RISA TECHNOLOGIES

CASE STUDY

Crystal Cathedral
Entertainment Engineering, Inc.

"The ability to be able to turn on and off members by isolating planes made it very easy to work with the member sections. It's something I found impossible to do in other beam editors and structural analysis software."

Project

Crystal Cathedral, Garden Grove, Calif.

Challenges

- The star-shaped chamber of the Crystal Cathedral features a glass-paneled exterior held in place by an intricate steel lattice
- The curtain wall is comprised of ductile and solid piping and includes more than 500 individual knee members
- Results from the original structural analysis were lost so the computer model was created from hand-drawn architectural plans

Solutions

For Brad Read, the opportunity to perform a structural analysis of the renowned Crystal Cathedral was an once-in-a-lifetime experience.

When Read was given the assignment to become the first engineer to create a computer model of the world-famous landmark, he knew the right software for the job: RISA-3D.

Read, the Director of Engineering for Entertainment Engineering Inc. (Burbank, Calif.), modeled the 25-year-old structure with RISA-3D, producing a model with more than 26,000 members.

"It was an honor," says Read, who also studied architecture in college. "I've always looked at this building as a masterpiece."

Though memorable, this was one of Read's most challenging jobs. The Crystal Cathedral is among the world's

QUICK FACTS

Location
Garden Grove, Calif.

Structural Engineer
Entertainment Engineering, Inc., Burbank, Calif.

Lead Engineer
Brad Read, PE

Architect
Philip Johnson

Size
415 ft. x 207 ft.

Built
1980

Software
RISA-3D

For more information on RISA-3D or to download a free demo version, go to www.risatech.com

"RISA-3D is my favorite FEA program. I use it every day."

Brad Read, Entertainment Engineering, Inc.

most distinctive buildings. Designed by the late great American architect Philip Johnson, the Crystal Cathedral is star-shaped asymmetrical chamber featuring a glass-paneled exterior (curtain wall) held in place by an intricate steel lattice.

Entertainment Engineering was contracted to do a FEA on the building for a new show. For years, the Crystal Cathedral Ministries used a preliminary analysis made by the building's engineer to determine the load capacity of the structure.

When Read set out to create his model, the calculations and real-world testing of the original analysis was lost. He had to start from scratch, using Johnson's hand-drawn plans as a guide.

He researched the structure and studied the technology of the curtain wall to determine acceptable deflection criteria. Along the way, he also discovered that the building's unique features, including both ductile and solid piping, 11 different sized trusses and more than 500 individual knee members, would make creating the model a real challenge.

"It's such a unique building," Read says. "There are four different slopes on the roof curtain walls and different compression and tension bracing going on all over the building."

"At that time, they didn't have RISA so they did a lot of shooting from the hip. They're a lot of unique knee joints because of the way the doors open and the walls move."

Read built individual panels and used RISA-3D's model copy tools to fill out the structure. Connecting the numerous knee joints would have been a tedious task without RISA's model selection tools, Read says.

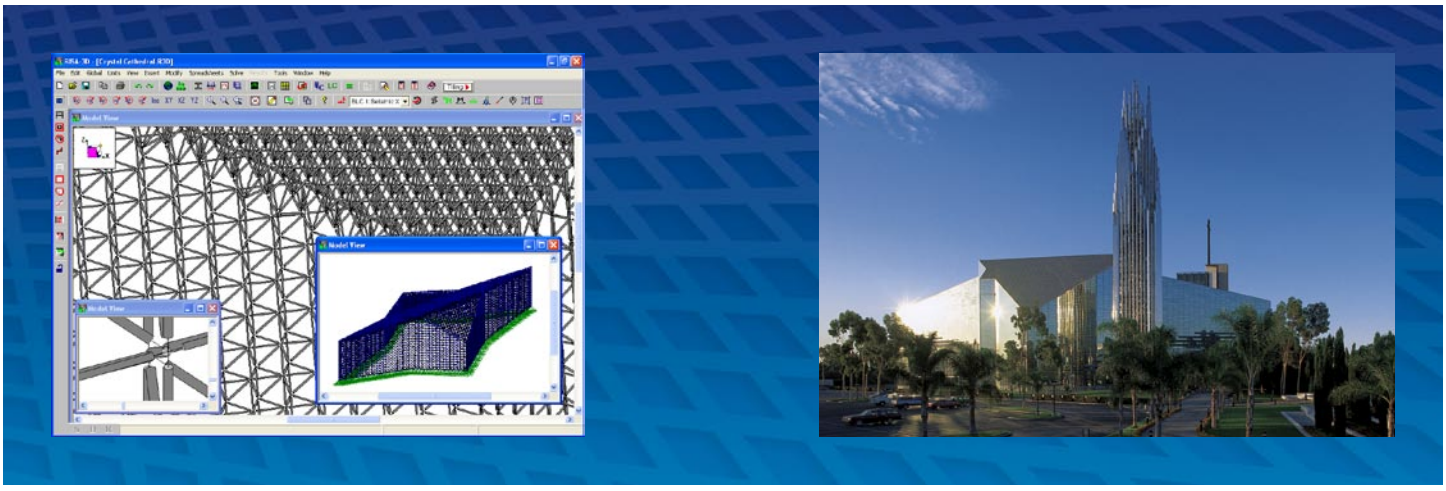
RISA-3D's powerful drawing capabilities and effortless interface not only made the process possible but surprisingly simple.

"The ability to be able to turn on and off members by isolating planes made it very easy to work with the member sections," Read says.

"It's something I found impossible to do in other beam editors and structural analysis software."

Read completed the design with a sense of accomplishment that he had produced a structural analysis that will be the standard for others to follow. But after more than seven years of using RISA software on a weekly basis, Read knows he can count on getting accurate results quickly.

"RISA-3D is my favorite FEA program," Read says. "I use it every day."



RISA Technologies has been an established leader in structural analysis and design software since 1987. RISA Technologies' top-rated software tools help structural engineers improve productivity and work more efficiently.

From general building and manufacturing firms to petroleum and power companies, RISA's use across multiple design categories is testimony to the versatility of our products.

RISA Technologies
26632 Towne Centre Dr., Suite 210
Foothill Ranch, CA 92610

800.332.RISA
www.risatech.com