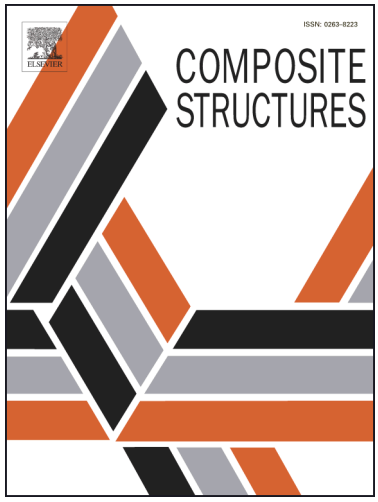

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PII: S0263-8223(17)30361-6
DOI: http://dx.doi.org/10.1016/j.compstruct.2017.02.011
Reference: COST 8230

To appear in: *Composite Structures*

Please cite this article as: Akterskaia, M., Jansen, E., Hühne, S., Rolfes, R., Efficient progressive failure analysis of multi-stringer stiffened composite panels through a two-way loose coupling global-local approach, *Composite Structures* (2017), doi: http://dx.doi.org/10.1016/j.compstruct.2017.02.011

Efficient progressive failure analysis of multi-stringer stiffened composite panels through a two-way loose coupling global-local approach

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Abstract

A two-way coupling global-local finite element approach, which has demonstrated its potential on the basis of representative test cases in earlier work, is used for the progressive failure analysis of large stiffened composite panels. In order to realize the capability of the approach to analyze larger panels, the efficiency of the analysis is enhanced and improved rules for the choice of the size of local models are developed.

The potential to carry out a progressive failure analysis for large stiffened panels is illustrated firstly through the analysis of a two-stringer panel with a local defect, in which the adjusted rules to define the local models are applied, and subsequently concretized by applying the approach to a large stiffened composite panel with five stringers. A comparison between the results of the global-local coupling analysis and the shell element reference analysis are demonstrated and the results are discussed. The results of the numerical analyses of the large panel are also compared with experimental results available.

Keywords: Composite structures, Stiffened panels, Progressive failure analysis, Multiscale analysis, Global-local method, Postbuckling

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