

عنوان مقاله:

Buckling Behavior of Composite Plates with a Pre-central Circular Delamination Defect under in-Plane Uniaxial Compression

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خلاصه مقاله:

Delamination is one of the most common failure modes in composite structures. In the case of in-plane compressional loading, delamination of a layered flat structure can cause a local buckling in delaminated area which subsequently affects the overall stiffness of the initial structure. This leads to an early failure of the overall structure. Moreover, with an increase in load, the delaminated area may propagate in the post-buckling mode; and consequently, to predict this behavior, a combination of failure modes will be used to predict failure. In this work, the proposed analysis will predict the delamination shape and load carrying capacity of a composite laminated plate during delamination process in post-buckling mode. For this purpose, it is assumed that the composite laminate contains an initial circular delaminated (defected) area. The analysis is performed through a numerical scheme based on finite element method. Results show that in most cases, the onset of crack growth is affected by the first opening mode while it is well probable that during the delamination growth, the effects of other modes dominate the initial primary opening mode. Consequently, during progression of any delamination which may occur as a result of further loading, a jump in failure mode which is predicted in this analysis, may occur. Moreover, the induced results show that the stacking sequence of the delaminated composite plate has a significant effect on the delamination growth and the load carrying capacity of the overall structure

کلمات کلیدی:

Buckling, Composite plates, delamination defect, Compressive uniaxial loading

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