

Seismic behavior Evaluation of semi-rigid steel frames with T-STUB connections under nonlinear analysis

Mehdi Shahbazi¹, MohammadAmin Mirzaei², Mohsen Izadinia³

1,2- M.S Student, Bushehr branch, Islamic Azad University, Bushehr, Iran

3- Assistant Professor, Najaf Abad branch, Islamic Azad University, Isfahan, Iran

m_shahbazi.d@iaubusher.ac.ir

m_mirzaei.d@iaubusher.ac.ir

Abstract

The high energy applied and movements of plus shape in less time by the near fault earthquake, which causes brittle fracture in rigid connections that during the Northridge 1994 and kobe1995 earthquakes was frequently seen. Semi-rigid connections behavior can be shaped and have a good ability to absorb energy. The use of semi-rigid connections in structure with more stories, provided on the drifts control can be appropriate. In the frame with semi-rigid connections, because of that the rigidity of connections is less than the beams and columns, with suitable energy absorption and rotation is causing tensions in the beams and columns become low. The purpose of this paper is analysis and compares the behaviors of rigid and T-Stub semi-rigid connections in steel frame moment with nonlinear time history analysis. In order to four frame with lateral loading systems and ordinary steel frame with number stories 3,6,9,12 according to UBC97 regulation designed to consider in two state, rigid and semi rigid connection. The results show that T-STUB semi-rigid connections decreases the lateral drift and increase the frame stability against lateral loading.

Keywords: T-stub semi- rigid connection, the near fault earthquakes, steel moment frames

1. INTRODUCTION

Steel moment have widely usage in high seismicity areas and have high ability in absorption energy. In designing seismicity of this frame the purpose is forming plastic joint in beam and prevent occurring this in column because of preserving lateral stability of structure. Moment frame should have high ability to transfer moment and shear between beam and column. Although (BWFF) web-bolt, weld-flange connection suggested like be suitable connection that its, function under seismicity loading. After occurring earthquake in Northridge 1994 and Kobe 1995, specify that its function of this kind of connection had been weak [1]. Low ductility in welded rigid connection area was one of major reasons of this destruction. After this earthquake researchers was finding suitable alternative for rigid welded connection. researchers indicated that frames with bolt semi-rigid connection in comparison to rigid frames in some condition good behavior under the earthquake. From that time for solving fractures rigid connection many connection presented for improving and new designing steel frame in high seismicity area [2]. Two kinds of suggested alternative connection had been EEP , T-STUB connection.

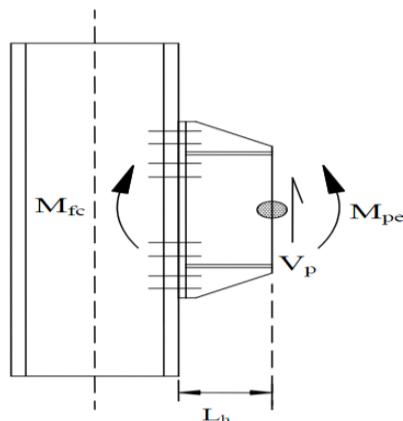


Figure 1. Typical EEP Connection [3]

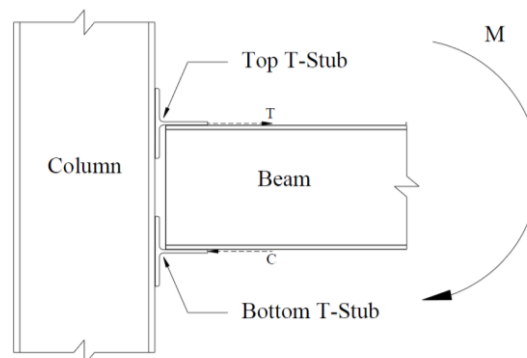


Figure 2. Typical T-STUB Connection [4]