Real-time monitoring of the drinking water network with the pipe::scan in Beijing, China

Drinking Water Monitoring

To measure turbidity, color, free/total chlorine, pH, conductivity and other conventional and key indicators at the same time, the Beijing Waterworks Group Co., Ltd. installed a pipe::scan in the drinking water network. The Group has been relying on s::can products since 2017. At that time 50 i::scans were installed for turbidity real-time monitoring.

Beijing Waterworks Group Co., Ltd.

Parameters monitored:

- pH
- Turbidity
- Color
- Total/Free Chlorine
- Conductivity
- Temperature

Facts & Figures

Company/Institution:
Beijing Waterworks Group Co., Ltd.

Location:
Beijing, China

Partner:
Beijing Clean water Co., Ltd.

Application:
Drinking Water

Key Products installed:
pipe::scan, chlori::lyser, i::scan, pH::lyser, condu::lyser, con::cube and auto::brush

Background

Beijing Waterworks Group Co., Ltd. is one of the most influential urban water supply enterprises in China. The group is responsible for the water supply of central Beijing, Tongzhou, Huairou, Miyun, Yanqing, Fangshan, Daxin, Mentougou and other new suburban areas. By the end of 2019 they supplied 4.85 million m^3 every day. The total length of the pipe network is more than 14,000 km and the service area includes nearly 1,180 km^2 with more than 5.3 million households.

Challenge

Beijing's water supply sources include local and external sources. More than 20 water sources are used, which is very rare. This represents the complexity and diversity of the water quality in Beijing. The aging urban network threatens the water quality and is therefore a potential source of danger. An automatic water quality monitoring equipment has to be installed in the pipe network, to ensure water supply safety in the capital. The installation space of the test site is small and the pipeline, made of cast iron, is aging, which might affect the reading of turbidity. The duration of the maintenance intervals and certain settings of the pipe::scan needed fine tuning. In addition, laboratory validation is required to determine whether the pipe::scan transfers the water quality data correctly to the SCADA.

s::can's solution

For the parameters like turbidity, free/total chlorine, pH and conductivity, the system was equipped with s::can sensors, automatic brush cleaning and the con::cube terminal. For the aged pipe, a double layer filter was added, to make sure that iron particles do not interfere with measurement results. SCADA get the data via the RS485/Modbus protocol from the con::cube.

Benefits

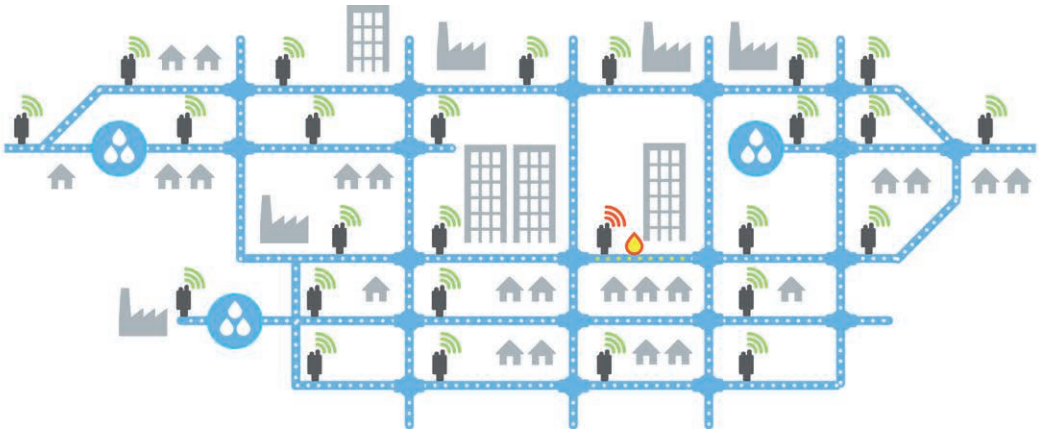
1. Real-time monitoring of different parameters - so that changes in water quality can be detected timely, speed up the maintenance response time and improve network reliability.
2. Understanding of the water quality changes of the entire water supply network, based on historical and actual readings.
3. Total chlorine monitoring in the pipe network not only determines the multiplication activities of microorganisms in water quality, but also controls the process operation of water systems, effectively controls the amount of added chlorine and reduces the formation of disinfection by-products.
4. Manual maintenance is extremely low, except regular manual sampling comparison and calibration.
5. Achievement of continuous monitoring with insertion installation, no discharge and pollution, which leads to water savings.

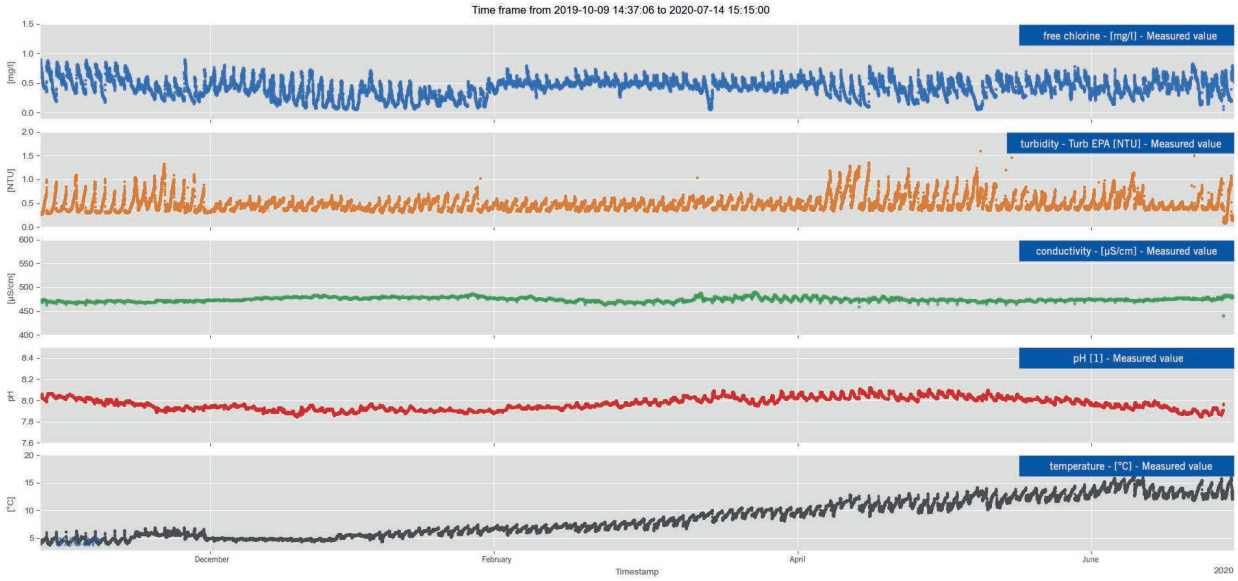
"The pipe::scan measures total chlorine/free chlorine, color, turbidity, pH, conductivity and temperature in one system. Other organic pollution parameters like TOC, DOC, UV254 can be added. After more than 6 months of testing, the equipment is running stable, the measurement is reliable and there is a super long maintenance cycle. These new devices increase the possibility of large-scale monitoring networks in the supply system."

Yanyang Hou (Manager) - Beijing Clean water Co., Ltd.

pipe::scan application process

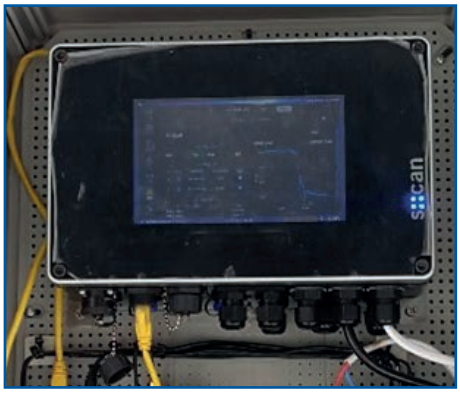
This project will be extended to many pipe::scan locations.





Water is supplied continuously for 24 hours in the pipe network, the turbidity value changes according to the regular fluctuation of water consumption.

The pipe::scan is a sensor system for monitoring drinking water quality in pipes under pressure. It measures up to 10 parameters in one device: TOC, DOC, UV254, Turbidity, Color, Chlorine, pH/Redox, Conductivity, Temperature and Pressure. The water quality data can be sent to any central database via almost any protocol. Multiple pipe::scans are the ideal solution to monitor drinking water at any point in the network.



con::cube - a compact, versatile terminal for data acquisition and station control. Newest processor technology and very flexible options for interfacing to SCADA or any central database systems makes the con::cube in combination with moni::tool a powerful terminal for compact station control.

pipe::scan installation in a suburb of Beijing.

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