ACM Special Issue: ICCM-17: Deformation and Fracture of Composites

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This ACM issue is a refereed compilation of selected papers presented at the 17th International Conference on Composite Materials (ICCM-17, www.iccm17.org) that was held in Edinburgh, UK, on 27–31 July 2009 in the session of *Deformation and Fracture of Composites*. The focus of this session was on understanding the initiation, propagation and interaction of failure mechanisms in the form of resin cracking, delamination and fibre microbuckling developed in multidirectional laminated constructions when loaded in tension and/or compression and their effect on strength and stiffness properties.

Composite materials have gained popularity in high-performance products that need to be lightweight, yet strong enough to take high loads such as aerospace structures (tails, wings and fuselages), ship construction and racing car bodies. Modern polymers containing long fibres of carbon, glass or Kevlar, contribute more than 50% of the structural mass of the Boeing 787 and the proposed Airbus A350. Present research effort is devoted to analysis and computational simulation of the manufacturing and assembly process as well as simulation of the performance of the structure, since they are all intimately connected and could make design and building with composites more affordable. Prediction of structural performance through modelling is the way forward. Predictive modelling based on the physics of composite material behaviour is wealth generating; by guiding material system selection and process choices, by reducing experimentation and associated high costs. No longer is computer hardware or software a barrier to the deployment of predictive modelling. Instead, with experience and the building of confidence we can identify the right approach and application of appropriate calculations at the appropriate level of sophistication to solve the correctly identified problem. Optimum material microstructures can be designed rather than found by trial and error, whilst maximising structural high performance and sustainable safe life.

As a guest editor of this special issue in Applied Composite Materials, I would like to thank all the authors who submitted their papers, reviewers who have helped to maintain the high standards set by the journal and Dr Peter Beaumont, the Editor-in-Chief of ACM for agreeing the publication of this special issue; hope you will enjoy reading them.

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