1. **H. Al-Thairy H, Wang YC, A numerical study of the behavior and failure modes of axially** **compressed steel columns subjected to transverse impact**,

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ABSTRACT

In this study a numerical simulation of the behavior and failure modes of axially compressed steel column subjected to transverse impact by a rigid mass at different impact speeds and locations is presented. Firstly, the capability of the present numerical model to trace the response and to predict different failure modes of transversely impacted beams and columns with and without axial compressive force has been validated. These failure modes include plastic global failure, tensile tearing failure and transverse shear failure. The validation was performed by comparing simulation results in term of the contact force, deformation shape, failure mode and the maximum transverse displacement with available published experimental test results by others. The progressive damage and failure model available in ABAQUS/Explicit has been utilized in the present numerical models to account for material shear and tensile tearing failure under impact. Comparisons between the experimental and simulation results confirmed that the numerical models were able to accurately predict the aforementioned failure modes. Thereafter, a parametric study has been conducted to investigate the effects of several parameters on the response of axially loaded steel column, based on the results of which simplifying assumptions on column behavior under impact can be made to develop appropriate design calculation methods for steel columns under such loading conditions.

Keywords: impact, steel columns, numerical modeling, failure modes