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Southwest Contractor

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Facing the Music

Instrument Museum Lets Guests See and Hear the World of Sound

By Scott Blair

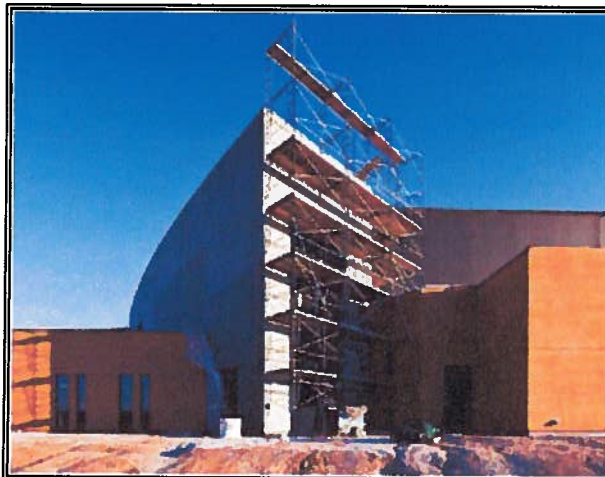
The first-of-its-kind, \$125-million Musical Instrument Museum in north Phoenix will allow guests to explore the world's musical instruments with 190,000 sq ft of exhibition and performance space.

How do you guide museum guests through the unseen world of sound?

That is the dilemma faced by the designers and builders of the new Musical Instrument Museum in north Phoenix.

The chairman and founder of the \$125-million museum is Bob Ulrich, chairman emeritus of the worldwide retail chain, Target Corp., which also contributed money and services to aid in construction of the museum.

Featuring instruments from diverse cultures and civilizations around the world and throughout history, the museum hopes to help visitors better understand musical expression in life, art and ritual.



The Musical Instrument Museum combines one- and two-story elements clad in limestone and enhanced stucco in tones of gold and gray-green intended to be sympathetic to the surrounding desert landscape. (Photo by CAPS)

"There's nothing like it in the world," says project designer Rich Varda, FAIA, who is also Target's vice president for store design at the firm's Minneapolis headquarters. "Since there is nothing of this scale and comprehensiveness out there, Bob felt this museum would be an important contribution as a cultural institution, and a great addition to Phoenix."

Adding to the challenge of forging a new museum was the speed in which it happened. "Our main benefactor [Ulrich] is known for wanting things done fast," Varda says. "Bob is creating an institution that didn't exist before with a full academic staff, building the collection and the museum building, all within essentially a four-year time period from inception to opening."

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The project broke ground in April 2008 and will be completed by November, but the museum won't open its doors until April to allow time for staffing, preparing artifacts and arranging exhibits.

Masonry and steel with metal joist and deck form the building's one-story areas, while the two-story gallery components are framed with heavy concrete to minimize traffic sound and vibration transference from the nearby busy intersection of Tatum and East Mayo boulevards, says Joe Schmid, senior project manager with the Phoenix office of general contractor Ryan Cos.

While the project won't be submitted for LEED certification, significant sustainable aspects include the use of fly ash, a recycled material, in the concrete, 25,000 sq ft of photovoltaic solar panels on the second-story roof areas, a chemical-free chiller water system and extensive xeriscaping.

"A gray-water irrigation system takes bleed and wash water from the cooling tower and collects it into a storage tank to be used for irrigation," Schmid says.

Due to the sensitivity of wood and other materials of the antique instruments being exhibited, moisture is always on the minds of everyone on the project.

"Typically, you are trying to keep moisture from the outside getting in, but here we are trying to keep it from going out because we want the controlled atmosphere," Schmid says.

Protection is multifaceted and envelopes the entire building. A 15-mm polyethylene multicore vapor barrier was placed between the sub-base and the slab-on-grade concrete for all the interior spaces. In addition, a trowel- and spray-on membrane wraps the vertical exterior walls and intersects with a roof membrane. These efforts sustain humidity at an ideal 40 to 50%.

On top of all this, the design also called for a rain-screen façade. "It's a fairly new type of construction to the U.S. where you provide an air gap between the cladding and the actual moisture protection of the building to screen it," says Rafael Olabarrieta, associate with the Tempe office of RSP Architects, the project's architect of record. "It also helps equalize the pressure between the exterior of the building and the interior." The screen is comprised of a 2-in.-thick limestone panel façade secured with anchor bolts to allow for a 2-in. air gap and 4 in. of insulation.

"The façade absorbs solar energy and keeps it isolated from the building while the air gap draws the hot air out using the chimney effect," Schmid adds.

Since some of the musical instruments are still being acquired, the exhibit plan had to be flexible. The building is organized around a meandering two-story central circulation corridor dubbed El Rio. "By having everything accessible off of this main spine, it gives us a lot of flexibility in how we set up the experience," Varda says.

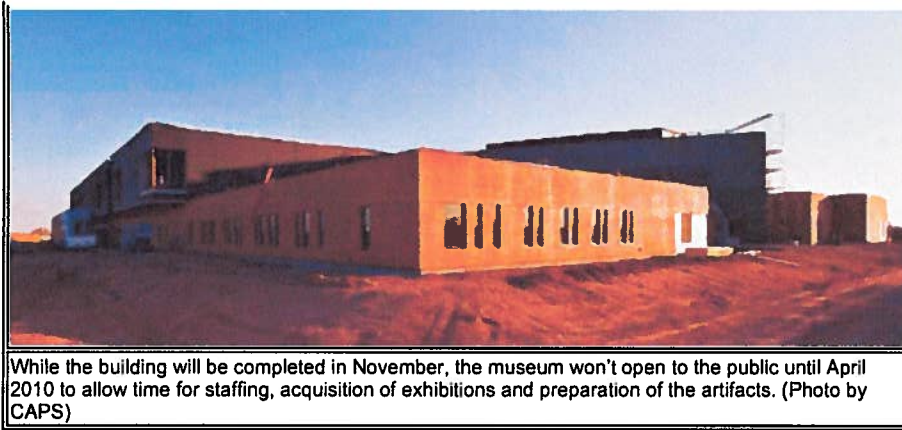
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Once visitors enter the building and purchase their tickets, they will be introduced to how to best use the museum through an orientation room. They can then proceed to the ground floor to view special and traveling exhibits, or

up to the second floor which houses galleries of instruments themed around geographic areas of the world. Other amenities accessed off this central spine include a cafeteria/coffee shop, gift shop, family center and a 299-seat performance space designed to be a building within a building.

"We've taken every measure we can to isolate the box of the theater from the rest of the building so that sound doesn't transfer," Olabarrieta says. Conditioned air flows quietly because of minimal pressure within the massively oversized 54-in. ducts.





Eight movable sound-absorption walls will tune the room to the acoustical needs of the performance. A small but sophisticated recording studio sits at the back of the theater.

In the exhibit space, designers want to give visitors an idea of how each instrument sounds without creating an audio cacophony.

The solution was to create a wireless infrastructure of audio signals tailored to broadcast in the immediate area of each exhibit. The signal can be shaped to optimize signal strength without interfering with nearby exhibits. Patrons will wear headphones that will allow them to hear a snippet of music played on the instrument, or audio that syncs with video incorporated into the exhibit. Because this system requires an extensive backbone of network cabling, "there are huge cable trays that will go to several communications rooms throughout the building," Schmid says.

The trays share just a few feet of ceiling space with a myriad of other systems, including oversized ductwork, chilled water piping, plumbing lines, roof drain piping, electrical conduit and a gravity-fed fire protection system.

To make sense of it all, the team used building information modeling.

The building's structural and architectural elements were designed in Autodesk's Revit software, while MEP was done in AutoCAD before being sent on to the design-assist subcontractors: Phoenix-based W.D. Manor Mechanical Contractors with Delta Diversified Enterprises Inc. and Alliance Fire Protection Co., both of Tempe.

W.D. Manor then built a 3D model in Autodesk's Navisworks, incorporating the coordination files from the other subcontractors into the BIM model.

As a result, more than 95% of the coordination and fabrication was taken care of prior to installation, preventing costly changes at the jobsite, Olabarrieta says. "We saved a lot of time and money doing the BIM process," he adds.

Because some traveling exhibits require specific fire protection systems to be in place before the artifacts are displayed, a double interlock preaction fire protection system was chosen for some of the exhibit spaces and instrument storage areas,

Schmid says. The system prevents accidental activation by only allowing water into the sprinkler pipes after both a smoke or heat detection alarm is sounded and an element in the sprinkler head is melted from heat.

The building features extensive back-of-house space for offices and storage, as well as a unique conservation laboratory with a large window allowing guests to observe the delicate process of maintaining and repairing the museum's artifacts.

Key Players

Owner: Musical Instrument Museum

Design Architect: Rich Varda, FAIA

Architect-of-Record: RSP Architects

General Contractor: Ryan Cos. US

Engineer: Meyer, Borgman and Johnson

Subcontractors: W.D. Manor Mechanical Contractors; Alliance Fire Protection; Delta Diversified Enterprises; Riggs Contracting; ISEC; Walters & Wolf; KT Fabrication; Able Steel; Sun Valley Masonry; Target Roofing; Progressive Concrete



Since all exhibits and amenities branch off from the two-story, atrium-like central circulation corridor, visitors will easily be able to flow from one area to the next. The oversized ductwork, mechanical piping and other components coordinated in BIM are visible here, but will soon be covered. (Photo by Scott Blair)

Useful Sources

To learn more about the museum, visit their website at www.themim.org

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