RETROSPECTI

Application of photoelasticity to mode one and mode two orthotr intensity factors

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Degree Type
Dissertation

Date of Award
1984

Degree Name
Doctor of Philosophy

Department
Engineering Science and Mechanics

Abstract
With the advancement of technology and application of ortho industry, the development of an experimental technique to an stress intensity factors in orthotropic materials was needed. T new experimental method of combining orthotropic photoela linear elastic fracture mechanics laws are developed. A new se by combining orthotropic photoelasticity laws and orthotropi formulas. These equations along with half-fringe photoelastici

ISSN 2572-679X

determine the stress intensity factors. To model orthotropic n
fiberglas/epoxy composites, made at IITRI are used. Compact
strip with a slanted edge crack are employed to determine mo
stress intensity factors. The optical and mechanical properties
determined by the use of tension specimens. A microcompute
and analyze the experimental data, and a finite element soluti
experimental results. Solid SAP, a finite element program capa
orthotropic materials is utilized for the finite element solution
show that photoelasticity can be used effectively in the determ
intensity factors. However, problems arise from the low sensi
the case where the cracks are parallel with the fibers in unidire
Further studies at higher loads, which are difficult because of
crack tip plasticity effects, need to be undertaken. In the case
photoelasticity is not as effective in determining stress intensit
mode one case.

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Copyright Date
1984

Language
en

Proquest ID
AAI8505851

File Format
application/pdf

File Size
162 pages