School Days

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Photography by Chris Casler

An attractive new Florida high school provides not only education, but also a memorable structure.

WHEN YOU THINK BACK TO YOUR HIGH SCHOOL YEARS, what do you remember? For most of us, we first recall our friends, our teachers, and the experience of becoming an adult with newfound challenges and privileges. Sure, we remember the building(s) we entered and exited every school day, but did it have any affect on our education? For some of us, yes, but for most of us, probably not. For those of us that went on to become architects and engineers, we can assist teachers and administrative personnel in the schools we design to develop a sense of pride in their buildings—and perhaps even give students buildings that they'll remember as adults.

Perhaps Suncoast Polytechnical High School (SPHS) in Sarasota, Fla. will become such a school. The school, which opened last August, is very different from the traditional high school, and nothing like the vocational/tech schools of the past. It is organized using the small learning community concept and allows for a seamless integration of core curriculum subjects and career technical education. The flexible and easily adaptable spaces accommodate both group and individual learning styles, which increases collaborative learning. The 600-student station high school contains 16 classrooms and four science laboratories, fine arts and technology education laboratories, raised access flooring, wireless internet access, a grand "Forum" area, and a 10,000-sq.ft outdoor gymnasium.

The school is the first phase of the 72-acre Sarasota Technical Center campus, a complex that will update the existing 40-year old campus over a five-year span to provide training and educational opportunities for the Sarasota community.

Exterior

The first thing that we typically look for when approaching a building for the first time is the signage as an indication that we are at the right place. In the case of SPHS, this sign is actually part of the structural system. The AESS hollow structural section (HSS) members that house SPHS's main signage became the creative result of a lateral bracing issue for the main front wall, which was caused by a continuous window the full height of the tower. This

above left: The signage for Suncoast Polytechnical High School is actually part of the structural system.

above right: Expressive pillars transition to the building's entrance overhang via architectural HSS.

Schenkel Shultz Architecture

left: The site plan for the 72-acre Sarasota Technical Center campus. SPHS is the yellow building.

below: The "Forum" of the building is a showcase for AESS and SmartBeams, which have round holes in the web to allow building services to pass through the beams instead of below them.

"structural signage," spelling out "SPHS," allowed the window to exist and fill the otherwise utilitarian stairwell with natural light.

Further creating a memorable entrance is an expansive roof overhang that creates a unique architectural identity using rectangular HSS members, a thin fascia, and a tapered soffit. The overhang tops five eye-catching yellow cast-in-place concrete pillars that are inspired by the school's "five pillars of education": Quality, People, Service, Resources, and Safety. The span between the curtain wall and the five pillars forced the architect to use deep yet efficient HSS members than what could be squeezed within a rather slender tapered soffit. Instead of increasing the depth of the soffit, the architect chose to highlight the structural members by expressing them as the "five fingers of education" that emerge from the bottom finished surface to visually grasp the front portion of the overhang.

The expansive curtain wall, braced by horizontal HSS wind beams, of the main entry into the school provokes an uplifting invitation to the building and allows students to interact with one another from both levels through the opening of the floor plate at the curtain wall. The space also becomes a "lantern" for those driving by after dusk.

Forum Area

Inside the building, the AESS members frame the "Forum" ceiling neatly and cleanly due to the notable absence of bridging, ductwork, fire sprinklers, and conduit. The spans of the Forum roof beams vary due to the splayed wall lay-out, but instead of varying the member sizes, one member size was chosen and the wall thickness was varied to achieve the necessary strength and stiffness while maintaining economy. Dapping the ends of the beams so that an "underslung" arrangement was achieved allowed for similar detailing as when a bar joist has an extended end. It allowed the edge of the overhang to be thin and unobtrusive. The metal roof deck of the Forum space is an acoustical/cellular type deck with a perforated flat bottom to further accentuate the clean lines and absorb sounds thereby reducing echoes. Plans for an upcoming phase include suspending an elevated interior walkway from the roof with exposed stainless steel cords. The roof beams are SmartBeams, which have round holes in the web to allow fire sprinkler lines and electrical conduit to pass through the beams instead of below them. The SmartBeams are fabricated from standard structural steel wide-flange shapes that are cut longitudinally in a quasi-sine wave pattern at the beam mid-depth to form two pieces. The two pieces are then spread apart, shifted longitudinally with respect to each other and welded back together, thereby increasing the beam depth approximately 50% and the strength and stiffness by approximately 40% while maintaining the same weight. While traditionally used in composite floor systems, we feel that SmartBeams offer an alternative to standard wide-flange shapes for long-span roof systems as well.

The second floor framing is composed of a 3-in. galvanized composite metal deck with 3½ in. of normal weight concrete above the flutes (6½ in. total thickness), which provides a one-hour "unprotected" deck fire rating and excellent vibration characteristics. The concrete slab was reinforced with a blend of steel and polypropylene fibers, with additional mild reinforcing added over the girders to control cracking. The deck bears on composite structural steel beams spaced approximately

10 ft. on center. The beams were cambered an amount equal to 80% of the calculated pre-composite dead load deflection. The filler beams and girders that frame to columns have an inherent greater connection rotational stiffness when compared to the filler-beam-to-girder connection, so a reduced camber is sometimes specified. After careful review of the anticipated pre-composite deflections, we came to the conclusion that we could ignore the differences in the connections, so we chose not to deduct any camber from members connecting to columns. Feedback from the field confirmed our decision, as the floor beams and girders deflected as anticipated so that the specified camber was forced out of the members by the weight of the wet concrete.

The floors, both slab-on-grade and elevated, were recessed in areas to receive access flooring to facilitate easy wiring of the data systems. Consequently, some areas of the elevated floor had to be thicker than the standard 6½ in. because the recessed areas have little relationship to the beam locations. If a step in the slab occurred midway between beams, the recessed slab would be 6½ in. thick but the main slab would be 10½ in. thick if the recess is 4 in. deep. The additional dead load due to the thicker than normal slab was easily accounted for in the RAM Structural System model.

The roof framing consists of a 1½-in. galvanized G90 metal roof deck spanning between open-web bar joists spaced approximately 5 ft on center. This deck was not exposed to view, so a standard wide-rib deck was used and cellular lightweight insulating concrete was placed on it.

In all, 350 tons of steel was used in the building.

Visual Memories

We need to remind ourselves of the importance of how structural elements can creatively enhance architecture and create a greater experience for its intended use, an experience that provokes a clear identity, a sense of spirit, and visual memories—all of which create a strong foundation for students' bright futures. We like to think that SPHS is such a building. MSC

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