RB245-22

IRC: R802.10.1, R802.10.3, FIGURE R802.10.3(1) (New), FIGURE R802.10.3(2) (New), FIGURE R802.10.3(3) (New), FIGURE R802.10.3(4) (New)

Proponents: John Grenier, representing National Council of Structural Engineers Associations (NCSEA) (jgrenier@greniereng.com); Larry Wainright, representing DrJ Engineering (lwainright@drjengineering.org)

2021 International Residential Code

Revise as follows:

R802.10.1 Truss design drawings. *Truss design drawings*, prepared in conformance to Section R802.10.1, shall be provided to the *building official* and *approved* prior to installation. *Truss design drawings* shall be provided with the shipment of trusses delivered to the job site. *Truss design drawings* shall include, at a minimum, the following information:

1. Slope or depth, span and spacing.
2. Location of all joints.
3. Required bearing widths.
4. Design loads as applicable.

    4.1. Top chord *live load* (~~as determined from~~ per Section ~~R301.6~~ R301.5)

    4.2 Roof live load (per section R301.6).

    4.3 Snow load (per section R301.2.3)

    4.4. ~~4.2.~~ Top chord dead load.

    4.5. ~~4.3.~~ Bottom chord *live load*.

    4.6. ~~4.4.~~ Bottom chord dead load.

    4.7. ~~4.5.~~ Concentrated loads and their points of application.

    4.8 ~~4.6.~~ Controlling wind and earthquake loads.

5. Adjustments to lumber and joint connector design values for conditions of use.
6. Each reaction force and direction.
7. Joint connector type and description such as size, thickness or gage and the dimensioned location of each joint connector except where symmetrically located relative to the joint interface.
8. Lumber size, species and *grade for each member.*
9. Connection requirements for:

    9.1. Truss to girder-truss.

    9.2. Truss ply to ply.

    9.3. Field splices.

10. Calculated deflection ratio or maximum description for live and total load.
11. Maximum axial compression forces in the truss members to enable the building designer to design the size, connections and anchorage of the permanent continuous lateral bracing. Forces shall be shown on the *truss design drawing* or on supplemental documents.
12. Required permanent ~~truss member bracing location.~~ individual truss member restraint location and the method and details of restraint and diagonal bracing to be used in accordance with Section R802.10.3.

R802.10.3 Bracing. Trusses shall be braced to prevent rotation and provide lateral stability in accordance with the requirements specified in the *construction documents* for the building and on the individual *truss design drawings*. ~~In the absence of specific bracing requirements, trusses shall be braced in accordance with accepted industry practice such as the SBCA Building Component Safety Information (BCSI) Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses.~~ All trusses shall be installed with a fully sheathed top chord (roof or floor) with wood structural panels, and a fully sheathed bottom chord (ceiling) with gypsum board ceilings. Any trusses installed without fully sheathed top and bottom chords shall require a project specific bracing design prepared by any *registered design professional*. Permanent individual truss member restraint where shown on the truss design drawings shall be accomplished by one of the following methods:

1. Permanent individual truss member restraint (PITMR) and permanent individual truss member diagonal bracing (PITMDB) shall be installed using standard industry lateral restraint and diagonal bracing details in accordance with TPI 1, Section 2.3.3.1.1; or Figures R802.10.3 (1) and R802.10.3(3).

2. Individual truss member reinforcement in place of the specified lateral restraints (such as buckling reinforcement such as T-reinforcement, L- reinforcement, proprietary reinforcement) such that the buckling of any individual truss member is resisted internally by the individual truss. The buckling reinforcement of individual truss members shall be installed as shown on the truss design drawing; on supplemental truss member buckling reinforcement details provided by the truss designer; or in accordance with Figures R802.10.3 (2) and R802.10.3(4).
3. A project-specific PITMR and PITMDB design provided by any registered design professional.

Add new text as follows:

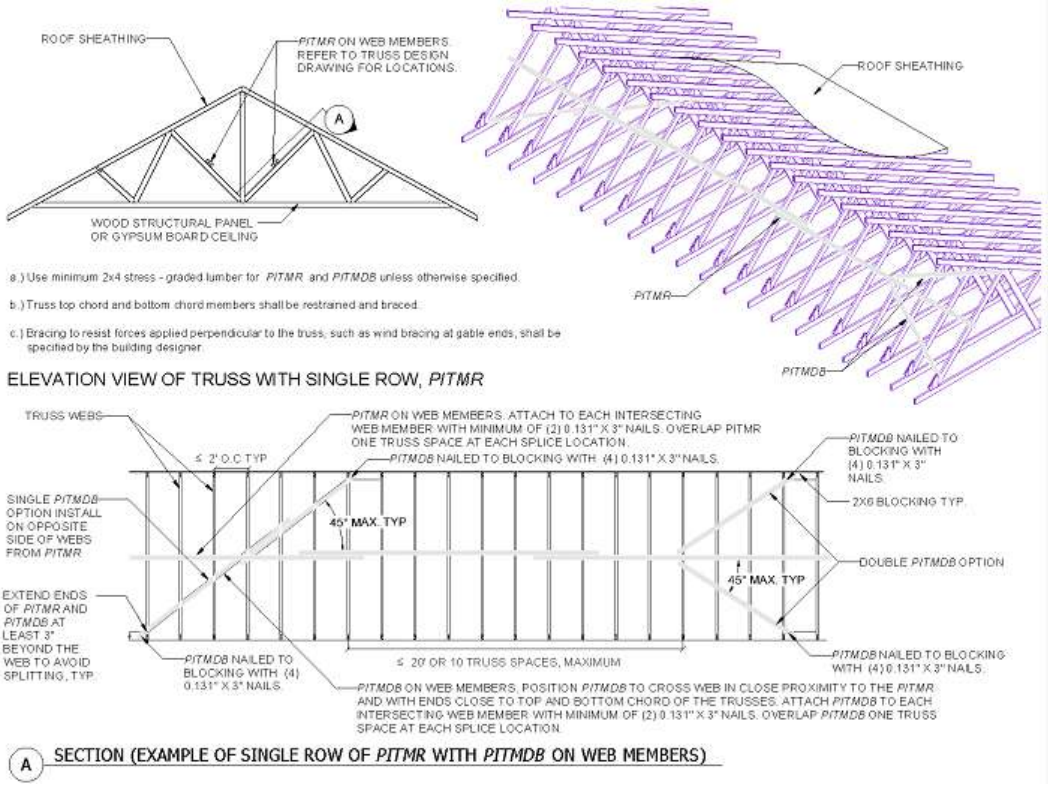
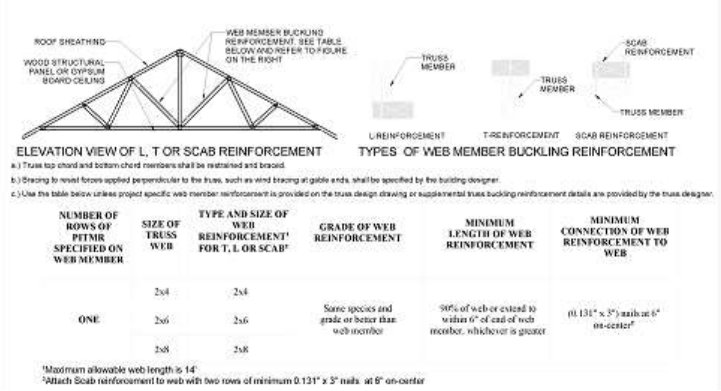


FIGURE R802.10.3(1) PITMR AND PITMB FOR TRUSS MEMBERS REQUIRING ONE ROW OF PITMR



a.) Truss top chord and bottom chord members shall be restrained and braced.

b.) Bracing to resist forces applied perpendicular to the truss, such as wind bracing at gable ends, shall be specified by the building designer.

c.) Use the table below unless project specific web member reinforcement is provided on the truss design drawing or supplemental truss bucking reinforcement details are provided by the truss designer.

NUMBER OF ROWS OF PITMR SPECIFIED ON WEB MEMBER	SIZE OF TRUSS WEB	TYPE AND SIZE OF WEB REINFORCEMENT[1] FOR T, L OR SCAB[2]	GRADE OF WEB REINFORCEMENT	MINIMUM LENGTH OF WEB REINFORCEMENT	MINIMUM CONNECTION OF WEB REINFORCEMENT TO WEB
ONE	2x4	2x4	Same species and grade or better than web member	90% of web or extend to within 6" of end of web member, whichever is greater	(0.131" x 3") nails at 6" on-center[2]
	2x6	2x6			
	2x8	2x8			

[1]Maximum allowable web length is 14'

[2]Attach Scab reinforcement to web with two rows of minimum 0.131" x 3" nails at 6" on-center

FIGURE R802.10.3(2) ALTERNATE INSTALLATION USING BUCKLING REINFORCEMTN FOR TRUSS WEB MEMBERS REQUIRED ONE ROW OF PITMR

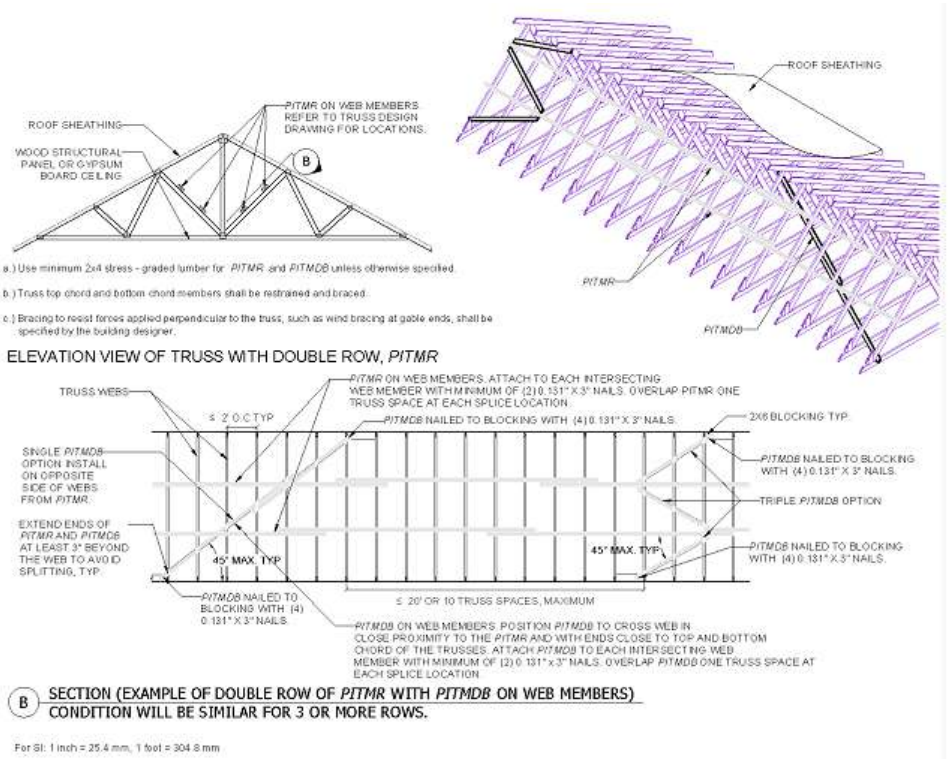
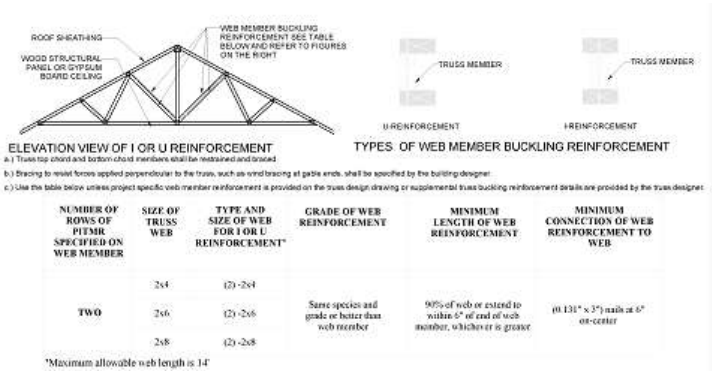


FIGURE R802.10.3(3) PITMR AND PITMDB FOR TRUSS WEB MEMBERS REQUIRING MULTIPLE ROWS OF PITMR



a.) Truss top chord and bottom chord members shall be restrained and braced.

b.) Bracing to resist forces applied perpendicular to the truss, such as wind bracing at gable ends, shall be specified by the building designer.

c.) Use the table below unless project specific web member reinforcement is provided on the truss design drawing or supplemental truss bucking reinforcement details are provided by the truss designer.

NUMBER OF ROWS OF PITMR SPECIFIED ON WEB MEMBER	SIZE OF TRUSS WEB	TYPE AND SIZE OF WEB FOR I OR U REINFORCEMENT*	GRADE OF WEB REINFORCEMENT	MINIMUM LENGTH OF WEB REINFORCEMENT	MINIMUM CONNECTION OF WEB REINFORCEMENT TO WEB
TWO	2x4	(2) -2x4	Same species and grade or better than web member	90% of web or extend to within 6" of end of web member, whichever is greater	(0.131" x 3") nails at 6" on-center
	2x6	(2) -2x6			
	2x8	(2) -2x8			

*Maximum allowable web length is 14'

FIGURE R802.10.3(4) ALTERNATIVE INSTALLATION USING BUCKLING REINFORCEMENT FOR TRUSS WEB MEMBERS REQUIRING TWO ROWS OF PITMR

Reason Statement: 1. The change to R802.10.1 #4.1 simply clarifies that floor live, roof live and roof snow loads must be listed on the Truss Design Drawings. The current language only says top chord live load.
2. A reference to TPI-1, section 2.3.3.1.1 was missing in section R802.10.3 Bracing, and has been added. TPI-1 section 2.3.3.1.1 Standard Industry Details, references BCSI-B3, and the redundant reference in IRC section R802.10.3 was removed.

3. Section R802.10.3 Bracing has been modified to state that the top and bottom chords must be fully sheathed for this prescriptive method to be used. If the chords are not fully sheathed, then a project specific Bracing Design must be provided. For the majority of residential projects, this is already being done, so it is no change to the normal practice. For jobs that don't have fully sheathed top and bottom chords, there could be a stability and a safety issue if all of the required bracing and restraints are not installed. This is especially important for roof trusses without a ceiling attached and the stability concerns due to wind uplift.

4. By having the new sections for bracing methods 1,2 and 3 2 added, that include new figures, will provide options to the Home Owner and Contractor regarding bracing installation, and allows for a variety of project types and field conditions.

5. For projects where the SBCA Building Component Safety Information (BCSI) Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses is not available or was not provided to the project, then having in the bracing details in the Code will help ensure that the trusses are installed and braced as required by the truss design.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The cost of construction will not change for typical residential projects since permanent individual truss member restraint and diagonal bracing of wood truss members is already required by the Code when required by the Truss Design Drawings.

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RB246-22

IRC: R802.10.1, R802.10.3

Proponents: Stephanie Young, representing National Council of Structural Engineers Associations (NCSEA) (stephanie@mattsonmacdonald.com); Larry Wainright, representing DrJ Engineering (lwainright@drjengineering.org)

2021 International Residential Code

Revise as follows:

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3. Required bearing widths.
4. Design loads as applicable.

    4.1. Top chord *live load* (~~as determined from~~ per Section ~~R301.6~~ R301.5).

    4.2. Roof live load (per section R301.6).

    4.3. Snow load (per section R301.2.3).

    4.4. ~~4.2.~~ Top chord dead load.

    4.5. ~~4.3.~~ Bottom chord *live load*.

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5. Adjustments to lumber and joint connector design values for conditions of use.
6. Each reaction force and direction.
7. Joint connector type and description such as size, thickness or gage and the dimensioned location of each joint connector except where symmetrically located relative to the joint interface.
8. Lumber size, species and *grade for each member.*
9. Connection requirements for:

    9.1. Truss to girder-truss.

    9.2. Truss ply to ply.

    9.3. Field splices.

10. Calculated deflection ratio or maximum description for live and total load.
11. Maximum axial compression forces in the truss members to enable the building designer to design the size, connections and anchorage of the permanent continuous lateral bracing. Forces shall be shown on the *truss design drawing* or on supplemental documents.
12. Required permanent ~~truss member bracing location.~~ individual truss member restraint location and the method and details of restraint and diagonal bracing to be used in accordance with Section R802.10.3.

R802.10.3 Bracing. Trusses shall be braced to prevent rotation and provide lateral stability in accordance with the requirements specified in the *construction documents* for the building and on the individual *truss design drawings*. ~~In the absence of specific bracing requirements, trusses shall be braced in accordance with accepted industry practice such as the SBCA Building Component Safety Information (BCSI) Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses.~~ All trusses shall be installed with a fully sheathed top chord (roof or floor) with wood structural panels, and a fully sheathed bottom chord (ceiling) with gypsum board ceilings. Any Trusses installed without fully sheathed top and bottom chords shall require a project specific Bracing Design prepared by any registered design professional. Permanent individual truss member restraint where shown on the truss design drawings shall be accomplished in accordance with Section 2303.4.1.2 of the International Building Code.

Reason Statement: 1. The change to R802.10.1 #4.1 simply clarifies that floor live, roof live and roof snow loads must be listed on the Truss

Design Drawings. The current language only says top chord live load.
2. Section R802.10.3 Bracing has been modified to state that the top and bottom chords must be fully sheathed for this prescriptive method to be used. If the chords are not fully sheathed, then a project specific Bracing Design must be provided. For the majority of residential projects, this is already being done, so it is no change to the normal practice. For jobs that don't have fully sheathed top and bottom chords, there could be a stability and a safety issue if all of the required bracing and restraints are not installed. This is especially important for roof trusses without a ceiling attached and the stability concerns due to wind uplift.
3. Instead of adding new bracing details and figures to the IRC, this proposal is referencing IBC Section 2303.4.1.2. Having access to those details and figures will provide options to the Home Owner and Contractor regarding bracing installation, and allows for a variety of project types and field conditions.

4. A reference to TPI-1, section 2.3.3.1.1 is in IBC Section 2303.4.1.2, and TPI-1 references Standard Industry Details as BCSI-B3, and the redundant reference to SBCA Building Component Safety Information (BCSI) Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses in IRC section R802.10.3 is removed.

5. For projects where the SBCA Building Component Safety Information (BCSI - B3) Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses is not available or was not provided to the project, then having access to the bracing details in the IBC will help ensure that the trusses are safely installed and braced as required by the truss design.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The cost of construction will not change for typical residential projects since permanent individual truss member restraint and diagonal bracing of wood truss members is already required by the Code when required by the Truss Design Drawings.

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