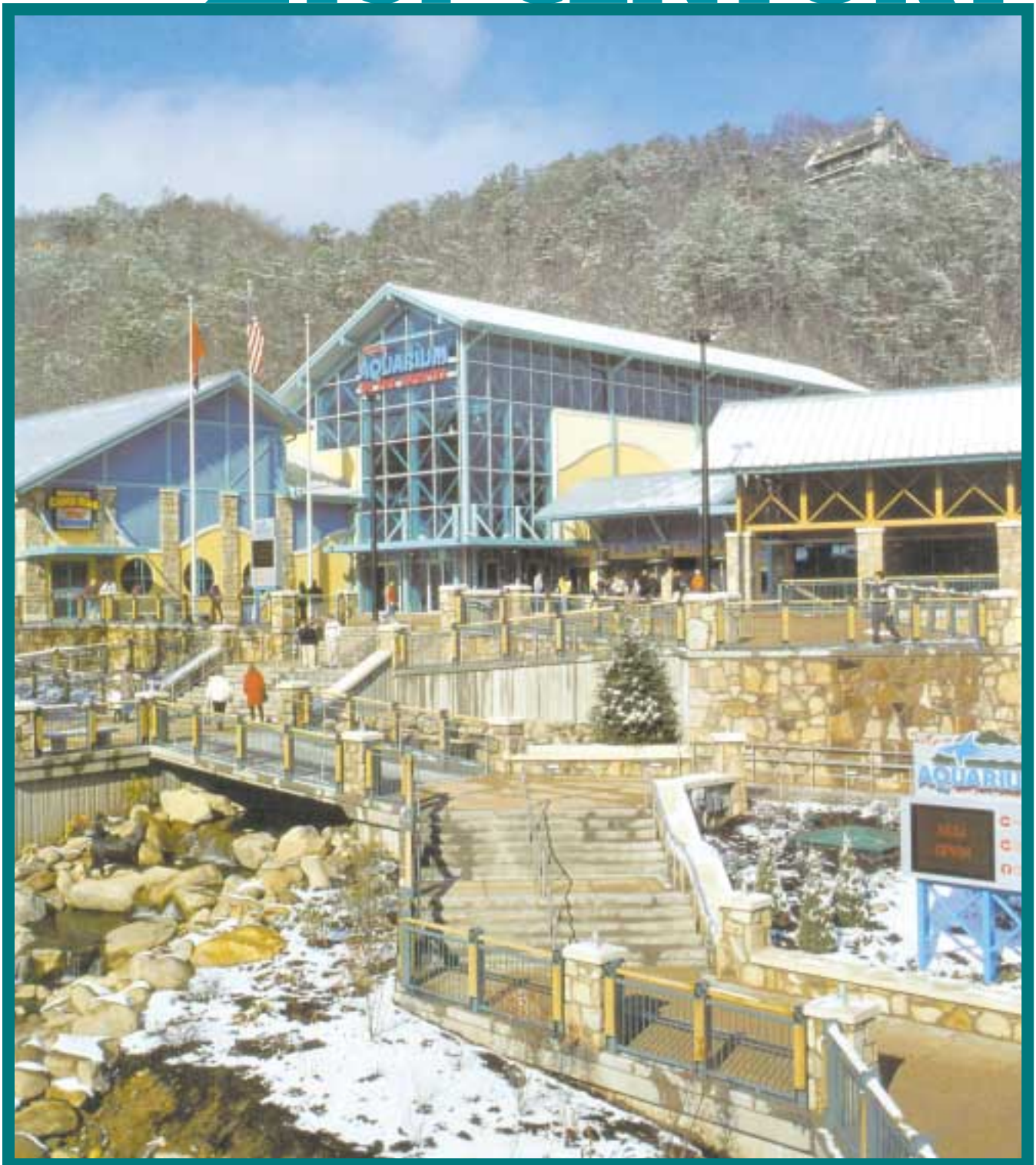


# HSS: DESIGNS FOR THE 21<sup>st</sup> CENTURY



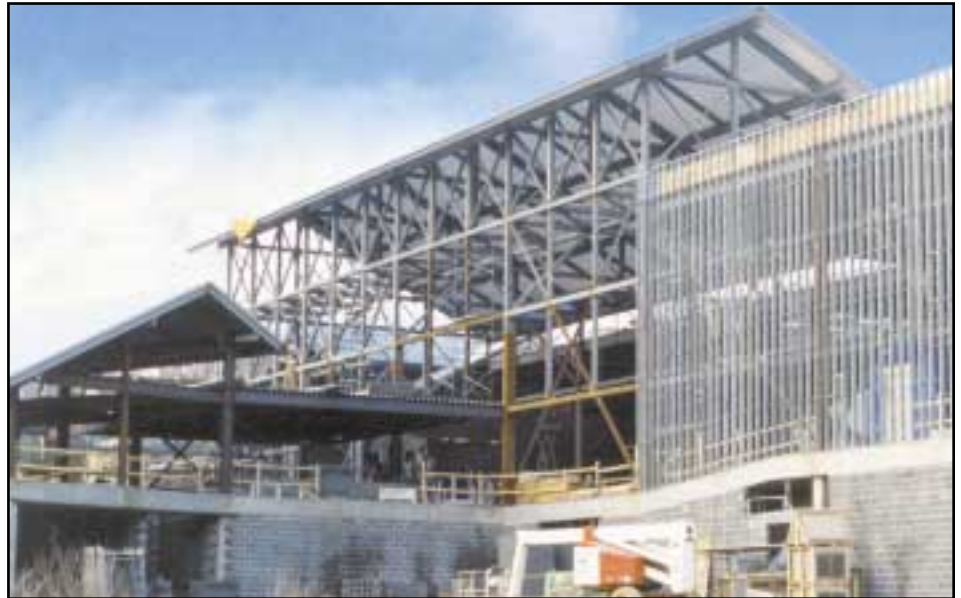
*HSS allowed Ripley's Aquarium of the Smokies to blend well with its surroundings.*

# HSS HELPS ARCHITECT MAKE AQUARIUM LOOK 'AT HOME' IN THE MOUNTAINS

When Ripley Entertainment, Inc. commissioned Helman Hurley Charvat Peacock Architects/Inc. (HHCP) to design its \$48-million, privately-funded aquarium in Gatlinburg, Tennessee, it was determined that the structure would blend in well with its surroundings in the popular Smokey Mountain resort town.

To meet that concern, Maitland, Florida-based HHCP turned to the mountains that tower above Gatlinburg on all sides, and to the area's heavy timber train trestles and farm buildings. A key material used in the striking design it developed was steel Hollow Structural Sections (HSS).

Situated in the center of Gatlinburg, Ripley's Aquarium of the Smokies opened in 2000 and gives visitors a multi-sensory sequence of experiences to see, hear and even touch sea life from all parts of the world. Its viewing tanks hold more than one million



gallons of water, most of it salt water, and thousands of marine animals.

The aquarium's unique design mimics the tilted rock striations formed millions of years ago when the Smokies were created. It evolved from conversations between HHCP's Vice President and Director of Design Michael K. Chatham, AIA, and Structural Engineer Mik Peller of Peller Associates, Cleveland. The design also reflects the image of heavy

timber construction while meeting the stringent safety requirements for a large, commercial structure.

## HSS Sets Building's Visual Theme

"We employed HSS as the principal image-generator or form-giver for the entrance canopies, the aquarium's main atrium and virtually all of the highly visible structural portions of the building," says Chatham, who served as Project Designer for the



structure. "Almost all of the HSS is exposed, although some is concealed by stone bases."

Eight-inch square HSS is used for the columns and roof trusses of the atrium.



For canopies and other entrance structures, HHCP used 6" square with 6" x 3" and 6" x 2" rectangular HSS. Wall thickness for the members ranged from 5/16" to 1/2".

In all, about 70 tons of HSS was used in the structure.

Much of the aquarium's unique appearance results from the HSS roof trusses, which have an offset gable shape that matches the tilted thrust of rock in the mountains. "The trusses are key to the imagery of the whole project," Chatham says. "They give the structure a really dynamic appearance, and we've repeated that motif throughout the project."

The main truss is 44 feet in length and divided into four panels. The ridge is 11 feet from one end, with a gradual slope to the other end of the truss.

Basically that creates the appearance of an off-centered gable, with one fourth of it on one side and three-fourths on the other.

### Ease of Connection, Strength Also Factors

"HSS was selected principally because it helped us achieve the real solid look and imagery of timber construction we wanted the structure to have," Chatham says. "It also was helpful to us in detailing those elements and in making the connections to other parts of the structure."

The high strength-to-weight ratios of HSS was another key factor.

"Early on we had sketched the desired proportions of the trusses and columns, and we were concerned what would happen to them when we got to

the actual engineering," Chatham notes. "Amazingly, thanks to the strength of HSS, Peller Associates was able to achieve exactly the look we had originally wanted."

Chatham says that most of the HSS connections are welded, although there are some bolted connections. "We were concerned about duplicating the appearance of timber, so all of the welds were ground down almost smoothly. The appearance is fantastic." Much of the structure was shop-fabricated into assemblies and then trucked to the site.

Ripley's Aquarium of the Smokies is the second such facility to be built by the entertainment firm. Its first aquarium opened several years ago in Myrtle Beach, South Carolina, and Ripley Entertainment is planning on opening additional aquariums.