DIGITALISATION: HERE TO STAY?

Juan Tapia, ABB, Spain, considers whether digitalisation is more than just a passing trend in downstream tank and terminal operations.

Digital business transformations are about doing things differently – creating new business designs using digital solutions to deliver more value to businesses, people and processes. While it seems that everyone is talking about these digital solutions, one key question is whether this is a passing trend or a truly transformative opportunity.

Sluggish global growth and the highly commoditised market for petroleum products mean that downstream companies, such as tank and terminal operators, need to explore new areas of process optimisation. Integrating automation, safety and other systems, such as telecommunications, can save companies 20 – 30% in capital and operating expenditures.

For example, one way to minimise downtime is to take full advantage of today's availability of inexpensive, non-intrusive sensors and real time asset monitoring systems. These devices make it possible for companies to shift away from time-based maintenance strategies, which can repair equipment too often or too little, to

Figure 1. CLH loading bays. Trucks are filled automatically with the product matching the order they have come to pick up (source: CLH).

Figure 2. Operators monitor terminal activity from a distance (source: CLH).

ones that are more heavily based on actual equipment needs. Avoiding unnecessary repairs is not only cheaper due to reduced frequency, but this also minimises the opportunities for things to go wrong. For example, it is not uncommon for equipment that has been maintained not to be put back to the correct parameters once maintenance procedures have been performed. Additionally, if a company's equipment indicates that it is likely to break down soon, the company has the opportunity to take proactive action before it fails.

In addition to improved maintenance strategies, another way that technology can help downstream players generate competitive advantages is by improving visibility beyond an individual plant, tank or terminal to an enterprise level, or even along the hydrocarbon supply and demand chain. Doing so can yield benefits from both a cost-saving and revenue-generating perspective.

This article will explore how terminals can use digital advances to extract significant financial value through optimising resources, reducing risk and increasing throughput.

Digitalisation in terminals

Traditionally, terminals have been primarily operated manually. However, with the new technology available today, it is possible to increase terminal efficiency by reducing or better balancing inventory needs. This delivers more flexible operations and minimises downtime. Digitalisation can also reduce the risk of loading incorrect quantities of product by ensuring real time control of product delivery, which reduces the scope for manual mistakes and improves communication between local terminals and headquarters.

While digitalisation can add value in a number of areas within a terminal, the most visible of these is in its potential to automate processes such that revenues are increased through faster loading and costs are cut through error minimisation and personnel reductions. Five general areas tend to benefit most from automation:

Order management

Instead of receiving orders via fax or email, which requires costly and time-consuming manual intervention with scope for mistakes, orders can be processed automatically with the relevant information being quickly fed into the company's enterprise resource planning (ERP) system for faster processing and reconciliation.

Site access

Trucks, rail wagons and barges no longer need to wait as long for manual verification and permission to enter for loading or unloading purposes. Instead, automated access control technology can allow trucks to enter and exit terminals quickly, while maintaining high levels of security. Valid access is granted through card readers, such as radio frequency identification (RFID), iris scanners, etc.

Product receipt and dispatch

Digitalisation can speed up the tasks that are needed to perform the loading and unloading of products, such as verifying orders, generating transaction documentation and monitoring volume changes. The generation and printing of bills of lading can also be automated for even greater efficiency.

Inventory balancing

Product inflows and outflows are dynamic. Digitalisation helps operators to calculate the difference between expected yields and actual values more accurately. This is achieved through maintaining a real time record of all terminal operations, calculating the theoretical product quantities and conducting timely product reconciliations to calculate product gains and losses.

Loading

Product and additive recipe calculations can be automated to improve speed and avoid manual errors, ensuring enhanced profitability and safety.

Case studies

Two large industry players have already used a range of ABB Ability™ digital solutions to improve their financial performance.

Figure 3. OMV Petrom has experienced significant reductions in loading time through automation (source: OMV Petrom).

Case study one

Compañía Logística de Hidrocarburos (CLH) stores, transports and distributes petroleum products in Spain. Its main business involves receiving oil products at its facilities – mainly gasolines, diesels, fuel oils, aviation fuels and biofuels – and transporting and storing these products. The company then delivers these materials to its customers through its tank truck loading facilities. CLH owns an oil pipeline network of 4020 km, which enables it to transport refinery output to different storage and distribution centres, before sending the product on to a range of end users.

CLH is in the process of making all 40 of its terminals entirely unmanned using ABB's terminal management system. The company already has 24 of its installations remotely supervised and controlled. Site access is controlled via truck RFID verification and driver magnetic card scanning. This speeds up a process that formerly took up to 60 min., such that it can now be completed in less than half the time. Trucks proceed to their designated loading area to be filled automatically with the product matching the order they have come to pick up. Bill of lading generation, and communication with the relevant tax authorities to authorise the product movement, is also automated. This accelerates the process by approximately 10 min.

A handful of operators at an offsite location use integrated CCTV to monitor terminal activity from a distance and interact with the driver, if necessary, via voice over internet protocol (VoIP). This is also facilitated by its integration of ABB's System 800xA.

Through total automation of its terminals, CLH has been able to increase its revenues significantly as more trucks can enter the terminal each day. The company has also reduced its labour bill, minimising its potential for error and maintaining a tighter grip on product inflows and outflows.

Case study two

OMV Petrom is an integrated oil and gas group in Southeastern Europe, with an annual oil and gas production of approximately 64 million boe in 2016. The group has a refining capacity of 4.5 million tpy and operates an 860 MW high efficiency power plant. It is present on the oil products retail markets in Romania and neighbouring countries through 784 filling stations, as of end March 2017, under two brands – Petrom and OMV.

ABB has been assisting OMV Petrom with the large scale modernisation of its storage and distribution infrastructure. The programme began with the construction of two new 'standard' terminals in Bucharest and the Petrobrazi refinery. Over time, the project will evolve to upgrade existing terminals with an automation solution. The plan is to eventually automate rail, pipeline and barge/ship distribution processes at the company's Petrobrazi refinery and the rest of its network, which consists of seven terminals in total.

The company currently uses ABB's terminal management system and System 800xA, including truck and driver authorisation, ADR* inspection, loading disposition, loading control, sealing, automatic inventory reconciliation, reporting, shipping document creation, integration with ERP, bay allocation, truck and rail tank car unloading, and automatic tank gauging. This system allows real time visibility and feedback to drivers and operators, as well as a comprehensive audit trail at every stage of terminal operations. Additionally, the substantive ERP integration enables the quick retrieval and updating of order information and operational results.

As with CLH, OMV Petrom has experienced significant reductions in loading time and, while its facilities are not entirely unmanned, they operate with significantly fewer operators than before. As a result, both companies enjoy improved revenues and reduced costs than experienced previously under their manually intensive setup.

Conclusion

Digitalisation offers real and substantive benefits to downstream tank and terminal operators, so much so that, in the case studies presented in this article, each company is working to increase its level of automation. Digitalisation pays by streamlining procedures to provide greater scope for revenue growth. Concurrently, making each unit of product more profitable to deliver significant cost savings through more efficient personnel deployment, improved order accuracy and enhanced system-wide visibility of operations. T&T

Note

*A European agreement concerning the International Carriage of Dangerous Goods by Road.