Digital, integrated spare parts management

How manufacturing can benefit from an end-to-end spare parts management system
Well-coordinated spare parts management in manufacturing plays an essential role in reducing downtime and improving operational efficiency. This white paper examines how deploying a fully integrated, digital and end-to-end spare parts management system can solve multiple business challenges and help manufacturing companies achieve significant time and cost savings.

As manufacturers across the globe transform from producing products to offering a wide range of value-added services, they are looking to differentiate themselves in a competitive marketplace. One way is to digitize existing systems to increase their ability to offer more customer-focused, individualized services. And one essential facet of manufacturing that is ripe for digitization is spare parts management.

Moving from manual to digital

Traditionally, managing spare parts in the manufacturing industry has required a tremendous amount of manual effort. For example, on the shop floor, workers often have to rely on experience and knowledge to order replacement parts when a machine breaks down.

This scenario is viable when the necessary spare part can be easily identified. However, in many cases this is impossible when a part is dirty or scratched or it has no bar code or ID.

For parts that are not often used, it takes a long time to search for and identify them. In some cases, the worker may order the wrong part or enter a wrong identification number. Even if the part is identified, a worker may repurchase the part instead of checking for parts on stock that might not have the same name but correspond with identical technical specifications.

This whole process can take considerable effort and is often very time consuming. Identifying the right parts can shorten repair cycle times, decrease capital costs and increase stock efficiency.

There are also many shortcomings involving transparency in traditional spare parts management. Several tools are available to provide transparency for suppliers’ and manufacturers’ own inventory that is located nearby. However, manufacturing companies often do not have a good grasp of their inventory stored across multiple warehouses, as the company systems are not fully integrated and do not provide sufficient analytical insights.
The primary challenge of spare parts management is to reduce manual effort and thereby decrease the high costs and amount of time it takes to accurately identify a needed part. Deploying an end-to-end spare parts management system takes advantage of emerging technology and a systems integration approach to better manage production and operations. It can reduce error rates, improve overall equipment effectiveness (OEE), and increase transparency, which helps companies optimize stock and enhances their forecasting capabilities.

Four keys to a successful system

A digital spare parts management system allows a manufacturer to not only streamline operations, but also to more easily introduce innovations that are emerging in the industry. Such a system allows workers to search existing inventory for a needed part, order it directly from a preferred supplier and maintain ongoing communication with maintenance staff. The following are the four key elements of an effective end-to-end spare parts management system:

**Spare part identification.** Correctly identifying the part needed is a crucial step in the spare parts management process. Typically, parts identification might involve using a barcode scanner or trying to record a specific number printed on the spare part. A digital image recognition solution provides many advantages over traditional manual identification. First, a maintenance worker can walk around the factory and, upon encountering a broken machine or part, immediately scan it. Also, if a part is dirty or has a scratched barcode, it can still be identified by the image recognition solution. In some cases, the worker does not even have to remove the part, as a mobile device can scan the part in its built-in state.

Many parts, especially smaller and less expensive ones, do not have a barcode or a predictive maintenance sensor. Once the solution’s app identifies the part, the location and part information are sent to the worker’s mobile device, and the app can generate accurate measurements for ordering the correct replacement.

In crafting advanced solutions for spare parts management, DXC Technology has forged partnerships with some of the most innovative companies in the manufacturing industry. One of these is Bosch Cognitive Services, a leading machinery engineering firm based in Germany. Bosch has developed a solution that allows a worker to take a picture of a broken part and identify it by using Bosch’s image recognition algorithm.

**Standardized article numbers.** Once the required spare part is accurately identified, it is necessary to locate it in the company’s inventory or procure it from the parts manufacturer or a supplier. To correctly match the part, it is essential to have standardized spare part article, or serial, numbers and designations.

Standardization of article numbers is important because the same part is often referred to by different names by workers on the shop floor. Sparetech, another company that DXC works with, has come up with an innovative solution that uses matching algorithms to standardize identifying attributes in spare parts data. Sparetech indexes the current stock of manufacturing companies, standardizes the data and then uses an intelligent algorithm to determine whether certain parts are the same — even though the naming and labeling across production networks differ.
Next, Sparetech matches these standardized datasets with a range of technical specifications in its global database for spare parts, which is built in collaboration with partners such as, for example, Festo. That way, a Festo cylinder that was distributed through different channels (direct sales, wholesale or machine manufacturer) can be identified within seconds and compared to stocks throughout the network of production sites. This means that manufacturers can cross off all duplicates from an inventory list and adjust the demand parameters, thereby reducing unneeded inventory.

**User manual applications.** Once the correct spare part is identified, secured and delivered, a user manual app can be very useful on the shop floor for guiding the maintenance staff through proper removal and installation. If a worker is experienced, replacing a part can be an easy process. But if there are new or complex machines involved, or an inexperienced worker is replacing the part, detailed guidance is required.

A user manual app can guide the maintenance worker through each step of the process, from part identification to installation. The app can include videos and, in some cases, integrate with augmented reality or other advanced digital technology to help guide the worker through the steps.

**End-to-end systems integration.** Showing the shop floor worker how to complete the part replacement process is key to the end-to-end nature of an integrated spare parts management system. By guiding workers through complicated tasks, a fully integrated solution can make the work easier and increase efficiency.

For true end-to-end visibility, DXC can provide a dashboard that gives maintenance workers a full overview of what is happening on the shop floor. For example, if a machine has experienced an incident, an alert appears on the dashboard, allowing the worker to go directly to that machine.

Key benefits of a fully integrated system are many: Aggregation and standardization of spare parts data will reduce manual effort and make inventory management more efficient. Spare parts data can be integrated into a central system, and the information can then be coordinated with suppliers’ systems.

**Better data quality**

Incorporating these four elements — spare part identification, standardized article/serial numbers, user manual apps and end-to-end systems integration — into an integrated spare parts management system improves data quality, thus delivering many significant benefits. For example, ongoing management of data and inventory delivers more efficient procurement and warehousing. In addition, identifying inventory redundancy and optimizing time-critical procurement processes can reduce machine downtime and increase cost savings.

High-quality data also helps predict the future by forecasting what inventory may be needed. In addition, companies can tap into such data to analyze current revenue and expenditures to establish a benchmark, then use that information to estimate future costs.
High-quality data also contributes to a critical area in manufacturing — predictive maintenance. Without such data, predictive maintenance use cases won’t work. Companies that have successfully implemented predictive maintenance measures know what objects are failing most often. This, along with an automated warehouse and automated system running in the background — and using the right algorithms — means that manufacturers can be fast and efficient at getting the right part to the right machine at the right time.

Conclusion
Because of the importance of keeping machines in operation to avoid downtime, spare parts management is a vital area in the manufacturing industry. Manufacturing companies should implement an integrated spare parts management system as part of the digital transformation of the business. Companies can address key trends and technologies such as Industry 4.0 and smart manufacturing by deploying a digital system that integrates parts information from machine to machine, from factory to factory, and with all suppliers. The cost savings and efficiency enhancement of a digitized end-to-end spare parts management system can be significant and substantial.

About the authors
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