</a>
Experimental evaluation of plasticity-induced crack shielding from crack tip displacement fields	J. M. Vasco-Olmo, F.A. Diaz	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.17">https://doi.org/10.53255/IGFTUBE.WS2015_A.17</a>
Fatigue crack tip damaging micromechanisms in a ferritic pearlitic ductile cast iron	V. Di Cocco, F. Iacoviello, M. Cavallini	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.18">https://doi.org/10.53255/IGFTUBE.WS2015_A.18</a>
Fretting in Complete Contacts the use of William's Solution	D. A. Hills, R. C. Flicek	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.19">https://doi.org/10.53255/IGFTUBE.WS2015_A.19</a>
Gradient enriched linear elastic tip stresses to perform the high cycle fatigue assessment of notched plain concrete	C. Bagni, H. Askes, L. Susmel	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.20">https://doi.org/10.53255/IGFTUBE.WS2015_A.20</a>
Growth of Inclined Fatigue Cracks using the biaxial CJP Model	G. Laboviciute, C. Christopher, M. N. James, E. A. Patterson	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.21">https://doi.org/10.53255/IGFTUBE.WS2015_A.21</a>
Interpreting experimental fracture toughness results of quasi-brittle natural materials through multi-parameter approaches	A. Carpinteri, A. Spagnoli, S. Vantadori	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.22">https://doi.org/10.53255/IGFTUBE.WS2015_A.22</a>
Load history effects on fatigue crack propagation: Its effect on the R-curve for threshold	X. Zhou, A. Hohenwarter, Th.	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.23">https://doi.org/10.53255/IGFTUBE.WS2015_A.23</a>

Presentation title	Authors	DOI
	Leitner, H.P. Ganser, R. Pippan	
Measurement and analysis of fatigue crack deformation on the macro- and micro-scale	D. Nowell, S. J. O'Connor, K.I. Dragnevski	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.24">https://doi.org/10.53255/IGFTUBE.WS2015_A.24</a>
Measurement and simulation of strain fields around crack tips under mixed-mode fatigue loading	Y. Hos, M. Vormwald, J.L.F. Freire	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.25">https://doi.org/10.53255/IGFTUBE.WS2015_A.25</a>
Multi parameter approximation of stress field in a cracked specimen using purpose-built Java applications	V. Vesely, J. Sobek, D. Tesar, P. Frantik, T. Pail, S. Seidl	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.26">https://doi.org/10.53255/IGFTUBE.WS2015_A.26</a>
Multi scale approach for the analysis of the stress fields at a contact edge in fretting fatigue conditions with a crack analogue approach	C. Montebello, S. Pommier, K. Demmou, J. Leoux, J. Meriaux	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.27">https://doi.org/10.53255/IGFTUBE.WS2015_A.27</a>
Multi scale crack closure measurements with digital image correlation on Haynes 230	S. Beretta, S. Rabbolini, A. Di Bello, H. Sehitoglu	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.28">https://doi.org/10.53255/IGFTUBE.WS2015_A.28</a>
Near Tip Strain Evolution of a Growing fatigue crack	Y. W. Lu, M.L. Zhu, C. Lupton, J. Tong	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.29">https://doi.org/10.53255/IGFTUBE.WS2015_A.29</a>
Progress in understanding of intrinsic resistance to shear-mode fatigue crack growth in metallic materials	J. Pokluda, T. Vojtek, A. Hohenwarter, R. Pippan	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.30">https://doi.org/10.53255/IGFTUBE.WS2015_A.30</a>
Some experimental observations of crack tip mechanics with displacement data	M. Mokhtari, P. Lopez-Crespo, B. Moreno, M. Zanganeh	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.31">https://doi.org/10.53255/IGFTUBE.WS2015_A.31</a>
Some relationships between the peak stresses and the local strain energy density for crack subjected to mixed mode (I-II) loading	G. Meneghetti, A. Campagnolo, F. Berto	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.32">https://doi.org/10.53255/IGFTUBE.WS2015_A.32</a>
Specimen thickness effect on elastic-plastic constraint parameter A	G.P. Nikishkov, Yu.G. Matvienko	<a href="https://doi.org/10.53255/IGFTUBE.WS2015_A.33">https://doi.org/10.53255/IGFTUBE.WS2015_A.33</a>



