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GmbH

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VAG Pressure Management Solutions for Water Loss Reduction



VAG Pressure Management

A better tool for sustainable water supply

Leaks in water pipes and leaking valves in urban water distribution systems and pipeline networks, mainly in developing and threshold countries, are the reasons for water losses of up to 50% in relation to the water quantity being produced in the water works.

General Problem

To overcome this problem, more than often investments which are made in the water sector, are first of all made under the aspect of increasing the production, and not to generate programs to reduce the water losses. To change this way of thinking, the most economic -and ecological- solution therefore is:

To reduce the water losses in the distribution systems and NOT to permanently increase the water production.

Whilst production capacities are being increased, the structure of the pipeline system, originally designed for much smaller output volumes, remains the same. In particular, the valves, which have to regulate the flows and pressures to maintain a constant supply of potable water, cannot do their job in an adequate way. If those valves cannot be controlled exactly, this will lead to high pressure differences in the piping system, to pipe bursts, and, ultimately,



to a complete collapse of the entire distribution system.

This is the task for regulating and control valves, which will control flows and pressures, or just open and close water distribution pipelines.

How to Reduce Water Losses and Pipe Bursts?

3 VAG Solutions for effective Pressure Management

VAG offers three pressure reduction solutions to assist utilities to reduce water loss to sustainable economic levels.

The VAG Plunger Valve can reduce system pressure using the following modes:

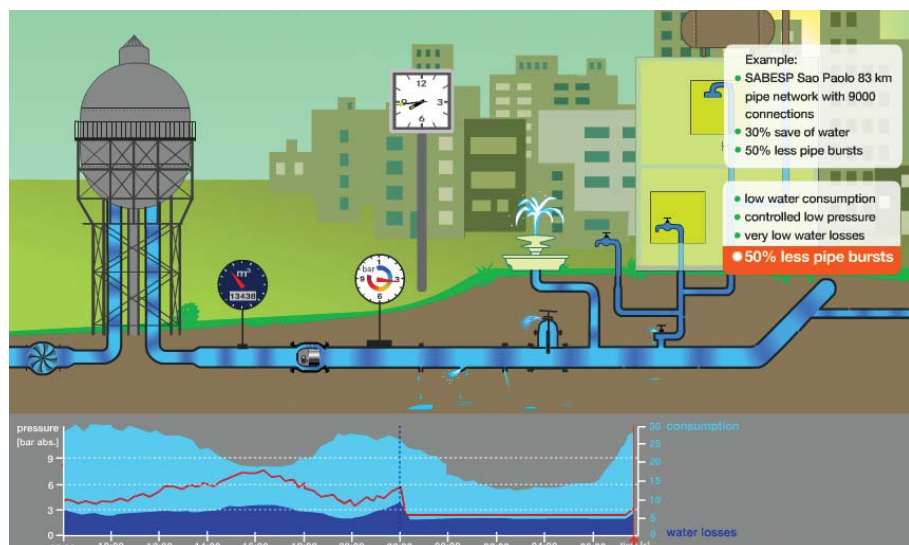
- Time Based Modulation
- Flow or Demand Based Modulation
- Remote Node Based Modulation

Each mode of operation offers different control characteristics and benefits which may be selected to meet budget and engineering requirements as discussed in the following text.

Time Based Modulation

This method is achieved by using a controller with an internal timer to change the set point of the fixed outlet control. Control is affected in time-bands in accordance with demand profiles. Time based modulation is very effective for areas with stable demand profiles and head loss and is usually used where cost is an issue, but a more proactive pressure management is desired, for example where night time pressure is to be reduced for a number of hours to reduce the effects of leakage.

The step before the Time Based Modulation is the so-called Fixed Outlet Modulation which is the most basis control which is achieved by simply modulating the valve to provide



Solution: Time Based Modulation

a steady outlet pressure (set point) as system flow demands change, and which VAG Plunger Valves can of

course handle as well.

VAG Pressure Management

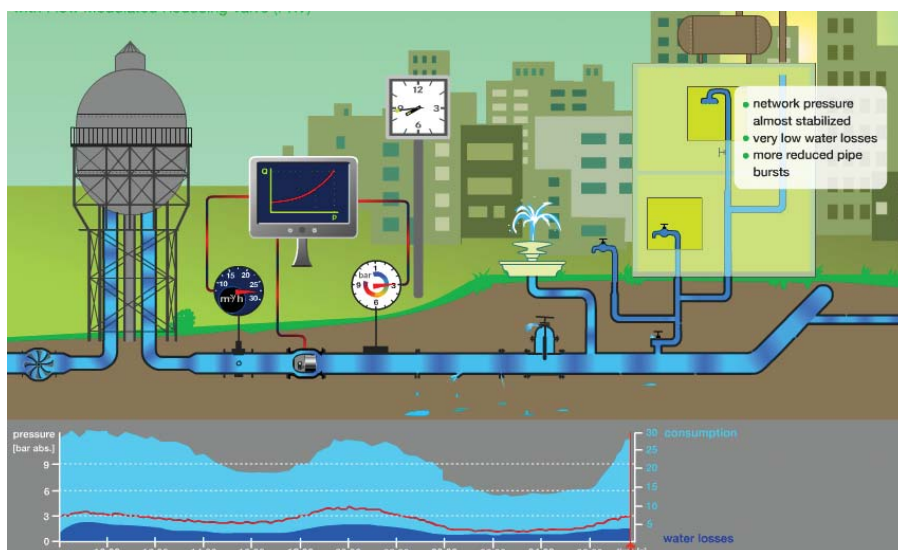
- or how to Reduce Water Losses

Flow or Demand Based Modulation

More water can be saved and more pipe bursts can be avoided when the pressure is following the demand cycle during the whole day, week, month and year.

A flow meter in the main supply pipeline is recognizing the actual demand for water in the network. This value is sent to a computer, where an evaluated curve specifically for this network is stored, this curve is showing the minimum pressure which is necessary to maintain the related flow rate.

This method has in the past proven to be the best type of control for areas with changing conditions, head loss, fire flow requirements and the need for proactive control. As demand is reduced primarily at night then pressures are reduced and as demands peak high-



Solution: Flow or Demand Based Modulation

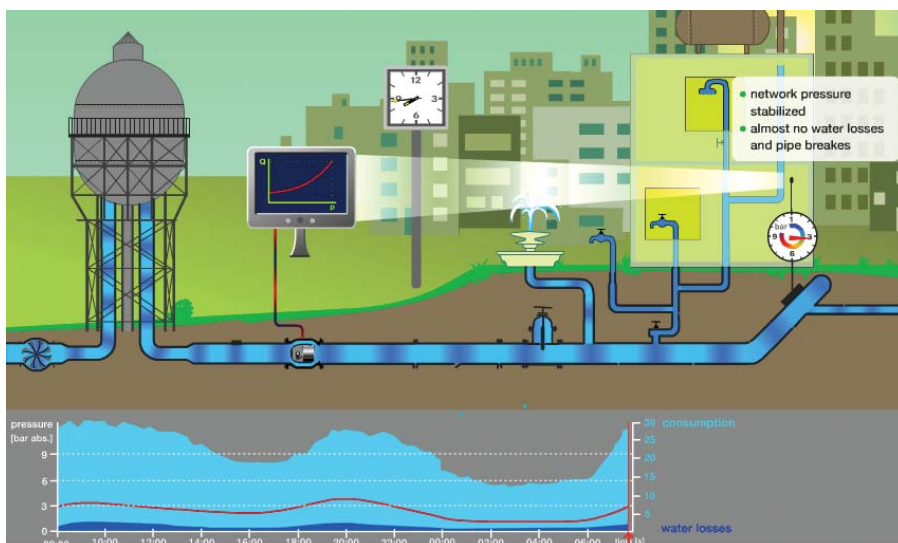
her pressures can be applied to the district. The effect is an efficient control of pressure and water loss. Additionally as pressures are smoothed out at the

weaker extremities of the system the number of new breaks is reduced.

Remote Node Based Modulation

With the Remote Node Based Modulation the pressure will be measured directly in the network at a critical place. The signal is sent via a wireless connection to the pressure reducing unit.

This type of control is probably the most proactive and is affected by connecting a remote pressure sensor to the valve controller, by means of radio or GSM. The remote sensor is usually placed at a critical point in the district and the controller set to change pressure at the valve to always maintain the desired pressure. As with the flow based modulation discussed above this mode of operation also smoothes the



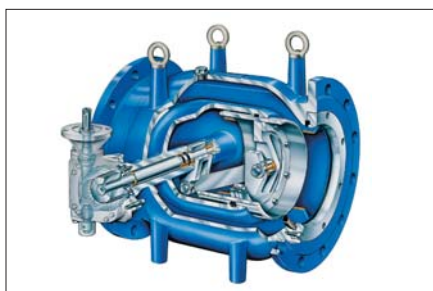
Solution: Remote Node Based Modulation

system pressure at the weaker extremities and has the added effect of

reducing the number of breaks.

The Heart of VAG Pressure Management

The VAG Plunger Valve precisely regulates the pressures in a piping system and guarantees the constant supply of water at any time, at any Condition, in perfect coordination of both, flow and pressure.



VAG Plunger Valve

PN 10...40

DN 150...1600

- linear regulating characteristic
- best cavitation behaviour
- lowest friction-loss

The Fight Against Water Losses

Case Study of Santo Amaro / Metropolitan Area of Sao Paulo, Brazil

The Santo Amaro Case

The water consumption in the Metropolitan area of Sao Paulo is continuously increasing. Today, for the local water suppliers -namely the state owned company SABESP - Companhia de Saneamento Básico do Estado de São Paulo - it is a challenge to meet the demand of the 17 Million people of Sao Paulo and ensure a constant supply of potable water in sufficient quantities.

Despite the quality service provided by SABESP it is possible to experience periods of rotational supply caused by lack of resource during a dry period.

One reason for lack of water supply is the high volume of - physical- water losses which occur during operation by leakage at critical points like mains and fittings. If the pressure can be managed effectively, then water losses will be reduced.

The VAG Task

The VAG task was to combat head loss and to apply pressure to the system when required and reduce pressure off the system when legitimate demand is at it lowest.

This was achieved by installation of an intelligent pressure reducing valve operating on a remote node modulation basis.



The VAG Solution

Supported by the German Government and in co-operation with the DEG - Germany Society of Development- and SABESP, VAG started a PPP-Project for Sustainable Water and Natural Resources Management in Sao Paulo in March 2004, and in August 2005.

VAG and SABESP installed in a pilot site in the District of Santo Amaro with a population of about 30.000 people and 80 kms of distribution pipes consisting of a highly sophisticated water loss reduction system consisting of pressure regulating valves, control panels, telemetry installations, and the supporting software. This pilot site has



demonstrated that modulated pressure management significantly reduces both the volume of water loss and the frequency of new breaks occurring. For the Santo Amaro district this means a reduction of up to 50% of new breaks and 30% volume, which is sufficient to supply an additional 8.000 people with potable water this is of particular significance in a fast growing Metropolis like Sao Paulo, and also important for other municipalities all over the world.



**VAG-
Armaturen
GmbH**

Carl-Reuther-Str. 1
68305 Mannheim
Deutschland
Phone +49 621 749-0
Fax +49 621 749-2153
info@vag-armaturen.com
www.vag-armaturen.com

VAG