عنوان مقاله:

On Moving Harmonic Load and Dynamic Response of Carbon Nanotube-Reinforced Composite Beams using Higher-Order Shear Deformation Theories

محل انتشار:

مجله مکانیک سازه های پیشرفته کامپوزیت, دوره 10, شماره 2 (سال: 1402)

تعداد صفحات اصل مقاله: 14

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خلاصه مقاله:

This paper uses different higher-order shear deformation theories to analyze the axial and transverse dynamic response of carbon nanotube-reinforced composite (CNTRC) beams under moving harmonic load. The governing equations of the CNTRC beam are obtained based on the shear deformation beam theory and the Hamilton principle. The exact solution for dynamic response is presented using the Laplace transform. A comparison of previous studies has been published, where a good agreement is observed. Finally, some examples were used to analyze aspect ratio, other higher-order theories, excitation frequency, the volume fraction of Carbon nanotubes (CNTs), the velocity of a moving harmonic load, and their influence on axial and transverse dynamic and maximum deflections. It was observed that the X-beam is a stronger beam than other CNT patterns, Reddy theory is the lower limit, and HSDT theory is the upper limit. The vibration response and dynamic movement of the structure can be controlled by choosing the appropriate items.

کلمات کلیدی:

CNTRC beams, Moving harmonic load, Laplace transform, Analytical Solution, Higher-order theories

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