

TEMPE CENTER FOR THE ARTS

TEMPE, ARIZONA

PROJECT PROFILE

Wenger



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- Don Fassinger, Manager, Tempe Center for the Arts

CHALLENGE

Provide acoustical support and aesthetic harmony in multi-purpose theater environment

WENGER SOLUTION

Designed and constructed full-stage acoustical shell in partnership with architect, acoustical consultant, theatrical consultant, stage equipment contractor and facility owner.

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BENEFITS

- Coordinates with hall's distinctive architectural features
- Improves onstage communication by reflecting and diffusing sound
- Projects sound energy to audience – not fly loft, curtains and stage wings
- Couples stage area and auditorium into one acoustical space
- Integrates with electro-acoustic enhancement system
- Offers flexible configuration options and easy handling

HIGHLIGHTS

"We had a great team and owner involved," says Millie Dixon, principal with Theatre Projects Consultants (TPC). "It was a wonderful convergence of everyone moving in the same direction with the same purpose."

The \$65.7 million Tempe Center for the Arts (TCA), which opened in September 2007, features a multi-purpose theater, studio theater, gallery and multi-function room. Besides TPC, other key consultants were architects Barton Myers Associates and Architekton, along with Arup Acoustics.

"It's been a tremendous experience," says Don Fassinger, TCA's manager, who worked on the project since its conception through the construction and now operating the building. Before his hiring in June 2001, Fassinger served on the Tempe Municipal Arts Commission during the community meetings and design competition.

The centerpiece of TCA's 600-seat proscenium theater is the Diva full-stage acoustical shell, consisting of 10 wall towers and three rows of ceiling panels, all finished in a beautiful Honduran mahogany veneer.

Fassinger says the planning committee struggled with the decision on the shell finish: natural wood or painted. "On any project you're always balancing limited dollars," he notes. "Wood was a significant cost increase compared with painted, but I'm so glad we chose wood because it's absolutely gorgeous."

He says working with Wenger was a really nice collaboration. "They understood our objectives and whenever we had needs, Wenger stepped up and met them."

The shell was part of the stage equipment package supplied by Texas Scenic Company. Gary Henley, vice president of marketing, says his company has worked with Wenger for 25 years. "We always have a good working relationship and we always have a happy customer," remarks Henley. "We never have to worry about the quality of the product."

CREATING VISUAL UNITY

For architect Peter Rutti, senior associate with Barton Myers Associates, a key objective for the shell was to visually unify the stage area and audience house. He designed horizontal bands in the audience house walls that are carried through to the shell's towers.

"Wenger coordinated their veneer layouts of the wall towers with my drawings, so the bands in the house and towers align properly," notes Rutti. "There was a lot going on behind the scenes, and Wenger was a great manufacturing partner that knew how to pull it all off."

Wenger created the desired banding effect by using a precision router on the panels, exposing the MDF (medium density fiberboard) core beneath the veneered surface. The revealed bands appear darker because of how the core material absorbed stain.

Unlike a piece of furniture that may require a single sheet of veneer, the towers and ceiling panels of this large acoustical shell utilized nearly 4,000 square feet of veneer constructed from approximately 125 4' x 8' sheets. Achieving a consistent visual appearance across such a large surface area is a challenging task. Wenger and its wood supplier pride themselves on paying attention to this key aesthetic detail.

"The veneer of the shell had to match everything else in the room and Wenger did a great job putting it all together," notes Dixon, who has worked with Wenger on numerous shell projects. "They do an excellent job matching all the wood flitches in the shell's veneer, including colors and wood grains going different directions." Continues Dixon, "You can usually walk into a space and tell whether or not it's a Wenger shell. Other companies that manufacture shells make them completely differently, and it's very obvious whose is whose."



To complement the horizontal banding on the wall towers and audience house, Rutti designed light troughs in a radial pattern extending through the shell ceiling and out into the auditorium acoustical reflector. Light fixtures incorporated into these troughs were a unique design feature Wenger had never created before. In a typical Diva shell ceiling, light fixtures are mounted into holes cut in the panels.

Because these troughs protruded through the back of the ceiling panels, Wenger adjusted the mounting hardware and other ceiling components. This ensured the lights would not compromise the limited storage area provided for the ceiling panels to rotate and store vertically. A secondary objective was achieving lighting angles that would not blind the first few rows of the audience.

For this project, as with many custom Diva shells, Wenger made finished mock-ups of ceiling and wall tower panel sections. These were hung in the incomplete theater space for review by the project team before shell manufacturing started.

“Acoustical shells are very complicated and it’s difficult describing them over the telephone,” notes Rutti. “You really need to stand underneath them and point at them. Wenger was on-site several times during the construction and this helped the back-and-forth discussions.” Rutti adds, “One of Wenger’s key strengths is asking the right questions at the right times – that’s very important.”



ACHIEVING ACOUSTICAL FLEXIBILITY

Multi-purpose spaces like the TCA theater present an acoustical challenge: How to best accommodate the requirements of a wide range of community and touring events. Principal consultant Kurt Graffy of Arup Acoustics says in the past a common approach would be to build a room large enough to support the longest reverberation times required, and use passive acoustical systems like draperies to decrease the reverberation time when necessary.

Improvements in technology can offer a small-room acoustical solution by incorporating an electro-acoustic enhancement system. The room is sized so that its natural acoustics support the dramatic spoken word.

Early on, there was discussion about which approach to take for the TCA theater. “Larger facilities are more expensive to build and operate,” explains Graffy. “Smaller, more compact buildings have lower foundation costs, construction material costs and lifetime costs like heating and cooling.”

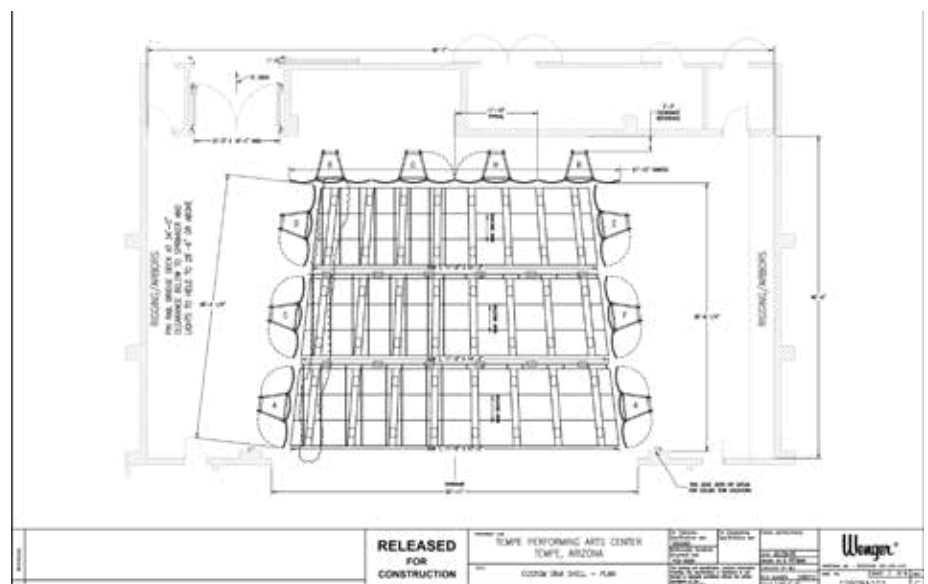
The decision was made for a smaller space with electro-acoustic enhancements. Graffy prefers the term ‘electronic architecture’ because it underscores the system’s importance to the facility’s overall functionality.

“This isn’t just an optional ‘sound system’ – it’s architecture,” he states. “Value-engineering out this system would be like removing some of the facility’s structural steel columns. The whole building has been purpose-built and designed based on this, and it’s what enables this room to work.”

The TCA theater features two separate LARES systems for the stage and house, totaling four microphones and more than 100 loudspeakers. Onstage, the system can adjust the amount of coupling to the hall to suit the musicians, including reverberation and early/late sound energy.

Complementing the electronic architecture, the Diva shell is a traditional acoustical solution intended to support the musicians onstage, whether a symphony, smaller ensemble or solo performer. The shell provides nearby surfaces for early reflections, enabling musicians to better hear themselves onstage and to foster cross-stage communication.

“In a natural acoustic hall, the reverberation is developed by reflections off all the surfaces on the stage and in the room,” explains Graffy. The TCA theater’s natural acoustics feature a reverberation time of 1.1 seconds.



“But when the room acoustics are being enhanced by 100+ loudspeakers, adding loudspeakers to the shell ceiling assembly effectively moves the musicians out into a common volume again,” he says. “Even though they’re onstage, they’re experiencing the same reverberation and acoustic conditions.”

To support this electronic architecture, a dozen of the theater’s 100+ loudspeakers are gimbal-mounted on pipe outriggers attached to the upstage edge of the shell’s front two ceiling panels. These loudspeakers rotate with gravity on the pipes so they are always facing down to the stage, even when the ceiling panels are rotated vertically and flown into their storage position.

This additional weight from loudspeakers required that Wenger recalculate the center of gravity for the ceiling panels, to maintain their proper balance in the performance position. “Both Ron Probst and Mark Ingalls of Wenger were very instrumental in helping us engineer the necessary modifications,” recalls Dixon.

“There’s a certain level of quality I know I can expect when working with Wenger,” she continues. “I know they’ll build the shell the way it needs to be built. If I ask for any special adjustments to the framing, I know they will engineer it. They also take care of all the little details and always stand behind their products to ensure I’m satisfied.”

To accommodate different size performing groups, the TCA shell is designed for three possible configurations. The largest setup features three wall towers on each side, four wall towers across the back and three rows of ceilings.

To reduce the shell size, downstage side towers are removed and the remaining side and back towers brought forward. Two rows of ceilings are used to coordinate with the remaining side towers, which feature angled tops to fit beneath the concert ceiling in any configuration. Unused ceiling rows are stored onstage rigging in the loft when not required for the alternate setups. Depending on the number of side towers used, the downstage height of the tallest tower ranges from 28’ to 21’.

“As you get into a smaller number of musicians, you want those shell boundaries to be closer to them,” explains Graffy. “This improves their playing, their sense of ensemble and support. This shell offers quite a flexible configuration.”



MAKING IT EFFORTLESS

Fassinger agrees about the flexibility, saying that his technical staff appreciates the versatile shell setups and ease of operations. In day-to-day use, he says the Diva shell moves quite easily. “Our production coordinator and two assistants can get the shell in and out in pretty fast order,” explains Fassinger. “The Air Transporter makes the whole process extremely easy – probably 1.5 hours to two hours.” The ten towers nest compactly for storage in a designated upstage area.

Graffy says the LARES system smoothly adapts to suit the shell configuration and these adjustments are transparent to the user. “Once you select the shell size, certain parameters are automatically adjusted to fit the resulting microphone and loudspeaker configuration,” he explains, adding that the reverberation time and level can also be adjusted.

“I’ve worked with Wenger for years and this was the second project where loudspeakers were integrated to the ceiling assembly,” remarks Graffy. “Wenger was very supportive of our direction and how the outriggers were designed. They were very easy to work with – it was a good collaborative effort.”

Because of their history and experience working with acousticians and musicians, Graffy believes Wenger is already up to speed on the key issues. “Their shells are well-constructed and high quality.”

Beyond TCA’s showpiece acoustical shell, Fassinger also found Wenger easy to work with when ordering furnishings and smaller equipment like music stands and conductor’s equipment. “Wenger was very responsive,” he says. “When I requested product samples, they were on my doorstep right away. I really couldn’t have asked for better customer service or a more congenial and professional working relationship.”

Dixon agrees. “Wenger is very good with customer service, product training and long-term customer support,” she says. “Their longevity as a company is also a big advantage.”



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