Remote Monitoring System Watches Over Green Bay's Historic Football Facility

Sensaphone SCADA 3000 monitors sewer system pumps and mixers

To the casual fan, City Stadium may not conjure up waves of childhood memories or even dreams of championships past, but it does exactly that to the city of Green Bay, Wisconsin, and the worldwide legion of Green Bay Packers fans.

Erected in 1957, City Stadium eventually earned a reputation as home to one of the most storied franchises in NFL history. When it was originally built, it was the first public stadium designed specifically for professional football. It was also the first professional stadium to feature a bowl-like seating arrangement that created natural sight lines for attendees.

In the years since it was constructed, City Stadium has hosted numerous historic football events, including three league championships, and played a significant role in the development of the Green Bay Packers football legend. Renamed Lambeau Field after team founder Curly Lambeau, the stadium has seen multiple renovations in its nearly 50 years, the latest of which was completed in 2003.

Today, Lambeau Field has a seating capacity of 72,601, more than double its original size. It also includes a Packers Hall of Fame and the Lambeau Field Atrium for special events, both of which transformed the facility from a football stadium to a destination.

With such an historic back story, it's no wonder every attempt imaginable is being made to maintain the facility. Part of that maintenance includes an underground sewer storage system that employs a Sensaphone SCADA 3000 remote monitoring and alarm notification system. The Sensaphone SCADA 3000 monitors pressure transducers, flow meters, water levels, timers, temperature, power, and in the case of Lambeau Field, mixers and pumps. When a problem is detected, the system automatically alerts facility management via phone, pager, fax, or e-mail.

The Sensaphone SCADA 3000 also offers flexible communication with a host PC using radio and/or telephone lines to receive information from receiver/transmitter units. It provides eight programmable control algorithms with options including Ladder, C-Programming, and remote-access programming, and comes with a flexible power source with intelligent battery charging, safe battery cut-off, and built-in support for solar power.

Handling the Overflow

The Lambeau Field sewer storage system operates strictly as an overflow basin that uses pumps and mixers to control the flow of sewage after each of the 10 home football

games (two preseason games and eight regular season games) each season, and, when necessary, playoff games. Lambeau Field is rarely used for non-football events.

With 72,000-plus fans packed into the stadium for each game, it's easy to understand why the system needs to be monitored so closely. "The city sewer system can't handle the sheer volume of sewage generated during a game," said Roy Campbell, master electrician and electrical lead worker within the electrical division of the City of Green Bay's Public Works Department. Campbell is the man responsible for making sure the system functions properly.

Campbell said each game generates an average of 156,335 gallons of sewage, which is directed to the system's two surge tanks, the first of which is 863 square feet with a capacity of 116,194 gallons. The second is 2,722 square feet and can hold 366,490 gallons.

In 2005 alone, the system processed 1.56 million gallons of raw sewage.

The system works by employing four pumps and six mixers to help stir the sewage and suspend any solids to help speed up the drainage.

"In the past, the system would need a lot of relays and control logic," Campbell said. "Now, not only are the controls based on timers but they are also activated by level sensors. The level of sewage has to reach a certain point before the mixers are turned on."

Post-Game Action

The system works by collecting the sewage as the game progresses and stores it in the two basins located underground beneath the stadium complex. The material flows into the smaller basin, which filters most of the solids before letting the liquid flow over a weir into the second, larger basin. The day after an event, both basins are mixed. Gradually, the material is pumped from the second basin back in to the first to ensure proper mixing. The mixing typically takes a minimum of three hours before any pumping into the municipal sewer system is initiated. The pumps direct the sewage into the city's 8-inch gravity sewer main where it is sent to the treatment plant. The process takes up to 16 hours to clear the tanks, which are then rinsed clean.

Each one of the Lambeau Field mixers and pumps is operated remotely using the SCADA 3000 system, with activities tracked and monitored through the system's data logging capabilities. "We use that information for troubleshooting purposes," Campbell said. "If anything fails, we know when and what the levels were at the time. It's also designed to automatically activate a backup should a failure occur."

With the new system in place and monitored by the Sensaphone, Campbell said he is able to remotely monitor the site activity, even issuing control commands – turning a pump or mixer on or off – when required. Much of that monitoring can be done from his office across town, or even from home.

"The monitoring system enables us to save many hours of labor by sensing failures and implementing backup procedures to make sure the process is completed without operator intervention," Campbell said. "Reviewing the data log sequence can help pinpoint time and conditions of the failure. Knowing when it happened and what the levels were at the time can explain why it happened. It could be a bad backup float or that levels weren't high enough. The point is we're able to identify the trouble quickly and address it."

With the SCADA 3000 monitoring the system and serving as logic controller, it is able to balance operating time across all of the pumps and mixers. "Time-based pre-mixing ensures a more complete pumped-down process and saves hours of tank cleaning labor," Campbell said. It also balances the wear and tear on each of the pumps and mixers.

Another added value is the level sensors that guarantee adequate levels are maintained in order to use the pumps and mixers.

After more than five years, Campbell, himself a member of the staff for more than 29 years and supervisor for six, has experienced no problems with Sensaphone SCADA 3000 monitoring system. In fact, he said, there was at least one instance where the Sensaphone system helped the city, not the stadium, avoid a potential headache when it alerted Campbell to a problem that was eventually traced to the city sewer system.

"For a while we were experiencing grease issues that were clogging parts of the system downstream," he said. "I noticed that the surge tanks were filling up when there was no game, which is exactly how it was designed to work, but it meant there was a problem downstream from the stadium. I had to contact the city, which sent someone to check the sewer lines and clear the clog. Had it gone undetected, it could have caused some significant problems."

Another potential problem was avoided when the system started pumping too early. Typically, the pumps are activated the day after a game, but only after the sewage had been mixed properly. "In this case, it started pumping while the game was still going on," Campbell said. "By alerting me to the problem, I was able to find out what happened, make adjustments, and prevent it from happening again. The basins were installed to prevent overburdening the system. The last thing you'd want to do is start the pumps too early, which would overflow the system."