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FOREWORD: Crack Paths 2015 (after CP 2015)

Most engineering structures and components contain cracks or flaws. Therefore, the direction or path of the initial crack and its subsequent growth path must be taken into account both in design and in the analysis of failures. Knowledge of potential crack paths is needed for both the complete solution of a crack growth problem under either quasi-static or cyclic loading, as well as for the selection of appropriate non-destructive testing procedures. Although improvements in the crack path assessment have recently been achieved, the interest on this challenging issue has steadily increased.

In September 2015, 150 fatigue and fracture delegates from 30 countries all over the world gathered in Ferrara, Italy, for the 5th International Conference on Crack Paths (CP 2015). The Conference was chaired by Professor Andrea Carpinteri, University of Parma, Italy, Professor Les P. Pook, formerly University College London, UK, Professor Luca Susmel, University of Sheffield, UK, and Professor Roberto Tovo, University of Ferrara, Italy.

Previous conferences in the series were held (always in September): the International Conference on Fatigue Crack Paths in Parma, Italy, 2003 (FCP 2003, Special Issue of Fatigue and Fracture of Engineering Materials and Structures, Vol. 28, No. 1–2, 2005), the 2nd International Conference on Crack Paths held in Parma, Italy, 2006 (CP 2006, Special Issue of Engineering Fracture Mechanics, Vol. 75, No. 3–4, 2008) where the scope was extended to cover all types of crack growth, the 3rd International Conference on Crack Paths held in Vicenza, Italy, 2009 (CP 2009, Special Issue of Engineering Fracture Mechanics, Vol. 77, No. 11, 2010), and the 4th International Conference on Crack Paths held in Gaeta, Italy, 2012 (CP 2012, Special Issue of Engineering Fracture Mechanics, Vol. 108, 2013, and Special Issue of International Journal of Fatigue, Vol. 58, 2014).

Before the CP 2015 Conference, ESIS Technical Committee TC3 on Fatigue of Engineering Materials and Structures, chaired by Andrea Carpinteri and Les P. Pook, proposed to the Editors of Engineering Fracture Mechanics and International Journal of Fatigue the publication of special issues.

This EFM special issue contains 22 selected papers from the Conference. Taken together, such papers show that, since the first Conference of the series (in 2003), there has been further significant progress in the understanding of crack path behaviour, and in the application of this knowledge to practical engineering problems. The papers have been revised and extended by the authors, as appropriate, and subjected to the normal Engineering Fracture Mechanics review process.

We thank the many anonymous reviewers who assisted us in the reviewing process.

The special issue of International Journal of Fatigue, entitled Fatigue Crack Paths 2015, also contains 22 selected papers.

The next International Conference on Crack Paths has tentatively been arranged for September 2018 in the north of Italy, where the delegates will exchange recent information and discuss how to promote research and development in this field as the 21st Century progresses.