Transit agency gets new monitoring and alarm system on sump pump system

Summary

- A transit agency in the Northeast had a pump system that was subject to power outages and other problems that were not easily identified without walking to the pump rooms to physically check the power cabinets

- The agency wanted real-time remote monitoring so it could take immediate action to correct problems when they occurred

- Phoenix Contact provided a plug-and-play solution that was simple to install and did not require high-level training to maintain

The transit agency's old pump system did not provide real-time notification of problems, so excess water often led to problems.

Background

The very rare occurrence of a major hurricane — namely Superstorm Sandy, which wreaked havoc on the Northeast shore a couple of years ago — provided many lessons to transit agencies. High water can quickly get to low places. Transit subway tunnels are susceptible to even normal rain runoffs. Because they are located at or close to sea level, many cities along the Eastern seaboard handle the excess water with pumps and piping to extract the water and dump it elsewhere. However, sometimes the sump pumps can become inoperative. This might be due to internal failure, because they exceeded the life expectancy, or because power is not getting to them — or they just can't keep up and become immersed and fail.

Customer profile

A large transit agency in the Northeast experienced pump outages during Superstorm Sandy. Several years later, the agency continues to have problems due to antiquated systems that could not provide real-time monitoring. The environment in the pump rooms is very

harsh. Failures happen often, and the agency does not always know when these occur. The power supply systems are subject to surges, and these can knock out the power to the pumps.

Challenge: Real-time pump monitoring

The transit agency's 19 pump rooms were equipped with pump control instruments that provided high/low alarm outputs. The alarm outputs were dry contacts, and the inputs to the supervisory control and data acquisition (SCADA) system were powered by 24 V DC.

The agency wanted real-time monitoring of the pump alarms and an alarm system that would take advantage of the networking connections that were close by. Ethernet was the available network. Alarm signals from each location needed to be transmitted via Ethernet and converted back to digital signals. Signals and alarms needed to be hard-wired into the existing SCADA I/O cards.

Solution: More reliable communication with PLCs

A Phoenix Contact ILC programmable logic controller (PLC) was installed at each of the 19 pump stations. The ILC can accept the alarm inputs from the pumps. Surge protection was installed on the 120 V AC power mains and all of the alarm inputs. ILC 191 controllers at the main pump control room master panel serve as "master" PLCs. Two were used due to the high input/output wire count. They communicate via Modbus/TCP to each "slave" ILC controller. 24 V DC digital outputs from the ILC 191 controller will interface with the current SCADA hardware.

Additional components included an unmanaged Ethernet switch, power supplies, terminal blocks, surge protection, controllers with I/O, and circuit breakers for on/off manual switching.

Results: High confidence in plug-and-play solution

The agency found the solution simple and easy to incorporate. The solution included a bolt-on enclosure with ILC/software logic and connectivity. Phoenix Contact programmed the controller, so the agency did not have to do any programming to get the system up and running. The agency now has real-time troubleshooting and real-time monitoring of pump on/off status and can now talk directly to the pump.

Phoenix Contact provided a plug-and-play solution that was simple to install and easy to maintain without high-level training. Thanks to the system's troubleshooting tools and "plug-and-play" component replacement ability, the agency now has a high degree of confidence in a pump system into which it can now "look."

At the "slave" or remote pump stations, the new Phoenix Contact solution sends an alarm back to the master station immediately, so the transit agency can take the necessary steps to prevent flooding or other problems.

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