COMPUTATIONAL DAMAGE MECHANICS OF COMPOSITE MATERIALS

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ABSTRACT

The achievement of safe, robust and optimized design of sustainable composite structures requires the use of advanced modeling and simulation, especially to predict complex phenomena that cannot be accessed by classical experimental testing. An example of well-known challenges to researchers in designing with composite materials includes the definition of damage and fracture models under a variety of conditions, such as severe environmental aging. The calibration of these models through effective identification procedures is critical to achieving reliable engineering design. As a consequence, virtual testing and model identification are necessary steps to meet the requirements of the next generation of composite applications. This mini-symposium welcomes contributions highlighting the critical role of virtual design and simulation in the development of advanced composite structures. Discussions held will cover a variety of topics, however the focus will be upon application-oriented problems through which simulation and modeling can provide real added-value with respect to pure experimental design approaches.

Key topics of discussion will be:

• damage and fracture mechanics with applications to composite structures

• simulation-based prediction of aging of composite structures in various environments

• robust identification of models for structural design

• multi-scale and multi-physics approaches for composite materials and structures

• simulation-aided design of multifunctional materials and structures

• simulation of macroscopic properties of nano modified composites.