

A Numerical Simulation for Damage Tolerant Performance of CFRP Laminates

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A problem of strength reduction of CFRP laminates with barely visible damage (BVD) is numerically simulated using finite element method. In particular, we are focused on the problem of compression after impact (CAI) strength reduction which is most important concern for damage tolerant design of aerospace structures. Modeling of impact damage is very complex and need many efforts. Furthermore, simulation of compressive performance of impact damaged laminates have many difficulty of calculation, such as contact problem of delaminated surfaces, geometrical nonlinearity involving local and global buckling, and numerical instability due to damage progression. We have analyzed postbuckling behavior of CFRP laminates with a realistic impact damage, and studied strength reduction and failure mechanism using fracture mechanics and cohesive zone model. We would like to present about damage analysis of laminates for damage tolerant performance of composite structures.

Keywords: Composite laminates, Delamination, Damage propagation, Cohesive element