



Coors Field Baseball Stadium



CONTINUING A TREND BEGAN MORE THAN A DECADE AGO IN BUFFALO, designers of professional baseball stadiums have engendered to create not just magnificent venues for viewing the game, but also architectural and structural masterpieces that enhance the community in which they are located. The new Coors Field Baseball Stadium in Denver is one of the most magnificent of these efforts.

The owner's and architect's fundamental objective with Coors Field was to create a dynamic and unique home for the Colorado Rockies baseball franchise. Not only did the stadium need to have its own special characteristics, but it had to fit-

in well with a historic part of downtown Denver, an area featuring brick buildings that date back to the 1800s.

In order to accomplish this, brick and masonry are prominent on the stadium's façade, along with an exposed structural steel frame that supports the main grandstand. Brick walkways leading up to the stadium, Terra Cotta tiles (with a design of the state flower, the columbine) on the façade, pedestrian friendly surroundings and numerous other elements all contribute to a design that captures the essence of a historic baseball stadium and also fits in well with the visual identity of lower downtown Denver. Despite



The use of masonry and exposed steel helps the new baseball stadium fit in with the surrounding formerly industrial neighborhood.

its traditional look, however, the stadium features all the modern amenities required by fans today.

Coors Field sits on a four square block area in the midst of refurbished historic buildings. The locale was originally a warehouse district and in recent times the area had fallen into disrepair. Today, though, in part due to the rejuvenating influence of the stadium, the area is filled with restaurants, clubs and other businesses that thrive both in-season and out. As an added bonus, it is situated in an area that provides panoramic views of the Rocky Mountains and has a stunning, modern backdrop provided by downtown Denver's modern office towers—all just a mile from the stadium.

EXPOSED STRUCTURE

The exposed structure of Coors Field is critical in adding to the historic flavor of the

Project Team

Structural Engineer:

Martin/Martin, Inc., Consulting Engineers, Wheat Ridge, CO

Architect:

HOK Sports Facilities Group, Kansas City, MO

General Contractor (joint venture):

Mortenson/Barton Malow, Denver

Owner:

Denver Metropolitan Major League Baseball Stadium District

Steel Fabricators:

Havens Steel (AISC Active Member)
 Zimmerman Metals (AISC Active Member)
 Zimkor Industries (AISC Active Member)

Steel Erector:

LPR Erectors (AISC Associate Member)

Steel Detailers:

Shawer-Price



Pictured is the upper concourse grandstand frame during construction.



Pictured are the right field mezzanine raker frames.

design. The structure itself includes an exposed structural steel frame that was erected from the main concourse up to the grandstand. All of the exposed steel on the project underwent initial sizing for structural optimization and then was reviewed with the architect for size and proportion. The shape of the trusses in the exterior frames was developed in concert with the architect's overall design concept for the masonry façade. Connection details were developed in exposed

frames using gusset plates with rounded headed tension control bolts to give the appearance of "old time" riveted construction. The project required 8,975 tons of steel in 15,000 separate pieces and structural bid packages issued over 15 months included 250 sheets of structural drawings.

Martin/Martin, the project's structural engineer, worked closely with the fabricators and erectors in order to detail the steel in the manner most efficient for the construction team.

On-site engineers participated in development of the erection scheme with the contractor and erector. In addition to traditional responsibilities, Martin/Martin integrated the input of the architect and contractor into a coherent package that could be constructed within a very tight schedule—despite a major design change.

Because of growing interest in season tickets from fans, seating capacity was twice increased after construction had already begun. As a result, more than 5,000 seats were added. Despite these changes, the stadium opened in time for the 1995 season. The finished stadium includes 50,249 seats, with field level seating, a main concourse, an upper level concourse and a multi-level grandstand. There also is club seating (4,513 seats), 797 luxury suites, and wheelchair areas (507 with 578 seats for companions). There also is ample space in the main and upper level concourses for fans to walk and purchase food and beverages, souvenirs and other merchandise. In addition, there is a complete children's playground, a batting cage and other baseball oriented games, a restaurant and brewery, along with plenty of concession areas and restrooms located at various points on the concourses.

ADVANTAGEOUS FEATURES

Beyond the fact that the skeletal structure of Coors Field gives the stadium the ambiance of a true grandstand park, there are several unique technical aspects of the stadium's design.

For example, during the schematic design, Martin/Martin evaluated the anticipated thermal motions of the stadium due to seasonal temperature changes. Based on this review, the main concourse level was broken into 12 pieces with 13 expansion joints. Both a double column scheme and a single column scheme with slide bearings were studied. The slide bearing scheme was selected to reduce



the amount of material and increase floor space availability in the suites.

Martin/Martin also designed and detailed all steel connections and worked with both the architect and contractor to create aesthetic and constructible details. Truss and braced frame splices and connections were detailed on an individual basis while typical floor framing connections were scheduled. Seated connections were used at all girder-to-column connections to ease erection and provide a consistent look with the slide bearing connections at expansion joints.

SCHEDULE CONSIDERATIONS

The schedule for Coors Field also resulted in the architect specifying that all structural steel be pre-painted with both primer and finish coats of 6 mils. This required special handling of the steel and verification that the painted surfaces met critical slip criteria.

Tests also were conducted in advance of construction to assure headed shear studs could be effectively welded through both the 16 gauge decking and heavy paint to the beams and trusses. Welded connections were typically seal welded to prevent future rusting of surfaces, which might not be accessible to provide full coverage while painting.

Martin/Martin performed a comprehensive vibration analysis of each of the unique bents supporting the grandstands to consider the baseball fan's dynamic loading of the structure. Many of the structural members, particularly the cantilevered trusses at the upper concourse, were governed by limiting accelerations at the suite boxes. Truss members ranged in size from W14x90 to W14x211.

The design of Coors Field provides baseball fans with a modern venue to watch major league baseball games, a stadium that is both "user-friendly" and traditional in appearance. In addition, the structure has helped revitalize an economically challenged neighborhood.