

عنوان مقاله:

Investigation of Weighted Sum of the Frequency and Buckling Load under External Load for a Laminated Composite Circular Cylindrical Shell Considering its Application in Railway Industry

محل انتشار:

ششمین کنفرانس بین المللی پیشرفتهای اخیر در مهندسی راه آهن (سال: 1398)

تعداد صفحات اصل مقاله: 1

نویسندگان:

,Roozbeh Ashrafaian - Semnan University

,Mohsen Motezaker - School of Railway Engineering, Iran University of Science and Technology

,A Mirafzal - Semnan University

خلاصه مقاله:

Components of rail vehicles have employed composite materials to date. In-future they are most likely to be further exploited. Today s rail vehicles use composites routinely for fabrication of complex three-dimensional moulded profiles and for high stiffness-to-weight ratio paneling for cab front ends and vehicle interiors. In addition, usage of laminated composite circular cylindrical Shells in railway industry could be vastly constructive, and with modern methods in optimization shall be able to optimize several functions. Optimization is one of the most important cases in process design. In this study a heuristic algorithm is used to maximize critical buckling force and natural frequency of laminated composite circular cylindrical shell. Functions is considered to find the optimum solutions as the goals. Orientation angles of fibers is mentioned in a well-known configuration as candidate design. Critical buckling force and natural frequency values are derived with the first order shear deformation theory. The composite shell is considered with 8 layers, also the boundary conditions are assumed to be fully simply support and to satisfy boundary conditions displacement and slope components are defined in form of double Fourier series. After combination of differential operators and Fourier series, finally matrix is found and function values are gained by Galerkin Method. All the levels are done in MATLAB & MAPLE software.

کلمات کلیدی:

Laminated composite, Cylindrical shell, Buckling load

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