

STRUCTURAL BUILDING COMPONENTS MAGAZINE

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No Sealed Placement Plans by Ryan J. Dexter

Letter to the Editor Regarding "Frequently-Asked Questions: Sealed Placement Plans"

by Ryan J. Dexter, Brian F. Keane, P.E., Tech Management, Inc., May 2001.

May 30, 2001

*Re: Frequently Asked Questions
Sealed Placement Plans by Ryan J. Dexter
May, 2001*

Dear Editor:

As a prior participant in the drafting of WTCA 1-1995, I read with interest Mr. Dexter's article in the May 2001, issue of WoodWords. I compliment his efforts to attempt to clarify the purpose of one of the more controversial issues in the pre-engineered (P.E.) truss industry (another being truss bracing).

However, from an engineering point of view, there is more to be said about the use and sealing of truss placement plans.

The wood truss industry has always taken the position that their product is an engineered component for apparent legal reasons. However, the construction industry that purchases these products see them as a structural support system. Unfortunately, the wood truss industry does not clarify the difference when it promotes its products.

Please don't get me wrong; I'm a big supporter of P. E. wood trusses. They are efficient, versatile, cost-effective, and for many installations easy to apply and simple to install. However, as with most successful products, new uses are always being considered, with design limits continuously being tested.

When a qualified engineer specifies the use of a P.E. wood truss system, I would expect few difficulties with the shop drawing approval process, and only on very complicated structures.

The first issue always starts with the truss placement plan. It never seems to fail that despite my best efforts in developing the truss layout, the truss manufacturer always wants to revise it for the most cost effective layout. Personally, and despite thirty-five (35) years of experience, I do not take issue with their recommendations because I do not pretend to have their expertise in truss fabrication efficiency. Therein becomes the need for a truss placement plan that meets the needs of the building design, while providing the technical input and efficiency of the truss manufacturer. A complicated truss system requires that the truss technician properly interprets the engineer's layout, load requirements, and support locations so the truss placement plan is an accurate representation of the engineer's intent. Once the placement drawing is accurately prepared, only then can the individual truss components be designed. Unfortunately, in many cases the truss engineer only reviews an 8-1/2" x 11" truss component drawing without the advantage of where the individual truss is located on the original engineer's truss plan.

If the truss technician, who is not an engineer, misinterprets the intent of the original design, the truss engineer that certifies a component design not only perpetuates the mistake, but makes it legal with his seal.

It has always been my position that the truss engineer cannot properly design a truss component without knowing its location in the truss system. When the truss technician is highly qualified, and the engineer-of-record is given the opportunity to review the placement drawings, I doubt if these projects have many truss related problems.

However, the percentage of projects that are built without an engineer's review of the truss placement drawing is significant, with potentially serious results. And the reason is simple; the owners,

architects, contractors, and erectors that purchase P. E. wood trusses perceive their purchase as a truss system, not single components. This perception is accurate when a qualified engineer is involved with the original design. This perception can be totally inaccurate if the building designer is not capable of providing a design that makes the truss system complete.

In response to this potential "gap" in the design process of a P.E. wood truss system, engineers and building officials have responded with the requirement to have truss placement plans sealed by the truss engineer. This step insures that the truss engineer has seen the proposed truss layout from the building designer, and the subsequent truss engineering component design(s) have been designed accordingly.

This new requirement, however, can be both good and bad. First, it is good since it insures that the truss designer has designed the individual truss components based on their location on the truss placement plan. It can be bad if it perpetuates the myth that the truss engineer has designed the entire roof system. It is, therefore, incumbent upon the P.E. wood truss industry to continue its education of the construction industry regarding the responsibilities of the truss manufacturer, the truss engineer, and the building designer.

The initial efforts of WTCA-1-95 regarding "design responsibilities" was only a first step. The use of sealed placement plans is a good second step. TPI's proposed document "Standard Responsibilities..." currently under development, is the next important step. However, these efforts to formalize "design responsibilities" are only part of the process. The truss industry must continue its efforts to promote the responsibilities of the building designer. Hopefully, the industry will respond by greater utilization of the services of qualified engineers to insure the proper design and application of P.E. wood trusses.

Sincerely,

Brian F. Keane, P.E.
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State laws assert that the work done by engineers requires engineering education, training and experience in the application of the mathematical, physical and engineering sciences. Placement plans are drawings that identify the assumed location for each truss based on the truss manufacturer's interpretation of the construction design documents. The creation of a placement plan does not fit the definition of engineering work, given that the scope of work is defining the assumed location of each truss, and as such cannot be considered part of the practice of engineering as defined by state laws.

Metal plate connected wood trusses are single engineered components that will carry the specific loads requested by the builder or building designer. As most state engineering laws exempt residential structures from having a professional engineer involved in the project, the truss design drawings for the trusses built for such exempt structures do not legally need to be sealed. However, many local code authorities require that truss design drawings are sealed. These drawings are therefore prepared and sealed to comply with state engineer laws and have very specific scope of work statements applied to them.

Metal plate connected wood trusses are not a structural system within themselves; they are only a component of the entire building structural system. Therefore, truss placement plans are for layout purposes only.

By law, the owner, builder and/or building designer is responsible to know how the building structural system is designed and how it will respond to and support the loadings and environmental requirements of local building codes. The building designer's framing plan should clearly illustrate how all loading conditions are transferred to the ground. The placement plan is created based upon the framing plan and should be approved or disapproved by the owner, builder and/or building designer as meeting the intent of the plans and specifications.¹ The upcoming ANSI consensus standard, BSR/TPI/WTCA 4-2002 (WTCA 1-1995), was created to (a) define as a standard the usual duties and responsibilities of the truss manufacturer and truss designer for the benefit of the owner, building designer, and contractor; and (b) to provide recommended guidelines to the owner, building designer, and contractor on matters related to the use of trusses. It specifically points out certain approvals that should take place before any trusses are manufactured. According to this document, the truss designer can be reasonably responsible for the element design depicted on the truss design drawing and all truss-to-truss connections.

"If the truss technician, who is not an engineer, misinterprets the intent of the original design, the truss designer who certifies a component design not only perpetuates the mistake, but makes it legal with his seal." ([From Letter to the Editor Regarding Frequently-Asked Questions: Sealed Placement Plans by Ryan J. Dexter, Brian F. Keane, P.E., Tech Management, Inc., May 2001.](#))

This statement reinforces the need to follow the design responsibility recommendations outlined in the upcoming BSR/TPI/WTCA 4-2002. It is important that the full intent of the owner, builder and/or building designer's layout be transferred to the truss placement plan and thus it becomes important for them to review and approve the placement plan. The owner, builder and/or building designer usually has specific reasons for how the framing plan was created and, as mentioned above, the initial submittal from the truss manufacturer may include a misunderstanding, which should be corrected by the owner, builder and/or building designer. The owner, builder and/or building designer must review the truss placement plan and each individual truss design drawing for compliance with the framing plan. This approval means that the owner, builder and/or building designer approves of the loadings used and the concept and intent of the truss submittals, but not the actual truss components.¹ Placement plans should be reviewed for truss span, loadings, spacing and supports including truss-to-truss connections. If a placement plan was to be sealed, the seal is required by professional engineering law to include a "scope of work" statement. This "scope of work" statement should include the requirement that the building designer confirm all quantities and dimensions. The "scope of work" statement should specifically state that the structural integrity of the trusses have been verified only for the dimensions and loads shown.

Our industry agrees with Mr. Keane about the importance of the role of the building designer (owner, builder, architect or engineer) in the specification, original design, engineering and overall building design review process. If this is not done systematically by those in responsible charge of design and construction, errors can be made. If the component industry is placed in the position of having to provide overall review of the roof system and this is assumed because a truss placement plan is sealed, our industry will have to look very seriously at becoming the building designer because to do this properly means we will be doing building design work. Why should we take on this responsibility and do the work thoroughly and not get compensated appropriately for it?

Our industry has functioned effectively for a long time using this model—owner, contractor, architect or engineer functions as the building designer and provides the structural component supplier with their design specifications. Our industry fulfills those specifications thoroughly under our prescribed scope of work. Contrast this with the identical process for a conventionally framed structure and consider whether or not the specifications and flow of loads are implemented as thoroughly as the structural building components industry implements theirs.

Our industry will continue to provide these services to the construction industry in the same professional manner that we have in the past. The reality may be that the market will press us into becoming building designers. If this is the case, we will consider doing so if that proves to be the best way to continue providing structurally sound and economically efficient structural building components to our customers. This may be a great value-added service to provide.

BSR/TPI/WTCA 4-2002 is currently in final form, awaiting ANSI approval to become a standard. By press time, this should be a reality. Be sure to visit the WTCA web site at www.woodtruss.com on a regular basis as the final version of the standard and a commentary will be posted when the ANSI approval process is finalized.

¹ "What Every Architect/Engineer (A&E) Should Know About Metal Plate Connected Wood Floor/Roof Trusses" (Draft), John E. Meeks, P.E., 2001. (This draft is available on request and is posted on WTCA's web site at www.woodtruss.com.)

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