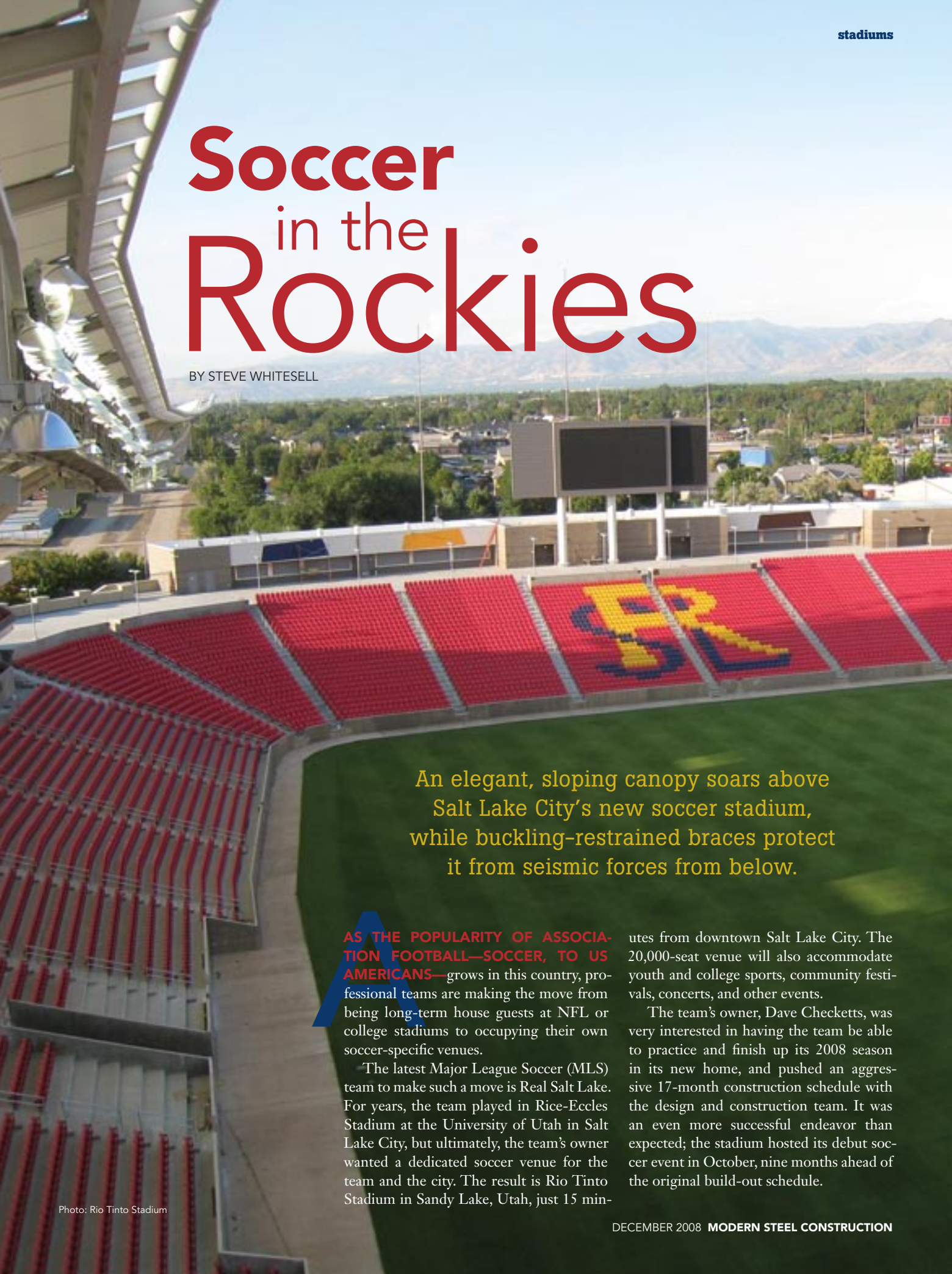
Soccer in the Rockies

BY STEVE WHITESELL



An elegant, sloping canopy soars above Salt Lake City's new soccer stadium, while buckling-restrained braces protect it from seismic forces from below.

AS THE POPULARITY OF ASSOCIATION FOOTBALL—SOCCER, TO US AMERICANS—grows in this country, professional teams are making the move from being long-term house guests at NFL or college stadiums to occupying their own soccer-specific venues.

The latest Major League Soccer (MLS) team to make such a move is Real Salt Lake. For years, the team played in Rice-Eccles Stadium at the University of Utah in Salt Lake City, but ultimately, the team's owner wanted a dedicated soccer venue for the team and the city. The result is Rio Tinto Stadium in Sandy Lake, Utah, just 15 minutes from downtown Salt Lake City. The 20,000-seat venue will also accommodate youth and college sports, community festivals, concerts, and other events.

The team's owner, Dave Checketts, was very interested in having the team be able to practice and finish up its 2008 season in its new home, and pushed an aggressive 17-month construction schedule with the design and construction team. It was an even more successful endeavor than expected; the stadium hosted its debut soccer event in October, nine months ahead of the original build-out schedule.

Photo: Rio Tinto Stadium

Roof framing before canopy installation.

Photos: Rio Tinto Stadium

Erection of the canopy framing.

Multi-Jointed Collaboration

Facilitating the accelerated schedule was general contractor Turner Construction's (in a joint venture with Layton Construction) prior experience with another MLS stadium, for the Colorado Rapids in Denver. For both projects, Turner used a design-build consortium, which for the Rio Tinto Stadium project included an erection and fabrication joint venture between erector LPR Construction and buckling-restrained brace (BRB) manufacturer Star Seismic. (Star Seismic's patented BRB designs incorporate pinned or welded connections, radiused copes, material consistency, and higher capacity systems to deliver maximum structural survivability while using less steel, welding, and crane time in the erection process. They also exceed all AISC provisions, and independent analysis shows that incorporating BRBs reduces building costs by up $2.40 per square foot.)

This collaborative effort was made possible by the understanding of Gene Fatur, Turner's executive project manager, that specific steel management and fabrication excellence would pay dividends to the owner. Working in concert, the LPR-StarGroup and Layton-Turner ventures used the expertise of structural engineer John A. Martin and Associates to meet the architectural vision—and bring it to fruition well ahead of schedule.

The primary objective for this joint venture was to procure the structural steel in advance, thereby avoiding costly steel material increases during the design process, and work in conjunction with the design team to implement the shapes into the design. A mill order was placed when the design development was only 50% complete, and was updated throughout the 12-week rolling cycle, enabling the team to not only stay on budget, but also improve the schedule. Opening nine months early not only allowed the team to finish out the season in its new facility, but also avoided costly winter construction.

Of the total original design budget, the structural engineering and fabrication costs were reduced by 9.1%, saving well over $1 million. Of this amount, nearly $250,000 was related to the incorporation of Star Seismic's WildCat BRBs. By using 191 WildCat braces in all, the LPR/StarGroup was able to reduce brace connections by 90% and allow the engineer to use smaller beams and columns. According to Star Seismic principal Argan Johnson, using a BRB system replaced the eccentric braced frame system, which allowed the team to save on materials, fabrication, welding, and bolting. In sum, 162,000 cubic yards of earth was removed, 5,000 cubic yards of concrete was poured, and 720 tons of steel was managed.

Wind and Snow

One of the key architectural elements of the stadium is a sloping fabric canopy whose white steel framing and fabric capture the essence of the surrounding snowy peaks. The canopy was designed to garner attention from afar, and the round curved beams at the canopy edges intend to resemble a "smooth sky trail on a snowy mountain top."

Because the Salt Lake area receives almost 5 ft of precipitation and multiple winter storms every year, the canopy had to withstand several forces simultaneously and drain effectively. Layton-Turner worked with wind engineering consultant RWDI (Guelph, Ontario, Canada) regarding wind and snowfall analysis. While several design options were discussed, a geometric steel frame design with tension fabric was selected to meet both the design criteria and engineering requirements of the sloped canopy.

Working with the project's structural engineer, John A. Martin Associates, the LPR/StarGroup joint venture was able to order materials before the snow study was complete. In essence, the team was able to develop a lighter structure with better load paths to reduce the total steel costs at a time when material costs were high. MSC

An aggressive construction schedule allowed Rio Tinto Stadium to open nine months early.

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Architect
Rossetti Architects, Los Angeles

Structural Engineer
John A. Martin Associates, Los Angeles

Steel Fabricator
Baer Welding, Inc., Providence, Utah (AISC Member)

Steel Erector
LPR Construction, Loveland. Colo. (AISC Member)

Buckling-Restrained Brace Supplier
Star Seismic, LLC, Park City, Utah (AISC Member)

General Contractor
Turner Construction and Layton Construction (a joint venture), Salt Lake City

Rio Tinto Stadium

Scoring with the Fans

Rio Tinto Stadium can seat 20,008 for soccer games, but for concerts, festivals, and community events, can accommodate up to 25,000. With a total of four levels, the stadium contains locker rooms, utility services, team offices, 32 private luxury suites, a presidential suite, a press lounge and press box, camera stations, and mechanical rooms.

The state-of-the-art audio/visual system includes a 40-ft by 22-ft scoreboard and a crystal-clear sound and paging system. To enhance the fan experience, the first row of seating is only 2 ft above the playing field, putting the fans as close as possible to the excitement. The natural grass turf and drainage system allows for year-round use, even at an elevation of 4,450 ft.

Rio Tinto Stadium is situated in a north-south direction, replicating the alignment of the Rocky Mountains just a few miles to the east. The stadium's placement has left room for commercial development just to the north that will include a hotel, a water park, restaurants, and retail space.