

Accepted Manuscript

Vibration analysis of multi-span lattice sandwich beams using the assumed mode method

Zhao Zhao, Shurui Wen, Fengming Li

PII: S0263-8223(17)32657-0

DOI: <https://doi.org/10.1016/j.compstruct.2017.11.069>

Reference: COST 9135

To appear in: *Composite Structures*

Received Date: 18 August 2017

Revised Date: 13 November 2017

Accepted Date: 24 November 2017



Please cite this article as: Zhao, Z., Wen, S., Li, F., Vibration analysis of multi-span lattice sandwich beams using the assumed mode method, *Composite Structures* (2017), doi: <https://doi.org/10.1016/j.compstruct.2017.11.069>

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.

Vibration analysis of multi-span lattice sandwich beams using the assumed mode method

Zhao Zhao¹, Shurui Wen^{2*}, Fengming Li^{1, 2*}

1. College of Mechanical Engineering, Beijing University of Technology, Beijing 100124, China

2. College of Aerospace and Civil Engineering, Harbin Engineering University, Harbin 150001, China

Abstract: So far, little attention has been paid to the vibration analysis of multi-span lattice sandwich beams, particularly using the assumed mode method (AMM). In this paper, the mode shapes of multi-span sandwich beams are assumed as those of uniform beams modified by the interpolation functions. The equation of motion of the beam is established using Hamilton's principle. The natural frequencies of multi-span pyramidal and Kagome sandwich beams so calculated agree well with those determined using the ANSYS software, which indicates that the present methodology is suitable for solving multi-span sandwich beams with lattice truss cores. The effects of Young's modulus, damping and geometric parameters of cores and sheets on the natural frequencies and time domain responses of two kinds of multi-span sandwich beams are analyzed. When the truss radius and sheet thickness are increased, the natural frequencies are increased initially and then decrease, while the vibration amplitudes at the mid-points of both the multi-span pyramidal and Kagome sandwich beams decrease. With the increase of the inclination angle of the truss α_c , the natural frequencies of structures experience a slight decline. In contrast, the amplitudes at the mid-points of the two different three-span sandwich beams both rise.

Keywords: multi-span lattice sandwich beam; free vibration analysis; assumed mode method; interpolation functions; natural frequency.

* Corresponding authors.

Email address: wenshurui@hrbeu.edu.cn (S. Wen).

Email address: lifengming@hrbeu.edu.cn (F. Li).

Download English Version:

<https://daneshyari.com/en/article/6704776>

Download Persian Version:

<https://daneshyari.com/article/6704776>

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