Wireless communications in the chemical industry

How quicker response improves efficiency, enhances safety and maintains quality.

The manufacture and processing of chemicals is a highly capital- and resource-intensive, and potentially dangerous, business. There is hardly any room for product differentiation or innovation: production methods are well-established and widely known. The only way to make a profit is to maximize efficiency and continuity, while paying close attention to safety. Wireless communications can make a valuable contribution in all these areas.

The chemical industry is a classic commodity business – particularly at the 'heavier' end of the scale, in areas like basic organic and inorganic compounds, fertilizers, gasoline and plastics. The supply chain is typically rather long and complex (as shown in Figure 1), and involves many transactions, with extremely tight margins. This is true whether it is a cracker plant producing several different chemical products, each with a small group of customers, or a refinery making products for an enormous range of customers.

The chemical industry is also very transparent. Most of the technology and processes have been known about for 50 years or more, and there are virtually no commercial 'secrets' and very few patents. Feedstock prices are out of the control of the producer, as are prices for the end-product, which vary widely according to global demand for the end-product – meaning margins also vary significantly. Profitability is therefore all about making products faster and cheaper on a scale that can smooth out the effects of global price fluctuations.

Another key attribute of the chemical industry is its absolute focus on safety. This is not just a question of being a good employer that meets regulations, it is also a matter of business rationale: unsafe plants that are prone to accidents are unlikely to be profitable.

Safety first

While chemical manufacturing has one of the best safety records of any industry in terms of accidents per man-hour, the dangers of leakage, fire and explosions are ever-present. Identifying and acting on problems early on is key to preventing small faults snow-balling into major incidents.

Wireless communications supports the fast, accurate execution of routines for dealing with faults and emergency situations – whether in the first, second or third 'lines of defence'. The communications solution can be integrated with plant monitoring and alarm systems so that critical alarms immediately trigger an alert to the most appropriate person. The reason for an alarm is always clear and precise.

Group calling functions enable emergency response teams to open a communications channel and talk to each other at the touch of a button, if the problem needs wider attention. Wide-area mobile communications can also be integrated so that a specialist can be contacted if necessary on a mobile phone, even when off site.

With features like ‘man down’ and positioning, wireless communications systems could be a real life-saver for people who are often working alone or out of sight in a large chemical plant.

Continuous process, continuous communications

With the need for continuous production, many chemical plants are expected to run continuously for five years or more – and with restarting a complex process potentially taking the best part of two weeks, ‘shutdown’ is a dirty word. Chemical plants are also typically very large sites, with relatively few people working on them. Together, these factors mean communications is vital in ensuring day-to-day operations run smoothly. In a typical large chemical processing plant, wireless communication has an essential role in ensuring that plant engineers and operators are able to communicate with each other, and with the control room, wherever they happen to be.

Maintenance matters

Keeping a large chemical plant running continuously means having very well defined maintenance routines in place. What is more, there is very little room for trimming maintenance costs in this environment, when safety is such a key concern.

Wireless communication can help here, through integration with monitoring and maintenance systems – enabling maintenance teams to manage and perform their tasks anywhere on site. If, for example, a supervisor notices a low-pressure reading on a particular valve, he can immediately notify the appropriate engineer of the location and nature of the problem.

With wireless communications, engineers can send back confirmations that they have completed a particular task to the control room as soon as they have finished. This enables them to move on to the next task as soon – and as safely – as possible.

Always up-to-date ...

With well-integrated wireless communications, plant supervisors need not stay in the control room in order to be kept fully up-to-date on operations. Wireless communications solutions can be integrated with plant monitoring and control systems to pull together information from a variety of sources and present it on-screen to plant managers and engineers wherever they are working. They not only have an up-to-the-minute, personalized view of key plant data; they can also spend more time out and about, keeping a close eye on actual plant conditions and able to trouble-shoot and respond to potential problems faster.

... always in control

A well-informed, expert engineer out on the factory floor is far more likely to identify faults faster and put them right in a controlled way. With wireless communications, an engineer who notices something wrong with a particular piece of equipment can immediately check quality and performance data on his handset, and make any adjustments straight away. If required, adjustments to feedstock levels or a controlled shut-down can be requested from the device, instead of using the 'emergency stop' button.

For an industry where the focus is permanently on producing product faster and cheaper than the competition, every day of optimized production counts. Smart integration of wireless communications can make a significant contribution to quicker response to changing conditions, enhanced efficiency and continuity, and safety of chemical plants. And that is a recipe for higher profitability.

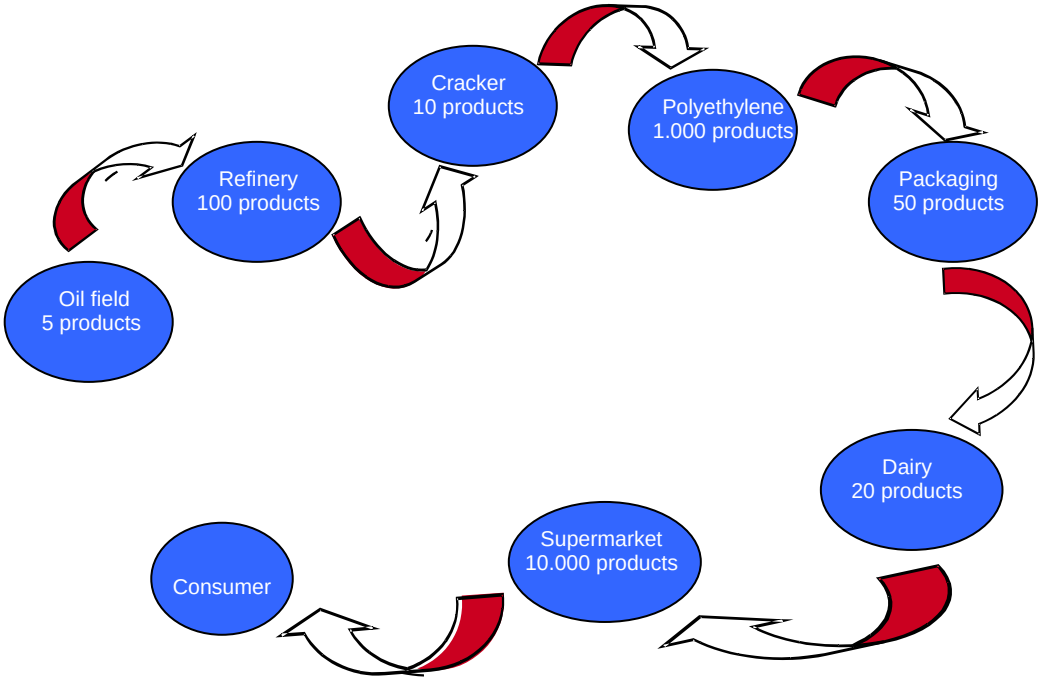

Figure 1. Typical chemical industry supply chain – in this case for the dairy industry.