MiTek Industries, Inc. is the leading supplier of connector plates, truss manufacturing equipment, design software, and engineering services for the worldwide component industry. For over 35 years, MiTek companies have developed and refined their connector plates into the state-of-the-art products they are today—consistent and dependable!

With MiTek, you’re assured of the best quality. MiTek connector plates are manufactured under strict quality control and undergo extensive testing in our R & D facility.

MiTek’s connector plates meet or exceed all building code and industry association requirements. Acceptances include BOCA, ICBO, HUD/FHA, SBCCI, Dade County, Wisconsin/DILHR, and LA City.

MiTek also offers the very best in framing layout and engineering software for roof and floor trusses, as well as wall panel design. These programs provide our fabricators with fast and accurate layout and design capabilities. Our engineering department is available to review and seal our customers’ designs. With offices in NC, Missouri and California, MiTek’s professional engineers can furnish seals for all 50 states!

Look to a MiTek fabricator for the best the industry has to offer! This brochure reviews the benefits of roof and floor trusses, but MiTek fabricators also offer a full line of builders hardware and a complement of other building components including wall panels and steel framing.

MiTek is committed to providing the best products and services in the industry and will continue our tradition of customer support.

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<td>Glossary of Terms</td>
<td>Joint</td>
<td>The intersection of two or more members. (Also referred to as a Panel Point.) Joint Splice A splice of the 4x2 chord member at a chord-and-web joint. KneeWall A short partition stud wall to increase a wall height, typically from the concrete wall plate to the floor decking. Lateral Brace A member placed and connected at right angles to a chord or web member of a truss. Level Return A lumber filler placed horizontally from the end of an overhang to the outside wall to form a soffit. L/D Ratio The ratio of the truss span (L) to its depth (D), both dimensions in inches. Live Load Any temporary applied load to a floor truss chord; typically roof live load is snow, while floor live loads are furniture, human occupancy, storage. Load-Bearing Wall A wall specifically designed to transfer a roof load and/or upper floor load into the foundation. Machine Stress Rated Lumber (MSR) Lumber which has been individually tested by a machine at the lumber mill to determine its structural design properties. MSR Lumber is designated by a flaxural (bending) stress and Modulus of Elasticity, e.g., 1650-1.5E. Moisture Content of Wood The weight of the moisture in wood expressed as a percentage of its oven-dry weight. Moments A structural measure of the effects of bending on a member due to applied loading. Overall Rise Vertical distance from bottommost part of the bottom chord to uppermost point on peak. Overhang The extension of the top chord of a truss beyond the heel measured horizontally. PCT Abbreviation for Parallel chord Trusses, the Truss Plate Institute (TPI) specification designation for trusses with parallel chords and 4x2 chord orientation. P&amp;I Design Specification for Metal Plate Connected Parallel Chord 4x2 Wood Trusses. PLF Pounds per lineal foot, acting along a structural member, usually equal to the uniform load (PSF) times the truss spacing. PSF Pounds per square foot of uniform load. Panel Length The distance between the centerlines of two consecutive joints along the top or bottom chord. Panel The chord segment defined by two adjacent joints. Panel Point The point where a web or webs intersect a chord. Peak Point on truss where the sloped top chords meet. Pitch Inches of vertical rise for each 12 inches of horizontal run. Plate A horizontal wood framing member, typically the top and bottom 2x4 members of a stud wall and the 2x6 sill plate bolted to a concrete wall for floor structural attachment. Plenum Typically the use of the entire floor truss cavity formed by the floor above and the ceiling below as a supply or return air “duct.” Plumb Cut Top chord end cut to provide for vertical (plumb) installation to fascia (face trim board). Plumb Rise Vertical overall measurements at the end of a truss where the top and bottom chords meet. Pre-Splice Plate Connector Plates pressed into the top and bottom 3-1/2” faces of two 4x2 chord members prior to final floor truss assembly to achieve a structural chord splice. Purflings Secondary structural components, spanning between primary structural members and supporting the decking. 1/4 Point (also referred to as Mid-Chord Bearing) The point at which the 4x4 block length is extended, this is referred to as Top-Chord Bearing. Reaction The total load transferred from the uniform load (PSF) applied to the floor truss deck, then into the floor truss, and ultimately, to the floor truss bearing or support. Ridge Line formed by truss apexes. Rim Joist An exterior transition member supporting the decking edge and wall sheathing, usually being the ends of floor trusses together. (Also referred to as a Mid-Chord Bearing) Rise Vertical distance from bottom most part of the bottom chord to inside of the peak. Scalp Additional timber connected to a truss to effect a splice, extension or general reinforcement. Shop Drawings Detailed drawings of a roof truss or roof framing showing critical dimensions such as span, overhang, cantilever, slope, etc. Slope See Pitch. Spacing The centerline-to-centerline distance between trusses. Span The overall distance between adjacent interior supports or to the outside of supports when at the end of a truss. (See detail above.) Splice Plate A 4x2 horizontal wood plate. The point at which two chord members are joined together to form a single member. It may occur at any point in the chord between the flanges. Squar End Cut of top chord cut perpendicular to slope of the member. Strongback A 2x6 lateral brace, used with its long dimension in a vertical orientation, running perpendicular to the trusses, and attached to the truss vertical web members. Support The structural element resisting the truss, usually a wall or beam. (Also referred to as a Bearing.) Symmetrical Truss A truss with the same configuration of members and design loading occurring on each side of a truss centerline. Top Chord The continuous 4x2 member forming the top of the floor truss. Top-Of-Beam A floor truss support condition in which the truss load is transferred to the bearing or support through the top chord and 4x4 block end detail. Truss A pre-built component that functions as a structural support member. A truss employs one or more triangles in its construction. Truss-clip Metal component designed to provide structural connection of trusses to wall plates to resist wind uplift forces. Visually Grade Lumber Which visual grade is usually visually rated at the lumber mill for structural properties through rules established by national agencies or state boards. Warren Truss A general truss configuration with repetitive web “W” orientation. For floor truss applications, the top and bottom chord panels are typically 30” length, usually with a 24” wide rectangular chase or duct opening at the centerline. Web A vertical or inclined member connecting the top and bottom chords of a truss.</td>
<td></td>
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<td></td>
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</tbody>
</table>
A truss is an engineered structural system in which the bending moment at a given point along the length of the member is transmitted by the combination of axial (tension or compression) forces and shear forces perpendicular to the length of the member. The bending moment is calculated by dividing the area by the distance between the points of support. The bending moment at any point along the length of the member is equal to the sum of the axial force and the shear force acting on that point. The bending moment is calculated by dividing the area by the distance between the points of support. The bending moment at any point along the length of the member is equal to the sum of the axial force and the shear force acting on that point.

Why Use Wood Trusses? Contractors and Builders Know!

Contractors and Builders know that a MiTek engineered roof or floor truss system ensures quality and efficiency.

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Contractors and Builders know that a MiTek engineered roof or floor truss system ensures quality and efficiency.
The installer should be knowledgeable about the truss drawings, truss placement plans, and all notes and cautions thereon.

**Temporary Bracing**

Temporary or installation bracing is the responsibility of the installer. Temporary bracing should remain in place as long as necessary for the safe and acceptable completion of the roof or floor and may remain in place after permanent bracing is installed.

**Storage**

Trusses should be stored in a stable position to prevent toppling and/or shifting.

If trusses are stored horizontally, the blocking should be eight to ten feet centers to prevent lateral bending. If the truss bundle is to be stored for more than one week, the solid-blocking, generally provided by the receiving party, should be at a sufficient height to lessen moisture gain from the ground.

During long-term storage, trusses should be protected from the elements in a manner that provides for adequate ventilation of the trusses. If tarpaulins or other water resistant materials are used, the ends should be left open for ventilation. If trusses are made with interior rated fire retardant lumber, extreme care should be taken to limit outside exposure.

**Field Assembly**

In some cases, the size or shape of wood trusses is such that some field assembly is required. The installer is responsible for proper field assembly.

Complete details on handling, installing and bracing can be found in the Truss Plate Institute (TPI) publications HIB-91 and DSB 89, available from TPI 583 D’Onofrio Drive, Suite 200, Madison, WI 53719.

Reprinted from the “Commentary & Recommendation for Handling, Installing & Bracing, Metal Plate Connected Wood Trusses, HIB-91”, by permission of Truss Plate Institute, Inc.

**Note:** Above max-spans are valid for lumber design only. Plating or other considerations may further limit the truss design.
Residential Flooring
40 psf TC live Load
10 psf TC Dead Load (3/4” plywood decking)
0 psf BC Live Load
5 psf BC Dead Load (1/2” to 5/8” drywall)
55 psf Total Load
(If heavy insulation or 2-ply drywall ceiling, BC Dead Load = 10 psf and 40/10/0/10 = 60 psf Total Load)

Commercial Floors
(Concrete deck)
50 psf TC Live Load (commercial use)
35 psf TC Dead Load (3” concrete floor)
0 psf BC Live Load
10 psf BC Dead Load
95 psf Total Load

Residential and Commercial Roofing
20, 25, 30, 40, 50 psf TC Live Load
(designated on local building code requirements)
10 psf TC Dead Load (includes future re-roofing)
0 psf BC Live Load
10 psf BC Dead Load
40 to 70 psf Total Load (dependent on TC Live Load)

Notes:
- Above representative loads are typical loading requirements for many regions in the country.
- However, the required applied loading for design purposes is the responsibility of the building designer, within the limitations of the prevailing local, state, or regional building code specifications.
- Roof trusses to be checked for local wind loadings.
- Commercial floors may require additional load cases.

MiTek Floor Truss Max-Spans
The chord max-spans shown on the next page are intended for use in bidding, estimating, and preliminary design applications. They are presented for six representative floor loadings. For proper interpretation of these max-spans, note the following:
- The max-spans are valid for the following (or better) species grades: No. 1 KD Southern Yellow Pine, No. 1 and better Douglas Fir 2100F, 1.6E Machine Stress Rated (MSR) lumber.
- Shorter spans will be achieved using lesser grade 4x2 lumber, while longer spans are generally possible with higher grade lumber.
- The max-spans represent truss overall lengths, assuming 3-1/2” bearing at each end. The spans are equally valid for top chord-bearing and bottom chord-bearing support conditions.
- The minimum truss span-to-live load deflection is 360 for floor application. For example, the maximum permissible live load deflection for a 20’ span floor truss is (20 x 12)/360 = 0.67”.
- In addition to the consideration of lumber strength and deflection limitations, the maximum truss span-to-depth ratio is limited to 20 for floor loadings. For example the maximum span of a floor application truss 15” deep is 15” x 20’ = 300” span = 25’ - 0” span.
- Floor loadings have included 1.00 Load Duration Increase and 1.15 Repetitive Stress Increase.
### Sound Transmission Ratings

Various floor-ceiling systems exhibit different abilities to reduce sound transfer from one room to another. This sound transmission resistance is measured by two indices - the Sound Transmission Class (STC) which rates airborne sounds and the Impact Insulation Class (IIC) which rates the impact sound transmission performance of an assembly. These ratings are used by regional building codes to regulate permissible sound transfer.

For more detailed information reference the Metal Plate Connected Wood Truss Handbook, ©1993 Wood Truss Council of America, Section 18.0 - Transitory Floor Vibration and Sound Transmission.

**Calculation Example**

<table>
<thead>
<tr>
<th>Description</th>
<th>STC High Frequency</th>
<th>IIC Low Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpet and Padding</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>3/4&quot; Gypcrete</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Wood Truss Floor</td>
<td>36</td>
<td>33</td>
</tr>
<tr>
<td>Resilient Channel</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>53</td>
<td>62</td>
</tr>
</tbody>
</table>

### Typical Construction Material Weights

**Floors**

- Hardwood (1 in. thick)......... 3.8 psf
- Concrete
  - Regular (1 in. thick)....... 12.0 psf
  - Lightweight (1 in. thick) .... 8.0 psf
- Linoleum ........................ 1.5 psf
- 3/4" ceramic or quarry tile ... 10.0 psf

**Ceilings**

- Acoustical fiber tile .......... 1.0 psf
- 1/2 in. gypsum board .......... 2.0 psf
- 5/8 in. gypsum board ......... 2.5 psf
- Plaster (1 in. thick) .......... 8.0 psf
- Metal suspension system ...... 0.5 psf
- Wood suspension system ...... 2.0 psf

**Miscellaneous**

- Sprinkling system .............. 1.0 to 1.5 psf
- Ductwork (24g) ................... 3.0 to 5.0 psf
- Rigid fiberglass (1 in. thick) .... 1.5psf
- Roll or batt insulation (1 in.) .. 0.3 psf
- Glass or rock wood (1 in. thick) .. 0.3 psf
- Floors Truss Weights
  - Single chord ................. 5.5 psf (approx.)
  - @ 24" o.c. spacing ....... 2.75 psf (approx.)
  - Double chord ............... 8.5 psf (approx.)
  - @ 24" o.c. spacing ....... 4.25 psf (approx.)

**Composition Roofing**

- Vermiculite concrete (1 in. thick) .... 2.5 psf
- Tectum (1 in. thick) ............ 2.0 psf
- Poured gypsum (1 in. thick) ...... 2.5 psf
- 2-15 lb. and 1-90 lb. .......... 2.2 psf
- 3-ply and gravel ............... 5.6 psf
- 4-ply and gravel ............... 6.0 psf

**And Decking**

- 1/2 in. plywood .................. 1.5 psf
- 5/8 in. plywood .................. 1.5 psf
- 3/4 in. plywood .................. 2.3 psf
- 1-1/8 in. plywood ............... 3.4 psf
- 1 in. sheathing (nominal) ...... 2.3 psf
- 2 in. decking .................... 4.3 psf
- Tectum (1 in. thick) ............ 2.0 psf
- Interior partition - (studs @ 16" o.c.) .. 50 psf (approx.)
- Exterior partition - (studs @ 16" o.c.) ... 85 psf (approx.)

**Partition Wall Weights (8’ Nominal Height)**

- Interior partition - (studs @ 16" o.c.) ....... 50 psf (approx.)
- Exterior partition - (studs @ 16" o.c.) ... 85 psf (approx.)

**Technical Information**

- 1-1/8 in. plywood .................. 3.4 psf
- 1 in. sheathing (nominal) ...... 2.3 psf
- 2 in. decking .................... 4.3 psf
- Tectum (1 in. thick) ............ 2.0 psf
- Poured gypsum (1 in. thick) ...... 2.5 psf
- 2-15 lb. and 1-90 lb. .......... 2.2 psf
- 3-ply and gravel ............... 5.6 psf
- 4-ply and gravel ............... 6.0 psf
- Root and Floor Sheathing
  - Extruded plastic (1 in. thick) ... 2.7 psf
  - Composition Roofing
  - Vermiculite concrete (1 in. thick) .... 2.5 psf
  - Tectum (1 in. thick) ............ 2.0 psf
  - Poured gypsum (1 in. thick) ...... 2.5 psf
  - 2-15 lb. and 1-90 lb. .......... 2.2 psf
  - 3-ply and gravel ............... 5.6 psf
  - 4-ply and gravel ............... 6.0 psf

*Estimates based on proprietary literature. Verify with individual companies.

**FLOOR TRUSS ONE-HOUR FIRE RATING**

The Truss Plate Institute has authorized fire tests be conducted to achieve a one-hour fire rating for a typical floor and ceiling assembly. Copies of those reports are available from the issuing agencies.

Additional information regarding one-hour fire ratings using wood trusses with gypsum board ceiling may be obtained from ICBO Research Reports No. 1632 and 1352.

Fire rating test results are summarized in the adjacent illustrations.

---

**Support Details**

- **Bottom Chord Bearing on Exterior Frame or Masonry Wall**
- **Intermediate Bearing - Simple Span Trusses**
- **Intermediate Bearing - Continuous Floor Truss**
- **Header Beam Pocket - Floor Truss Supporting Header Beam**
- **Top Chord Bearing on Frame Wall**
- **Top Chord Bearing on Masonry Wall**

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*International Conference of Building Officials*  
1313 East 60th Street • Chicago, IL 60637

**Underwriters Laboratory, Inc.**  
333 Pfingsten Road • Northbrook, IL 60062

***Factory Mutual Research***  
1151 Boston-Providence Road • Norwood, MA 02062

---

**Technical Information**  
800.325.8075 • www.mii.com

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**Floor Truss Construction Details**  
14
**Floor Decking Information**

Virtually all decking systems may be easily applied to MiTek floor trusses. The wide 3-1/2” nailing surface assures that floor decks are installed accurately and quickly. The adjacent table is a summary of plywood deck requirements presented by various American Plywood Association publications.

<table>
<thead>
<tr>
<th>Floor Construction</th>
<th>Panel Indent</th>
<th>Thickness</th>
<th>Floor Truss Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional Double-Layer Plywood Underlayment over Plywood Sub-Flooring</td>
<td>48/24</td>
<td>23/32”, 3/4”, 7/8”</td>
<td>24” Spacing</td>
</tr>
<tr>
<td></td>
<td>40/20</td>
<td>19/32”, 5/8”, 3/4”, 23/32”</td>
<td>19.2” Spacing</td>
</tr>
<tr>
<td>Wood Strip Flooring over Plywood Sub-Flooring</td>
<td>32/16</td>
<td>15/32”, 1/2”, 5/8”, 9/16”, 19/32”</td>
<td>16” Spacing</td>
</tr>
<tr>
<td></td>
<td>40/20</td>
<td>19/32”, 5/8”, 3/4”, 23/32”</td>
<td>16” Spacing</td>
</tr>
<tr>
<td>Dropped Chord Balcony Cantilever</td>
<td>48/36</td>
<td>7/16”, 15/32”, 1/2”</td>
<td>19/32”, 5/8”, 3/4”</td>
</tr>
</tbody>
</table>

**Connector Plate Code Approvals**

MiTek connector plates have been approved by all recognized national and regional model building code groups, based on extensive structural testing. The following approvals may be referenced for more detailed information:

- BOCA National Building Code
- Uniform Building Code (UBC)
- International Conference of Building Officials (ICBO)
- Standard Building Code (SBC)
- Southern Building Code Congress International (SBCCI)
- Federal Housing Administration (FHA/HUD)
- Federal Housing Administration (FHA/HUD) U.S. Department of Housing and Urban Development (HUD) Truss Connector Bulletin No. TCB 17.08.
- Wisconsin State Code
- Wisconsin Department of Industry, Labor and Human Relations (DILHR) Approval No. 960022-W, 970036-N.
2x6 “Strongback” lateral supports should be located on edge approximately every 10 feet along the floor truss. They should be securely fastened to vertical webs. Blocking behind the vertical web is recommended while nailing the strongback. The strongbacks should either be secured to adjacent partition walls or alternate ‘X’-bridging should be used to terminate the bracing member.

Notes
• Special engineering required for girder floor trusses.
• Slope for drainage, as required.
• Cantilever span controlled by lumber size and grade deflection limitations.

**MAXIMUM MECHANICAL SERVICE CLEARANCES - FLOOR TRUSSES**

<table>
<thead>
<tr>
<th>Overall Truss Depth (Inches)</th>
<th>Width (W) (Inches)</th>
<th>Diameter (D) (Inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>32</td>
<td>5</td>
</tr>
<tr>
<td>13</td>
<td>34</td>
<td>5</td>
</tr>
<tr>
<td>14</td>
<td>36</td>
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<td>6</td>
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<tr>
<td>24</td>
<td>46</td>
<td>7</td>
</tr>
</tbody>
</table>

**FLOOR TRUSS CANTILEVER CONCENTRATED LOADS**

Floor truss cantilevers often support load-bearing walls carrying roof live loads and wall material dead loads. The adjacent chart provides a convenient means of determining an equivalent concentrated load for representative roof loads which incorporate a 15% load duration factor for the roof load only.

**CONCENTRATED LOAD SAMPLE CALCULATION**

**Roof Loading** = 20/10/0/10 = 40 psf @ 1.15

**Roof Load (Floor Truss Reaction)** = 40 psf \times (30/12) \times 2'-0" \text{ o.c.} = 1200 \text{ lbs.}

8’ Stud Wall Weight (@ 85 lbs./lineal ft.) = 85 plf \times 2'-0" \text{ o.c.} = 170 \text{ lbs.}

**Equivalent Floor Truss Load** = \left(\frac{1200}{1.15}\right) \times 170 = 1215 \text{ lbs.}

Concentrated Load

Note:
Also check floor truss for dead load only at end of cantilever.

**LATERAL BRACING SUGGESTIONS**

**Floor Cantilevered Perpendicular to Floor Truss Span**

**Floor Cantilevered Perpendicular and Parallel to Floor Truss Span**

**Notes**
- Special engineering required for girder floor trusses.
- Slope for drainage, as required.
- Cantilever span controlled by lumber size and grade deflection limitations.
**Minimum Depth**

**Maximum Deflection**

**Recommended Camber**

**Span/24**

**Span/240 (Live Load)**

**Dead Load Deflection**

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**Minimum Depth**

**Maximum Deflection**

**Recommended Camber**

**Span/24**

**Span/240 (Live Load)**

**Dead Load Deflection**

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**Floor**

<table>
<thead>
<tr>
<th>Floor</th>
<th>Roof</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Depth</td>
<td>Maximum Deflection</td>
</tr>
<tr>
<td>Spar/20</td>
<td>Spar/360 (Live Load)</td>
</tr>
<tr>
<td>Spar/24</td>
<td>Spar/240 (Live Load)</td>
</tr>
</tbody>
</table>

*Provide slope of 1/4” per foot of span for proper drainage to prevent water ponding.*

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**Architectural Specification**

- Trusses shall be fabricated by a MiTek truss manufacturer in accordance with MiTek floor truss engineering specifications.
- MiTek engineering design drawings bearing the seal of the Registered Engineer preparing the design shall be provided to the Project Architect for his approval.
- Truss designs shall be in accordance with the latest version of ANSI/TPI1 National Design Standard for Metal Plates Converted Wood Construction, a publication of Truss Plate Institute and generally accepted engineering practice.
- Delivery, handling, and erection of MiTek trusses shall be in accordance with the "TPI Quality Standard for Metal Plate Connected Wood Trusses," published by Truss Plate Institute.
- Truss hangers, anchorage, permanent bracing, and required design loads shall be the responsibility of the Project Architect.
- MiTek truss connector plates are manufactured under rigid quality control using structural Grade C hot-dipped, galvanized steel meeting ASTM Specifications A653.

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**Recommended Depth, Deflection, and Camber Limitations**

In addition to allowable lumber stress limitations, floor truss designs are also regulated by maximum permissible deflection-to-span and depth-to-span limitations, as shown in the chart below. The suggested camber to be built into the truss during fabrication is also included.

The truss deflection is calculated by complex engineering methods and verified by extensive full-scale load tests. The floor span-to-depth limitation is intended to prevent objectionable floor vibration. All of the following recommended limitations should be achieved to provide a quality floor system and assure complete customer satisfaction.

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**Construction Guidelines**

**Floors**

- **DO** color-code floor truss ends for correct non-symmetrical installations.
- **DO** locate trusses to allow for plumbing or duct riser clearances.
- **DO** assure that trusses are installed with a joint located over an interior bearing.
- **DO** use warning tags on floor trusses to provide proper installation orientation and to warn against cutting or modifying trusses.
- **DON’T** use floor trusses when exposed to weather, chemically corrosive environment, or extremely high humidity.
- **DON’T** cut truss chords or webs or modify them in any way during construction.

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**Stairway Framing**

- **Built-up Beam with Strap Hanger**
- **Header Beam Pocket**
- **Header Beam with Strap Hanger**
- **Typical Basement Stair Framing Cross-Section**

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**Header Beam Pocket**

**Header Beam with Strap Hanger**

**Built-up Beam with Strap Hanger**

**Typical Basement Stair Framing Cross-Section**

**Stairwell Opening without Stud Walls**

**Stairwell Opening Carried by Stud Wall**

**Stairwell Opening Perpendicular to Floor Trusses, Carried by Stud Wall**

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**Note:** Framing opening between header beams must usually be increased beyond conventional framing opening to permit necessary headroom.