Reducing maintenance costs with the Micropilot FMR20

Non-contact radar level measurement in pump stations

Icon Water is the Australian Capital Territory (ACT) supplier of essential water and sewerage services. They own and operate assets worth over $2.6 billion, comprising of the ACT's network of dams, water treatment plants, sewage treatment plants, reservoirs, water and sewage pumping stations, mains and other related infrastructure.

"Micropilot FMR20 radars can be commissioned and accessed via Bluetooth®, without entering the well. From a safety perspective, this is a major advantage, since we can avoid confined space entry and potential issues with gases."

Tom Koenig - Instrumentation Maintenance Supervisor, ICON Water

Tom Koenig - Instrumentation Maintenance Supervisor, ICON Water

Multiple obstructions can often obscure the path of a radar. With a Bluetooth® operated mapping function, these can be easily removed.

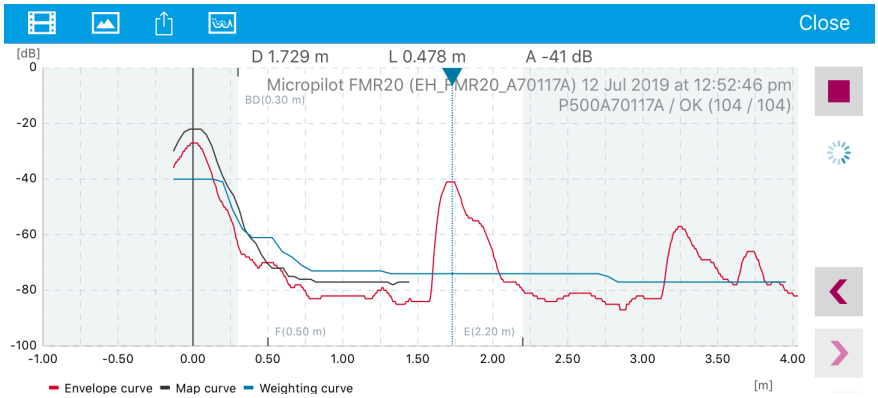
Pump operation in sewage pump stations is generally controlled by continuous level, point level or a mixture of both. Traditionally, hydrostatic probes are used for continuous level measurement. However, they can be easily damaged during standard well maintenance procedures such as cleaning, often require expensive replacement.

Non-contact level measurement can instead be used. A key challenge for non-contact level measurement in wet wells is to ensure that any stationary well obstacles are avoided so that only the moving sewage level is recorded. Stationary obstacles may include ladders, pumps and inlet pipes. For this, we need to be careful in the selection of the level measurement technology. Our choice was radar.

Challenge ICON Water undertook an extensive project to rehabilitate sewer mains which were reaching the end of their service life and at risk of blockage. The rehabilitation works served to increase reliability of their network and reduce the overall risk of sewer blockages by up to 60%. In order to facilitate parts of this major upgrade, new sewage pump stations were required in addition to the refurbishment of old.

Sewage pump stations require various online measurements to ensure efficient operation, safety and protection against the costly replacement of pumps. As well as sewage flow and pipeline pressure, a reliable and accurate level monitoring system is critical to the overall pump station performance.

Typically, level measurement is performed by hydrostatic type level sensors. However, sewage



Envelope curve for Micropilot FMR20 radar (red line) and mapping of well obstructions (black line) to ensure correct measurement.

pump stations are extremely harsh environments. Raw sewage can often contain solids and grease, which can severely impair the hydrostatic level measurement and require frequent maintenance. During maintenance and wet-well cleaning operations, hydrostatic level probes can be easily damaged and require complete replacement. This can become expensive over a prolonged period of well operation.

Due to the issues with hydrostatic level measurement, a non-contact level measurement system was trialled. As the name suggests, non-contact level instruments do not suffer the same conditions that hydrostatic probes are subjected too, since they are never in contact with the raw sewage. They also offer additional advantages in terms of remote commissioning and negligible maintenance requirements.

Our solution Endress+Hauser offered the Micropilot FMR20 radar level for this application. This highly compact radar offers advantages wireless Bluetooth® commissioning via the SmartBlue® application. Since the measurement is non-contact, we could avoid previous issues with hydrostatic level such as ragging, build-up of solids and frequent maintenance.

The wireless commissioning of the FMR20 provided a number of benefits in this application. Radars were often installed in a confined space which required specific licenses for operator access. With Bluetooth® access, radars could be commissioned outside of Ex-rated zone without the need to enter the well. Additionally, the SmartBlue® application allowed for simple mapping of the wet well to ensure that obstacles were avoided during online measurement. Bluetooth® commissioning with the FMR20 is incredibly secure – no unauthorised access is allowed through encrypted data transmission and password protected communication.

The measuring point consisted of the following component:

- Radar Sensor: Micropilot FMR20

Order code: FMR20-AAPBNWDEXR01

Results The Micropilot FMR20 provided a simple but highly effective solution and offered clear benefits over a standard hydrostatic level measurement for sewage pump stations, as described below:

- Non-contact level measurement was extremely low maintenance and avoided previous difficulties with the hydrostatic alternative
- Well lifetime costs reduced since radar levels were not damaged during cleaning operations
- Bluetooth® commissioning with the SmartBlue® application was fast, simple and safe since operators were not required to enter confined space
- The mapping function ensured that the radar avoided well obstacles and followed only the moving sewage level