

What's COOL in STEEL

It's August again, and you know what that means: MSC's **What's Cool in Steel** list is here! Every year we put together a list of interesting and fun people, buildings, structural elements, and other odds and ends associated (sometimes, very loosely) with steel. This year's Cool List includes a new take on AISC's Steel Sculpture, a staircase that appears to defy gravity, a unique house in the Colorado Rockies, a comprehensive online learning program, and... a dinosaur! Enjoy!



Chas McGrath

COOL STAIRCASE

Raising Stairs to a New Level

True originals are difficult to find in any field, but the grand staircase that ties the 10th, 11th, and 12th floors of structural engineering firm Walter P Moore's new Houston headquarters is like no other. In classic "form follows function" fashion (try saying that three times fast), the fundamental elements of a stair also function as part of the structural system.

The backbone of the innovative staircase is the two wide-flange W16x57 structural steel columns, which anchor the system. Seemingly defying the laws of physics, 11 high-performance precast concrete treads and riser stair units cantilever diagonally over 25 ft to just above the landing below, floating 6½ in. above the bottom landing.

To support the stair, two 1½-in.-diameter tension cables combine with two 1½-in.-diameter PV-150 fully locked steel coil cables 8 in. apart to form the top tension chord of a Vierendeel cable-concrete truss. Eleven 3½-in. mild steel rods (A36), spaced 22 in. apart at every other stair tread, form the vertical posts of the truss.

By supporting the stair at the top of the landing and cantilevering down to the bottom landing, tension is created in the top handrail elements and compression is created in the bottom tread elements, thus matching the available structural capacities.

One might expect vertical vibration in this case, but vibration is mitigated by a supplementary hanging tuned mass damper system. This vibration absorber, which is attached to each side of the stair between the first and second precast units at the bottom of the structure, provides the necessary motion control or vibration absorption to make the stair safe and comfortable to use, without the accelerations caused by people climbing and descending the stair.

Not only is the staircase, well, a staircase, it's also an interactive educational tool for employees and visitors; an accelerator attached to the stair and connected to a nearby computer plots the vertical motion in real time and displays it on a plasma screen at the 10th-floor landing.

COOL SCULPTURE

AISC's Steel Sculpture Becomes Personal

BY BRUCE HELMREICH

Last year marked the 50th year of service to the Michelmann Companies of Quincy, Ill. from William F. Gerdes III, P.E. Bill joined Michelmann Steel Construction Company in 1957 after graduating from the University of Illinois and eventually became president in 1975. In 2006, the presidency was turned over to his daughter, Laura Gerdes Ehrhart, but he remains as chairman of the board.

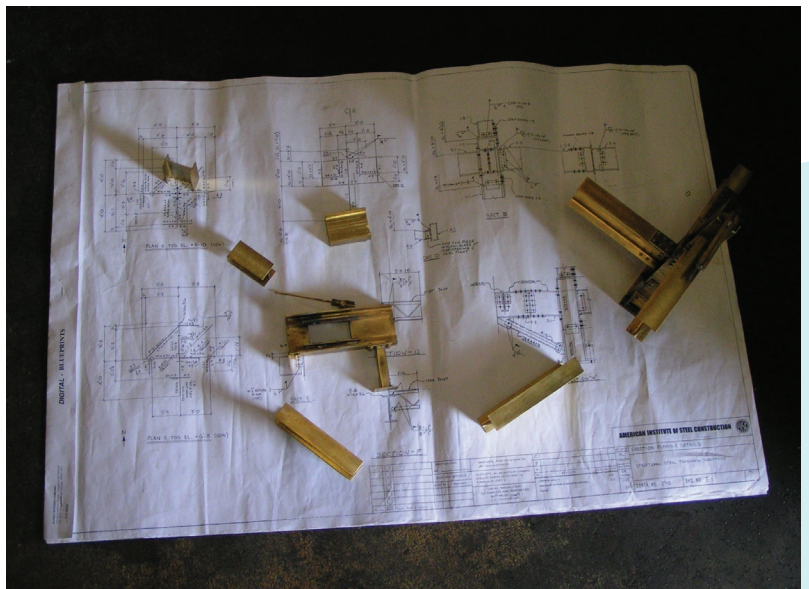
Commemorating a milestone as significant as 50 years of service required something special. In this case, it was the AISC Steel Sculpture. Bill had the drawings for the sculpture in the office for several years, and mentioned it frequently. Knowing the meaning the sculpture held for her father, Laura decided to complete a full-size version, to be mounted in front of Michelmann's plant.

She also asked a long-time employee (me) to make some sort of model to be presented to Bill at a surprise luncheon. I talked to my brother-in-law, Bob Tangerose of Tri-State Tool and Die of Golden, Ill., about the possibility of machining the shapes from solid brass. Bob welcomed the challenge and offered the use of his shop. My son Ryan and I, with Bob's help and equipment, machined the parts.

The brass model is 1/8 scale of the original sculpture (1 1/2 in. = 1 ft). The shapes were machined from brass bars, and approximately 90% of the brass ended up as metal chips. The finished shapes were then polished on a buffing wheel, cut to length, drilled, and assembled. Silver solder and regular solder were used for "welded" connections. The "bolted" connections were made with scale brass hex bolts and nuts. The finished sculpture is mounted on a marble base using brass anchor rods drilled and epoxied into the marble. A piece of shaped wood painted gray is used for the "grout." The model took many more hours to build than the full-size sculpture, because each section had to be machined to shape before it could be "fabricated." Bruce assembled the model using needle-nosed pliers and miniature sockets and wrenches.

The full-size sculpture, built by Michelmann Steel, is mounted on a busy street corner across from the Michelmann fabrication shop in Quincy. Both sculptures were featured on the PBS TV show "Illinois Stories," with host Mark McDonald, this past February.

Bruce Helmreich is project manager with the Michelmann Companies.





COOL SCULPTURE, PART II

Fossilized and Galvanized

Inspired by the American Galvanizers Association's (AGA) rustsucks.com advertising campaign, the staff at Bristol Galvanizing in Bristol, Va. decided to develop "T-Rex" as a part of a new marketing concept of their own.

The company brainstormed marketing slogans and decided to develop a concept around the idea of hot-dip galvanizing as a long-lasting coating. Going with the long-lasting theme, as well as considering the long history of using galvanizing to protect steel, the concept of a dinosaur emerged. Continuing down this path, Bristol developed the slogan: "Don't let your steel become extinct." Customers donated steel—pipe, rod, bolts, nuts, etc.—to help create the dinosaur. Zophia Kneiss Farrier of Burning Art listened to their ideas and welded them into reality, creating the T-Rex sculpture.

T-Rex, which has garnered an AGA Excellence in Hot Dip Galvanizing Award (in the Artistic category), now stands outside Bristol's galvanizing plant for all to see and has become quite a landmark and photo opportunity. In addition, the new slogan and images of the T-Rex have been incorporated into all of the company's marketing materials, providing Bristol Galvanizing a creative and unique marketing centerpiece that will hopefully be as long-lasting as the steel it dips.



COOL HOUSE

There's Steel in Them Thar Hills!

BY GREGORY R. KINGSLEY, P.E., C.C.E., PH.D.

When it comes to mountain retreats, on one end of the spectrum would be the quintessential, rustic log cabin. On the other end might be, say, a 12,000-sq.-ft, two story, single-family home made of steel, glass, and concrete. The latter was the vision of architect Antoine Predock Architect PC, Albuquerque, N.M., in designing a private residence in a mountain valley in Colorado.

The architect drew inspiration from the interplay between the geological formations and rising aspen groves that cover the site. The home's geometric form is in sync with nature and the structure appears to rise from the earth as displaced stone and glass strata. As a result of this design, the home has little expression of a traditional vertical façade, but rather it is a series of sloped extensions that are in harmony with the surrounding mountains.

The lower level of the home is composite steel construction, the main level is a conventionally reinforced concrete flat slab, and the roof is a combination of non-composite steel beams supporting steel deck and titanium cladding or composite steel beams supporting a composite concrete slab and split-face granite stones.

Porte Cochere

Designed by structural engineering firm KL&A, Inc., the home uses exposed steel in several locations throughout, and there are several steel highlights.

One is the 72-ft free-span port cochere that projects like a wing to the east of the main building and connects to a small landscape storage building. The roof was limited to a maximum structural depth of 24 in. for architectural reasons. To withstand mountain snow loads, the roof is supported by five W21x93 beams at approximately 5 ft on center. The inner three beams are continuous across the storage building to provide a "fixed-end reaction" and stiffen the whole system. As a result of these beams being continuous, field-welded moment splices were required, and some of the beams were more than 87 ft long.

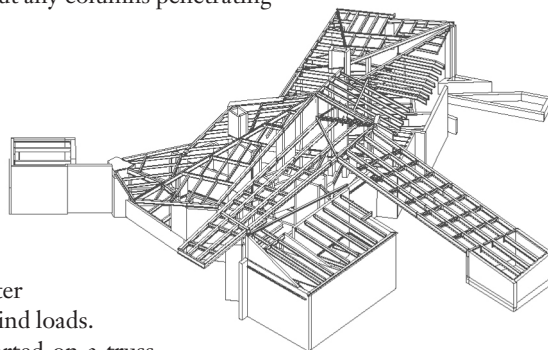
Steel Roof Arch

Five roof planes all converge at one point over the family room. The vaulted ceiling in this space provides a 32-ft ceiling height without any partition walls to conceal a support column. The roof planes are all supported on a steel arch that bridges this volume. The steel arch is built from W14x82 sections, and the lateral thrust is resolved through an architectural concrete moment frame and concrete shear wall that are tied at the second level through the concrete slab with mild reinforcing. This integration of steel and concrete allows the maple-clad ceiling surfaces to hover above, mirroring the roof planes, without any columns penetrating the grand space.

Family Room Window and Catwalk

The west wall of the family room is a 30-ft-tall wall of glass with a walkway connecting the main volumes of the house with the master suite. The mullions of the window system are actually structural steel columns built into a trapezoidal section from 3/8-in. stainless steel plate. These vertical "mullions" span from the main level to the roof and provide support for the west edge of the catwalk and the panes of glass that open to the pond.

The catwalk serves a dual purpose in being a walkway to connect the master suite to the rest of the house and as a lateral brace for the window wall to resist wind loads. The walking surface of the catwalk is transparent laminated glass plate supported on a truss built from solid 1-in. x 3-in. stainless steel bar. The east side of the catwalk is a vertical truss built from the same stainless steel bar and bears on Teflon pads to allow for both thermal and load-induced deflections.



KL&A, Inc.

Gregory R. Kingsley is president and CEO of KL&A, Inc.



Photos: Timothy Hursley



AISC eLearning

COOL LEARNING OPPORTUNITY

Class is in Session

BY SHANNA QUINN

While not a physical manifestation of steel, we think the AISC Continuing Education program is worthy of the Cool List this year. After all, the program brings the finest steel-related seminars to a city near you, to your company, and now even to your desktop! AISC eLearning is part of the continuously expanding suite of AISC continuing education programs, which is focused on providing you with the knowledge and tools you need to confidently choose steel.

What sets AISC eLearning apart from other online continuing education offerings is our combination of the highest quality content with the best value. AISC eLearning provides all engineers, from recent graduates to seasoned professionals, the exciting opportunity to learn from the experts in steel design and construction. We bring you the biggest names, like Duane Miller, Jim Fisher, Larry Griffis, and Ted Galambos, all with a click of your mouse. What's more, AISC eLearning courses are free to view, so you and all of your colleagues can watch and re-watch your favorite lectures again and again! If you need a CEU/PDH certificate, each course offers the option to purchase one after passing a short test; the cost for this ranges from only \$25 to \$100 for AISC members.

Divided into three distinct sections, the AISC eLearning portal on AISC's web site, www.aisc.org, allows you to customize your online education activities. Each section covers a variety of topics, credit hours, and media, with some courses being video-based and others publication-based. This variety allows almost anyone to meet the various educational and accreditation requirements that are applicable throughout the 55 licensing jurisdictions.

The three types of programs are:

Boxed Lunch (1 -1.5 credit hours)

These are 60- to 90-minute presentations focused on shorter topics or introductory information on longer topics. Although they can be viewed any time, these programs make great lunch-time viewing. Many companies have scheduled all-staff seminars and projected the Boxed Lunch program on-screen in the company conference room. A new Boxed Lunch presentation debuts about once a month.

Webinars (6 credit hours)

These are longer presentations that can be downloaded in 30-minute segments, making it easy to view them segment by segment at your convenience. Every recently retired AISC seminar, including *Steel Design After College*, *Field Fixes*, and the popular *Bolting and Welding Primer*, is

currently available. If you missed these programs when they were on tour, or you want to revisit something you don't quite remember from the lecture you attended, it is now easy and convenient to view them. Taping for the next new webinar is currently underway. Look for the popular but now retired AISC seminar authored by Lou Geschwindner, *Design Steel Your Way with the 2005 Specification and 13th edition Manual*, which will debut this fall.

Extra Credit (1 - 3 credit hours)

You're already reading articles in *Modern Steel Construction* and AISC's *Engineering Journal*; now you can get CEU/PDH credit too! Extra Credit is a series of read-and-write test-based continuing education opportunities. Each one is based on a top-notch article from the pages *MSC* or *E7*. It's a great way to stay current and get the extra credit you deserve.

Continuing your professional development has never been easier—or more cost-effective. For more information visit AISC's eLearning web site at www.aisc.org/elearning. If you have any questions or comments, or would like to schedule a contract seminar, please contact us at seminars@aisc.org or visit www.aisc.org/seminars for more information. **MSC**

Shanna Quinn is AISC's education coordinator.