

SIOT Italy Introduces Wireless Radar from Emerson for Pipe Transportation of Crude for the Heart of Europe

RESULTS

- Improved custody transfer efficiency for critical oil movement business
- Increased flexibility for future modifications – easy to add instrumentation
- Minimized cost for cabling, conduits, and cable trays
- Quick installation and commissioning, with no risk of operational disturbances due to excavation work
- Easier access to data from other instrumentation

APPLICATION

Custody transfer crude oil pipeline transportation using level and temperature measurements for volume calculations. These readings are used to calculate official values for fiscal transfers. Online blending operations are facilitated via level rate measurements from the same system.

CUSTOMER

SIOT (Società Italiana per l'Oleodotto Transalpino S.p.A.) is the Italian branch of TAL (Transalpine Pipeline), strategically located close to the Adriatic harbor of Trieste and several Mid-European countries. It comprises a tank storage terminal and port facilities.

CHALLENGE

Every year more than 400 vessels bring an average of 35 million tons of crude oil—worth approximately 13-14 billion Euros—to the SIOT Marine Terminal mostly from Africa, the Middle East, Russia and Venezuela. The 100 different grades of crude oil are stored in 32 floating-roof tanks and then pumped pure or in-line blended to be transported through a 753 km pipeline to any of eight refineries in Germany, Austria, and the Czech Republic.

SIOT had a good experience with its existing Saab (now Emerson) radar-based tank gauging system installed in 1993. The problem was that it was getting old and replacement parts were not easily available.

Furthermore, the existing cabling to the tanks dated back to the 1960s and was not suitable for modern data communication. At the time the cabling was installed, there were no regulations regarding installation within cable trays, so the cabling's shielding was worn out. Additionally, the location of the cabling created a risk of communication cross-talk.

The cost of new signal cabling, however, was estimated at about 1 million Euro.

Accurate tank level measurement is critical for custody transfer pipe transportation, so the customer looked to Emerson for a reliable, cost-effective alternative.



“Since oil movement is the core business of our company, we want the most reliable and safe system for just-in-time delivery to refineries.”

Massimo Diminich, Technical Assets Manager SIOT Italy



The TankRadar Rex gauge from Emerson is connected to a Smart Wireless THUM Adapter antenna unit (mounted on the vertical pipe above the tank).

SOLUTION

Since SIOT was satisfied with the reliability of its old radar system over the past two decades, Emerson suggested the company stay with the technology, but with a modern upgrade—wireless capabilities.

The high cost for investing in new signal cabling made Emerson’s Smart Wireless technology economically attractive, and, thanks to the robust, simple and elegant one-layer network architecture that surpassed other options on the market, SIOT eventually selected the Emerson Smart Wireless technology.

For each tank, the existing level gauge was replaced by a wireless Rosemount TankRadar Rex gauge equipped with a 12-in. still-pipe array antenna positioned on the same nozzle.

The Rex gauge uses a Smart Wireless THUM Adapter which, in turn, sends tank level and temperature data over the wireless network to a pair of redundant Smart Wireless Gateways located indoors in the control center.

“We wanted the highest reliability out of the entire system, so we added redundant gateways to the wireless network”, said Mr. Diminich.

The Gateway antennas were installed at the control center roof via a 15 m cable. Communication between Gateways and the DCS system is handled via the Modbus protocol.

Four tanks were included in a pilot test network installed in October 2011. Before putting the system into full operation, the company wanted to make sure the new wireless system would be as accurate, fast and reliable as the legacy wired system. SIOT also wanted to analyze the network with the following considerations:

- Extreme weather conditions in the area, with strong bora winds and heavy rain
- Tank sizes range between 20-80 m in diameter, and distances between tanks can reach up to 300 m
- SIOT had a bad experience with a previous non-Emerson wireless system at their marine terminal

The test went well, so SIOT is now confident about Smart Wireless and Emerson as a supplier, and will expand the network to the other 28 tanks.

Diminich said SIOT appreciates the flexibility of the open *WirelessHART*-based system. The network can easily be expanded to other tanks by adding new equipment. Additionally, the wireless system enabled each tank to be connected to a fire alarm system that utilizes the wireless network. With Smart Wireless, data from nearby equipment—such as gas detectors and switches, which are powered but have no signal lines—can be seamlessly integrated into the network, opening up numerous possibilities for future modifications.

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“Installation was quick and easy,” said Massimo Diminich, Technical Assets Manager, SIOT Italy. “The test turned out as fantastic as expected despite the worst bora in years stressing the system during commissioning.”

Emerson Smart Wireless Solution

Emerson’s Smart Wireless solution is based on IEC 62591 (*WirelessHART*), the industry standard for wireless field networks.



Technical details are subject to change without prior notice.


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