

عنوان مقاله:

Stress transfer modeling in viscoelastic polymer matrix composites with an internal damage

محل انتشار:

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خلاصه مقاله:

A viscoelastic analysis of a multilayered composite model is carried out to investigate the time-dependent stress transfer between elastic unidirectional Fibers and viscoelastic matrix for loading in the axial direction. The laminate is subjected to an elliptical damaged zone of radii r_1 and r_2 . The stress state in the composite is solved at incremental time intervals to obtain the stabilized solution, and the time required to reach a stable state. To study effect of viscoelasticity on unidirectional composite material used The Wiechert model. It is assumed that all long fibers lie in a finite width laminate. A hexagonal arrangement is postulated to deduce the equilibrium equations. Upon proper use of boundary and boundness conditions, stress and displacement fields are derived within the laminate and as well as elliptic hole surrounding. In order to simulate almost a crack and a circular hole, two values of r_1/r_2 assume 0 and 1, respectively. The solution is obtained analytically as well as numerically, using finite element technique. The analytical results on stress concentration factors were compared to those of finite element values. A close match is observed between the two methods

کلمات کلیدی:

Polymer matrix composite; viscoelasticity; finite element method; analytical solution; Stress concentration

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