

A Meso Macro Model Prediction of Laminated Composite Damage Elastic Behaviour

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Abstract : The present paper proposed a meso-macro model describing the mechanical behaviour composite laminates of stacking sequence $[+\theta/-\theta]_s$ under tensile loading. The behaviour of a layer is expressed through elasticity coupled to damage. The elastic strain is due to the elasticity of the layer and can be modeled by using the classical laminate theory, and the laminate is considered as an orthotropic material. This means that no coupling effect between strain and curvature is considered. In the present work, the damage is associated to cracking of the matrix and parallel to the fibers and it being taken into account by the changes in the stiffness of the layers. The anisotropic damage is completely described by a single scalar variable and its evolution law is specified from the principle of maximum dissipation. The stress/strain relationship is investigated in plane stress loading.

Keywords : damage, behavior modeling, meso-macro model, composite laminate, membrane loading

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