

BCSI-B3 SUMMARY SHEET - PERMANENT RESTRAINT/BRACING OF CHORDS & WEB MEMBERS

Truss Clear Spans of 60' or greater may require complex permanent bracing. Please always consult a Registered Design Professional.

WARNING! Disregarding permanent restraint/bracing is a major cause of truss field performance problems and has been known to lead to roof or floor system collapse.

CAUTION! Trusses with clear spans of 60 feet (18.3m) or greater, may require complex permanent bracing. Please always consult a registered design professional.

RESTRAINT / BRACING MATERIALS & FASTENERS

Commonly used restraint/bracing materials include wood structural panels, gypsum board sheathing, stress-graded lumber, proprietary metal products, and metal purlins and straps.

MINIMUM ATTACHMENT REQUIREMENTS FOR LUMBER RESTRAINT/BRACING

Lumber Size	Minimum Nail Size	Minimum Number of Nails per Connection
2x4 stress-graded	10d (0.128x3")	2
	12d (0.128x3.25")	
2x6 stress-graded	16d (0.131x3.5")	3
	10d (0.128x3")	
	12d (0.128x3.25")	
	16d (0.131x3.5")	

1 Other attachment requirements may be specified by the building designer or truss designer.

2 The grade/size and attachment for bracing materials such as wood structural panels, gypsum board sheathing, proprietary metal restraint/bracing products, and metal purlins and straps are provided by the building designer.

PERMANENT BRACING FOR THE VARIOUS PLANES OF A TRUSS

Permanent bracing is important because it, a) prevents out-of-plane buckling of truss members, b) helps maintain proper truss spacing, and c) resists and transfers lateral loads from wind and seismic forces.

Trusses require permanent bracing within ALL of the following planes:

1. Top chord plane
2. Bottom chord plane
3. Web plane

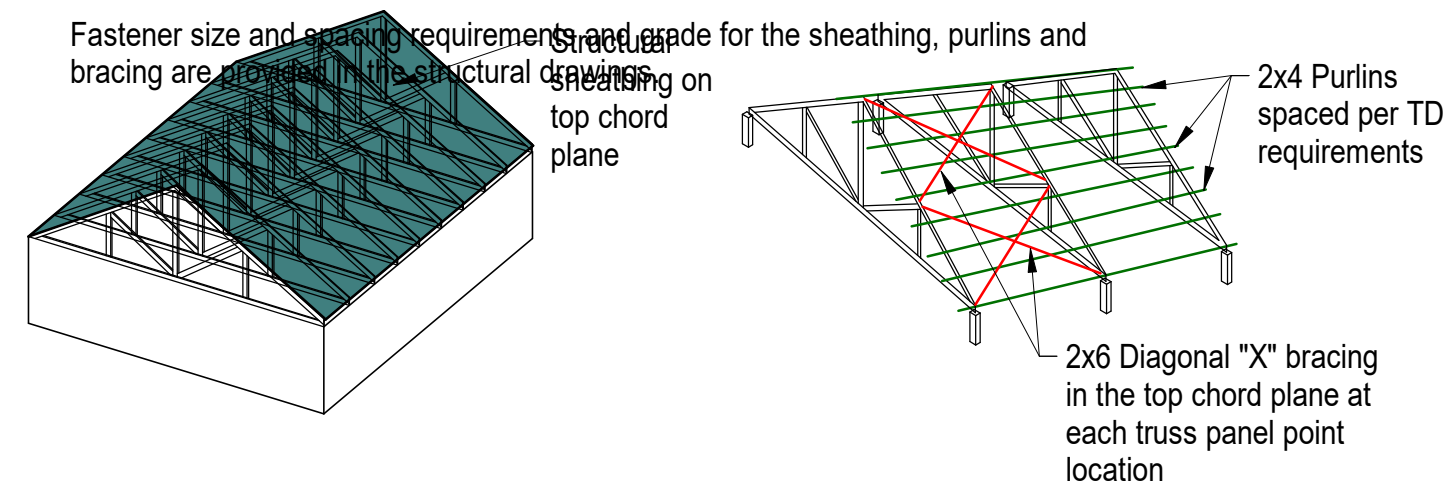
CAUTION! Web members, if a portion of its members, will buckle (i.e., fail) at loads far less than design without permanent bracing.

1. PERMANENT BRACING FOR THE TOP CHORD PLANE

Use plywood, oriented strand board (OSB), or wood or metal structural purlins that are properly braced. Attach to each truss.

The Truss Design Drawing (TDD) provides information on the assumed support for the top chord.

Fastener size and spacing requirements and bracing are provided in the structural drawings on the top chord plane.

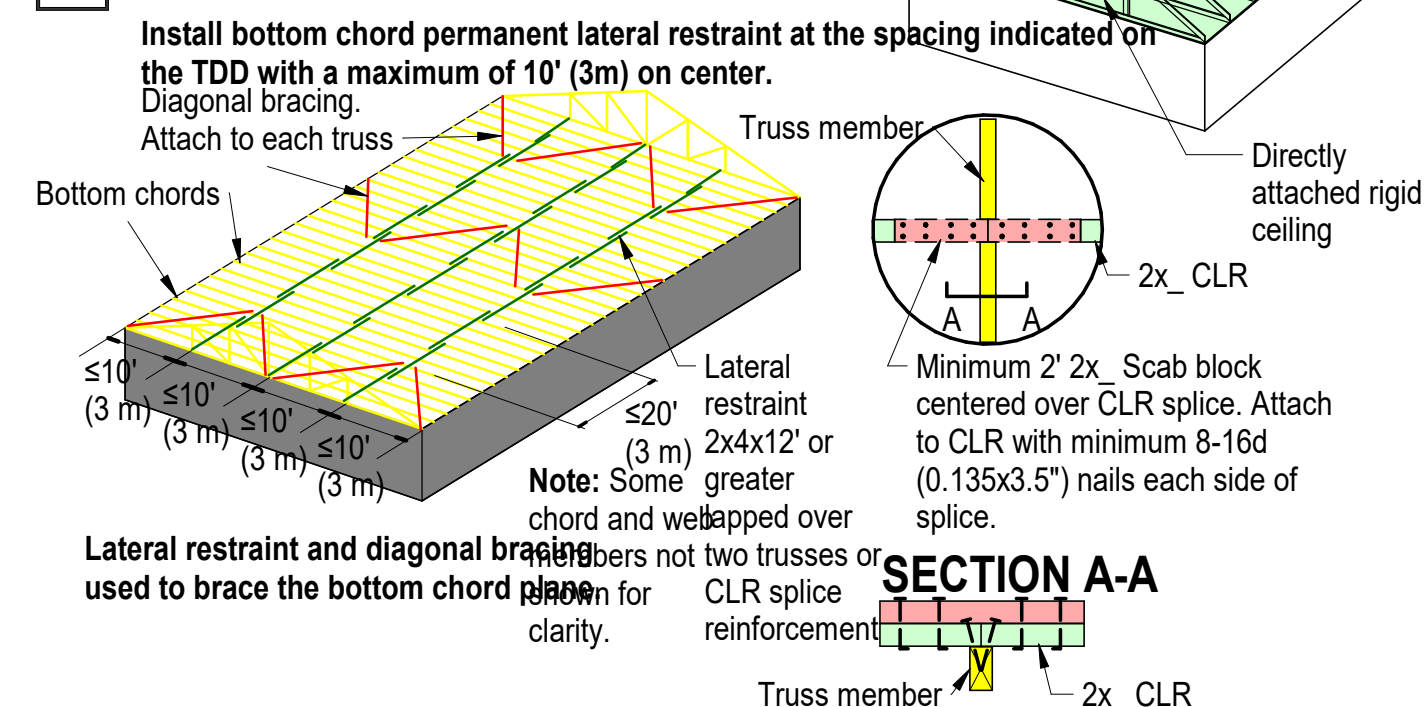


2. PERMANENT BRACING FOR THE BOTTOM CHORD PLANE

Rows of continuous lateral restraint with diagonal bracing, gypsum board sheathing or some other ceiling material capable of functioning as a diaphragm.

The TDD provides information on the assumed support for the bottom chord.

Install bottom chord permanent lateral restraint at the spacing indicated on the TDD with a maximum of 10' (3m) on center. Diagonal bracing. Attach to each truss.



3. PERMANENT BRACING FOR THE WEB MEMBER PLANE

Web member permanent bracing collects and transfers buckling restraint forces and/or lateral loads from wind and seismic forces. The same bracing can often be used for both functions.

Individual Web Member Permanent Restraint & Bracing

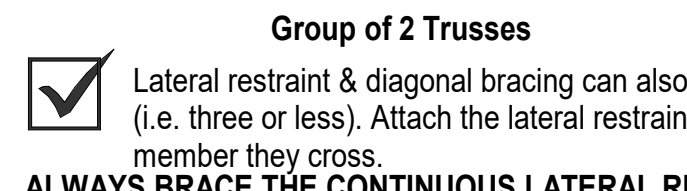
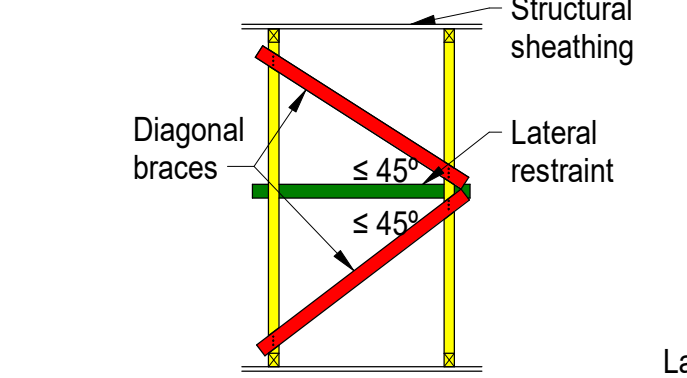
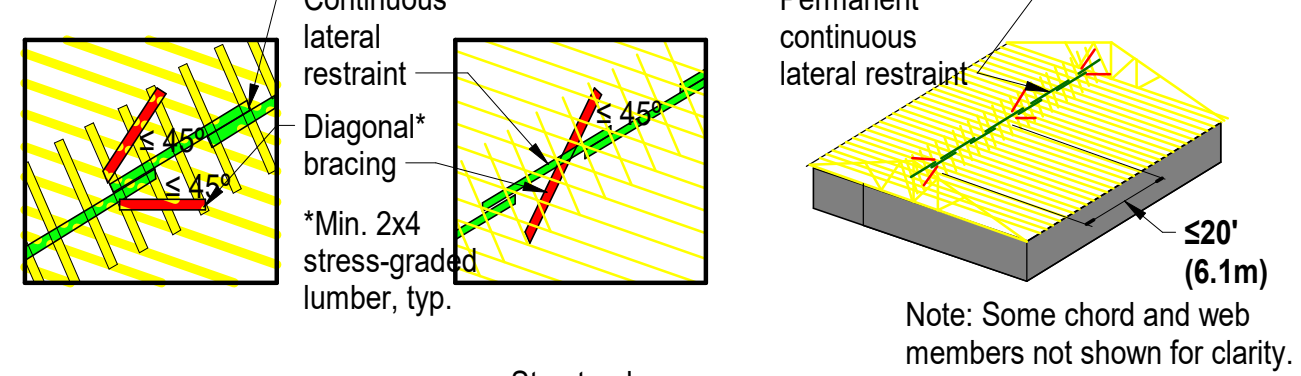
Check the TDD to determine which web members (if any) require restraint/bracing. One restraint required for each web. Note: CLR can be installed on either side of Member.

Restrain and brace with, A. Continuous lateral restraint and diagonal bracing, or B. Individual member web reinforcement.

A. Continuous Lateral Restraint (CLR) & Diagonal Bracing
Attach each row of CLR at the locations shown on the TDD.

Install the diagonal bracing at an angle of less than or equal to 45° to the CLR and position so that it crosses the web in close proximity to the CLR. Attach the diagonal brace as close to the top and bottom chords as possible and to each web it crosses. Repeat every 20' (6.1 m) or less.

EXAMPLES OF DIAONAL BRACING WITH CONTINUOUS LATERAL RESTRAINT



Lateral restraint & diagonal bracing can also be used with small groups of trusses (i.e. three or less). Attach the lateral restraint & diagonal brace to each web member they cross.

ALWAYS BRACE THE CONTINUOUS LATERAL RESTRAINT!

B. Individual Web Member Reinforcement
T-, L-, Scab, I-, U-Reinforcement, proprietary metal reinforcement and stacked web products provide an alternative for resisting web buckling.

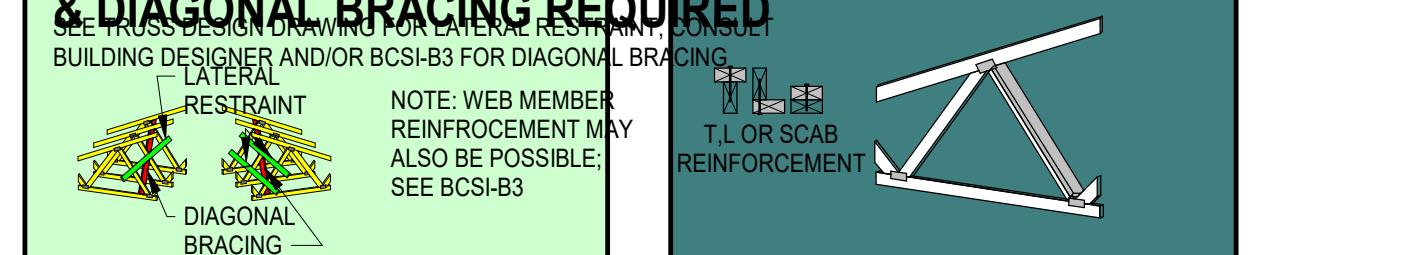


The following table may be used unless more specific information is provided.

Specified CLR	Size of Truss Web	Type & Size of Web Reinforcement				Grade of Web Reinforcement	Minimum Length of Web Reinforcement	Minimum Connection of Web Reinforcement to Web
		T	L	Scab	I or U			
1 Row	2x4	2x4	2x4	2x4	Same species and grade of better than web member	90% of web or extend to within 6" (150mm) of end of web member, whichever is greater	16d (0.131x3.5") on-center	
	2x6	2x6	2x6	2x6				
2 Row	2x4	---	---	---	2-2x4	whichever is greater	16d (0.131x3.5") on-center	
	2x6	---	---	---	2-2x6			
	2x8	---	---	---	2-2x8			

1 Maximum web length is 14 feet (4.3m)
2 Attach Scab Reinforcement to web with 2 rows of minimum 10d (0.120x3") nails at 6" (150 mm) on-center.

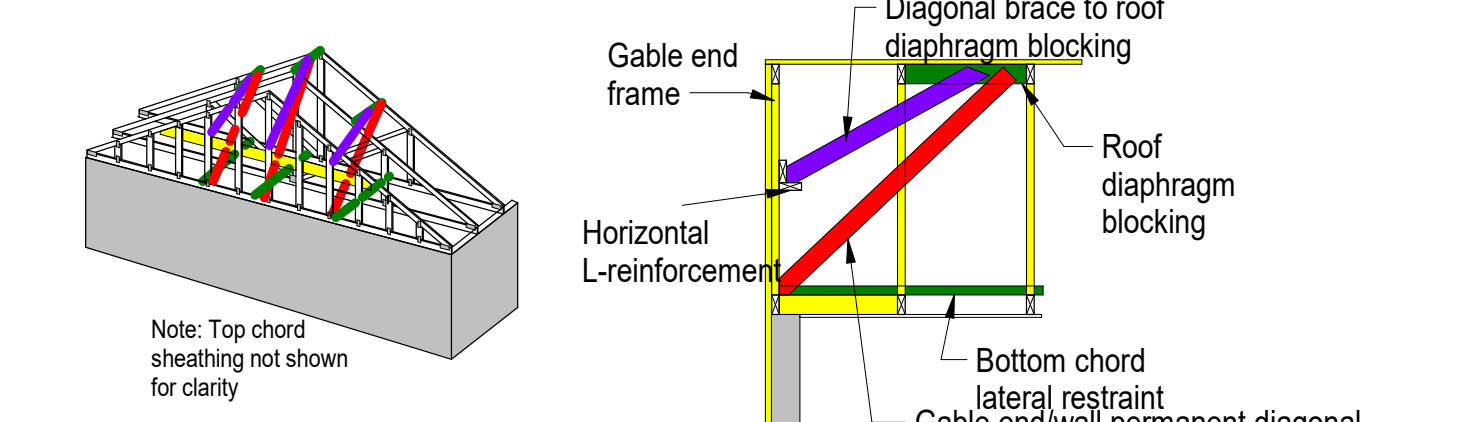
PERMANENT LATERAL RESTRAINT & DIAGONAL BRACING REQUIRED



Some truss manufacturers provide additional assistance by using tags to mark the web members that require lateral restraint or reinforcement.

WEB MEMBER PLANE PERMANENT BUILDING STABILITY BRACING TO TRANSFER WIND & SEISMIC FORCES

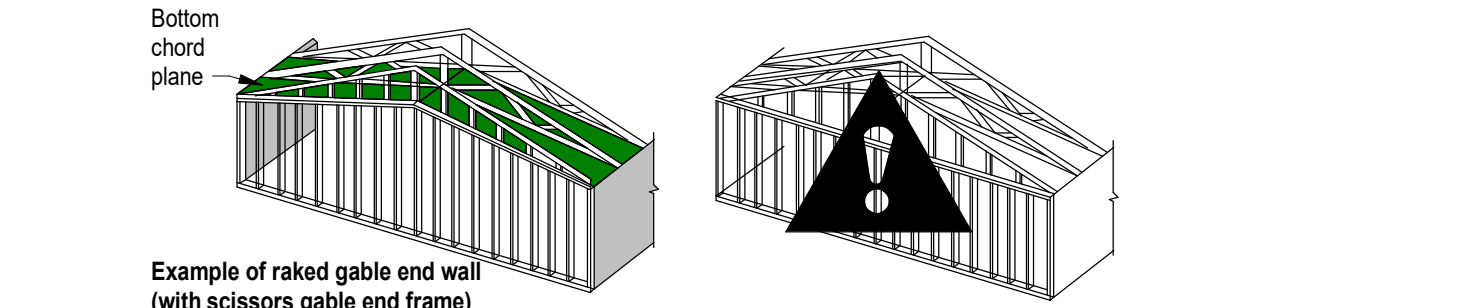
The web member restraint or reinforcement specified on a TDD is required to resist buckling due to axial forces caused by the in-plane loads applied to the truss. Additional restraint and bracing within the web member plane may also be required to transfer lateral forces due to wind and/or seismic loads applied perpendicular to the plane of the trusses.



Some truss designers provide general design tables and details to assist the building designer in determining the bracing required to transfer lateral loads due to wind and/or seismic forces from the gable end frame into the roof and/or ceiling diaphragm.

Gable End Frames and Sloped Bottom Chords

The gable end truss should always match the profile of the adjacent roof trusses to permit installation of proper bottom chord plan restraint & bracing unless special bracing is shown in the structural drawings.



PERMANENT BRACING FOR SPECIAL CONDITIONS

Sway Bracing

(2)2x6 "Sway" bracing shall be installed as shown to help stabilize the truss system and minimize the lateral movement due to wind and seismic loads.

Sway bracing installed continuously across the building also serves to distribute gravity loads between trusses of varying stiffness.

Permanent Restraint / Bracing for the Top Chord in a Piggyback Assembly

Provide restraint and bracing by: using rows of minimum 4x2 stress-graded lumber CLR and diagonal bracing, or connecting the CLR into the roof diaphragm, or adding structural sheathing or bracing frames, or some other equivalent means. = < 45° typ.

Refer to the TDD for the maximum assumed spacing between rows of lateral restraint (e.g. purlins) attached to the top chord of the supporting truss.

The TDD provides the assumed thickness of the restraint and minimum connection requirements between the cap and the supporting truss or restraint.

If diagonal bracing is used to restrain the CLR(s), repeat at 10' (3 m) intervals, or as specified in the construction documents.

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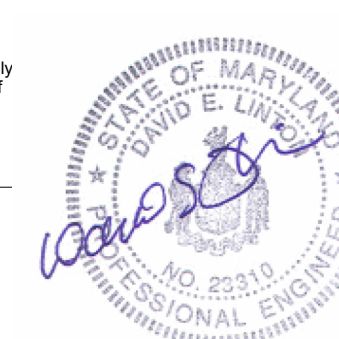
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Professional Certification:
I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the state of Maryland.
License Number: 07/09/24
Expiration Date: 2/3/10



R	Date	Description
	10/13/2023	Permit Set

Drawing Title:
ROOF SECTIONS AND DETAILS

Graphic Scale:
3/32" = 1'-0"

Project No:

2011

Date:

10/13/23

Drawing No:

S504