

**Design Guide 12**  
**Bolted end plate to column moment connections**

**by**

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**contributing author**

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- Design Guide 5: Angle cleat connections
- Design Guide 6: Seated connections
- Design Guide 10: Bolted end plate beam splice connections
- Design Guide 11: Welded beam to column moment connections

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## CONTENTS

	<i>Page</i>		<i>Page</i>
List of figures	iv		
List of tables	vi		
Preface	vii		
About the author	viii		
About the contributing author	viii		
Acknowledgements	ix		
1 CONCEPT OF DESIGN GUIDES.....	1		
1.1 Background	1		
2 DESCRIPTION OF CONNECTION .....	2		
3 TYPICAL DETAILING OF CONNECTION ..	5		
4 DETAILING CONSIDERATIONS.....	9		
5 AS 4100 REQUIREMENTS .....	12		
6 BASIS OF DESIGN MODEL.....	13		
7 CALCULATION OF DESIGN ACTIONS ...	15		
8 RECOMMENDED DESIGN MODEL— SUMMARY OF DESIGN CHECKS.....	21		
9 RECOMMENDED DESIGN MODEL.....	26		
9.1 DESIGN CHECK NO. 1—Detailing requirements	26		
9.2 DESIGN CHECK NO. 2—Design capacity of flange welds to beam	28		
9.3 DESIGN CHECK NO. 3—Design capacity of web welds to beam	29		
9.4 DESIGN CHECK NO. 4—Design capacity of bolts at tension flange	31		
9.5 DESIGN CHECK NO. 5—Design capacity of bolts in shear	33		
9.6 DESIGN CHECK NO. 6—Design capacity of end plate at tension flange	34		
9.7 DESIGN CHECK NO. 7—Design capacity of end plate in shear	38		
9.8 DESIGN CHECK NO. 8—Design requirements for stiffener to end plate	39		
9.9 DESIGN CHECK NO. 9—Design capacity of stiffener welds to end plate	40		
10 RECOMMENDED DESIGN MODEL— UNSTIFFENED COLUMN .....	41		
10.1 DESIGN CHECK NO. 10—Local bending of column flange at beam tension flange	41		
10.2 DESIGN CHECK NO. 11—Local yielding of column web at beam tension flange	44		
10.3 DESIGN CHECK NO. 12—Local yielding of column web at beam compression flange	45		
10.4 DESIGN CHECK NO. 13— Column web crippling at beam compression flange	47		
		10.5 DESIGN CHECK NO. 14—Column web compression buckling	49
		10.6 DESIGN CHECK NO. 15—Column web panel in shear	50
		11 RECOMMENDED DESIGN MODEL— COLUMNS WITH DOUBLER PLATES.....	51
		11.1 DESIGN CHECK NO. 16—Local bending of column flange with flange doubler plates at beam tension flange	51
		11.2 DESIGN CHECK NO. 17—Local yielding of column web with doubler plate(s) at beam tension flange	52
		11.3 DESIGN CHECK NO. 18—Local yielding of column web with doubler plate(s) at beam compression flange	54
		11.4 DESIGN CHECK NO. 19—Crippling of column web with doubler plate(s) at beam compression flange	55
		11.5 DESIGN CHECK NO. 20— Compression buckling of column web with doubler plate(s)	57
		11.6 DESIGN CHECK NO. 21—Column web panel with doubler plate(s) in shear	59
		12 RECOMMENDED DESIGN MODEL— COLUMNS WITH TRANSVERSE STIFFENERS.....	61
		12.1 DESIGN CHECK NO. 22—Column with transverse stiffeners at tension flange	61
		12.2 DESIGN CHECK NO. 23—Column with transverse stiffeners at compression flange	65
		12.3 DESIGN CHECK NO. 24—Column with transverse diagonal shear stiffeners	67
		13 ADDITIONAL CONSIDERATIONS .....	69
		14 ECONOMICAL CONSIDERATIONS .....	70
		15 DESIGN EXAMPLE.....	71
		15.1 Design example—Four bolt unstiffened end plate to column connection	71
		16 REFERENCES.....	79
		17 DESIGN CAPACITY TABLES .....	80
		17.1 Four bolt unstiffened end plate	81
		17.2 Four bolt stiffened end plate	85
		17.3 Six bolt unstiffened end plate	87
		17.4 Eight bolt stiffened end plate	89
		APPENDICES	
		A Thick and thin end plate behaviour	90
		B Limcon software	92
		C ASI Design Guide 12 comment form	97



## LIST OF FIGURES

	<i>Page</i>		<i>Page</i>
Figure 1	Bolted end plate to column moment connections ..... 2	Figure 24	Clearance dimensions $a_f$ and $s_{po}$ ... 27
Figure 2	Forms of extended end plate connection ..... 3	Figure 25	End plate stiffener detailing ..... 27
Figure 3	Possible configurations of the bolted moment end plate beam to column connection ..... 4	Figure 26	Flange weld design actions ..... 28
Figure 4A	Typical detailing for 4 bolt unstiffened bolted end plate to column connection ..... 5	Figure 27	Web weld design actions ..... 30
Figure 4B	Typical detailing for haunched rafter to column bolted end plate connection ..... 6	Figure 28	Yield line pattern 4 bolt (2/2) unstiffened end plate ..... 34
Figure 5	Removal of column flange with thicker plate inserted ..... 6	Figure 29	Yield line pattern 4 bolt (2/2) stiffened end plate ..... 35
Figure 6	Column doubler plate types ..... 7	Figure 30	Yield line pattern 6 bolt (2/4) unstiffened end plate ..... 36
Figure 7	Column transverse stiffener types .. 8	Figure 31	Yield line pattern 8 bolt (2/6) unstiffened end plate ..... 36
Figure 8	Shims used between end plate and column flange ..... 9	Figure 32	Yield line pattern 8 bolt (4/4) stiffened end plate ..... 37
Figure 9	Stiffener detailing ..... 10	Figure 33	Yield line pattern 4 bolt (2/2) end plate to unstiffened column flange ..... 41
Figure 10	Clearance required for tensioning bolts ..... 11	Figure 34	Yield line pattern 2/4(6) bolt end plate to unstiffened column flange ..... 42
Figure 11	Design actions on beam at column ..... 15	Figure 35	Yield line pattern 2/6(8) bolt end plate to unstiffened column flange ..... 42
Figure 12	Calculation of flange forces due to bending moment and axial force—horizontal beam ..... 16	Figure 36	Yield line pattern 4/4(8) bolt end plate to unstiffened column flange ..... 43
Figure 13	Calculation of force components where beam is inclined to column in upwards direction ..... 17	Figure 37	Flange removed with new plate inserted ..... 43
Figure 14	Calculation of force components where beam is inclined to column in downwards direction ..... 18	Figure 38	Application of $c_t$ term—Column web yielding at beam tension flange ..... 44
Figure 15	Alternative stress distributions in beam ..... 19	Figure 39	Application of $c_t$ term—Column web yielding at beam compression flange ..... 45
Figure 16	Notation used for 4 bolt (2/2) unstiffened end plate ..... 22	Figure 40	Angle of dispersion used in DESIGN CHECK NO. 12 ..... 46
Figure 17	Notation used for 4 bolt (2/2) stiffened end plate ..... 22	Figure 41	Dispersion arrangement used in DESIGN CHECK NO. 14 ..... 46
Figure 18	Notation used for 8 bolt (4/4) stiffened end plate ..... 22	Figure 42	Case I arrangement ..... 47
Figure 19	Notation used for 6 bolt (2/4) unstiffened end plate ..... 23	Figure 43	Case II and case III arrangement .. 47
Figure 20	Notation used for 8 bolt (2/6) unstiffened end plate ..... 23	Figure 44	Examples of web panel shear conditions ..... 50
Figure 21	Summary of design check locations on column ..... 24	Figure 45	Column flange doubler plate details at beam tension flange ..... 51
Figure 22	Column and beam dimensions used in design model ..... 25	Figure 46	Column web doubler plate details at beam tension flange ..... 53
Figure 23	Stiff bearing dimension $b_{sc}$ used in design model ..... 25	Figure 47	Column web doubler plate details at beam compression flange ..... 53
		Figure 48	Web doubler plate—Welds to column flange ..... 53
		Figure 49	Case I arrangement ..... 55



	<i>Page</i>		<i>Page</i>
Figure 50	55	Figure 60	68
Figure 51	56	Figure 61	69
Figure 52	58	Figure 62	71
Figure 53	59	Figure 63	72
Figure 54	62	Figure 64	77
Figure 55	63	Figure 65	77
Figure 56	63	Figure 66	78
Figure 57	64	Figure 67	90
Figure 58	64		
Figure 59	65		



## LIST OF TABLES

		<i>Page</i>
Table 1	Range of tested parameters .....	14
Table 2	Equations to be applied for different configurations and connection elements.....	20
Table 3	Recommended limits on parameters .....	26
Table 4	Strength of plate to AS 3678—Grade 250 .....	35
Table 5	Strength of flat bars to AS 3679.1—Grade 300 .....	39
Table 6	Stiffener material strengths.....	62
Table 7	Design moment capacity of connection $\phi M_{\text{conn}}$ —Four bolt unstiffened end plate—M24 bolts 8.8/TB category threads included in shear plane—Unhaunched welded beam/universal beam sections > 300 mm deep .....	81
Table 8	Design moment capacity of connection $\phi M_{\text{conn}}$ —Four bolt unstiffened end plate—M20 bolts 8.8/TB category threads included in shear plane—Unhaunched universal beam sections > 200 mm deep .....	82
Table 9	Design moment capacity of connection $\phi M_{\text{conn}}$ —Four bolt unstiffened end plate—M24 bolts 8.8/TB category threads included in shear plane—Haunched universal beam sections > 300 mm deep .....	83
Table 10	Design moment capacity of connection $\phi M_{\text{conn}}$ —Four bolt unstiffened end plate—M20 bolts 8.8/TB category threads included in shear plane—Haunched universal beam sections > 200 mm deep .....	84
Table 11	Design moment capacity of connection $\phi M_{\text{conn}}$ —Four bolt stiffened end plate—M24 bolts 8.8/TB category threads included in shear plane—Unhaunched welded beam/universal beam sections > 300 mm deep .....	85
Table 12	Design moment capacity of connection $\phi M_{\text{conn}}$ —Four bolt stiffened end plate—M20 bolts 8.8/TB category threads included in shear plane—Unhaunched universal beam sections > 200 mm deep .....	86
Table 13	Design moment capacity of connection $\phi M_{\text{conn}}$ —Six bolt unstiffened end plate—M24 bolts 8.8/TB category threads included in shear plane—Unhaunched welded beam/universal beam sections > 450 mm deep .....	87
Table 14	Design moment capacity of connection $\phi M_{\text{conn}}$ —Six bolt unstiffened end plate—M20 bolts 8.8/TB category threads included in shear plane—Unhaunched universal beam sections > 350 mm deep .....	88
Table 15	Design moment capacity of connection $\phi M_{\text{conn}}$ —Eight bolt stiffened end plate—M24 bolts 8.8/TB Category threads included in shear plane—Unhaunched welded beam and universal beam sections > 520 mm deep .....	89



## PREFACE

This new series of connection publications by the Australian Steel Institute (ASI) covering capacity tables, theory and design of individual rigid connections will be known as the Structural Steel Connections Series, Part 2: 1<sup>st</sup> ed. 2009 (*Connection Series, Part 2*). This Connection Series, Part 2 details the method of design and provides capacity tables and detailing parameters for a range of rigid connections commonly used for structural steel in Australia. Connections have a major engineering and economic importance in steel structures influencing design, detailing, fabrication and erection costs. Standardisation of design approach integrated with industry detailing is the key to minimum costs at each stage. This Connections Series, Part 2 in conjunction with the Connection Series, Part 1 for simple connections (collectively the Structural Steel Connections Series or *Connection Series*) replaces and enhances an ASI flagship publication first released in 1978 at which time connection design theories were developed for the purpose of generating and releasing connection capacity tables. The first three editions were released in permissible stress format. The fourth edition *Design of Structural Connections* (often referred to as the Green Book) was released in 1994 in limit state format but there was no subsequent release of a limit state companion document containing connection design capacity tables.

This Design Guide is intended to provide a recommended design model for the extended bolted moment end plate connection when used as a beam-to-column connection.

The recommended design model is based extensively on the American Institute of Steel Construction Steel Design Guide 4 *Extended end-plate moment connections, seismic and wind applications*, Second Edition, and Design Guide 13 *Stiffening of wide flange columns at moment connections: wind and seismic applications* and Steel Design Guide 16 *Flush and extended multiple-row moment end-plate connections*.

The new Connections Series format with separate design guides for individual connection types is intended to facilitate addition to or revision of connection model theory using relevant new local or international research as deemed appropriate by the ASI. Connection models developed using the Handbook 1 theory follow a stylised page format with a numbered DESIGN CHECK procedure to simplify connection capacity assessment.

Engineering Systems has worked closely with the Australian Steel Institute to further develop Limcon as the companion program for this new Connection Design Guide Series. The latest version of Limcon fully implements the new connection design models and it was employed in checking the design tables. The Limcon output for the worked example is included in the appendix to this Design Guide. The program is an efficient tool covering the full range of structural connections, including those beyond the scope of the Design Guide capacity tables.

An appendix to each Design Guide also contains an ASI comment form. Users of this publication are encouraged to photocopy this one page form and forward any suggested improvements which may be incorporated into future editions.

T.J. Hogan

N. van der Kreek



## ABOUT THE AUTHOR

Tim Hogan is Consultant to and retired Director of SCP Consulting Pty Ltd. His academic achievements include a Bachelor of Engineering from the University of NSW with 1<sup>st</sup> Class Honours and the University Medal. Post graduate qualifications include a Master of Engineering Science and a Master of Business Administration. Tim is a Member of the Institution of Engineers Australia with CPEng and FIE Aust. status.

His early experience was on bridge design and construction with the NSW Public Works Department and subsequently as Development Engineer and then Engineering Manager with the Australian Institute of Steel Construction until 1980. Consulting experience with SCP Consulting since 1980 has included design and supervision of large steel framed buildings, industrial buildings, mill buildings, retail developments, defense infrastructure and composite steel-concrete buildings. His published works deal primarily with the areas of composite construction, steel connections, fabrication and erection of steel structures and he was a major contributor and editor of the Commentary to AS 4100. He is a member of a number of Standards Australia Committees dealing with steel and composite structures and is currently Chairman of Committee BD-001 Steel Structures and BD-032 Composite Construction. He received an award from Standards Australia for his contributions to writing of Australian Standards.

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Significant contributions were made by:

- Richard Collins—Engineering Systems in the development and upgrade of the Limcon software code in parallel with the design theory and aiding in the editing and validation of the revised models.
- Biometrical Data Processing for technical typesetting expertise.
- Whizzcad Pty Ltd with drafting and graphics for publishing.
- ASI State Engineering & Construction special Sub-Committees for progressive engineering and industry review of manuscripts.

Together with support of:

- All facets of the ASI membership including design engineers, steelwork detailers and fabricators in contributing industry best practice and standards through ASI surveys and direct consultation to establish the theory and geometry in this new ASI Connection Manual.

