

CASE STUDY

Burns & McDonnell Works Behind the Scenes to Get Stadium Ready for Prime Time

A complete upgrade and overhaul of critical heating, ventilation and air conditioning (HVAC) and lighting control systems at a large Arizona stadium that frequently hosts major sporting and entertainment events proactively positions stadium personnel to address energy conservation, mitigate equipment failure, enhance guest comfort, and streamline operation and maintenance procedures.



Challenge

When the facilities team at a large stadium in Glendale, Arizona, learned that one of the world's largest and most watched sporting events was coming their way, it triggered alarms. Adding urgency to this development was another announcement that an international pop music star would have a concert at the stadium about four weeks afterward.

Getting a facility ready for events of this magnitude was a challenge for the stadium venue management company. They recognized this was a great opportunity to address foreseen challenges associated with a tight labor market, replace the stadium's end-of-life building automation components and create workflows needed to implement effective facility management practices.

In addition, the full-scale overhaul of these critical stadium systems needed to be executed in approximately 18 months in a live stadium environment.

Solution

With only a year and a half to get the stadium ready, the facilities group turned to Burns & McDonnell for a comprehensive condition assessment that would serve as the basis for specifications guiding the procurement of new equipment and systems. This effort included upgrading the telecommunications infrastructure, replacing the end-of-life HVAC and lighting control systems, and capturing the domain knowledge their operators used to manually operate the stadium.

Project Stats

Client

Confidential

Location

Southwest United States

Burns & McDonnell soon found that the initial condition assessment scope uncovered a need for modified sequences of operation to enhance occupant comfort and energy optimization. The direct digital control (DDC) systems component and enterprise environment were especially critical because they serve as the operator's command and control interface for nearly 650 pieces of HVAC equipment and nearly 800 lighting circuits for a 1.7 million square foot stadium. Under a unified design-build contract, the upgrade included installing an open-architecture controls platform to serve as the digital brains of the enhanced HVAC and lighting systems.

Another foundational element was installing a fiber cable backbone throughout the facility to future-proof the network infrastructure for implementing new technologies, such as a 5G wireless telecommunications upgrade.

No Outages or Shutdowns

Executing all elements of this complex project in a live stadium environment required a programmatic approach. The most urgently needed repairs and upgrades were sequenced according to priority and executed precisely and orderly within tight windows so that no previously scheduled events at the stadium would be disrupted.

The trickiest part of this upgrade was the migration of disparate technology systems. It meant that older and newer systems would have to work in tandem and be fully operational for live events. Because of tight planning and coordination, this project element achieved 100% success with no events deferred, canceled or disrupted over the 18-month project duration.

Monitoring-Based Commissioning Environment

A monitoring-based commissioning (MBCx) environment was included in this project to provide advanced fault detection and diagnosis (AFDD) and energy use analysis during the project's construction phase. The MBCx provided visibility into how systems were performing and was instrumental in achieving four primary goals — efficient equipment operation, optimal utility performance, continued occupant comfort, and streamlined operation and maintenance procedures. The MBCx continues to uncover equipment performance deficiencies and has enabled a more proactive method of identifying needed equipment repairs and insights into modifying the system sequence of operations to enhance operational efficiencies and energy savings.

Results

With the completed upgrade of the HVAC and lighting DDC control systems, successfully aggregating these systems under a unified and open-architecture enterprise solution, the implementation of an MBCx environment that utilizes AFDD, and a new telecommunications system in place, the stadium's operators now have the visibility, command and control, and decision-making tools that offer holistic insights into enterprise-wide operations, building conditions, energy use, and guest comfort.

Burns & McDonnell continues to provide ongoing commissioning and project management services using the MBCx analytic environment to uncover and address equipment performance deficiencies and energy savings opportunities. The firm's ongoing commissioning and project management services have resulted in consistent average stadium temperatures of 74 degrees (F) during events and continued electrical power demand performing under previous years — as seen in August of 2023 versus 2022, where electrical demand was down an average of 1 MW per day. The team also resolved a persistent condensation issue on ductwork within the stadium making the guest experience more pleasurable.

With a much more effective and proactive approach operating a large and complex facility, the stadium's venue management company and operators are in a proactive position to execute effective facility management practices. Practices that protect their investment, address energy conservation, mitigate equipment failure, and promote a world-class stadium environment.

About Burns & McDonnell



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