



HOW TO AVOID BUILDING A NEW 10-YEAR-OLD TERMINAL

Five experts from Emerson share their thoughts on technologies available that could significantly improve terminal operations

As an industry, it's common to see new terminals and expansion projects that by some measure are 10 years old the day that they are commissioned. One root cause is a hands-off approach to new technologies. Add to that the aging workforce set to retire and the new technologies are being left to their millennial successors to implement. There are many reasons for a hands-off approach from 1) 'we have always done it that way' 2) 'new technologies are too expensive' 3) 'resources can't maintain what we have, let alone new technology' or 4) 'just get it built and we'll optimise it afterwards'.

Recently, Emerson received a request from a customer who wanted to buck the trend and understand what technologies are out there that they should consider. Their request was driven by market conditions, which are favourable today but they expected to see tightened – in other words 'can we invest now to gain a competitive edge in the future?' A cross section of experts from Emerson share their thoughts on technologies that could significantly improve terminal operations.

WIRELESS TANK PRESSURE CONTROL

Michael Calaway, Fisher Regulators and Flow Control Products

Historically, tank pressure control products such as pressure vacuum relief valves, emergency vents, and tank blanketing regulators have been forgotten about or ignored. A survey conducted by Emerson in 2014 showed that many tank operators use external gas detection and visual inspection as a primary method of detecting tank pressure control problems. Operators are also reactive to tank pressure control problems rather than proactive. This means that the industry is relying on 'after the fact' detection of events

Operators are also reactive to tank pressure control problems rather than proactive

or worse sending operators into potentially unsafe situations.

When contacted to solve a tank pressure control problem, it is rarely already diagnosed down to a single device, but more often the effect of the problem. For example, the top three effects of poor pressure control that are encountered are high blanketing gas usage, high maintenance costs, and poor product quality typically a result of product oxidation.

Operators should start by getting visibility to what the tank top pressure control devices are doing. On the safety side, begin monitoring the devices being used as the last line of defense. Depending on the tank this could be the emergency pressure relief vent (EPRV) or a large pressure vacuum relief valve (PVRV). When a device is being used as a last line of defense operators should be aware if it is not functioning properly so that they can take proper action to resolve the problem.

Next, begin monitoring the tank pressure



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even as fluids change temperature and pressure causing the volume to expand and contract.

WIRELESS ROOF TILT MONITORING

Ulf Johannesson, Rosemount Tank Gauging

More than half of the world's larger tanks used for storing common petroleum products have floating roofs. Floating roofs offer environmental and economic benefits over fixed roofs without the need for vapour balancing and recovery. However, the risks of floating roofs sinking, tilting, leaking and sticking is often overlooked leading to costly structural damage and major environmental and safety risks.

Given these various issues that can affect floating roofs, it is vital for operators to be provided an early warning, should an abnormal situation occur. An automated monitoring solution involves level instruments being installed at multiple points. This provides the advantage of continuous surveillance and real-time verification that the floating roof is operating as it should. There are two options for where these instruments can be placed - either on top of the tank, or on the floating roof itself:

- 1) Three non-contacting radars (NCR) such as Emerson's Rosemount 5900 series are installed, mounted at 120 degrees from each other. The presence of roof tilt can be tracked by comparing the level value from all three radars. This non-contact solution is highly accurate and reliable. It is suitable for any size of tank, and can be retro-fitted to existing tank gauging systems. Its functionality as overfill protection is a further benefit, along with the redundancy of the level measurement.
- 2) Three wireless and battery-powered guided wave radars (GWR), such as Emerson's Rosemount 3308, are installed on the roof. The have probes penetrating through the roof and into the liquid below. Potential roof tilt is tracked by comparing the immersion levels of the probes into the liquid product. Using this solution, alarms can be generated for issues with not only tilting, but also buoyancy and roof sticking or sinking.

An automated monitoring solution provides operators with 24/7 surveillance and real-time verification that the floating roof is operating normally. Automated solutions offer an improved means of maintaining the integrity of the roof, helping operators adhere to the recognised industry standard API 650. Automating what was previously a manual task can also help operators meet health and safety regulations. It provides a significant risk reduction compared to manual inspections, for a relatively low investment.

WIRELESS PUMP HEALTH MONITORING

Mark Granger, Reliability Solutions

Scheduled maintenance versus conditioned based monitoring for pumps is still pervasive

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01 & 02 Wireless regulators and PVRVs provide control room visibility and reduce operator trips to the field

03 Coriolis helps terminal operators reduce maintenance activities while improving confidence in measurements

04 Just one roof tilt event can justify the cost of an avoidance solution

05 Wireless pump health monitoring provides a cost effective method to avoid unplanned failures

uled maintenance costs that other metering technologies require. They also employ advanced internal diagnostics, like the micro motion smart meter verification, or SMV, that indicates when the meter is measuring accurately and when it might not be, whether because of unexpected damage to the meter itself, or even just because of a process upset like vapour in the line.

In terminals that receive from multi-product pipelines, transmix can be reduced by using Coriolis meter density and mass flow rate measurements together to control divert valves at the precise moment. This reduces contamination of product in storage by transmix, while at the same time not sending perfectly good product off to the slop tanks resulting in needless reprocessing.

Recently, Coriolis meters have been used for leak detection of the interconnecting piping system because they measure mass flow directly. Mass flow measurement makes the whole system easier to monitor for leaks,

and the devices that control this pressure. Using wireless position monitoring technology, tank operators can now monitor the position of their pressure control devices. This position indicates along with tank pressure measurements vital information for detecting, troubleshooting, and even preventing pressure control problems. It seems simple but recently Emerson saw a project where the insurance costs alone dropped by 40% by adding wireless tank protection methods.

THE UNTAPPED BENEFITS OF CORIOLIS

Marc Buttler, Flow Solutions

With the latest in modern flow measurement technology, opportunities exist for improving terminal operations. Coriolis meters provides the ability to measure fluid density simultaneously with the flow measurement and is a great online tool for monitoring product quality and consistency. The density measurement also provides an instant warning if vapour or cavitation should occur indicating that there may be a problem to investigate with a pump or seal upstream.

One of the key benefits is that Coriolis meters require no maintenance, so they instantly save 100% of the ongoing sched-

“Automating what was previously a manual task can also help operators meet health and safety regulations”

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in the terminals world and we continue to see pumps run to failure resulting in disruptions to operations and potentially hazardous situations. In Europe, the ATEX 95/137 Directives for the identification and assessment of explosion risks has customers looking for ways to meet the requirements of the Directive while continuing to keep legacy equipment in lieu of a costly replacement program.

An easy and cost effective method for remotely monitoring the health of pumps is the addition of wireless temperature and vibration transmitters to the pump tied into a wireless gateway. One wireless vibration transmitter can monitor both the pump and the motor to provide very early notification of problems that if left alone will result in unexpected downtime, costly repair, and potential loss of containment. The measurement signals are automatically processed in the transmitter and sent for immediate and early problem notification. Maintenance can then remotely analyse using predictive diagnostics to determine the specific pump performance issues and needed maintenance activities to prevent unnecessary downtime. The wireless gateway also eliminates the need for hard wiring back to the control room reducing installation costs

as well as providing a wireless network that other measurement points can be added to.

INTEGRATED TERMINAL MANAGEMENT SYSTEMS

Aaron Boettcher, Automation Solutions

For terminal operators, efficiently maximising the throughput of the terminal is critical to remain as key suppliers to their customers and to be financially successful. Surprisingly, many terminals are still operating without an integrated terminal management system to plan and manage the loading/unloading operations and – more importantly – to provide visibility

and management of the terminal’s inventory and commercial activity.

Fully automating the loading process from entry gate to exit gate is a core capability of most terminal management systems. Advanced features can manage and optimise truck traffic within the terminal and before the trucks arrive. Terminal operators have achieved real gains in throughput by implementing terminal management systems such as Emerson’s TerminalManager to manage their loading operations, with 15% to 30% improvements of terminal throughput over the baseline.

In addition to managing truck loading, advanced terminal management software systems provide a single integrated platform to manage the entire terminal business process: bringing in customer orders, executing the loading operation, charging for services, managing inventory, and billing activity back to the customer. This eliminates manual processes between disparate systems, shortening the month-end closing process from 10 or more days to as few as two or three days. These new systems are built not only to move products but to efficiently move information which in turn optimises the order to cash cycle for the terminal and helps streamline the customer’s supply chain logistics activities. With today’s modern, integrated terminal management systems, terminal operators have the tools they need to reach new levels of business performance, customer satisfaction, and overall profitability.

CONCLUSION

These are a few technologies that are available that provide tangible benefits to terminals operators. Wireless in general is having greater acceptance than even two or three years ago as operators look to increase the flow of information from the field to the control room. In addition, Terminal management systems are continuing to focus more on connecting the field to the Enterprise in order to move information to facilitate a faster order to cash cycle.

FOR MORE INFORMATION

This article was written by Chris Amstutz, director, tanks, terminals & transportation at Emerson Automation Solutions.

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