عنوان مقاله:

On Validity of Analytical Method in Cracked Column Post-Buckling Analysis Using Empirical and Numerical Investigations

محل انتشار:

فصلنامه مکانیک جامد, دوره 14, شماره 2 (سال: 1401)

تعداد صفحات اصل مقاله: 13

نویسندگان:

K Salmalian - *Department of Mechanical Engineering, Bandar Anzali Branch, Islamic Azad University, Bandar Anzali, Iran*

A Alijani - *Department of Mechanical Engineering, Bandar Anzali Branch, Islamic Azad University, Bandar Anzali, Iran*

H Ramezannejad Azarboni - *Department of Mechanical Engineering, Ramsar Branch, Islamic Azad University, Ramsar, Iran*

خلاصه مقاله:

The three analytical, finite element and experimental methods are applied to study the nonlinear buckling of cracked columns. The original aim of this research is to investigate the validity of the common analytical method in an analogy with the experimental method and the finite element method of MATLAB programming-based. The literature review shows that papers applied this analytical method without considering its drawbacks to determine the post-buckling results. Results in the linear part of the analytical method are in close accordance with the two others, while a clear difference in the nonlinear part of the analytical method is observed with the actual results obtained from the experimental tests and numerical results of the finite element method. An in-depth discussion is represented to find out the main reasons of this difference. The conversion matrix technique in the finite element method and dividing the column into two segments in the analytical method are used to include the crack parameters in relations according to the continuity conditions in the crack tip. An investigation is performed to study the effect of the crack depth and position on the critical buckling load and the post-buckling path.

کلمات کلیدی:

analytical method, Cracked column, Experimental method, Nonlinear buckling, Finite Element Method