

DELAMINATION INCLUDING INTERNAL CONTACT

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ABSTRACT

Delamination is one of the critical failure modes occurring in laminated composite materials and structural elements made thereof. This kind of failure is due to breaking of the bond between the layers within a small region and results in a progressive separation that will affect the integrity and load-carrying capabilities of the laminate. Therefore, with the rapid growth of applications of laminated composite materials in engineering practice, it is important in engineering design to check them against delamination failure.

Modelling of the deformation process of a body undergoing delamination is very complex as, in a general case, it should take into account debonding and unilateral contact with friction. The problem is inherently non-convex and dissipative. Over the past decade a lot of research has been conducted into the mathematical modelling of composite materials and numerical simulation thereof. Considerable advances have been made in developing or implementing of complex failure criteria and mathematical formulations of the corresponding boundary value problems defined by inequality constraints. New discretization ideas and solution algorithms have been developed, including also the field of computational contact mechanics. However, challenges remain and further progress still need to be made in the research and development, so that the computational models can be used to solve complicated, large-scale industrial problems.

This mini-symposium will provide a forum for discussion of various aspects of the delamination phenomenon in composites. Guided by this motivation, the organizers invite presentations that are connected with the topics mentioned above. Of particular interest are analyses of the novel mathematical formulations and computational models as well as solution procedures.