

# Network Control Solution

## Fen River meets efficiency and information technology objectives at 25% of the cost of traditional modernisation alternatives

### Situation

The Fen River Irrigation District in China's Shanxi province consists of two reservoirs and three weirs diverting water from the Fen River into five main channels for irrigation and industrial uses. In recent years the province has faced serious water shortages resulting from drought and growing demand from domestic and industrial water users.

Built in 1950, the district's infrastructure mainly consists of manual control gates and almost no flow measurement. The distribution efficiency of the system, which includes farm channels, is estimated to be around 45%, meaning most water is lost before it reaches farmers' fields.

However, in recent times greatly reduced inflows have meant that the district has struggled to supply water to irrigators reliably and equitably. Shortages are now common, particularly for irrigators whose farms lie furthest downstream.

A series of central government directives requiring irrigation district modernisation provided the catalyst for the Fen River Irrigation Authority to look for a solution. The Water Reform and Development Plan required districts to improve distribution efficiency through infrastructure modernisation, which had traditionally involved lining channels with concrete and replacing control

gates. Additionally, the Rural Water Information Transformation Plan required districts to introduce automation, flow metering and comprehensive data collection by 2020.

### Solution

After a successful pilot project Rubicon implemented a TCC® Network Control Solution, which involved installing FlumeGates® on primary and secondary channels. NeuroFlo® software automatically coordinates and controls the gates to optimise the delivery of water and eliminate spills. SCADAConnect® provides remote management and data collection.

With the solution, Fen River could achieve distribution efficiency improvements without the expense or major interruption to irrigation involved with concrete lining of its channels. Plus the FlumeGate's integrated flow and level measurement and remote communications would meet all measurement and data collection requirements in a single device. This provided Fen River with a low cost and simpler alternative to integrating control, automation, measurement and communications components.



Before



After

China  
Shanxi Province



### Customer profile

The Fen River Irrigation District in China's Yellow River Basin is managed by the Fen River Irrigation Authority. The district covers 100,000 hectares and supplies water on rotation to hundreds of thousands of small landholders growing crops that include wheat, corn and vegetables.

The district's irrigation water is supplied to farmers via 420km of main channels and over 3,000km of smaller farm channels, which are also managed by the authority.

### Solution components

#### Software



SCADAConnect



Network Visualisation



NeuroFlo

#### Hardware



FlumeGate



SlipMeter



SlipGate



Radio Network

- FlumeGate x 75
- SlipMeter x 39
- SlipGate x 2
- Radio nodes x 4

## Results

The pilot project enabled Fen River to assess the costs and the benefits of the solution and work with Rubicon staff to gain a better understanding of a new way of managing their water resources. It also enabled them to trial the FlumeGate's ability to control flows in harsh local conditions, including the very cold temperatures experienced during winter irrigations.

FlumeGates proved to be robust in these conditions and could control flows in temperatures as low as -20°C. And together with Rubicon's SCADAConnect software, they met all of the Government's information and communications technology requirements.

Impressed with the performance of the pilot installation, Fen River authorised the China Irrigation and Drainage Development Center (CIDDC) to assess the pilot project and compare the costs and benefits of implementing Network Control throughout the district with the alternative of lining all channels and replacing existing gates with new manual gates.

### The CIDDC report found that Network Control:

- Would provide farmers with an equitable, reliable and flexible water supply
- Could improve efficiency by up to 20%
- Could be implemented at 25% of the cost of channel lining and would enable the easy identification of high-loss areas of channel for targeted lining
- Could be deployed much more quickly than traditional channel lining and gate replacement
- Was the most effective way of reducing losses. The cost of each percentage point improvement in distribution efficiency for Network Control was 1.9 million RMB (\$300 000) compared with 8.9 million RMB (\$1.4 million) for lining all channels with concrete
- Should be used by other large irrigation districts to enable them to meet their modernisation objectives

CIDDC concluded that Network Control should be implemented throughout the district. In late 2016 Fen River completed installing Network Control on the 56km East Main channel and a 17km secondary channel.



A Chinese language SCADAConnect interface provides operators at Fen River's control centre with real-time flow and water level information

“ After two seasons we are confident that TCC technology meets our requirements. FlumeGates have proved to be very reliable and provide accurate measurement and precise flow control. Implementing Network Control will enable us to meet all of our modernisation needs while providing farmers with a more flexible and reliable supply service. I highly recommend TCC for other irrigation districts. ”

Li Ming Xing, Director, Fen River Irrigation Authority

“ The system fully meets both irrigation district modernisation and information technology requirements and is suitable for modernising China's large scale districts. ”

CIDDC Eastern Main Modernisation Implementation Report, 2012

## About Rubicon Water

Rubicon Water delivers advanced technology that optimises gravity-fed irrigation, providing unprecedented levels of operational efficiency and control, increasing water availability and improving farmers' lives.

Founded in 1995, Rubicon has more than 30,000 gates installed in TCC systems in 15 countries.