



Tricky Design Job Showcases Pioneer Truss Company's Creativity

by Emily Patterson

at a glance

- 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.

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. Sound impossible? With most traditional truss design software, it may be. When this question was posed to the staff at Pioneer Truss Company in Owensville, MO, it sounded impossible to them at first. But for a company that "wants to be known as the company that can truss anything," the challenge was too good to pass by, said Chris Lenauer, Co-owner and Vice President of Sales at Pioneer. Or, as he summed it up, "If it's trussable, Pioneer can do it."

The company was tested to live up to those words last year when it received a prospective project from a local lumber yard. The job called for the design and manufacture of roof trusses for Di Zang Hall, a temple for the Mid-America Buddhist Association (MABA). The approximately 800-sq. ft. temple's design called for the roof trusses to form a half-egg shape with a pointed peak on top for electricals. "It wasn't necessarily a large structure, but it's a complicated structure," said Chris Lenauer.

In Memoriam

Paul D. Lenauer, 42, Operations Manager and Co-owner of Pioneer Industries, LLC, passed away suddenly on October 24, 2005. He played a vital role in growing the company and made significant contributions to the Di Zang Hall project. *SBC* staff spoke with Paul during an initial phone interview for this article.



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An initial look at the structure's design showed that the roof's curved shape would make designing the trusses using conventional design software extremely difficult, if not impossible, because it wouldn't show the project in true 3D. "My first thought was, 'We don't want to be involved,'" joked Roger Campbell, the project's eventual designer. "Everything we fabricate has straight lines. This project has curves and arcs with different radiuses. Because there are so many calculations and the project is so out of the ordinary, I was concerned that errors would show up in the roof or there would be problems for those installing the trusses," he explained.

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

Continued on page 36

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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."

The challenging nature of the project is echoed by the temple's architect, Lei-Hoo Mak of Mak Architects, Inc. "The challenges were both cultural and aesthetic; cultural in that

we're in the United States in the 21st century and aesthetic in what kind of architecture will fit the setting," he said. Nearly ten years ago, Mak designed MABA's meditation center—a project that also used component construction—which sits on the same property as Di Zang Hall.

Noting that the temple is under 1000 sq. ft., Mak said he tried to come up with something modern with an Eastern flavor. "This is a memorial building, what many people might call a mausoleum," he explained. Pointing out that the temple's concrete walls are more than 12 inches thick, Mak stressed that Di Zang Hall had to be designed and constructed to stand the tests of time: "This structure is permanent and durable."

Mak credits structural building components in helping make 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-

Continued on page 40

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The architect's intention was a solid, modern building with an Eastern flavor. He credits trusses for the design flexibility he enjoyed in this project—one he is sure will stand the test of time.

Tricky Design Job...

Continued from page 38

tomers' needs and providing timely service. "At least once a week, we contact customers and do takeoffs," he explained. "I've had customers tell me that we've delivered trusses to

them on a job before competitors have even responded to the initial quote."

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. "[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. 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. **SBC**

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