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November 2010

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by Libby Maurer

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The mission of Structural Building Components Magazine (SBC) is to increase the knowledge of and to promote the common interests of those engaged in manufacturing and distributing structural building components. Further, SBC strives to ensure growth, continuity and increased professionalism in our industry, and to be the information conduit by staying abreast of leading-edge issues. SBC's editorial focus is geared toward the entire structural building component industry,

which includes the membership of the Structural Building Components Association (SBCA). The opinions expressed in SBC are those of the authors and those quoted, and are not necessarily the opinions of Truss Publications or SBCA

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# Editor's Message

# A Lifer's Journey Through the Ranks

by Joe Hikel

Find out about your new President's roots.

would like to thank the Board and members of SBCA for having the confidence in me to be your President. I am honored for the privilege and take the responsibility seriously.

Here is a little background about my career in the industry so you have perspective on my views. I am what you would call a "lifer" in component manufacturing. I worked for two other component plants before we started our family business in Westminster, Maryland in 1976. I have done just about every job in a component plant including wall panel assembly, truss assembly, saw operator, jig set up, forklift operator, truss design, sales, plant management and sales management. Today I run the daily operations of our enterprise with the title of Chief Operating Officer. Like many family businesses the majority of our family's personal net worth is in the business. It truly motivates you to be successful when most of your money is on the line every day.

Like other family businesses we have had to consider succession planning in our overall strategy. We went to a retreat dedicated to this subject in 2000. We decided that in order for me to have the responsibility to successfully run the daily operations, I needed to enhance my skill set in business management. We struggled with how to accomplish this—I was already working full time managing the business, so I was getting all the on the job training possible.

I was in my SUV in between sales calls one day and a commercial came on the radio

advertising an Executive MBA program designed for senior managers of their organizations. I thought it seemed like a perfect fit for our needs and pitched the idea to my family. They thought it was a great idea as long as it didn't take away from performing my daily responsibilities. I started the program in 2001, about the same time we oversold our production capacity by about 30 percent. We decided it was time to think about expanding our capacity to capitalize on the margin we were leaving on the table by subcontracting out these sales. The next two years became 90-100 hour work weeks where I integrated going to school and running the business. I would write papers about our business, and also weave new ideas from my peers in the program into the design and execution of our new manufacturing facility. The strategies we implemented during this time have enabled us to be extra lean in these hard times; they will also allow us to react guickly when the market recovers.

# at a glance

- ☐ Joe Hikel from Shelter Systems Limited (Westminster, MD) is this year's SBCA
- ☐ Hikel worked up through the ranks in the family business, doing everything from component assembly to truss design to sales.
- □ SBCA plays a very important role in Shelter's pursuit of running a state-ofthe-art operation.

My company has been engaged in SBCA since the early days of our company. My dad Dwight has been active in various roles at the chapter and national level. He encouraged me to become engaged at about the same time I took on a general management role. The idea of having an opportunity to discuss similar issues with component manufacturers from all over the country has been invaluable for us. From ideas that we incorporated into our plant during visits when we were in our benchmarking period, to financial reporting and wage and benefit comparisons. to direct business opportunities on both the buy and sell side, our company has benefitted greatly from our association. Our company goal is to be state of the art in component manufacturing, and SBCA plays a very important role in that pursuit. A recent example of how SBCA participation has helped us is the SCORE program. We were looking for something that would turn our philosophy on excellence into something tangible, marketable. We feel SCORE set the tone for best practices and

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# **Editor's Message**

Continued from page 7

achieving the Elite level of SCORE fit with our goals. I wish more component manufacturers out there realized the same benefits from SCORE certification that we have.

My goal for the association this year is to solidify our link in the building supply chain by working to improve collaboration with our vendors and our customers. There are several initiatives underway to accomplish this goal. Exciting stuff! I'll tell you about them in more detail in future articles. I also want to make sure that each and every member understands that my goal for SBCA is to provide the tools to not only survive current economic conditions but also to thrive in the future. I don't know about you, but I plan for our family business to be around for a long, long time. **SBC** 

SBC Magazine encourages the participation of its readers in developing content for future issues. Do you have an article idea for a future issue or a topic that you would like to see covered? Email your thoughts and ideas to editor@sbcmag.info.

In the past, the November issue of *SBC* has included a complete directory of the supplier and professional members of SBCA. Due to budget constraints, this year's directory is not included in the print edition of the magazine, but will appear on our website's Past Issues page under November 2010. For additional ways to search for SBCA Supplier and Professional Members, see the ad on page 19.

# New! Fire Insights

The latest technical resources from SBCA address building component performance in fire situations. Called *Fire Insights*, these bulletins analyze issues component manufacturers face with respect to fire performance and offer position statements.

Equivalent Performance Through Testing of Unprotected Floor Assemblies discusses a 2012 IRC and IBC code change requiring floor truss assemblies to be covered with a minimum of ½" gypsum board to provide fire resistance. The code change is based on data from various floor assembly fire tests were conducted under vastly different test criteria and conditions. Therefore, the data should not be used to influence code changes.

The report concludes with SBCA's position that fire resistant materials ought to be required for *all* floor structural framing materials and not single out one particular material.

SBCA's policy is to foster the concept of fire ground safety that is fair and rational. Where increased fire resistance is desired, beyond what has traditionally been allowed by the IRC/IBC, a minimum of ½" gypsum wall board or other materials that increase the fire resistance of the floor assembly should be applied to unprotected floor applications, regardless of the structural framing materials that make up the floor system.

Visit www.sbcindustry.com/fireinsights.php to view more Fire Insights. SBC



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# ECHNICAL Technical Q & A

# What Does BCSI Mean by Stress-Graded?

by Jim Vogt, P.E.

Requirements for the type of lumber used for restraining and bracing

at a glance

■ BCSI recommends that lumber used for restraining and bracing trusses be stress-

□ Stress-graded lumber is graded for

□ Stress-graded lumber can be found in

☐ AF&PA's Supplement to the National

available lumber in the U.S.

Design Specification® (NDS®) includes

the design values for all commercially

visual grades, MSR and MEL grades.

mechanical properties like strength and

araded.

stiffness.

he Building Component Safety Information (BCSI) booklet indicates that lumber used for restraining and bracing truss members must be *stress-graded*. The term *stress-graded* sometimes leads to confusion when determining the minimum grade of lumber that can be used. Though the topic has been discussed before in *SBC*, we revisit it here to clarify a couple of the more common misperceptions.

### Question

I am a framing contractor who will be installing metal plate connected wood trusses in the roof of an apartment building. The truss manufacturer has provided BCSI summary sheets as part of its jobsite package. While reviewing the information, I noticed BCSI recommends that the lumber used for lateral restraint and diagonal bracing of the trusses should be minimum 2x4 stress-graded lumber. The term stress-graded puzzles me. Does this mean I need to use MSR lumber for the bracing, or is No. 2 SPF acceptable? Also, it used to be permissible to use 1x3s and 1x4s for truss bracing. Why the change?

You do not need to use machine stress rated (MSR) lumber for the truss member restraint and bracing. Certain visual grades will also meet BCSI recommendations. Stress-graded refers to lumber that has been graded for its mechanical (i.e., strength and stiffness) properties.

## **Answer**

You do not need to use machine stress rated (MSR) lumber for the truss member restraint and bracing. Certain visual grades will also meet BCSI recommendations. Stress-graded refers to lumber that has been graded for its mechanical (i.e., strength and stiffness) properties. These properties include bending stress,  $F_b$ ; tension parallel to grain stress,  $F_c$ ; compression perpendicular to grain stress,  $F_{c\perp}$ ; compression parallel to grain stress,  $F_c$  and modulus of elasticity, E. The properties are used by architects and engineers to determine the grade and size of lumber required to safely resist the anticipated design loads. The requirement that the lumber used for restraint and bracing of truss members be stress-graded is to ensure that the material has been graded to account for the effects of strength reducing characteristics (e.g., knot quality, size, location and frequency) and not solely on appearance.

Visually graded lumber grades that meet the definition of stress-graded include: Select Structural, No. 1, No. 2, No. 3, Stud, Construction, Standard and Utility. Various grades of mechanically graded lumber including MSR and machine evaluated lumber (MEL) also meet the stress-graded definition.

Design values for sawn lumber are available from several sources. This includes lumber grading agencies that develop the grading rules and lumber associations that provide technical and marketing support for the various products. The Supplement to the National Design Specification<sup>®</sup> (NDS<sup>®</sup>), published by the American Forest and Paper Association (AF&PA) includes the design values for all of the commercially

USE WITH TABLE 4A ADJUSTMENT FACTORS									
	Size classification	Design values in pounds per square inch (psi)							
Species and commercial grade		Bending	Tension parallel to grain F <sub>t</sub>	Shear parallel to grain F <sub>v</sub>	Compression perpendicular to grain $F_{c_{\perp}}$	Compression parallel to grain F <sub>c</sub>	Modulus Of Elasticity		Grading Rules Agency
							E	Emin	
SPRUCE-PIN	E-FIR								
Select Structural		1,250	700	135	425	1,400	1,500,000	550,000	NLGA
No. 1/No. 2	2" & wider	875	450	135	425	1,150	1,400,000	510,000	
No. 3		500	250	135	425	650	1,200,000	440,000	
Stud	2" & wider	675	350	135	425	725	1,200,000	440,000	
Construction	2" – 4" wide	1,000	500	135	425	1,400	1,300,000	470,000	
Standard		550	275	135	425	1,150	1,200,000	440,000	
Utility		275	125	135	425	750	1,100,000	400,000	
SPRUCE-PIN									
SOUTH)									
Select Structural	2" & wider	1,300	575	135	335	1,200	1,300,000	470,000	NELMA NSLB WCLIB WWPA
No. 1		875	400	135	335	1,050	1,200,000	440,000	
No. 2		775	350	135	335	1,000	1,100,000	400,000	
No. 3		450	200	135	335	575	1,000,000	370,000	
Stud	2" & wider	600	275	135	335	625	1,000,000	370,000	
Construction		875	400	135	335	1,200	1,000,000	370,000	
Standard	2" - 4" wide	500	225	135	335	1,000	900,000	330,000	
Utility		225	100	135	335	675	900,000	330,000	

Figure 1. Excerpt from Table 4A of the 2005 edition of the National Design Specification® (NDS®) Design Values for Wood Construction Supplement showing the reference strength values for various visual grades of SPRUCE-PINE-FIR and SPRUCE-PINE-FIR (South) lumber.

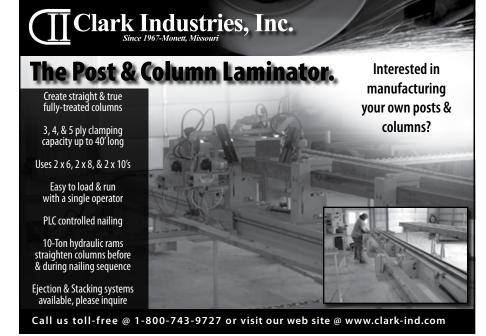
available lumber in the United States. Figure 1 shows an excerpt from the 2005 Edition.

Let's clarify your point about using dimensions other than 2x4 for bracing and restraint. The building designer can certainly specify the use of other materials, including 1x3s and/or 1x4s for restraint and bracing. This is indicated in BCSI:

Minimum size Bracing and Lateral Restraint material is 2x4 stress-graded lumber, or approved Proprietary Metal Restraint/Bracing, unless otherwise specified by the Building Designer.

It is critical, however, to make sure that stress-graded board material is used. Board grades such as No. 1, No. 2 and No. 3 are sometimes mistaken to have the same design values as No. 1, No. 2 and No. 3 visually graded dimension lumber. In reality, No. 1, No. 2 and No. 3 boards are graded for appearance and primarily non-structural applications. Stress-graded boards from Canadian species and species from the eastern and western U.S. include the designation "SRB" on the grade stamp indicating a Stress-Rated Board. Stressrated Southern Pine boards include the grades Industrial 55, Industrial 45 and Industrial 26. The design values for stress-rated boards are published by the grading agency for the particular species combination being used. **SBC** 

To pose a question for this column, call the SBCA technical department at 608-274-4849 or email technicalga@sbcmag.info.



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by Libby Maurer

**BCMC** Build unites attendees toward a common goal.



Volunteers set the walls mid-day on Day 1.

o one will ever forget the first year of BCMC Build: rain, then mud, and a whole lot of camaraderie. Enough camaraderie, in fact, to change the tenor of the entire BCMC Show. "We were covered with red mud from head to toe at the end of the first day...and laughing about it," said Carl Schoening, BCMC Build Production Chair. "But it gave everyone something positive to talk about. That was the point."

Ever since the downturn, the BCMC Committee has turned its attention toward reinventing the 30-year-old tradeshow. "The show has typically been very machinefocused. I don't think that's enough anymore, especially during a time when the industry isn't expanding a whole lot," said Dan Holland, BCMC Build 2010 Chair. He thought a charitable event would unite people toward a common, positive goal. And maybe even appeal to folks who wouldn't normally go to BCMC. "There's a strong need to reach out to people who feel they don't have a reason to come to the show."

If the goals were to bring the industry together, help a Charlotte family realize the American Dream, and educate the community about the benefits of building components, BCMC Build was an exhilarating success. "The camaraderie of all kinds of people from our industry was something to see. We had management, executives and competitors—none of them competing for attention. To see it fall into place was amazing," said Jerry Vulgaris, BCMC Build Marketing Chair. In essence, the Build more than lived up to the BCMC theme, Building Community, Making Connections.

The teamwork for BCMC Build started well before volunteers met on the jobsite September 27. In March, the group started working with Habitat Charlotte on the floor plan and integrating building components into the home. In February, the Committee began a fundraising campaign to collect funds to build the house from the ground up. (Over \$55.000 was donated by more than 50 companies. See page 9 or visit www.bcmcshow.com/bcmcbuild.php for a list of donors.) Component manufacturers and material vendors were given the opportunity to make material donations. In the weeks leading up to BCMC Build, the Committee finalized jobsite signage and



The roof trusses were set Day 1.

t-shirts for the volunteers. Schoening put together the volunteer list, created the framing schedule, and defined production goals for Day 1 and Day 2 to keep things on track.

# **Going the Distance**

A framing crew from Capital Structures drove over 900 miles towing a trailer full of tools. "They brought every tool you could possibly imagine from Arkansas to Charlotte," Holland said. Jeremy Jones, Wes Sadler, Larry Sanford, Justin Williams and Steven Spradlin (SBCA Past President) coordinated each stage, calling out the next steps so other volunteers could prepare tools and materials. "I was afraid we'd get bogged down in making decisions. But the Capital guys blew past those points so we could move forward."

Schoening said the framing team was integral to staying on schedule. "They sure knew how to work that timeline. You could tell they've had experience doing this kind of build before," he said. Sanford said his team stepping in to take the lead is natural. "We each know our strengths and revert to what we're used to," noting the team has worked together on similar charity builds.

Nuconsteel donated the materials for a cold-formed steel garage near the back of the house. Volunteers from the company were on site on Day 2 to frame it. (See photo on page 15.)

Although the Ksor family's limited English created quite a language barrier, many volunteers said their actions expressed their gratitude. At the jobsite both days, Mr. Ksor helped frame, while mother Ayui Rmah swept the subfloor free of debris over and over. "When the family is working alongside you, it makes you appreciate the work you're doing for them," Spradlin said.

The Habitat personnel learned a lot about how to use structural components and their benefits by observing how they were framed. "One of the site supervisors said they picked up two full days on the job by using components. We framed it in half the time, so they were very aware of the advantages," said Vulgaris.

The event attracted impressive local media coverage, including live from the jobsite segments by local NBC and ABC Continued on page 14



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Volunteers from Capital Structures put the finishing touches on the floor trusses.

# First Annual BCMC Build Gives Industry a Feel-Good Boost

Continued from page 13

affiliates. The staff of Visit Charlotte and Habitat Charlotte promoted BCMC Build tirelessly by distributing media advisories and organizing open media sessions at the jobsite. "The work of Habitat Charlotte and Visit Charlotte to pitch our event was tremendous. Linda Blum and Phil Prince from Habitat Charlotte and Molly Hedrick, Susan Schwint and Mike Butts from Visit Charlotte did a fantastic job," Vulgaris said.

# **Local Media Coverage**

Reporter Meghan Danahey with NBC affiliate WCNC Channel 36 documented the event from before volunteers started Monday morning all the way to Wednesday's Kick-Off ceremony at the Convention Center. Her interviews with volunteers appeared on several newscasts throughout the week, and one segment was even posted on WCNC.com's "Most Viewed" video list. Ben Hershey, who joined his ProBuild colleagues on the jobsite Tuesday, found that the media coverage made quite an impact. "On the way to the airport, I told the taxi driver I'd been in Charlotte for the BCMC Conference. He said, 'Oh, you're the group that built the house everyone is talking about.' All I could do was smile," he said.

Suppliers who donated their products were grateful that Habitat allowed them full exposure on the jobsite. "There's no doubt that when you compare this event to Extreme Makeover: Home Edition, everyone who donated products got some mileage out of the exposure. Habitat was completely open to helping us market our products," Vulgaris said. Spradlin said it's refreshing to work with an organization that "gets" that charity should be a selfless act. "The great thing about this project is it wasn't about glitz and glamour. It's about helping a deserving family."

A video crew from ITW Building Components including Michael Fagan, Gary Muzzarelli and Mark Duffy filmed the event from start to finish, and then produced a video documenting each stage of the process for viewing on the show floor.

# **Wednesday Kick-Off**

Bert Green, Executive Director for Habitat Charlotte, told BCMC attendees that they lived out their theme of Building Community, Making Connections. "Your industry shows us that the power of making connections makes things stronger. Roof, floor or wall—it doesn't matter what the components are, when you connect them, they create something even stronger," he said at the Kick-Off ceremony Wednesday morning. "Acknowledging the family really brought the experience together. Seeing them together, you realize we



Volunteers from NUCONSTEEL framed the family's garage with cold-formed steel on Day 2.

took a house and it made it a home," said Vulgaris. The Ksor family accepted a housewarming gift, and the father thanked BCMC attendees and exhibitors for their generosity.

Holland believes the idea he had one morning driving to work in late 2009 had a large influence on the culture of BCMC. "And I think probably a lasting one. The initial goal was to have an activity other than buying and selling machinery. But the unexpected result was that it bridged a divide among all



The Ksor family, pictured with BCMC Chair Bob Allen and Habitat Charlotte Executive Director Bert Green, accepted a housewarming gift at the BCMC Kickoff ceremony.

of us as competitors." Vulgaris felt the mood at BCMC was a little lighter. "You could almost feel the pride in the air." When the waters get still, sometimes you have to make your own waves. BCMC Build is a wave the industry hopes to ride for years to come, rain or shine. **SBC** 

Preparations are already underway for BCMC Build 2011 in Indianapolis. If you'd like details about getting involved, contact Jill at izimmerman@ qualtim.com. Visit www.bcmcbuild.com for a copy of the final video.



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# Tower Units & Steep Sloping Roof Make for Inventive Design



by SBC Staff

he residents of a new multi-family unit in a suburb north of Indianapolis may not appreciate the intricate truss design work that went into their building. But Eric Kolosky, truss technician with Trussway Ltd., and Joe Heinsman, one of the project engineers with Lynch, Harrison & Brumleve Inc., remember it well.

The 200-unit apartment building in Carmel, IN contains three levels of living space (about 220,000 sq. ft.) and features a number of complex structural elements to achieve its intended aesthetic. The first floor of the building is reserved for commercial space. Apartment units line the second and third floors around the outer and inner perimeter. The fourth floor has a "mezzanine" level or partial story that extends the fourth floor wall height to two full stories. There are two levels of underground parking, and an open-air courtyard with pool sits in the middle of the complex.

Each of the complex's four corners is capped by towers. The south side of the building faces the main street of the city's art district, so the towers (southeast and southwest) serve as its focal point. The southeast tower is easily identifiable with rounded walls and a cone-shaped roof, while the southwest tower is square. Each tower contains a unique truss system.

The truss systems have one thing in common: they're all tray trusses that bear on both the top of mezzanine walls and a lower tall wall that is less than the full two-story walls. Heinsman explained that this type of truss configuration steadies the walls and prevents them from moving in or out, and the walls hold the trusses up. "That's true of all tray trusses, but in this scenario it's even more deliberate, because of the tall

walls and higher corner zone wind loads," he said.

But that's where the similarities end. The truss configurations as well as their orientation in the towers' roof system are completely different.

# **Southeast Tower Fit for a King**

Based on its appearance, you may guess that the southeast corner (see photo on facing page) was the most complicated to design. Not so, Heinsman said. "It appears to be messier and required more coordination, but it really wasn't as structurally complicated as the southwest corner." The two main objectives were 1) making the transition from the walls to a true curved roof, and 2) tying the steep vaulted scissors trusses into a beam that dissected the tower.

The stick-framed walls were built to create a semi-curved effect, but they don't form a true circle. The walls are curved between openings but had to be straight at the openings, creating an alternating straight and curved shape at the top of the wall. The identical scissors trusses were set to fan out into a half-circle. On the inside, scabs were needed on some of the trusses to create the transition from the non-circular wall to the truly conical truss configuration.

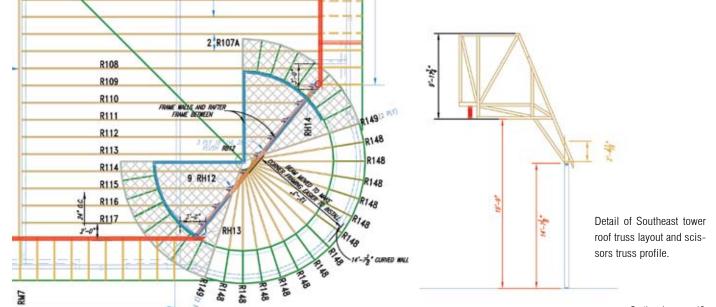
Around the perimeter of the building at the mezzanine level, continuous 3-ply LVL beams carry the roof trusses for the entire roof. This was necessary because a mansard runs the perimeter of the building splitting the 2-story exterior walls in half with the top half slopping inward. The beams come together at the southeast corner with short cantilevers. They are supporting another beam, set at a 45 degree angle, which splits the corner in half. Heinsman said the truss supplier had some excellent ideas to improve the way the supporting beams were configured. The end result required a 1-ply paralam for the cantilevered beams to simplify the connection of the angled LVL beam.



The tower is framed with high-heeled scissor trusses, creating a true conical roof shape. Scabs added to the sides of many truss bottom chords create an alternating straight and curved shape at the top of the wall. This makes way for the transition to a true continuous circle for the tower. A total of 15 trusses with a 28/12 pitch create a "fan effect," said Kolosky. The trusses tie into the angled beam (top).



A cantilevered beam (top left) carries the beam that runs across tower at a 45 degree angle (top right). An identical configuration is replicated on the opposite side. "The two cantilevered beams are one-piece paralam to avoid concerns over the hanger distributing load to multiple plies in a very short cantilever," Heinsman said. Kolosky and Heinsman worked together to adjust the placement of the beam to allow the scissor trusses to tie into it and simplify the installation.



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"The design was complicated enough that I'm thinking 'good luck' to the framer. But they did a really good job," said Kolosky. The framing crew built several elements on the ground before setting them, including the dormers. "The pictures are a little deceptive because the roof pitch is so steep the dormers don't really look like dormers." Heinsman said.

# **Square Tower Is No Square**

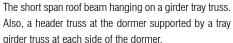
Although the rounded tower may be more visually exciting, Heinsman said the square tower on the west end actually yielded the most complicated design. "Structurally it was kind of interesting because we had to deal with load coming from two directions." He said the basic square shape from the outside looks deceptively simple. "You have trusses running east to west, but then the south wall has short jack trusses that had to be tied to the trusses behind them with blocking and strapping to give additional stability." Tying the jacks to the main span trusses and the ceiling and roof diaphragms allows them to function as lateral braces for the top of the wall just as the main span trusses do.

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View of loft corner. The top left shows jack trusses tying into the main east-west trusses to provide stability to the walls. (The framing and straps tying the jack trusses to the main span trusses are not yet in place.)

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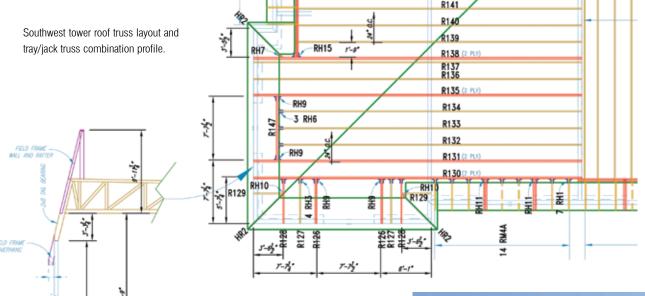


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# **Tower Units...**

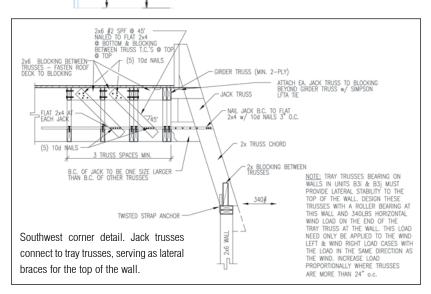
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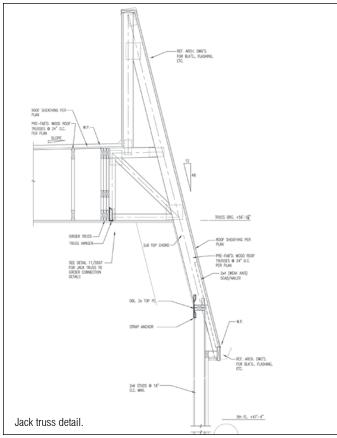


Outside view of Southwest tower.

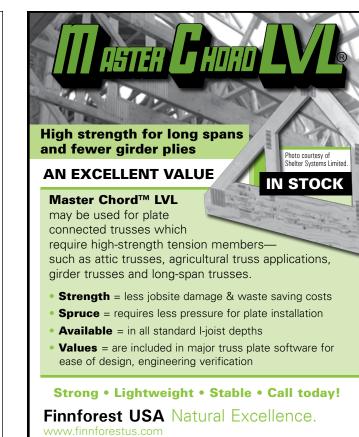
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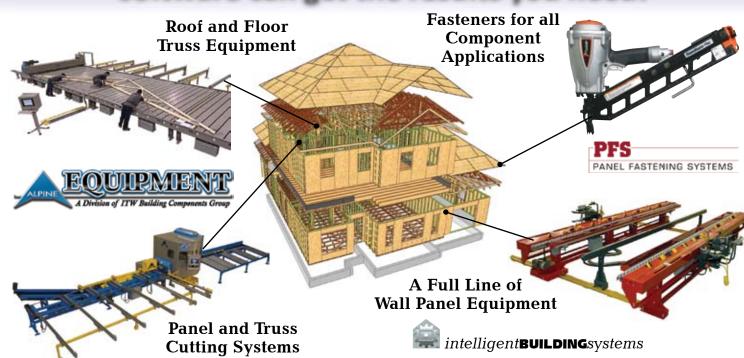


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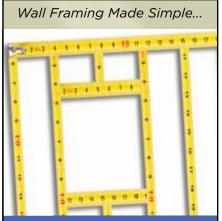




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The members of the SBCA's Texas Chapter, the Truss Manufacturers Association of Texas (TMAT), work hard every year to make sure they bring home the #1 Chapter trophy in the SBCA Annual Membership Drive. Showing off their TMAT pride, attendees of their September golf outing and dinner meeting gathered 'round for this photo with the marble trophy.

Coming as no surprise, the chapter pulled off an eleventh-hour victory in the 2010 Membership Drive too—after this meeting, the trophy was headed back to the engraver to have the chapter's name etched onto the column for the eighth time! **SBC** 





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