STRUCTURAL BUILDING COMPONENTS MAGAZINE
September/October 2003

Introducing ANSI/TPI 1-2002: Manufacturing Quality Assurance Procedure

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The new design standard is out has been out since May. Do you know what Chapter 3 means for your current in-plant quality assurance procedure? This first article in a new series will address these issues and more.

Did you know that May 1, 2003 was the industry's target implementation date for the new National Design Standard for Metal Plate Connected Wood Truss Construction, ANSI/TPI 1-2002? More importantly, are you ready for it?

Here are some highlights from Chapter 3, Quality Criteria for the Manufacture of Metal Plate Connected Wood Trusses, pertaining to the requirements for manufacturing quality assurance procedures. It is this part of the standard that is aimed specifically at you, the component (truss) manufacturer. Therefore, it is especially important for you to know and understand what the new standard really means.

THE "GENERAL" STUFF

3.1.1 Chapter 3 is the quality standard for the manufacturing processes of metal plate connected wood trusses, and shall be used in conjunction with a manufacturing quality assurance procedure and a truss design. These provisions shall be included in the quality assurance program of each truss manufacturer.

3.1.2 Metal plate connected wood trusses shall meet the minimum manufacturing quality requirements specified in this chapter, so that design assumptions are met.

What it means: Chapter 3 is your quality bible. Chapter 3 provides all the necessary interpretive rules to inspect a metal plate connected wood truss for quality compliance as it relates to the truss design itself. An in-plant quality assurance procedure is the engine that powers Chapter 3. These elements, taken together, ensure that the finished and delivered product has acceptable structural quality and will perform to its expected design capacity (when properly installed, of course).

3.1.3 Truss manufacturers and inspection agencies shall establish methods that document the application of these quality assurance procedures throughout the manufacturing process. The truss manufacturers' methods shall be subject to periodic audit for compliance with the requirements of this standard by an approved inspection agency, where required by local authorities having jurisdiction, or other means.

What it means: Continuous documentation of in-house production control procedures is critical to maintaining quality in the manufacturing process. It is so important that the standard requires it, but gives you the flexibility of choosing the method of documentation. Just as we hire CPAs to audit our financial records and assure our book keeping practices are sound and correct, having another set of eyes (a third party) to look over your documentation is the best way to confirm that your quality assurance procedures are being used properly and are effective in their purpose of achieving an acceptable level of quality.

[The third party auditing process will be examined further in the second part in this series. See the November issue of SBC Magazine.]

3.1.4 Manufacturing inaccuracies exceeding the allowable tolerances described in this section are acceptable upon approval and follow-up documentation by a truss designer. Any necessary repair authorization shall be prepared by a truss designer.

What it means: If your manufactured truss has a deviation from its design (lumber, plating or gaps) greater than the allowable tolerances in Chapter 3, it needs approval by the truss designer. The deviation may be acceptable to the truss designer or it may need a repair, but either way it needs the documented approval of the truss designer.

THE "NEW" REQUIREMENTS — 3.2 IN-PLANT QUALITY ASSURANCE PROGRAM

3.2.1 An in-plant quality control manual shall be maintained for each truss manufacturing facility, which will include the requirements for daily quality control and any audits that will be performed.

What it means: A quality control manual documents the foundation of your plant's quality assurance procedures. It is your plant's instruction book and should include all manufacturing practices that you approve for the production of each truss. Proper use of pressing equipment and acceptable lumber substitutions within your lumber inventory are examples of the instructions or guidelines found in your quality control manual. In addition, it should outline how periodic in-house quality assurance audits (perhaps executed by an appointed QC manager) are to be performed and recorded.

3.2.2 At a minimum, three trusses per week per set-up location per shift shall be inspected and recorded for in-plant audits.

What it means: Each truss manufacturing plant should establish (based on the structure and management of the plant) reasonable, manageable-sized groups in each work shift from which three trusses per week will be inspected and recorded for the in-plant audit. For example, a "set-up location" might be defined as a crew, or group of personnel within a defined work area building one truss. If defined as this, then each "crew" during each shift will have a minimum of three trusses inspected per week.

This is the minimum inspection frequency required to be in conformance with Chapter 3. This requirement is in recognition of the need to continuously monitor any potential inaccuracies or

quality non-conformances in the manufacturing process. An effective inspection frequency must provide monitoring of all areas where a potential problem could arise. This includes crews that together comprise all the production personnel, which will provide an indication of any needs for additional training of personnel, repairing, recalibrating, or replacing equipment, developing new or different assembly practices, or any other modifications to the in-house quality assurance program.

In addition to the minimum inspection frequency set forth by the standard, it is recommended that the first truss manufactured after the introduction of any major change in the production process (new personnel, new machinery, adjustments made to machinery) be inspected. Additionally, the plant should ensure that compliance with the quality standard is achieved consistently (for at least three trusses in a row or three trusses in the first several trusses produced) following such changes.

3.2.3 A random representative sampling of trusses shall be chosen for inspection, either off the production line after all pressing operations are completed, or from finished goods storage.

What it means: Don't inspect all 28-foot fink trusses! The proportion of any one truss size or type inspected should be consistent with its share of the total truss production at the plant. For example, if a truss plant produces 20 percent parallel chord trusses, then approximately 20 percent of the trusses inspected should be parallel chord trusses.

3.2.4 For trusses chosen for inspection, the joint inspection procedures of Section 3.7 shall be used with joints designed using a quality control factor, C_q, equal to 1.00 for plates embedded into lumber faces wider than two inches, or 1.11 for plates embedded into lumber faces less than or equal to two inches. (The quality control factor, C_q, will be addressed in a future article in this series.)

What it means: After the basic truss lumber (size and grade), assembly and plating (size, gauge and type) requirements have been addressed, the key to truss performance is the adequacy of the joint. The joint inspection procedures in Section 3.7 are referred to as the Plate Placement Method (PPM) because they focus on the placement of the metal connector plate onto the lumber, versus ANSI/TPI 1-95 which focused on the number of teeth in each member. The PPM inspection procedures are the primary mode of joint quality assessment, with the goal of streamlining inspections. An alternative method, the Tooth Count Method (TCM), which is essentially the same as the quality criteria of ANSI/TPI 1-95, appears in an annex at the end of Chapter 3.

The joint tolerances in both PPM and TCM are linked to the truss design via the C_q settings input to create the truss design drawings. This is set by the component manufacturer in concert with your Truss Design Engineer. Always check to ensure that you are using the appropriate C_q settings for the method of inspection you choose!

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