ABSTRACT

Special truss moment frame (STMF) is a relatively new type of steel framing system suitable for high seismic areas. The frames dissipates earthquake energy through ductile special segments located at the middle span of the truss. STMF generally have higher structural redundancy compared to other frame systems because four plastic hinges can form in the chords of one truss girder. One other advantage of using STMF systems is that the truss girders can be used over longer spans, and greater overall structural stiffnes can be achieved by using deeper girders. In addition, the holes in the truss can be used for mechanical and electrical ductwork. Research work carried out at the University of Michigan led to the formulation of design code provisions (Goel and Itani, 1994; Basha and Goel, 1994; AISC, 2010a). A structure designed to resist seismic force need to have enough ductility, this is important because if the actual seismic force is larger than the design seismic force, the structure will not collapse. The first step in determining the ductility of the structure with STMF is to design the structure with conditions mentioned in AISC 341-10. After the design process is finished, ductility of the structure is tested using static nonlinear pushover analysis with SAP2000 v.16.0 program to verify the inelastic behaviour in the Vierendeel panel of the special segment. Analysis results shows that inelastic behaviour is seen only in the special segment, while other member is still in elastic condition. Next study is to compare STMF with special moment resisting frame with different column distance and the optimum condition of each structure is found.

Key words: truss, seismic, STMF, Vierendeel