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Guest Editorial

Advances in damage mechanics of polymer composites



This special issue is devoted to the most recent and exciting accomplishments in the knowledge of damage onset and evolution in composite materials.

The papers presented here are a balanced selection of high standard works covering important topics of composite damage mechanics, with focus on experimental analyses, assessment of the influence of damage evolution on the overall mechanical properties of composites and multiscale numerical modelling. Conventional fiber reinforced and concrete composites have been investigated as well as polymer nanocomposites and composites.

The selected papers cover the most important issues related to various loading conditions, such as large-scale blasting, impact, shear loadings, compression and fatigue.

In particular, special attention is devoted to the analysis of fatigue behavior and crack propagation in composite materials, including the description of complex phenomena such as damage evolution under multiaxial stress states, the effects of stress concentrations and oblique cracking.

The issue also includes a comprehensive collection of papers dealing with the experimental techniques suitable to observe and monitor the damage evolution in composite materials, ranging from conventional approaches like acoustic emission, micro-computer tomography and thermal mapping, to more innovative solutions based on the measurement of the electrical resistance of GFRP. Scientific topics are addressed, as well as important technical issues related to their implementation on full scale composite structures. Some of the most recent advances in analytical and

numerical modeling of the damage behaviour of structural composites complete this collection of works, providing a rather wide overview on the most widespread modeling strategies, such as homogenization techniques, models interaction and multi-scale approaches.

We would like to thank all the authors for their highly qualified contribution to this Issue and all the colleagues who agreed to serve as reviewers for their help and efforts which were essential in maintaining a very high standard.

Valter Carvelli

Department of Structural Engineering, Politecnico di Milano, Italy

Luciano Feo

Department of Civil Engineering, University of Salerno, Italy

Alessandro Pegoretti

Department of Industrial Engineering, University of Trento, Italy

Marino Quaresimin

Michele Zappalorto

*Department of Management and Engineering, University of Padova,
Stradella S. Nicola 3, 36100 Vicenza, Italy*

E-mail address: marino.quaresimin@unipd.it (M. Quaresimin)

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