Epic Data Whitepaper Series

🍃 Epic Data Production Control

Tower: Providing visibility and control in the Digital Factory
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About Epic Data 6
A manufacturer’s production control room is where all value-chain data comes together. The plans and bills of materials generated in the ERP system, the process rules and quality standards developed in engineering, the data collected from the shop floor as well as the machinery and energy sources used in production. They all come together in the control room where instructions are delivered, production status and energy usage is monitored, deviations and inefficiencies are flagged for attention, and corrective control taken.

The ‘control room’ of the past used to contain a white board where customer orders were assigned work orders, a computer terminal where shop travelers were printed out to provide work instructions and track production data, and a telephone to talk over change requests and production issues.

As manufacturing and energy management have become more automated and manufacturing execution systems more sophisticated, so have the control rooms that support them. The era of the digital factory brings a production control room with walls of displays offering visualization of shop-floor activities and energy consumption patterns, computers interconnected with internal and supply chain ERP/MOM systems, and powerful data processing capabilities to synchronize and analyze the data. As the digital factory becomes more instrumented, interconnected and automated, a well-designed production control room may separate the best-in-class manufacturers from the rest.

Epic Data calls its state-of-the-art control room the ‘Production Control Tower’. From the Production Control Tower (PCT), operations managers can oversee production, look ahead, and react to issues that arise to keep production running smoothly. Process engineers can monitor power quality, energy production and consumption, and carbon emissions from production equipment and energy sources. It’s like having a birds-eye of everything that impacts the production schedule and product quality.
Let’s look at the elements required for an effective Production Control Tower implementation.

**PCT to Structure, Monitor and Control your Production**

First and foremost, an effective Production Control Tower’s design is a reflection of the company’s strategic goals and major initiatives. The information displayed and the control actions enabled should allow managers to monitor and improve upon the company’s key performance indicators for strategic initiatives including: employee safety, productivity rates, quality levels, service levels, and waste reduction.

The manufacturer must determine who needs to know what information in order to achieve the company’s goals. Their MES and PCT designers can contribute knowledge of how best-in-class manufacturers collect, distribute and analyze data, and the best format in which to view the information. Together, the manufacturer and the MES/PCT designers develop a strategy for distributing and computing the information necessary for effective operations management consistent with corporate goals.

PCT designers may collect information from a variety of sources. Information pertaining to planning and scheduling can be imported from the ERP and MES system. Customer and supply chain portals can provide up-to-the-minute information about demand and parts availability to fine-tune production schedules. Data from real-time shop floor activities may come from production equipment, shop floor barcode and other input devices, closed-circuit TV (CCTV), machine and environmental monitoring sensors.

Data is analyzed and processed into meaningful information for operations managers. They may choose to display information as red/yellow/green lights, auditory alarms, or on small or wall-sized computer monitors displaying graphical, diagrammatic or video images.

*Diagrammatic, graphical and video images combine in the Production Control Tower to allow operations managers to oversee and interact with shop floor production.*
Information to Act Upon for Efficient and Profitable Manufacturing

More than simply displaying the information, an effective Production Control Tower is tied into an comprehensive MES system, such as Epic Data’s Integra Suite, which interprets the data and alerts operations managers where action is required.

Examples of corrective action that can be taken from a well-designed production control room include:

- **Avoid parts shortages.** Many manufacturers monitor WIP and some may use kanban tickets or boards to drive parts delivery to their point of consumption (POC). Epic Data’s IntegraProduction, IntegraTrak and IntegraPOC work together to establish production plans, monitor parts movement and, like a kanban system that extends into the supply chain, ensure parts arrive at their point of consumption when they’re needed. More importantly, the suite works together to alert production managers at their Production Control Tower to potential parts shortages while there’s still time to avoid production delays.

- **Improve quality, reduce rework.** Quality teams use quality measurements and statistical process control (SPC) algorithms to determine when production may be going awry. Quality management personnel can examine statistical quality data, video evidence and alarm conditions from the Production Control Tower to determine the best course of action. As they develop remedies for quality improvement, they can compare quality statistics and video images from global facilities to select and replicate best practices.

- **Reduce sources of waste.** Waste from any source — whether idle time on machines, scrap and unused material, or rework due to quality issues — is costly and directly impacts a manufacturer’s profitability. One manufacturer asked Epic Data to design a Production Control Tower to display and alarm eight key sources of waste they had identified in their continuous improvement initiatives, allowing them to focus their efforts on taking action to reduce these costly sources of waste.

- **Prevent incorrect resource/asset usage.** In a Digital Factory, all tools, parts and people are identified and connected on a shop floor data collection network. If someone tries to perform a task they’re not certified for, or a part is about to be installed in the wrong assembly, or the wrong die is to be used to make a part, alarm bells sound in the Production Control Room and at the shop floor site. Operations managers can take corrective action to ensure correct production procedures are followed.
Energy Management Visibility for Lower Costs and Reduced Emissions

Energy management is increasingly a focus of operations management as manufacturers try to reign in the rising costs of energy and meet evermore stringent regulations for carbon emissions. As with production equipment automation, the Digital Factory employs extensive sensor and control technology for energy management. SmartGrid technology is being deployed on the factory floor to improve power quality, production equipment energy efficiency, and to reduce peak-usage costs.

From the Production Control Tower, process engineers can monitor power quality in manufacturing and automation equipment, and control power quality through phase shifting for optimum efficacy. Operations managers can monitor energy consumption from different processes, in order to put in place and measure the effectiveness of energy efficiency programs. They can control how and when energy is used to reduce usage during costly peak hours. Production schedules and personnel sensors can be tied into lighting, heat and machinery switches so that usage is reduced when production areas are idle.

Effective energy management systems can significantly reduce energy costs and carbon emissions. The Production Control Tower makes data from monitored equipment and power source visible, providing the information and accessibility to control and optimize energy consumption.
Expertise brings together data collection, production planning and ERP in Epic Data PCT

Make no mistake: designing an effective production control room is a task best suited for shop floor data collection and manufacturing execution system experts. It is not a task for video conference room designers or corporate IT personnel used to office applications. Expertise in real-time data management to ensure data integrity, synchronization and validity is critical. A thorough understanding of the capabilities and data structures of the ERP and MES system are a must.

Data collection, management and integration with ERP and MES systems are the critical foundation of the Production Control Tower.
About the Author

Alan Foster is Executive Vice President, Product and Services at Epic Data. He has been responsible for the creation, commercialization/productization, manufacturing, deployment and support of information dissemination solutions and data acquisition equipment for enterprise workers for over 20 years. With a great depth of experience in developing data collection technologies such as RFID, bar coding, UID and associated data capture devices and wireless data communications, he has built and delivered applications that enable the constant flow of valuable information to people who need to know.

Alan invites you to contact him to discuss improving your manufacturing operation management and manufacturing information systems.

About Epic Data

For 36 years, Epic Data has delivered real-time data collection and production information to discrete manufacturers through turnkey data collection, warehouse management and lean manufacturing operations management solutions. Defense contractors, aerospace, automotive, high technology and industrial equipment & machinery manufacturers employ Epic Data solutions to optimize the ROI of their manufacturing IT infrastructure investments and operations by increasing plant productivity, materials visibility and production velocity.

To make sure you’re harnessing the power of manufacturing operations management systems, make sure you consult the experts. Contact Epic Data at info@epicdata.com or via telephone at:

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