Floor Truss Ribbon Board Load Path

Design Guide

Revised 3/24/2017

SBCA

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Introduction

- When walls are installed on top of bottom chord bearing floor trusses, a ribbon board, or “band” board, is typically installed.
- This is done for the following reasons:
  - To provide lateral support to the trusses
  - To provide support for floor sheathing
  - To transfer loads from the wall above to the truss ends where they can be transferred to the wall below.

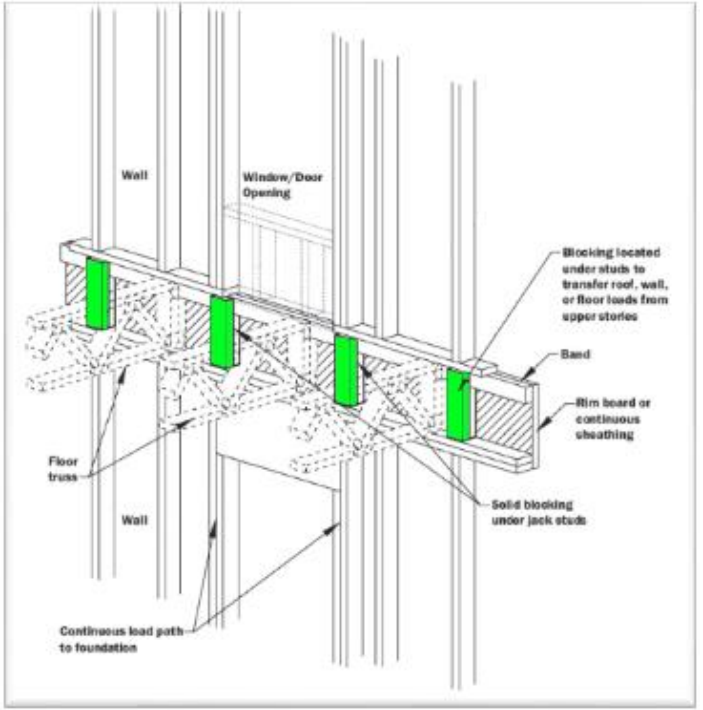


Figure 2.15a, *Wood Frame Construction Manual 2012*.

Introduction

- The IRC does not provide specific guidance as to when blocking may be required to transfer the loads directly.
- The 2012 Wood Frame Construction Manual (WFCM), a referenced standard within the IRC, includes the detail at right, where intermediate blocking (green) is included between the wall bottom plates and the bearing wall below to provide this load transfer.
- The following step by step guide will assist the designer to determine whether or not this blocking is required.

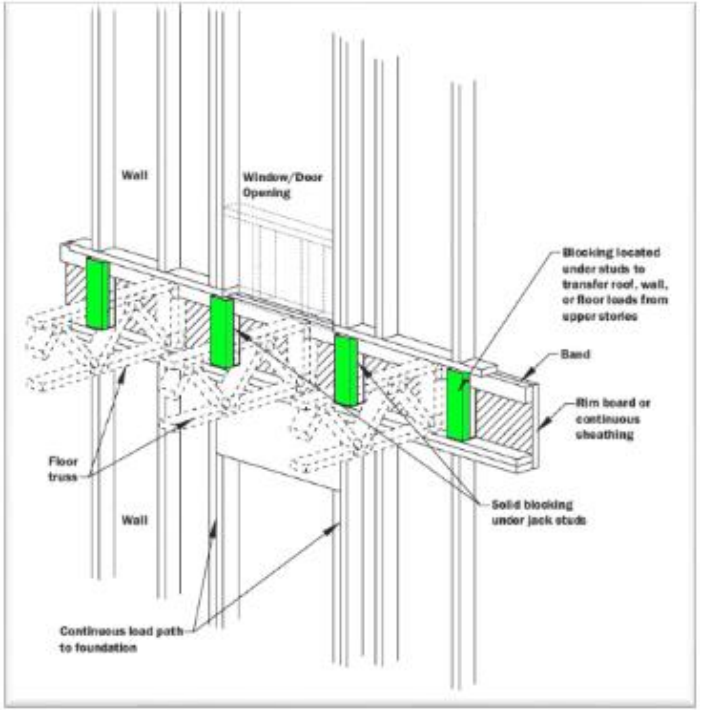


Figure 2.15a, *Wood Frame Construction Manual 2012*.

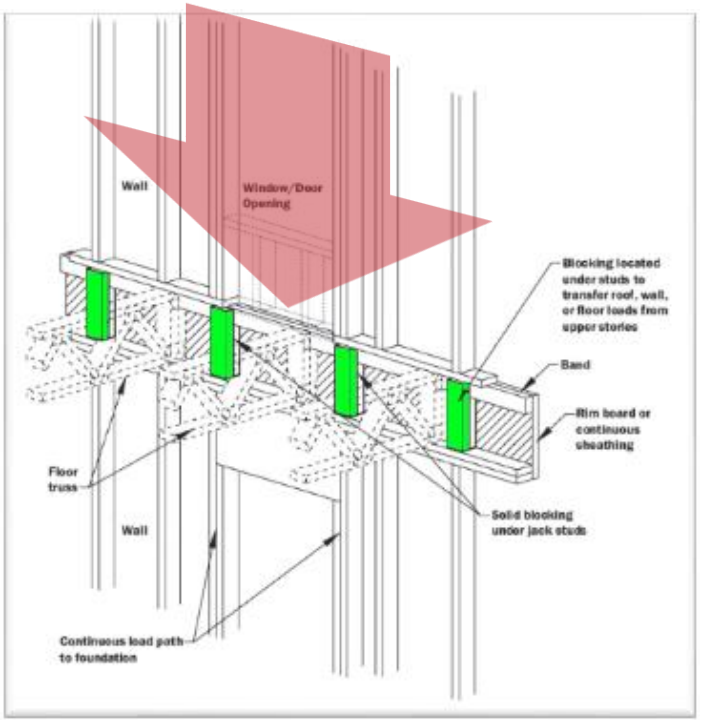
Introduction

- Testing by the Structural Building Components Institute (SBCRI) determined that for the three conditions tested, Floor truss systems using a ribbon board can support the following loads without blocking.

Ribbon Board Assembly Test Results					
Ribbon Board Size	Floor Sheathing Size	Floor Sheathing Glued	Average Maximum Load (lbs)	Average Maximum Load (PLF)	Maximum Allowable Load w/ Safety Factor of 2.0 (PLF)
2x4	23/32"	No	14,569	3,642	1,821
2x4	23/32"	Yes	15,457	3,864	1,932
2x6	23/32"	No	17,894	4,474	2,237

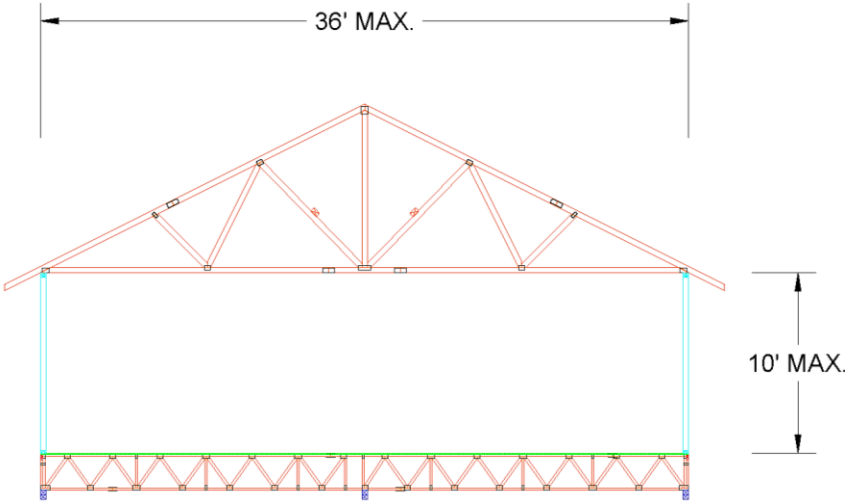
Step 1: Determine the Load

- Determine the load that needs to be transferred from the wall above to the floor truss system.
- If the loading carried by the ribbon board does not exceed the maximum allowable, blocking may be omitted.



Step 2: Determine the Load – Example

- Example – Assembly as shown at right:
  - Roof trusses:
    - 36’ clear span
    - 24” overhangs
    - 24” o.c. spacing
  - Stud wall:
    - 10’ tall by 3-1/2” deep
    - 24” o.c. stud spacing
    - Double 2x4 top plate or better
    - Single 2x4 bottom plate or better
  - Rim board
    - Assumed 2x4 No.2 or better



Step 2: Determine the Load – Example

- Per *ANSI/TPI 1-2014* section 7.5.2.1, all loads along this load path can be considered as uniform PLF loads.

7.5.2 Girder Loading.

7.5.2.1 Application of Reactions onto Girder Trusses.

Reactions, R_i, imposed by uniformly spaced members spaced at more than 34 in. (86 cm) on center shall be applied as concentrated loads. Conversion of Reactions imposed by uniformly spaced members spaced less than or equal to 34 in. (86 cm) on center to an equivalent uniform load is not prohibited.

Step 2: Determine the Load – Example

- Calculations to determine the loading carried by the ribbon board are found per ASCE, where:
  - P_f = Flat Roof Snow Load
  - Lt_R = Roof Load
  - Lt_W = Wall Load

$$P_f = 0.7*C_e*C_t*I_s*P_g$$
$$= 0.7*1*1.1*1*70$$
$$= 53.9$$

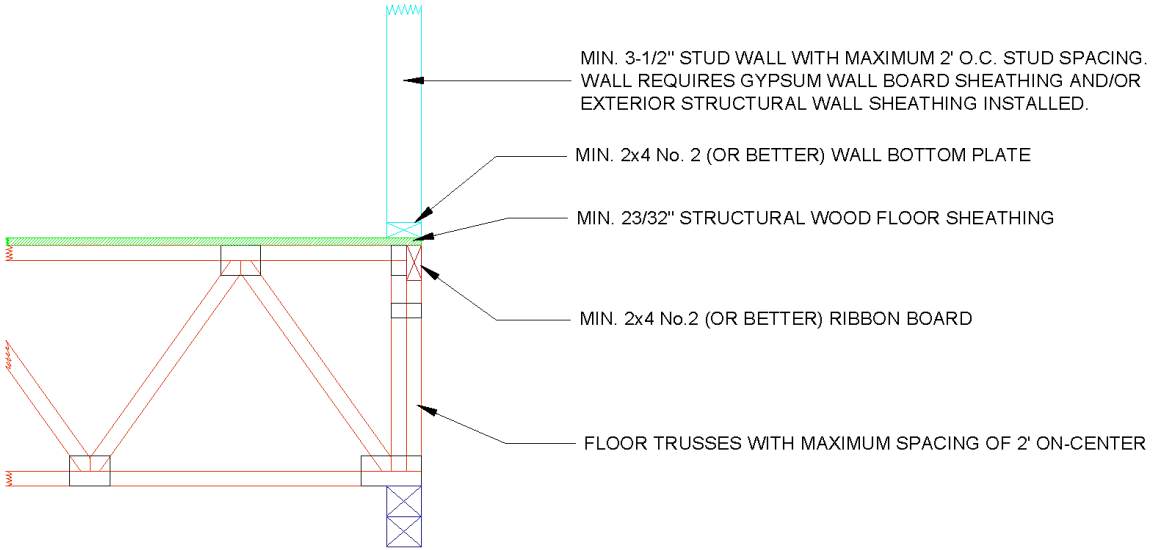
$$Lt_R = \Sigma P_R$$
$$= ((53.9+10+10)(36+2+2))/2$$
$$= 1478 \text{ PLF}$$

$$Lt_W = \Sigma P_W$$
$$= 10 * 10$$
$$= 100 \text{ PLF}$$

$$\Sigma L = Lt_R + Lt_W$$
$$= 1478 + 100$$
$$= 1578$$

Step 2: Determine the Load – Example

- The loading carried by the ribbon board is 1578 plf, which does not exceed the 1821 plf limit from the SBCRI testing.
- In this example, blocking is not required



Step 3: Concluding Discussion

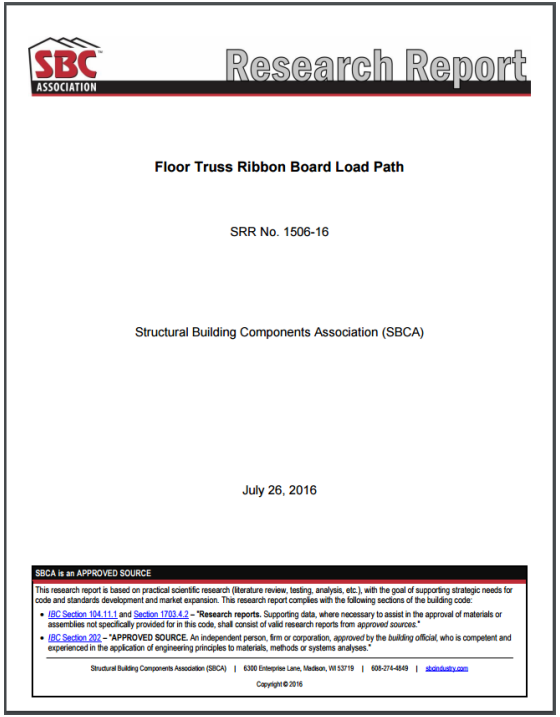
- The example shown was for a building where the applied snow loads and roof spans are at the limits of the IRC.
- Any buildings with a lower snow load or roof span would also be permitted without the blocking.
- Where the floor is carrying more than one story, the loading should be checked using the actual applied loads to determine whether blocking is needed or not.

Step 3: Concluding Discussion

- Other methods of transferring the loads are permitted. Examples of other methods include:
  - Provide 2x trusses of the same depth as the floor trusses along the bearing walls to provide a “rim board” that will provide the load transfer. Floor trusses would need to be shortened to accommodate this method.
  - Provide trussed panels to fit between the trusses along the bearing walls.
  - Use engineered lumber of the same depth as the trusses to provide a rim board.

References

- For a full explanation of the testing completed, see the SBCA Research Report SRR 1506-16, *Floor Truss Ribbon Board Load Path*



SBC ASSOCIATION

Research Report

Floor Truss Ribbon Board Load Path

SRR No. 1506-16

Structural Building Components Association (SBCA)

July 26, 2016

SBCA is an APPROVED SOURCE

This research report is based on practical scientific research (literature review, testing, analysis, etc.), with the goal of supporting strategic needs for code and standards development and market expansion. This research report complies with the following sections of the building code:

- *IBC* Section 104.11.1 and Section 1703.4.2 – **"Research reports.** Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved sources*."
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