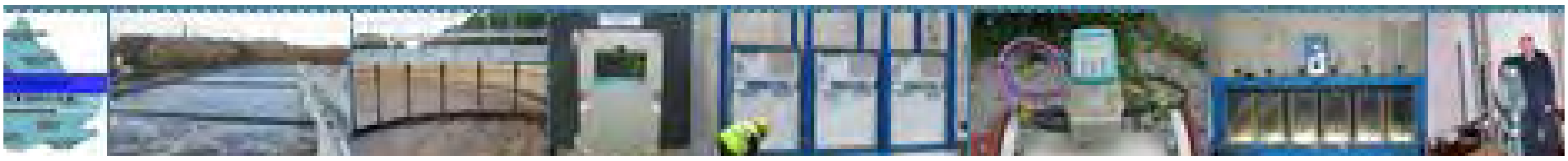


Article:

The need for Smart Wastewater Networks

With increased environmental regulation and the need to improve customer service, cities are turning to “smart,” data-driven solutions to improve their wastewater systems. Traditionally, wastewater systems have operated “passively” with system modelling and long-term goals based on historical patterns, such as rainfall, water levels and flow data (Brown et al., 2015). However, there is now a growing shift towards adopting online models, which can pre-empt weather events and ensure the health and proper function of wastewater systems. A smart wastewater system provides solutions for improving water quality, energy efficiency, sewage overflows, industrial pollution, and overall system efficiency.

There are two common types of municipal wastewater systems: Separate Sanitary Sewers (SSS), which collect only wastewater, and Combined Sewer Systems (CSS), which consist of a single pipe designed to collect and carry domestic sewage,industrial wastewater and storm water runoff to wastewater treatment plants.

Overflows in both of these systems pose threats to human health, the environment, and add to high costs incurred by utilities during the process of addressing flood events, such as when providing manpower, system management, remediation, accounting and compensation.

Sanitary Sewer Overflows (SSOs) are caused by blockages, line breaks, operational and power failures, and sewer defects allowing excess storm water and groundwater infiltration into an SSS (EPA, 2004). An SSS is not designed to collect large amounts of storm water, thus increased storm water infiltrating the system can cause untreated and partially treated sewage to be released to the surrounding environment as well as onto city streets and into residential homes (Boyd & Quist, 2015). In contrast, due to its dual-flow carrying capacity, a CSS is designed to release large amounts of untreated water into the environment when flows rise above a certain level, causing a CSO, or Combined System Overflow (EPA, 2016).

Proper operation and management is necessary in order to minimise discharges into the environment. Investing in smart, data-driven technologies can help reduce pollution by providing predictive capabilities, maintaining existing infrastructure, minimising sewage overflows, increasing storm water capture and treatment, and notifying the public in the event of a CSO or SSO (EPA, 2004). Smart wastewater technologies can stop outflows, or if unavoidable, prioritise them within the system. These solutions utilise available flow, water quality, and weather data to predict and provide updated alerts about network problems such as sewer blockages, flooding, and pipe bursts. With this information, utilities can recognise problems before they occur, reducing the flow volumes released into the environment. For example, using smart CSO solutions, network managers can decide the best method for separating storm and sewer water, as well as which flows to store within the system based upon contaminant concentrations (Brown et al., 2015).

Single Purpose Basic Alarm Devices

To estimate the impact of a sewage overflow, a utility must use either long term sensor observations or simulation models based on the unique dynamics of the system (Salau, 2016). Sensors act as a system control to aid in preventing overflows by sending alarms to system managers, thus reducing response time. There are two common types of event monitoring devices for overflows: Single Purpose/Basic Alarm Devices (SP/BAD) and True Real-time Monitors (TRM). SP/BADs provide alarm notifications in the chance of blockages that can lead to increased flow levels.

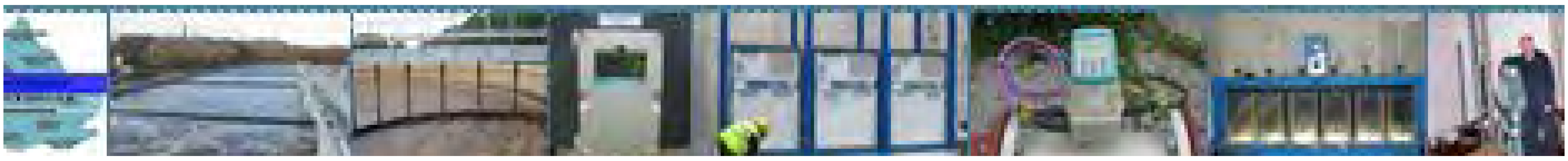
Though SP/BADs are generally marketed at a lower price point, TRM systems are more advanced and possess predictive capabilities. These solutions provide real-time viewing of remote sites, two-way communication between system managers and the system site, level and flow data, and assistance with report generation. Such trend tools allow users to not only be notified of an overflow event, but also allow for the predictive ability to avoid situations where an alarm would be needed (preparing days or weeks in advance). These devices can further assist in directing a utility’s capital to areas of the system that need it the most (Boyd & Quist, 2015).

Other examples of smart wastewater solutions integrate information from SCADA and GIS systems to simulate rainfall and runoff under various conditions. For example, hydraulic modelling solutions allow operators to model catchment systems and watersheds. This provides an accurate representation of the surrounding environment through flow equations and mapping of ground topography, water levels, and system infrastructure data. Such tools allow utilities to explore all options for system control and provide sample consequences of each situation (Boulos, 2013). In addition, smart wastewater solutions can provide notifications of flood risks to customers through several different platforms, such as via web or smart phone applications.

Before adopting a smart wastewater network, a utility must determine its “end game” based on its individual business drivers, such as financial savings, environmental impact, and customer service. It is important to consider which facets to optimise. For example, when examining the cost-benefit analysis of flood prevention, a utility must consider more than just the manpower used in remediation, but also the costs of public relations, reporting to authorities, litigation, and compensation (Boyd & Quist, 2015).

The goal of the Smart Water Networks Forum (SWAN) is to accelerate the development of smart water and wastewater networks worldwide. A more technical report on smart wastewater will be made available soon to SWAN members, complete with utility case studies for practical reference. A free, new Wastewater Management Solution is also currently under

Sewer Flow Monitoring



development as part of the SWAN Interactive Architecture Tool (www.swan-tool.com). In addition, in September SWAN is launching the SWAN North American Alliance, which will be free to join and accelerate smart water and wastewater development in North America through tailored webinars, a utility workshop, research studies and the opportunity to form internal partnerships within the industry.

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Industry News (continued)

Yokogawa releases FieldMate R3.02 versatile Device Management Wizard

Yokogawa Electric Corporation announces that it has significantly enhanced its FieldMate® device management software, and is releasing this as FieldMate R3.02 on August 10. FieldMate is a versatile software program used to configure, adjust, and manage a wide variety of field devices used in factories and other production sites. This latest version of FieldMate includes new functions that reduce maintenance workload by simplifying a number of field maintenance tasks.

Digital communications standards are playing an increasingly important role in communications between plant central control systems and field devices. With a number of digital communication standards in use today, plants often have devices from multiple vendors that use different standards. Software tools are thus required that have the versatility to configure, adjust, and manage these devices.

With its support of a variety of digital communication standards and its ability to configure, adjust, and manage a variety of devices from different manufacturers, FieldMate is up to this challenge. With this latest update, FieldMate has become even easier to use and improves the efficiency of field maintenance operations.

Previous FieldMate versions could run on Windows® 7 PCs and tablets. With release 3.02, FieldMate can now be used on PCs and tablets that run Microsoft's latest operating system, Windows 10. This is particularly significant because Windows 7 and 10 tablets are increasingly being used in the field by maintenance personnel.

Additional key new features of FieldMate R3.02 are as follows:

- One-click (touch) operation for complex procedures
- Easy comparison with past settings
- FieldMate Validator