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The Health of Manufacturing is Back— Thanks to Technology

Like most everything else, technology has been key to the manufacturing industry moving forward. In the last 25 years, most manufacturers have implemented new technology in some form, with the overall goal of boosting output and increasing revenues.

Manufacturing and IoT

Now, manufacturing is undergoing the next wave: the implementation of the Internet of Things (IoT) to again experience gains. What is IoT? A report by BI Intelligence defines it as “any stand-alone internet-connected device that can be either monitored and/or controlled from a remote location.” According to BI, any company using an IoT solution is leveraging the IoT ecosystem, which comprises things like sensors, devices, remotes, dashboards, networks, gateways, analytics, storage, and more.

Manufacturing is leading the adoption of IoT, and a recent Fortune BI report predicts that manufacturers will invest \$136.83 billion dollars towards IoT by the end of 2026. Not surprisingly, manufacturing has seen the highest ROI from IoT compared to other industries.

A big bang for maintenance.

Just how are manufacturers leveraging IoT? There are many ways, but one of the most significant and beneficial is in maintenance. The automation of maintenance using technologies like sensors on equipment delivers a number of benefits. It can improve situational awareness of plant operations and real-time condition of equipment. It can

present maintenance information to personnel in a summary view as dashboards with real-time measurements and performance trends. It can provide automated alerts based on degraded performance giving the staff ample time to act and therefore prevent more serious failure and disruption. And, if the manufacturer is far enough along in adoption of concepts like predictive maintenance, increased analytics functionality that significantly impact performance, efficiencies and output.

What are the main benefits of the adoption of IoT in the maintenance of a manufacturing facility? In general, IoT has the biggest effect on:

Downtime. By identifying potential problems before they occur, IoT can minimize and even eliminate downtime, especially important where risks to product quality are imminent, and replacement costs for machinery are prohibitively high.

Production efficiencies. By facilitating Overall Equipment Effectiveness (OEE) and Total Effective Equipment Performance (TEEP), IoT can help boost production increases and long-term savings.

Failure rates. No amount of production efficiency is worth it if a product isn't safe and must be recalled. Through the use of IoT in maintenance, teams can be alerted to potential weaknesses well in advance of machinery break-down.

Intrusiveness. Preventive maintenance can involve disassembling/reassembling of machinery, which weakens systems and increases potential for breakdown. IoT can facilitate predictive maintenance, which can reveal system or component health in real time, without compromising the lifespan of systems and machinery.

Barriers to adoption.

By using IoT data, manufacturing maintenance can make the important shift from being reactive to being proactive, and therefore be key in delivering the benefits stated above. But despite these obvious benefits, there are barriers to the adoption of IoT within the manufacturing industry.

Currently, there is a lack of recognized, industry-supported standards when it comes to IoT, which limits the ability to choose solutions that have broad support and long-term usability. There are few sensor options – and sensors are a key component in a successful IoT implementation – to support the wide variety of measurements required; today's options tend to be not robust enough for many harsh industrial environments. Many of today's plants are not sufficiently networked to support the addition of hundreds of new sensor end points; traditional Ethernet and WiFi is not adequate, however emerging radio-networking technologies show great promise. And finally, human reluctance to new technology implementation among an aging maintenance staff population is a challenge which brings the organization's human resources and management into play.

Steps to success.

Despite these barriers, smart manufacturers determined to take advantage of what IoT has to offer will move forward, following a few steps that tend to support successful implementation:

- 1. Assess ROI.** Benefits from IoT can be truly realized only if the tangible value of the data to a maintenance organization and overall manufacturing operation are clearly defined ahead of time. Failure modes, realistic costs of downtime, specifications of necessary measurements and sensor types, and information useful in improving situational awareness must all be identified. Cost of repetitive labor tasks should be factored in. Only then can any benefits be tested against the costs, and a sound and actionable business case be made.
- 2. Prepare for behavioral change.** In order for IoT to be successful, it is essential that Operational Technology (OT) in the plant and IT cooperate. This will require significant changes in behaviors for the maintenance personnel and increased coordination with their IT counterparts. In return, IT will have to become much more savvy about how OT functions and continually work to provide easy-to-use applications that supply maintenance personnel with relevant and actionable information.

While recent numbers confirm that manufacturing is moving into the next wave of adopting IoT technology, the reality is that most maintenance data today is still collected, stored and used only locally – in many cases still on paper.

However, smart manufacturers will begin now to take steps toward incorporating IoT into their operations – especially with regard to the benefits it can bring maintenance. They'll be that much further ahead of the competition, when it soon comes time for reaping the rewards.