**2. H. Al-Thairy, Y.C. Wang, A Simplified Analytical Method for Predicting the Critical Velocity of Transverse Rigid Body Impact on Steel Columns, International Journal of Impact Engineering 58 (2013) 39-54**

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**Abstract:**

This study presents the development of a simplified analytical method to predict the critical velocity of transverse impact by rigid body on steel column under axial load. This method is based on energy balance with a quasi static approximation of the column behaviour. The general method has been widely used for beams under lateral impact but without any axial load, but column buckling adds complexity to the problem. For simplification, the observations and conclusions drawn from the parametric study conducted by the authors [22] have been used to provide guidance on establishing several assumptions. After presenting the full development of this method, the aforementioned parametric study results are compared with predictions using the proposed analytical method for the column axial force – critical velocity relationship, the maximum column transverse displacement-axial force relationship, and various energy quantities used in the simplified energy balance equation. This comparison indicates good accuracy of the proposed analytical method.

Key words: Impact, Critical velocity, Steel column, Simplified method, Axial loads.