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Engineered Documents for Prefab Trusses by Kirk Grundahl, P.E.

Grassroots initiative and a unified team spirit pays off once again—this time in Riverside County, California.

The sealed placement plan trek began in early September 2002 at a California Engineered Structural Components Association (CaESCA) Chapter meeting. The issue at hand was the onerous rule that Riverside County, CA was requiring: someone had to seal the truss placement diagrams and that burden was effectively placed on component manufacturers or their supplier's truss design engineers. Riverside County led the U.S. in housing starts by county for the year, guaranteeing that a mountain of placement plans would need sealing every day. Many truss design engineers were spending more time robotically sealing placement diagrams than performing the engineering work that provided far greater value to our industry and building safety overall. Ken Cloyd of California Truss Company jokingly called this the "Stevie Wonder Syndrome," as truss design engineers were playing their engineering seals with as much skill and grace as Stevie Wonder would play the piano, yet the professional output was complete dissonance and was even trending toward chaos.

On September 10, 2002, CaESCA formed a subcommittee of Bill Turnbull (CompuTrus, Inc.), Gary Sartor (Stone Truss Co., Inc.) and Ken Cloyd to work on this issue. First, the subcommittee drafted a letter to send to Riverside County to start a discussion on "wet sealed placement diagrams." Gary took the lead in drafting the letter; Bill and Ken reviewed and improved. They also immediately called WTCA-National staff to engage them in providing a broad-based team approach to this issue, and to take advantage of their knowledge base, given that other areas of the country were dealing with the very same issues. Having worked on an identical issue in San Diego in 1998, this group knew that:

- Engineering law is very complex.
- Care must be taken in what was done in Riverside, as if any mistake was made, it could easily carry over to other

THE IMPLEMENTATION STRATEGY WE DEPLOYED TO WORK ON THIS ISSUE WAS:

- Create an effective industry subcommittee team.
- Make sure to consider all past industry experience.
- Utilize the vast expertise of our industry through TPI TAC and WTCA's Engineering and Technology Committee.
- Rely and build upon existing industry policy.
- Use a consistent and unified voice when speaking to Riverside.

Each of these pieces by themselves would not have gotten the job done, collectively success was inevitable.

- The working relationship that we developed with Kack is epitomized by his comment: "I received your draft regarding the above mentioned issues. You really did a lot of research about it. I know that we are on the

counties, the State of California and eventually to other areas of the U.S. A wrong move could also put the association and the industry at a high level of cost and risk.

- Applying the best expertise to remedy the problem would be essential to success.
- In all likelihood, there were examples of positive results from other jurisdictions that could be used to bolster the arguments that would need to be presented to the Riverside County leadership.

The team drafted a letter that laid out the issues as follows:

- It acknowledged the fact that the truss industry in Southern California was fully aware of and appreciated the fact that the requirements for plan review are at the discretion of Riverside County.
- It advised that the truss industry in Southern California believed that truss placement diagrams should be reviewed and approved by either the project architect and/or the engineer of record. In the absence of either, the review would be a part of plan review process.

The team provided the following rationale for this policy change:

1. Truss placement diagrams are not engineered drawings. Generally, truss placement diagrams are produced by the builder/developer, truss sales person or truss manufacturer, and as such are not produced by the truss design engineer. Therefore, they cannot legally affix a seal to this document. These drawings are produced to assist the architect, engineer, building department official and builder in correctly identifying and locating each individual component being supplied. These drawings are an interpretation of the construction documents by the component manufacturer from the information and/or drawings supplied by the building designer (owner, builder/developer, architect, engineer) and therefore require an approval of the building designer that they coincide with the construction documents.

2. The U.S. wood truss industry is of the opinion that the building designer is responsible to ensure that the individual components indicated on the truss placement diagram are in compliance with the overall design of the building.

3. The truss design engineer's seal should never be placed on a truss placement diagram because this creates a situation where the truss design engineer is not in compliance with engineering laws. If required to apply a seal, it is then necessary that a specific scope of work statement be applied to the truss placement diagram defining the specific engineering work being sealed.

4. The truss design engineer's seal on a placement plan along with any scope of work statements that are required due to engineering laws does not relieve the building designer from their responsibility to review and approve the location, loading and load transfer created by the

same page, I am sure that we can come up with a good resolution."

- It is clear that in the association business, the best possible scenario to achieve the most profound positive industry impact is when egos and personal agendas are put on a shelf and a team is built that is wise enough to use all the best intelligence of our industry. This will ensure industry success every time it is employed, and lasting friendships will be developed as an added benefit.

application of the components into the structure.

5. The truss design engineer's design responsibility, generally by contract, is to assure that the individual trusses designed will support the loads indicated on each truss design drawing. This is accomplished by undertaking the design work necessary to confirm this and then by placing his/her seal and signature on each individual truss design drawing or index/cover sheet that includes all the truss design drawings for a project.

6. On projects that have no architect or engineer of record, the builder/developer or owner assumes the role of the building designer and as such are responsible to review and approve the location, loading and load transfer created by the application of the components. This would then follow the same compliance and approval standards that are used for all other structural framing members (e.g., joist and rafter, I-joist, LVL, etc.) used in the project.

Since the component manufacturer is simply a material supplier, the purpose in addressing this issue is to assure that the component manufacturer's standard contractual scope of work and responsibilities are clear.

The team requested that a meeting be set up with a small group of our members to work out a policy that assures the consumer receives a product that was designed, engineered, reviewed, approved, built and inspected as intended. This meeting was held on October 23, 2002, with the Riverside Plan Review Department, headed by chief engineer Mr. Kack Sung, P.E. As a result of that meeting, our team was charged with taking the first cut at a proposal of the sequence of events for approving truss design drawings and sealed placement diagrams that would make the plan review and approval process more efficient for Riverside County. This began a process of frequent communication between Kack and the CalESCA/WTCA staff subcommittee.

In studying the California engineering law, we found the following:

Rules of the Board for Professional Engineers and Land Surveyors California Code of Regulations Title 16, Division 5 §§ 400-474.5 411. Seal and Signature. (e) The seal shall be capable of leaving a permanent ink representation, an opaque and permanent impression, or an electronically-generated representation on the documents. The signature may be applied to the documents electronically.

This led Kack to send out the following policy on September 2, 2003:

The section 411 of the California Code of Regulations for Professional Engineers and Land Surveyors, Title 16, Division 5 states that signatures may be applied to the documents electronically. We may not have been handling these signatures consistently especially with pre-fabricated truss packages. The following guideline shall be used to clarify the matter.

If the seals and signatures are placed electronically as a part of a computer file, such printed truss design drawings may be accepted with a single cover sheet sealed and wet signed by the truss design engineer. The cover sheet shall include

the following statement:

The bound truss design drawings having an electronic seal and signature printed on each page have been reviewed and approved by the truss design engineer as indicated by the engineer's seal and wet signature on this cover page. This review and approval applies solely to the attached truss design drawing pages that are bound together.

Clearly, this saved a great deal of engineering time. We were on the right track.

The final resolution was completed on May 1, 2004 (see sidebar for full text of the resolution). We learned many important lessons as we worked together and traversed the challenges of making positive and proactive change. Primarily, we learned that patience is essential. One never knows what other agendas exist that may cause actions that seem simple to take much longer than common sense would suggest. Our patience produced an advocate for our cause in Kack, who became a friend of the industry in the process.

On May 1, 2004, the following sealed placement diagram policy was implemented:

Effective May 1, 2004, this department will no longer consider the "truss layout plan" or the "truss placement plan" as an engineered framing plan. This memo will apply to all projects applying for permits on or after May 1, 2004.

Truss packages may be considered as deferred submittals per section 106.3.4.2 of the 2001 CBC and the building permit can be issued without the truss engineering package. All construction documents utilizing these prefabricated trusses shall include information necessary to design each truss as an engineered component design on the building plans signed by the Engineer Of Record. The truss package will be submitted as a "shop drawing package" after the engineer of record verifies the compliance with the provisions of the approved building plans. Following are the various submittal requirements.

PART - I

Information required to be included in the building plans (signed by the engineer of record)

- The truss framing plan, which is not to be confused with the layout plan normally prepared by the truss company, shall show the locations of all the various configurations of trusses used. Provisions shall include, but not be limited to the following:
 1. Spans indicating the distances between outside supports along with distances to the center of interior supports if interior supports exist.
 2. Design loading (DL, LL, wind, concentrated load, equipment weight, drag force, etc.)

3. Identify all structural connectors required (hangers, hurricane anchors, etc.)
4. Note on plan: "Truss design drawings sealed and wet-signed by a registered engineer shall be submitted to the Engineer Of Record (ER) for review and approval. The Engineer Of Record will then place a shop drawing approval stamp and signature on the placement plan and submit to the building department for record purposes prior to the framing inspection."

PART - II

Prefabricated trusses in Conventional light-frame construction shall comply with CBC Section 2320.

Prefabricated trusses may be used for buildings in compliance with this section of the code, when there is no deviation that would require engineering. Such framing plans need not be signed by a registered professional. The truss package shall meet the requirements set in PART - III below. (Not included for conciseness and is the typical requirement for truss design drawings found in the building code.)

These guidelines will help to clarify the responsibilities of professionals involved in the preparation of construction documents and it will streamline the permit approval process.

A virtually identical scenario in Jacksonville, FL, requiring a truss placement diagram to be sealed by the truss design engineer, was a primary reason that the resolution was accomplished. After analyzing the Florida engineering law, the City of Jacksonville arrived at the conclusion that a truss placement diagram did not need to be sealed. Showing Riverside County that we went down an identical path with another jurisdiction lent credence to our proposal. We had also been successful in variations on this same theme in the State of North Carolina and the State of Florida, which helped immensely.

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