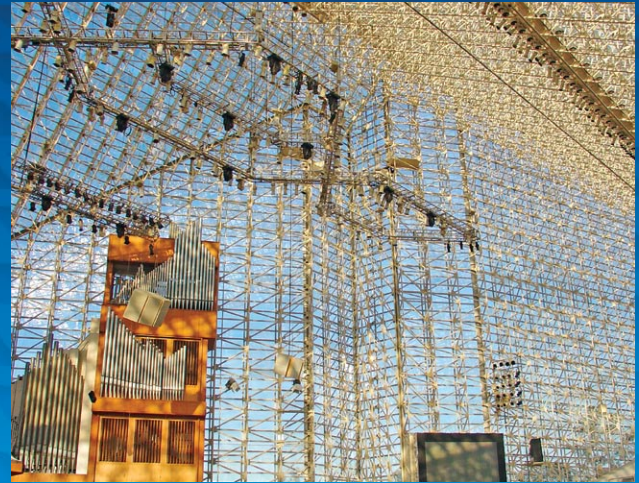


“The ability to be able to turn on and off members by isolating planes made it very easy to work with the member sections. It’s something I found impossible to do in other beam editors and structural analysis software.”



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

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

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

Brad Read, Entertainment Engineering, Inc.

Cathedral is among the world’s 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.

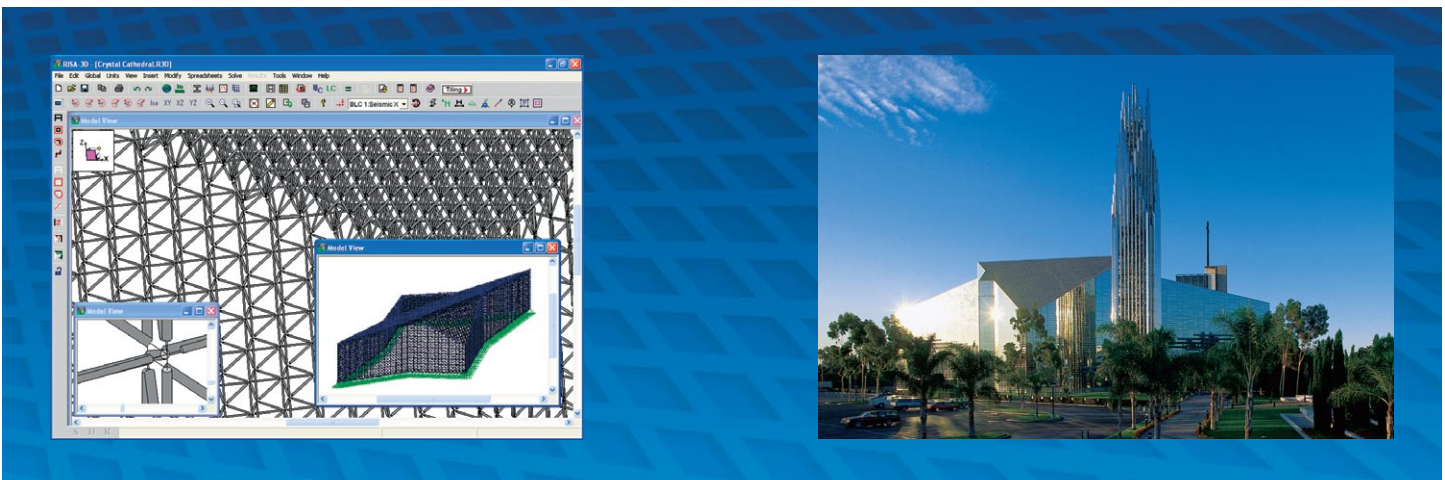
“The ability to be able to turn on and off members by isolating planes made it very easy to work with the member sections,” Read says.

“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 developed cutting-edge structural design and optimization software since 1987. With a well-trained team of engineers and software developers, we are working to meet the needs of our growing client base by implementing new design features and expanding the suite of software tools that we offer.

Our products are used by 24 of the top 25 U.S. design firms and in more than 70 countries for towers, skyscrapers, airports, stadiums, petrochemical facilities, bridges, roller coasters and everything in between.

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

800.332.RISA
www.risa.com