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Evaluation of Effect of Force Generated in Bolts with T-stub Connections

Lisa Hanumm, Wang Han*

Department of Civil engineering, School OF Civil Engineering and Transportation, Beijing, China.

*Correspondence should be addressed to Wang Han, Department of Civil Engineering, School of Civil Engineering and Transportation, Beijing, China. Tel: +86 10 6327 6501; Fax: +86 10 6327 6501; Email: r mailto:wanghan@scut.edu.cn.

ABSTRACT

Numerous failures of fully welded flexural joints have encouraged structural designers to consider other types of alternative joints. These failure modes have been unexpected and frightening, including welded joints used to provide the optimal combination of strength, stiffness, and ductility in flexural strength frames. The research conducted in this research leads to the development of criteria for the design and use of screw fittings with an emphasis on T-Stub fittings. The primary goal is to elucidate the transmission and deformation mechanism presented in this type of connection, as well as to develop simple and reliable models for use in developing the design strategy for such connections. The ultimate goal is to provide design tools that balance the price and performance of screw joints for designers and employers. In this research, the screws were modeled in Abacus software, and by applying force, the obtained results showed that by increasing the length of the flange plate, the lever effect can be strengthened, which is effective in the tensile behavior of the screws. However, at the level of rupture performance of the web plate, the thickness of the flange plate (tf) is effective because when the screw reaches its final stress in its thread, the increase in length can lead to local rupture of the flange plate at the point of contact with the screw.

Keywords: **Sensitivity analysis, strength, modeling, high strength screws**

1. INTRODUCTION

One of the most economical ways for lateral restraint on steel frame structures is to use the steel moment-resisting frame (MRF) with fixed connections. In order to maintain the integrity of MRF buildings when subjected to horizontal forces such as wind and earthquakes, the use of bolted connections is a practical solution to provide the required restraint in the beam-column connection [1-3]. Formulating the design The beam-column connection in the frame of steel provisions to analyze the force generated in the bolts of this connection, taking into account the true behavior of the connecting components through nonlinear analysis, is a significant step in the more secure and economical design of bolt connections with the high-strength bolts, and it requires a more detailed and comprehensive examination of this issue.

structures is used to transfer the load from beam to column