Industrial Wireless: Improving Plant Flexibility

In today’s pharmaceutical plants, reducing costs and accelerating schedules are ever-present challenges. After receiving FDA approval, manufacturers must get new products into production as quickly as possible. They also need to effectively focus resources on critical production areas and quickly adapt or change operating and commissioning priorities. This allows schedules to be compressed as required by market demands.

New technology developments such as industrial wireless are having a profound effect on plant operating strategies. By enabling greater workforce mobility and connectivity, wireless allows manufacturers to diversify production, and change from a single-chain product to producing multi-chain products, in an efficient and flexible way to help meet the needs of patients.

Today’s Business Challenges

Around the world, pharmaceutical manufacturing is evolving from a high margin, large volume, make-to-stock, supply-driven operation to a price sensitive, small volume, make-to-order, value-driven operation. With limited available capital, equipment, and talented human resources, maximizing asset utilization and return on investment is becoming vital to future success and survival.

For generations, pharmaceutical producers have configured their facilities to run campaigns of single products. To meet the challenges of the new global economy — and blockbuster drugs being replaced by multiple products with small production

batch sizes — companies are transitioning their new and existing facilities to modular, flexible plant configurations.

Flexibility has value for pharmaceutical companies due to the time required to build dedicated capacity, the finite duration of patent protection, and the probability that new products will not reach the market due to technical or regulatory reasons. Having flexible capacity generates tangible options, which enables manufacturers to delay the decision about constructing product-specific capacity until technical uncertainty is resolved. In addition, initiating production in a flexible facility can enable the firm to optimize production processes in dedicated facilities.

Demand for New Technology

During the next decade, pharmaceutical manufacturers will be under greater pressure to utilize technology advancements to improve their operational agility. Already a vital enabler of research, technology is also essential to other functions from clinical trials to commercialization. New mobile solutions that streamline these processes and speed time-to-market are rapidly being deployed.

Wireless technology will be the cornerstone enabler for plant operations to increase visibility, quickly adapt to market changes, improve production efficiency and rapidly configure equipment controls for new products.

Industrial wireless networks provide better coverage on the plant floor than traditional wired systems, and allow personnel to interact efficiently with a wide range of equipment. Workers can spend more of their time paying closer attention to processes using devices such as hand-held tablets. For example, an operator assigned to multiple production units can receive alerts at any time and respond to abnormal situations along with performing routine tasks.

With wireless technology, manufacturing facilities are able to eliminate fixed workstations and hardwired controls, and introduce modular equipment configurations. This approach provides remote access to production equipment and minimizes the number of user interfaces in sterile process areas. Should any workstation have a fault there is no longer a need to shut down a process while the station is fixed or replaced. The flexibility offered by the wireless network and mobile workstations provides a perfect backup system. Furthermore, when a new product is being launched or a recipe changed, the mobile stations can be moved throughout the plant as required. This eliminates the need to install new operator stations.

Thanks to advanced wireless solutions, pharmaceutical plants can reduce operating costs, better monitor critical systems; improve production efficiency, track assets, and support decision-makers in making informed decisions in real-time.

Impact on Plant Personnel

From field operators and controls engineers, to production and maintenance technicians, wireless technology has a significant impact on personnel across the plant enterprise. It enables workers to reliably perform all of their current tasks on mobile devices hosted on a common grid that is shared with production units, sensors and control devices. The best illustration of how wireless improves manufacturing performance comes through the eyes of the actual people working on the plant floor and having immediate access to data from operations.

For quality and production technicians, their daily routines are improved by reducing the amount of time they spend manually collecting data and later logging it into a database. With wireless technology, the collection and entry processes are automated, allowing the technician to spend more time focused on areas with the potential for real added value.

Wireless reduces maintenance costs through better equipment monitoring and notifications. With thousands of assets being monitored simultaneously, the maintenance engineer can respond to a call by accessing equipment records and maintenance procedures online, allowing the problem to be diagnosed on the spot. The equipment’s status will be updated and maintenance records will be logged — all while the engineer is still on the plant floor — eliminating the need for paper logbooks.

For the controls engineer, wireless technology offers quick deployment and greater system agility, which is another key to a successful plant transition from a fixed configuration to a modular design. With wireless technology, equipment modules can be installed and production units configured without wiring and verification costs.

For the plant manager, the strength of wireless technology is in its ability to lower both the initial capital cost of an automation project and the total cost of ownership while at the same time providing immediate access to plant information. The results are reduced operating costs and product losses.

Typical End-User Experience

Like other pharmaceutical companies, Shire Plc. seeks to economize its operations and still maintain the rapid schedules necessary to get products out the door. The company received FDA-approval for a new product and had to act quickly to build a suitable manufacturing facility. The new plant was designed to utilize disposable vessels and tank liners to reduce the cost of cleaning and verification of process equipment.

Shire required technology to simplify scale-up from R&D to commercialized production in order to manufacture its new product as efficiently and reliably as possible. Several alternatives were considered, but the company discovered wireless stations would save money and help increase economies of scale in more ways than it imagined.

Shire selected Honeywell’s OneWireless network to provide access to process data in a safe and cost-effective manner. Based on the ISA100.11a standard, this industrial-grade solution is composed of industrial wireless access points, called multinodes, which self-discover to create a redundant, self-healing mesh network supporting Wi-Fi devices and industrial I/O devices simultaneously. The wireless implementation allowed Shire to mount controllers on moveable equipment without having to worry about cabling issues, which helped increase its production flexibility, safety and efficiency.

Shire initially opted for wireless stations because it was a less costly alternative to the more traditional, hardened wash-down enclosures. In this case, however, wireless stations also helped reduce the number of stations required for ongoing plant operation. A manufacturing area containing eight operating units overseen by two operators would typically include a hardened station at each piece of equipment, which would result in eight large stations. Using wireless technology, Shire reduced this to two stations — saving computer and enclosure costs, software licensing fees, and the frequently overlooked annual operating expenses for a business computer. This can be three to five times the hardware cost of the computer.

Shire not only saved money over more traditional wired options for its new manufacturing plant, but more importantly, it saved precious implementation time by enabling key personnel to travel anywhere in the plant and still have access to secure, real-time data. Operators can move from one location to another with their mobile station while maintaining an overview of the process. This enables them to make fast, reliable decisions that help get products into the hands of consumers where they need it the most.

Conclusion

New technology plays an increasingly important role in the pharmaceutical industry. Many manufacturers are now achieving significant advantages by installing industrial wireless networks. This advanced solution enables personnel to travel anywhere in the facility with the mobility of wireless versus hard-wired fixed clients, and reduces maintenance compared to wired alternatives. Production operations also benefit from cost savings due to fewer personnel required to commission wiring and start-up, as well as increased flexibility allowing the plant to change direction quickly and easily.

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