



Trellis Tops Busy Shopping Center

Tourists and locals alike spend hours strolling a popular destination located in the center of Waikiki in Honolulu on the world-famous Kalakaua Avenue. The Waikiki Shopping Plaza is home to dozens of well-known merchants, including GUESS, Sephora and Armani Exchange, as well as a few hometown favorites such as Local Motion and Ukulele House. Perched on top of this 30,000-square-foot building is a series of structural trellis systems made from interwoven panels. The trellis systems, constructed from pultruded fiberglass reinforced polymer (FRP), add



This rooftop trellis system, designed by MGA Architecture and fabricated by Plas-Tech Ltd., enhances the aesthetics of the Waikiki Shopping Plaza.

significant architectural detail to the exterior of the building. Honolulu-based MGA Architecture LLC collaborated with Plas-Tech Ltd., a custom composites and

fiberglass fabrications specialist also in Honolulu, to create the trellis systems. "Our design was inspired by the native Hawaiian culture to induce sensory response and an emotional

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experience while blending in with the urban character of modern-day Waikiki," says Matthew Gilbertson, president and principal architect of MGA Architecture.

In the early development and design stages, other materials were considered. However MGA Architecture quickly determined that FRP was the best overall solution because it's lightweight, easy to install and requires low maintenance. In addition, FRP is corrosion-resistant and long-lasting.

Warm Pacific Ocean breezes made traditional materials such as wood, aluminum and steel poor choices for the trellises: The high level of salt in the air in Waikiki invites corrosion, requiring constant maintenance and regular replacement of some or all of the trellises. FRP, however, provides years of beauty with little to no maintenance. Considering the entire lifespan of the structure, the FRP trellis systems will cost less than ones made from traditional materials because of reduced maintenance fees.

"Having our engineering firm design a lightweight system that was strong and durable enough to meet the demands of a large rooftop assembly was definitely a challenge," says Benjamin Rowe, general manager at Plas-Tech Ltd. "Composites were a key component to achieving the design."

The Waikiki Shopping Plaza features five connected trellis systems, each consisting of four curved outrigger fiberglass beams measuring 28 feet long, six inches wide and one foot deep. Plas-Tech made the beams using an open molding process. The trellis' cross members utilize 28 of Strongwell's EXTREN® 2 x 6½-foot rectangular tubes – a combination of pultruded fiberglass reinforcements and thermosetting polyester resin systems – per trellis system.

"The combination of the two different manufacturing processes – the open molding process of the beams and pultrusion process of the tubes – provides elements of custom lines

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while using Strongwell's products that were commercially produced and ready-made, allowing a more economical package," says Rowe. The completed trellis systems were coated with a premium urethane topcoat to protect against the prolonged ultraviolet light exposure.

"The job went off without a hitch and both MGA and Plas-Tech are very happy with the fabricated trellis," says Rowe. MGA and Plas-Tech were so pleased with Strongwell's pultruded

FRP structural shapes that they have plans to add more trellis systems on the neighboring building.

"We will continue to meet the needs of our island client base and produce composite systems for other notable architects and customers," says Rowe.

Terin Bufford is the communications coordinator at ACMA. Email comments to tbufford@acmanet.org.