



ALEXANDRIA UNIVERSITY
FACULTY OF ENGINEERING
STRUCTURAL ENGINEERING DEPARTMENT

**BEHAVIOR OF END-PLATE STEEL CONNECTIONS
STIFFENED WITH STIFFENERS OF DIFFERENT GEOMETRICAL
DIMENSIONS**

By:

Yosra Magdy Mohamed Ahmed

B.Sc. Civil Engineering, (Very good with Honor Degree June 2007)
Faculty of Engineering, Alexandria University

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Abstract

Extended end-plate connections are widely used in steel structures as moment resistance connections. These connections consist of end-plate welded to the end of beam and field bolted to the connecting column. End-plate connections are commonly classified as semi-rigid joints, because the concept of perfect rigid or pinned is a pure theoretical point of view. These connections should be classified in terms of relationship between the moment transmitted by the connection and their rotation in-plane of the connection. According to EuroCode 3 and most researches; it can be classified by its rotational stiffness, strength and ductility.

With the advances in modern computing techniques, finite element analysis has become a practical tool for engineering analysis and design. Development of structural design code equations or redevelopment them requires a wide range of experimental studies which is costly, time consuming and uneconomical. So we can simplify this problem with using ABAQUS, which is finite element model analysis program.

This study presents and discusses results of parametric analysis of extended end-plate connections using FE modeling tools based on a specification for the end-plate connection rotation. The finite element model took into account both material and geometrical nonlinearities. The analysis was calibrated to some published experimental results and satisfactory agreements are obtained. In this thesis, the studied parameters are panel zone, bolt diameter, end-plate thickness, and end-plate rib stiffeners.

Study results indicate that the end-plate connection differences in the details, including flush and extended types, column stiffeners, end-plate rib stiffeners, various bolt sizes and end-plate thicknesses, all influences the moment resistance, the initial rotation stiffness, the rotation capacity and failure mode significantly. Extended end-plate connections are better than flush ones. Column stiffeners and end-plate rib stiffeners can improve the end-plate connection rotation capacity and ductility. For thinner end-plates and large bolts can increase the stiffness of connection greatly.

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