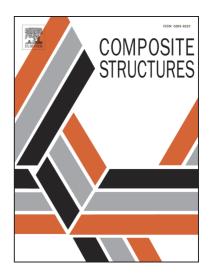
Accepted Manuscript

An exact solution for the free vibration analysis of laminated composite cylindrical shells with general elastic boundary conditions

Guoyong Jin, Tiangui Ye, Yuehua Chen, Zhu Su, Yuquan Yan

PII:	S0263-8223(13)00275-4
DOI:	http://dx.doi.org/10.1016/j.compstruct.2013.06.002
Reference:	COST 5200

To appear in: *Composite Structures*



Please cite this article as: Jin, G., Ye, T., Chen, Y., Su, Z., Yan, Y., An exact solution for the free vibration analysis of laminated composite cylindrical shells with general elastic boundary conditions, *Composite Structures* (2013), doi: http://dx.doi.org/10.1016/j.compstruct.2013.06.002

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

An exact solution for the free vibration analysis of laminated composite cylindrical shells with general elastic boundary conditions

Guoyong Jin, Tiangui Ye^{*}, Yuehua Chen, Zhu Su, Yuquan Yan

College of Power and Energy Engineering, Harbin Engineering University, Harbin, 150001, P. R. China

Abstract

A unified and exact solution method is developed for the free vibration analysis of composite laminated cylindrical shells with general elastically restrained boundaries and arbitrary lamination schemes. Each of the shell displacements, regardless of boundary conditions, is constructed as a standard Fourier cosine series supplemented with auxiliary functions introduced to eliminate all the relevant discontinuities with the displacement and its derivatives at the edges and accelerate the convergence of series representations. Mathematically, such series expansions are capable of representing any functions (including the exact displacement solutions). Rayleigh-Ritz procedure is employed to obtain the exact solution based on the energy functions of the shell. The current method can be universally applicable to a variety of boundary conditions including all the classical cases, elastic restraints and their combinations. Several numerical examples are presented to validate the excellent accuracy and reliability of current solutions, and the effects of boundary restraining stiffnesses and lamination schemes on frequency parameters are illustrated. New results for different lamination schemes with elastically restrained edges are presented, which may serve as benchmark solutions.

Keywords: composite cylindrical shells; vibration; elastically restrained ends; lamination

^{*} Corresponding author, Tel: +86 451-82569458 Fax: +86 451-82518264 E-mail address: yetiangui@gmail.com

Download English Version:

https://daneshyari.com/en/article/6708801

Download Persian Version:

https://daneshyari.com/article/6708801

Daneshyari.com