

Application of XFEM to structural analyses of composites

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Abstract

In order to effectively perform stress analyses for evaluation of structural integrity of CFRP composite structures, the extended finite element method (XFEM) is employed in this study. Two kinds of method based on XFEM have been developed. One is an XFEM using 6-node pentahedral elements, which can perform damage propagation analyses considering both matrix cracks and delamination. Another is an XFEM using three-node triangular shell elements, which can perform stress analyses of thin-walled structures with an open hole. In this presentation, both damage propagation analyses of OHT specimens and stress analyses of a CFRP stiffened panel with a maintenance hole were demonstrated and validated through comparisons with experimental results.

Keywords: XFEM, Composite laminate, Cohesive zone model, Delamination, Crack

References

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