On the net

AUTOMATION By converting to a wireless measurement system, SIOT improved custody transfer efficiency for its critical oil movement business, realised significant cost savings in its communication infrastructure and increased flexibility for future modifications.

Società Italiana per l'Oleodotto Transalpino SpA (SIOT) last year faced a problem with its ageing tank gauging system. Replacement parts were no longer easily available for the old system and given the crucial strategic role of its operations it could not afford any potential shutdowns or delays.

SIOT is part of the TAL Group, which operates the Transalpine Pipeline connecting the port of Trieste with several central European countries to help meet their energy needs. The TAL pipeline system plays a strategic economic role, covering all of Bavaria’s oil supply needs, more than 50 per cent for Baden-Württemberg, 90 per cent for Austria, and more than 30 per cent for Germany as a whole and the Czech Republic.

Strategically located close to the Adriatic harbour of Trieste and several mid-European countries, SIOT handles custody transfer of crude oil through the pipeline, 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.

Every year more than 400 vessels bring an average of 35 million tonnes of crude oil worth approximately €13.14bn to the SIOT marine terminal, mostly from Africa, the Middle East, Russia and Venezuela.

The marine terminal is located in the bay of Muggia and can receive tankers of up to 280,000 dwt. Each of the four moorings is connected to storage tanks 5 km away by both the port of Trieste and several mid-European countries, SIOT handles custody transfer of crude oil through the pipeline, 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.

The existing cabling to the tanks dated back to the 1960s, when there were no regulations regarding installation within cable trays. The cabling was in a location with a high risk of communication crosstalk, and its shielding had worn out. The cost of new signal cabling, however, was estimated at about €1m, so the customer looked to Emerson for a reliable, cost-effective alternative.

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 opinions on the market, SIOT eventually selected this technology.

For each tank, the existing level gauge was replaced by a wireless Rotemmust TankRadar ReX gauge equipped with a 12-inch still-pipe array antenna positioned using the same nothole. The new level gauge was then connected to the existing temperature sensor through a Data Acquisition Unit. This nine-spot temperature sensor was installed diagonally in a pipe in order to move together with the floating roof.

The new gauge uses a Smart Wireless THUM Adapter to send tank level and temperature data over the wireless network to a pair of redundant Smart Wireless Gateways located indoors in the control centre. The gateway antennas were installed at the control centre roof via a 15-metre cable. Communication between each gateway and the DCS system is handled by the Modbus protocol. Each individual wireless device communicates with the host system through the Smart Wireless Gateway.

SUCCESSFUL PILOT

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 old wired system. SIOT also wanted to analyse the network with the following considerations.

- The region is prone to extreme weather conditions, including heavy rain and strong Bora winds that create cold, dangerous conditions. In February 2012, Bora winds reached 150 km/h and dropped temperatures to -14°C.
- Tank sizes range between 20 m and 80 m in diameter, and distances between tanks can reach up to 300 m.
- Installation was quick and easy,” says Massimo Diminich, technical assets manager at SIOT. “The test turned out as fantastic as expected despite the worst Bora in years stirring the system during commissioning.

Diminich stresses the importance of being able to rely on the vendor, having day-to-day communication with a dedicated representative, and an open dialogue when difficulties arise. Emerson, he said, met all of these criteria.

SIOT is now confident about Emerson’s wireless capabilities and will expand the network to the other 28 tanks.

Diminich says SIOT appreciates the flexibility of the open system, which is based on the IEC 62591 (WirelessHART) standard. 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 uses the same 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.

A WirelessHART device can transmit its own data as well as relay information from other devices in the network. The self-organising mesh network automatically finds the best way around fixed or temporary obstacles. Nodes can identify a network, join it, and self-organise into dynamic communication paths. Reliability actually increases when the network expands - the more devices, the more communication paths nodes will have access to.

The Buncefield investigation - and others in the systems as well as functional safety. It focuses on process, electrical, control and instrumentation detailed design to fabrication, site construction, service to the customer. Its service ranges from the needs of customers and projects. Flotech specialises in engineering, which offers engineering services, internal coatings and asbestos removal. The company to react quickly and efficiently to measurement devices during this year's show. Be demonstrating its latest high-tech level services, internal coatings and asbestos removal. Other engineering firms making a show HTS specialises in delivering Tank Integrity software for risk-based inspection, storage tanks and pipelines. The company also offers a range of inspection techniques, including X-ray, gamma ray and ultrasonic. It also offers non-invasive inspection of process pipework, offshore ritters, subsea pipelines and buried pipelines. Mistras Group provides inspection solutions for storage tanks, associated hardware and asset integrity globally, using automated ultrasonic inspection, computer radiography, acoustic emission, vibration and NDT solutions. It can undertake both in-service and out-of-service inspections. Innovation provides advanced tank floor inspection services using the saturation low-frequency eddy current techniques, recommended for corrosion screening. It offers a range of MEC floor scanners based on the technique, capable of detecting defects much smaller than would be detected by other techniques. Inventure Technologies produces RB-IT Tank Integrity software for risk-based inspection maintenance and planning. The software is part of Inventure's focus on storage tanks and is also compliant with industrial standards and regulations. Asiax Engineering Associates is a UKAS-accredited inspection body for pressure vessels, high hazard systems and storage tanks, and is also able to prepare and certify written schemes of examination. The company also designs bespoke repairs or modifications to storage tanks, valves and tanks and ensures its repairs are code-compliant. Process Services will be presenting Xiscor, a highly sensitive leak detection system for underground and aboveground storage tanks and pipelines. The system locates leaks without the need for the tank or pipeline to be taken out of service, which can be used in a variety of locations and is compatible with any hydrocarbon and almost any chemical.

What's in the tank?
Another critical element of tank terminal operation that was highlighted by the Buncefield report was level monitoring and overflow prevention. Technological improvements are making sophisticated gauges and inventory management systems more reliable and easier to install and operate. Several providers will be in evidence in Coventry, including Honeywell Enraf, which offers a variety of services for terminal operations, up to complex turnkey solutions to meet government regulations for safe and optimised operations. These solutions also cover inventory management, control, automation, fire and gas, security. Endress and Hauser offers reliable and accurate solutions for all inventory management applications, including inventory monitoring of levels in tanks and storos, along with scalable software packages that can monitor inventories on a local, global or national scale. Omnima specialises in remote monitoring, critical alarm and event management, data acquisition, and control and energy management. It also offers remote status monitoring and multipurpose multi-sensing, multi-input, multi-output and multi-service alarms. In systems can be used on petroleum and diesel tanks and chemical storage. Flexim Industries UK manufactures non-invasive flow measurement solutions for liquid and gas pipelines, and also provides non-invasive mass flow measurement and product identification. It will be exhibiting its range of non-invasive clamp-on flow metering technologies on a demonstration liquid flow rig. Magneto International is a long-established supplier of level and flow instrumentation used across a number of industries, including the oil and gas, petrochemical, and chemical power sectors. It provides a range of solutions and products for various applications using state-of-the-art technology. Radar Tank Gauging is a distributor for the Rosemount Raptor high-accuracy tank gauging system designed for storage facilities that store high-value liquid products. Raptor can be used for refineries and tank terminals, and offers high accuracy and repeatability.

Equipment for all
Some of the regular exhibitors are returning once more to the TSA show, offering products to help terminal operators improve efficiency and safety. For instance, Fort Vale Engineering will be showcasing its Safeguard petroleum bottoms loading coupler and its range of Dryflow disconnect couplings, for use with a variety of liquid cargoes including chemicals and foodstuffs. Dantes manufactures a range of high quality composite boxes including Dryseal and PA boxes. Dantes has a range of composite boxes for use with biofuels and other products. It also offers a hose inspection, repair and certification service, more information on which is available on its new website, www.dantes.com.

Other exhibitors involved in product transfer include: Eladex, which produces a range of hoses, expansion joints, dry-disconnect couplings, nuts and flange assortments. It will also have the Mann-Tiky disconnect couplings on show. Loadtec provides solutions to companies that have issues with bulk liquid transfer and fall prevention, with a range of products including tank loading and unloading arms and access platforms. This year Loadtec has introduced a range of high-integrity loading arms for fuel and chemical use. IFC Inflow supplies loading equipment and safe access systems for fuel terminals, including petroleum bottoms loading and chemical loading rakes, loading skids, safe tanker access and folding stairs. Looking for Blasting roofs or tank seal? Check out Baillie Tank Equipment, HMT Rubbings and Anrex, which says it has the first silicon-free aluminium dotme roof on the market. Coatings and linings are on offer from PPG and International Paint.

MRC Transmark is the largest distributor of valves and sensors for the oil and gas market in Europe. It offers a wide range of both manual and automated valve types, and can provide a range of bespoke solutions for all applications. Protege will be showing its tank valves, flame arresters and a range of tank equipment. It will be demonstrating its testing programme at the exhibition, which allows the user to calculate venting requirements for storage tanks, and is also introducing a range of lighting and static protection solutions. Flare Industries specialises in combustion and pollution control technology, providing quality flare systems, thermal oxidisers, incinerators, burners and ignition systems. Knowlsey SK designs and supplies specialist firefighting equipment and systems for oil, gas and petrochemical industries for use in offshore and onshore locations. It also offers tanker protection services, remote-controlled monitors and jetty protection systems. The 2013 TSA conference and exhibition is shaping up to be another success for the UK's bulk liquid storage trade association. All exhibitor spaces have now been sold out, so companies looking to get in on the act should get their names down soon for the 2014 event. Prospective delegates should be aware that, although the increased capacity in the E.On Lounge at the Ricoh will accommodate 350 people, the news is that spaces are selling quickly, so get your name down. This is the event not to miss!

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September 2013 HAZARDOUS CARGO BULLETIN

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Engineers at large
Storage tanks are important assets, and keeping them maintained and in line with safety regulations is of vital importance, never more so than in the post-Buncefield environment. A range of exhibitors specialising in different tank-related areas are attending this year's event, offering a variety of services for those looking to build or maintain their tanks. Pyrenex, a large and well-established industrial service contractor recently acquired by Wood Group PLC, provides a range of fabric maintenance and infrastructure support services for tank farm operators and is one of the UK's primary painting and protective coating specialists. Pyrenex offers a full range of services, including tank protection services, internal coatings and abrasive removal. ABB Consulting, which provides one of the speakers at last year's TSA conference, is an international technical consultancy that also provides engineering services and will be demonstrating its latest high-tech level measurement devices during this year's show. ABB's Mark Austin says the company is 'devoted to be involved with the 2013 TSA Conference', which 'provides an excellent opportunity for the industry to impress in performance even further'. Other engineering firms making a show of themselves in Coventry include Flotech Performance Systems, which offers engineering and turnkey services, including design, manufacture, installation and site support. It also has a team of in-house designers, allowing the company to react quickly and efficiently to the needs of customers and projects. Flotech specialises in solutions for the storage, transfer and distribution of liquid and gas products, Fusedon Storage Tanks specialises in the design, construction and refurbishment of aboveground storage tanks. It has a team of professionals dedicated to ensuring a delivery of high quality service to the customer. Its service ranges from detailed design to fabrication, site construction and post-installation, maintenance and support. EMERSON Engineering Group specialises in delivering process, electrical, control and instrumentation systems as well as functional safety. It focuses on instrumental, automated, control, safety systems, and delivers a high level of engineering and expertise.

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Monitoring and inspection
The Buncefield investigation - and others in the field in recent years – have highlighted the need for effective maintenance and inspection programmes. Visitors to the TSA exhibitions will have plenty of opportunities to choose from, including Inspection Consultants (InCor), an inspection company that specialises in non-destructive testing (NDT), with services including storage tank, pipeline and heat exchanger tube inspections compliant with a range of guidelines. It also offers storage tank floor inspection, storage tank integrity management and a range of other services. Earlier this year it introduced a comprehensive tank cleaning service, including tank isolation, cleaning, blasting and return to service. Silverswing UK is a specialist NDT inspection service provider with a focus on storage tank vessels and pipelines within the petrochemical industry. Silverswing has a team of specialist NDT technicians and certified inspectors to provide a complete service, using the latest technology and inspection equipment. In service includes magnetic thin-liguid leakage detection and much more. NDT Global Services offers a range of different inspection techniques, including X-ray, gamma ray and ultrasonic. It also offers non-invasive inspection of process pipework, offshore ritters, subsea pipelines and buried pipelines. Mistras Group provides inspection solutions for storage tanks, associated hardware and asset integrity globally, using automated ultrasonic inspection, computer radiography, acoustic emission, vibration and NDT solutions. It can undertake both in-service and out-of-service inspections. Innovation provides advanced tank floor inspection services using the saturation low-frequency eddy current techniques, recommended for corrosion screening. It offers a range of MEC floor scanners based on the technique, capable of detecting defects much smaller than what would be detected by other techniques.

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