AXIAL STRENGTH AND DEFORMATION DEMANDS FOR T-STUB CONNECTION COMPONENTS AT CATENARY STAGE IN THE BEAMS

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Abstract. *Capacity of multi-storey steel frame buildings to resist extreme loading may depend on the performance of beam-to-column joints to provide continuity across the damaged area, and thus to allow the development of alternate loads paths (AP). The AP method, with its emphasis on continuity and ductility, is similar to current seismic design practice. However, there are specific problems which need to be considered when localized failures, particularly of columns, occur, i.e. development of the catenary forces in the beams and admissibility criteria to be considered in the design considering the interaction between axial loads and bending moments. It is therefore of interest to study the capacity of actual design procedures to provide enough robustness for connections under extreme loading conditions. The deformation capacity of beam-to-column connection components at different levels of axial force in the beams is investigated experimentally. T-stub components play a major role in providing the connection strength, stiffness and ductility, and the balance between these properties is very important. Therefore, different T-stub components, designed to fail in mode 1 and 2, were tested in tension until failure, to simulate their behaviour in catenary action phase, and thus to evaluate the axial strength and deformation capacity. Numerical models were validated against test results.*

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