COMPARISON OF COMPUTATIONAL TECHNIQUES FOR PREDICTION OF DELAMINATION INITIATION AND PROPAGATION IN COMPOSITE LAMINATES

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In the past few decades, interlaminar and intralaminar damage interaction on composite laminates has been extensively investigated in order to predict failure. It is widely known that predictive modelling of composite structures failure -specifically during the manufacturing stage- could significantly reduce the production cost and time. In many cases, delamination is the main threat leading to failure. Despite having an enormous amount of research via both numerical and experimental, comparison between different techniques for predictive modelling of delamination initiation and propagation results in significant discrepancies [1].

In this work, comparison between different techniques for prediction of delamination and fracture in CFRP laminates is presented. Three methods are assessed in conjunction with distinct techniques (damage evolution, initiation criteria, etc) for computation of damage and fracture. These methods include: Virtual Crack Closure Technique (VCCT) [1], Cohesive Element (CZM-CE) [2] and Extended Finite Element Method (XFEM) [3]. These different numerical predictions of crack initiations and propagations data are validated and compared against experimental results. A discussion on the advantages and mishaps of them is presented. In addition, other factors such as data accuracy and run-time are shown. Further test results and findings will be included at the time of the conference.

References

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