**6. H. Al-Thairy, Wang YC “ Behaviour and Design of Steel Columns Subjected to Vehicle Impact “, Applied Mechanics and Materials Vol. 566 (2014) pp 193-198© (2014) Trans Tech Publications, Switzerland,doi:10.4028/www.scientific.net/AMM.566.193**

**https://www.scientific.net/AMM.566.193**

**Abstract**

The main objective of this study is to develop a simplified analytical approach to predict the critical velocity of vehicle impact on steel columns. This method utilizes the energy balance principle with a quasi-static approximation of the steel column response. Results of ABAQUS numerical simulations of the dynamic impact response of axially loaded steel columns under vehicle impact are used to validate the proposed method. To account for the effect of vehicle impact, a simplified numerical vehicle model has been adopted using a spring-mass system with a bilinear spring load deformation relationship. The validation results show good agreement between the analytical method results and the numerical results with the analytical results tending to be on the safe side. The numerical results are used to assess the design methods in Eurocode 1, namely the static force method and the impulse method. The static force method has been found to be acceptable for columns with small and moderate cross-section sizes, but unsafe for columns with large cross section sizes. To use the impulse method, the characteristics of both the column and the vehicle have to be included and a method is proposed in this paper

**Keywords:** Vehicle impact, Steel column, Simplified method, Assessment, Design requirement, Dynamic impulse.