

Accepted Manuscript

Assessment of Dynamic Instability of Laminated Composite-Sandwich Plates

Rosalin Sahoo, B.N. Singh

PII: S1270-9638(17)30355-3
DOI: <https://doi.org/10.1016/j.ast.2018.07.041>
Reference: AESCTE 4692

To appear in: *Aerospace Science and Technology*

Received date: 1 March 2017
Revised date: 7 May 2018
Accepted date: 22 July 2018

Please cite this article in press as: R. Sahoo, B.N. Singh, Assessment of Dynamic Instability of Laminated Composite-Sandwich Plates, *Aersp. Sci. Technol.* (2018), <https://doi.org/10.1016/j.ast.2018.07.041>

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.



Assessment of Dynamic Instability of Laminated Composite-Sandwich Plates

Rosalin Sahoo*^a, B. N. Singh^b

^a Department of Civil Engineering, Indian Institute of Technology (Banaras Hindu University)
Varanasi, 221005, UP, India

^b Department of Aerospace Engineering, Indian Institute of Technology Kharagpur, 721302,
West Bengal, India

Abstract

The current work deals with the assessment of dynamic stability behavior of laminated composite and sandwich plates subjected to in-plane static and periodic compressive loads based on a recently developed zigzag theory by the authors. This theory satisfies the traction-free boundary conditions at top and bottom surfaces of the laminate as well as the inter-laminar stress continuity at layer interfaces. Also, it obviates the need of artificial shear correction factor. The theory is based upon shear strain shape function assuming non-linear distribution of transverse shear stresses. An efficient C^0 continuous, eight-noded isoparametric element with seven field variable is employed for the dynamic stability analysis of laminated composite and sandwich plates. The boundaries of principal instability domains are obtained following Bolotin's approach and are represented either in the non-dimensional load amplitude-excitation frequency plane or load amplitude-load frequency plane. A series of numerical examples on the dynamic stability analysis of laminated composite and sandwich plates are studied to demonstrate the effects of modular ratio, span to thickness ratio, boundary conditions, thickness ratio, static load factor and various load parameters on the principal instability regions. The predicted results are compared with the available existing results in order to ensure the performance of the proposed model.

Keywords: Dynamic instability; Zigzag theory; Finite element method; Laminated composite; Sandwich plate

* Corresponding Author, email: rosalin.civ@iitbhu.ac.in

Download English Version:

<https://daneshyari.com/en/article/8057179>

Download Persian Version:

<https://daneshyari.com/article/8057179>

[Daneshyari.com](https://daneshyari.com)