

What Should Constitute a Truss Submittal Package?

(Information that should be provided with truss delivery)

Released July 28, 2009

Introduction:

A primary purpose of the Structural Building Components Association (SBCA) is to promote industry best practices that enhance product application knowledge and, in this case, foster improved jobsite safety¹. In light of this purpose and knowing that consistency promotes better understanding, it is in the best interest of all component manufacturers to standardize the information that is provided with each and every truss delivery.

Information from several different sources were used in the development of this *Tech Note*, including: (1) the *2006/2009 International Building Code (IBC)*, (2) the *2006/2009 International Residential Code (IRC)*, (3) the *National Design Standard for Metal Plate Connected Wood Trusses (ANSI/TPI 1)*², and (4) the *Building Component Safety Information (BCSI)³: Guide to Good Practice for Handling, Installing, Restraining & Bracing of Metal Plate Connected Wood Trusses*.

Issue:

The minimum standard to which metal plated connected wood trusses are to be designed and manufactured in the United States is *ANSI/TPI 1. ANSI/TPI 1-2007*, which is the latest edition, both establishes minimum requirements for the design and construction of metal plate connected wood trusses, and defines the accepted responsibilities for all parties involved in the design and application of metal plate connected wood trusses (Chapter 2). One of the Truss Manufacturer's responsibilities is to supply the Truss Submittal Package. The Truss Submittal Package is defined in *ANSI/TPI 1* (see **Appendix F**) as:

ANSI/TPI 1-2007

Section 2.2: Definitions

TRUSS SUBMITTAL PACKAGE: Package consisting of each individual Truss Design Drawing, and, as applicable, the Truss Placement Diagram, the Cover/Truss Index Sheet, Lateral Restraint and Diagonal Bracing details designed in accordance with generally accepted engineering practice, applicable BCSI defined Lateral Restraint and Diagonal Bracing details, and any other structural details germane to the trusses.

Industry guidelines for handling, installing, restraining and bracing the trusses, as provided in *BCSI* (which is jointly produced by SBCA and the Truss Plate Institute), are a crucial part of the Truss Submittal Package. While certainly not meant to be interpreted as superior to other possible methods or specifications concerning the handling, installing, restraining and bracing of trusses, the information provided in *BCSI*, if correctly implemented, helps to ensure consistent jobsite safety and acceptable structural performance.

Recommendations:

Property damage, serious bodily injury and/or death are possible if the Contractor fails to properly handle, install, restrain and brace trusses. In an effort to minimize the potential for these types of disasters and to ensure that trusses are handled safely and correctly, the truss industry has developed *BCSI*, which includes simple, safe and proven methods that are consistent with accepted framing construction

¹ www.sbcindustry.com/aboutus.php

² www.tpinst.org

³ www.sbcindustry.com/bcsi.php

practices. This information is considered so important that the truss industry has referenced it as part of the information to be included in a Truss Submittal Package as defined in *ANSI/TPI 1*.

SBCA provides a standard JOBSITE PACKAGE as a tool in helping Truss Manufacturers effectively fulfill their duty to educate and warn the Contractor per *ANSI/TPI 1* and building code requirements, and provides the Contractor with important standardized installation and safety information with every jobsite delivery. This consists of the following documents in a zippered plastic bag:

- Information for Framers insert
- Cover Sheet: English/Spanish warnings on the front and some of the *ANSI/TPI 1-2007* design responsibilities on the back.
- TTB Checklist for Handling and Installing
- Four *BCSI* Summary Sheets:
 - *BCSI-B1*: Guide for Handling, Installing, Restraint & Bracing of Trusses
 - *BCSI-B2*: Truss Installation & Temporary Restraint/Bracing
 - *BCSI-B3*: Web Member Permanent Bracing/Web Reinforcement
 - *BCSI-B4*: Construction Loading

Additional documents can be added to SBCA's standard JOBSITE PACKAGE to address jobs that include truss clear spans over 60 ft., post frame trusses (*BCSI-B10*), floor trusses (*BCSI-B7*), engineered wood products, and wall panels. SBCA also offers JOBSITE PACKAGES that are specific to cold-formed steel trusses. It is recommended that the Truss Submittal Package that component manufacturers provide with each truss delivery includes the SBCA JOBSITE PACKAGE. This will provide builders and erectors with best practice information regarding handling and installing components. SBCA's legal counsel Kent Pagel provides the concepts behind this recommendation in his *Structural Building Components (SBC) Magazine* article entitled "*Legal Edge: He Who Supplies the Jobsite Package 'Makes the Rules' in Litigation*" (June/July 2009)⁴:

"Each of the documents contained within a JOBSITE PACKAGE provides the requisite information for component manufacturer customers and erectors to properly and safely unload, handle, store, install and brace manufactured structural components. Typically manufacturers also add their truss design drawings and truss placement diagrams, and at times, some company-specific additional information to their JOBSITE PACKAGES and then make sure to include a JOBSITE PACKAGE with each delivery. For proof that the JOBSITE PACKAGE has in fact been received by the customer and the truss installer, an increasing number of component manufacturers are charging their customers for the JOBSITE PACKAGES. They mark up the cost of the JOBSITE PACKAGES modestly, but more importantly when a customer has paid for the package, during a dispute the argument that the component manufacturer never provides jobsite and product handling, installation and bracing documentation, is all but eliminated. In other words, 'Why did you pay for the JOBSITE PACKAGE if you did not receive it?'"

Further in *Structural Building Components (SBC) Magazine* article entitled *The Jobsite Package: A Critical Picket in Your Fence of Protection* (March 2008)⁵, the following reasons why providing genuine warnings and instructions is incumbent on the component manufacturer:

REASON: A jobsite package may very well prevent a truss collapse from occurring!

REASON: The jobsite package is geared entirely at the persons who handle, store, erect and brace structural components. As such, it is important that these persons be provided guidelines and other solid information relating to safe and proper use of trusses and components.

⁴ www.sbcmag.info/Archive/2009/jun/0906_legalEdge.pdf

⁵ www.sbcmag.info/Archive/2008/mar/0803_pagel.pdf

REASON: It is good risk management to provide industry-based guidelines and documentation to help your customers intelligently handle, store, brace and install the products you manufacturer and sell.

REASON: History has provided the industry and individual companies with sufficient notice that we must all act proactively to warn, instruct and educate. Component manufacturers are often wrongly accused of having done something wrong and it has become a reflex reaction for them to be named in each lawsuit where trusses hit the ground during or after erection. Thus, component manufacturers should take appropriate steps to warn, instruct and educate.

At a minimum, component manufacturers should provide the following (in addition to the Truss Design Drawings and Truss Placement Diagram, if/when required by the contract) with their Truss Submittal Package:

- For Sloped Roof Trusses: *BCSI-B1* and *BCSI-B3* Summary Sheets
- For Floor and Flat Roof Trusses: *BCSI-B1* and *BCSI-B7* Summary Sheets

Appendix A

Background & Analysis:

ANSI/TPI 1 Reference

Both the *2006 International Building Code (IBC)* and the *2009 IBC* references *ANSI/TPI 1* as the standard to use when metal plate connected wood trusses are involved with a project in the *2006 IBC* Sections 2303.4.2 and 2306.1 (see **Appendix D**) / the *2009 IBC* Sections 2303.4.6 and 2306.1 (see **Appendix E**):

2006 IBC, Chapter 23 - Wood

Section 2303: Minimum Standards and Quality

2303.4 Trusses.

2303.4.2 **Metal-plate-connected trusses.** ...the design, manufacture and quality assurance of metal-plate-connected wood trusses shall be in accordance with TPI 1. ...

2009 IBC, Chapter 23 - Wood

Section 2303: Minimum Standards and Quality

2303.4 Trusses.

2303.4.6 **TPI 1 specifications.** In addition to Sections 2303.4.1 through 2303.4.5, the design, manufacture and quality assurance of metal-plate-connected wood trusses shall be in accordance with TPI 1. ...

2006 IBC / 2009 IBC Section 2306: Allowable Stress Design

2306.1 **Allowable stress design.** The structural analysis and construction of wood elements in structures using allowable design methods shall be in accordance with the following applicable standards: TPI 1: National Design Standard for Metal Plate Connected Wood Truss Construction

The purpose of the Truss Plate Institute (TPI) is to maintain the wood truss industry on a sound engineering basis. TPI accomplishes this purpose by establishing methods of design and construction for wood trusses using metal connector plates through its standard *ANSI/TPI 1*. *ANSI/TPI 1* not only defines what a Truss Submittal Package is, but also defines who should receive it (see **Appendix F**):

ANSI/TPI 1-2007

Sections 2.3.6 / 2.4.6 REQUIREMENTS OF THE TRUSS MANUFACTURER

Sections 2.3.6.5 / 2.4.6.5 Required Documents. The Truss Manufacturer shall supply to the Contractor the Truss Submittal Package...

Sections 2.3.6.7 / 2.4.6.7 Truss Submittal Packages. ...the Truss Manufacturer shall provide the appropriate Truss Submittal Package to one or more of the following; Building Official; Registered Design Professional for the Building / Building Designer and/or Contractor for review and/or approval

ANSI/TPI 1 Sections 2.3.6.5 and 2.4.6.5 also state that the Truss Manufacturer's Truss Submittal Package not only includes the Truss Design Drawings and the Truss Placement Diagram, but also the required Permanent Individual Truss Member Restraint and the method used to restrain and brace (see **Appendix F**):

ANSI/TPI 1-2007

Sections 2.3.6.5 / 2.4.6.5 Required Documents. The Truss Manufacturer shall supply to the Contractor the Truss Submittal Package, including the Truss Design Drawings..., a Truss Placement Diagram,... and the required Permanent Individual Truss Member Restraint and the method to be used ...

The *2006 IBC* (see **Appendix D**) and the *2009 IBC* (see **Appendix E**) also provides similar language as to what should constitute a Truss Submittal Package:

2006 IBC Section 2303.4.1.4 Truss submittal package. The truss submittal package shall consist of each individual truss design drawing, the truss placement diagram for the project, the truss member permanent bracing specification and, as applicable, the cover sheet/truss index sheet.

2009 IBC Section 2303.4.3 Truss submittal package. The truss submittal package provided by the truss manufacturer shall consist of each individual truss design drawing, the truss placement diagram, the permanent individual truss member restraint/bracing method and details and any other structural details germane to the trusses; and, as applicable, the cover/truss index sheet.

Per *ANSI/TPI 1*, the Contractor is responsible for making certain that the trusses are installed properly. But without the Truss Manufacturer providing the “manufacturer’s installation instructions” (*BCSI*) to the Contractor, it is unclear what the instructions/guidelines are. The *2006 International Residential Code (IRC)* and the *2009 IRC* state that the installation instructions need to be available at the jobsite:

2006 / 2009 IRC Section R106.1.2 Manufacturer’s installation instructions. Manufacturer’s installation instructions, as required by this code, shall be available on the jobsite at the time of inspection.

ANSI/TPI 1 references *BCSI-B1* to inform the Contractor of the truss installation tolerances, as well as providing installation restraint/bracing guidelines with the information included with the Truss Submittal Packages.

ANSI/TPI 1-2007

Sections 2.3.4.5 / 2.4.4.5 Truss Installation. ...Truss installation shall comply with installation tolerances shown in *BCSI-B1*. Temporary Installation Restraint/Bracing for the Truss system and the permanent Truss system Lateral Restraint and Diagonal Bracing for the completed Building and any other construction work related directly or indirectly to the trusses shall be installed by the Contractor in accordance with: (a) The Construction Documents, and/or (b) The Truss Submittal Package.

If a Truss Manufacturer does not provide *BCSI-B1* (at the very least), they are not complying with industry standards or the building codes, which are primarily concerned with life safety.

BCSI-B1

The introduction to *BCSI-B1* highlights the importance of what is included in the Submittal Documents:

BCSI-B1: Guide for Handling, Installing, Restraining & Bracing of Trusses

In order to properly receive, store, erect, brace, connect and integrate the Trusses into the Framing Structural System, it is necessary to have a complete understanding of the Submittal Documents for the project. Submittal Documents typically include, but are not limited to:

- The Construction Documents (i.e., architectural/structural plans and specifications)
- The Truss Submittal Package which includes:
 - The Truss Design Drawing
 - The Truss Placement Diagram(s) (if/when required by the Contract)
- This *BCSI* document and/or B-Series Summary Sheets (when provided)
- The erection and installation plan (if provided)
- Site specific conditions

BCSI-B1 references other *BCSI* documents (most notably *BCSI-B2*, *BCSI-B3* and *BCSI-B4*) for further information on handling, installing, restraining, and bracing metal plate connected wood trusses at the jobsite. *BCSI-B1* also references *BCSI-B7* for the temporary and permanent restraint/bracing of parallel chord trusses.

All of the care and quality involved in the design and manufacturing of trusses is jeopardized if the trusses are not properly handled, hoisted, installed, restrained, and braced by the Contractor. The Truss

Manufacturer can do their part to minimize the potential for these types of problems by providing the Contractor with the most current and up-to-date industry information and guidelines for handling, installing, restraining and bracing trusses as part of the Truss Submittal Package.

BCSI-B2

ANSI/TPI 1 references *BCSI-B2* for further information on diagonal bracing and lateral restraints in their respective definitions.

ANSI/TPI 1-2007

Section 2.2 DEFINITIONS

BCSI-B2: *Truss Installation & Temporary Restraint/Bracing* of the Building Component Safety Information (BCSI).

Diagonal Bracing: Structural member installed at an angle to a Truss chord or web member and intended to temporarily and/or permanently stabilize Truss member(s) and/or Truss(es) (See *BCSI-B1*, *BCSI-B2*, *BCSI-B3*, *BCSI-B7*, and *BCSI-B10*).

Temporary Installation Restraint/Bracing: Lateral Restraint and Diagonal Bracing installed during construction for the purposes of holding Trusses in their proper location, plumb and in plane, until Permanent Individual Truss Member Restraint, Diagonal Bracing and Permanent Building Stability Bracing are completely installed (See *BCSI-B1*, *BCSI-B2*, *BCSI-B3*, *BCSI-B7*, and *BCSI-B10*).

BCSI-B3

ANSI/TPI 1 references *BCSI-B3* or *BCSI-B7* (for use with parallel chord trusses) as sources of information for a Contractor to use if the Owner or a Registered Design Professional does not have another method for properly installing the Permanent Individual Truss Member Restraint/Bracing.

ANSI/TPI 1-2007

Section 2.3.3 / 2.4.3 REQUIREMENTS FOR THE PERMANENT MEMBER RESTRAINT/BRACING OF TRUSS SYSTEMS

Sections 2.3.3.1 / 2.4.3.1 Method of Restraint. The method of Permanent Individual Truss Member Restraint/Bracing and the method of anchoring or restraining to prevent lateral movement of all Truss members acting together as a system shall be accomplished by:

Sections 2.3.3.1.1 / 2.4.3.1.1 Standard Industry Details. Standard industry Lateral Restraint and Diagonal Bracing details in accordance with *BCSI-B3*: Permanent Restraint/Bracing of Chords and Web Members and/or *BCSI-B7*: Temporary & Permanent Restraint/Bracing for Parallel Chord Trusses of the Building Component Safety Information (*BCSI*).

Sections 2.3.3.3 / 2.4.3.3 Absence of Truss Restraint/Bracing Method or Details. If a specific Truss member permanent bracing design for the roof or floor Framing Structural System is not provided by the Owner or any Registered Design Professional / Building Designer, the method of Permanent Individual Truss Member Restraint and Diagonal Bracing for the Truss Top Chord, Bottom Chord, and Web Members shall be in accordance with *BCSI-B3* or *BCSI-B7*.

The introduction to *BCSI-B3* provides the following warning if information/recommendations on permanent restraint/bracing of chords and web members is not provided by the Truss Manufacturer to the Contractor:

BCSI-B3: Permanent Restraint/Bracing of Chords and Web Members

WARNING: Disregarding Permanent Individual Truss Member Restraint and Permanent Building Stability Bracing recommendations is a major cause of Truss field performance problems and has been known to lead to collapsed roof and/or floor systems. Failure to install the proper restraint and



Standard SBCA JOBSITE PACKAGE Installation and Safety Information
FIGURE 2

An SBCA press release dated May 26, 2009 (see **Appendix B**) discusses the importance of including the JOBSITE PACKAGE with each and every jobsite delivery.⁷

SBCA’s legal counsel Kent Pagel recently penned two articles for *Structural Building Components (SBC) Magazine*⁸ that addressed the issue of minimizing component manufacturer’s risks by including SBCA’s JOBSITE PACKAGE:

SBC Magazine 2009 June/July

Legal Edge: He Who Supplies the Jobsite Package “Makes the Rules” in Litigation by Kent J. Pagel⁹

...While there are many best practices component manufacturers should follow to minimize product and completed operations risks,...providing a JOBSITE PACKAGE and being able to document that it was duly received by your customer and the truss installer, is a risk management tool that in our opinion can VERY much protect component manufacturers from product and completed operation risks.

Each of the documents contained within a JOBSITE PACKAGE provides the requisite information for component manufacturer customers and erectors to properly and safely unload, handle, store, install and brace manufactured structural components. Typically manufacturers also add their truss design drawings and truss placement diagrams, and at times, some company-specific additional information to their JOBSITE PACKAGES and then make sure to include a JOBSITE PACKAGE with each delivery. For proof that the JOBSITE PACKAGE has in fact been received by the customer and the truss installer, an increasing number of component manufacturers are charging their customers for the JOBSITE PACKAGES. They mark up the cost of the JOBSITE PACKAGES modestly, but more importantly when a customer has paid for the package, during a dispute the argument that the component manufacturer never provides jobsite and product handling, installation and bracing documentation, is all but eliminated. In other words, “Why did you pay for the JOBSITE PACKAGE if you did not receive it?”

SBC Magazine 2008 March

⁷ www.sbcindustry.com/pressreleases/090527_Jobsite_Package_Golden_Defense.doc

⁸ www.sbcmag.info

⁹ www.sbcmag.info/Archive/2009/jun/0906_legaledge.pdf

The Jobsite Package: A Critical Picket in Your Fence of Protection by Kent J. Pagel ¹⁰

...consider the following as reasons why providing genuine warnings and instructions is incumbent on the component manufacturer:

REASON: A jobsite package may very well prevent a truss collapse from occurring!

REASON: The jobsite package is geared entirely at the persons who handle, store, erect and brace structural components. As such, it is important that these persons be provided guidelines and other solid information relating to safe and proper use of trusses and components.

REASON: It is good risk management to provide industry-based guidelines and documentation to help your customers intelligently handle, store, brace and install the products you manufacturer and sell.

REASON: History has provided the industry and individual companies with sufficient notice that we must all act proactively to warn, instruct and educate. Component manufacturers are often wrongly accused of having done something wrong and it has become a reflex reaction for them to be named in each lawsuit where trusses hit the ground during or after erection. Thus, component manufacturers should take appropriate steps to warn, instruct and educate.

¹⁰ www.sbcmag.info/Archive/2008/mar/0803_pagel.pdf

Appendix B

SBCA Press Release
May 26, 2009

FOR IMMEDIATE RELEASE
Contact: Suzi Grundahl, 608/310-6710

SBCA Jobsite Packages are a “Golden” Defense

Madison, WI—The Structural Building Components Association (SBCA) has initiated an informational campaign to raise awareness of its Jobsite Packages. The packages are intended to be sent to the jobsite with each shipment of components to provide builders and erectors best practice information regarding handling and installing components. The Jobsite Packages also fulfill component manufacturers’ responsibility to warn about installation dangers, and they help to ward off spurious claims with respect to product and completed operations.

SBCA Legal Counsel Kent Pagel said given the state of the housing market, now is a critical time for component manufacturers and truss design software suppliers to be mindful of the Packages’ risk management benefits.

“Builders and condominium developers are starting to see an increase in construction defect lawsuit filings asserted by homeowners whose homes are valued far below their mortgage balances and are desperately looking for some means of relief,” he said. Pagel warned that an increased number of construction defect lawsuits will inevitably involve lower tier suppliers like component manufacturers.

SBCA Jobsite Packages are a low-cost risk management tool, selling for as little as \$2.90. Pagel suggests adding a line item on your customer purchase order or invoice that details a charge for each Package delivered. ([Click here](#) for an example.) This shows the package value, provides a return on investment, and serves as proof that the customer received it. “When a customer has paid for it, during a dispute the argument that the component manufacturer never provided jobsite and product handling, installation and bracing documentation is all but eliminated,” he said. “It can be a ‘golden’ defense.”

SBCA President Ben Hershey urged members to take advantage of this affordable risk management tool. “SBCA’s goal is to help its membership protect our businesses by providing solid industry best practices. I can’t think of a more economical, effective tool than the Jobsite Package,” he said.

The Jobsite Package is also a key element of SBCA’s [SCORE](#) program (Structural Component Operations Reaching for Excellence). All SCORE-certified locations are required to send a package with each job—one of several ways that they’ve made a commitment to participating in SBCA programs, which demonstrate to customers how dedicated they are to both industry professional practices and continual improvement.

Visit www.sbcindustry.com/pubs/category_tree.php to view samples of the various types of Jobsite Packages or to place an order.

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The Structural Building Components Association (SBCA) is an international not-for-profit trade association of structural building component manufacturers. Formerly WTCA—Representing the Structural Building Components Industry, the association evolved its name in October 2008 to more accurately reflect the work of the association and its membership. Currently, SBCA has nearly 700 component manufacturer members, 35 chapters, and 267 supplier and related services members seeking to protect and expand the markets for the products they manufacture.

Appendix C

The language in **RED** signifies sections of the code or law that have been used in the foregoing document to make it easier for the reader to see the language in context.

Definitions¹¹

BCSI: Guide to Good Practice for Handling, Installing, Restraining & Bracing of Metal Plate Connected Wood Trusses jointly produced by the Structural Building Components Association (SBCA) and the Truss Plate Institute (TPI).¹²

BCSI-B1: Guide for Handling, Installing, Restraining & Bracing of Trusses of the Building Component Safety Information (BCSI).¹³

BCSI-B2: *Truss Installation and Temporary Restraint/Bracing* of the Building Component Safety Information (BCSI).¹⁴

BCSI-B3: *Permanent Restraint/Bracing of Chords and Web Members* of the Building Component Safety Information (BCSI).¹⁵

BCSI-B7: Temporary & Permanent Restraint/Bracing for Parallel Chord Trusses of the Building Component Safety Information (BCSI).¹⁶

CONSTRUCTION DOCUMENTS: Written, graphic and pictorial documents prepared or assembled for describing the design, location and physical characteristics of the elements of a project necessary for obtaining a building permit.¹⁷

CONTRACTOR: Owner of a building, or the person who contracts with the Owner, who constructs the building in accordance with the Construction Documents and the Truss Submittal Package. The term "Contractor" shall include those subcontractors who have a direct contract with the Contractor to construct all or a portion of the construction.

COVER/TRUSS INDEX SHEET: Sheet that is signed and sealed, where required by the legal requirements, by the Truss Design Engineer, and depending on the legal requirements shall be permitted to contain the following information: (1) identification of the building, including building name and address, lot, block, subdivision, and city or county; (2) identification of Construction Documents by drawing number(s) with revision date; (3) specified building code; (4) computer program used; (5) roof dead and live loads; (6) floor dead and live loads; (7) wind load criteria from a specifically defined code (e.g., *ASCE 7*) and any other design loads (such as ponding, mechanical loads, etc.); (8) name, address and license number of Registered Design Professional for the building, if known; (9) a listing of the individual identification numbers and dates of each Truss Design Drawing referenced by the Cover/Truss Index Sheet; and (10) name, address, date of drawing and license number of Truss Design Engineer.

DIAGONAL BRACING: Structural member installed at an angle to a truss chord or web member and intended to temporarily and/or permanently stabilize truss member(s) and/or truss(es).

LATERAL RESTRAINT: Also known as continuous lateral brace or CLB. A structural member installed at right angles to a chord or web member of a truss to reduce the laterally unsupported length of the truss member.

¹¹ Unless otherwise noted, all definitions taken from *ANSI/TPI 1-2007*.

¹² www.sbcindustry.com/docs/06_BCSI_booklet_FINAL.pdf

¹³ www.sbcindustry.com/images/publication_images/b1.pdf

¹⁴ www.sbcindustry.com/images/publication_images/b2.pdf

¹⁵ www.sbcindustry.com/images/publication_images/b3.pdf

¹⁶ www.sbcindustry.com/images/publication_images/b7.pdf

¹⁷ Taken from the *2009 International Building Code*: Chapter 2 – Definitions, Section 202.

OWNER: Person having a legal or equitable interest in the property upon which a Building is to be constructed, and: (1) either prepares, or retains the Building Designer or Registered Design Professional to prepare the Construction Documents; and (2) either constructs, or retains the Contractor to construct the Building.

REGISTERED DESIGN PROFESSIONAL: An individual who is registered or licensed to practice their respective design profession as defined by the statutory requirements of the professional registration laws of the state or jurisdiction in which the project is to be constructed.

TRUSS DESIGN DRAWING: Written, graphic and pictorial depiction of an individual truss that includes the information required in Section 2303.4.1.2 of the *2006 IBC* and Section 2303.4.1.1 of the *2009 IBC* per *ANSI/TPI 1*.

TRUSS DESIGN ENGINEER: Person who is licensed to practice engineering as defined by the legal requirements of the jurisdiction in which the building is to be constructed and who supervises the preparation of the Truss Design Drawings.

TRUSS PLACEMENT DIAGRAM: Illustration identifying the assumed location of each truss.

TRUSS SUBMITTAL PACKAGE: Package consisting of each individual Truss Design Drawing, and, as applicable, the Truss Placement Diagram, the Cover/Truss Index Sheet, Lateral Restraint and Diagonal Bracing details designed in accordance with generally accepted engineering practice, applicable BCS/defined Lateral Restraint and Diagonal Bracing details, and any other structural details germane to the trusses.

Appendix D

2006 International Building Code (IBC) Chapter 23 - Wood Section 2303 Minimum Standards and Quality

2303.4 Trusses.

2303.4.1 Design. Wood trusses shall be designed in accordance with the provisions of this code and accepted engineering practice. Members are permitted to be joined by nails, glue, bolts, timber connectors, metal connector plates or other approved framing devices.

2303.4.1.1 Truss designer. The individual or organization responsible for the design of trusses.

2303.4.1.2 Truss design drawings. The written, graphic and pictorial depiction of each individual truss shall be provided to the building official and approved prior to installation. Truss design drawings shall also be provided with the shipment of trusses delivered to the job site. Truss design drawings shall include, at a minimum, the information specified below:

1. Slope or depth, span and spacing;
2. Location of joints;
3. Required bearing widths;
4. Design loads as applicable;
5. Top chord live load (including snow loads);
6. Top chord dead load;
7. Bottom chord live load;
8. Bottom chord dead load;
9. Concentrated loads and their points of application as applicable;
10. Controlling wind and earthquake loads as applicable;
11. Adjustments to lumber and metal connector plate design value for conditions of use;
12. Each reaction force and direction;
13. Metal connector plate type, size, thickness or gage, and the dimensioned location of each metal connector plate except where symmetrically located relative to the joint interface;
14. Lumber size, species and grade for each member;
15. Connection requirements for:
 - 15.1. Truss to truss;
 - 15.2. Truss ply to ply; and
 - 15.3. Field splices.
16. Calculated deflection ratio and maximum vertical and horizontal deflection for live and total load as applicable;
17. Maximum axial tensile and compression forces in the truss members; and
18. Required permanent individual truss member bracing and method per Section 2303.4.1.5, unless a specific truss member permanent bracing plan for the roof or floor structural system is provided by a registered design professional.

Where required by one of the following, each individual truss design drawing shall bear the seal and signature of the truss designer:

1. Registered design professional; or
2. Building official; or
3. Statutes of the jurisdiction in which the project is to be constructed.

Exceptions:

1. When a cover sheet/truss index sheet combined into a single cover sheet is attached to the set of truss design drawings for the project, the single sheet/truss index sheet is the only document that needs to be signed and sealed within the truss submittal package.

2. When a cover sheet and a truss index sheet are separately provided and attached to the set of truss design drawings for the project, both the cover sheet and the truss index sheet are the only documents that need to be signed and sealed within the truss submittal package.

2303.4.1.3 Truss placement diagram. The truss manufacturer shall provide a truss placement diagram that identifies the proposed location for each individually designated truss and references the corresponding truss design drawing. The truss placement diagram shall be provided as part of the truss submittal package, and with the shipment of trusses delivered to the job site. Truss placement diagrams shall not be required to bear the seal or signature of the truss designer.

Exception: When the truss placement diagram is prepared under the direct supervision of a registered design professional, it is required to be signed and sealed.

2303.4.1.4 Truss submittal package. The truss submittal package shall consist of each individual truss design drawing, the truss placement diagram for the project, the truss member permanent bracing specification and, as applicable, the cover sheet/truss index sheet.

2303.4.1.5 Truss member permanent bracing. Where permanent bracing of truss members is required on the truss design drawings, it shall be accomplished by one of the following methods:

1. The trusses shall be designed so that the buckling of any individual truss member can be resisted internally by the structure (e.g. buckling member T-bracing, L-bracing, etc.) of the individual truss. The truss individual member buckling reinforcement shall be installed as shown on the truss design drawing or on supplemental truss member buckling reinforcement diagrams provided by the truss designer.

2. Permanent bracing shall be installed using standard industry bracing details that conform with generally accepted engineering practice. Individual truss member continuous lateral bracing location(s) shall be shown on the truss design drawing.

2303.4.1.6 Anchorage. All transfer of loads and anchorage of each truss to the supporting structure is the responsibility of the registered design professional.

2303.4.1.7 Alterations to trusses. Truss members and components shall not be cut, notched, drilled, spliced or otherwise altered in any way without written concurrence and approval of a registered design professional. Alterations resulting in the addition of loads to any member (e.g., HVAC equipment, water heater) shall not be permitted without verification that the truss is capable of supporting such additional loading.

2303.4.2 Metal-plate-connected trusses. In addition to Sections 2303.4.1 through 2303.4.1.7, the design, manufacture and quality assurance of metal-plate-connected wood trusses shall be in accordance with TPI 1. Manufactured trusses shall comply with Section 1704.6 as applicable.

Section 2306 Allowable Stress Design

2306.1 Allowable stress design. The structural analysis and construction of wood elements in structures using allowable design methods shall be in accordance with the following applicable standards:

Truss Plate Institute, Inc.

TPI 1 National Design Standard for Metal Plate Connected Wood Truss Construction

Chapter 35 - Referenced Standards

TPI	Truss Plate Institute 583 D'Onofrio Drive, Suite 200 Madison, WI 53719	
Standard reference number	Title	Referenced in code section number
TPI 1—2002	National Design Standards for Metal-plate-connected Wood Truss Construction	2303.4.2, 2306.1

Appendix E

2009 International Building Code (IBC) Chapter 23 - Wood Section 2303 Minimum Standards and Quality

2303.4 Trusses.

2303.4.1 Design. Wood trusses shall be designed in accordance with the provisions of this code and accepted engineering practice. Members are permitted to be joined by nails, glue, bolts, timber connectors, metal connector plates or other *approved* framing devices.

2303.4.1.1 Truss design drawings. The written, graphic and pictorial depiction of each individual truss shall be provided to the *building official* for approval prior to installation. Truss design drawings shall also be provided with the shipment of trusses delivered to the job site. Truss design drawings shall include, at a minimum, the information specified below:

1. Slope or depth, span and spacing;
2. Location of all joints and support locations;
3. Number of plies if greater than one;
4. Required bearing widths;
5. Design loads as applicable, including:
 - 5.1. Top chord live load;
 - 5.2. Top chord dead load;
 - 5.3. Bottom chord live load;
 - 5.4. Bottom chord dead load;
 - 5.5. Additional loads and locations; and
 - 5.6. Environmental design criteria and loads (wind, rain, snow, seismic, etc.).
6. Other lateral loads, including drag strut loads;
7. Adjustments to wood member and metal connector plate design value for conditions of use;
8. Maximum reaction force and direction, including maximum uplift reaction forces where applicable;
9. Metal-connector-plate type, size and thickness or gage, and the dimensioned location of each metal connector plate except where symmetrically located relative to the joint interface;
10. Size, species and grade for each wood member;
11. Truss-to-truss connections and truss field assembly requirements;
12. Calculated span-to-deflection ratio and maximum vertical and horizontal deflection for live and total load as applicable;
13. Maximum axial tension and compression forces in the truss members; and
14. Required permanent individual truss member restraint location and the method and details of restraint/bracing to be used in accordance with Section 2303.4.1.2.

2303.4.1.2 Permanent individual truss member restraint. Where permanent restraint of truss members is required on the truss design drawings, it shall be accomplished by one of the following methods:

1. Permanent individual truss member restraint/bracing shall be installed using standard industry lateral restraint/bracing details in accordance with generally accepted engineering practice. Locations for lateral restraint shall be identified on the truss design drawing.
2. The trusses shall be designed so that the buckling of any individual truss member is resisted internally by the individual truss through suitable means (i.e., buckling reinforcement by T-reinforcement or L-reinforcement, proprietary reinforcement, etc.). The buckling reinforcement of individual members of the trusses shall be installed as shown on the truss design drawing or on supplemental truss member buckling reinforcement details provided by the truss designer.
3. A project-specific permanent individual truss member restraint/bracing design shall be permitted to be specified by any *registered design professional*.

2303.4.1.3 Trusses spanning 60 feet or greater. The owner shall contract with any qualified *registered design professional* for the design of the temporary installation restraint/bracing and the permanent individual truss member restraint/bracing for all trusses with clear spans 60 feet (18 288 mm) or greater.

2303.4.1.4 Truss designer. The individual or organization responsible for the design of trusses.

2303.4.1.4.1 Truss design drawings. Where required by the *registered design professional*, the *building official* or the statutes of the jurisdiction in which the project is to be constructed, each individual truss design drawing shall bear the seal and signature of the truss designer.

Exceptions:

1. Where a cover sheet and truss index sheet are combined into a single sheet and attached to the set of truss design drawings, the single cover/truss index sheet is the only document required to be signed and sealed by the truss designer.

2. When a cover sheet and a truss index sheet are separately provided and attached to the set of truss design drawings, the cover sheet and the truss index sheet are the only documents required to be signed and sealed by the truss designer.

2303.4.2 Truss placement diagram. The truss manufacturer shall provide a truss placement diagram that identifies the proposed location for each individually designated truss and references the corresponding truss design drawing. The truss placement diagram shall be provided as part of the truss submittal package, and with the shipment of trusses delivered to the job site. Truss placement diagrams that serve only as a guide for installation and do not deviate from the *permit* submittal drawings shall not be required to bear the seal or signature of the truss designer.

2303.4.3 Truss submittal package. The truss submittal package provided by the truss manufacturer shall consist of each individual truss design drawing, the truss placement diagram, the permanent individual truss member restraint/bracing method and details and any other structural details germane to the trusses; and, as applicable, the cover/truss index sheet.

2303.4.4 Anchorage. The design for the transfer of loads and anchorage of each truss to the supporting structure is the responsibility of the *registered design professional*.

2303.4.5 Alterations to trusses. Truss members and components shall not be cut, notched, drilled, spliced or otherwise altered in any way without written concurrence and approval of a *registered design professional*. Alterations resulting in the addition of loads to any member (e.g., HVAC equipment, piping, additional roofing or insulation, etc.) shall not be permitted without verification that the truss is capable of supporting such additional loading.

2303.4.6 TPI 1 specifications. In addition to Sections 2303.4.1 through 2303.4.5, the design, manufacture and quality assurance of metal-plate-connected wood trusses shall be in accordance with TPI 1. Job-site inspections shall be in compliance with Section 110.4, as applicable.

2303.4.7 Truss quality assurance. Trusses not part of a manufacturing process in accordance with either Section 2303.4.6 or a standard listed in Chapter 35, which provides requirements for quality control done under the supervision of a third-party quality control agency, shall be manufactured in compliance with Sections 1704.2 and 1704.6, as applicable.

Section 2306 Allowable Stress Design

2306.1 Allowable stress design. The structural analysis and construction of wood elements in structures using allowable design methods shall be in accordance with the following applicable standards:

Truss Plate Institute, Inc.

[TPI 1 National Design Standard for Metal Plate Connected Wood Truss Construction](#)

Chapter 35 - Referenced Standards

TPI

Truss Plate Institute
218 N. Lee Street, Suite 312
Alexandria, VA 22314

Standard reference number	Title	Referenced in code section number
TPI 1—2007	National Design Standards for Metal-plate-connected Wood Truss Construction.	2303.4.6, 2306.1

Appendix F

ANSI/TPI 1-2007: National Design Standard for Metal Plate Connected Wood Trusses Chapter 2: Standard Responsibilities in the Design and Application of Metal-Plate-Connected Wood Trusses

2.3 RESPONSIBILITIES WHERE THE LEGAL REQUIREMENTS MANDATE A REGISTERED DESIGN PROFESSIONAL FOR BUILDINGS

2.3.1 REQUIREMENTS OF THE OWNER

2.3.1.5 **Review and Coordinate Submittal Packages.** The Owner or Owner's representative shall be responsible for ensuring that the requirement of [Section 2.3.4.2](#) is accomplished.

2.3.2 REQUIREMENTS OF THE REGISTERED DESIGN PROFESSIONAL

2.3.2.3 **Review Submittal Packages.** The Registered Design Professional for the Building shall review the Truss Submittal Package for compatibility with the Building design. All such submittals shall include a notation indicating that they have been reviewed and whether or not they have been found to be in general conformance with the design of the Building.

2.3.3 REQUIREMENTS FOR THE PERMANENT MEMBER RESTRAINT/ BRACING OF TRUSS SYSTEMS

2.3.3.1 **Method of Restraint.** The method of Permanent Individual Truss Member Restraint/Bracing and the method of anchoring or restraining to prevent lateral movement of all Truss members acting together as a system shall be accomplished by:

2.3.3.1.1 **Standard Industry Details.** Standard industry Lateral Restraint and Diagonal Bracing details in accordance with *BCSI-B3: Permanent Restraint/Bracing of Chords and Web Members* and/or *BCSI-B7: Temporary & Permanent Restraint/Bracing for Parallel Chord Trusses of the Building Component Safety Information (BCSI)*.

2.3.3.1.2 **Substitution with Reinforcement.** Permanent Individual Truss Member Restraint shall be permitted to be replaced with reinforcement designed to prevent buckling (e.g., buckling reinforcement by T-reinforcement or L-reinforcement, proprietary reinforcement, etc.).

2.3.3.1.3 **Project Specific Design.** A project specific Truss member permanent lateral restraint/bracing design for the roof or floor Framing Structural System shall be permitted to be specified by any Registered Design Professional.

2.3.3.2 **Method Specified by any Registered Design Professional.** The method of Permanent Individual Truss Member Restraint and Diagonal Bracing for the Truss Top Chord, Bottom Chord, and Web members shall be permitted to be specified by any Registered Design Professional.

2.3.3.3 **Absence of Truss Restraint/Bracing Method or Details.** If a specific Truss member permanent bracing design for the roof or floor Framing Structural System is not provided by the Owner or any Registered Design Professional, the method of Permanent Individual Truss Member Restraint and Diagonal Bracing for the Truss Top Chord, Bottom Chord, and Web Members shall be in accordance with *BCSI-B3* or *BCSI-B7*.

2.3.4 REQUIREMENTS OF THE CONTRACTOR

2.3.4.2 **Information Provided to the Registered Design Professional.** The Contractor, after reviewing and/or approving the Truss Submittal Package, shall forward the Truss Submittal Package for review by the Registered Design Professional for the Building.

2.3.4.3 **Truss Submittal Package Review.** The Contractor shall not proceed with the Truss installation until the Truss Submittal Package has been reviewed by the Registered Design Professional for the Building.

2.3.4.5 Truss Installation. The Contractor shall ensure that the Building support conditions are of sufficient strength and stability to accommodate the loads applied during the Truss installation process. Truss installation shall comply with installation tolerances shown in BCSI-B1. Temporary Installation Restraint/Bracing for the Truss system and the permanent Truss system Lateral Restraint and Diagonal Bracing for the completed Building and any other construction work related directly or indirectly to the trusses shall be installed by the Contractor in accordance with:

(a) The Construction Documents, and/or

(b) The Truss Submittal Package.

2.3.6 REQUIREMENTS OF THE TRUSS MANUFACTURER

2.3.6.5 Required Documents. The Truss Manufacturer shall supply to the Contractor the Truss Submittal Package, including the Truss Design Drawings sealed by a Truss Design Engineer, a Truss Placement Diagram, if required by the Construction Documents or Contract, and the required Permanent Individual Truss Member Restraint and the method to be used per [Section 2.3.3](#).

2.3.6.6 Special Application Conditions. The Truss Manufacturer shall be allowed to provide detail drawings to the Contractor to document special application conditions.

2.3.6.7 Truss Submittal Packages. Where required by the Construction Documents or Contract, Legal Requirements or the Building Official, the Truss Manufacturer shall provide the appropriate Truss Submittal Package to one or more of the following: Building Official; Registered Design Professional for the Building and/or Contractor for review and/or approval per Section 2.3.4.2.

2.4 RESPONSIBILITIES WHERE THE LEGAL REQUIREMENTS DO NOT MANDATE A REGISTERED DESIGN PROFESSIONAL FOR BUILDINGS

2.4.1 REQUIREMENTS OF THE OWNER

2.4.1.4 Review and Coordinate Submittal Packages. The Owner or Owner's representative shall be responsible for ensuring that the requirements of [Section 2.4.4.2](#) are accomplished.

2.4.2 REQUIREMENTS OF THE BUILDING DESIGNER

2.4.2.3 Review Submittal Packages. The Building Designer shall review the Truss Submittal Package for compatibility with the Building design. All such submittals shall include a notation indicating that they have been reviewed and whether or not they have been found to be in general conformance with the design of the Building.

2.4.3 REQUIREMENTS FOR THE PERMANENT MEMBER RESTRAINT/ BRACING OF TRUSS SYSTEMS

2.4.3.1 Method of Restraint. The method of Permanent Individual Truss Member Restraint/Bracing and the method of anchoring or restraining to prevent lateral movement of all Truss members acting together as a system shall be accomplished by:

2.4.3.1.1 Standard Industry Details. Standard industry Lateral Restraint and Diagonal Bracing details in accordance with BCSI-B3: Permanent Restraint/Bracing of Chords and Web Members and/or BCSI-B7: Temporary & Permanent Restraint/Bracing for Parallel Chord Trusses of the Building Component Safety Information (BCSI).

2.4.3.1.2 Substitution with Reinforcement. Permanent Individual Truss Member Restraint shall be permitted to be replaced with reinforcement designed to prevent buckling (e.g., buckling reinforcement by T-reinforcement or L-reinforcement, proprietary reinforcement, etc.).

2.4.3.1.3 Project Specific Design. A project specific Truss member permanent lateral restraint/bracing design for the roof or floor Framing Structural System shall be permitted to be specified by any Building Designer.

2.4.3.2 Method Specified by any Building Designer. The method of Permanent Individual Truss Member Restraint and Diagonal Bracing for the Truss Top Chord, Bottom Chord, and Web members shall be permitted to be specified by any Building Designer.

2.4.3.3 Absence of Truss Restraint/Bracing Method or Details. If a specific Truss member permanent bracing design for the roof or floor Framing Structural System is not provided by the Owner or any Building Designer, the method of Permanent Individual Truss Member Restraint and Diagonal Bracing for the Truss Top Chord, Bottom Chord, and Web members shall be in accordance with *BCSI-B3* or *BCSI-B7*.

2.4.4 REQUIREMENTS OF THE CONTRACTOR

2.4.4.2 Information Provided to the Building Designer. The Contractor, after reviewing and/or approving the Truss Submittal Package, shall forward the Truss Submittal Package to the Building Designer for review.

2.4.4.3 Shop Drawing Review. The Contractor shall not proceed with the Truss installation until the Truss Submittal Package has been reviewed by the Building Designer.

2.4.4.5 Truss Installation. The Contractor shall ensure that the Building support conditions are of sufficient strength and stability to accommodate the loads applied during the Truss installation process. Truss installation shall comply with installation tolerances shown in *BCSI-B1*. Temporary Installation Restraint/Bracing for the Truss system and the permanent Truss system Lateral Restraint and Diagonal Bracing for the completed Building and any other construction work related directly or indirectly to the trusses shall be installed by the Contactor in accordance with:

(a) The Construction Documents, and/or

(b) The Truss Submittal Package.

2.4.6 REQUIREMENTS OF THE TRUSS MANUFACTURER

2.4.6.5 Required Documents. The Truss Manufacturer shall supply to the Contractor the Truss Submittal Package, including the Truss Design Drawings, a Truss Placement Diagram, if required by the Construction Documents or Contract, and the required Permanent Individual Truss Member Restraint and the method to be used per [Section 2.4.3](#).

2.4.6.6 Special Application Conditions. The Truss Manufacturer shall be allowed to provide detail drawings to the Contractor to document special application conditions.

2.4.6.7 Truss Submittal Packages. Where required by the Construction Documents or Contract, Legal Requirements or the Building Official, the Truss Manufacturer shall provide the appropriate Truss Submittal Package to one or more of the following: Building Official; Building Designer and/or Contractor for review and/or approval per Section 2.4.4.2.