Deferred Submittals

Part 1: Integrating Responsible Parties

By Dean D. Brown, S.E.

Over the course of my career, I have worked in both engineering design and construction. While I have dealt with each of the systems described above, most of my experience has been with pre-engineered wood trusses. My purpose here is not to so much discuss their design, but rather focus on the overall coordination needed during the design process, including their role as a deferred submittal. – Dean Brown

We are living in an age of integration. Just pick up your smart phone for a quick example. Information is increasingly becoming real time. You will hear buzzwords or buzz-phrases like interoperability, integrated project delivery, partnering, design-build, holistic, sustainable, cross-functional teams, and streamlining. The trend is to compress time and cost while increasing scope and service. Doing more with less is the new normal in today's professional practice. Evolution is the constant

Integration affects structural engineers in common ways, perhaps in varieties not typically thought about. Many of today's projects include proprietary products that involve specialty engineers and deferred submittals. Examples include metal-plate-connected wood trusses, cold-formed steel trusses, pre-engineered metal buildings, prestressed or post-tensioned concrete systems, and some types of curtain walls.

Use of these systems creates new complexities and requires greater coordination between design professionals and contractors. Building codes, specifications, general notes, standard contracts, and rules of professional responsibility need to reflect this practice, because engineering design is no longer performed in a bubble.

Definitions

Deferred submittals are clearly defined in the 2009 *International Building Code* (IBC) (Section 107.3.4.2) as "portions of the design that are not submitted at the time of the (permit) application and that are to be submitted to the building official within a specified period." Please note that this provision requires the deferred submittal to be listed on the construction documents, and many building officials also require them to be listed on the application for a building permit.

ANSI/TPI 1-2007, a wood truss building code reference document published by the Truss Plate Institute, defines deferred submittals as "those portions of the design that are not complete at the time of the application for the Building Permit and that are to be submitted to the Building Official within a specified period in accordance with Legal Requirements."

The California Division of the State Architect (DSA) elaborates further (**www.dgs.ca.gov/dsa/Programs/progProject/overview/projsubmitintro.aspx**): "Deferred approval does not mean that the A/E of Record may defer the design of the component to the contractor. DSA requires that the A/E of Record accept responsibility for verifying that all components (including those granted deferred approval) of the project are properly designed by appropriately licensed design professionals. The A/E of Record is also responsible for coordination of all components of the project. Finally, the A/E of Record is responsible for designing connections to the structure for all deferred approval components and verifying that all interactions (deflection compatibility, drift compatibility, vertical loads, etc.) are adequately addressed and in conformance with good engineering practices and the California Building Standards Code."

Reasons for this hierarchy in review are best described by the wood truss industry in Appendix H of the *Metal Plate Connected Wood Truss Handbook*, Third Edition: "Contemporaneous preparation of the Building Structural System Design Documents (i.e., contract documents prepared by the EOR) with that of the Truss Design Drawings (i.e. prepared by the Specialty Engineer of Record (SEOR)) would allow for easier design of support and bearing conditions, temporary and permanent lateral and diagonal bracing, and all the anchorage needed to resist uplift, gravity and lateral forces on the structure. However, as it is often impractical or even impossible for the Truss Designer to provide input at the time the Building Structural System Documents are prepared, many engineering assumptions will need to be made in the design of the structure. Accordingly, the Truss Design Drawings, when produced, may not exactly match with the assumptions used. For example, it is very unlikely that the calculated uplift loads will match the uplift loads developed by the Truss Designer. They should not be expected to be identical. For this reason, it is essential that the Truss Design Drawings be reviewed and approved by the Owner or the Building Designer as delegated by the Owner. It is the responsibility of the Owner or the Building Designer, as delegated, to specify appropriate uplift loads and connection requirements for use by the Contractor for all anchorage and connection requirements of the Trusses."

Roles and Responsibilities

As implied, the structural design process is iterative, requiring the EOR and SEOR to coordinate their efforts. While this is a critical step in the review process, the EOR is ultimately in responsible charge to ensure that the overall structure is safe and code-compliant. In its MasterSpec evaluations, the American Institute of Architects (AIA) writes, "Design responsibility issues continue to trouble the truss industry … [which] maintains that some design areas remain the responsibility of others. Although truss fabricators engineer wood trusses, other related requirements, such as permanent bracing and anchoring trusses at bearing points, are not addressed."

Especially over the last few building code cycles, the truss industry had worked hard at clarifying language on respective roles and responsibilities between the EOR, SEOR and building official. A good example in one in which the author acted as EOR and construction manager/field superintendent for the building owner.

The project was a wood-framed assisted living campus and involved pre-engineered wood trusses (ten buildings in all). While there can be (and are) many other scenarios, the following sequence is what the wood truss fabricator and the author used to get documents routed and approved. Variations will depend on regional practices, the truss manufacturer, and even the local building official.

- The Structural Design Drawings (SDD) are submitted with P.E. stamp, date and signature to the building department as a condition of being granted a building permit. The deferred submittals (e.g., pre-engineered wood trusses) are listed on the SDD and on the building permit application. Some building officials will instead require the Truss Design Drawings (TDD) as described by the 2009 IBC (Section 2303.4) to be submitted with the original application. Some truss plants, in an effort to appease the building official, will provide a 'preliminary' design to serve as a placeholder for the deferred final design.
- Once a review of the SDD has been satisfactorily achieved, a building permit is issued.
- The contractor installs the foundation and erects the load-bearing walls. Concurrently, the contractor also places a purchase order for the pre-engineered trusses. Many truss plants subcontract the truss engineering to a third-party SEOR. As in the author's case, the truss plant does not proceed to a *final* design on the trusses until a purchase order has been officially placed and jobsite conditions have been verified.
- After load-bearing walls have been framed, the truss manufacturer comes to the jobsite and performs a final measure of the wall layout to ensure field and plan dimensions coincide.
- The truss plant releases the SEOR to finalize the design and submit TDD for reviews and approval.
- A copy of the final TDD design is sealed, signed, and dated by a registered P.E. and sent to the client (i.e., the contractor). The contractor, in turn, routes a copy of the deferred submittal to the owner and/or EOR for final concurrent review.
- The EOR checks for differences between the assumed truss layout (per SDD) and the final truss layout (per truss manufacturer and SEOR). Girder trusses may be in different locations. Bearing points may have been adjusted. Headers may need to be redesigned. Jack trusses may be in different locations. Permanent bracing (e.g., between the wood structure and the truss diaphragm system), other truss overbuild or piggy back locations, truss deflections, and truss supports and anchorage (e.g., for lateral and vertical loading conditions) need to be checked.
- After review of the TDD, the EOR makes revisions to the SDD, re-stamps if necessary, and indicates to the building official that the deferred submittal is in general conformance with the SDD. The updated documents are routed back to the client and/or contractor.
- The contractor, in turn, provides the updated set (both the SDD and the TDD) to the building official for approval.
- Once approval has been granted, the contractor returns the approved TDD back to the truss plant and jobsite office, and fabrication begins. The contractor may also need to make some framing revisions based on the updates.
- Trusses are fabricated and shipped to the project site.
- The framing contractor begins the erection of the truss system and calls for appropriate inspections by the building official.

While the 2009 IBC (Section 107.3.4.2) stipulates that deferred documents are deferred designs, it also mandates the proper review of such documents by stating, "Documents for deferred submittal items shall be submitted to the registered design professional in responsible charge [EOR] who shall review them and forward them to the building official with a notation indicating that the deferred documents have been reviewed and found to be in general conformance to the design of the building." A good engineering practice would be to cite this provision in the general notes and emphasize that erection of trusses must not occur until the EOR has reviewed the TDD.

Conclusions

As with most design-bid/negotiate-build projects, the only common stakeholders from design through construction are the owner and the building official. Generally, architects and engineers have limited access to jobsite progress, depending on their contracts with the owner. The contractor, in turn, may or may not be involved in constructability reviews during the design phase. The owner in most cases is not a building professional, and therefore not familiar with typical industry practices for deferred document approvals. That leaves the building official, who is charged with the authority to ensure that proper routing takes place.

In this age of integration, success depends on all stakeholders acting in unison with building code standards. We need to focus more on commonalities with other building professionals, rather than differences. A previous STRUCTURE magazine article, *Good Design Should Consider Poor Execution* (May 2011) by Bouldin and Showalter, states, "An implicit assumption in the design of wood framed structures is that proper construction methods are followed during the implementation of these designs." Do we as designers likewise make an implicit assumption that building officials are reviewing deferred submittals properly? Part 2 of this series, will attempt to answer that question with some of the author's own findings.▪

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