شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها

علي هذه الأفلام قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

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التوثيق الالكتروني والميكروفيلم

وثائق لم ترد بلاصل

يصعب قراءة بعض الوثائق

A SHEAR-FLEXIBLE THEORY FOR ANISOTROPIC THIN-WALLED CLOSED-CELL BEAMS AND APPLICATIONS

By

Mostafa Mohammed Abdalla

A thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the Requirements for the Degree of
Master of Science
in
Aerospace Engineering

Faculty of Engineering, Cairo University
Giza, Egypt
June 2000

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MOSTAFA MOHAMMED ABDALLA

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ACKNOWLEDGEMENTS

I would like to express my deepest gratitude for members of the advisory committee; Prof.\ Edward. A. Sadek for his continuous and unfailing support and for his invaluable and patient guidance through every stage of this work, and Prof.\ Hani M. Negm for his valuable help and support.

I woul like also to thank all my Professors, colleagues and students in the Aerospace department for making the last three years a wonderful experience.

Finally, my thanks goes to my family for being there for me whenever I needed their support.

ABSTRACT

In this work a consistent, limiting, shear-flexible theory for anisotropic thin-walled, closed-cell, beams is developed based on a non-shear, flexible, asymptotically correct, theory using the St. Venant's inverse approach. Closed form results for beam stiffness properties are obtained for simple geometric shapes and lay-up configurations. The theory is used to analytically assess the importance of including shear flexibility in the analysis of composite beams in static and dynamic problems.

To extend the scope of applicability of the theory, a one-dimensional finite element model is developed for cross sectional analysis that is capable of analyzing general multi-cell beams. This greatly reduces the number of degrees of freedom required for composite beam modeling compared to conventional finite element codes.

Three one dimensional finite elements for the anlysis of global static and dynamic behavior of composite beams are developed. Results are compared to exact analytic solutions indicating good convergence characteristics.