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"Technology is Key to Engineering Service Advancements by Truss Plate Institute (TPI) Companies" by Stephen W. Cabler

Imagine a time when truss-engineering drawings are transmitted via the Internet and arrive on an engineer's computer within seconds. The P.E. produces and reviews the requested designs on the computer, seals and digitally signs the designs, and sends them back to you electronically. No paper changes hands. Instead, communication occurs at the speed of light.

Sounds pretty high tech doesn't it? It's reality in the truss industry today. TPI plate companies can do all of these things right now! In addition to developments in this area, TPI is finalizing a new design standard/code, and member companies are expanding the breadth of their software services to help component manufacturers grow.

ELECTRONIC ENGINEERING DRAWINGS

The systemic constraints we face in delivering these types of advancements need to be, and will be, overcome. It is just a matter of time. Laws governing the practice of engineering are slow to change and, in many cases, are based on practices and technologies that are more than 50 years old.

Other areas of the law are more progressive. The Electronic Signatures in Global and National Commerce Act, which makes documents signed using digital signatures legally binding, was signed into federal law last summer. However, it is not clear how these statutes relate to state boards of professional regulation that govern the practice of engineering. Most states are evaluating the legal inclusion of this technology into their statutes. Some states will move quickly while others may take years to address this issue.

Florida is leading the pack in the area of electronic signatures. The Florida State Board of Professional Engineers currently allows digitally signed and sealed engineering documents. One agency in particular, the Florida Department of Transportation, has developed a software program that allows the agency to send digitally sealed engineering drawings using secure, hash algorithm technologies.

Recently, an industry contingent including WTCA staff, WTCA Florida Chapter representatives, TPI plate company representatives and key Florida building officials were given a demonstration of the Department of Transportation's "Professionals' Electronic Data Delivery System" (PEDDS) in Tallahassee. The idea was to see how our industry could utilize or at least learn from seeing existing technology placed in a real application.

It was interesting to see what will certainly become the future of our industry. Whether we use Florida's approach or a variation, our industry will transition from paper to electronic communication. Once again, it's just a matter of time. Savings in paper, storage space and most importantly time are some of the advantages offered by electronic delivery. In addition, security is actually improved over paper systems.

One building official executive who attended the demonstration was very interested in pursuing this technology. Do you think they are lagging behind in the technology explosion? All of the field inspectors in his county carry laptop computers! Do your sales representatives do the same?

TPI and WTCA will continue to work together to make this happen so that as an industry we can deliver our services more efficiently and continue to better serve your needs and the needs of your customers.

TPI CODE ADVANCEMENTS

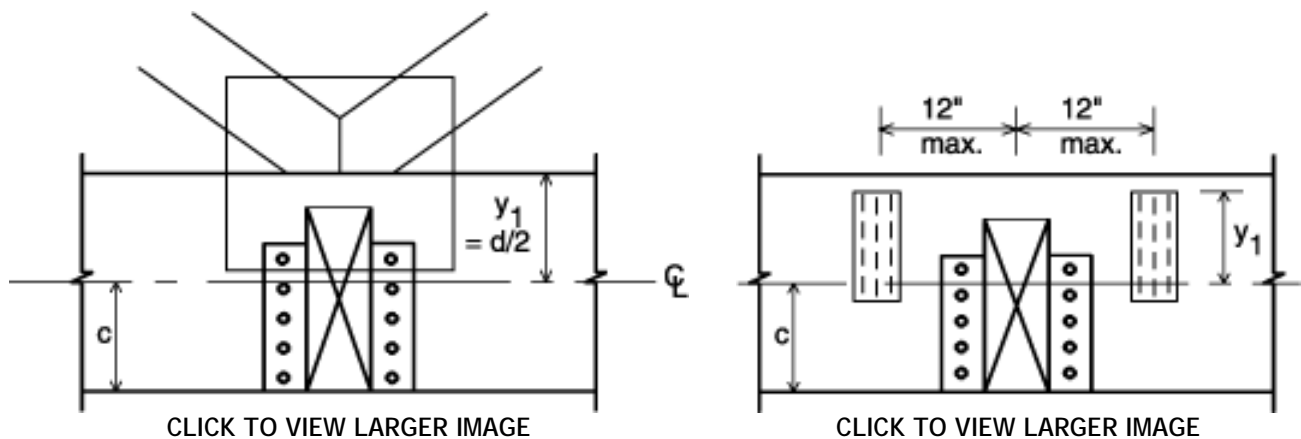
For some time now a considerable effort has been underway by TPI and an ANSI Project Committee to develop a new ANSI/TPI design standard for metal plate connected wood trusses. As we approach the end of this process and look forward to the new standard, there are several provisions that have a significant impact.

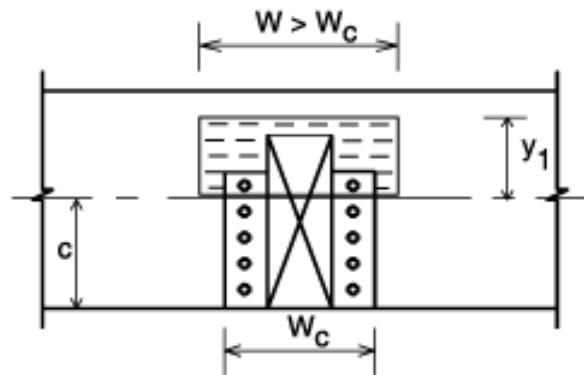
Through a TPI-funded research project at the University of Wisconsin, several new repetitive member stresses increases have been developed that apply to additional lumber properties. Current code permits a 15 percent increase in allowable bending stresses for truss chords that are in contact, or spaced less than or equal to 24", are sheathed and include three or more contiguous trusses. The new code will also provide 10 percent increases to the compression and tensile allowable stresses. This will help us to better utilize chord materials, lower grades and provide more competitive solutions. Because of our ability, and with the help of sophisticated software tools to fully utilize our materials, a 10 percent boost in strength is greatly significant!

Finger jointed lumber is now specifically recognized in the standard. This allows for more material choice options and clear reference as to requirements for suitability.

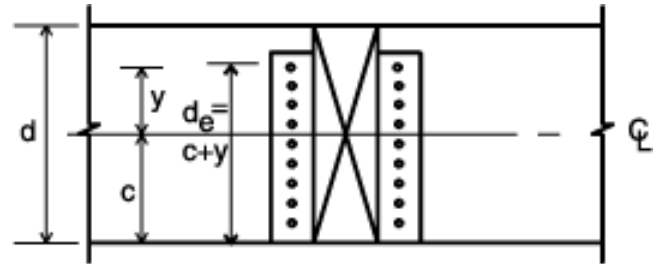
Top chord bearing-reaction limitations are provided for 3x2 materials. This will help expand the potential use of 3x2 floor trusses to include top chord bearing applications.

The code has been modified so that connector plates can be used to increase hanger capacities for partial chord coverage situations where reductions were previously required, as shown in the four figures that follow:





CLICK TO VIEW LARGER IMAGE



CLICK TO VIEW LARGER IMAGE

The quality control (QC) section of the standard is being overhauled with several critical goals in mind:

- To make the inspection process in a typical truss plant easier and faster to perform.
- To make the inspection easier for plant personnel to understand and implement.
- To provide the assurance that while QC is performed quickly, code mandated structural performance is achieved.

Each of these changes should help our industry compete with alternative products in the market. TPI has worked closely with WTCA in the code development process to ensure that the interests of all parties are met.

EXPANSION OF SOFTWARE PRODUCTS

The software design tools available to the component industry are incredibly powerful and comprehensive, yet are easy to use. We have come a long way. Software is now vital to virtually every area of our business. Software now drives the manufacturing process including component saws, laser projection systems, jiggling systems, work schedules, inventories and truck loading schemes. In addition, software is necessary in the quoting process and in tracking job progress and is also linked to accounting and Enterprise Resource Planning (ERP) systems.

While we have been designing and manufacturing roof and floor trusses for many years, our customers are also seeing the expansion of roles and opportunities to provide more related products. Wall panels, door and window components, engineered wood beams, hangers and related connectors, shear panels, I-joists, and other products are becoming part of a "truss manufacturer's" product offerings.

Due to this continuing trend, TPI plate companies have been expanding the scope of their software offerings. Currently available are software packages that include roof, wall and floor integration; load transfer through walls; wall design; header and beam design; and automatic hanger design. Linkages to related software products are being developed as well as lateral design capabilities and more.

CONCLUSION

The trusses manufactured today may look very much like the trusses manufactured 25 years ago, with lumber chords and webs joined by metal connector plates. However, the technology employed in all aspects of the process is radically different. This means that we are doing far more with far less and are capable of building better, higher quality products.

TPI plate companies have also increased speed and efficiencies. In today's truss plant, software is utilized in almost every activity, not just engineering and cutting. From the early days when a fink truss design might

take half a day to complete, today, the same truss design would take a matter of seconds. In the past, we depended on the U.S. mail to send sealed truss documents to our customers in a matter of days. Now communication is almost instantaneous.

Our design codes have historically relied upon simplified procedures that could be done by straightforward calculations. In the past, the code wasn't much more than a few pages in length. Now we have consensus code development and utilize sophisticated computer modeling to ensure our design methods are complete and structurally sound.

What will the next ten years bring? No one can know. Nonetheless, look for exciting, new software and digital delivery methods that will continue to evolve and make component manufacturers more efficient and more successful.

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