

The logo for SINGER, featuring the word "SINGER" in a bold, white, sans-serif font with a trademark symbol (TM) to the upper right. The background is a dark blue with a radial motion blur effect.

SINGER™

SOLUTION SPOTLIGHT:

HOW 3 WATER SYSTEMS OVERCAME

Water Pressure & Level Issues,
Poor Water Quality &
Pressure Problems

Mueller Co.

Reliable Connections®

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SINGER™

Learn how three major water districts and municipalities turned things around with high-performance solutions customized to their challenges.

Whether you're charged with designing best-in class water systems throughout your district or municipality or you're a key decision maker, having the right equipment for your needs is crucial. But, when it comes to the complexities of reducing water pressure and leakage and staying compliant with water safety standards, there are a lot of considerations that must be made to ensure that your technology translates into solutions for your needs.

In the stories that follow, we'll learn more about how three municipal organizations transformed the quality of their water systems by implementing customized solutions.

SPECIFICALLY, WE WILL ADDRESS CHALLENGES AROUND:



Pressure and
water level
control



Pipe bursts, leakage
and insufficient
water supplies



Lack of surge
protection and high
pressure levels

PROJECT 1:

SAN XAVIER'S STRUGGLE TO CONTROL PRESSURE AND WATER LEVELS

CHALLENGE

The San Xavier Reservation, near Tucson, Arizona, was once known for growing organic alfalfa for racing horses and other livestock, as well as other produce. And until 2001, the 900-acre farm depended on ground water wells for irrigation. However, due to urban development, ground water demand increased, drastically depleting the supply.

"The low pressures in the underground irrigation distribution system offered a unique challenge," said Jeff Riley, supervisory civil engineer with the U.S. Bureau of Reclamation.

SOLUTION

Despite the complicated and unusual application, Singer Valve stepped in and performed hydraulic modeling to properly assess the specific needs of the area. In search of the best solution, Singer built a simulator to mimic the behavior of the San Xavier irrigation system. After testing a standard proportional integral derivative (PID) on the simulator, Singer's Vice President of Technology and Applications, Kari Oksanen, wrote a custom algorithm for a programmable logic controller (PLC).

Following 11 algorithm revisions, Oksanen's program stabilized water levels within a few minutes compared to the standard PID's performance of two days. Singer then designed and implemented the following customized equipment for San Xavier's flood irrigation system:

- One 16-in. globe style valve
- Eight 12-in. angle style valves
- Five storage tanks (each with its own control panel)

Despite having a custom algorithm to support the system's design, controlling flow intake, high pressure and each tank's water level electronically and simultaneously throughout the entire water system was challenging. According to Dave Buchwald, a fluid dynamics specialist, this project was among the most complicated that the team had ever seen.

However, according to Oksanen, there are great benefits to such a system, "Controlling levels electronically is very difficult. But the beauty of PLC is that there is no limit to what you can tell it to do."

PROJECT 1: CONT...

RESULTS

With Singer's help, San Xavier now has a sophisticated flood irrigation system capable of controlling water pressure and levels electronically and simultaneously. The custom anti-cavitation trim works at all flows and valve openings and the customized proprietary algorithm handles level control while limiting flow and preventing inlet surges.

DID YOU KNOW...

Singer can customize the anti-cavitation trim to meet specific requirements such as limiting flow, improving already impressive low flow stability, reducing closing surges and improved PLC control over a wide range of flows.

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Singer Valve was extremely helpful during the design phase, and they even performed hydraulic modeling before receiving the contract."

JEFF RILEY,
U.S. BUREAU OF RECLAMATION
SUPERVISORY CIVIL ENGINEER



PROJECT 2:

EAST BAY'S STRUGGLE WITH WATER PRESSURE AND SURGE PROTECTION

CHALLENGE

East Bay Municipal Utility District (MUD), near San Francisco, had long faced water pressure issues throughout its water system. And despite attempts to resolve the situation, the district continued to struggle with various problems including lack of surge protection during hydrant flushing and the inability to reduce pressure in distribution piping.

SOLUTION

Kari Oksanen, vice president of Technology and Applications at Singer Valve, visited the East Bay MUD office and found the team struggling to design a new valve with standard components that met their specific requirements. After learning about the district's valve challenges, Singer Valve jumped in to design a valve specifically tailored to the district's needs. "We left it up to them to decide which valve—theirs or ours—worked better for that application," said Oksanen.

A standard pressure-reducing valve was adapted to include an integrated back-up system with a second diaphragm and a secondary pilot system that did not require electricity. Several months later, Singer returned with a prototype of the first-ever PR-SM valve. The 4-inch valve was installed and delivered excellent results.

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We had problems regulating pressure. And we had valves that wouldn't close when they were supposed to, so that caused a lot problems."

RON LAUW
FORMER MECHANICAL SUPERVISOR
FOR EAST BAY MUD



PROJECT 2: CONT...

RESULTS

With the use of PR-SM valves, East Bay MUD's primary control system is always supported by a secondary system that kicks in to control downstream pressure, but at a slightly higher pressure.

THE DISTRICT'S WATER SYSTEM HAS ALSO SEEN THE FOLLOWING BENEFITS:

- 100% surge protection
- Safe, continuous delivery when failure is not an option
- Reduced emergency repairs and costs
- Scheduled maintenance repairs
- Minimized risk of malfunction and damages

DID YOU KNOW...

Singer's PR-SM valve maintains constant downstream pressure, regardless of fluctuations in upstream flow or pressure. If the main diaphragm or primary pilot fails, the back-up system takes over.

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The valve is now East Bay's standard pressure reducing valve. And we ensured that they could retrofit existing Singer valves in their systems with the PR-SM valve."

KARI OKSANEN
VICE PRESIDENT OF TECHNOLOGY
AND APPLICATIONS AT SINGER VALVE

PROJECT 3:

MALANG CITY'S AGING INFRASTRUCTURE CAUSES DAILY PIPE BURSTS, LEAKS AND INSUFFICIENT WATER SUPPLY

CHALLENGE

Malang City, Indonesia, supplies water to 70% of the city's population. Approximately 30% of the supply is gravity fed directly from springs and 70% is pumped to eight storage reservoirs. The city has continually struggled with lack of water supply and low reservoir levels due to leakage and pipe bursts that deprived nearly 30% of the population of water supply from normal distribution mains.

SOLUTION

With daily pipe bursts and dropping reservoirs, Teguh Cahyono, the director of Non-Revenue Water (NRW) for the city, knew something needed to change. He brought in a team of experts to create a water loss management plan.

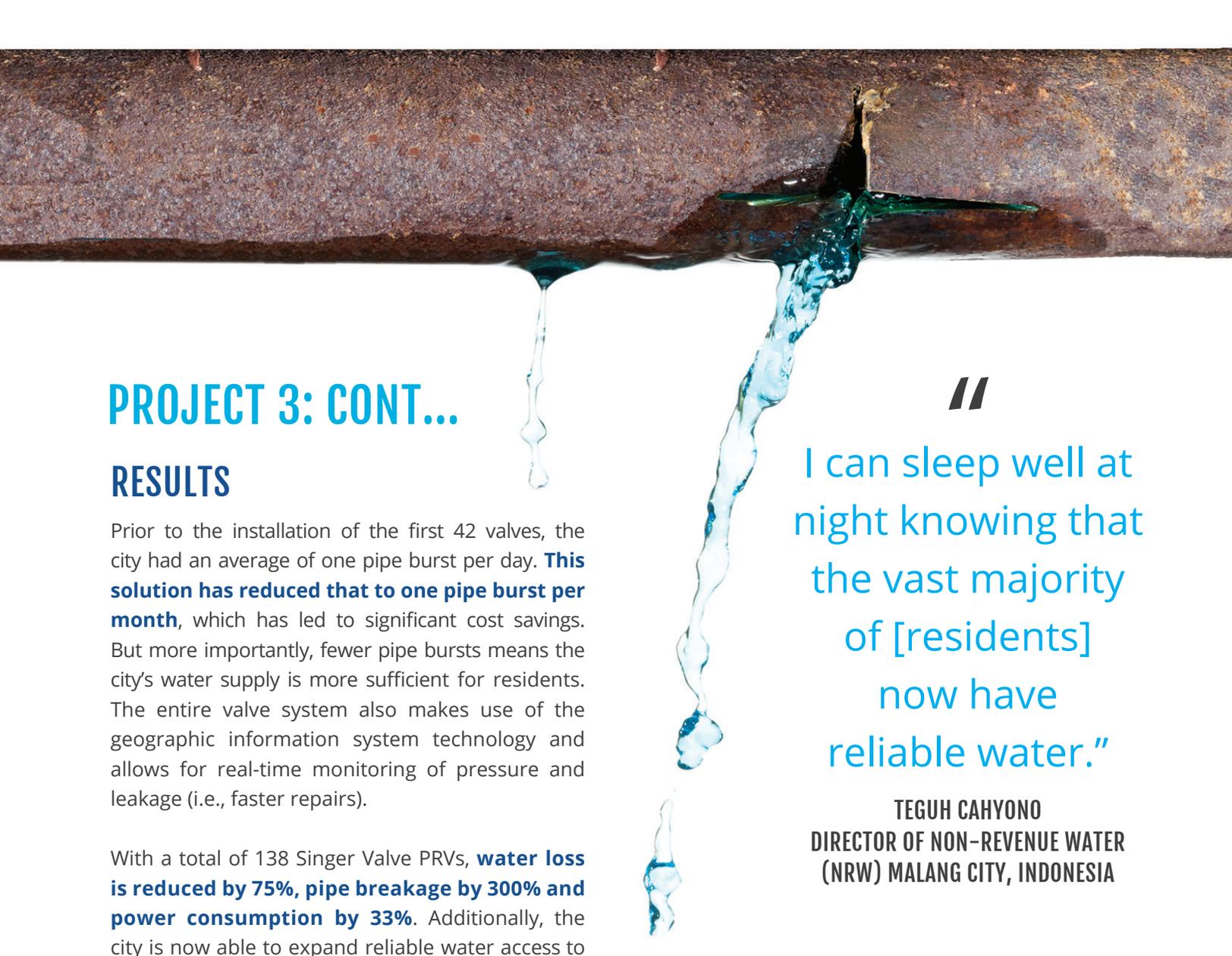
The overall consensus was to develop numerous control zones or DMA's with a single source of water comprising a meter and a pilot-operated control valve at the source of the DMA. Pressure can only be managed once the flow is measured as there is a direct correlation to pressure and leakage.

Though the water-loss management team developed a solution, securing funding from the city's water directors and other authorities was a challenge. In an effort to demonstrate that the ROI would be there, the team installed three test DMAs and PRVs near a problematic reservoir. **The pipe bursts stopped, leakage was greatly reduced and reservoir levels were maintained.** The city's directors were convinced

by the value of the test installations and funding was approved.

DMA construction began with the installation of 42 Singer Valve S106-2PR-BT units. To manage pressure at different times (day and night), two pressure reducing pilots were added to the main diaphragm operated control valves.

In addition to the first installations, larger valves were required for larger main DMA areas. These valves feature single rolling diaphragms (SRD) rather than flat diaphragms, which often have seat chatter with fluctuating flow. Moreover, the SRD provides smooth, steady and precise pressure control from maximum to virtually zero flow without the need for low-flow bypass valves.



PROJECT 3: CONT...

RESULTS

Prior to the installation of the first 42 valves, the city had an average of one pipe burst per day. **This solution has reduced that to one pipe burst per month**, which has led to significant cost savings. But more importantly, fewer pipe bursts means the city's water supply is more sufficient for residents. The entire valve system also makes use of the geographic information system technology and allows for real-time monitoring of pressure and leakage (i.e., faster repairs).

With a total of 138 Singer Valve PRVs, **water loss is reduced by 75%, pipe breakage by 300% and power consumption by 33%**. Additionally, the city is now able to expand reliable water access to new communities.

“

I can sleep well at night knowing that the vast majority of [residents] now have reliable water.”

TEGUH CAHYONO
DIRECTOR OF NON-REVENUE WATER
(NRW) MALANG CITY, INDONESIA

PROJECT SPOTLIGHT:

Learn how this water system gave their pressure reducing valves a boost without breaking the budget.

[CLICK HERE FOR MORE INFORMATION](#)

THE SINGER SOLUTION

Whether your water system is challenged with with pressure and level control issues, noncompliance with safety standards, pipe bursts or lack of surge protection, Singer Valve has a cutting-edge solution to fit your needs. Check out our [complete product guide](#) and contact a [Singer](#) representative to discuss your water system challenges.

ABOUT SINGER

Singer designs and manufactures automatic control valves for the global water industry. Since 1957, its pilot operated diaphragm control valves have been installed on virtually every continent around the world. Whether it is water loss management in Southeast Asia, water conservation concerns in Saudi Arabia or urban distribution demands in the United States, Singer provides water management solutions to governments, cities, companies and contractors around the world.