**7. Haitham Al-Thairy , “A modified single degree of freedom method for the analysis of**

**building steel columns subjected to explosion induced blast load”**

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**Abstract**

In this paper, a modified approach to the single degree of freedom (SDOF) analysis method of axially loaded steel columns under blast load is presented and validated. The suggested method utilizes a new non-linear resistance function of steel columns under transverse blast load. The new resistance function was derived based on a quasi-static approximation of column behaviour taking into consideration the reduction in the column transverse resistance caused by the axial compressive load. The derived resistance function has been implemented in a single degree of freedom analysis procedure to trace the full response of the steel column up to global instability failure taking into account the strain rate effects. The developed resistance functions and the SDOF method have been validated against numerical simulation results using two steel columns sections with two boundary conditions subjected to different values of the blast impulse and under different levels of axial compressive loads taken as a percentage of the column design static compressive load. The validation results have indicated the capability and feasibility of the suggested method to predict the response and failure of steel columns under transverse blast load.

**Keywords:** Blast load, SDOF method, Steel columns, Resistance function, Axial load.