

29 June 2021 (Tuesday)

4.00pm-5.30pm (SGT) (GMT +8)

Session 3.11 – Used Water Asset Management

Session Chair(s): Richard Lewis, Tideway London (UK)

Holistic Approach To Planning And Prioritizing Investments - From Chaos To Order

N. Kroghsbo, PH. Nielsen, P. Hallager, N. Askjær. VCS Denmark (Denmark)

VCS Denmark (VCS) is a progressive water and wastewater utility in Odense and Nordfyn municipalities in Denmark who operate, maintain, and manage an extensive sewer system. With an annual investment of DKK 150-200 million (US\$23-30 million), VCS funds many different projects, but is limited by both financial and resource constraints. For this reason, as well as their corporate commitment to following sustainable development tenets, they have implemented a proactive, systematic planning process to optimize their yearly investments. Not only driven by economic considerations, this system takes a holistic, long-term approach with a multiple bottom line. This paper will discuss how this forward thinking utility addresses the challenges of planning in a dynamic utility and municipal environment.

Designing a Robotic Platform for Deep Tunnel Sewerage System

H. Dinh, WC. Law, B. Burhan, SH. Yeo, GL. Seet. Nanyang Technological University (Singapore)

The environment in sewerage tunnels are frequently challenging for humans. It is desirable to exclude humans or to minimize human exposure. Frequently robots are challenged by obstacles and access restrictions. Robot deployment in deep large bore tunnels, is a challenging problem to resolve. Where human access is possible, inspection and maintenance tasks are frequently performed with human operators. Robot, in the long term, promises to offer a safer and more cost-effective solution. This paper describes a robotic solution for the inspection of deep large-bore sewer tunnels in Singapore, where tunnels may be 20 to 50 meters below the surface. The robotic platform includes a mobile robot and an umbilical cable management system that allows the system to capture the tunnel-surface images with incursions of up to 500 meters. The system offers the capability of stitching, the captured video images, to form a full map of the tunnel. This enhances the ease and capability of inspection. The system has been deployed and repeatedly verified in existing and operational segments of sewerage tunnels in Singapore.

Improving Used Water Plant Resiliency And Asset Performance Through Condition Based Smart Digital Pressure Monitoring Trial For Aeration Diffusers At Ulu Pandan Integrated Validation Plant

PC. Siow. Xylem Water Solutions Singapore Ptd Ltd (Singapore)

Fine Bubble Aeration Grid's Dynamic Wet Pressure (DWP) Monitoring is a critical operational activity for Water Reclamation Plants (WRP). In the Ulu Pandan Integrated Validation and Demonstration Plant (IVP) of PUB, Singapore's National Water Agency, a digital version of DWP Measuring Device (DPM) has been introduced and comparison is made against the current analogue Pressure Monitoring System (PMS). From the trial monitoring, it is observed that the digital DPM has many advantages over the analogue version from the aspect of reliability and accuracy, efficacy of automated trend monitoring and as an asset resiliency and performance improvement enabler.

Efficient Operating Conditions For Variable Frequency Drive Based Vertical Pumps Under Structural Looseness Due To Ageing

SC. Athikessavan, A. Vijaya Bhaskar, E. Jeyasankar, SK. Panda, S. Mulpuri, P. Chella, SS. Muthuraj. National University of Singapore (Singapore)

Variable speed operation of vertical pumps in wastewater treatment plants increases the likelihood of resonance conditions which in turn increases the overall vibration level of motors and pumps. Such resonance conditions are aided by structural looseness due to ageing. Although structural overhauling due to ageing is inevitable, identifying the range of safe operating speeds by conducting the impact test and then operating pumps close to the Best Efficiency Point (BEP) can reduce OPEX and also fully utilizes lifespan of motors and pumps until a major repair-work is scheduled. This paper provides insights about vibration spectrum of a decade old, four 450 kW, LV motor-pump setups under the impact test. The safe operating speeds of all the motors with maximum efficiencies are selected based on the impact test which can provide an additional overall flow rate of 200 m³/hour with a total cost savings of up to S\$36 k/annum.