

Modernizing flood protection: higher availability at lower cost



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Overview

- Advancing urbanization and localized weather events create new challenges for cross-border water regulation when it comes to protecting cities and communities from flood water and flooding.
- Phoenix Contact offers holistic automation solutions that contribute to flood protection, reduce engineering effort, and simultaneously increase system availability.
- The automation solution provides an efficient overview of the individual process parameters as well as quick, secure signal processing.



Water pumps in the Nimjegen pumping station

Customer profile

The Dutch water authorities in Rivierenland are responsible for the water balance in 38 municipalities with a total of around 950,000 inhabitants.

The pumping station in Nimjegen controls the water level in the rivers, so that citizens in Ooijpolders and Düffelt as well as the Lower Rhine polder areas are constantly protected from flooding.

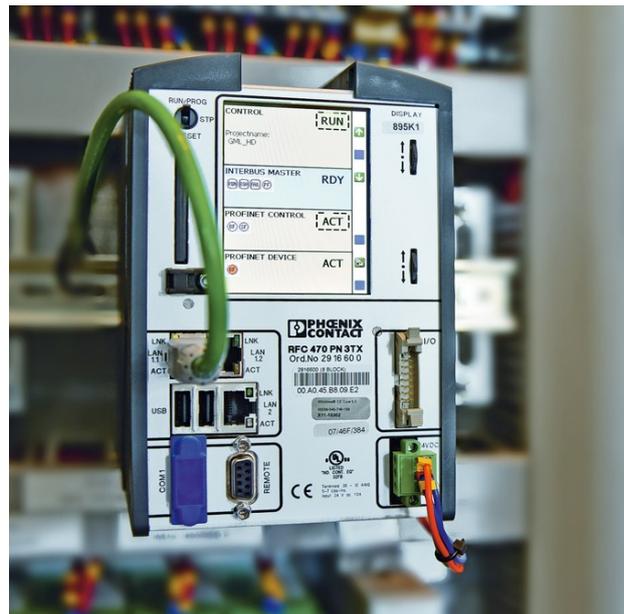


Pumping station in Nimjegen

Application

The rising population and the resulting advance in urbanization lead to constant growth in urban infrastructures. When handling natural resources such as water, it is therefore no longer enough to simply consider local requirements and events. Consequently, cross-border water regulation is required, in order to protect cities and communities from flood water and flooding.

As part of a project by the International Water Association, a total of 165 weirs and 135 channel pumping stations will be converted to modern technologies. This also affects the landmark pumping station in Nimjegen, which is operated by the local Rivierenland water authority. As part of a collaboration project between the Netherlands and Germany, the relay technology used to date here was replaced by a modern automation solution from Phoenix Contact.



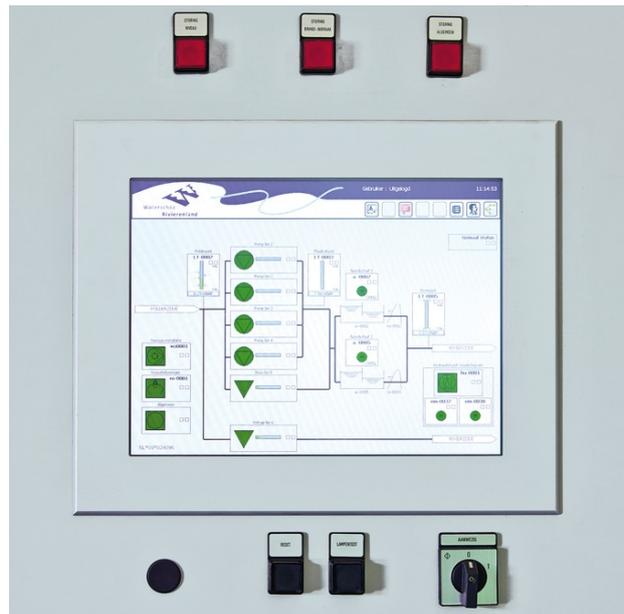
RFC 470 PN 3TX high-performance controller

Solution

A centrally installed RFC 470 PN 3TX controller now manages up to three large pumps. It reads out the frequency inverter via PROFINET, so that the units can be constantly monitored. PROFINET IL PN BK DI8 DO4 2TX bus couplers, distributed across the system, permit various sensors and actuators to be connected via digital and analog signals. Simple diagnostic options assist employees in the event of a fault when troubleshooting, which increases the availability of the pumping station.

Employees must also be able to intervene in the process at any time during operation. To this end, a touch panel is installed in the control cabinet door. Here, all measurement and operating data is displayed clearly, and can be manually altered if required. Due to the high cost of a SCADA system, those in charge opted for the web-based visualization software, WebVisit. It communicates with the central controller via Ethernet and displays current information on the panel via web pages. As such, employees can call up current values of all pumping stations and weirs, via a secure VPN tunnel. This means a quick reaction is possible in the event of a fault. A standard was developed for the web page design as well as for the programming of the controllers and documentation. Engineering costs are reduced, thanks to this simplification.

To constantly monitor remote systems, the most important measurement and control data is now safely and reliably transmitted to the control center via the remote control protocol IEC 60870-5-104. The central controller installed in the pumping station processes the control commands triggered by the control room and sends the current operating data back via the VPN connection. Should data transmission be interrupted, all information is issued with a time stamp and is stored in the memory of the RFC 470 PN 3TX. Once communication is restored, the controller transmits the data in the correct order to the control room.



Panel PC with touch function

Summary

In addition to modernizing the old relay technology, the water authorities are aiming to be carbon neutral by 2030. To achieve this goal, solar panels and small wind turbines generate the energy required to supply the weirs locally. In order for this to be sufficient enough to operate each system, the use of electrical components with a low power consumption is essential.

The existing inefficient equipment is replaced by economical automation products from Phoenix Contact. This kind of swap permits the resource-efficient operation of all weirs and therefore contributes to protecting the environment.

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