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To cite this version :

Andrea CARPINTERI, Ali FATEMI, Thierry PALIN-LUC, Sabrina VANTADORI - Special Issue on 'Multiaxial fatigue 2016: Experiments and modeling': Selected papers from the 11th International Conference on Multiaxial Fatigue and Fracture (ICMFF11), held in Seville, Spain, on 1–3 June 2016 - International Journal of Fatigue p.1 - 2017

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Special Issue on ‘Multiaxial fatigue 2016: Experiments and modeling’: Selected papers from the 11th International Conference on Multiaxial Fatigue and Fracture (ICMFF11), held in Seville, Spain, on 1–3 June 2016

This Special Issue of the International Journal of Fatigue contains selected papers presented at the International Conference on Multiaxial Fatigue and Fracture held in Seville, Spain, on 1–3 June 2016. This conference was the eleventh in a successful series initiated by Keith J. Miller. The first conference was held in 1982 in San Francisco, USA. Subsequent conferences were held in Sheffield, UK (1985), Stuttgart, Germany (1989), St. Germain-en-Laye, France (1994), Cracow, Poland (1997), Lisbon, Portugal (2001), Berlin, Germany (2004), Sheffield, UK (2007), Parma, Italy (2010), and Kyoto, Japan (2013).

Multiaxial fatigue and fracture of materials and structures are examined by both engineers and researchers. As a matter of fact, many engineering components and structures in the automotive, aerospace, power generation, and other industries are subjected to multiaxial stresses during their service life. Despite increased efforts in the understanding of multiaxial fatigue and fracture behaviour, failure assessment procedures are becoming more complex. This is partly due to the synergistic effects of many parameters and variables involved with regards to the material behaviour, component geometry, manufacturing process, and service load history. Therefore, the aim of the conference was not only to review the progress made by experimentalists, theoreticians, industrial practitioners, and academic experts, but also to illustrate how to apply research results to industrial practice.

This conference was an official European Structural Integrity Society (ESIS) conference. It was organised by Andrea Carpinteri (University of Parma, Italy), Ali Fatemi (University of Toledo, USA) and Carlos Navarro Pintado (University of Seville, Spain) as chairmen. Support for the conference organisation was also provided by University of Seville, University of Parma, University of Toledo, European Structural Integrity Society, Ministerio de Economía y Competitividad de España, Grupo Español de Fractura, ASTM International, German Association for Materials Research and Testing, French Society for Metallurgy and Materials, Italian Group of Fracture, and Curtiss-Wright Surface Technologies.

The conference provided an interactive forum with 156 delegates from 33 countries. There were 101 paper presentations, which were included in the proceedings of the conference issued to delegates on a memory stick. The selected papers for this special issue cover a wide range of topics related to cyclic deformation, fatigue crack nucleation and damage evolution under multiaxial stresses. The effects of geometrical stress concentrations, defects, overloads, and fretting are examined. Practical considerations include methods of testing, evaluation of damage parameters and damage calculation techniques. The selected papers have been revised and significantly extended by the authors and subjected to the normal IJF review process. Further selected papers from the conference are published in a Special Issue of Engineering Fracture Mechanics on ‘Multiaxial Fracture 2016’.

The paper topics examined at the Seville conference underline the importance of multiaxial fatigue and fracture in today’s engineering practice, and also demonstrate the need for further work. To improve understanding of multiaxial fatigue and fracture behaviour and the associated failure assessment procedures, the conference series will be continued in Bordeaux, France (June 2019) and San Francisco, USA (June 2022).

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