R Citarella et al., Ind Eng Manage 2014, 3:5
http://dx.doi.org/10.4172/2169-0316.S1.006

OMICS Group Conferences
Accelerating Scientific Discovery

International Summit on
Industrial Engineering
December 08-10, 2014 DoubleTree by Hilton Hotel San Francisco Airport, USA

Boundary element crack growth analysis of a riveted fuselage skin

R Citarella[1], **M Perrella**[1], **S Mellings**[2] and **R Adey**[2]
[1]University of Salerno, Italy
[2]Beasy, UK

Aircraft structures are made from complex assemblies of panels; they are typically built up from a number of components and "fastened" together using fasteners such as rivets. Predicting how cracks develop and propagate in these structures is an essential aspect of their design. To model crack propagation in this type of structure it is essential to be able to accurately capture the stress concentrations in the panels as well as the re-distribution of the load and its transfer through the fasteners as the crack grows. The normal way to model connectors with Boundary Element Method (BEM) is to create a three dimensional model of the structure, however for large structures this would lead to very large complex models, whereas it is more efficient to model the structural panels separately as 2D structures as they are very thin. The different "panels" in the model form independent layers in the BEM model and there are two ways this can be modelled in the BEM: standard boundary element connections or special connector elements. This paper shows an application in which the two approaches are compared in terms of accuracy and efficiency. The technology has been applied to a test panel and the numerical crack growth results compared with test results. The approach based on special connectors achieves a significant reduction in the model size and the modelling effort even if further investigation of the model idealization etc is required to obtain closer correlation with the test results.

Biography

R Citarella has completed his PhD at the age of 30 years from University of Naples Federico II and postdoctoral studies from University of Salerno. He is Assistant Professor at the University of Salerno. He has published nearly 30 papers in reputed journals and serving as an editorial board member of reputed journal. The research activity is based on Fracture Mechanics, with applications in the aeronautic field. The topic is carried on by developing new modeling approaches, based on the numerical methodologies FEM (Finite Element Method) and BEM (Boundary Element Method), to be applied on full scale aeronautic panel.

rcitarella@unisa.it