Towards a well oiled machine

Martin Keulemans, Brainum BV, the Netherlands elaborates on the potential of using modern IT in the liquid bulk storage industry.

While oil was traditionally synonymous with high profits, today’s more challenging economic climate has resulted in an increased focus on efficiency and cost awareness in the liquid bulk storage industry. In the present time of backwardation, liquid bulk terminals not only need to offer competing prices, they also need to be more agile to more quickly respond to ever changing customer needs. Terminals require real time management information to be able to quickly decide and act. The ‘time is money’ principle applies now more than ever before. This is where modern, integrated business management systems, specifically designed for the liquid bulk industry, can help.

A complicated perfect world
Managing a liquid bulk terminal is all about storing liquid bulk in the most cost effective way while complying with all regulations (safety, customs) and offering customers the service and quality they demand. To stay competitive, terminals have to deliver optimal client focussed services.

Being cost effective implies an optimal utilisation of assets and efficient processes to provide services; it is about having a clear overview of client orders, equipment (maintenance) statuses, outstanding actions, etc. It is also about knowing what activities staff (operators) are working on, what incidents are reported and which follow up actions are taken. It is about being sure that all client services are invoiced correctly, at the right time.

These days clients request higher service levels, at lower costs. They want to know the status of their orders, need the planning to be visible and do not want to pay for unnecessary demurrage claims. Terminal managers need to ensure that their clients get what they are promised, at reasonable cost. At the same time managers need insight on client profitability, and to focus on the ones offering the most value.

The challenges of an average day
The reality of the terminal is a world in which many stakeholders (clients, shareholders, traders, suppliers, transport
agencies, staff, surveyors, governments) need to be satisfied. A world in which (new) terminal storage capacity is rapidly being expanded, yet demand is threatening to drop off. New supply chains arise and can make terminals almost obsolete. Customers nowadays demand specific services and change their minds at the last minute, forcing terminals to be flexible and agile, and to respond to customer needs quickly. This requires flexible processes, advanced planning tools and real time information to support decision making.

Similar trends long ago forced the electronics and manufacturing industries to apply advanced information systems to control their supply chain. The key to success was collaboration, aligned processes and integrated automation systems. It seems the liquid bulk industry has not yet taken full advantage of the learnings in other industries.

Today, many terminals still have a low level of automation. Microsoft Excel seems to be the dominant tool to administer volumes and orders. Transportation documents and customs declarations are created manually, and volume/storage reports for clients are recorded and communicated in old fashioned and time consuming ways. A paperless office seems a long way away (Figure 1).

Furthermore, there are continuous challenges that add to this picture. Ageing infrastructure forces many terminal managers to spend a lot of time on equipment related issues and projects. Increased legislation pressures them to focus on transparency and compliance. This is time they could rather spend on providing better service to customers, and becoming more cost efficient.

Now: Losing revenue
All too often terminals lose money by being uninformed, being informed too late or being informed inaccurately. Without correct real time information and planning tools, there is sub or blends are created wrongly by misinformed operators.

In a non–automated and non-workflow driven organisation, invoicing processes are troublesome since they are run by people rather than a system. Continuously changing contract agreements create administrative chaos. The risk of invoicing wrong volumes and services (handling fees), or even forgetting to invoice them is high. All leading to potentially lost revenue and unhappy customers.

Nowadays, terminals face many challenges. How these are handled will directly impact on the profit and loss account of the terminal. Research shows that revenue is lost through inaccurate, unclear information and unstructured processes resulting in delays, bad decisions, mistakes and unhappy customers. This is where IT brings the solution. Integrated, complete software solutions can help terminals becoming future proof.

Towards a digital reality: How IT helps
Currently, terminals have some form of IT solution in place, though most of them at a basic level. Typically, the IT solutions that terminals apply exist in three maturity levels:

Stand alone, isolated point solutions
Dedicated but isolated systems for terminal automation, inventory management, process control/supervisory control and data acquisition (SCADA), order management, maintenance management, incident management, human resource management (HRM), and finance. Isolated systems entail departments working in information silos, resulting in a lot of inefficient, duplicated work, increasing the risk of failure. Moreover the software is often old fashioned (not web based), requiring a multitude of license fees, and is difficult to update when legislation changes.
Connected/interfaced service oriented architecture

The availability of modern middleware systems makes it possible and feasible to connect point solutions and exchange information. However, implementing this architecture is expensive, and maintenance is very time consuming. Stability can be an issue as well.

Integrated business software

These software solutions are workflow oriented and based on a single database, offering full process and information integration. Such a business process management system is characterised by the following:

- Has one database only; data needs to be entered only once, is always up to date and available to any user at any time. Editing of information is processed simultaneously and immediately available at other places for other functions.
- Is workflow driven, process oriented, structuring all sub processes, and informing all staff in the process on what they need to do and when.
- Integrates the different processes; shares information at different levels for the various stakeholders and presents it through user specific dashboards, enabling quick decision making and managing.

Differences exist as to the completeness and the focus the software was initially designed for. While certain systems are specifically designed for the liquid bulk industry, other more generic systems initially emerged in other industries, both having their own characteristics. Generic integrated business software is often more ‘tool box’ than a ready to use system, and thus requires dedicated and often costly implementation processes.

Like in other industries, it can be expected that integrated IT is the future, and will help liquid bulk terminals operate more efficiently and safely.

Introducing an integrated IT solution

An example of an integrated software solution for the liquid bulk industry is QINO, developed by Dutch company Brainum, who is supported by global partners. This tank terminal business management system contains all functionality at level 3, 4 and 5 (Figure 3) to operate and manage terminals. It brings all administrative, logistical and operational processes together in one integrated system based on a single database. QINO interfaces with standard software solutions for financial accounting, customs management and digital control systems.
QINO comes with a full set of integrated pre configured terminal specific work processes (workflows), reflecting best practice in the liquid bulk industry. This includes processes for: managing order 2 cash; supporting stock accounting; managing gains and losses; registering incidents; managing and following up on incidents; guiding operators in their operational activities in the field, etc. Each process gives management direct visibility and control on its progress and status.

Brainum’s web based tank terminal management system is based on the latest standards in IT technology. It is an extendable, modular architecture and the multi lingual interface can be used on any device and multiple browsers. Since it is based on a single database, data entered anywhere directly informs and affects any other process in real time. This allows for direct data look up and entry anytime, anywhere, offering additional flexibility to efficiently organise the complicated world at the terminal by informing all stakeholders at hand and at once.

As such, to change the destination of his vessel to Rotterdam at the last minute, a trader in the USA modifies the nomination through his tablet. Instantly, the manager of the terminal is informed about this vessel arriving. Based on the new estimated time of arrival, provided by the vessel, QINO automatically replans the nomination. QINO checks available tank storage space and jetty space and warns the planner on potential conflicts through his smartphone.

Organising the complicated world
The terminal specific technology comes with advanced planning capabilities and tools for various planning time horizons, from long term to short term (tactical):

- **Long term (planning horizon: days to months):**
  The supply and demand planner gives customers insight into future stock levels per tank, product and period, as well as in planned nominations & orders and their impact on stock levels. Nominations and orders can be planned based on customer and order priority, forecasted stock volumes and equipment availability.

- **Medium term (planning horizon: days):**
  The berth and jetty planner allows for optimal utilisation of berths and jetties, based on forecasted vessel arrival times and handling times. Demurrage costs can thus be minimised, while customer service is improved. An interface with a leading maritime and nautical data provider is available to receive real time ETAs. The impact of changes in ETAs will be directly visible to the planner.

- **Short term (planning horizon: hours, minutes):**
  The movement (route) planner suggests the optimal sequence of movements in the tank park, based on customer orders and priorities. QINO’s automatic line up functionality suggests the most optimal route for each movement between source and destination, taking into account equipment status, product type (to prevent contamination), and pump rates. Movement planning takes into account real time feedback from field operations. The software even calculates theoretical densities and pre calculates stop levels, informing operators or DCS when to stop a movement and thus preventing overflow or off spec blends.

QINO puts the terminal manager back in control, and allows him to run the business efficiently and satisfy his customers, thus enforcing:

- **Compliance:** ensuring the terminal is compliant with the latest (stock) accounting principles and governmental (safety driven) requirements.

- **Transparency:** which processes are running, who is doing what.

- **Control:** knowing exactly what is going on, being well informed, and making the right decisions.

**Conclusion**
Running a terminal is complicated, with numerous challenges and stakeholders. The historical lack of using modern IT technology to manage this complexity, is now taking its toll.

While present times demand high client satisfaction and optimal efficiency, still too much money is being lost by being uninformed and through inefficient processes. Modern IT business management solutions can help terminals become future proof again. Integrating processes and optimising workflows, enhanced with advanced planning capabilities, can help terminals function as a well oiled machine to become more competitive, and face a well informed future.