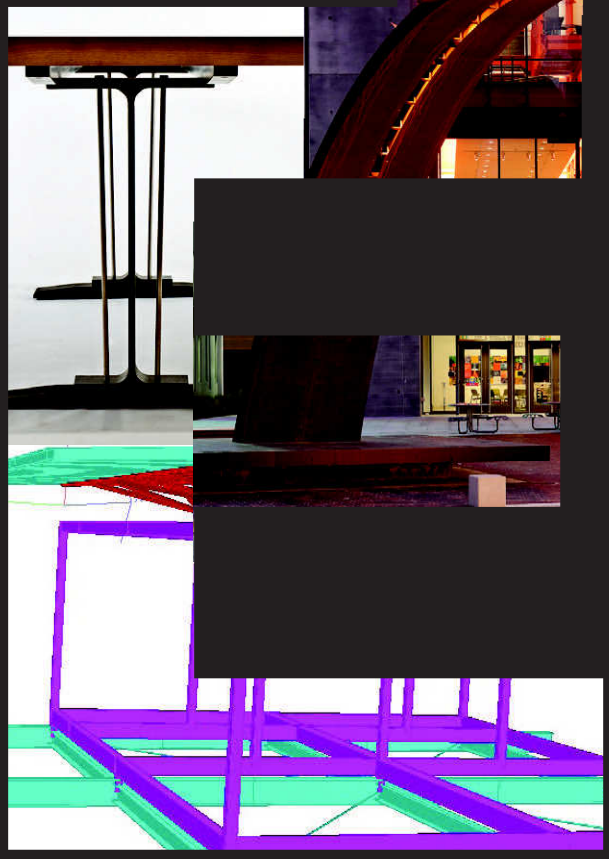
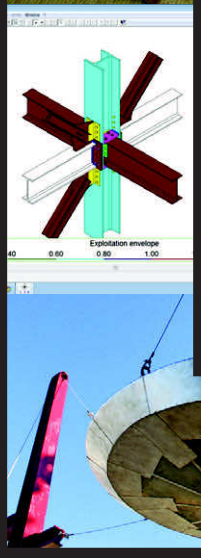
What's **Cool** in





Cool Sculpture

A Classic, Reinvented

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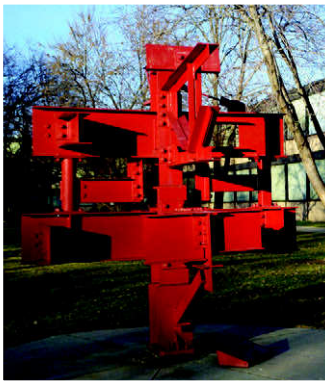


Photos, except above inset: Courtesy of Oregon Tech

LAST OCTOBER, AISC's Steel Sculpture turned 25. Since its beginnings in 1986 this teaching sculpture has been installed, in varying forms, at more than 130 locations around the world (see *MSC* 10/2011, p. 20). The original purpose of the sculpture (above, inset), as designed by Duane Ellifritt, was to help engineering students better understand structural steel by exemplifying the many methods of steel framing and their corresponding connections.

For more than five years, the Civil Engineering Department faculty at Oregon Institute of Technology wanted to add one of these sculptures to the school's campus in Klamath Falls. Knowing that their students could benefit greatly by seeing and touching—and in some cases deconstructing and constructing—various connections, the faculty sought funding sources to build the sculpture and began collecting components.

While some small commitments and in-kind donations were made over the course of a few years, the windfall support to complete the project came from a very timely source. Owens Hall, the building that houses the Civil Engineering Department, was due for deferred maintenance in the form of asbestos abatement and seismic retrofits at the same time that federal stimulus funds became available. As this resulted in a much larger capital project, it triggered Oregon's Percent for Art program, which required that 1% of the project's budget be spent on public art in or around the building.

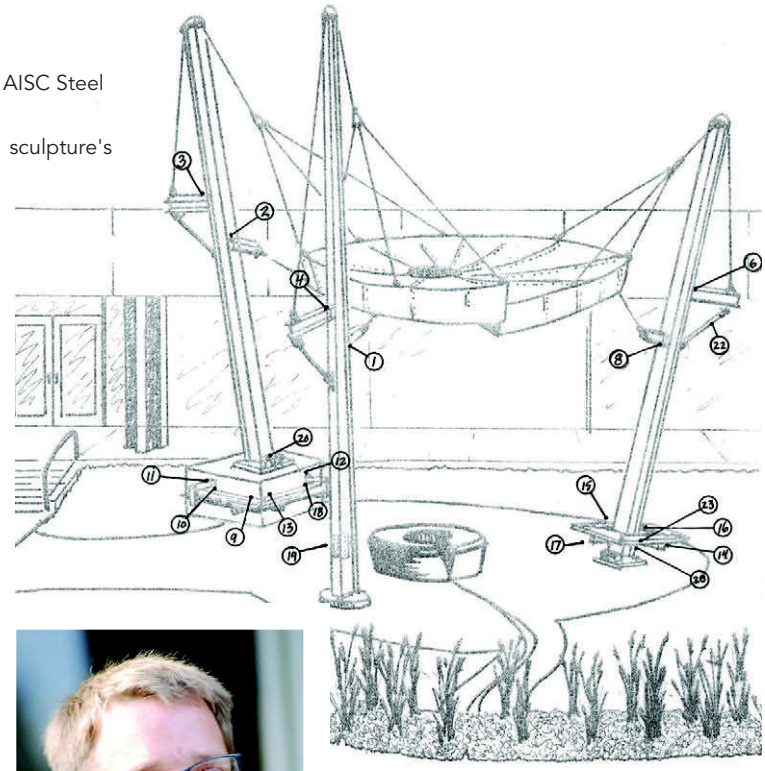
The program required a rigorous process coordinated by a representative of the Oregon Arts Commission—and involving a committee of architects, educators, students and artists—that led to the eventual selection of a local artist. Lee Imonen, a sculptor and art teacher at Lane Community College in Eugene, Ore., was chosen for his experience with large, construction-style art that focuses on its place in the community and the environment.

Imonen's vision for the sculpture resulted in a final design that would serve two purposes. The first was to follow Ellifritt's original idea of teaching structural steel connections; the sculpture incorporates 24 different types of steel connections. As the connections in the sculpture actually carry load, shear connections, moment connections and splices are placed where they are most appropriate and where analysis can also consider the load side of the equation. With the breadth of connection types from the original Ellifritt sculpture now provided in a format that requires structural analysis, this new version of sculpture is an valuable tool for improving the instruction of steel design for hundreds of civil engineering students at Oregon Tech. It can also be used as a basis for analysis and design problems in courses other than steel design, such as statics, engineering mechanics, structural analysis and even concrete foundation design.

The sculpture's second purpose is to serve as a place-based, artistic metaphor for the Klamath River basin, and virtually every element represents something. For starters, the sculpture includes a suspended basin that is roughly the same shape as the Klamath basin. This suspended form is covered in a patchwork of aluminum plates representing the rural community's patchwork of farms and land and the heavily engineered nature of the Klamath River watershed. The basin has a fracture in it, symbolic of the sometimes combative and opposing nature of the people and politics of the Klamath Basin, as well as the volcanic history of the area that formed the shape of

BASIN: A Steel Connections Teaching Sculpture. **Inset:** The AISC Steel Sculpture.

Top: A sketch of the sculpture. **Middle:** Lee Imonen, the sculpture's creator.



the surrounding earth. As with the river basin, the metal basin serves to collect and distribute water downward (or downstream). Water, and who owns the rights to it, has long been a contentious issue in the Klamath basin. Historically, conflicts over water have taken place between native tribes, farmers and ranchers and environmentalists who wish to protect the wildlife that depend upon the water. These three influences are represented by the three HP14x89 structural steel columns and W8x35 and W6x12 cantilevered beams that hold the basin and its water aloft and in tension via ½-in. galvanized steel cables. Each column pulls the water in its own direction, and yet each is necessary to keep the water from being lost altogether. In terms of equilibrium, the columns both support the basin and depend upon it for stability. In fact, dead load moments at the base of each column are zero as a result of Imonen's choice of 7.5° for the slope of the columns, based on aesthetic considerations, a serendipitous detail confirmed by the authors during design. Numerous other historical representations, such as wagon wheels and logging derricks, can be found in the sculpture, honoring the region's past while looking toward the future.

Ultimately, the entire structure is a metaphor for the delicate balance of the area's natural resources. It provides an opportunity to teach not only technical topics, but also important concepts regarding sustainability and the environment. Steel, in this form, is not merely a structural material with connections to be comprehended, but also a piece of the complex ongoing experiment of society.

While the erection of the sculpture was relatively simple, it involved a number of different groups. The main structural members were lengths of HP14x89 donated by Hamilton Construction of Springfield, Ore. (an AISC Member Fabricator). Imonen split and re-welded them to give them the tapered look and provide another opportunity to discuss the challenge of connecting steel to steel. Precision Structural Engineers, in Klamath Falls, donated time to review and seal the construction drawings. The university's facilities department and the faculty members involved donated time for design, permitting and inspection. Students participated in the base-plate and foundation design and drafting, and local ready-mix companies offered to pump and place the foundation concrete at cost. The collaboration between students, professors, engineers, contractors and artists is what made this project such a success.

BASIN: A Steel Connections Teaching Sculpture (the sculpture's formal title) was installed on the Oregon Tech campus in the summer of 2011. While it has a very different look and style than the original Ellifritt sculpture, it still serves the purpose of helping students to visualize complex steel connections—with the additional benefit of helping them think beyond the technical and consider more than just engineering, economy and efficiency; it encourages them to consider the social and environmental impacts of their designs as well.

The sculpture's dedication at Oregon Tech.