Wireless-based structural measuring technology at the lock system in Kiel-Holtenau

PHOENIX CONTACT
SEA Pte. Ltd.
105 Eunos Avenue 3
#04-00
Singapore 409836
+65 6435 9800

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Overview

- After over 100 years in operation, the supply culverts of the Kiel-Holtenau lock system are being upgraded while the locks are still in use.
- During the construction, high-quality sensors measure all important points of the lock system.
- The Radioline wireless system from Phoenix Contact connects the remote measuring stations to the central control and alarm system.

Customer profile

The Federal Waterways and Shipping Administration operates the locks of the North Sea-Baltic Sea canal in Kiel, among others. Around 35,000 ships cross the waterway every year. The Kiel-Holtenau lock system is located at the eastern end of the canal. After over a hundred years in operation, the Federal Waterways and Shipping Administration has decided to carry out a structural replacement in order to maintain the operational reliability of the locks.

Application

The system consists of a large and a small group of locks, each with two chambers. While the locks remain in operation, state-of-the-art technology will be used to drill a 400 meter long and 2 meter wide tunnel beneath the entire system at a depth of approximately 30 meters. Several new shafts between the chambers will be used to connect the supply lines.

Components from Glötzl Gesellschaft für Baumesstechnik mbH, located in Rheinstetten near Karlsruhe, will be used to supervise the construction and evaluate measurement results.

In the lock system in Kiel-Holtenau, measurements are taken in four areas by distributed measuring elements – so-called MCC (Measurement Communication Control) systems. The challenge here is that the four isolated stations have to transmit their data to the central MCC master station, which is located in the control center on the central island.

Between the individual stations and the control center lie not only several hundred meters, but also the lock chambers. The laying of cables is therefore not feasible from either a technical or economical perspective.

MCC systems from Glötzl are installed in four different areas of the locks

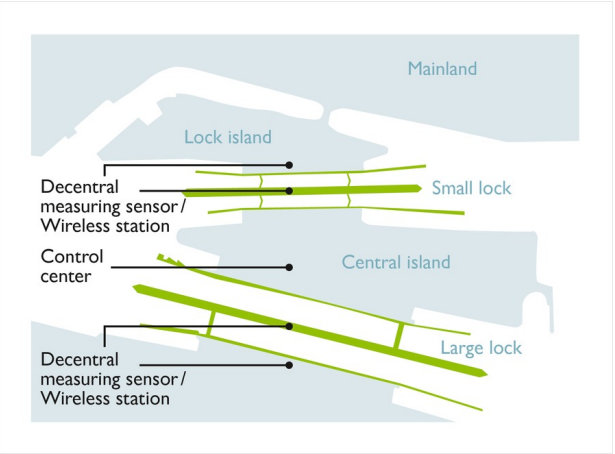
Solution

“With this in mind, we opted for the Radioline wireless system from Phoenix Contact, as it is extremely flexible”, explains Joachim Haberland, Project Manager at Glötzl Baumesstechnik responsible for supervising the construction of the lock system. “The Radioline modules enable both I/O signals and serial data to be transmitted, without extra cost.”

The sensors mounted in the lock system scan the surface with a high degree of precision and thereby record any gradients or movement in the chamber walls. The groundwater level is also recorded in ten locations by level sensors. The sensors emit these signals via a serial RS-485 interface.

The Radioline wireless system is connected directly to the RS-485 output of the measuring element and transmits the values wirelessly to the control center. Here the MCC master stores and evaluates the data.

“All measured values can now be continuously recorded, which means that faults can be identified in good time and countermeasures implemented immediately”, says Jürgen Glötzl, Executive Vice President at Glötzl Baumesstechnik.



Overview of the lock system in Kiel-Holtenau

Both serial and I/O data can be forwarded

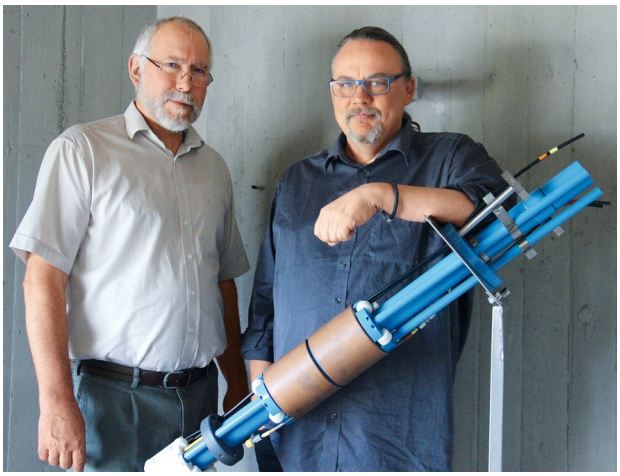
The new Trusted Wireless 2.0 wireless technology forms the basis for the Radioline system, which is geared toward the special requirements of industrial infrastructure applications. It closes the gap between WirelessHART as a solution for sensor networks in process technology and the Bluetooth and Wireless LAN wireless standards, which are widely used in factory automation.

Depending on application requirements, the Radioline modules offer various setting options. From a simple point-to-point connection to self-healing mesh networks, all types of network structure can be configured.

Summary

By using the Radioline wireless system, the Federal Waterways and Shipping Administration has saved a lot of time and money.

“The wireless modules have now been transmitting the recorded measured values to the control center for several months without interruption, which has far exceeded my expectations in terms of the stability of the wireless connection”, concludes Jürgen Glötzl. “Based on this positive experience we will no doubt be using wireless solutions from Phoenix Contact in the future.”



Executive Vice President Jürgen Glötzl and Project Manager Joachim Haberland