

COMPARATIVE STUDY ON CODE BASED ANALYSIS OF STEEL MOMENT RESISTING CONNECTIONS

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Master of Engineering Degree in Structural Engineering Design

University of Moratuwa

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Engineering

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Abstract

Moment resisting connections are usually designed as simple or continuous although the actual behavior is known to fall between these two extreme cases. The use of semi- continuous connection results substantial savings in steel weight of the overall construction. Extended endplate and Flush end plate connections are the widely used type of connections in steel frame construction. To understand the real behavior of semi- continuous connection, full scale laboratory test is the most accurate approach, but it is time consuming and costly to undertake. Therefore other methods were developed to predict the capacity of connections.

Thus, in this study three EEP and three FEP connections were analyzed using two standards (BS 5950 Part 1: 2000 and EC 3- with UK national application document). A method proposed by Steel Construction Institute (SCI) was taken into account for analyzing. The results obtained from the numerical analysis were then compared with the existing experimental test results on the resistance of moment and mode of failure to determine the accuracy of numerical analysis. Comparison between the results from numerical analysis and experiment results satisfactorily agreed.



Specially dedicated to my beloved family and friends...



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LIST OF ABBREVIATIONS

Abbreviation	Description
A_e	Sum of the effective net areas of all the elements of the cross section
A_{eff}	Effective cross-sectional area
A_g	Gross cross-sectional area
A_n	Total net area
A_s	Shear area of a bolt
A_t	Tensile stress area as specified in the appropriate bolt standard
A_v	Shear area of member
a_p	Weld throat thickness
b_1	Stiff bearing length
b_e	Distance to the nearer end of the member from the end of the stiff bearing
d	Nominal diameter of the bolt
e	End distance
F_{vp}	Column web panel zone the local shear force
P_{bb}	Bearing capacity of the bolt
p_{bs}	Bearing strength of the connected part
p_c	Compressive strength
p_s	Shear strength of a bolt
P_T	Transverse capacity per unit length of weld



P_t	Tension strength of the bolt
P_{bw}	Bearing capacity of the web
P_y	Yield strength of the connected part.
P_v	Shear capacity
P_{yw}	Design strength of the web
r	Root radius
s	Leg length of a fillet weld
T	Thickness of a flange
T	Thickness of a web
t_p	Thickness of the connected part



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