

Industry Trends.

Automation
Transformation

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by **EASYFAIRS**

The Case for Automation Transformation in a Post-Covid-19 Age.

Manuel Arroyo, Director of Oil and Gas Industry Programmes, Emerson Automation Solutions, discusses how terminal operations can leverage process automation technology as a business strategy to good effect in 2021, increasing capacity, enhancing safety, and improving profitability.

The Market

While COVID-19 threatened to seriously damage the global liquid storage terminal market, the fact is that today, markets are stabilising. The market is still growing and it's projected to be worth around \$37 billion by 2027. Storage capacity is expected to grow by eight percent from 8.3 billion barrels in 2020 to 8.97 billion barrels by 2024. So, how can terminal operators make the most of these positive forecasts and achieve operational excellence in a post-COVID-19 world?

Safety, Efficiency and Performance

With the increased size and complexity of today's storage terminals, mitigating risks for employees, assets and facilities is quickly becoming a major focus among terminal operators, especially as incidents can affect the overall supply chain. While terminals are already beset by extensive safety regulatory requirements, the rapid industry growth has forced operators to attempt to remain compliant without necessarily increasing personnel. The handling and storage of hazardous liquids has always been inherently risky, and with the industry continuing to grow, it's essential that today's terminals are safe as well as operationally efficient.

This requires a reversal of the traditional industry mindset of maintaining the status quo, which has fostered a sceptical approach to automation and digitalisation where risk-averse companies sometimes believe new technologies are too difficult to adopt or are not practical for day-to-day operations.

This attitude leaves many terminal operators stuck in a cycle of using outdated, unreliable, and inefficient systems to perform some of their most important work. This can cost such operators millions in unrealised revenue as well as millions in regulatory compliance fines – of course, this only puts them further behind the more forward-thinking competition; not only in terms of profit margins, but also operational efficiency and workplace safety.

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Digital Technologies

So, let's take a look at the four main areas where digital technologies can help terminal operators achieve operational excellence:

- **Safety** – remove workers from high-risk activities like climbing tanks for manual readings, avoid the potential for product contamination and the loss of primary containment.
- **Capacity** – eliminate time-consuming manual processes that harm asset capacity, inventory turnover, custody losses, terminal throughput, and revenue capture.
- **Reliability** – employ technology to gain predictable capacity available data, lower maintenance costs, and reduce risks due to equipment failure events.
- **Energy** – use technology to become more sustainable by lowering energy usage, reducing emission levels, and reducing overall energy costs.

A Path to Digital Transformation

Certainly, there are best practices that terminal operators should follow when implementing a digital strategy in order to maximise a return on investment. The best performing terminals are those with a cross-functional integration of digital technologies, software, service, and expertise that optimise asset utilisation while maximising revenue.

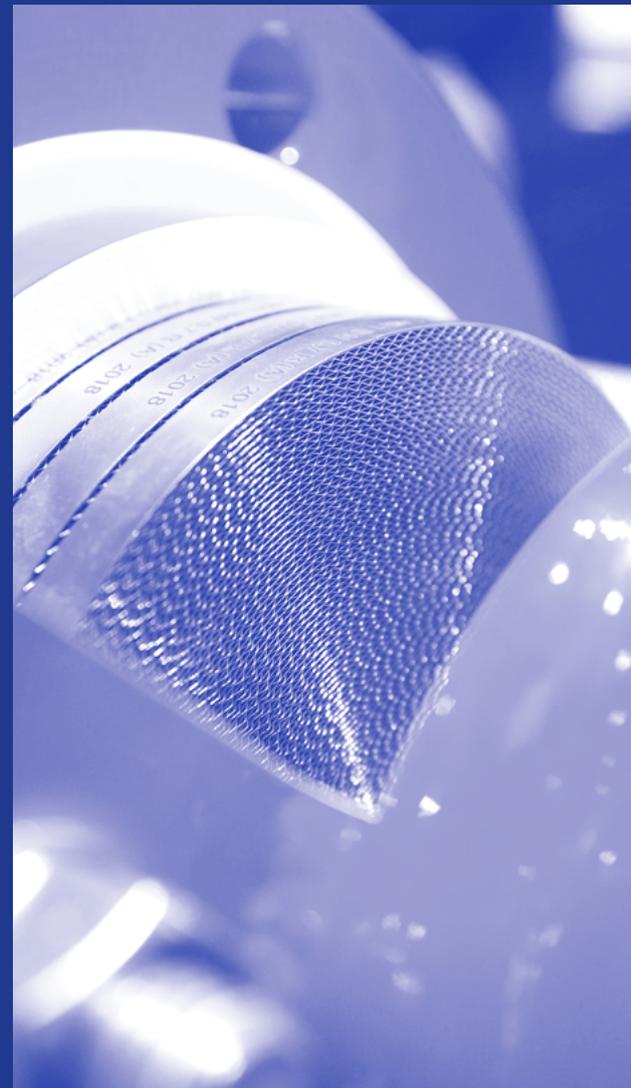
A successful path to digital transformation starts with a clear business case in an area with potential for improvement. Then, terminals should leverage industry and technology experts to identify proven methodologies of improvement. Finally, decision-makers should ensure that their investment considers organisational readiness and its connectivity to company culture.

In response to the industry's demand for clear guidance on facilitating digital transformation, Emerson developed its Digital Transformation Roadmap. It is intended to help companies develop and execute a tailored digital transformation plan to ultimately enable top-quartile performance driven by operational excellence.

Any roadmap should consist of two primary focus areas – impact domains and enabling domains. Impact domains cover capabilities and performance relative to industry benchmarks. Enabling domains focus on capabilities in organisational effectiveness, systems, and data integration. This approach provides terminal operators with a clear starting point to realise quick wins and maximise ROI.

A Conclusion

While the cost and complexity that comes with implementing an automation and digitalisation strategy can be daunting, such concerns are usually allayed when you consider the cost of not getting with the times and not using digital technologies. In a post-COVID-19 world, it is going to be the terminal operators that embrace the times that demonstrate best industry performance.



Q&A with Terra Inspectioneering.

How did Terra get Started with Drones?

After working for big companies in the process industry for more than 40 years, I started my own company in 2012, because I had a vision that in the new era of inspections in dangerous confined spaces, we should replace the people with robotics.

It's very, very difficult to make changes in the process industry and initially take-up was low. Acceptance was hindered by legislation. Which is far behind what you can actually do with drones. In 2016 I came together with two other companies and we founded a company called RoNik Inspectioneering. We had three sets of expertise. One company specialised in inspections compliance with the rules and regulations for the process industry. One company was a start-up company developing drone hardware and software for the process industry, because normal commercial drones are not suitable. And then there was myself. After many years I know all the big customers in the industry and I had my network. By bringing those three elements together we could give our customers in the process industry a total service package. From that time, we were already very specialised in confined spaces. We started our own research and development department developing hardware and software with one theme – to develop full inspection procedures in the process industry.

In 2019 we were approached by Terra Drone, a worldwide drone inspection company headquartered in Tokyo in Japan. They already had their own drone inspection companies in about 30 countries, but they were all related to outside inspections, for example for flare stacks and infrastructure like bridges and power lines. None of those companies had anything on confined spaces, so Terra took a stake in the company and from that moment our technology, that we developed here in the Netherlands, has been deployed over all of those existing 30 countries.

There has been a lot of reluctance when it comes to drones, but in 2018 the CEO of Dow, Jim Fitterling, announced that by 2025 there will be no more people in confined spaces in Dow. Everybody had been avoiding drone technology because they thought it was risky but then Dow made it a directive. Shell followed and BP followed, and others, under the new wave of acceptance.

What are the Main Advantages of Using Robotics and Drones for Confined Spaces?

A key driver for using drones is safety, because you don't want to have people in these dangerous environments. 80% of the accidents that happened in the process industries are either working in a confined space, or working at height. If you have a very high storage tank of about 30 metres you are in a confined space and you have to work at height. We can eliminate this.

The second thing that is very important is the time reduction on the inspection cycles. If you have a tank of about 60 metres in diameter, normally you have to bring everything in piece by piece through the manhole to build the scaffolding, and then have everybody working on the inspection. One example is a customer in the Netherlands who would once inspect their big tanks by means of rope access. That would take three weeks with five people to do the complete inspection internally. Of course, they had all the issues of five people being continually in the confined space so it was the highest risk, and the work permit process was very complicated with trying to guarantee the safety of all those people.

By doing this with drones, inspections now take just three days with only a maximum of four people. This kind of huge difference is feasible right now.

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Also, because the inspection time is much less, the uptime of your asset or your tank is much higher. Another example is a big terminal that was in discussions with the authorities about the status of the tank, the predicted lifetime and suitable inspection intervals. We introduced a fully detailed plan and digital inspection method. The authorities were astonished. There is so much data available using this method compared to the data that is usually taken manually. Also, because this data is taken automatically, the quantity is much better and it's repeatable. Normally when an inspector goes in a tank, he has a piece of paper and writes down the values. He may take photographs but that's it. Perhaps when he comes back in the office, the original value was 6.3 but he can't read it so he enters 6.8 into the Excel sheet. Secondly, maybe he can't remember quite where he was in the tank when he took a particular picture. The drone takes thousands of measurements, so the data is much better. By proving this to the authorities we were able to reschedule the inspection interval from 10 years to 17 years.

What Changes do you Think we can Expect in Drone Technology?

Our approach is to focus on digitalising the inspection process, particularly the report for the customer that's given to the authorities to prove compliance with legislation, and also the safety report. These reports are much more reliable using digital technology. The first step is improving the data capturing. The interest is not so much with what drones we're flying.

When a drone enters a tank, it is effectively flying in a Faraday cage, with no compass or GPS. At this moment, when we do non-man entry, we still have to rely on pilots and a lot of the quality is determined by their capability. We are working now to fully automate these drones so they can fly on their own. We are building a network right now that will allow an operator to go to a screen, give it the code, put the drone inside the tank and then it flies on its own exactly where you have determined that it needs to fly. The inspector doesn't have to be in the field, you only need one operator to make sure that everything is going okay with the drone. The inspector can still say behind the screen and see the real data streaming from the drone. This is a new shift in the whole inspection methodology. We've started that already but it's still in development.

Is There Anything Else You Think People Should Know About Terra or Drones?

There is a lot of resistance to drones, because the culture of the process industries is so conservative, so we have to fight against this. One of the hurdles is that people automatically think that the drones are dangerous. On the other hand they consider it safe to have people working up scaffolding on ropes at 30 metres in a confined space because they've known this and been used to it for 20 years. When you take a realistic view of this, it's complete craziness to send people into a dangerous environment, just because you're used to it.

A new maintenance trend that a lot of companies are implementing is risk-based inspection, (RBI). This can give very good results, and also one of the things it predicts, amongst others, is the lifetime of your asset using using a model. If you don't have the data these RBI systems are unreliable, or they predict values with a much broader spread, for example an asset life of 12 and 16 years, but which is it? You need the right data and the right quality of data. Drones can give 1,000 times more data than manual means. If you feed this into an RBI system you can do a very precise prediction as to what your lifetime will be, instead of giving a spread of four years. The next step will be to bring the value-adds of this kind of calculation. The people who take RBI seriously should realise that they need quality data, and that drone technology is the best alternative.

Marien van den Hoek, Commercial Director, Terra Inspectioneering

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How RBI Inspections can Reduce Overall Compliance Risks & Costs.

Electrical equipment in hazardous area inspection campaigns often begin with a clean slate, with little or no historical design, equipment certification and inspection information available to the inspection personnel. Inspectors head out into the field with little more than an equipment list and inspect the installation 'as they see it.'

Unsurprisingly, this approach generates large numbers of unnecessary defects and follow up actions during inspections. For example, where certificates, declarations, specific conditions for safe use, justifications for use or intrinsically safe circuit descriptive system documents are not available to the inspector, defects or follow-up actions are usually recorded.

Alternatively, the inspector may leave the checks on hold until this information can be located and confirmed. Lack of in-field access to compliance documentation thus results in inefficient, ineffective inspections, where actual defects risk being lost amongst the flood of spurious items raised due to uncertainty and poor information availability. Often the same spurious items are raised repeatedly in subsequent campaigns, for the same reasons.

Certified tablets combined with Ex inspection and dossier management platforms such as Ex-Online have provided a step change opportunity to improve the effectiveness of inspection campaigns and verification dossier management. Such systems can provide in-field access to engineering and compliance data, allowing faster inspections with higher quality, more consistent data capture, automation of reporting, and much lower levels of follow up activity. This not only translates into immediate cost savings but can also provide a platform for implementation of Risk Based Inspection (RBI) methodologies to unlock further efficiencies.

Rhys Davies, General Manager, Ex-Online, QGE Australia.

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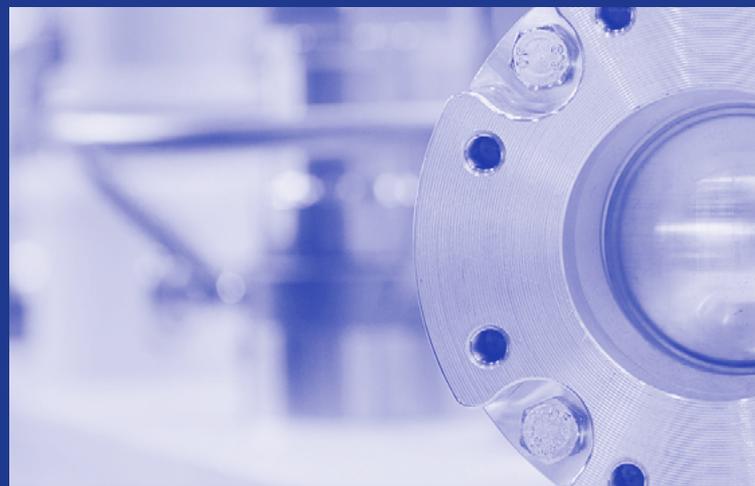
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Emerson to Launch New Mobile Inventory Management System.

For tank farm operators, inventory data is critical to run efficiently. All the way from accepting orders, receiving shipments and filling and emptying tanks to closing books at the end of each month. Inventory status is what underpins operations and business decisions. Modern inventory management software enables more people to access information they need by providing live data at any time, and any place.

Emerson's Rosemount TankMaster Mobile inventory management software is a web-based app optimised to work seamlessly across smartphones, tablets, and computers. It is easy to use and provides instant inventory overview as well as quick access to tank details. Gone are the days of siloed information that would not reach outside of the tank farm control room. Instead, shared inventory insight provides the opportunity to increase efficiency, drive productivity and improve communication throughout the supply chain.

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