

عنوان مقاله:

Dynamic Characteristics of Joined Steel and Carbon Fiber-Reinforced Plastic Tubes: Experimental and Numerical Investigation

محل انتشار:

مجله مکانیک سازه های پیشرفته کامپوزیت، دوره 4، شماره 2 (سال: 1396)

تعداد صفحات اصل مقاله: 10

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خلاصه مقاله:

The fundamental frequencies and mode shapes of steel and carbon fiber-reinforced plastic (CFRP) cylindrical shells with steel inserts were investigated using finite element analysis and modal testing. The free-free boundary condition was tested with modal testing using the roving hammer method and verified by finite element analysis using ABAQUS. The results show good agreement between the testing and finite element analysis in both natural frequencies and mode shapes. Then, the vibrational behavior of cylindrical shells with steel/CFRP lap joints for simply supported-free and clamped-free edge conditions was studied using the verified finite element modeling, and the effects of lengths and thicknesses of composite cylinders and steel inserts on the free vibration of joined steel/CFRP were investigated. The results show that the vibrational behavior of the CFRP shell and its dimensions has a major influence on natural frequencies and mode shapes of the joined shells.

کلمات کلیدی:

Cylindrical shell, Steel/composite joined tubes, Free vibration, natural frequency, Mode shape

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