Sealing Truss Placement Diagrams:

A Follow Up to "Standing Up & Being Heard"

A letter about skirting responsibility is addressed.

by Ryan J. Dexter, P.E.

The April 2007 issue of SBC included an article entitled "Standing Up & Being Heard," which profiled a WTCA member professional engineer's experience in arguing against a proposed Division of State Architects amendment to the new California Building Code requiring a Truss Placement Diagram (TPD) to be sealed by a Truss Designer.

We received feedback on this article and decided that a follow-up article was necessary. Here are excerpts of a note from Keith Fuller who is an International Code Council (ICC) Master Code Professional in Montgomery County, PA (a suburb of Philadelphia):

> ...An engineer should seal his or her designs so those in the field know who prepared the drawings, and that the placement drawings were consistent with the individual truss designs. A good truss design is no good if the truss is not put where it was designed to be installed. An engineer that won't seal their own drawings should find other work. Be responsible for what you do.
>
> ...Installers and inspectors in the field need this information, and they also need to know who's responsible for the design....As a building official, I want it in writing; I don't want you all pointing fingers at each other when the roof system fails under snow load. You'll have to be responsible for what you do.
>
> As one who reviews plans and inspects in Pennsylvania, if the plans aren't sealed, they won't be accepted, period. If trusses are improperly installed by virtue of their lack of proper bracing, improper placement, or damage, that is also unacceptable....Do what's right to protect the average person who will be in the building—keep them safe.

Without question, our industry overall desires the same things as Mr. Fuller—to keep buildings safe. The issue here is typical scope of responsibilities. We completely agree that an engineer should seal his work; that's basic engineering law. What is needed up front is an understanding of the particular situation in California, Pennsylvania, or anywhere else, what a TPD is and why it is prepared. The key is to have everyone on the same page before construction begins so there is no "pointing fingers" after the fact. Let's dissect the scenario to achieve this common understanding. In this article, we borrow from California and Pennsylvania state codes and IBC to support our position.

The issues in "Standing Up & Being Heard" revolve around proposed code language specific to California Division of the State Architect (DSA) projects. The DSA is charged with providing design and construction oversight for K–12 schools and community colleges in California. The "victory" described in the article was to remove the DSA specific requirement for a Truss Placement Diagram (TPD) to bear the seal and signature of the Truss Designer. The argument used against this proposed requirement by Bryan Hill, P.E., from WTCA member company A.C. Houston Lumber Co., was that the structural framing plans prepared and sealed by the Building Designer (for DSA projects this would be the Registered Design Profession [RDP]) are sufficient and that the trusses are designed to match the requirements of these plans. If deviations are required they must first be approved, in writing, by the Building Designer (i.e., RDP) per the building code as follows (2006 IBC):

at a glance

- The topic of whether truss placement diagrams (TPDs) should be sealed continues to be misunderstood.
- The TPD should not to be viewed as an engineering document; it is provided to help the installer locate the trusses within the structure.
- A TPD is generally not prepared within the typical duties of an engineer and is therefore not typically prepared under the engineer's direct supervision.
- Truss Designers are counseled to only undertake Building Designer responsibilities under a special set of circumstances.

> **106.3.4 Design professional in responsible charge.**
>
> **106.3.4.1 General.** When it is required that documents be prepared by a registered design professional, the building official shall be authorized to require the owner to engage and designate on the building permit application a registered design professional who shall act as the registered design professional in responsible charge. If the circumstances require, the owner shall designate a substitute registered design professional in responsible charge who shall perform the duties required of the original registered design professional in responsible charge. The building official shall be notified in writing by the owner if the registered design professional in responsible charge is changed or is unable to continue to perform the duties.
>
> The registered design professional in responsible charge shall be responsible for reviewing and coordinating submittal documents prepared by others, including phased and deferred submittal items, for compatibility with the design of the building.

For these projects, sealed Truss Placement Diagrams in addition to sealed framing plans are redundant, potentially confusing, and a waste of time and resources.

The 2006 International Building Code (IBC) has furthermore codified that a TPD should not be sealed unless it is prepared under the direct supervision of a Registered Design Professional:

> **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.

The TPD is not to be viewed as an engineering document except as stated above; 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 review and approve the TPD to ensure that the assumed load paths match up with the building design concepts that they have employed.

ANSI/TPI 1 Chapter 2, which is adopted by reference in IBC 2006 (102.4, 2303.4 and Chapter 35 "Reference Standards"), defines Building Designer as follows:

> **2.3.4 *Building Designer:*** The Owner of the Building or the individual or organization (including either an Architect or Engineer or the Contractor) that contracts with the Owner for the design of the Building Structural System and/or who produces the Structural Design Documents.

The IBC defines RDP as follows:

> **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.

If a Truss Designer were to seal a TPD, it has been strongly suggested by the legal profession in our country 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 and into the foundation. Hence undertaking a building re-design, which is quite redundant.

Truss Designers are counseled to only undertake Building Designer responsibilities under a special set of circumstances: they are professionally capable of taking on such responsibility and properly compensated for the work. For example, the Commonwealth of Pennsylvania provides Engineer, Land Surveyor, and Geologist

Continued on page 52

Sealing Truss Placement Diagrams

Continued from page 51

Registration Law in PA Act 367[1]. According to Section 4(g)(6):

> **Section 4. General Powers of Board. ...(g) Suspension and Revocation of Licenses; Registrations and Certificates; Reinstatements.** ...For the purposes of this subsection, the code of ethics is as follows: It shall be considered unprofessional and inconsistent with honorable and dignified bearing for any professional engineer: ...(6) To attempt to obtain or render technical services or assistance without fair and just compensation commensurate with the services rendered.

Therefore, if the Truss Designer was hired to design the single truss components and compensated as such, it would be unlawful for him or her under a reasonable interpretation of Pennsylvania law to provide additional system engineering services within the state for free.

In most jurisdictions and definitely with DSA projects, the Building Designer of a non-residential structure must be a RDP, as defined above; pursuant to the IBC Section 106.1:

> **106.1 Submittal documents**. …The construction documents shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed. ...

The construction documents should in turn clearly define the scope of the work proposed by the Building Designer:

> **106.1.1 Information on construction documents.** ...Con-struction documents 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 relevant laws, ordinances, rules and regulations...

In preparing the construction documents, the Building Designer must provide the Truss Designer with the information necessary to properly design the trusses for the building.

Assuming the requisite information is provided within the construction documents issued by the Building Designer, the Truss Designer's sole responsibility is to properly design the 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.

Again assuming the requisite information is provided within the construction documents, a TPD is prepared by component manufacturer personnel who are not typically engineers. The individuals preparing a TPD are trained individuals who work as truss technicians, truss take-off specialists or truss salespeople. As a TPD is typically prepared outside the engineer's scope of work, it may not be reviewed or even seen by the Engineer responsible for preparing the Truss Design Drawings. A TPD is generally not prepared within the typical duties of an engineer and is therefore not typically prepared under the engineer's direct supervision.

A TPD is intended to assist customers, erectors and code enforcement officials in positioning or locating the trusses and related structural components supplied by the component manufacturer. Its function is to serve as a detailed installation guide. The TPD indicates the component manufacturer's assumed location for each truss or related component that has been designed and manufactured. A TPD would best be described as a "shop drawing."

"Shop drawings," as defined by Federal Acquisition Regulation (FAR),[2] are typically drawings submitted by the construction contractor or a subcontractor at the different phases or stages of construction or required under a construction contract scheduling requirements, showing in detail either or both of the following:

1. The proposed fabrication and assembly of structural elements.
2. The installation (i.e., form, fit, and attachment details) of materials or equipment.

FAR is the primary regulation for use by all Federal Executive agencies in their acquisition of supplies and services with appropriated funds.

Similar to a shop drawing, a TPD is intended as an installation detail and is covered by engineering exemptions in many states. Again using Mr. Fuller's location as an example, the Commonwealth of Pennsylvania specifically exempts shop drawings from requiring an engineer's seal in PA Act 367:

> **Section 5. Exemption from Licensure and Registration.** Except as specifically provided in this section, this act shall not be construed to require licensure and registration in the following cases:...(j) The preparation of shop drawings or the performance of construction management services by persons customarily engaged in construction work.

PA Act 367 also provides a definition for the *Practice of Engineering:*

> **Section 2. Definitions.** As used in this act –(a) (1) **"Practice of Engineering"** shall mean the application of the mathematical and physical sciences for the design of public or private buildings, structures, machines, equipment, processes, works or engineering systems, and the consultation, investigation, evaluation, engineering surveys, construction management, planning and inspection in connection therewith, the performance of the foregoing acts and services being prohibited to persons who are not licensed under this act as professional engineers unless exempt under other provisions of this act. ...

The preparation of a TPD does not require the need for education in mathematical or physical sciences.

Finally, because a TPD is generally neither created by nor created under the immediate personal supervision of a licensed design professional, it cannot be sealed. To require that it be sealed violates all state engineering laws. For example, Chapter 37 of *The Pennsylvania Code*[3] provides rules that govern the proper use of an engineer's seal:

> **§ 37.59. Use of seal.** The following rules govern the proper use of a registrant's seal: (1) A registrant may use his seal and signature only when the work being sealed and signed was prepared by the registrant or under the registrant's complete direction and control. ...

The Engineer's Code of Ethics as outlined in Section 4 of PA Act 367 states:

> **Section 4. General Powers of Board. ...(g) Suspension and Revocation of Licenses; Registrations and Certificates; Reinstatements.** ...It shall be considered unprofessional and inconsistent with honorable and dignified bearing for any professional engineer: ...(9) To use or permit the use of his professional seal on work over which he was not in responsible charge.

In conclusion, Mr. Fuller has brought up very good points and WTCA is in agreement with the issues he has raised. The code is clear that the Building Designer is the Registered Design Professional who has responsibility for the overall building design in accordance with the state's statutes and regulations. The Building Designer is also the person who reviews and coordinates all the Construction Documents prepared by others (including the Truss Design Drawings and Truss Placement Diagrams) to make sure they do not conflict with the scope of the project, the specifics of which are listed in IBC Section 106.3.4.1:

> **106.3.4.1 General.** ...The registered design professional in responsible charge shall be responsible for reviewing and coordinating submittal documents prepared by others, including phased and deferred submittal items, for compatibility with the design of the building. ...

The Truss Placement Diagram is an illustration identifying the assumed location for each truss based on the Truss Manufacturer's interpretation of the Construction Documents. The TPD is not an engineering document and should never be considered a replacement for a structural framing plan prepared by the Building Designer. If a seal is required on a TPD, it should be evaluated by the Building Designer and signed and sealed as reviewed and approved in conformance with the overall building design. SBC

[1]www.dos.state.pa.us/bpoa/lib/bpoa/20/eng_board/act_367_professional_engineers-5-04-new1.pdf
[2]farsite.hill.af.mil/reghtml/regs/far2afmcfars/fardfars/far/02.htm
[3]www.pacode.com/secure/data/049/chapter37/chap37toc.html

STRUCTURAL BUILDING COMPONENTS™

THE FUTURE OF FRAMING

www.sbcmag.info

Dear Reader:

The mission of ***Structural Building Components Magazine (SBC)*** is to increase the knowledge of and to promote the common interests of those engaged in manufacturing and distributing of structural building components to ensure growth and continuity, and to be the information conduit by staying abreast of leading-edge issues. SBC will take a leadership role on behalf of the component industry in disseminating technical and marketplace information, and will maintain advisory committees consisting of the most knowledgeable professionals in the industry. The opinions expressed in SBC are those of the authors and those quoted solely, and are not necessarily the opinions of any affiliated association (WTCA) .

Truss Publications, Inc.

6300 Enterprise Lane • Suite 200 • Madison, WI 53719
608/310-6706 phone • 608/271-7006 fax
www.sbcmag.info • admgr@sbcmag.info