Position Statement on Sealed Truss Placement Diagrams for Projects in the State of California
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Issue:

Certain jurisdictions in California are requesting engineering seals on Truss Placement Diagrams (TPD) (also known as a truss placement plan, truss layout, framing plan or framing layout). The following information should be used to provide insight into why component manufacturers should seriously consider all the ramifications of providing seals on TPD for projects governed by the 2001 California Code of Regulations, Title 24, also referred to as the California Building Code.

Background:

The TPD is not to be viewed as an engineering document except as stated below; rather it is provided to assist the installer in properly locating the trusses within the structure.

All the necessary truss engineering and analysis is found on the Truss Design Drawings (TDD). If a TPD is provided, it is recommended that the project’s Building Designer or Engineer of Record review and approve the TPD to ensure that the intended load paths have not been altered.

According to ANSI/TPI 1-1995 (TPI 1) (see Appendix A), which is adopted by reference in the California Building Code through Sections 101.7 (see Appendix B), 2303, 2321 and Part IV provisions (see Appendix C), a Building Designer is defined as:

Section A.1.2.2 “Building Designer” is the individual or organization having responsibility for the overall building or structure design in accordance with the state’s statutes and regulations governing the professional registration and certification of architects or engineers. This responsibility includes but is not limited to foundation design, structural member sizing, load transfer, bearing conditions, and the structure’s compliance with the applicable building codes. Also referred to as a registered architect or engineer, building designer, and registered building designer, but hereinafter will be referred to as Building Designer.

If a Truss Designer were to seal a TPD, it has been suggested that they could inappropriately be held responsible for ensuring the proper flow of loads through the truss to the bearing and support structure below the truss then onto the foundation. Truss Designers would only undertake Building Designer responsibilities under a special set of circumstances if capable and when properly compensated.

According to the 2001 California Building Standards Administrative Code, Title 24 Section 4-217(a) (see Appendix D), the “architect or registered engineer is responsible to see that the completed work conforms
in every material respect to these regulations and the approved plans and specifications.” Therefore, if a Truss Placement Diagram is provided, the Building Designer (architect or engineer) should review and approve the diagram to ensure that the intended load paths have not been altered.

**Analysis:**

**Plans and Specifications**
The California Building Code (see Appendix B for complete text) provides that the plans and specifications for a project shall be prepared by a licensed architect or engineer where required by the law of the jurisdiction in which the project is being constructed. In particular, the California Building Code states:

106.3.2 Submittal documents. ...When [Plans, specifications, engineering calculations, diagrams, soil investigation reports, special inspection and structural observation programs and other data] are not prepared by an architect or engineer, the building official may require the applicant submitting such plans or other data to demonstrate that state law does not require that the plans be prepared by a licensed architect or engineer. The building official may require plans, computations and specifications to be prepared and designed by an engineer or architect licensed by the state to practice as such even if not required by state law.

The plans and specifications should in turn clearly define the scope of the work proposed by the Building Designer:

106.3.3 Information on plans and specifications. Plans and specifications...shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and all relevant laws, ordinances, rules and regulations.

In preparing the construction documents, the Building Designer needs to provide the Truss Designer with the information necessary to properly design the trusses for the building. According to TPI 1, the following information should be provided (see Appendix A for complete text):

**ANSI/TPI 1-1995 Appendix A**

**A.3.0 BUILDING DESIGNER RESPONSIBILITIES**

A.3.2 (The Building Designer shall) prepare the Construction Design Documents, showing all trussed areas, which must provide as a minimum the following:

- A.3.2.1 All truss orientations and locations;
- A.3.2.2 Information to fully determine all truss profiles;
- A.3.2.3 Adequate support of the Truss and all truss bearing conditions;
- A.3.2.4 Permanent bracing design for the structure including the Trusses,...
- A.3.2.5 The location, direction and magnitude of all dead and live loads applicable to each Truss
- A.3.2.6 All Truss anchorage designs required to resist uplift, gravity, and lateral loads;
- A.3.2.7 Allowable vertical and horizontal deflection criteria;
- A.3.2.8 Proper transfer of design loads affecting the Truss; and
- A.3.2.9 Adequate connections between Truss and non-Truss components,

A.3.3 Review and approve the Truss Placement Plan and each Truss Design Drawing for conformance with the requirements and intent of the Construction Design Documents, the effect of each Truss Design Drawing and Truss Placement Plan on other parts of the structure, and the effect of the structure on each Truss.

A.3.4 ... specify how the permanent lateral bracing is to be anchored or restrained to prevent lateral movement if all truss members, so braced, buckle together.

**Truss Design and Preparation of Truss Design Drawings**
Assuming the requisite information is provided within the construction documents issued by the RDP or Building Designer, the Truss Designer’s sole responsibility is to properly design the individual trusses according to this information. Once designed, a truss is then depicted on a TDD. The Truss Designer is therefore specifically responsible for the single truss design depicted on each TDD.

**Who Typically Prepares Truss Placement Diagrams?**
Assuming the requisite information is provided in the construction documents, TPD are prepared by component manufacturer personnel who are not typically Truss Designers. The individuals preparing TPD are trained individuals who work as truss technicians, truss take-off specialists or truss salespeople. As TPD are typically prepared outside the Truss Designer’s scope of work, they may not be reviewed or even seen by the Truss Designer. TPD are generally not prepared within the typical duties of the Truss Designer and are therefore not prepared under the Truss Designer’s direct supervision.

**Why are Truss Placement Diagrams Prepared?**
TPDs are intended to assist customers, erectors and code enforcement officials in positioning or locating the trusses and related structural components supplied by the component manufacturer.

Their function is to serve as detailed installation instructions. They indicate the component manufacturer’s assumed location for each truss or related component that has been designed and manufactured.

For example, a truss or related structural building component is no different than a window that is manufactured and in turn installed within a building. A window may be a highly engineered component of a house with specific installation specifications and instructions. However, there is no requirement to provide an engineer’s seal on the installation instructions for windows.

**To Require Truss Placement Diagrams to be Sealed Would Violate California Law.**
Because TPD are generally neither created by nor created under the immediate personal supervision of a licensed design professional, they cannot be sealed. To require that they be sealed is contrary to the responsible supervision requirements under the 2001 California Building Standards Administrative Code, Title 24 Section 4-209, Section 4-210(f) (see Appendix D), and the existing California Business and Professions Code Section 6735(a) (see Appendix E), which state in pertinent part:

**Title 24 Section 4-209. Design Responsibilities.**
(a) General Responsible Charge. For every essential services building project there shall be an architect, structural engineer or civil engineer in general responsible charge of plans, specifications and observation of construction...
(b) Delegation of Responsibility. The architect, structural engineer or civil engineer in general responsible charge may delegate responsibility for any portion of the work to, or may employ, or retain other architects, structural engineers or civil engineers.
(c) Evidence of Responsibility. The stamp and signature of the architect or registered engineer on a plan, specification, or other document shall be deemed evidence that full responsibility is assumed by the signator for the work shown...

**Title 24 Section 4-210. Plans, Specifications, Computations and Other Data.**
(f) Signatures Required. All plans and specifications submitted for approval shall bear the stamp and signature of the architect or professional engineer in general responsible charge of design. When responsibility for a portion of the work has been delegated, the plans and specifications covering that portion of design shall also bear the stamp and signature of the responsible registered engineer or architect.

**California Business and Professions Code**
**Section 6735 (a)** All civil (including structural and geotechnical) engineering plans, calculations, specifications, and reports...shall be prepared by, or under the responsible charge of, a registered civil engineer and shall include his or her name and license number.
The International Code Committee (ICC) Has Recently Codified That Truss Placement Diagrams Should Not Be Sealed

The state of California is moving to adopt the International Codes. The 2003 International Building Code (IBC) does not clearly define TPD. As such, some may wrongly infer that they are part of the “Truss Design Drawings” which are defined as follows [2303.4.1 (see Appendix F) (IBC 2003)]:

**2003 IBC 2303.4.1 Truss design drawings.** Truss construction documents shall be prepared by a registered design professional and shall be provided to the building official and approved prior to installation.

To clear up any confusion on this issue, Section 2303 of the 2006 IBC has been revised to include the following regarding “Truss Placement Diagram”:

**2006 IBC 2303.4.3 Truss Placement Diagram.** A diagram supplied by the truss manufacturer 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.

**Conclusion**

The California professional engineering law and the California Building Standards Code provide the basis upon which to evaluate the need to provide an engineer’s seal on a Truss Placement Diagram (TPD). Based on this evaluation, a TPD does not require a professional engineer’s seal.
Appendix A

ANSI/TPI 1-1995
National Design Standard for Metal Plate Connected Wood Truss Construction
Appendix A – Standard Responsibilities in the Design Process Involving Metal Plate Connected Wood Trusses

A.1.0 SCOPE AND DEFINITIONS

A.1.2.2 “Building Designer” is the individual or organization having responsibility for the overall building or structure design in accordance with the state’s statutes and regulations governing the professional registration and certification of architects or engineers. This responsibility includes but is not limited to foundation design, structural member sizing, load transfer, bearing conditions, and the structure’s compliance with the applicable building codes. Also referred to as a registered architect or engineer, building designer, and registered building designer, but hereinafter will be referred to as Building Designer.

A.1.2.8 “Truss Designer” is the design professional, individual or organization, having responsibility for the design of metal plate connected wood trusses. This responsibility shall be in accordance with the state’s statues and regulations governing the professional registration and certification of architects or engineers. Also referred to as truss engineer, design engineer, registered engineer, and engineer, but hereinafter will be referred to as Truss Designer.

A.3.0 BUILDING DESIGNER RESPONSIBILITIES

A.3.1 Design a structure suitable to ensure that the intended function of each Truss is not affected by adverse influences including, but not limited to, moisture, temperature, corrosive chemicals and gases;

A.3.2 Prepare the Construction Design Documents, showing all trussed areas, which must provide as a minimum the following:

A.3.2.1 All truss orientations and locations;
A.3.2.2 Information to fully determine all truss profiles;
A.3.2.3 Adequate support of the Truss and all truss bearing conditions;
A.3.2.4 Permanent bracing design for the structure including the Trusses, except as provided in A.3.4 (see below) and A.6.2.12 (required permanent Truss member bracing location);
A.3.2.5 The location, direction and magnitude of all dead and live loads applicable to each Truss including, but not limited to, loads attributable to: roof, floor, partition, mechanical, fire sprinkler, attic, storage, wind, snow drift and seismic;
A.3.2.6 All Truss anchorage designs required to resist uplift, gravity, and lateral loads;
A.3.2.7 Allowable vertical and horizontal deflection criteria;
A.3.2.8 Proper transfer of design loads affecting the Truss; and
A.3.2.9 Adequate connections between Truss and non-Truss components, except as noted in Section A.6.2.9 (Truss to Truss girder; Truss ply to ply; and Field Splices).

A.3.3 Review and approve the Truss Placement Plan and each Truss Design Drawing for conformance with the requirements and intent of the Construction Design Documents, the effect of each Truss Design Drawing and Truss Placement Plan on other parts of the structure, and the effect of the structure on each Truss.

A.3.4 Specify permanent lateral bracing where indicated by the Truss Designer on the Truss Design Drawings, to prevent buckling of the individual truss members due to design loads. The Building Designer shall specify how the permanent lateral bracing is to be anchored or restrained to prevent lateral movement if all truss members, so braced, buckle together. This shall be accomplished by: (a) anchorage to solid end walls; (b) permanent diagonal bracing in the plane of the web members; or (c) other means when demonstrated by the Building Designer to provide equivalent bracing.
101.7 Standard Reference Documents. The codes, standards and publications adopted and set forth in this code, including other codes, standards and publications referred to therein are, by title and date of publication, hereby adopted as standard reference documents of this code.

106.3.2 Submittal documents. Plans, specifications, engineering calculations, diagrams, soil investigation reports, special inspection and structural observation programs and other data shall constitute the submittal documents and shall be submitted in one or more sets with each application for a permit. When such plans are not prepared by an architect or engineer, the building official may require the applicant submitting such plans or other data to demonstrate that state law does not require that the plans be prepared by a licensed architect or engineer. The building official may require plans, computations and specifications to be prepared and designed by an engineer or architect licensed by the state to practice as such even if not required by state law.

EXCEPTION: The building official may waive the submission of plans, calculations, construction inspection requirements and other data if it is found that the nature of the work applied for is such that reviewing of plans is not necessary to obtain compliance with this code.

106.3.3 Information on plans and specifications. Plans and specifications shall be drawn to scale upon substantial paper or cloth and shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and all relevant laws, ordinances, rules and regulations. Plans for buildings of other than Group R, Division 3 and Group U Occupancies shall indicate how required structural and fire-resistive integrity will be maintained where penetrations will be made for electrical, mechanical, plumbing and communication conduits, pipes and similar systems.
Appendix C

2001 California Building Code, Volume 2
Chapter 23 WOOD

SECTION 2303
STANDARDS OF QUALITY

The standards listed below labeled a UBC Standard are also listed in Chapter 35, Part II, and are part of this code. The other standards listed below are recognized standards. (See Sections 3503 and 3504.)

5. Design standards.
5.1 ASTM D 5055, Structural Capacities of Prefabricated Wood I-Joists
5.2 ANSI/TPI 1 National Design Standard for Metal Plate Connected Wood Truss Construction
5.3 ANSI/TPI 2 Standard for Testing Performance for Metal Plate Connected Wood Trusses
5.4 ASCE 16, Load and Resistance Factor Design Standard for Engineered Wood Construction

Division V - DESIGN STANDARD FOR METAL PLATE CONNECTED WOOD TRUSS

Based on ANSI/TPI 1-1995, National Design Standard for Metal Plate Connected Wood Truss Construction, of the Truss Plate Institute

SECTION 2321
METAL PLATE CONNECTED WOOD TRUSS DESIGN

2321.1 Design and Fabrication. The design and fabrication of metal plate connected wood trusses shall be in accordance with ANSI/TPI 1-1995.

Part IV: Recognized Standards

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

2303
Appendix D

2001 California Building Standards Administrative Code
Part 1, Title 24 – California Code of Regulations (C.C.R.)
CHAPTER 1. ADMINISTRATIVE REGULATIONS OF THE CALIFORNIA BUILDING STANDARDS COMMISSION

Section 4-209. Designation of Responsibilities.

(a) General Responsible Charge. For every essential services building project there shall be an architect, structural engineer or civil engineer in general responsible charge of plans, specifications and observation of construction, except that plans, specifications and observation of construction may be under the responsible charge of a registered mechanical or electrical engineer for work involving only those respective branches of engineering. A project may be divided into parts, provided that each part is clearly defined by a building or similar distinct unit. The part, so defined, shall include all portions and utility systems or facilities necessary to the complete functioning of that part. Separate assignments of general responsible charge may be made for the parts.

(b) Delegation of Responsibility. The architect, structural engineer or civil engineer in general responsible charge may delegate responsibility for any portion of the work to, or may employ, or retain other architects, structural engineers or civil engineers. Registered mechanical and electrical engineers may be delegated responsibility for the mechanical and electrical portions of the work, respectively.

(c) Evidence of Responsibility. The stamp and signature of the architect or registered engineer on a plan, specification, or other document shall be deemed evidence that full responsibility is assumed by the signator for the work shown thereon, including also those portions of the accompanying computations, specifications or plans which pertain to such work.

Section 4-210. Plans, Specifications, Computations and Other Data.

(a) General. When an application is filed, it shall be accompanied by the required number of complete sets of the plans and specifications, the complete structural design calculations, site data and a fee as established by the enforcement agency.

(b) Plans. Plans shall show the use or occupancy of all parts of the essential services buildings and shall give such other information as may be required to indicate the nature of the work proposed and to show compliance with the act and these regulations. The drawings shall be legible and sufficiently detailed and cross-referenced to show clearly the pertinent features of the construction, and shall have sufficient dimensions to be readily interpreted. Where a project includes several buildings, the plans for each shall be drawn independently except that details common to all need not be repeated. Submitted plans and specifications, which are obviously incomplete or incorrect, shall be returned to the architect or registered engineer in general responsible charge with a request for compliance with these regulations before checking is begun or resumed by the enforcement agency.

(c) Specifications. Specifications shall completely set forth the requirements for the various types of materials that will enter into the permanent construction and shall describe the methods not covered in the technical regulations which are to be used to obtain the required quality of the work shown on the plans and described in the specifications.

(d) Design Computations. Computations, stress diagrams and other pertinent data shall accompany the plans and specifications and shall be sufficiently complete so that calculations for individual structural members can be readily interpreted. The computations shall be prefaced by a statement clearly and concisely outlining the basis for the structural design and indicating the manner in which the proposed essential services building will resist vertical loads and horizontal forces. The computations shall be sufficiently complete to establish that the structure will resist the loads and forces prescribed in Part 2, Title 24, CCR. Assumed safe bearing pressures on soils and specified
strengths of concrete shall be given in the computations and noted on the plans. Where unusual conditions occur, such additional data as are pertinent to the work shall be submitted.

(e) Site Data. Site data for all essential services buildings covered by these regulations shall include a soil investigation report providing information on subsurface site work and laboratory testing, an evaluation of site soil conditions, a recommendation for the type of foundation to be used and an allowable design value for the soil bearing capacity. For all essential services building sites not exempted from the provisions of the act, a geologic and earthquake hazard report including an evaluation of both known and potentially active local and regional fault systems, slope stability, liquefaction potential and other hazards shall be prepared by competent persons and submitted with the application, plans and specifications. All or parts of the geologic and earthquake hazard investigation and report may be waived by the enforcement agency when in the judgment of the enforcement agency those requirements are unnecessary and would not be beneficial to public safety.

(f) Signatures Required. All plans and specifications submitted for approval shall bear the stamp and signature of the architect or professional engineer in general responsible charge of design. When responsibility for a portion of the work has been delegated, the plans and specifications covering that portion of design shall also bear the stamp and signature of the responsible registered engineer or architect.

Section 4-217. Duties of the Architect and Registered Engineers.

(a) General. The architect or registered engineer is responsible to the owner and to the enforcement agency to see that the completed work conforms in every material respect to these regulations and the approved plans and specifications. The architect or registered engineer may, if so authorized, act as agent for the owner in completing and submitting the application to the enforcement agency. The architect or registered engineer, in no way, is relieved of any responsibility by the activities of the enforcement agency in the performance of its duties.

(b) General Responsible Charge. The architect or registered engineer in general responsible charge shall advise the owner in regard to filing of the application for approval of plans, the selection of a project inspector and the selection of a testing laboratory. The architect or registered engineer shall prepare the plans, specifications, design computations and other data and shall prepare documents authorizing changes in the approved drawings and specifications when so directed by the owner or as required by conditions on the project. The architect or registered engineer shall make, or cause to be made, the corrections required on the various documents to comply with the requirements of these regulations and shall provide the project inspector and testing agency with a complete set of stamped plans, specifications and documents authorizing changes. The enforcement agency directs all technical correspondence to the architect or registered engineer in general responsible charge of the project.
Appendix E

California Business and Professions Code
Section 6735

(a) All civil (including structural and geotechnical) engineering plans, calculations, specifications, and reports (hereinafter referred to as "documents") shall be prepared by, or under the responsible charge of, a registered civil engineer and shall include his or her name and license number. Interim documents shall include a notation as to the intended purpose of the document, such as "preliminary," "not for construction," "for plan check only," or "for review only." All civil engineering plans and specifications that are permitted or that are to be released for construction shall bear the signature and seal or stamp of the registrant, the date of signing and sealing or stamping, and the expiration date of the certificate or authority. All civil engineering calculations and reports shall bear the signature and seal or stamp of the registrant, the date of signing and sealing or stamping, and the expiration date of the certificate or authority. If civil engineering plans are required to be signed and sealed or stamped and have multiple sheets, the signature, seal or stamp, date of signing and sealing or stamping, and expiration date of the certificate or authority shall appear on each sheet of the plans. If civil engineering specifications, calculations, and reports are required to be signed and sealed or stamped and have multiple pages, the signature, seal or stamp, date of signing and sealing or stamping, and expiration date of the certificate or authority shall appear at a minimum on the title sheet, cover sheet, or signature sheet.

(b) Notwithstanding subdivision (a), a registered civil engineer who signs civil engineering documents shall not be responsible for damage caused by subsequent changes to or uses of those documents, if the subsequent changes or uses, including changes or uses made by state or local governmental agencies, are not authorized or approved by the registered engineer who originally signed the documents, provided that the engineering service rendered by the civil engineer who signed the documents was not also a proximate cause of the damage.
Appendix F

International Building Code
Chapter 23 WOOD
SECTION 2303: MINIMUM STANDARDS AND QUALITY

2303.4.1 Truss design drawings. Truss construction documents shall be prepared by a registered design professional and shall be provided to the building official and approved prior to installation. These construction documents shall include, at a minimum, the information specified below. Truss shop drawings shall be provided with the shipment of trusses delivered to the job site.

1. **Slope or depth, span, and spacing;**
2. **Location of all 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;**
10. **Controlling wind and earthquake loads;**
11. **Adjustments to lumber and joint connector design values for conditions of use;**
12. **Each reaction force and direction;**
13. **Metal connector plate type, size, thickness or gauge, 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 girder;**
   15.2 **Truss ply-to-ply; and**
   15.3 **Field splices.**
16. **Calculated deflection ratio and/or maximum description for live and total load;**
17. **Maximum axial compression forces in the truss members to enable the building designer to design the size, connections and anchorage of the permanent continuous lateral bracing. Forces shall be shown on the truss drawing or on supplemental documents; and**
18. **Required permanent truss member bracing location.**