

Optimised Operation of Tankfarms

Reduce Risk, Increase Performance with Integrated Operations





Is your tankfarm running at its full potential?

Streamlined and efficient operations for tank farms and terminals can be achieved through an integrated end to end solution built upon the automation of receiving, storage, transfer, and loading operations. A fully integrated solution will have a high return on investment, reducing risk through repeatable results and will incorporate solutions for other business KPI's, such as workplace health and safety or environmental initiatives.

The Challenges at hand

A complete solution will incorporate the process and technologies to manage the flow of product into and through a facility as well as manage the plant assets controlling the flow. A failure of any asset will impede product flow, and hence impact profitability. Solving the combined product management and asset management challenge will take a company to the next level. The key focus points are:

➤ Efficiency

The reduction of wasted efforts is a clear benefit to the bottom line and will reduce the squeeze on tight margins. The reduction in waste also permits a successful manager to operate the plant at a lower total cost making the plant far more competitive and more likely to maximise the facilities' potential.

➤ Risk

The greatest risk in any business is uncertainty. With integrated tools comes greater access to information and faster analysis so that management can reduce uncertainty, make informed decisions and take advantage of market fluctuations.

➤ Globalisation

The current market place is global. Fluctuating markets in different regions of the world, create both risks and opportunities. The ability to take advantage of any change can be hamstrung by adherence to local requirements and regulations. A system that manages the full spectrum of plant information, ensuring compliance to new and changing legislation empowers owners to respond faster to opportunities as they occur. In the same way, competition is tough and margins are tight. A single mistake could eat deeply into profits which was built up over many transactions.

How can these challenges be addressed to stay competitive?

Technology Innovation

Technology can be applied in these domains to overcome the challenges of Efficiency, Risk & Uncertainty and Globalisation. In the following section we will explain how technology can address these challenges with key focus on Environment, Site Security, Asset Utilisation and Material Handling.





Today's market pressures and focus on cost and cash-flow management require plants to be flexible, optimized and adaptable to ever-changing operational dynamics. Markets, regulations and companies demand reliability, repeatability and safe operations.

Environment (HSE)



➤ Monitor over-fill

Any time users monitor storage assets inaccurately, they risk overfill, which can create serious safety issues. In addition to monitoring for overfill, users must ensure that potentially harmful vapour safely filter into slop tanks, rather than into the atmosphere. User error causes most incidents, and site impacts include:

- Health and environmental hazards
- Operational shutdown
- Heavy fines and/or legal ramifications
- Asset disruption

Powerful tools such as alarms, notifications, automatic interlock, accurate measurement, and real-time monitoring help users prevent incidents. Online leak and spill detectors help identify incidents early. These tools can also connect to other site functions and ensure proper balance between production and recovery. Implementation of these tools helps sites enforce safe practices by ensuring proper procedures every time.

➤ Ensure certifications

All participants in a movement must go through steps to obtain and prove proper certification in order to work with or at a site. HSE risks increase when users allow uncertified participants access to sites. Uncertified vehicles unable to prove their state of cleanliness pose contamination risks. In addition, upon discovering that assets are uncertified, local authorities may:

- Levy fines
- Take away operating permits
- Shut down the site
- Disrupt movements

Sites can enact strict controls that regulate proper certification and restrict and /or block movement without it. These controls are essential to maintaining a safe and smoothly running site.

➤ Observe regulations

Sites must keep up with ever changing environmental regulation and validation demands. Users work in a fast paced environment where movements happen quickly and change constantly. Users may not catch accidental blending or cross contamination of materials, which can cause waste and material losses. User error like this can mean:

- Safety risks
- Reporting problems
- Heavy fines
- Material waste

Tools like recipe specification, real-time recipe control and flushing and clean-up notifications are all very valuable to a user who is juggling many tasks. Sites can continuously update their system to reflect current regulation and validation standards, thus protecting assets from incorrect blending and contamination. This will protect sites from incorrect reporting and resulting fines.

Site Security

➤ Access site

Sites manage the movement and storage of many different kinds of potentially dangerous materials every day. With constant material comings and goings, site management must monitor who is in their area at all times for security purposes. If users do not have control over access, the site is vulnerable to hazards including:

- Site security threats
- Materials theft
- Queue-jumpers
- Congestion

Securing a site means monitoring access control at a designated entry point and denying access to those who do not meet all certifications, regulations, schedules, business permissives and physical characteristics of the site.

➤ Authorise movement

When a ship, truck or railcar arrives, users must ensure that it is registered, scheduled and authorised to perform the required task. In addition, ships must meet port and docking requirements and trucks must have a certified drivers. Without correct calculations and certifications, the whole site could be at risk. Sites that do not oversee movement authorisation can encounter:

- Damage to site or assets
- Risk to user or customer security
- Congestion on site
- Contamination of assets

Proper authorisation provides order identification, movement control and checks at entry via rebooked slots and materials dispensing according to order details and customer allocation limits. Generating Bills of Lading, Certificates of Quality and necessary paperwork automatically ensures correct and prompt tracking, accounting, authorising and invoicing of movements.

➤ Authorise users

Many people come and go from sites each day. We assume they are authorised to be in that area. These people have different roles and responsibilities as well as rights to the process and systems. For security purposes, sites must secure their practices and ensure that people have the appropriate security access. Allowing unauthorised access to site controls presents dangers to:

- Entire operations
- Movements
- Customers
- Users

All users must have unique, personalised codes that allow them access to the appropriate tasks or functions in systems.

Asset Utilisation

Improper use of equipment, inaccurate inventorying and unexpected scheduling complications increase downtime, maintenance and movement interruptions.

➤ Schedule equipment

Effective logistics management is about understanding all assets and event variables, so if something looks like it might go wrong, users can correct the problem before it occurs. Users must carefully schedule all assets including inventories, line contents, active movements, equipment limits, upcoming orders and

available infrastructure to keep movements flowing smoothly. A chain of events can occur during movements that shift everything off schedule. For example, a queue-jumper who did not reserve a pick-up may load the last of a material that another truck had scheduled to pick up. When this goes uncontrolled, sites face outcomes such as:

- Business opportunity loss
- Revenue loss
- Vehicles congestion
- Customer dissatisfaction

An integrated scheduling

tool gives users clear visibility of assets and allows them to pre-schedule and re-schedule movements. This allows an understanding of all variables along with the flexibility to respond when problems occur, so that movement flow is safe, efficient and continuous. Furthermore, faults on instruments should be identified immediately and corrected to prevent or minimise impact on the operation.

➤ Reduce turn-around time of fulfilment

Every user focuses on efficiency to reduce turn-around times and to make sure movement is maximised. For example, if a site can enable trucks to move in and out of bays efficiently, the site will have less downtime, more satisfied customers and less wasted assets. Sites that inefficiently manage movements, schedules and vehicles will struggle with:



- Movement delay
- Site congestion
- Revenue loss
- Customer dissatisfaction

Reducing turn-around times at a site is as simple as implementing integrated planning and scheduling tools that enable users to manage assets and movements effectively. With such tools, users are able to identify and resolve movement and schedule conflicts before they arise and keep vehicles entering and exiting quickly and efficiently.

Material Management

➤ Balance material

A user's inability to accurately judge how much of an asset he or she is moving could have heavy business impacts. It is essential that users control movement balances to correctly fill orders, maintain proper inventories and not over-fill tanks. Without precise measurements, sites could experience:

- Material losses
- Financial losses
- Customer dissatisfaction
- Over-fill and spill

In order to maintain precise movements, sites must have exact reporting tools including high accuracy custody flow meters to measure material movements and repeatability, and flow capabilities to deliver accurate ordered quantities that support the movement material type. Precise measurements alleviate worries about over-filling and the resulting safety and environmental concerns.

➤ Reconcile inventory

Users are responsible for knowing current material inventories and must verify them frequently. Inability to correctly verify inventory at the beginning of the day, during a shift change or at the end of an accounting period could pose problems. If users do not know exact measurements, they cannot identify loss, leaks or actual quantities. Checking inventory by dipstick can become cumbersome when the levels in tanks have changed considerably since last mea-

surement. Not knowing what the inventory level in these tanks are makes it hard to commit to receiving a load when it is not known whether or not the tank has in fact got sufficient storage left for instance. This can also limit the ability to:

- Know quantities
- Schedule orders
- Report to customers
- Optimise product receipts (restocking)
- Report to management

Accurate reporting tools that verify quantities frequently enable users to identify problems, track inventories, efficiently fill customer orders and generate required reports correctly. Material accounting ability provides validation, reconciliation and reporting of stock and yields. This is the basis from which users can identify and reduce losses, improve yields and control operating costs. Utilising online tank gauging improves the accuracy of level measurements and confidence in the value used for reconciling inventory.

➤ Sustain performance

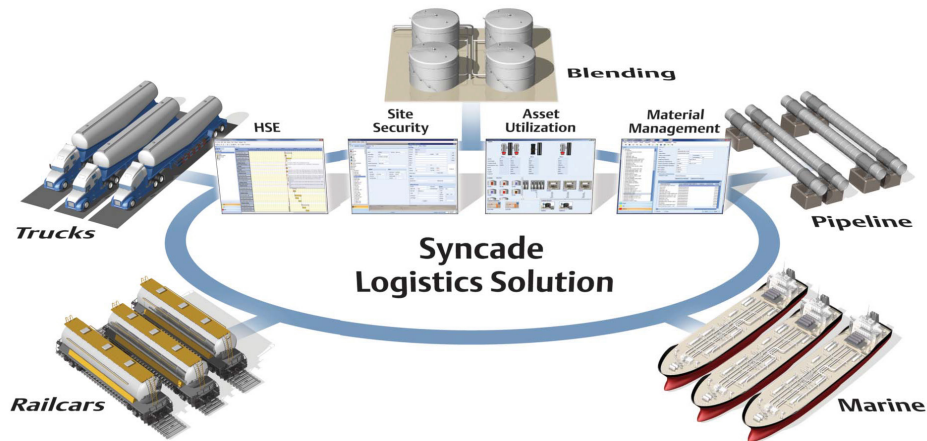
Sites need to track movements to prove that they can sustain fiscal measurement performance and repeatability over time. They strive for precision and accuracy combined with logistics management and execution, which are keys to cost-effective facility operation. Not having appropriate custody measurement can result in:

- Stock imbalance
- Customer dissatisfaction
- Liability
- Loss of business

Automated reporting, tank gauging, tank blanketing, movement control and inventory management systems record movements and provide a complete view of inventory at all times. Accurate gauges and meters with standard volumetric and mass adjustments are the basis for custody transfer and reconciliation. Only with a combination of these tools, plus real-time planning and scheduling, can you satisfy customers, management, stakeholders and regulatory agencies.



Summary: Streamlined Logistics and Movements



➤ Optimise supply and distribution

Most asset holding and movement sites consist of multiple loading, storage and delivery systems—each with its own subsystem of equipment, personnel and documentation. Key modalities such as trucks, blending, pipe lines, rail cars and marine vessels all have their unique logistics challenges. Seamlessly integrated subsystems and components that work in concert—sharing data and technology to provide complete movement and terminal visibility are available. Each subsystem can exist on its own merit, or it can selectively integrate based on needed modality. Complete visibility of all movement and terminal operations within a user's span of control allows better managed and better controlled logistics throughout a facility. Improve overall user effectiveness by increasing what one user can easily handle. Increase overall throughput by managing comprehensive facility activity and reporting to ERP (Enterprise Resource Planning). Eliminate paperwork-based errors by combining key functional modules.

➤ Optimise movement

Moving and storing materials in storage assets (containers) creates variables and risks every time. Terminal management solutions ensures safe, secure and uneventful movement from one storage asset to another with material traceability. Movements through all modalities are destination secure. Optimised movement routes accommodate the container or storage asset type. Each solution addresses all attributes associated with the enterprise's processes and business rules. Material reconciliation and movement reporting are integrated and available for future reference. Every visit creates a record with tracking and timing for analysis. Modularised solution designs are configurable to meet each facility's specific needs and subtleties. Configurable standard logistics solutions for all movements of materials must be able to match your specific operation and unique facility design. Site audits identify opportunities to capture quantifiable benefits from automation enhancements that improve operating efficiency and reliability.

Solutions must cover tanks but also cater for the unique attributes and behaviours of the following:

Pipeline

- Fiscal measurement
- Online density / API measurement
- Material differentiation
- Quality control
- Material accounting

Marine

- Planning and scheduling
- Gantt chart overview
- Optimised route selection
- Demurrage cost minimised
- Concurrent movements to / from storage asset

Blending

- Recipe management
- On-line/offline optimisation
- Quality control
- Ratio control with ramping and pacing
- Monitoring, tracking and reporting

Railcar

- Spur monitoring
- Tracking data to assist shunting of railcars
- Managed from central control room
- Single order for multiple railcars
- Integration with yard management application

Truck

- Schedule by time slots
- Traffic management, entry/exit
- Loadrack blending of components, additives and biofuels
- Automated generation of bill of lading, LAB reports
- Measurement by volume and weight