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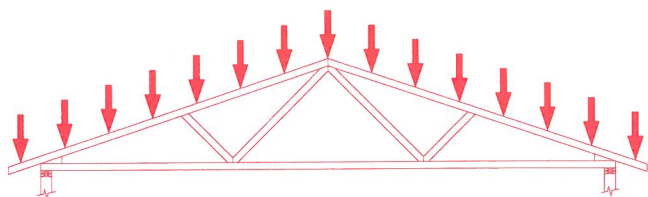
HANDLING, ERECTION AND BRACING OF WOOD TRUSSES

While the recommendations for handling, erection and bracing contained herein are technically sound, it is not intended that they be considered the only method for erecting and bracing of a roof system. Neither should these recommendations be interpreted as superior to or a standard that would necessarily be preferred in lieu of an architect's or engineer's method for erection or design for bracing a particular roof system.

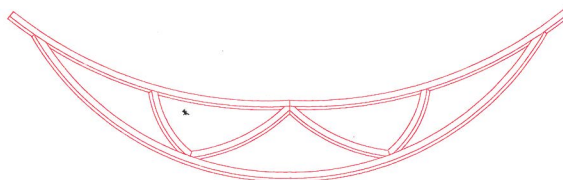
These recommendations originate from the collective experience of leading technical personnel in the wood truss industry, but must, due to the nature of responsibilities involved, be presented only as a guide for the use of a qualified building designer, builder or erection contractor. Thus, the Truss Plate Institute of Canada and W.W.T.A. expressly disclaims any responsibility for damages arising from the use, application, or reliance on the recommendations and information contained herein by building designers or by erection contractors.

1. HANDLING RECOMMENDATIONS

Trusses must be in the vertical plane to take advantage of their superior ability to support loads. The truss erector or the builder shall take the necessary precautions to ensure that erection procedures and handling methods do not damage the trusses and thus reduce their load carrying capacity.



TRUSSES ARE STRONG THIS WAY



BUT WEAK THIS WAY

2. CHECK TRUSSES WHILE THEY ARE ON THE GROUND

- Count trusses to ensure that you have the correct number for the job.
- Measure trusses for the correct pitch, span, and any special details.
- Check for damage, broken members, loose plates, etc.

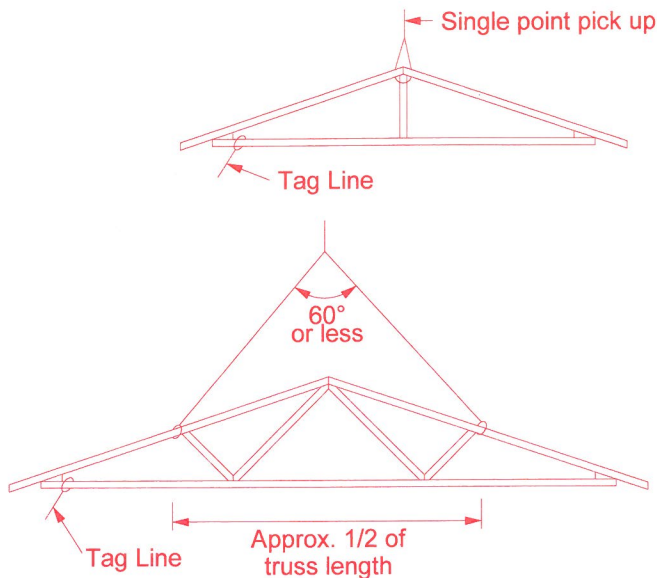
3. ERECTION PROCEDURE

- Mark the bearing plates on both walls to the required spacing of the trusses (normally 24" o.c.).
- Hoist the trusses to the roof level, taking care not to bend or twist the trusses. See section 4.
- If interior walls are available, trusses may be laid flat.
- If no partitions exist, trusses shorter than 32' may be inverted and hung from the bearing plates.
- Erect gable or end trusses and install braces to prevent lateral movement. See section 5.
- Run a string line from heel to heel of the end trusses to be used as a guide line.
- Erect trusses using string to locate heels. Brace each truss as it is erected.
- Trusses may be marked at one end. Place trusses so that all marked ends are on the same side of the building.
- When flat trusses are used, ensure that they are installed with the proper side up.
- Install temporary bracing with sufficient X-bracing to prevent trusses from buckling or toppling over. See section 5.
- Secure trusses to plate using nails, hangers, anchors, or bearing brackets as required.
- Check alignment. See section 6.
- Install permanent bracing. See section 7.
- Complete roof by installing roof decking, gable end ladders, etc.

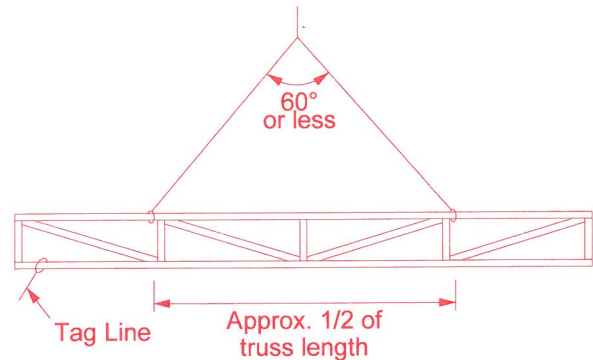
4. MECHANICAL HANDLING

Ideally, when mechanical means are used, the trusses should be lifted in banded sets and lowered onto supports. When this method is used, extreme caution must be exercised when breaking the metal straps. Trusses may domino, lose lateral stability, or totally collapse, if temporary braces and supports are not in place before releasing the banding. Lifting trusses singly should be avoided, but if necessary an appropriate spreader bar should be used with slings of sufficient strength and placed in a "toed-in" position. The "toed-in" position will prevent the trusses from folding.

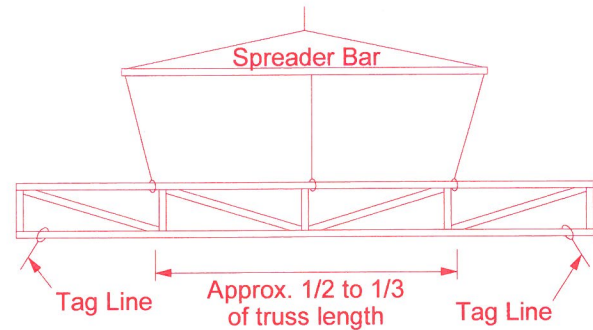
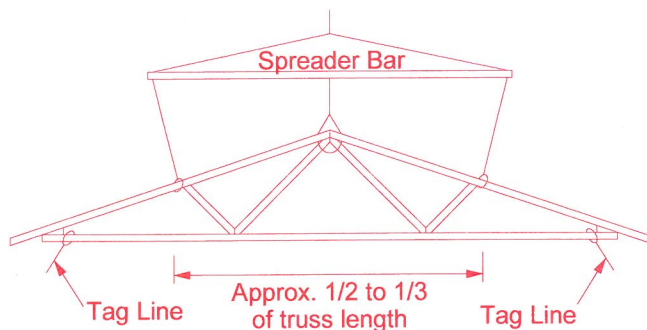
If erectors have any doubt, contact the truss supplier immediately.



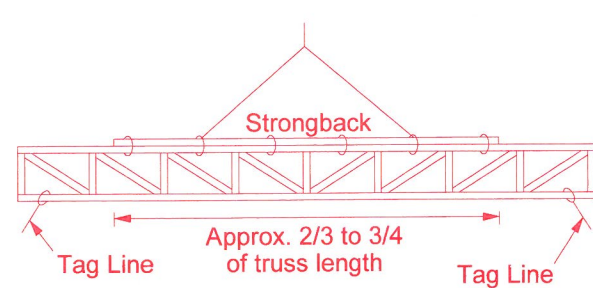
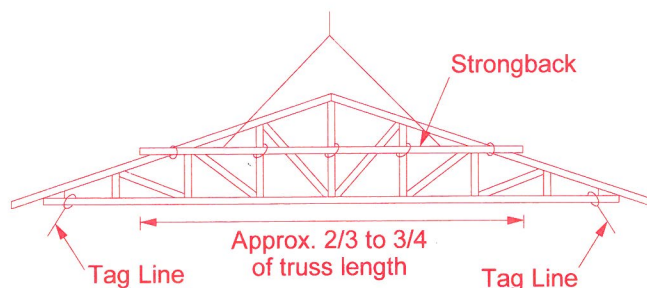
For spans of 20' or less, a single pick up point may be used to lift the truss. A tag line should be used whenever a truss is lifted to avoid having it swing and do damage.



Trusses up to 30' in length should be lifted using two pick up points located so that the distance between them is approximately one-half the length of the truss. The angle between the two cables should be 60 degrees or less to reduce the tendency for the truss to buckle laterally during the lift. A tag line should be fastened to one end to prevent the truss from swinging and causing damage to other parts of the work or to the truss itself.



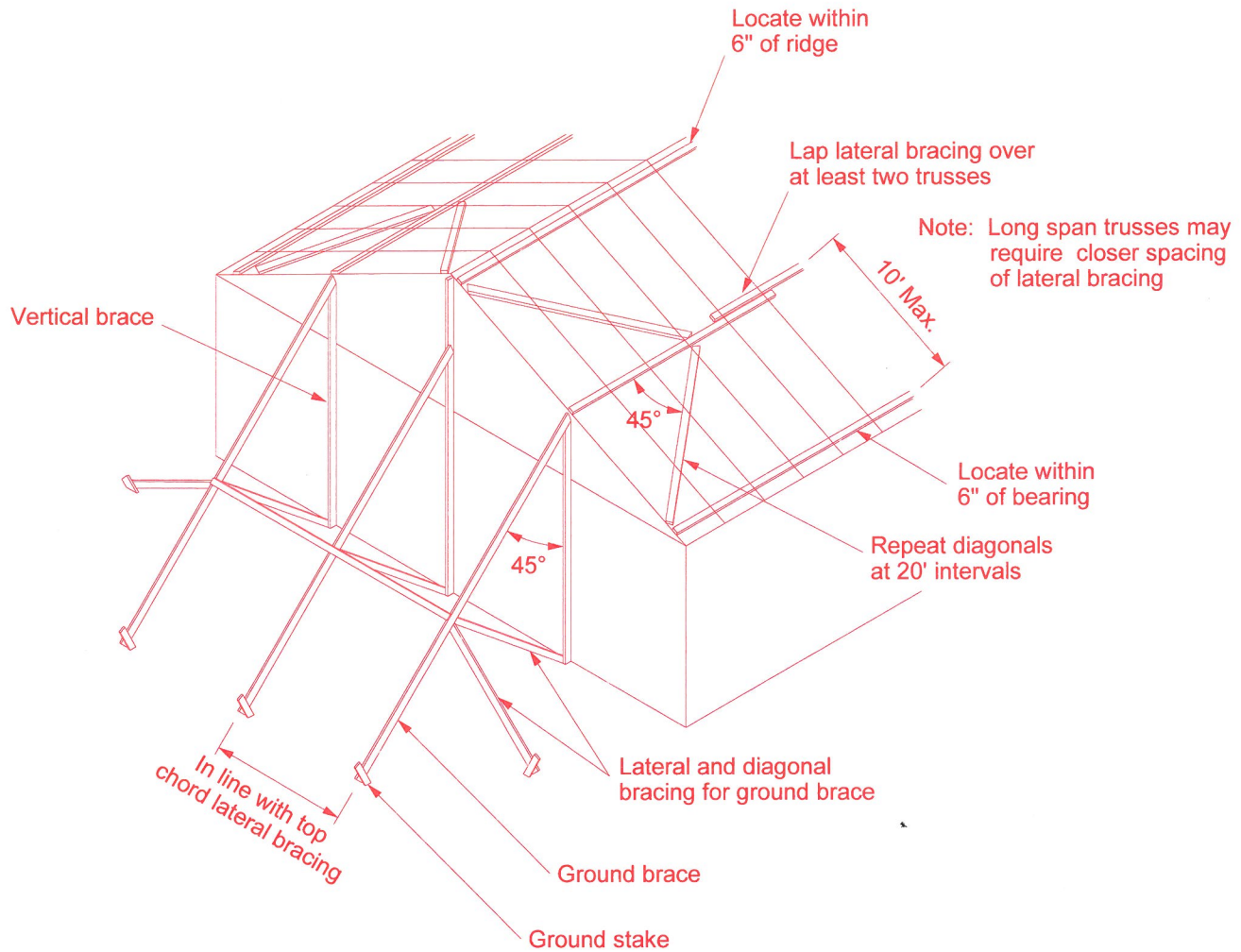
A spreader bar and short cable slings should be used to lift trusses in the 30' to 60' range. The cable slings may be vertical, but it is recommended that they be "toed-in" to prevent the truss from folding during the lift. Two tag lines should be used to control trusses of this size.



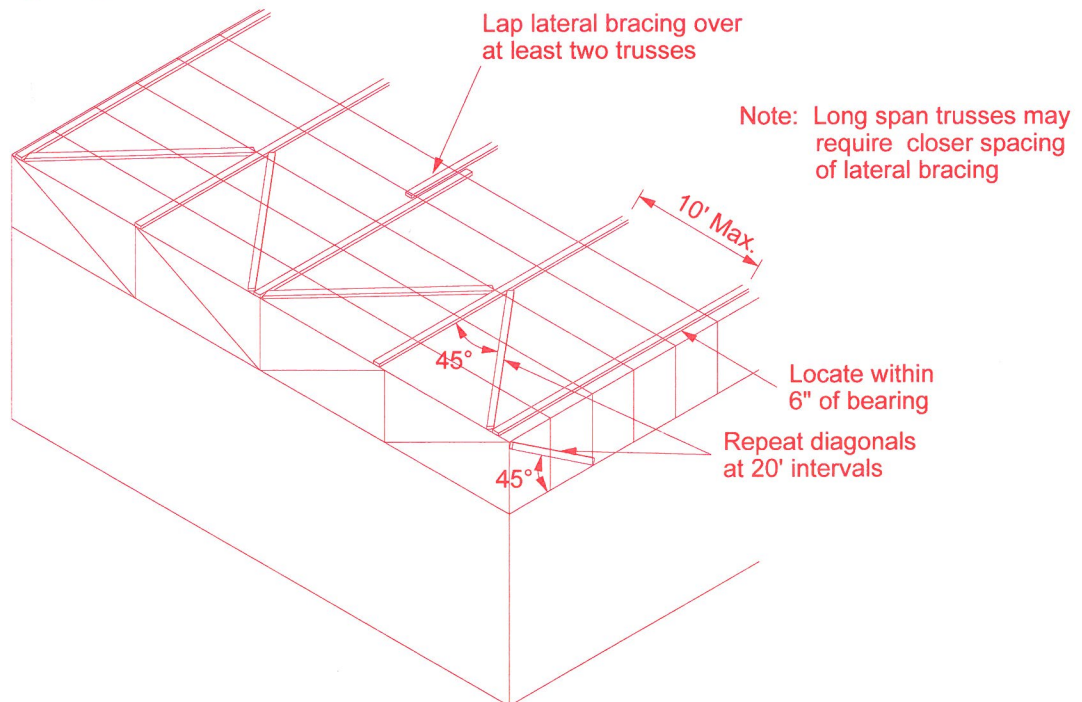
Trusses above 60' in length should be lifted with a strongback 2/3 to 3/4 the length of the truss. The truss should be securely tied to it at intervals of 10' or less. For flat trusses, the strongback should be tied to the top chord. Strongbacks should be positioned high enough on pitched trusses to prevent overturning of the truss. Two tag lines should be used to control the truss during lifting. Supervision by a professional engineer may be required.

5. TEMPORARY BRACING REQUIRED DURING ERECTION

a) Temporary bracing for gable truss top chord of pitched trusses.



b) Temporary bracing for top chord of flat trusses.



c) Temporary bracing for bottom chord and webs should be installed as per section 7 and left in place as permanent bracing.

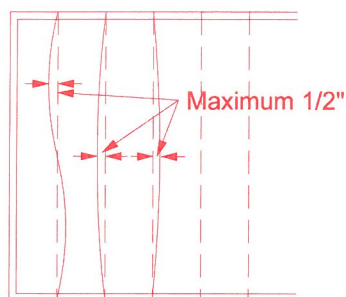
6. VERTICAL AND LATERAL ALIGNMENT - GENERAL WARNINGS AND PRECAUTIONS

All trusses are laterally unstable until properly braced. The longer the span the more care required. Adequate restraint is necessary at all stages of construction.

Complete stability is not achieved until the bracing and decking is completely installed and properly fastened.

Erection, bracing, and procedures as well as the safety of the workers are the responsibility of the erector.

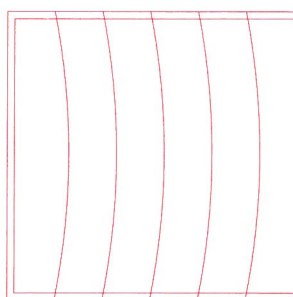
Problems may occur in attempts to realign trusses. Align each truss and place it permanently in position before it is connected to the bracing system. Once there is a load, even from the weight of the truss itself, large lateral forces are developed by attempts to realign the trusses. This may break the bracing system.



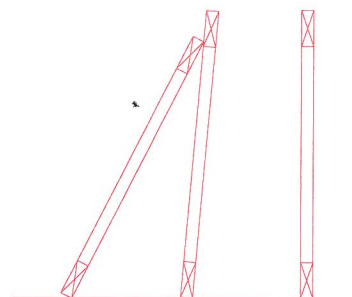
When properly aligned, each top chord should not vary more than 1/2" from a straight line.

	D	D/100
	12"	1/8"
	24"	1/4"
	36"	3/8"
	48"	1/2"
	60"	5/8"
	72"	3/4"
	84"	7/8"
	96"	1"
	108"	1"

Out of plumb installation tolerances.



The bracing system should provide support at spacings no farther apart than the drawings show for the bridging. Without proper bracing the trusses may not support even their own weight.



Collapse can easily occur without a bracing system that will prevent both horizontal sway (pictured to the left) or roll over (pictured above). By rolling on their sides, where they have no strength, the trusses will break or pull the ends off the bearings.

DO NOT permit cutting, drilling or any procedure that may damage the truss chords or webs!

DO NOT remove truss webs (even temporarily)!

DO NOT make field repairs to damaged trusses without the approval of the manufacturer!

DO NOT overload single trusses or groups of trusses with sheathing, roofing, or other construction materials or tools!

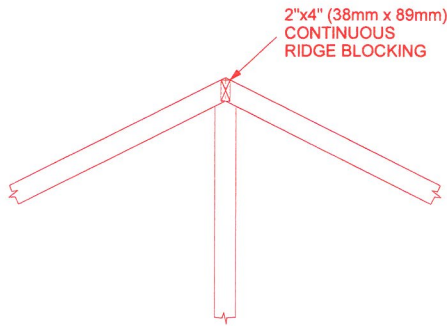
DO NOT erect damaged trusses! Should a truss or group of trusses fall to the ground or become damaged, do not proceed! The site engineer of record must certify that the trusses are satisfactory to erect. Notify the truss supplier immediately.

DO NOT use nails other than those specified without the approval of the manufacturer. Common wire nails are typically specified, and box nails, spiral nails, and power driven nails are not as strong!

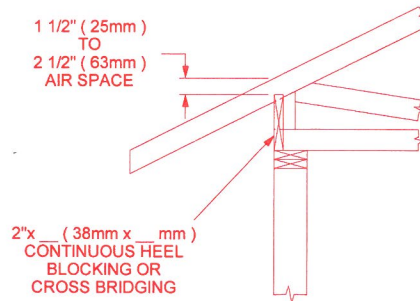
7. PERMANENT BRACING

Permanent bracing is designed and specified for the structural safety of the building. It is the responsibility of the building designer or an authority other than the truss designer to indicate size, location, and attachments for all permanent bracing. Typical applications of permanent bracing to be specified by the building designer are as follows:

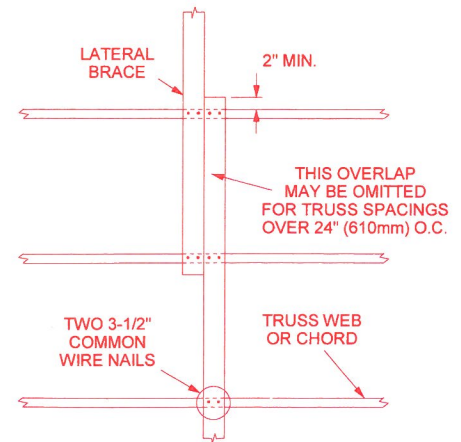
a) Typical details



TYPICAL RIDGE BLOCKING DETAIL



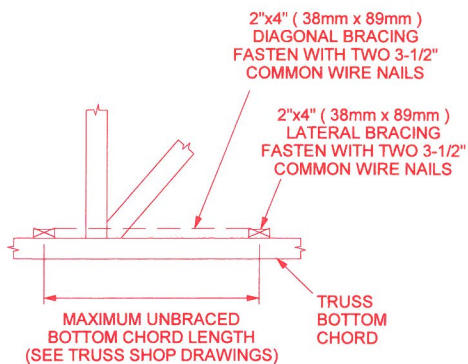
TYPICAL HEEL BLOCKING DETAIL



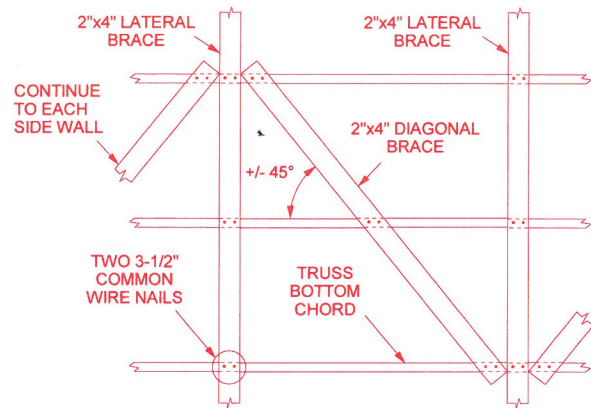
TYPICAL SPLICE DETAIL FOR LATERAL BRACING

b) Bottom chord bracing

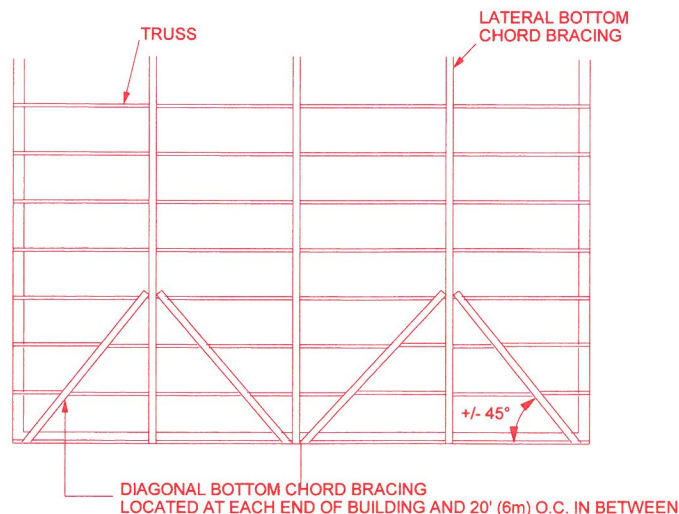
This lateral and diagonal bracing is required to maintain the proper truss spacing and to transfer force due to lateral forces into the side walls, shear walls or other resisting structural elements.



LATERAL BOTTOM CHORD BRACING END VIEW



TYPICAL BOTTOM CHORD BRACING DETAIL PLAN VIEW



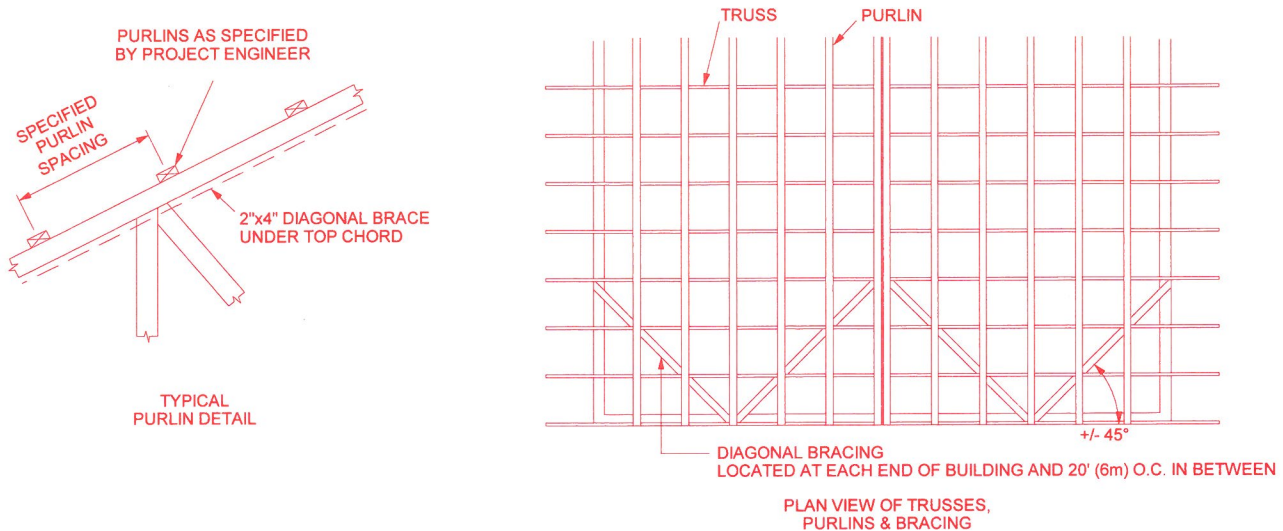
PLAN VIEW OF TRUSSES AND BOTTOM CHORD BRACING

1"x4" and 2"x3" may be substituted for 2"x4" in some applications. Consult your designer or project engineer.

7. PERMANENT BRACING (Continued)

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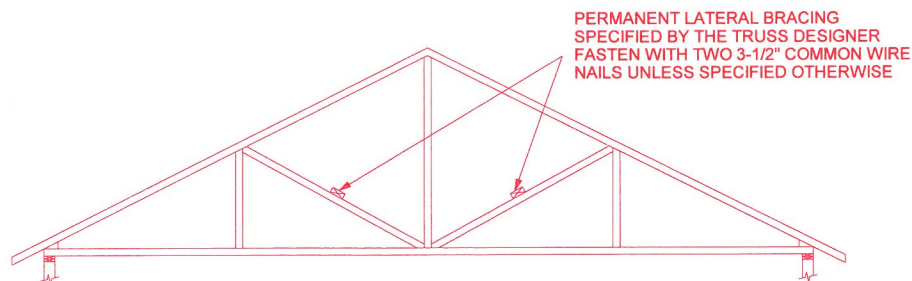
c) Top chord bracing (if purlins are used).



If valley sets, piggy-back trusses or conventional framing are installed on top of the main trusses, the full length of the top chords of these trusses must be restrained by sheathing or purlins spaced as specified on the structural or truss design drawings. Top chords of trusses must always be restrained from lateral movement.

d) Lateral web bracing

This type of bracing is specified by the truss designer to prevent buckling of truss members, and is shown on the truss drawings.



It must be emphasized that lateral bracing **MUST BE INSTALLED** when it is shown on the truss design drawings.

Lateral movement of the lateral bracing **MUST BE RESTRAINED** by installing permanent anchor bracing as shown in section 7.e.

If it is not possible to install lateral web bracing as specified on the truss design drawing, or if the truss run is less than three trusses of the same kind, a "T" brace shall be installed as per the truss design drawing or Appendix C Table C.1.1 of the T.P.I.C. Truss Design Procedures and Specifications manual.

7. PERMANENT BRACING (Continued)

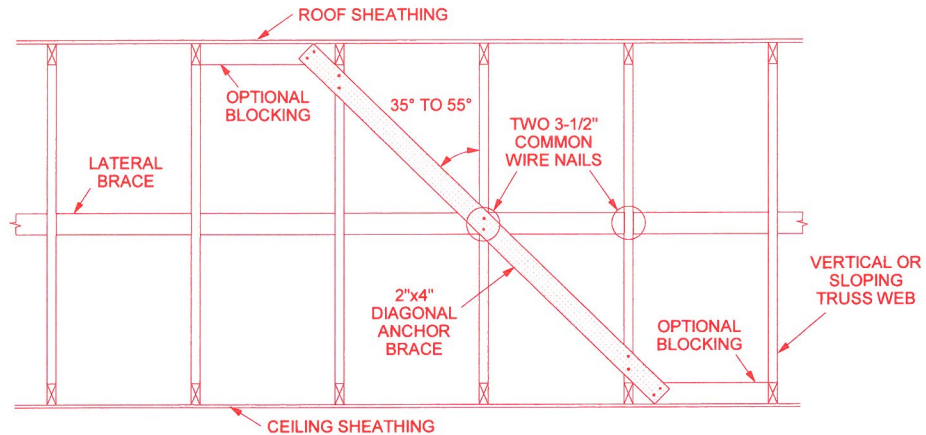
Permanent bracing is designed and specified for the structural safety of the building. It is the responsibility of the building designer or an authority other than the truss designer to indicate size, location, and attachments for all permanent bracing. Typical applications of permanent bracing to be specified by the building designer are as follows:

e) Anchor bracing

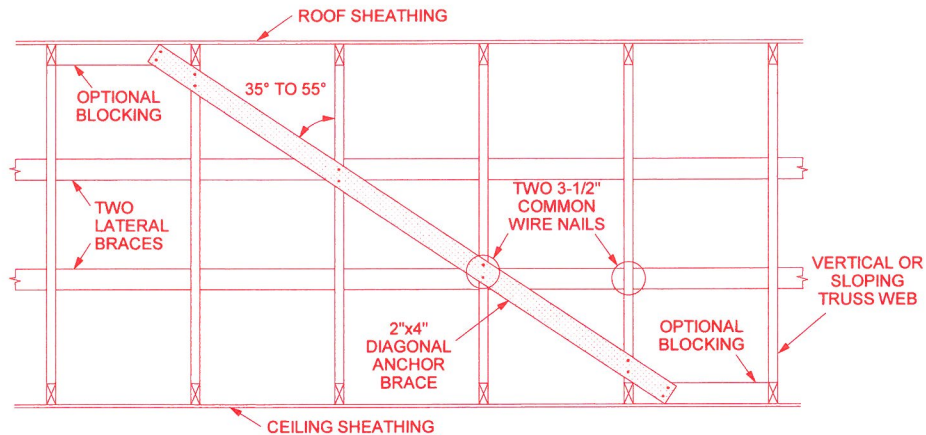
Permanent lateral bracing similar to that described in section 7.d. must be anchored. It is the responsibility of the building designer to specify the type of anchor. Typical methods of anchoring the permanent lateral web bracing are shown below.

Anchor bracing should be installed at each end of the lateral bracing run, and at 20' (6m) o.c. maximum in between, or as otherwise specified.

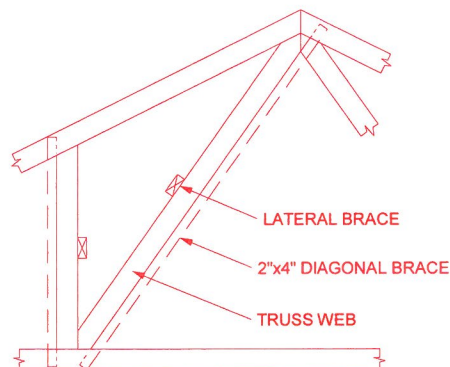
TYPICAL ANCHOR BRACING DETAIL
FOR ONE LATERAL WEB BRACE



TYPICAL ANCHOR BRACING DETAIL
FOR TWO LATERAL WEB BRACES



LATERAL WEB BRACING
END VIEW



7. PERMANENT BRACING (Continued)

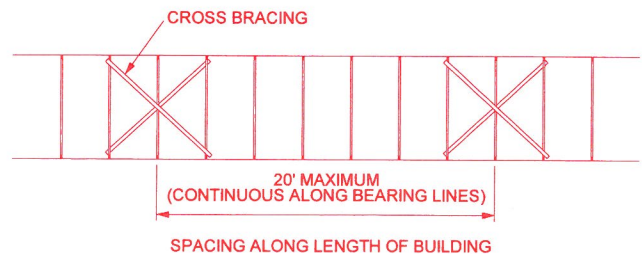
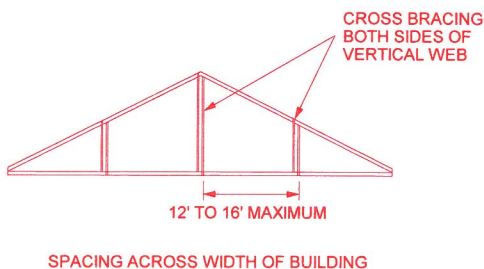
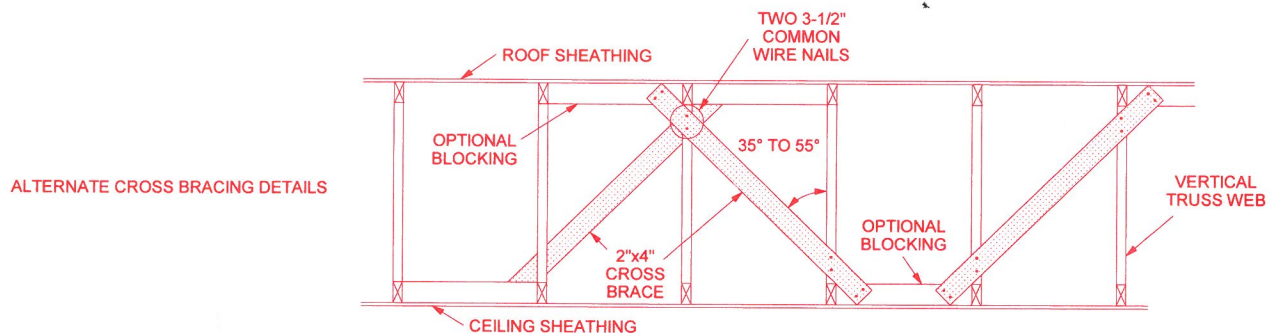
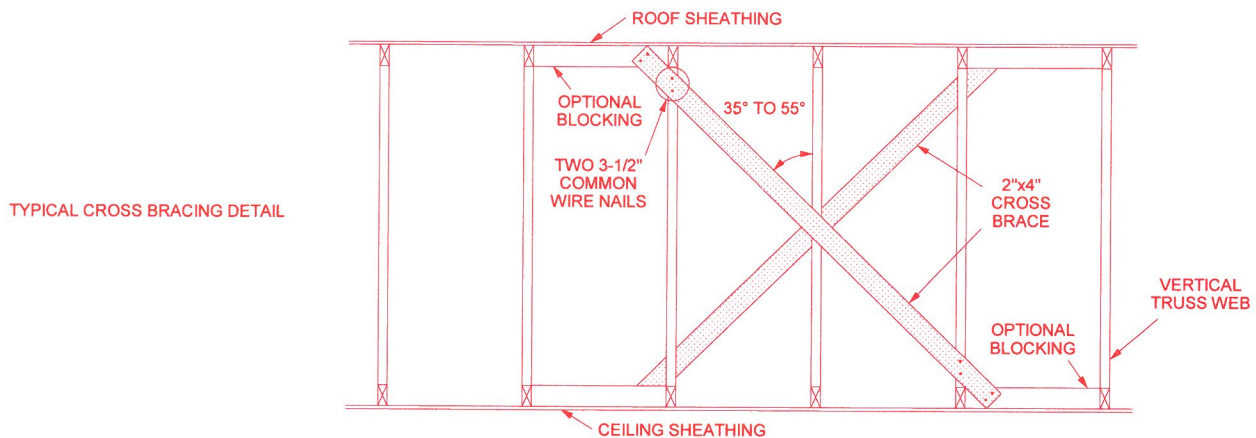
Permanent bracing is designed and specified for the structural safety of the building. It is the responsibility of the building designer or an authority other than the truss designer to indicate size, location, and attachments for all permanent bracing. Typical applications of permanent bracing to be specified by the building designer are as follows:

f) Diagonal web bracing (Cross bracing)

The diagonal web bracing specified by the building designer is used to hold the trusses in a vertical position, to maintain the proper spacing, to distribute unequal loading to adjacent trusses, and to transfer lateral forces to diaphragms and shear walls.

Diagonal web bracing should be installed at each end of the building, and 20' (6m) o.c. maximum along the length of the building, or as otherwise specified. Also, it should be installed at 12' to 16' (3.6m to 4.8m) intervals along the span of the trusses.

Continuous diagonal web bracing should be installed along all truss bearing lines, unless the trusses are sheathed or otherwise restrained at that location.



More handling, erection and bracing information is available at:

Western Wood Truss Association (WWTA)
www.wwtams.com

Truss Plate Institute of Canada (TPIC)
www.tpica.ca

Canadian Wood Council (CWC)
www.cwc.ca

