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The arts of fabric

In the design of the Mesa Arts Center, fabric—lots of it—is being used to create an oasis environment

By Richard Broderick

Like many smaller cities located near large cities, Mesa, Arizona, has had to fight not to be swallowed up by the expanding megalopolis, in this case, Phoenix.

It's not that Mesa isn't growing itself—right now, it ranks as the 50th largest city in the United States—but that it faces the dual challenge of maintaining its individual identity while saving and restoring a downtown business community undermined by the all-too-familiar threats of the suburban strip mall and highway bypass.

Enter the Mesa Arts Center. Local politicians and city boosters hope that when the center, which takes up most of a city block right in the center of Mesa, opens in 2005, it will not only put the town on the map, identity-wise, but also provide a big boost to the downtown businesses.

An ambitious, multidisciplinary arts and educational complex, the Mesa Arts Center covers some 2.8ha (7 acres) of prime downtown real estate. Within its 18,000 sq. m of built space, the center will house four theaters and a performing arts center with seating that ranges from an intimate 100 up to 1,600, a 3,150 sq. m community arts school that will teach fine and performing arts for children and adult learners, and a 1,350 sq. m gallery for contemporary art.

The heart of the Mesa Arts Center is a 1.6ha (4 acres) public space shared by the art school and the theater complex (all of the theaters share a lobby and are housed in the same building.) Given the city's location, the motif for this shared space takes its cue from the desert and utilizes generous amounts of architectural fabric in both conventional and unconventional ways to create a pleasing mixture of light and shadow, air and water.

"The shared space is a kind of oasis environment," explains Michael Tingley, a principal with BOORA Architects, the Portland firm that is design architect for the project. "The heart of it is something we characterize as a shadow walk, a landscape arranged along a long arc that runs from end of the center to the other, sweeping down the length of the site." Along this shadow walk, Tingley says, are smaller spaces given over in turn to grass, gardens, trees, stone paving, all of it tied together by a "metaphorical version" of an arroyo that, like a desert gulch, is sometimes dry, sometimes flowing with water.

"This is envisioned as an active and enriching place that will be a gathering spot for community events," Tingley says. "It is filled with canopies and trellises and a broad variety of trees to create shade and a rich texture of shadows. It will be an inviting environment in
By far, however, the most ambitious use of fabric at Mesa Arts Center is in the two horizontal canopies that shade a pair of entryway points leading from Mesa’s main street to the entrance of the theater entrance. Floating 15.25m above the walkways, each canopy is 36.6m long and 9.14m wide and constructed of three 2.44m wide ribbons of off-white Teflon-coated fiberglass that weave at varying angles to each other and are anchored to four 22.9m tall sparred masts.

For help in creating these complex canopies, BOORA turned to FTL Design Studios, a New York firm noted for its quarter century experience designing and engineering tensile structures. “We went to FTL because we came to realize that amount of expertise and special knowledge you need to work with this kind of material was beyond our in-house capabilities.”

At FTL, the first order of business was to settle on the proper support system for the canopies. “When BOORA came to us it took a couple of days wrestling with it, but then it came down to deciding that the canopies were sails and then working within that structural idiom,” says Nick Goldsmith, a principal with FTL. Once that conclusion was reached, it was a matter of how to manage the wind and other stresses that would be placed upon the material.
Computer rendering of nighttime at the Mesa arts center along the "shadow walk."
A series of fabric shade "sails," supported from vertical columns, are set just in front of the glass curtainwall to help mitigate solar heat gain. The shades are made of PTFE-coated glass fiber selected for its long life, high durability, and resistance to yellowing over time.

"I see each canopy as four flying carpets floating in space together but never really touching, yet sharing a support structure that makes them very interdependent upon each other," explains Goldsmith. The solution to how to balance the grace and undulating flexibility of the fabric with the strength needed to anchor the sails was solved by attaching the ribbons of fabric to the spars and then cable-bracing them to each other.

"We were clear on the effect we wanted, but the solution changed as a result of FTL's input," says Tingley. "Ultimately, we arrived at a design objective that was achievable within the technology of tensile fabric architecture."

"We wanted to create shade without creating a strong barrier... We wanted to blur the distinction between inside and outside. Fabric was the best way of achieving a softer and more organic barrier." —Mike Tingley

Richard Broderick is a regular contributor to Fabric Architecture.

Project data
Client: City of Mesa, Ariz.
Architect: DWL Architects, Phoenix
Consultant architect: BOORA, Portland, OR
Structural engineer: Paragon Structural
Tensile consultant: FTL Design Studio
Landscape architect: Martha Schwartz Inc.
Fabric element fabrication: shade sails, Shade Concepts; canopies, Birdair
Fabric: PTFE-coated glass fiber