AISI/COFS/PM SUPPLEMENT-2004

American Iron and Steel Institute

AISI STANDARD

2004 Supplement to the Standard for Cold-Formed Steel Framing – Prescriptive Method for One and Two Family Dwellings, 2001 Edition

Supplement to AISI/COFS/PM-2001

Endorsed by:

Steel Framing Alliance™

DISCLAIMER

The material contained herein has been developed by the American Iron and Steel Institute Committee on Framing Standards. The Committee has made a diligent effort to present accurate, reliable, and useful information on cold-formed steel framing design and installation. The Committee acknowledges and is grateful for the contributions of the numerous researchers, engineers, and others who have contributed to the body of knowledge on the subject. Specific references are included in the *Commentary*.

With anticipated improvements in understanding of the behavior of cold-formed steel framing and the continuing development of new technology, this material may eventually become dated. It is anticipated that AISI will publish updates of this material as new information becomes available, but this cannot be guaranteed.

The materials set forth herein are for general purposes only. They are not a substitute for competent professional advice. Application of this information to a specific project should be reviewed by a design professional. Indeed, in many jurisdictions, such review is required by law. Anyone making use of the information set forth herein does so at their own risk and assumes any and all liability arising there from.

1st Printing – October 2004

PREFACE

The American Iron and Steel Institute (AISI) Committee on Framing Standards (COFS) has developed this *2004 Supplement to the Standard for Cold-Formed Steel Framing – Prescriptive Method for One and Two Family Dwellings* [*Supplement*] to provide revisions and updates to the Standard for Cold-Formed Steel Framing – Prescriptive Method for One and Two Family Dwellings, 2001 Edition.

Also included in this document, as User Notes, are the *Errata to the Standard for Cold-Formed Steel Framing – Prescriptive Method for One and Two Family Dwellings* [*Errata*], dated September 15, 2004. User Notes are not part of the *Supplement*, but are provided as an aid to the reader.

The Committee acknowledges and is grateful for the contributions of the numerous engineers, researchers, producers and others who have contributed to the body of knowledge on the subjects. The Committee wishes to also express their appreciation for the support and encouragement of the Steel Framing Alliance.

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2004 SUPPLEMENT TO THE STANDARD FOR COLD-FORMED STEEL FRAMING – PRESCRIPTIVE METHOD FOR ONE AND TWO FAMILY DWELLINGS, 2001 EDITION

A. GENERAL

A4 Limitations on Framing Members

(User Note: Revise the text in Section A4.5 on Hole Patching, as shown below.)

A4.5 Hole Patching

Web holes violating ~~any of~~ the requirements ~~set forth in~~ of Section A4.4 shall be patched ~~with~~ if the depth of the hole does not exceed 70% of the flat width of the *web* and the length of the hole measured along the *web* does not exceed 10 inches (254 mm) or the depth of the *web*, whichever is greater. The patch shall be a solid steel plate, *stud* section, or *track* section in accordance with Figures A4-3 or A4-4. The steel patch shall be of a minimum thickness as the receiving member and shall extend at least 1 inch (25.4 mm) beyond all edges of the hole. The steel patch shall be fastened to the *web* of the receiving member with No.8 screws spaced no greater than 1 inch (25.4 mm) center-to-center along the edges of the patch with minimum edge distance of 1/2 inch (12.7 mm).

Structural members shall be replaced or designed in accordance with accepted engineering practices when *web* holes exceed the following size limits:

(a) The depth of the hole, measured across the *web*, exceeds 70% of the ~~depth~~ flat width of the *web*; and/or,

(b) The length of the hole measured along the *web*, exceeds 10 inches (254 mm) or the depth of the *web*, whichever is greater.

E. WALL FRAMING

E2 Wall to Foundation or Floor Connection

(User Note: Revise the text in Section E2 on Wall to Foundation or Floor Connection, add Figure E2-4, and revise the first row in Table E2-1 on Wall to Foundation or Floor Connection Requirements, as shown below.)

Structural walls shall be anchored to foundations or floors in accordance with Table E2-1 and Figures E2-1 through ~~E2-3~~ E2-4.

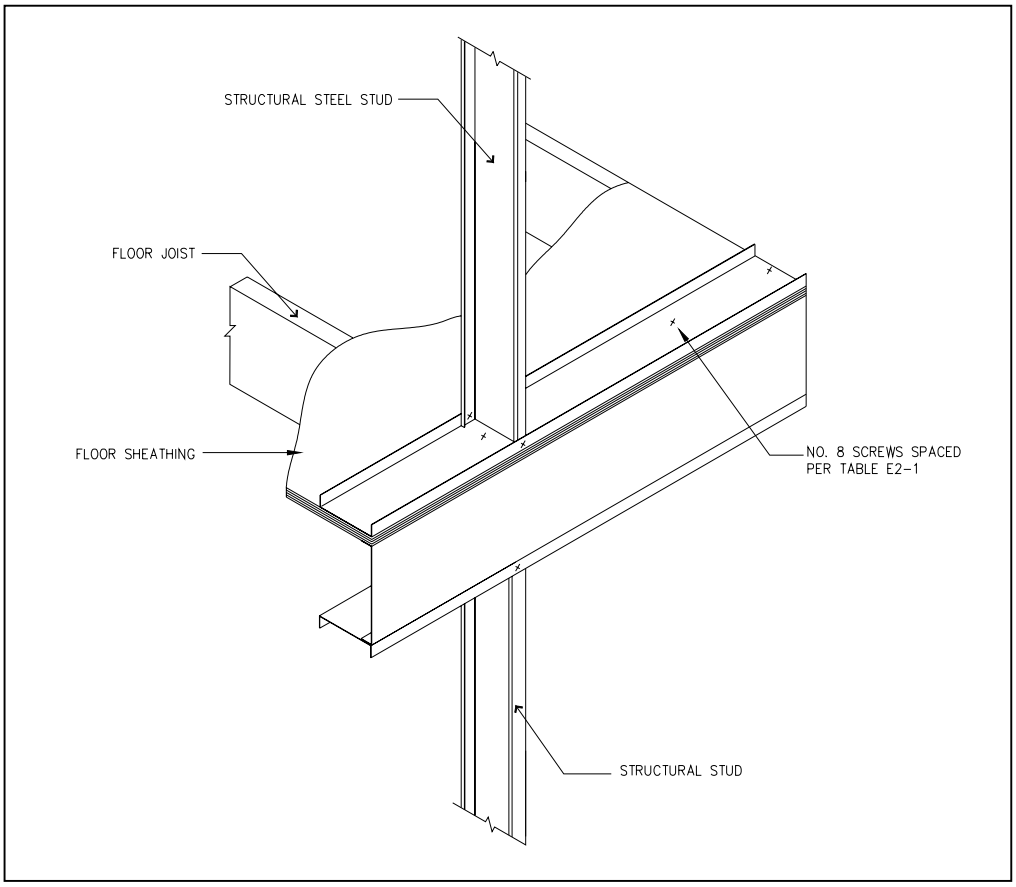

Figure E2-4 Wall to Floor Connection

Table E2-1
Wall to Foundation or Floor Connection Requirements[1]

Framing Condition	Wind Speed (mph), Exposure, & Seismic Design Category[2]					
	85 A/B or SDC[3] A,B,C	90 A/B	100 A/B 85 C	110 A/B 90 C	100 C	< 110 C
Wall bottom *track* to floor ~~*joist or track*~~	1-No.8 screw at 12" o.c.	1-No.8 screw at 12" o.c.	1-No.8 screw at 12" o.c.	1 – No.8 screw at 12" o.c.	2 – No.8 screw at 12" o.c.	2 – No.8 screw at 12" o.c.

(User Note: Table E2-1 continues unchanged.)

E3 Minimum Stud Sizes

(User Note - Errata: In Tables E3-1a, E3-2a, E3-3a, E3-4a, E3-5a, E3-6a, E3-7a, E3-8a, E3-9a and E3-10a, for the case of wind exposure C, 350S162 member size, 24-inch spacing and 8-foot stud length, reverse the values for 120 mph and 130 mph wind speeds.)

(User Note - Errata: In Table E3-4b, for the case of 130 mph wind speed exposure C, 350S162 member size, 24-inch spacing, 8-foot stud and 20 psf snow load, change the value from "543" to "54".)

E7 Headers

(User Note: Revise the text in Section E7.3 on Double L-Headers and replace Figure E7-3, as shown below.)

E7.3 Double L-Headers

Double L-*headers* shall be constructed in accordance with Figure E7-3 and Tables E7-10 through E7-23. An L-*header* consists of a cold-formed steel angle with one short leg lapping over the top *track* of the wall and one leg extending down the side of the wall above window or door openings as shown in Figure E7-3. Each angle is fastened to top *track* above an opening with No.8 screws spaced at 12 inches (305 mm) on center. The "L" angle is placed on both sides of the wall opening to form a double angle L-shaped *header* (double L-*header*). The long leg of the L-*header* angle shall be attached to each ~~king and~~ *cripple stud(s)* and a minimum of one *king stud* at each end with one No.8 screw at top and bottom.

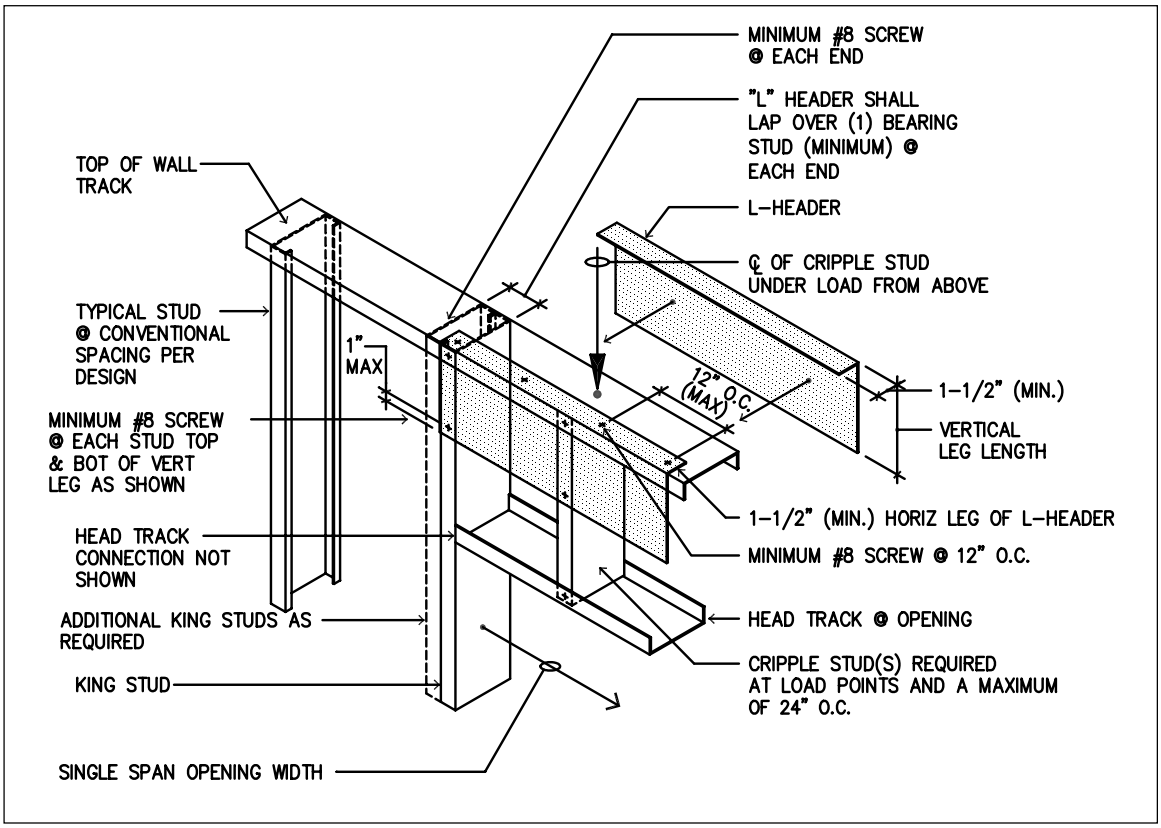

Figure E7-3 Double L-Header

E13 Braced Wall Design in High Wind Areas

(User Note: Add Section E13.3.3 on Header Uplift Connections and add Figure E13-1, as shown below.)

E13.3 Connections of Walls in High Wind Areas

E13.3.3 Header Uplift Connections

When it is necessary to make an uplift strap connection to a back-to-back header the header beam shall be reinforced as shown in Figure E13-1. Uplift straps shall be installed on both sides of a back-to-back header beam (inside and outside of the wall) when the header is supporting loads from the roof and ceiling only.

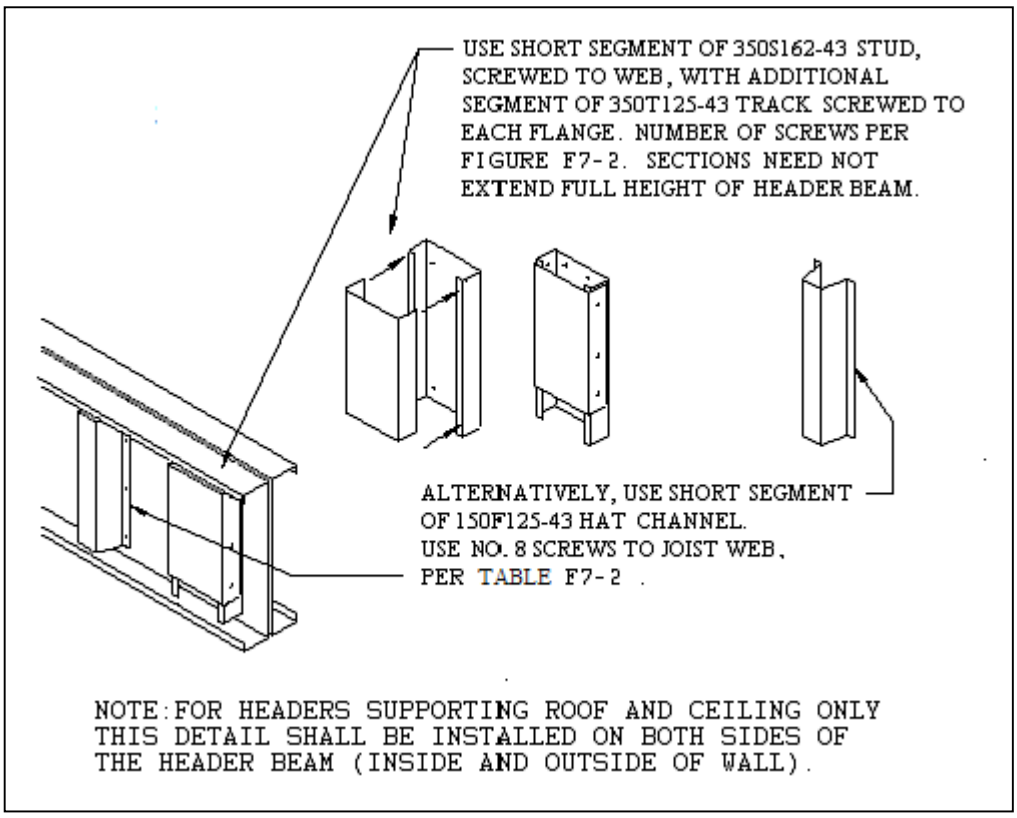

Figure E13-1 Back-to-Back Header Beam Reinforcement for Uplift Strap Connection

F. ROOF FRAMING

F2 Ceiling Joists

(User Note: Revise Section F2.4 on Ceiling Joist Top Flange Bracing and add Figures F2-5 and F2-6, as shown below.)

F2.4 Ceiling Joist Top Flange Bracing

The top *flanges* of *ceiling joists* shall be laterally braced as required by Tables F2-1 through F2-8, with a minimum:

1. 33 mil (0.84 mm) *C-shaped* member in accordance with Figure F2-5, or
2. 33 mil (0.84 mm) *track* section in accordance with Figure F2-5, or
3. 33 mil (0.84 mm) hat section in accordance with Figure F2-5, or
4. 54 mil (1.37 mm) 1- 1/2" cold-rolled channel section in accordance with Figure F2-5, or
5. 1-1/2 inch x 33 mil (38 mm x 0.84 mm) continuous steel *strap* in accordance with Figure F2-6.

Lateral *bracing* shall be installed perpendicular to the *ceiling joists* and shall be fastened to the top *flange* of each joist with one No.8 screw. *Blocking* shall be installed between joists in-line with ~~*strap*~~ *bracing* at ~~the termination of all *straps* and at~~ a maximum spacing of 12 feet (3.66 m) measured perpendicular to the joists. Lateral *bracing* shall be fastened to *blocking* with two No.8 screws. Ends of lateral *bracing* shall be attached to *blocking* or anchored to a stable building component with two No.8 screws.

Exception: When *strap bracing* and 3.5" (88.9 mm) ceiling *joists* are used, *strap bracing* shall be fastened to *blocking* with three No.8 screws and ends of the *strap bracing* shall be attached to *blocking* or anchored to a stable building component with three No.8 screws.

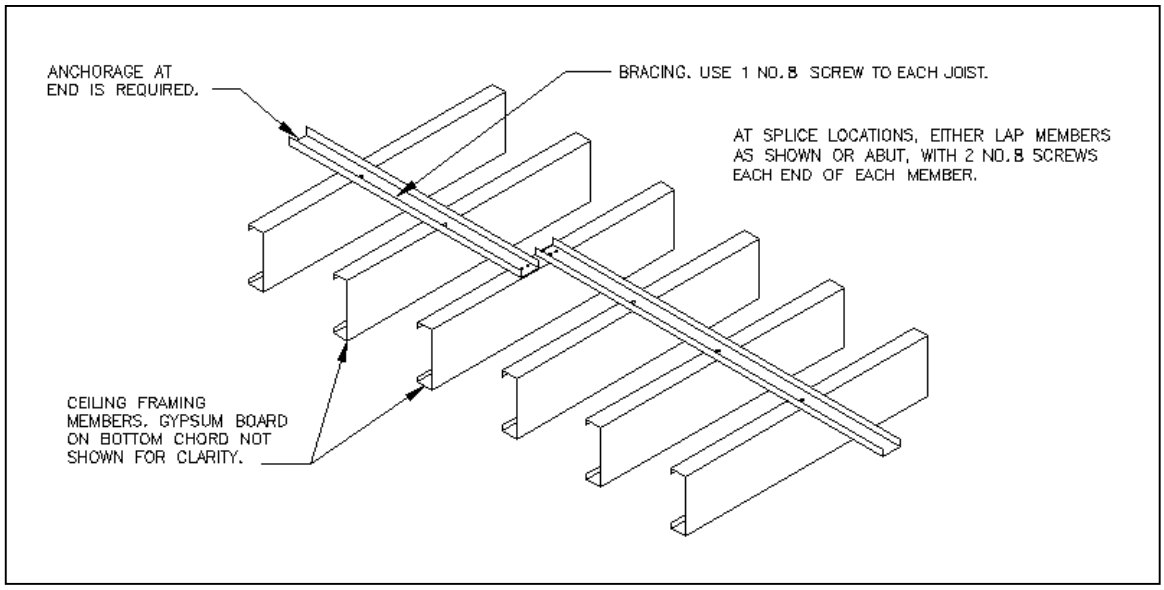

Figure F2-5 Ceiling Joist Top Flange Bracing with C-Shape, Track or Cold-Rolled Channel Section

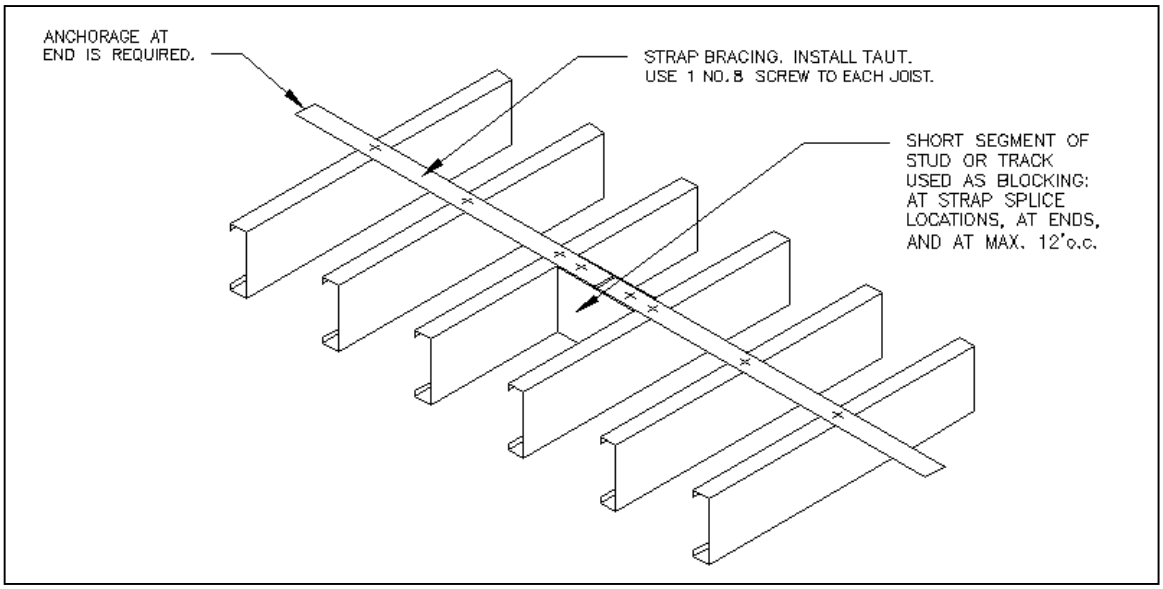

Figure F2-6 Ceiling Joist Top Flange Bracing with Continuous Steel Strap and Blocking

F7 Roof Framing Connections in High Wind Areas

(User Note - Errata: In Table F7-1, for the case of 130 mph basic wind speed, exposure C, 24-inch framing spacing and 28-foot roof span, change the value from "9130" to "913".)

(User Note: Revise Section F7.3 on Ridge Strap Connection, as shown below.)

F7.2 Uplift Connection – Roof Rafter or Truss to Wall

Table F7-1
Required Uplift Capacity
Roof Truss or Rafter to Wall

		Basic Wind Speed (mph)		
EXPOSURE A/B		130		
EXPOSURE C		110	120	130
Framing Spacing[3] (in.)	Roof Span (ft)	Required Connection Capacity[1,2] (lbs)		
	24	245	336	435
	40	643	881	1144
24	24	413	671	868
	28	557	763	~~9130~~ ← 913
	32	624	855	1130
	36	691	947	1230
	40	804	1101	1430

F7.3 Ridge Strap Connection

Roof rafters shall be provided with a connection at the *ridge* line to transfer tension loads. The *ridge* connection shall be capable of resisting the unit loads listed in Table F7-3 multiplied by the appropriate spacing multiplier. Alternatively, a ~~1-1/4 inch (32 mm) by 33 mil (0.84 mm)~~ steel *ridge strap* shall be provided with minimum No.8 screws on each end of the *strap* as required in Table F7-3. The number of screws shall be increased to account for the spacing multipliers shown in the table. The size of the *ridge strap* shall be in accordance with Table F7-4.

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E. WALL FRAMING

(User Note: Add Section E2 on Wall to Foundation or Floor Connection, as shown below.)

E2 Wall to Foundation or Floor Connection

In 2004, Table E2-1 was revised to allow direct connection of wall *track* to the floor sheathing rather than to require connection only through the floor sheathing to the floor *joist* or *track*. This revision was based on research by the NAHB Research Center (NAHBRC, 2003) in which five shear tests and six withdrawal tests were conducted where 33-mil *track* was connected to 23/32-inch-thick OSB sheathing using #8 screws. The average ultimate shear capacity was 412.2 lb and the average ultimate pullout capacity was 350.2 lb. Considering that the minimum allowable fastener capacities for steel-to-steel connections for #8 screws and 33 mil material of 164 lb for shear and 72 lb for pullout were used to calculate the requirements for the *Prescriptive Method*, the Committee deemed that it would not be necessary to require that every fastener connect to a floor *joist* or *track* member.

E7 Headers

(User Note: Revise the text in Section E7.3 on Double L-Headers, as shown below.)

E7.3 Double L-Headers

A double L-header is shown in Figure E7-3 of the *Prescriptive Method*. Tables for gravity and uplift loads are provided for double L-headers. Double L-headers are typically the easiest *headers* to install. They can be installed during or after the wall has been framed. They do not require pre-insulation and provide a large surface to apply finishing materials. They also require less material (steel and screws) than back-to-back or box-beam *headers*. Double L-headers do not need to be cut to exact lengths; however, they need to lap over ~~the required~~ a minimum of one *king* ~~*studs*~~ *stud* at each end.

In 2004, the requirements in the *Prescriptive Method* for the *L-header* to *king stud* connection was revised to be consistent with the *Header Standard* (AISI, 2001c). This was unintentionally missed in the previous edition of the *Prescriptive Method*.

E13 Braced Wall Design in High Wind Areas

(User Note: Add Section E13.3.3 on Header Uplift Connections, as shown below.)

E13.3 Connections of Walls in High Wind Areas

E13.3.3 Header Uplift Connections

In 2004 a figure was added to the *Prescriptive Method* to illustrate a header uplift connection to a back-to-back header beam. For back-to-back headers supporting roof and ceiling only, these provisions require that uplift straps be installed on both sides of

the header beam (inside and outside of the wall) in order to minimize any effect of torsion. The Committee felt this was appropriate since back-to-back header beams lack sufficient torsional strength and stiffness. For back-to-back headers supporting loads from one floor, roof and ceiling, and for any box and double L-headers, a single uplift strap is permitted and may be installed on either side of the header beam.

REFERENCES

(User Note: Add one reference, as shown below.)

(NAHBRC, 2003), *Hybrid Wood and Steel Sole Plate Connection Walls to Floors Testing Report,* National Association of Home Builders' Research Center, Upper Marlboro, MD.