

Marshall University's growing  
engineering program gets a big boost from its upcoming facility.

# Engineering a Future

BY MARK TRIMBLE, P.E., AND MATT HORNE, P.E.

**"SLIDE RULES, T-SQUARES AND TRIANGLES;** those were my tools," recalls Roy Maynor from his days as a freshman engineering student at Marshall College (now Marshall University) in 1948.

In the years following World War II, many servicemen, hoping to live the American dream, were enrolling at colleges thanks to the G.I. Bill.

"One-hundred-twenty-five students were in my freshman class, but by 1952, calculus and physics had cut our ranks to just the ten of us who received our general engineering degrees," he recalls. His classes included strength of materials, structural design and structural drafting, all of which prepared him well for his future in steel fabrication. The school's engineering program, housed in a two-story wooden military building, did not have an engineering laboratory.

Maynor eventually joined Huntington Steel and Supply Company (like Marshall, also in Huntington, W.V.) in 1972 as structural division manager and helped lead the company, long known for boiler and non-structural work, into the structural market. Unfortunately, not long before he joined the company, his alma mater's engineering program was dismantled due to budget constraints.

## The Comeback

Fortunately, it got a second chance.

The initial plans for bringing back Marshall's engineering program were developed in the mid-1990s with the creation of the College of Information Technology and Engineering (CITE).

"Once the college was created, alumni of the former engineering program started to believe that engineering really was coming back to Marshall," explains Betsy Dulin, current professor of engineering and former dean of CITE during its formative years. "The four-year undergraduate degree program was built on the 1997 merger between Marshall's 'pre-engineering' program and West Virginia Graduate College's graduate program. During the intervening years, Marshall University's leadership, alumni, the business community, benefactors and government leaders worked hard to make the program a reality."

In 2006, under the leadership of current president Dr. Stephen J. Kopp, the Bachelor of Science in Engineering program was approved by Marshall's Board of Governors and began admitting students. The program was accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET) in 2010 and currently enrolls close to 200 students.



- The monumental stair is supported by exposed W18x76 kinked stringers that span between floors.



Bastian & Harris, Hastings+Chivetta Architects



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- ◀ The 145,000-sq.-ft. four-story Arthur Weisberg Family Applied Engineering Complex will open in 2015.
- ▼ One of the staircases after installation.



Huntington Steel

“The strong support we have received from the community combined with a growing number of applicants seeking admission provide clear indications affirming the strategic decision made by the administration and the Board of Governors to invest and expand Marshall’s College of Information Technology and Engineering,” notes Kopp.

### New Digs

That support includes a brand-new complex, with steel fabricated by Huntington Steel. Named for the late Arthur Weisberg, a local businessman and philanthropist who provided significant funding for the facility, the 145,000-sq.-ft. four-story Arthur Weisberg Family Applied Engineering Complex is currently under construction. According to Dr. Wael Zatar, Dean of CITE, the new complex will not only provide facilities for substantial development of engineering areas like mechanical engineering, electrical engineering

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BBL Carlton

- ◀ The reaction floor anchors for the Advanced Materials Testing Lab were designed to support test loads of up to 100 kips apiece.
- ▼ There are 261 in all.



Bastian and Harris

### Valued Partners

In addition to Huntington Steel fabricating the structural steel for Marshall's new engineering facility, the company is also currently working with Marshall to promote a true internship/work-study program whereby students receive school credit for work within the steel industry—and it currently employs multiple Marshall graduates and students.

Tanner Johnson, Huntington Steel's structural fabrication manager, completed his mechanical engineering degree at West Virginia University, but he started at Marshall. (This was in the early stages of the CITE before a full engineering degree was possible at the university.) Johnson champions the revival of the engineering program and is glad that students now have the opportunity to complete an engineering degree at Marshall.

"Now that the program is on its way back, we are beginning to see its benefit for the university and Huntington Steel," he says. "Our company has provided and received tangible benefits through our partnership with the university. We have sponsored Marshall's team in the National Student Steel Bridge Competition and watched with excitement as

they prepared for their first trip to the finals in Seattle. Students and faculty members have toured our facility, observed the project management process and been on the shop floor—touching beams and columns that will be part of the structure soon to be home to their engineering program."

"Huntington Steel has benefited as well," Johnson adds. "Currently, we have three students who are paid interns—two who are in engineering and one in the safety technology program. All three have spent time on the shop floor learning the ins and outs of how a fab shop works. The steel industry will benefit from the knowledge and experience they gain."

Zach Marsh, a second year civil engineering student at Marshall, is working full time at Huntington Steel and attending classes in the evening, thanks to the company's tuition reimbursement program. "Working in the shop has helped me appreciate my classwork, and after I graduate my learning curve won't be so steep," he says. "I see the shop drawings coming out to the shop floor and see how our guys turn a drawing into a finished product. This helps make my engineering classes come to life."

and bioengineering, but will also enhance Marshall's capabilities in specific engineering sub-disciplines such as environmental engineering, transportation engineering and structural engineering.

"The new building is going to have a lot of purposes," adds Dulin. "The common thread that runs through that is putting programs and people together who are now spread across all parts of the campus."

The building is comprised of two separate structures that are isolated by an expansion joint. To the west is a two-story structure that will primarily house the Advanced Materials Testing Lab (AMTL) and to the east is the four-story main building that will house offices, classrooms and laboratory space. The project was perfectly suited for structural steel due to 50-ft-long spans at the AMTL, large open atriums featured at the entrances and numerous setbacks in the exterior building faces. Wide-flange columns with composite beam floor framing were used as the gravity load supporting system. W14 beams and W21 girders comprise the typical floor framing. For the laboratory space holding sensitive equipment, W16 beams and W24 girders were used to keep floor vibration velocities below 2,000  $\mu$ -in./sec. Moment frames comprised of W12 columns and W24 beams laterally brace the building in the east-west direction, and concentrically braced frames comprised of W10 columns and square HSS braces were used for the north-south lateral load resisting system.

The architectural design transforms the building into an active engineering learning environment by exposing the structural framing at the AMTL, stairs, atriums and entrance canopies. The atriums and stairs feature architecturally exposed structural steel (AESS) HSS columns and beams that laterally brace the continuous curtain wall extending 60 ft high. The monumental stair, located at the heart of the building between the north and south entrances, is supported by exposed W18x76 kinked stringers that span between floors.

The 5,100-sq.-ft AMTL, which will bring state-of-the-art testing capabilities to Marshall's new engineering program, features a 3-ft-thick concrete reaction floor, 4-ft thick L-shaped post-tensioned concrete reaction wall and 20-ton bridge crane. Huntington Steel and structural engineer Schaefer collaborated extensively

on the fabrication of the reaction floor anchors, which were designed to support test loads of up to 100 kips per anchor. Through this teamwork, anchor components were evaluated from multiple suppliers resulting in the most cost-effective fabrication possible for the 261 floor anchors.

### Evolution of an Engineering Program

The future of Marshall's engineering program is being revealed day by day in tandem with the construction of its new home and an ongoing partnership with the structural steel fabrication industry. When it opens in 2015, the Applied Engineering Complex will feature 1,000 tons of structural steel, the fabrication of which several engineering students and faculty were able to witness at Huntington Steel's facility just down the road from the university.

"This is a new era of engineering at Marshall and we are extremely proud of our faculty and students," says Dr. Kopp. "This pride is fueled by the exceptional success of our students and graduates in this high-demand program and the amazing new engineering complex that is under construction." **MSC**

#### Owner

Marshall University, Huntington, W.V.

#### General Contractor

BBL Carlton, Charleston, W.V.

#### Architect

Bastian & Harris, Charleston, W.V.

#### Associate Architect

Hastings+Chivetta Architects, St. Louis

#### Structural Engineer

Schaefer, Cincinnati

#### Steel Team

##### Fabricator

Huntington Steel & Supply, Huntington, W.V. (AISC Member/AISC Certified Fabricator)

##### Detailer

International Design Services, Inc., Maryland Heights, Mo. (AISC Member)