عنوان مقاله:

Finite Element Analysis of Buckling of Thin Cylindrical Shell Subjected to Uniform External Pressure

محل انتشار:

فصلنامه مکانیک جامد, دوره 1, شماره 2 (سال: 1388)

تعداد صفحات اصل مقاله: 11

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خلاصه مقاله:

One of the common failure modes of thin cylindrical shell subjected external pressure is buckling. The buckling pressure of these shell structures are dominantly affected by the geometrical imperfections present in the cylindrical shell which are very difficult to alleviate during manufacturing process. In this work, only three types of geometrical imperfection patterns are considered namely (a) eigen affine mode imperfection pattern, (b) inward half lobe axisymmetric imperfection pattern extended throughout the height of the cylindrical shell and (c) local geometrical imperfection patterns such as inward dimple with varying wave lengths located at the mid-height of the cylindrical shell. ANSYS FE non-linear buckling analysis including both material and geometrical non-linearities is used to determine the critical buckling pressure. From the analysis it is found that when the maximum amplitude of imperfections is ١t, the eigen affine imperfection pattern gives out the lowest critical buckling pressure when compared to the other imperfection patterns considered. When the amplitude of imperfections is above ١t, the inner half lobe axisymmetric imperfection pattern gives out the lowest critical buckling pressure when compared to the other imperfection patterns considered.

کلمات کلیدی:

Thin cylindrical shell, Buckling pressure, Geometrical imperfections

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