

عنوان مقاله:

Comparative vibrational behavior study of marine composite panels consisting of bidirectional non-woven and woven fabrics

محل انتشار:

دوازدهمین کنفرانس بین المللی آکوستیک و ارتعاشات (سال: 1401)

تعداد صفحات اصل مقاله: 8

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خلاصه مقاله:

A wide range of fibres are available for design and use in the construction of composite structures. There are various factors influencing the choice of fibre type such as the type of loading on the structure, and the construction method. Unidirectional or bidirectional non-woven fibres have high in-plane tensile and compressive properties. While woven fibres have lower in-plane tensile and compressive properties than non-woven fibres, they have better in-plane shear properties. Also, the fibre volume fraction is different for various types of fibres in composition with matrix. Therefore, due to different density of fibres and resin, different vibrational behaviours are expected for these two types of fibres. This article compares the vibration behaviour of composite panels for marine structures consisting of bidirectional non-woven as well as woven fabrics. First, the properties of a composite lamina with the same thickness from these two types of fibres are determined, and then their vibration behaviours are compared using the finite element method. By means of modal analysis, the frequencies of the primary vibration modes for panels consisting of two types of woven and non-woven fibres will be extracted and compared. The results show that in spite of low axial elastic modulus for woven fabrics, the panel laminated by woven fibre lamina have the same vibration behaviour as the panel laminated by biaxial non-woven lamina. Also, the first six mode shapes of the two panels consisting of different lamina (woven and biaxial non-woven) are similar.

کلمات کلیدی:

Areal density; Woven fabric; Vibration characteristics; Marine structure

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1611208>

