Joint demonstration model long-distance water supply

Control and monitoring of long-distance water supply pipelines

Nowadays, a reliable water supply has become a major challenge. Therefore drinking water obtained from groundwater has to be transported via long-distance water supply lines into a high-level tank, in order to reliably feed the supply network from there.

Operators face the challenge of ensuring an effective and material-saving high-level tank management. The filling of the high-level tank has to be carried out in such a way that no attributable cavitation damage occurs due to too high pressure differences on the components. Further challenges during operation include the avoidance of pressure surges and leaks in pipelines.

As a group of recognized partners in water management, KROHNE Messtechnik, Phoenix Contact and VAG-Armaturen GmbH have taken on the task to provide the solution for efficient control and monitoring of long-distance supply lines and water towers.

KROHNE Messtechnik GmbH
headquartered in Duisburg. Develops, produces and sells products in the field of flow, level, temperature, analysis and pressure measuring technology. KROHNE is one of the market leaders in industrial process measuring technology.

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VAG-Armaturen GmbH
is a German company with more than 140 years of experience in the design and manufacturing of heavy-duty valves for all kinds of water applications. With more than 1,200 employees worldwide the valve manufacturer is a globally active company and is setting new standards as a solution and system provider in water and wastewater technology.

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Valve technology from VAG
VAG RIKO® Plunger Valve

- The valve can be adapted to suit a wide variety of operating conditions through the use of control devices
- The symmetrical flow control concentrates the energy of the water in the centre of the pipe, which results in less wear on the valve and the pipe
- By means of calculation, the valve can be operated in any degree of opening without internal cavitation
- High corrosion resistance due to stainless steel internal parts and certified coating systems
- Long valve lifetime thanks to the certified corrosion protection and low-wear piston guide and seal arrangement
- Available nominal diameters: DN150-2000/6-80" to PN40 as standard versions

Measuring technology from KROHNE
- OPTIFLUX 2300 C, electromagnetic flowmeter (DN2.5-3000 / 1/10" - 120"), suitable for subsea and pipeline installation
- OPTIFLEX 1100 C, 2-wire level meter (guided radar) for storage applications
- OPTIWAVE 5200 C, 2-wire level meter (FMCW radar) for liquid applications
- OPTISYS CL 1100, measuring system for free chlorine, chlorine dioxide or ozone with automatic sensor cleaning, ideally suited for reliable measurements in emergency chlorination
- Threaded resistance temperature assembly OPTITEMP TRA/TCA-510 for general applications

Process automation and control systems from Phoenix Contact
- Easy commissioning with the industry-specific water process library Waterworx
- Easy integration of measuring and control technology with pre-programmed function blocks
- Permanent system overview with integrated visualisation on-site and in the control room
- Reliable transmission of all relevant process data almost all communication networks such as mobile, public telephone network, wired systems, radio systems
- Support of all standard communication interfaces such as PROFINET®, PROFIBUS®, Modbus
- Reliable remote communication via standardised protocols such as IEC 60870-5-101/104 and ODP

Automation technology
Water process library
Waterworx

Innovative automation solutions tailored to customer requirements that make the difference in process and plant automation. We are committed to providing customers with the best possible automation technology for all applications, from small and medium-sized plants to large industrial processes. KROHNE’s expertise in the process industry is based on more than 140 years of experience in process measuring technology. This long-term expertise is reflected in the high-quality products and services offered by KROHNE, which are designed to meet the specific needs of customers in the process industry.
During the filling process, a high pumping pressure is discharged through the open discharge in the high-level tank. Regardless of differential pressure and flow rate, the water can be accelerated so fast that vapour bubbles (cavitation) occur that cause significant damage to the reservoir inlet or the fitting. This can be prevented by the combined use of control valves, flow and level measurement and process automation.

The *level measurement* in the high-level tank sets the controlled variable for the plunger valve. The control of the plunger valve is made through the use of *control technology* which also ensures the connection to the control room.

The *chlorine measuring system* installed in the water tower further ensures that the legally prescribed limit value for free chlorine is maintained or not exceeded – even at the infeed point to the network.

The water temperature is also measured, if required. By means of a calculation based on the minimum and maximum flow rate, as well as the pressure difference, the *plunge valve* is designed so that the transmission is outside the cavitation range at all times.

Any leaks on the transport route from the water well to the high-level tank are detected with the help of *flow and pressure measurements* at each entry point into the transport network and the tank inlet and visualized in the control room.

**Advantages**
- Simple engineering and easy commissioning thanks to coordinated drive, measuring and control technology
- Intelligent container management on the basis of reliable measured values and targeted control of the fittings
- Condition-based maintenance thanks to the transfer of all relevant process data from the field to the control room
- Immediate detection of leaks in transport pipelines using continuous pressure and flow measurement
- Cost minimization through low-wear operation of the transport line