



“Totally bewitching, it grabs hold of your senses long before you find the words to articulate what it has accomplished.”

—Paul Dannels

The challenge of designing a Hall of Fame for NASCAR? Capturing the essential spirit of NASCAR racing in architectural form. In exploring the possibilities for expressing speed and spectacle, the architect and structural engineer were drawn to the arena of action, the racecourse, where fans and race teams come together each race week for the experience of race day. Curving, sloped forms are evocative not only of the dynamic and changing sinuous shape of the racetrack but also the perception of speed, which, of course, is at the heart of any race.

The expression of these forms could only have been achieved through the use of steel, both as cladding and structure, encompassing several long-span and architecturally exposed structural steel (AESS) elements and employing innovative approaches to connections, detailing and the interface of structural steel with stone, glass and steel as a finish material.

The Hall of Fame consists of four basic elements:

- ▶ A large glazed oval shape forming a Great Hall serves as the symbolic core of the Hall of Fame
- ▶ A rectangular volume houses visitor services, including entry and exhibit space on upper floors
- ▶ A Hall of Honor is situated as an iconic element within the Great Hall
- ▶ A broadcast studio enlivens the Hall of Fame Plaza, the sweeping forecourt that welcomes visitors

Design explorations of speed and spectacle evolved into an architectural element, the Ribbon that envelops the full-block building in a form that speaks to the imagery and spirit of NASCAR. Beginning as a curved, sloping exterior wall enclosing the building, the Ribbon twists in a free span over the main entry to form a welcoming canopy. Long, thin incisions in the metal skin, which are animated by running lights in colors that represent those of recent race winners,

are analogous to the blur of a car racing past the spectator at tremendous speed. Within the Great Hall, a signature element of a curved, banked ramp leads the visitor from the main floor to exhibit levels above. The ramp contains a display of race cars frozen in a moment from a race, capturing in another way the speed and spectacle that is the essence of the sport.

The selection of material for the Ribbon was critical to realizing the design intent. The team drew on another aspect of the world of NASCAR—its technology—and was inspired by the process of shaping raw sheet metal to form the body of the race car. This fundamental element has underlain all NASCAR race cars since the beginning of the sport. From a design point of view, metal imparts a light and airy feeling to the architecture. As the cladding material the stainless steel softly reflects light and accentuates the dynamic aspect of the Ribbon as its sculpted form changes around the building.

Technically, there are tremendous benefits to the use of steel. Its lightness as a cladding element allows structural support to be minimized and makes it possible to achieve the great span over the main entry. The lightweight sub-panels are easily assembled into unique shapes following computer-generated geometry, and the shingled application of the finished stainless skin panels are a natural solution to the complex problem of installing a durable finish on a curvilinear, warped surface.

The Ribbon takes the form of a mobius, a continuous closed surface with only one side, formed from a rectangular strip by rotating one end 180° and joining it with the other end. The Ribbon is constructed using 165 prefabricated sub-panels and more than 5,000 stainless steel skin panels. At the twisting canopy over the main entry, the Ribbon free-spans 158 ft and weighs 157 tons, with a 4-ft-diameter, 1½-in.-thick internal support pipe with W-shape cantilevers



...serving as its backbone. At the ends of the twisting free-span, significant reactions result from the action of gravity, wind, snow, ice and temperature. At one end the Ribbon is anchored to the braced frame at the perimeter of the Great Hall. At the other it is anchored to a concrete shear wall through a large embedded plate with closely spaced deformed bar anchors and shear studs. At the top half of the embed plate, four 1 $\frac{3}{8}$ -in. Dywidag post-tensioned re-bars provide a clamping force between the embed plate and the concrete wall. Developing the underlying structure, coordinating it with the primary structure of the building and resolving issues of deflection, thermal expansion and construction tolerance were achieved through an intensive design and engineering process that used the latest in BIM technology. Close coordination among the architect, structural engineering team and design-build contractor of the Ribbon was critical to success. The result is a unique iconic form, emblematic of the sport it celebrates, and the defining symbol of the facility.

The structure's significant spans were achieved with structural steel trusses:

- A set of trusses spanning 175 ft achieve a grand column-free ballroom
- A 100-ft-long, bi-level footbridge, supported by a pair of one-story-deep trusses, links the ballroom with the existing Charlotte Convention Center
- Two- and three-story-high trusses cantilever 30 ft over the broadcast studio.

One of the most significant AESS elements in the project is the Vierendeel frame supporting the glass façade of the Great Hall. The lateral-load-resisting system at this façade also functions as the braced frame that supports the Ribbon.

The structural bid set was issued six months before the 100% CD set. The steel tender was divided into multiple

packages to enable detailing and fabrication of portions of the project to proceed before the full design was complete. A 3D Tekla model was used in the steel detailing to identify and resolve potential conflicts in the field. These efforts and effective team communication allowed the long scheduled public opening to occur on time.

#### **Owner/Developer**

City of Charlotte; NASCAR Hall of Fame, Charlotte, N.C.

#### **Owner's Representative**

NASCAR, Charlotte

#### **Architects**

Pei Cobb Freed & Partners LLP, New York  
Little Diversified Architectural Consulting, Charlotte

#### **Structural Engineer**

Leslie E. Robertson Associates, RLLP, New York

#### **General Contractor**

BE&K Building Group, Charlotte, N.C.

#### **Design-Build Contractor for Ribbon**

Zahner, Kansas City, Mo.

#### **Steel Fabricator and Bender/Roller**

SteelFab, Inc., Charlotte (AISC Member/AISC Certified Fabricator)

#### **Steel Detailer**

Hutchins & Associates, Clemmons, N.C. (AISC Member)

#### **Steel Erector**

Williams Erection Company, Smyrna, Ga. (AISC Member/AISC Advanced Certified Erector)

#### **Photographs**

Paul Warchol Photography, Inc.