

# Improving manufacturing operations with wireless technology

January 2017

Wireless technology is one of the fastest-growing platforms in manufacturing, distribution, warehousing, and consumer and industrial products. According to the 2016 RSM Manufacturing Monitor, 38 percent of U.S. manufacturers are planning major wireless technology initiatives; 66 percent have already implemented mobile technologies. A fundamental key to the success of these initiatives is the alignment of the wireless infrastructure with a particular business need.

## Using wireless technology for common business processes

A technology solution implemented without properly defined objectives, scope and maintenance responsibilities is a project without a strategy. Before bringing a wireless solution into an organization, management should identify what problems it needs to address and the goals it wants to achieve. Only then can the search for the appropriate technology begin.

Following are some of the areas where wireless technology can be considered and, once implemented, can help improve overall

operations, inventory management, information access and other concerns:

### Automating manual processes

Many businesses are using robots and other machines to automate manual processes via wireless networks.<sup>1</sup> But the setup and configuration of the wireless network involves a significant amount of work. If the robot goes too far out of range or has lost its direction, for example, it can no longer be part of the wireless process. If the wireless has any dead spots or failures, the automation is interrupted and must be remediated. While this solution may be a large upfront expenditure and more expensive than manual labor, the returns on such an investment include a significant reduction in risk due to injury or human error.

### Mobile printing

In a wireless environment, mobile printers can reduce walking time to a stationary printer, remove the limitation of having to

<sup>1</sup> Whelan, R. "Fully Autonomous Robots: The Warehouse Workers of the Near Future" (Sept. 20, 2016) The Wall Street Journal

place a printer in a particular spot and eliminate wiring costs. Industrial-grade, wireless printers are made to be durable, portable and easily maintained. However, even the best mobile printer is of no value without a reliable wireless network to transport the data that tells the printer what to print.

### Product location tracking

Radio-frequency identification (RFID) can provide more accurate location services and tracking than a manual barcode scan, which allows only for a point-in-time reference regarding when the item was scanned. With barcodes, if the item moves, it has to be scanned again for a status update. RFID, on the other hand, is often utilized as a constant, real-time location services platform that removes the manual process.

RFID tags are attached to assets that emit signals to wireless access points placed throughout a defined area. Coupled with a back-end database to correlate the unique RFID tag, management can easily access asset properties such as make, model, quantity, weight and the like in order to track and locate inventory.

Implementing an RFID platform can be a fairly costly upfront expenditure that will pay for itself over time by decreasing manual work, improving data visibility and enhancing production planning. In addition, warehouse operations can access accurate, real-time information and locate products quickly.

### Equipment maintenance

The machines that drive production are often complex, with many moving parts, configurations and maintenance routines. Using wired or fiber optic links to devices can be costly and, for equipment that must be moved, it can be challenging to maintain a connection. A wireless solution can help decrease downtime, enhance quality and safety, and provide easier access to enterprise-wide data.

### Going paperless

Manual paper processes such as checklists and inventory reports can be transferred to a digital format that can be backed up, secured and centralized. Where appropriate, a small, handheld device with the proper functionality can provide standardized data that can be monitored and quantified for better overall reporting.

## Managing expectations

Before purchasing wireless equipment, management needs to make sure all stakeholders are in agreement regarding the equipment and the expectations of performance, cost, security, reliability and management. Each major stakeholder might have a different idea of what the equipment is intended to accomplish, ranging from easy maintenance and process improvements to lower costs and access to data. The key is to begin conversations early in the process regarding these goals and the metrics used to measure progress toward them.

## Assessing the site

A number of connectivity considerations need to be assessed before wireless systems can be installed. A site survey should be completed by specialists with heavy networking experience, as well as a business sponsor familiar with the business use case and processes involved in the proposed solution. Such a survey would look into:

- **Radio frequency:** Investigating the proposed area for broadcasting that could interfere with wireless waves.
- **Location and materials:** Because wireless waves can't flow through many materials, walls, beams, ceilings, floors, pipes, rafters, racks and machinery must be examined.
- **Open line of sight:** Unless there are obstacles that wireless waves can pierce, this is critical to keeping a connection wireless.

After establishing the static areas of the proposed wireless network, a site surveyor will also look at any moving pieces of factory equipment that would modify the radio frequency spectrum throughout the day. There may be some processes or shifts that operate machinery or equipment in different areas that should be considered. The wireless solution should be able to adapt to changes in equipment placement and adjust radio signals accordingly.

Frequency range is the silent killer of wireless solutions and can make or break the solution. Missing coverage means devices could lose their connection, but too much coverage causes devices to end up in disarray. Choosing the right frequencies for specific devices, areas and channels is paramount.

## Performance

Any wireless solution likely involves a business application such as an enterprise resource planning system, asset inventory platform, warehouse management or production monitoring suite. The performance could be compromised by poor wireless connectivity, however, as some applications can be hypersensitive and will crash if for any reason the connectivity is dropped. Investigating bandwidth requirements on the network, peak application usage, number of devices and latency restrictions should be part of the initial project planning.

## Security

The growth in wireless networks means that the number of devices connecting to corporate networks is increasing at a rapid rate, which can expose systems to security breaches and cyberattacks. Simply making the wireless network accessible through a password is not enough: By isolating production devices on a separate network from corporate networks, internet traffic, and phone and surveillance systems, companies can create an "island" approach to networking that limits the movement of traffic and devices between islands. By properly segmenting a network, companies can limit movement between networks to appropriate devices and block the movement of devices that are unnecessary or provide little value.

## Choosing the right solution

After a proper system selection process that includes a site survey, stakeholder requirements, proof of concepts, and calculating total costs of ownership, companies can move forward with actual implementation of the solution. Depending on the scope of the project, putting the wireless infrastructure in place is typically a quick operation. Most of the time dedicated to implementation is spent on the line of business process configuration, quality assurance, reconfiguration and integrity testing.

Picking the actual wireless equipment to use involves many variables. The technology staff may want to put in familiar equipment that may not meet all the requirements for environmental conditions, radio frequency (RF) range, security or other capabilities. Picking the right solution for the job needs to be seriously considered: If the information technology staff is not comfortable with the solution, then training and education with the vendor should be negotiated.

“Future proofing” the solution is difficult to do, but implementing a wireless infrastructure that becomes obsolete within a year would be a short-sighted strategy. Investigating potential future bandwidth requirements, floor space expansion, multisite deployments and acquisitions should be considered.

## Maintenance

Once the wireless infrastructure has been implemented, tested and verified to be working, the maintenance phase of a platform begins. Monitoring RF interference and dropped devices; reviewing access and security reports; updating software as needed; and staying up to date on plant logistics and modifications are just a few of the responsibilities inherent in maintaining a wireless network. The infrastructure must be built and maintained to keep production fluid and not inhibit people, processes or systems.

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