

# **Cold-Formed Steel Connections to Other Materials**

## **A Design Guide**

**Committee Report**

**Editor:**

**Perry S. Green**

ISBN: 979-8-3313-0732-5

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571

**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2024) by American Society of Civil Engineers  
All rights reserved.

Printed with permission by Curran Associates, Inc. (2024)

For permission requests, please contact American Society of Civil Engineers  
at the address below.

American Society of Civil Engineers  
1801 Alexander Bell Drive  
Reston, VA 20191  
USA

Phone: (800) 548-2723  
Fax: (703) 295-6333

[www.asce.org](http://www.asce.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# Contents

Contributors .....	xi
Acknowledgments.....	xiii
Preface.....	xv

<b>Chapter 1 Introduction to Cold-Formed Steel Connections to Other Materials.....</b>	<b>1</b>
1.1 General.....	1
1.2 Connections of Cold-Formed Steel Members .....	2
1.3 Design Specification.....	2
1.4 Attachment Methods.....	3
1.4.1 Self-Drilling, Self-Piercing, and Self-Tapping Screws .....	3
1.4.2 Bolts.....	5
1.4.3 Power-Actuated Fasteners .....	6
1.4.4 Post-Installed Mechanical and Adhesive Anchors .....	8
1.4.5 Welds.....	11
1.4.6 Wood Screws.....	14
1.5 Report Objectives.....	15
References .....	15
<b>Chapter 2 Cold-Formed Steel Connections to Structural Steel .....</b>	<b>17</b>
2.1 Introduction .....	17
2.2 Common Practice and Considerations for Connecting Cold-Formed Steel to Structural Steel .....	17
2.3 Design Examples of Cold-Formed Steel Connections to Structural Steel.....	18
2.3.1 Example 2A: Bypassing an Exterior Wall Stud Attachment to a Floor (or Roof) Slab Edge with a Rigid Clip Angle.....	18
2.3.2 Example 2B: A Head-of-Wall Connection to a Fire-Proofed Steel Beam .....	31
2.3.3 Design Example 2C: A Cold-Formed Steel Floor Joist to an HSS Beam .....	39
2.3.4 Example 2D: A Cold-Formed Steel Truss Bottom Chord to a Steel Bearing Connection.....	44
2.4 Design Considerations and Recommendations.....	54
References .....	54

**Chapter 3 Cold-Formed Steel Connections to Concrete.....57**

3.1	Introduction .....	57
3.2	Common Practice and Considerations for Connecting Cold-Formed Steel to Concrete.....	57
3.3	Design Examples of Cold-Formed Steel Connections to Concrete... 59	
3.3.1	Example 3A: Cold-Formed Steel Jamb Stud to Concrete Using an Epoxy Anchor .....	59
3.3.2	Example 3B: Cold-Formed Steel Jamb Stud to Concrete Using a Cast-in-Place Anchor (Seismic Analysis Controls) .....	67
3.3.3	Example 3C: Cold-Formed Steel Track to a Concrete Slab Using Power-Actuated Fasteners.....	78
3.3.4	Example 3D: Cold-Formed Steel Track to a Hollow-Core Slab Using Power-Actuated Fasteners .....	82
3.3.5	Example 3E: Cold-Formed Steel Track to a Concrete Slab Using Screw Anchors .....	85
3.3.6	Design Example 3F: Cold-Formed Steel Interior Partition Wall Brace to the Underside of a Concrete-Filled Steel Deck.....	90
3.4	Design Considerations and Recommendations.....	99
	References .....	100

**Chapter 4 Cold-Formed Steel Connections to Concrete Masonry  
Units and Brick Masonry .....101**

4.1	Introduction .....	101
4.2	Common Practice and Considerations for Connecting Cold-Formed Steel to Concrete Masonry Units and Brick Masonry....	101
4.3	Design Examples of Cold-Formed Steel Connections to Concrete Masonry Units and Brick Masonry .....	102
4.3.1	Design Example 4A: Cold-Formed Steel Joist Connection to the Face Shell of a Grout-Filled Concrete Masonry Unit.....	102
4.3.2	Example 4B: Jamb Anchorage on Top of a Grouted Concrete Masonry Unit .....	106
4.3.3	Example 4C: Cold-Formed Stee Zee Furring Connection to a Hollow Concrete Masonry Unit.....	111
4.3.4	Example 4D: Cold-Formed Steel Zee Furring Connection to Brick Veneer.....	115
4.4	Design Considerations and Recommendations.....	118
	References .....	119

**Chapter 5 Connections of Cold-Formed Steel to Wood and Wood  
to Cold-Formed Steel .....121**

5.1	Introduction .....	121
5.2	Application of National Design Specification for Wood Construction in Combination with Cold-Formed Steel Members...	123

5.3 Design Examples of Cold-Formed Steel Connections to Wood and Wood to Cold-Formed Steel.....	124
5.3.1 Example 5A: Connection of Cold-Formed Steel to Sawn Wood Members .....	124
5.3.2 Example 5B: Connection of a Cold-Formed Steel Metal Panel to Plywood.....	132
5.3.3 Example 5C: Cold-Formed Steel Joist Connected to a Metal Joist Hanger That is Connected to Sawn Lumber and/or Laminated and Engineered Wood Beam .....	135
5.3.4 Example 5D: Plywood to Cold-Formed Steel Connection Creating a Shear Wall .....	140
5.4. Design Considerations and Recommendations.....	146
References .....	147
<b>Chapter 6 Summary .....</b>	<b>149</b>
6.1 Observations .....	149
6.1.1 Introduction to Cold-Formed Steel Connections to Other Materials.....	149
6.1.2 Cold-Formed Steel Connections to Structural Steel.....	150
6.1.3 Cold-Formed Steel Connections to Concrete .....	150
6.1.4 Cold-Formed Steel Connections to Concrete Masonry Units and Brick Masonry .....	150
6.1.5 Cold-Formed Steel Connections to Wood .....	151
6.2 Conclusion .....	151
References .....	152
<b>General References .....</b>	<b>153</b>
<b>Appendix A Clip Angle Strength Check .....</b>	<b>155</b>
<b>Appendix B Material Sizing Definitions.....</b>	<b>163</b>
<b>Appendix C Industry Organizations.....</b>	<b>165</b>
<b>Index.....</b>	<b>167</b>