

Case study
Miller Park
Milwaukee, Wisconsin



Maximizing fan experience, stadium performance and efficiency

April 6, 2001, marked the first opening day game the Milwaukee Brewers played in their new home stadium, Miller Park in Milwaukee, Wisconsin. The state-of-the-art stadium is now a landmark for the city and remains the only ballpark of its kind in the nation. From design through construction, commissioning and ongoing daily operations since the park opened, Johnson Controls has been working with the Brewers to deliver the best experience possible for fans while maximizing the performance and efficiency of the stadium. And with environmental stewardship and social responsibility in mind, the Brewers are in the process of developing a sustainability strategy for the stadium.

Miller Park's signature is its fan-shaped convertible roof. A quality experience within the new stadium was a key reason the Brewers drew 79 percent more fans during 2001 than the previous season. The roof enables a climate-controlled environment that continues to be valuable to improving game attendance and increasing revenues to field a winning team. This is particularly important in April and May when cold weather kept many fans away from the old open-air Milwaukee County Stadium, built in 1953.

The \$400 million ballpark also offers numerous amenities, such as 67 luxury suites, 30 permanent concession stands, 550 television monitors, the Metavante Club fine dining restaurant and bar, as well as grills for more casual dining, and assorted rooms available year-round for meetings, parties and banquets. The improved amenities are complemented by sophisticated HVAC, lighting, fire alarm and security systems.



In the game from the beginning

Johnson Controls participated in the stadium project from design through construction and commissioning. A Johnson Controls Metasys® building management system controls HVAC for the stadium and, along with advanced lighting controls, helped reduce first-year utility costs despite a spike in natural gas prices that year.

Under a five-year operations and maintenance contract, a five-person team of Johnson Controls technicians was on board from the beginning to help the Brewers administrative and operations staff settle into their new home. Administrative functions were moved to the new stadium while it was still under construction. The construction team had just less than five months to get the park ready for the first exhibition game that March, which created a steep learning curve for the operations staff.

Johnson Controls technicians provided training on the mechanical equipment that serves the seating bowl and the extensive lighting system, security and access controls, and a fire alarm system. In addition, the technicians supported the operations staff with technical skills during the commissioning process and worked through an extensive list of items to ensure conformance with specifications. The commissioning work proved its worth after occupancy, helping the Brewers to document warranty claims on equipment.

"Attention to detail, expertise in building management and reliability are all among the best attributes of Johnson Controls. Hosting events in a building as large as Miller Park, we have the highest confidence that Johnson Controls efforts lead to a guest experience that is best-in-class."

**BOB QUINN
EXECUTIVE VICE PRESIDENT –
FINANCE AND ADMINISTRATION
MILWAUKEE BREWERS**



The team behind the team

Once operations were in full swing, Johnson Controls remained responsible for operations and maintenance of the HVAC equipment and the Metasys system for the remainder of the five-year contract. In 2005, Johnson Controls was awarded a facilities management agreement for overall operations of the stadium. "For Brewers management, the mission has always been to keep fans comfortable and safe at Miller Park. Under the new contract, our continued goal is to help the Brewers deliver the best fan experience possible by putting the right processes and experienced people in place to drive improved efficiency and performance," says Kara Tuttamore, manager of Johnson Controls stadium operations team.

Tuttamore supervises the facility operations and maintenance staff, which involves scheduling the activity of over 11 Johnson Controls specialists and operators in addition to various onsite contractors and vendors. Other responsibilities include management of operations budgets and Milwaukee Brewers projects, and compilation and validation of capital project listings for budget planning purposes.

The Johnson Controls team is responsible for repair and maintenance of nearly 350 pieces of HVAC equipment. General duties include structural maintenance, management and repair of electrical, plumbing and other equipment in both the stadium and outbuildings. Specially trained technicians are responsible for troubleshooting and maintaining third-party security, fire alarm and suppression systems, and the lighting system.

The lighting system controls all lights in public areas, the sports lights and parking lot lights and consists of 21 field controllers. The ability of Johnson Controls onsite technicians to troubleshoot and address lighting concerns during an event is crucial. The technicians also manage the stadium control center where all of these systems are monitored and controlled.

In addition, Johnson Controls maintains a computerized maintenance management system, which ensures work orders are addressed promptly and are properly recorded. Maintaining the inventory of maintenance materials and supplies, and monitoring daily purchasing requests for the Brewers ensures budgets are on track. Other duties include facility manager support, report generation, maintaining park signage and even assisting the Brewers with miscellaneous stadium events.

Ensuring fan comfort, efficiently

The Metasys system continues to be one of the major contributors to not only the comfort of fans but also energy savings. The park's HVAC equipment and lighting system are monitored and controlled by the Metasys system. This includes equipment in the luxury suites, which are an essential source of revenue for the Brewers. To meet suite holders' comfort needs, each suite's space conditions are controlled individually by the Metasys system. Metasys also regulates the temperature beneath the roof, which covers the entire seating bowl.

Utilizing over 2,500 points of data, the Metasys installation is one of the largest in the state. Johnson Controls technicians employ their long-term knowledge of the stadium's operating characteristics to continually modify building control strategies, minimizing utility expenditures while maximizing comfort and asset lifecycles. By identifying building anomalies early, technicians can use the Metasys system to reduce or temporarily eliminate their effects, ensuring effective daily operations. In an effort to recoup costs, Johnson Controls installed interfaces on the two main electric meters, the main gas meter and the water inlet and outlet for the cooling tower. By monitoring this data, utility consumption can be projected and used to determine the cost of events at Miller Park. The cost of the events can now be charged to the event holder, enabling the Brewers to recoup those costs.

Scheduled start-up and shutdown of HVAC equipment ensures equipment is running only when needed to keep guests comfortable and that it is shut down promptly when the event is over. Scheduling modifications in the Metasys system occur frequently to support games, events or special occupancy issues throughout the entire year. Operating parameters are routinely reviewed and adjusted to ensure comfort and system efficiency, which results in less wasted energy and more satisfied fans, staff and management of the Brewers. The Brewers typically hold the seating bowl temperature at 60 degrees Fahrenheit. Temperatures remain uniform within about five degrees throughout the park.

Miller Park facts:

Seating capacity: 41,900

Luxury suites:

67 (20 founder's suites, 44 club suites, 3 party suites)

Field surface: Natural grass

Building size:

1.2 million square feet (25 acres)

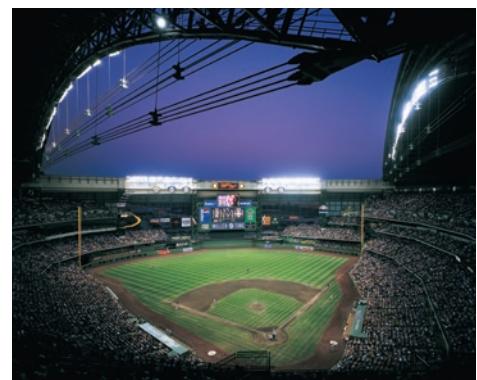
Roof span:

600 feet covering 10.5 acres

Roof height at peak: 330 feet

"Miller Park is not only home to Brewers baseball but also to many other events ranging from small company outings to full-scale concerts. Johnson Controls has demonstrated great success in their ability to be flexible and adapt Miller Park to all of these functions, regardless of their scope and requirements."

RICK SCHLESINGER
EXECUTIVE VICE PRESIDENT –
BUSINESS OPERATIONS
MILWAUKEE BREWERS



How Miller Park keeps the fans comfortable

The space beneath the convertible roof at Miller Park is as large by volume as nine indoor sports arenas. Keeping that space warm and comfortable is essential to the Milwaukee Brewers aim of boosting attendance, especially during the cooler months of April, May and September.

Heat for the seating bowl comes from 18 indirect-gas-fired heaters delivering a combined 68,200 Mbh, and from eight built-up air-handling units with supply fans that deliver 1.1 million cfm.

Gas heaters located on the Terrace and Field Levels discharge warm air through ductwork and diffusers on those levels and on the Loge Level. Air-handling units, fed by hot water from the stadium's four gas-fired boilers (totaling 33,600 Mbh) are located on the Service Level behind the Field-Level seats. Fans force air into the seating bowl through slots cut into the concrete stands.

During the cold-weather games to be played under the roof, the heaters are activated at a predetermined hour before game time – early enough to ensure fan comfort. Sensors in the gas-fired heating units monitor return air temperature; the Metasys system then modulates the burner flames to maintain the desired temperature.

The Brewers typically hold the seating bowl temperature at about 60 degrees. Temperatures remain uniform within about five degrees throughout the park.

The air stays cooler on the playing field and in the outfield sections of seats, where outside air enters along the track beam at the base of the roof and through joints in the outfield wall, which like the roof can be opened and closed. Natural convection occurs as newly introduced warm air rises and cooler infiltrating air settles.