

MANUFACTURING INTELLIGENCE

CAN A COMPANY SURVIVE WITHOUT REAL-TIME KNOWLEDGE?

(Real-time refers to having access to production events, over a network, the moment they occur.)

Manufacturing is undergoing a revolution that is fueled by a global economy that requires greater speed, better accuracy, and lower manufacturing costs. All companies are facing the demands of trying to meet this challenge and beat these demands. There is an almost frantic search for methods of improving productivity, product quality, and lower manufacturing costs. They are embracing the Web, network intelligence tools, and new manufacturing technologies to convert their companies into the next generation of manufacturing (e-manufacturing).

Using New Technology

To survive in this competitive world we live in, it is important to learn about and use new technology as soon as it is possible. Those that do not, may find their competitors anywhere in the world will, and could quite possibly result in not being able to compete with them effectively.

Dr. W. Edwards Deming's Management Challenge

Dr. Deming, whose work in Japan in the 1950s, had a profound effect on manufacturing throughout the world. Adopting his philosophies, Japanese management and their industries in 10 short years became the world's leading manufacturer of high quality goods. In his book "**Out of the Crisis**" he places most of the problems in manufacturing on management. According to Dr. Deming, 85 to 90% of the problems in industry can be attributed to the decisions, or indecision of management. He justified his opinion on the basis that only management had the authority to make changes, purchase new equipment, and supply the training required for workers to use the equipment to its fullest potential. Has much changed in many industries, or have they learned that the key to a healthy plant is a progressive management?

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Manufacturing Intelligence allows managers to improve the effectiveness and efficiency of operations by providing them with easy access to enterprise-wide, key information. Information Sources. A direct connection to machine controls is used to continuously monitor, track, compare, and analyze production parameters. This enables manufacturers to uncover opportunities for improvement and ensure that machines are operating within the defined expectations. Being able to view and analyze monitored production data from anywhere, at any time, is what provides real-time manufacturing intelligence.

Understanding Overall Equipment Effectiveness (OEE)

Although many organizations understand the theory of OEE as a tool to maximize capacity, few have actually put it into practice. Continuous control-system monitoring provides an Internet-enabled OEE tool to monitor the efficiency and manufacturing effectiveness. Real-time Manufacturing Intelligence is aimed at turning raw machine data to optimize production and create a more strategic operation. Data from the factory floor is vital to making informed business decisions. With a remote monitoring and diagnostics system, off-site specialists can support plant operations and quickly identify potential problems areas in the production process and allow plant personnel, supervisors, and off-site technical support specialists to view and manage data directly from any Web-enabled PC.

Decreasing Downtime

Downtime is one of the most costly conditions a manufacturer can experience, a proactive technical support program can generate significant cost savings. Continuous-monitoring services can also generate cost savings by protecting existing investments. The direct high-speed connection used for online monitoring provides a conduit for

regular backup of system software and machine settings. This protects manufacturers against information loss due to electrical failure, disaster, or system lockup.

MAZAK CYBER MANAGEMENT SYSTEM

The Cyber Management System provides a comprehensive information-gathering system that starts with the design of a product, continues through every stage of the manufacturing process, and includes customer service. The information assembled through the **Central Dataway** is available to everyone involved in the manufacturing process such as marketing, engineering, and manufacturing. It also includes everyone that plays a part in the manufacturing process such as sales, service, suppliers, and distributors. With this type of information available, it is possible to manage a factory in real time by providing accessibility to machine, manufacturing, and tool data, production schedules, and many other types of information required to run a first-class manufacturing operation.

Summary

A cyber production center network allows management to operate a factory in real time providing accessibility to machine data, machining programs, fixture data, tool data, production schedules, and other data. This same data is available over a company network to sales, finance, engineering, production control, suppliers, and distributors which greatly increases the efficiency and productivity of a factory.

Manufacturing Intelligence Requirements

A manufacturing software solution must act a manufacturing intelligence platform and a bi-directional pipeline between the plant floor and various business systems. It must:

- Collect, visualize, analyze and report on any plant floor data in real time.

- Be mission-critical, guaranteeing data integrity along every step of the way, and designed to be running 24/7/365.
- Interface simply and seamlessly with the devices on the plant floor and with the business systems that would benefit from the information it would provide.

Achieving Operational Visibility

Even though much money has been spent over the past decade to improve quality, increase efficiencies, and reduce costs, technology has virtually by-passed the plant floor. Effectively connecting business systems to the plant floor, focusing on sources of downtime in the plant, identifying and removing constraints, and improving product quality are challenges for which most manufacturing plants require a solution.

The Challenge

Most attempts to improve productivity and plant floor efficiency have suffered from the availability, timeliness, and accuracy of the plant floor data. Let us examine briefly the role that data plays in each of the areas touched on.

1. Most **Enterprise Resource Planning** (ERP) systems depend upon manually entered data for their connection to the plant floor. The time delay between the occurrence of an event and therefore most manufacturers limit the amount and type of data to strategic areas.
2. Among those aspects of **SFM** related to the plant floor, there is a critical dependence on manually entered data for event monitoring and management. It becomes a difficult, and often impossible task, to build a forward-looking model of an operation with only a limited and delayed view of the past.

3. **Scheduling & Optimization:** Current schedules are created based on large numbers of assumptions and calculations which include the actual availability of all required assets/resources/machines.
 - The actual (real) time required to complete a volume of production, scrap percentages, change-over or setup times is valuable to show exactly what is being produced.
4. **Maintenance:** Most predictive and preventive maintenance is done based on time and the manual total of downtime sheets once a shift or once a day. By the time this data is aggregated and reported, it is often too late to react.
5. **Production Monitoring:** Knowing how much is being produced and scrapped; where the plant problems are; how much inventory is tied up on the plant floor; the top sources of downtime, all these are critical to a plant's decision-making process.