Drop it in

YOU KNOW IT'S A GREAT DAY when you top out a 4,600-ton structural steel project by dropping a 260-ft-long, 100-ton truss into place with 6 in. of clearance on either end, the client and other project big-wigs are watching, and the whole operation not only goes off without a hitch, but almost looks easy.

SME Steel Contractors' field manager, Mark Mundy, held his breath and watched as the two cranes lifted the giant truss at a twisted angle above the

The perfect placement of a massive truss tops off an athletic and performing arts facility in Idaho.

the Slot

STORY AND PHOTOS BY MICHAEL A. MOORE

BYU–Idaho's upcoming sports and performing arts facility uses 4,600 tons of structural steel. The facility will open in 2010.

roof line. Project ironworkers gently guided the 260-foot truss into alignment, as the cranes lowered it into place between a 120-ft-long king truss on one end and slots in pre-cast walls of the multi-use domed sports auditorium on the other. Mundy let out a big sigh of relief.

"That pick started months ago when the building was still in pre-design," he explained. "If we hadn't been working with the AEC team from the beginning, this topping out probably would not have happened today and it might not have gone as smoothly."

Complications, Above and Below

The story of the pick started several months before, when SME was asked by the design team to participate in the design and construction of a major sports/performing arts facility for Brigham Young University - Idaho's campus in Rexburg. Erection began in June of 2008 and will finish up this June; the project will open in 2010.

"We got involved when the structural drawings were still in the conceptual stage," said Jeremy Stam, SME's project manager for the Rexburg project. "This was not a normal fab and erect job."

According to Stam, space at the site was tight and SME had to deal with getting the trusses set before winter hit. In addition, a further complication came in the form of a set of tunnels that needed

Two dozen roof trusses were used in total for the gym and auditorium portions of the project.

to be put in place under the building. "If we had followed the normal ground-up construction sequence, we would have started hanging iron at the beginning of winter," he said.

"The decision was made that the sequence should be turned upside-down—that we build from the top to the bottom. That way we would have the concrete walls and steel trusses in place with a roof so that Okland [the contractor] could do their tunnels and concrete pours in a covered environment when the snow hit. And, it allowed us to maintain the tight temperature tolerances we needed for the trusses to fit into their slots in the concrete walls."

SME's contribution to the design process focused on how to streamline structural fabrication and erection from a field operations standpoint. Decisions on whether connections should be bolted or welded, fabrication and erection sequencing, optimization of material shapes, and how to best use scarce lay-down room that would get progressively smaller, were all made during the design and pre-construction phases, when it was possible to make changes without incurring major costs in time and money.

"Our involvement from the beginning definitely helped expedite the schedule," said Stam. "We even had our detailers share a Tekla Structures model with the precast guys so that everybody was working off the same page during the design phase."

A Tale of Two Fab Shops

SME made full use of their two major fabrication facililties in making the project happen on time. The home shop in West Jordan, Utah handled the job of fabricating the challenging trusses for the auditorium, which were to be totally field assembled. This meant that the proper angle of camber had to be built into each segment at the shop and then maintained during the field welding process.

Further north, SME's Pocatello, Idaho shop built the trusses for the gymnasium part of the building. Those trusses were built in three sections and pre-painted at the shop, then assembled on site by field ironworkers.

"Our detailers had to detail the field splices to create camber in the finished

piece," Stam said. "The detailer provided check dimensions so the field crews could check to make sure that the proper camber was maintained throughout each piece."

Stam also said that on-site quality control was a challenge, especially when the days and nights started to get cold. "If the camber had been out of tight tolerance, those trusses would not have fit into place, and you don't want to be making field corrections on a 260-ft-long truss hanging up in the air," he explained.

The day of reckoning for the SME team came on an overcast, cold day this past October when the 260-ft-long truss was carefully lifted high into the narrow slot of space remaining in the nearly finished roof of the gymnasium side of the project. Ironwokers walked the narrow top of the hanging truss, making last-second adjustments before signaling the crane operators to make the last short drop into the waiting slots of the concrete walls that had been designed and placed in perfect position and angle months before. When the signal came, the huge truss slipped smoothly into its new home. MSC

Architect
FFKR Architects, Salt Lake City

Structural Engineer
TSBA Engineers, Centerville, Utah

Steel Fabricator and Erector
SME Steel Contractors, West Jordan, Utah (AISC Member)

Steel Detailer
Global Structural Detailing Ltd., Edmonton, Alberta, Canada (AISC Member)

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