Imagine taking a horizontal slice of a hard-boiled egg and looking at it from the top. Now imagine designing roof trusses to fit on top of that shape and completing the job within budget. Pioneer came up with the idea of drawing the trusses first in CAD to represent the roof in true 3D.

Paul Lenauer credited technology with making this project possible, while the project’s architect credits structural building components with helping make his vision a reality.

A Shot in the Dark

With so many complexities, how did Pioneer come up with an accurate and competitive bid for the job? “We had no idea,” said Chris Lenauer. “Pricing this project was sort of a shot in the dark because we’d never done it before,” added Paul Lenauer, Pioneer’s late Operations Manager (See “In Memoriam” above). Pioneer decided to use the total component square-footage cost (calculated by software) and add 50 percent to arrive at the bid price. The formula paid off and Pioneer won the bid. In fact, the company’s bid came in so much lower than the competition that the customer asked Pioneer to double check its bid. “We were literally half the cost of competitors in the area,” said Chris Lenauer. Aside from helping Pioneer win the bid, the calculation proved accurate when the company fell within its budget for the project.

Once Pioneer won the bid, staff began tackling the job. The project posed a number of challenges from the beginning, explained Paul Lenauer. “A half moon above an entrance is one thing. That’s an easy design because all the trusses are the same size and dimension. This project was much more difficult because the trusses that make up the oval shape are each a different dimension.”

Pioneer’s design consisted of four different types of trusses. The high peak in the roof was achieved by piggybacking a bottom and top truss (see figures 1 and 2 on page 36). A half-moon-shaped truss and an end truss then rounded out the roof’s egg-like shape at the ends of the building (see figures 3 and 4 on page 37). The edges of the curve (the very top and bottom of the hard-boiled egg) would be completed by builders on the jobsite with dimensional lumber.

Not only did the job call for a complex roof design, the structure’s oval shape also required that each truss in the roof to double check its bid. “We were literally half the cost of competitors in the area,” said Chris Lenauer. Aside from helping Pioneer win the bid, the calculation proved accurate when the company fell within its budget for the project.

Once Pioneer won the bid, staff began tackling the job. The project posed a number of challenges from the beginning, explained Paul Lenauer. “A half moon above an entrance is one thing. That’s an easy design because all the trusses are the same size and dimension. This project was much more difficult because the trusses that make up the oval shape are each a different dimension.”

Pioneer’s design consisted of four different types of trusses. The high peak in the roof was achieved by piggybacking a bottom and top truss (see figures 1 and 2 on page 36). A half-moon-shaped truss and an end truss then rounded out the roof’s egg-like shape at the ends of the building (see figures 3 and 4 on page 37). The edges of the curve (the very top and bottom of the hard-boiled egg) would be completed by builders on the jobsite with dimensional lumber.

Not only did the job call for a complex roof design, the structure’s oval shape also required that each truss in the roof to double check its bid. “We were literally half the cost of competitors in the area,” said Chris Lenauer. Aside from helping Pioneer win the bid, the calculation proved accurate when the company fell within its budget for the project.

Once Pioneer won the bid, staff began tackling the job. The project posed a number of challenges from the beginning, explained Paul Lenauer. “A half moon above an entrance is one thing. That’s an easy design because all the trusses are the same size and dimension. This project was much more difficult because the trusses that make up the oval shape are each a different dimension.”

Pioneer’s design consisted of four different types of trusses. The high peak in the roof was achieved by piggybacking a bottom and top truss (see figures 1 and 2 on page 36). A half-moon-shaped truss and an end truss then rounded out the roof’s egg-like shape at the ends of the building (see figures 3 and 4 on page 37). The edges of the curve (the very top and bottom of the hard-boiled egg) would be completed by builders on the jobsite with dimensional lumber.

Not only did the job call for a complex roof design, the structure’s oval shape also required that each truss in the roof to double check its bid. “We were literally half the cost of competitors in the area,” said Chris Lenauer. Aside from helping Pioneer win the bid, the calculation proved accurate when the company fell within its budget for the project.

Once Pioneer won the bid, staff began tackling the job. The project posed a number of challenges from the beginning, explained Paul Lenauer. “A half moon above an entrance is one thing. That’s an easy design because all the trusses are the same size and dimension. This project was much more difficult because the trusses that make up the oval shape are each a different dimension.”

Pioneer’s design consisted of four different types of trusses. The high peak in the roof was achieved by piggybacking a bottom and top truss (see figures 1 and 2 on page 36). A half-moon-shaped truss and an end truss then rounded out the roof’s egg-like shape at the ends of the building (see figures 3 and 4 on page 37). The edges of the curve (the very top and bottom of the hard-boiled egg) would be completed by builders on the jobsite with dimensional lumber.

Not only did the job call for a complex roof design, the structure’s oval shape also required that each truss in the roof to double check its bid. “We were literally half the cost of competitors in the area,” said Chris Lenauer. Aside from helping Pioneer win the bid, the calculation proved accurate when the company fell within its budget for the project.
Tricky Design Job...
Continued from page 35

...system come together like a puzzle to fit perfectly with the rest of the structure, leaving no room for inaccuracies. “We not only had to hit everything side by side perfectly plum, but also front to back. The project is curved in both directions,” explained Campbell. “The pieces really had to fit together.”

To meet this level of accuracy, the project also required extra time outside the design office. “It’s one of those jobs where you’ve got to go out multiple times and snap a line on 50 percent of every truss,” said Chris Lenauer. He noted that repeat trips to the jobsite to confirm measurements played a key role in assuring that Pioneer’s design not only worked in the design phase, but also when the trusses were delivered to the site.

Cad to the Rescue
Because the temple’s x and y axis changed for each truss, Pioneer’s staff knew that designing the project with the company’s proprietary software would be extremely difficult as it wouldn’t represent the job in true 3D. The project’s unique design forced the team at Pioneer to look beyond standard truss design. “We knew this job would be time consuming. Roger [Campbell] figured it would take a week and a half to figure out,” said Chris Lenauer. It was Campbell who came up with the idea of drawing the trusses first in CAD to represent the roof in true 3D. Pioneer enlisted the skills of Steve Nolting, a local CAD designer who works for an area company that manufactures display cases for retail stores. “Putting the job in CAD made it a lot quicker,” said Chris Lenauer.

Once the structure was designed in CAD, Campbell extracted a set of reference points from each truss and input them into Pioneer’s proprietary software. “[The CAD designer] segmented [the architect’s] drawings for us. We basically connected the points and created profiles that would fit inside the segments.”

With a true 3D representation of the structure, the roof system design began to come together. “We rounded three different sections for trusses with a 24/12 pitch with room inside for heating ducts,” said Chris Lenauer. The trusses that made up the roof’s peak were then piggybacked to achieve the full design height. “Some trusses were so tall we had to cap the caps,” he commented (see photo on page 36).

Advancements in the Shop
With the design complete, the project proceeded to the shop, where again the job posed unique challenges. The project’s oval shape required the table setup to change for each set of trusses. Pioneer’s automated saws helped sawyers quickly cut webs to the appropriate length. The job then proceeded to the table where the overhead laser projection system sped up set-ups and assemblies. “Without that technology, this project would have been almost impossible to set up,” said Chris Lenauer. “Most companies would take two days [to complete this stage of the job], but we did it in eight hours.” Paul Lenauer also credited technology with making this project a reality, saying, “A few years ago, this project might not have been possible. Thanks to CAD, the proprietary software, automated saws and the overhead laser, we were able to accomplish this incredible feat.”

The trusses that made up the roof’s peak were then piggybacked to achieve the full design height. Some trusses were so tall, Pioneer had to cap the caps.

The “Tri-Axis” Hydraulic Roof & Floor Truss Press
Patented Joystick Control • Table width up to 16 feet • Gravity travel up to 215 FPM, 3-Sec Cylinder Pressing Cycle • Std. 30 Ton or optional 63 Tons of Pressing Piner Presses

The structure’s oval shape also required that each truss in the roof system come together like a puzzle to fit perfectly with the rest of the structure, leaving no room for inaccuracies. (Photos have been used to show this project at various stages in the construction process. They are not representative of proper bracing per BCS1 1-03.)
Tricky Design Job...

Continued from page 37

Architect's Perspective

Pioneer's staff says that communication—both with the architect and the outside CAD designer—played a major role in the project's success. "Roger had multiple conversations with the architect and CAD designer. He talked to these guys many, many times," said Tim Gooch, the main technician on the project. "What Roger designed, they ended up using."

Mak credits structural building components in helping his vision a reality. "Trusses, cost-wise, make sense," he said. "Trusses' ability to give us flexibility from a design standpoint helped give us more of what we wanted on the project."

Campbell said he couldn't be happier that the architect and the customer were pleased with Pioneer's design and that there were no difficulties with installing the trusses on the jobsite. "I was very happy to learn that the job went well," he said. He commented that the project's many challenges tested his skills and taught him not to underestimate his abilities. "A lot of times you can do things you didn't think you could. You may think, 'I don't want to venture into that realm because it's outside of my experience.'"

A Formula for Success

Pushing oneself to the next level has been a goal, and a major key to success, for Pioneer. Since the Lenauer brothers, Chris, Paul and Matt, purchased it in 2000, sales have doubled and the company has grown from a 10-acre facility to a 33-acre facility. Noting that truss design has become increasingly more complex, Chris Lenauer says that he and his brothers made a conscious decision to invest in technology.

Part of that investment included linking communication between all of Pioneer's departments. "Everything is wireless, from design to pricing to the shop," says Chris Lenauer. He says that technology has helped transform Pioneer into a well-oiled machine that can dedicate more energy to cus...
the test questions.

Chris Lenauer says that, when he and his brothers first bought the company, they took a pragmatic look at the types of jobs the company was doing. In that examination, they determined how different kinds of jobs figured into the company’s bottom line, and decided they needed to make some changes. The company made a conscious decision to work with some of the bigger builders in the state because it helps ensure a steady stream of work. “If the larger builders build year round, they’re just as strong in December as they are in April,” he said.

While the brothers found job security and stability in their big builder customers, they also recognized the need to balance that work with other types of projects that could showcase Pioneer’s full range of services as a truss manufacturer. Overall, Chris Lenauer says the company developed a formula to move forward and grow its business. “We diversified,” he explained. “I think you have to look at your sales like you look at your financials,” he explained. Pioneer’s formula aims to focus 80 percent of the company’s business on residential jobs while the remaining 20 percent is dedicated to other projects.

Clearly, the Di Zang Hall project falls into the 20 percent “other projects” category, and Chris Lenauer says it’s a fun type of job to show Pioneer’s abilities. While he admits, “You wouldn’t want to do jobs like that every day,” because they demand extra time and can become costly, he says they’re a good opportunity to step outside the mold. “Everyone sees you’re capable of more than the typical cookie-cutter projects,” he said.

Chris Lenauer says that the company’s serious investment in technology clearly paid off with the Di Zang Hall project: “This project wouldn’t have been possible if we didn’t have the technology—the CAD and the lasers—to get the job done right.” Indeed, with technology, imagination and determination, it seems Pioneer has found its formula for success.

O.K., maybe not a test like what you think. But if you manufacture wood components, you WILL BE TESTED.

Right now at least a thousand plants are cutting components with manual or “semi-automated” saws. Most are wondering whether they should bring in a fully automated saw. But what kind—a conventional automated component saw or one of the new linear feed automated saws? How much do they cost? Do they have the right kind and size operation? How in the world will they pay for it? Exactly what will it do for their production? Which manufacturer’s saw should they go with? And, all critically, exactly how would it impact their bottom line?

Those ARE the test questions.

And, at some point, you’ll almost certainly have to find the answers. Automation is here. And it is changing wood component manufacturing dramatically.

We can help you find SOLID answers. All you have to do is provide us with some key information. If we knew what you produced last week and how many workers it took to do it, we could tell you exactly how long and how much labor it would take to accomplish the same thing with automation. That’s what the Worksheet you see here is all about. You complete it—it doesn’t take long—and we provide you with the “automated answers” for your plant.

Yes, we manufacture the industry’s leading automated saws. But if you think our every answer will point to your buying one, you’re wrong.

We no more want our Service-Omni Component saw™ or our Miro™ linear-feed saw installed in a plant where it doesn’t make good business sense than you do. We couldn’t offer prospects our entire list of customers to talk to if we operated differently.

Actual results can be startling. Customers report that their automated saw paid for itself—in labor savings alone—within 9 months. Others tell us within 12 to 18 months. But savings really go far deeper than labor—from much faster truss & panel assembly to some 6 to 8% less drop off—and can have just as much impact. Not to mention the difference in finished-product quality... and increased safety because manual pull saw and chop saw cutting is all but eliminated. All said, you’ll be producing more product of higher quality in a much better work environment... which will start showing up in your financial statements almost immediately.

Call, E-mail, write or FAX for a Worksheet. We’ll generate an evaluation for your plant—or use your actual information—and send it back to you (please allow 2 weeks). It may not answer your every question. But it’ll be a good start. And to maximize your business—even to remain competitive these days—you will ultimately have to find the answers.
Dear Reader:

Copyright © 2006 by Truss Publications, Inc. All rights reserved. For permission to reprint materials from SBC Magazine, call 608/310-6706 or email editor@sbcmag.info.

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 of structural building components to ensure growth and continuity, and to be the information conduit by staying abreast of leading-edge issues. SBC will take a leadership role on behalf of the component industry in disseminating technical and marketplace information, and will maintain advisory committees consisting of the most knowledgeable professionals in the industry. The opinions expressed in SBC are those of the authors and those quoted solely, and are not necessarily the opinions of any of the affiliated associations (SBCC, WTCA, SCDA & STCA).