



10 Key Ways “Going Paperless” with a Manufacturing Execution System

Drives Fast Cost Reduction

Introduction

As a manufacturer, you know that effectively managing production operations in today's demanding business environment is a difficult task. Market pressures require maximum flexibility to produce value in the eyes of the customer. Financial pressures require continual process improvement to achieve "lean" manufacturing. Whether your production is driven from discrete manufacturing orders, repetitive schedules or demand pull signals, disruptions in the execution process are often extremely costly. When demand changes, machines go down, or material shortages occur, you must have fast access to accurate information to make and communicate decisions across your operations.

Meeting these and other challenges requires embracing manufacturing execution technologies that leverage real-time information to help ensure products are produced according to stringent customer demands. These technologies should not only meet all of the challenges you face today, but they must also empower you to configure new processes as you continuously improve operations through Six Sigma or kaizen (the Japanese term for continuous improvement).

With the appropriate manufacturing execution solutions (MES) that empower you to create a "paperless shop floor," you can gain immediate benefits such as:

- Reduction of manufacturing cycle time
- Reduction of order lead time
- Reduction of direct labor costs
- Reduction of data entry time
- Reduction or elimination of paperwork
- Reduction of work in process (WIP) inventory
- Increase in machine utilization

A "paperless shop floor" enables critical information to flow throughout the organization—including the once-forgotten areas of manufacturing. This means information is in the hands of those who actually produce your products. "Paperless shop floors" have been created for thousands of forward-thinking manufacturers, producing dramatic gains throughout their entire organizations. Now you will learn how the same results are possible for your company.

Creating a "Paperless Shop Floor" Environment

Quite simply, by introducing actionable, real-time information into the traditionally paper-based shop floor environment, manufacturers are able to create a "paperless shop floor." This real-time control empowers them to streamline production to help ensure products are produced according to stringent customer demands. Creating a "paperless shop floor" gives manufacturers the flexibility to address the key business processes and functional activities that provide them with the quickest time to benefit. A flexible manufacturing execution solution will allow manufacturers to configure new processes and continuously improve operations through Six Sigma or kaizen.

These "paperless shop floors" are created by leveraging existing manufacturing execution solutions that utilize event-driven notification and workflow to provide proactive visibility into disruptions in the manufacturing process. Work instructions are communicated to workers in real time using a variety of technologies, including radio frequency devices and Web-based touchscreens. This approach replaces error-prone, paper-based communication with a streamlined, "paperless shop floor" environment.

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Now that we have defined how manufacturing execution solutions create “paperless shop floor environments,” the next question to be answered is “What benefits will my company realize?”

1. Increased Levels of On-Time and Complete Shipments

Manufacturing execution solutions provide the workflow, visibility and event notification required to ensure that manufacturing is meeting customer demand. Additionally, these systems reduce non value-add activity, increase data accuracy and provide ERP and MRP systems with the real-time data needed to maximize processing, planning and scheduling activities. This results in your ability to increase levels of on-time and complete shipments.

Creating a “paperless shop floor” means putting information in the hands of those who actually produce your products. The manufacturing execution solution creates this paperless environment by giving operators instant access to work instructions and CAD drawings, so they always have the direction required to build products that meet customers’ demanding specifications.

More importantly, having information about events as they occur allows companies to more easily identify and prevent potential problems or bottlenecks. For example, you may already be well aware of the problems created by shortages of key manufacturing materials that halt production, shipments arriving late or incomplete, and backorders. Additionally, a lack of visibility into machines operating outside control limits or processes not meeting appropriate yields can ultimately delay customer shipments. With event management, you have real-time notification of events and exceptions—often before they occur—so you are able to take proactive steps to manage them. This will likely save you the cost of expediting shipments that were unexpectedly completed late. Ultimately, you’re able to keep costs in check, production and shipments on schedule, and customers happy.

By streamlining data acquisition and execution for operators on the factory floor, companies create efficient processes that consist only of value-added activities. The result is a leaner environment. From mobile data terminals for material handlers to strategically placed WIP stations or touchscreens on the factory floor, workers are directed to perform tasks and collect information in real time using intuitive and graphical user interfaces. In addition, new employee training time is significantly reduced, while event-driven notification and workflow via electronic communication provides cross-training opportunities for the existing workforce. Manufacturing execution solutions empower companies to easily implement and manage truly paperless manufacturing processes.



2. Strengthened Decision-Making Based on Real-Time Information

Using a leading manufacturing execution solution, key personnel are given the decision-making data necessary to optimize manufacturing performance. From any location, the technology will allow managers to make immediate decisions on staffing, maximize labor efficiencies, control order fulfillment and monitor machine utilization. Real-time performance reports such as actual versus plan, production unit cycle time,

production efficiency, scrap and downtime by machine or work cell can all be specifically configured for up-to-the-second review and action by management.

When unexpected events do occur, a manufacturing execution solution also helps managers and lead operators take proactive steps by utilizing a broad set of alerts and alarms. Using alert/alarm notification mechanisms such as e-mail, reader boards, lights, pagers and phones, key individuals are notified about potential issues—before they become costly problems. Manufacturing execution solutions do not stop after notifying operators of unexpected events. This type of system pairs event notification with appropriate workflow so operators take suitable resolution steps in real time without affecting operations.

Production order status and work in process are readily accessible via Web browser. This empowers managers and other decision-makers to communicate information electronically to customers and other manufacturing locations. Ease of information access also smoothes the daily transition between shift managers and provides updated statistics on key performance indicators (KPI), wellness views and other important reports.

3. Continuous Improvement: “Adapt or Fail”

Manufacturers have learned that staying competitive means they must continually improve their processes or face the consequences of technological Darwinism—“adapt or fail.” Whether the initiative is Six Sigma or kaizen, traditional manufacturing execution solutions are nearly impossible to change when needed because they require expensive, time-consuming custom code-based modifications. Because of this, they become a barrier to operational excellence. This usually means that improvement opportunities are lost, or work-arounds are developed to accomplish tasks outside of the system. This results in poor data accuracy.

A new type of adaptable manufacturing execution solution has been built on the belief that software should be a catalyst for continuous improvement—not an obstacle. These adaptable manufacturing execution solutions not only provide a detailed view of plant history, but their flexible architecture also allows you to reconfigure processes quickly and cost-effectively as your manufacturing operations change. They also provide metrics needed to make fact-based decisions and adapt as manufacturing operations improve over time.

4. Maximized Supplier Relationships

In today’s lean and just-in-time manufacturing environments, collaboration with key suppliers is essential. The best manufacturing execution solutions provide manufacturers with the capability to exchange information among trading partners and enable true collaborative execution up and down the supply chain. A secure Web portal replaces time-consuming phone calls and faxes as the basis for real-time information sharing and improved inventory visibility—critical factors in enhancing collaboration and streamlining supply chain operations.

Some manufacturing execution solutions also provide both the communication and visibility necessary to facilitate the effective delivery of goods from supplier to buyer. From the point of purchase order (PO) release at the buyer’s location through fulfillment, shipment and receipt, processes that have historically been performed manually—or in some cases simply not performed—are automated. With improved communication regarding compliance and/or serialized labeling requirements, inventory is received at the dock door with the required bar codes already applied. Functionality can also be provided to allow suppliers to perform other value-added services for their customers, including demand-pull replenishment, advanced shipping notification (ASN), and supplier quality inspections.

5. Rapid Product Recall Decisions

Product safety and quality are paramount concerns for manufacturers. When there are concerns about safety or quality, it is essential for manufacturers to have traceability tools that assist them in making product recall decisions. Manufacturing execution solutions aid in this process by capturing detailed product genealogies. When suppliers communicate a product defect, it is possible to trace exactly which finished goods were manufactured using the supplier’s defective component. This traceability can be achieved using lot number, serial number or other product attribute such as version, revision or “born-on date.”

Product recalls often result in enormous costs for the company issuing the recall. In most cases, companies lack information about the affected products. This results in companies inspecting individual products, or being overly cautious and recalling products that have no risk of quality or safety issues. Manufacturing execution solutions bridge this information gap for many manufacturers. With detailed product and order history information, these systems help companies deal with recalls in a timely, cost-effective manner.

6. Leveraged ERP Investment

Manufacturers that have implemented an ERP system have invested significant effort (and money) creating an enterprise software solution. Despite these investments, manufacturers often find their ERP systems do not provide the results they expected on the shop floor. ERPs often fall short because they are overly complex, difficult for shop floor employees to use, and rooted in traditional MRP batch-based processing. A manufacturing execution solution is designed to leverage an ERP investment, not replace it.

Manufacturing execution solutions address these issues by providing intuitive execution capabilities based on a real-time, lean execution philosophy. This means manufacturers get the best of both worlds—easy-to-use execution tools for the shop floor that also support planning decisions by continuously feeding real-time transaction information to the ERP. Manufacturing execution solutions share information with the ERP in real time, allowing the ERP to have an accurate representation of shop floor activities. With real-time visibility to execution, the ERP makes intelligent decisions about supply/demand matching and order promising.

7. Reduced Cost of Regulatory Compliance

Manufacturing environments are becoming increasingly regulated. Whether the compliance requirement is for the FDA or Sarbanes-Oxley, the costs associated with achieving compliant processes can be excessive. With a rich transaction history that provides detailed audit trails and electronic approval processes, a manufacturing execution solution will facilitate compliant processes without excessive paperwork and manual work-arounds. Additionally, a manufacturing execution solution is designed to be responsive to change over time. This means that new regulatory requirements are easily met without system upgrades or customizations.



8. Personalized Manufacturing

Customer-specific manufacturing is a trend driving increased complexity and cost for today's manufacturers. Customer-specific bills of materials, routings and test instructions are challenging to manage, but can be a source of competitive differentiation. Manufacturing execution solutions respond to this challenge by offering personalization capabilities that meet today's customer requirements and adapt to meet tomorrow's unforeseen demands.

The ability to personalize a manufacturing execution solution is a key benefit—but not one that all applications offer. The greatest level of benefit will be achieved through a solution that accommodates personalization via configuration tool sets. With this type of platform, configurations can be made easily and cost-effectively. This means the manufacturers—not the solution vendors—truly own the system. With a flexible manufacturing execution solution, there is no custom coding required for configuration; changes carry over and workflow can be altered as needed after the system go-live. The result of this is that the system's total cost of ownership is greatly reduced over the lifetime of the application.

9. Focused Technology Approach

With the most robust manufacturing execution solutions, nearly any station or work cell in the facility can be integrated into the system and either monitored, controlled or reported against. Machines, scales, gauges, statistical process control (SPC) systems, PLCs, label printers, serial devices, PDAs, automated material handling equipment, wired and wireless terminals, and RFID systems are integral parts of manufacturing execution—and the best manufacturing execution solutions will integrate seamlessly with all of them. Manufacturing execution solutions often feed multiple host systems and facilitate reporting beyond the current capabilities of many ERP systems.

Solving the problems inherent in today's manufacturing environment is best accomplished using a modular technology approach. Manufacturing execution solutions start with bar code or RFID data acquisition to improve order visibility and extend beyond basic data collection as appropriate in each company's individual situation. This allows for a right-sized application based on current business needs and areas requiring the most attention. Oftentimes, this provides self-funding for future projects because ROI is generated quickly.

10. Focused Technology Approach

In today's emerging global economy, seamless communication does not stop at the four walls of the plant. Sharing information in real time both within the enterprise and beyond is an essential component to maintaining information integrity and achieving operational excellence. This communication must also include supply chain-wide notification of status and events in real time to effectively link a global network of suppliers, manufacturers and customers. The right manufacturing execution solution will empower manufacturers to achieve seamless integration across their business systems and software—while protecting IT investments and customer relationships. It will achieve this by integrating Web-based solutions directly with enterprise and business-to-business applications. A manufacturing execution solution should also provide the platform for real-time information flow, eliminate process gaps and deliver competitive advantage—eliminating the delays and errors caused by systems which cannot effectively share operational data.

Component Checklist for Your Paperless Shop Floor

Data Acquisition and Manufacturing Execution

- Work-in process (labor/materials)
- Scrap/production reporting
- Online work orders, instructions, drawings and quality steps
- Lot and serial number genealogy
- Machine integration - PLC/SPC
- Bar code and RFID data collection

Management Visibility and Event Notification

- Alerts and notifications
- Wellness views and key performance indicators
- Real-time management visibility
- Configurable dashboards and reports
- PC browser or wireless PDA ready
- Traceability and recall management

Device Integration

- Portable data terminals and RFID
- PDAs, cell phones and pagers
- Scales, machines, PLC networks
- Conveyors, sorters, palletizers

Integration With Enterprise Systems

- Certified ERP interfaces: SAP®, Oracle®, PeopleSoft®
- Manifesting systems
- Integration technologies: XML, Web services, TCP/IP

Finding the Right Manufacturing Execution Solution for Your Unique Environment

As you move toward coupling your manufacturing operations tightly with logistics, transportation and customer demand, finding the right solution is key. As with any enterprise-wide software evaluation process, there are a handful of important questions that must be answered prior to selecting a vendor. You must be able to find a solution that addresses your business' specific painpoints at a cost that works within your budget. For each vendor involved in the selection process, it is essential that your selection team gather detailed responses to the following issues:

Breadth of technology

Does the vendor offer a wide range of supply chain-related solutions that integrate easily on the same platform? Does it have experience integrating with a variety of software and hardware systems? Does it have a history of releasing product upgrades containing new functionality that demonstrates a commitment to excellence in the space?

Ability to adapt to change

How does the vendor approach changes to your system as your requirements shift? Does it utilize costly custom code? Do these changes carry forward during an upgrade?

Company History

Has the company been in business for a number of years? Does it have a track record of solving problems for manufacturers? Does the product line demonstrate progressively more complex technologies developed using the most advanced toolsets?

Financial Stability

Will the company be around in three years to support the system you have purchased? Are the vendor's sales growing? Does the company have a sufficient amount of emergency capital in case of an economic downturn?

Customer base

Does the vendor have a long list of satisfied customers? Are the majority of these customers referenceable? Can the vendor prove it can keep customers happy over the long term?

Implementation success

Has the company ever had a failed implementation? If so, how recently? What were the reasons?

Conclusion

By now the good news for manufacturers should be clear: manufacturing execution solutions offer a host of bottom-line benefits through the creation of a "paperless shop floor environment." The most effective manufacturing execution solutions will provide you with the tools necessary to cost-effectively increase productivity, eliminate non value-add activities, decrease operating costs and eliminate the potential for errors and waste. By leveraging this type of solution to streamline your operations and "go paperless" on the shop floor, you'll have the information and processes in place to meet stringent customer demands on time, every time.

About HighJump Software

Forward-thinking companies entrust HighJump Software to power their supply chains. HighJump Software simplifies the art and business of creating, selling and moving products across global networks. HighJump Software helps more than 1,300 clients worldwide drive growth and manage change.

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