

Introduction

This guideline is intended to provide safe information on the safe storage, handling and erection of light frame wood trusses. The safe installation of wood trusses requires an understanding of how wood trusses are designed to carry loads, as well as the requirement to ensure that the trusses are properly structured during the erection (or demolition) of a structure.

This guideline provides a general overview, but is not intended to be comprehensive in all aspects. The wood truss erection contractor must ensure that all necessary specifications, erection drawings, bracing details and other information is reviewed and compiled with prior and during wood truss erection.

Roof Truss Erection Guidelines

The safe erection of wood truss systems is dependent on:

- Proper delivery and storage of wood trusses
- Proper documented erection procedures
- trained wood truss erection workers
- Skilled and experienced supervision

Major causes of Wood Truss Failures

Wood trusses ([Fig. 2](#)) are usually long slender members made up of dimensional lumber connected with special metal plate fasteners.

Trusses have very little lateral strength or resistance to lateral (side) loading. This is the primary reason for truss failures and collapse. prior to the trusses being properly secured, braced and sheathed, they are often subjected to lateral loads which can result failure of the truss system. The major causes of these failures are;

- improperly located or installed temporary bracing ([Fig. 1](#))
- improper or inadequate connections to the supporting structure
- overloading of the trusses before permanent bracing or sheathing has been installed (usually

- stacks of plywood placed on trusses)
- improper or unauthorized field changes to the trusses
- installation of damaged, or broken or improperly repaired trusses
- improper truss alignment before bracing

Delivery and Storage of Wood Trusses

(See [Fig. 3](#))

- Schedule delivery of trusses reasonably near the scheduled time of erection.
- Upon arrival and during the unloading process, inspect the trusses for damage.

IF IT APPEARS THAT THERE IS ANY TRUSS DAMAGE THIS SHOULD BE NOTED AND MANUFACTURER CONTACTED FOR N ON-SITE INSPECTION, PRIOR TO ANY ERECTION OF THE TRUSSES.

NOTE: DO NOT repair damaged or broken trusses without precise instructions from the manufacturer or a duly qualified professional engineer.

- Prepare a clear access to the worksite and designate level area for storage of the trusses. Make sure that there is no chance of damage to the trusses by other work activity or weather conditions. Be aware of overhead powerline restrictions when unloading and hoisting the trusses. Keep the trusses strapped together until the start of the erection.
- Trusses stored horizontally must have lateral support to reduce any deflection. If stored vertically, the truss bundle must be braced properly to prevent any toppling.

Truss Erection Procedures: General

It is essential that all necessary erection and bracing instructions, in written form, are available at the worksite, prior to beginning truss erection. The truss erection contractor must install the trusses in accordance with the manufacturers information and any instructions of a professional engineer. In addition, all workers must be instructed in the proper method of erecting the wood trusses, based on the documentation. This includes the methods of hoisting, sequence of erection, bracing and connection details, loading limitations and any other relevant information. Truss erection must be undertaken under the direct supervision of a skilled supervisor. Only workers directly involved in the truss erection work shall be in the area.

Hand Installation

This method of installation is limited to trusses that can be carried, raised up, and rotated into position without excessive lateral deflection (i.e. 6" (150 mm) on a 20' (6m) length of truss)

- Support of trusses to reduce the deflective damage shall be provided at the peak when less than or equal to 20' (6m), and at quarter points when greater than or equal to 30' (9m).
- Trusses shall be handled to ensure support at intervals of 25' (8m) or less.

Mechanical Installation

Where a crane or other hoisting device is used to erect trusses, the following hoisting rules must be followed:

- Use closed loop attachments such as slings, cables or nylon strapping of sufficient strength to support the weight of the truss.
- Provide necessary spreader bars, tag lines, strong back etc. in accordance with good rigging practice. Strongbacks should be attached to the top chord and web members at intervals of approx. 10' (3m) and must be strong and rigid enough to carry the weight and resist bending the truss.
- Do not lift trusses with spans greater than 20' (6m) by the peak
- See the following comments and illustrations for lifting dimensions and criteria

NOTE: When a spreader bar is used, lines to the truss connection points should be "toe-in" to reduce the chance of buckling the truss.

NOTE: A forklift may be used to hoist trusses into place, if the same pick-up point and spreader bar assembly criteria is followed.

Figure 4

Small trusses may be installed by hand provided that care is taken to prevent excessive lateral bending when sliding them over the walls and when flipping them upright on the walls.

Figure 5

For spans of 6m 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.

Figure 6 and Figure 7

Trusses up to 9 m 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.

Figure 8 and Figure 9

A spreader bar and short cable slings should be used to lift trusses in the 9 to 18 m range. The cable slings may be vertical or may be toe-in. Two tag lines should be used to control the raising of trusses of this size.

Figure 10 and Figure 11

Trusses above 18 m in length should be lifted with a strongback which is 2/3 to 3/4 the length of the truss. The truss should be securely tied to it at 3m intervals or less. For flat trusses the strongback should be tied to the top chord. Pitched trusses should be positioned high enough on the strongback to prevent overturning of the truss. Two tag lines should be used to control the truss during lifting.

Temporary Bracing

It is absolutely necessary to provide proper temporary bracing for wood truss structures during the construction process. Temporary bracing is installed as the trusses are erected to hold the trusses in a stable condition by providing lateral stability until permanent truss bracing and floor sheathing is completed.

Temporary bracing must remain in place as long as necessary for the safe completion of the truss assembly.

Temporary lateral bracing is NOT sufficient to prevent the collapse of a group of wood trusses. Diagonal bracing should always be used with lateral bracing to provide "triangulation", which strengthens the trusses in all directions.

There must be an adequate means of attaching the trusses to the supporting structure, immediately upon the trusses being installed.

NOTE:

The spacing for lateral and diagonal bracing should be provided by the manufacturer of the trusses or a design engineer. If it is not provided, DO NOT begin erection of the trusses. Ensure that proper detailed bracing erection drawings are provided and followed exactly.

Ground Bracing is used to provide stability for the first truss installed. It is composed of vertical and diagonal members providing support from the installed trusses to the earth, floor, foundation or slab.

- Ground braces must be a minimum of 2"x4" (50mm x 100mm) construction grade lumber.
- Ground bracing should be located in line with the top chord lateral bracing.
- Proper ground bracing also requires lateral and strut bracing to ensure stability and support, as indicated on the erection drawings.

Major points to remember for bracing

- The first truss being installed must have complete and substantial bracing, since all other trusses rely on support from the first truss (Fig. 12 and Fig. 13).
- A minimum of 2 - 16d nails must be used for each truss bracing connection (Fig. 14)
[2 - 2 1/2" (60mm), up to 24" (600mm) centers]
[2 - 3 1/2 (90mm), up to 24" (600mm) centers]
- Bracing shall consist of a minimum 1"x4" (25x100mm) construction grade lumber, up to truss spacing of 24' (600mm) on center.
- Bracing shall consist of minimum 2"x4" (50x 100mm) construction grade lumber, for truss spacing greater than 24" (600mm) on center.
- Lateral bracing shall overlap at least two trusses.
- Lateral bracing is not sufficient on its own and MUST be used with proper diagonal bracing, (i. e. bracing installed at a 45 degree angle to the trusses)
- Diagonal bracing should be installed immediately after the first group of trusses have been

laterally braced. A rated sheathing brace system (i.e. 4'x8' plywood) is an acceptable alternative and should be repeated at the same intervals as the top chord diagonal bracing plan.

- Temporary bracing must be removed with care and only if the permanent roofing or flooring material is being installed. The temporary bracing is removed in stages and sequentially, as the permanent system is being installed.

Demolition and Truss Removal

The principle behind demolition and the removal of trusses is to sequence the work in reverse to the installation procedure for the structure.

As the permanent floor or roof is removed, bracing must be provided to the trusses that become laterally unsupported. The removal of the decking should be done in stages, and not removed all at once prior to any temporary bracing is being installed. It is better to sequence the removal of the trusses in stages, moving from one end of the structure to the other, than to remove all the decking for the entire roof or floor prior to removing the trusses.

For further information and details regarding the erection of roof trusses, contact:

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