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E-Book

Planning for a successful ERP and MES integration

To respond to the opportunities—and challenges—of globalization, manufacturers are increasingly looking to IT solutions that provide standardization and visibility into the goods and materials that flow through their production facilities and supply chains. This eBook provides the buying tips and implementation advice manufacturers need to master inventory in the emerging global supply chain.

Plus:

- Understand the main benefits of MES
- Learn how to choose an MES vendor
- Be prepared for the challenges of ERP-MES integration
- Read about one manufacturer's integration project

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Manufacturing execution system (MES) FAQ

By Todd R. Weiss, SearchManufacturingERP.com contributor

Manufacturing execution system (MES) is an incredibly complex, large and varied application that controls your company's manufacturing lifeblood. There is no cookie cutter MES software; each system must be built and customized for a specific application. This MES FAQ will help you select the best MES solution for your company's needs.

What does MES software do?

MES allows a company to track and monitor just about every aspect of its manufacturing processes in its factories, from ingredients measurement to output to labor to production reports, while tying it all together for detailed analysis of each process. The MES software can be tied into other reporting systems, including enterprise resource planning (ERP) and business process management (BPM) applications to give companies a deep overall view of its production capabilities.

Can MES software fit every manufacturer?

MES software is very complex and varied and must be custom-configured for specific manufacturing situations. An MES software package for an electronics maker would not be the same for a canned food processing plant. The applications must be built and customized for the specific manufacturing steps needed inside a plant through add-ons, custom code and layered applications, depending on the requirements and vendors involved.

What are some of the chief benefits of using MES for a manufacturer?

Cost-savings can be directly seen through the monitoring of every step in the manufacturing cycle, from the tracking and delivery of raw materials to the progress of the products all the way through to final packaging. Companies can measure every process to find new ways to bring in process improvements that can save time, money and raw materials during manufacturing, as well as conduct detailed analyses to find increased productivity.

How do you find the right MES software vendor?

Start by talking with industry analysts to get their views and read as much as you can on MES vendors, especially checking into their client lists. Find MES vendors who deal with manufacturing businesses similar to yours and call them to find out about their real world experiences with the MES products they brought in and about the vendors they selected.

This is an incredibly complex and large application, controlling your company's lifeblood, so if you have questions and concerns, bring them up early and get them all answered before you make any buying decisions. Some MES vendors are specific to certain industries, so be sure to seek those out for bids and information if they already have important insights into your manufacturing needs.

What should I be careful about as I pursue my MES strategy?

Know what you need. Know your own best-practices requirements. Know your production hardware and equipment inside out so you can be sure that it can be monitored and controlled by a prospective MES vendor's products. Don't believe every claim you hear from an MES vendor. Ask them to prove their claims by checking with clients who've installed their applications and are seeing them work every day.

Know the vendor's responsibilities to uptime, production needs, tech support, training and every other conceivable detail before you sign a contract. Know the answer to your question before you even ask the vendor, because you already did the research and know it from every angle. Be sure your prospective vendors value your critical business processes as much as their own before you put your factories and production into their hands. This is an ongoing partnership with the MES vendor, not just a purchase. Make sure they'll be there after the sale -- in writing.

Todd R. Weiss is a technology journalist and freelance writer who worked as a staff reporter for Computerworld.com from 2000 to 2008. Follow him on Twitter @ TechManTalking.

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Evaluating your need for an MES upgrade

By Edward Bassett, SearchManufacturingERP.com contributor

Roughly half of the manufacturing execution system (MES) software out there was deployed in the last six years, a sign that manufacturers are finding that MES upgrades are not easy, according to interviews with analysts.

MES is not easy to connect to the rest of the plant or support, and it runs on old hardware platforms that are no longer viable, analysts say. For example, many MES systems were written for DEC's VAX platform, which is no longer supported.

Manufacturers opting to replace MES software

As more manufacturers look to standardize their MES, many are opting instead to rip and replace the systems. Integration is far easier with most of the new MES systems that are based on Microsoft .NET Web services technology, according to Robert Parker, an analyst at IDC Manufacturing Insights. That's making it much easier to standardize across multiple plants, one of the most important reasons for investing in the new systems, analysts and vendors said.

"If I'm going to have manufacturing flexibility, I need consistent systems," Parker said. "So the movement toward putting new MES in is less about something great about the new stuff. First and foremost, it's because I need a standard reference system running across the plants."

Making the case for an MES upgrade

How can an organization tell when it's time to make a change?

The No. 1 sign that it's time to do something, Parker said, is realizing that there is no longer portability of products between plants because everything is kept in silos.

The rising cost of obsolescence is another sign, according to Simon Jacobson, a research director at AMR, a Gartner Inc. company. Manufacturers consider new systems when the cost of maintaining an MES on an old mainframe goes through the roof, he said.

The need to make a major business change is another common motivation, according to Jacobson. For example, a company might want to better align its MES with a customer, supply chain, or product supply initiative.

A new MES can cost anywhere from $150,000 to $300,000 for the software license, plus one and a half to three times that amount on services, depending on the complexity and the number of sites involved, Jacobson said. Parker put the cost for a large plant at $150,000, a third of which is the license, two thirds being services.

Implementations started this year are likely to take three to six months for a project of very low complexity, while a highly complex project can last a couple of years, Jacobson said. Parker has seen rollouts as short as six months for a single plant, while slower implementations tend to take 18 months.

MES integration poses some challenges

Newer MES systems, while much improved, still have weaknesses. MES integration is easier than before but can still cause problems, these analysts said.

Parker said that most MES systems handle scheduling processes very well; but for product genealogy, quality management and asset management, it's a mixed bag. What's more, MES is sometimes weak at managing the costs associated with processes. To compensate, companies sometimes buy separate quality management, product, costing, and asset management packages to run in conjunction with the MES, according to Parker.

Also, MES software hasn't gained many truly new functions in recent years. Many of the recent innovations have focused on visualizing the production process and performing analytics. "That's great, but if you're not delivering any value to the customers or increasing their brand value, those things are ultimately rendered useless," Jacobson said.

Although off-the-shelf MES generally performs well, most MES is weak in plant-to-enterprise integration, said Julie Fraser, principal industry analyst and president of Cambashi Inc. Integration can be difficult if the MES and legacy ERP can't cope with the constant reconfiguration needed to support Six Sigma continuous-improvement initiatives, which often require adding fields for data capture and complex feedback loops as processes change, Jacobson said. However, ERP vendors that also offer MES tend to have easier integration between the two packages, according to the analysts.

To ward off these MES challenges, it is important for a company's business and IT sides to collaborate on an MES project, they said. Whoever is setting the operating strategy -- for example, a chief product supply officer -- must be involved in major decisions along with a cross-functional team that brings the leaders of each manufacturing site together with managers of centralized IT.

Introduction to MES integration

By Todd R. Weiss, SearchManufacturingERP.com contributor

So what is a manufacturing execution system (MES)?

MES is a complex software application that can track, monitor and manage just about every manufacturing process, system, operation and function inside multiple facilities to provide manufacturers with critical and detailed information to run their business. MES integration with other software systems optimizes data management across manufacturing organizations.

MES is to a manufacturing plant what an accounting system is to a financial institution -- its heart and soul -- containing every piece of relevant operational information from incoming raw materials to processes, the mixing of ingredients, measurements, cost-saving efforts, product changes and real time monitoring on everything happening inside a factory's walls.

MES software's greatest value is also one of its most difficult challenges: It's complexity is such that one MES system can't be all things to all manufacturers. A chemical company MES system, for example, will require different processes than will an automaker or a large-scale bakery. Each system must be configured and adapted for whatever a company makes.

MES is often integrated with other key business IT systems, including enterprise resource planning (ERP) and supply chain management (SCM) to enable companies to watch over all facets of their operations. For example, ERP warehouse management system (WMS) software tracks orders that come into the warehouse through the order management system so they are filled accurately and on time.

Today's MES systems come from a wide assortment of vendors including Apriso Corp., Rockwell Automation Inc., Broner Metals Solutions Ltd., Siemens A.G. and GE Automation.

Many applications today are web-based and can be used through standard web browsers for ease of use and accessibility from any location. This makes them very flexible and powerful for users.

For more information on MES and other manufacturing applications, contact Manufacturing Enterprise Solutions Association (MESA) International. MESA is an independent, non-profit MES organization made up of manufacturing companies, IT hardware and software suppliers, system integrators, analysts and others who aim to improve business production operations through MES and other process improvement applications.

Manufacturing execution systems and ERP integration: A happy manufacturing marriage?

By Jean Thilmany, SearchManufacturingERP.com contributor

It used to be what happened on the plant floor stayed on the plant floor.

The manufacturing execution system (MES) -- a central system for managing all manufacturing information such as resource allocation, manufacturing planning, supply chain information and quality inspection numbers -- operated as an isolated and self-contained system.

Similarly, the enterprise resource planning (ERP) system, which pulls together and stores business operating information about human resources, accounting, customer relationship management and other financials, hummed along independently. Both systems have always been critical to the manufacturing organization, but until recently, had never been linked.

However, during the past five years, experts say many manufacturers have realized that by marrying these two mammoth systems, they can create an integrated ecosystem stretching from headquarters across multiple factories, warehouses, engineering centers and even sales offices. This allows them to more easily home in on all company operations and refine them as quickly as necessary. A more holistic view of purchasing, credit, accounting, supply chain management and manufacturing planning gives them greater agility and better data to aid in decision making and forecasting -- from sales and purchases to asset utilization and hiring and manufacturing planning.

Integrating MES and ERP brings operational clarity

Bonset America Corp. in Browns Summit, N.C., makes heat-shrinkable film used to create labels and safety seals for packaging. It faced the perennial problem plaguing many manufacturers: The manufacturing side and the business side didn't talk -- they simply had no effective way to communicate.

The company relies on a manufacturing execution system to track raw materials. But the enterprise resource management system, which tracks other business functions, couldn't receive that information.

"We just didn't have a means to automatically convert the data from the MES to the ERP," said Rob Richardson, Bonset's information technology manager.

That lack of system communication made it hard to sync business and manufacturing information for an overall view of company operations.

So, Bonset started an MES and ERP integration project -- but first had to solve a gating problem.

Although plant-floor employees could automatically weigh material put into the blenders, they still recorded raw materials manually. This manual input allowed Bonset to record only essential data. But the whole integration goal was to make as much data as possible available to get an overall look at how the company was functioning. So a key step in the project was implementing an automated data collection system. The data collection technology helps track exactly which raw materials are used to produce finished goods. Integrated in tandem with the MES and ERP systems, this allows Bonset to track raw materials as well as finished goods.

The Bonset plant and its corporate side can now calculate efficiency and better determine costs.

"The biggest improvement for Bonset has been the ability to more accurately trace materials in our system and our raw material inventory accuracy," Richardson said.

It was a similar story when executives at Des Plaines, Ill.-based specialty chemical manufacturer UOP LLC sought a way to increase the value of its new ERP system. UOP, a wholly owned subsidiary of Honeywell International Inc., teamed with Raytheon Co. to deploy an enterprise-wide IT architecture that connected the MES and business systems.

"Return on an ERP investment can be increased by 50 percent by integrating it with accurate, real-time, plant information," said Dave Mueller, former senior systems specialist at Raytheon Consulting and Systems Integration in Pittsburgh.

ERP and MES software market responding to demand

As vendors have come out with offerings that ease integration and as standards-settings bodies have also stepped in to help, interest in marrying MES and ERP has really ramped up, adds Greg Gorbach, vice president of collaborative manufacturing at the ARC Group, a Boston-based manufacturing consulting firm.

"For the past four of five years now, we've really seen a sharp uptick in interest in people looking to integrate these business systems," Gorbach said.

The case for integration is sweetened in part because of new demands for fast response times in manufacturing. While both MES and ERP can give executives a detailed snapshot into what's happening within a business at exactly one moment in time, the ERP system returns basically a snapshot, while the MES offers a better way for organizations to react to the events it tracks.

ERP is essentially a reporting technology, a way to store myriad information in accessible form. But ERP simply gives an overview of company operations: what's been sold, what's been ordered. In contrast, an MES shows what's happening in real time and connects the dots more quickly, so manufacturers can react and immediately see results based on what they've changed. The MES system can show, for instance, that product inventory is 50 but 75 orders were just received, so inventory will need to be increased by 25 and the company should immediately start making more product. Or, if the MES system shows that orders for a particular item have increased, planners could react by ordering exact quantities of the raw ingredient needed to produce the item.

ERP plays an important role, too. MES systems can feed ERP systems accurate, timely information such as production levels, inventory, work-in-process status, and part and serial numbers, for tracking purposes.

The latter is particularly useful for companies that need to comply with stepped-up regulatory reporting to government agencies, such as those in the medical device, food and pharmaceutical realms.

It's that kind of ability to react and run a more efficient operation that business leaders seek by linking the systems, Gorbach said.

"Executives wanted to have visibility into the plant floor system to better answer questions from customers," he said. "Even during the manufacturing process, customers would want to know, where are you with the quality of my product?"

ERP and MES integration still challenging, but easier now

Integration is less a headache than in the past, due to new features in many of the technology offerings, but some companies still need to bring in third-party integrators. Others need to add extra software to aid integration, Gorbach said. Bonset's data collection technology implementation is just one example of additional capabilities that might support an ERP and MES integration project. Though the challenges of marrying the two systems are fewer than in early integration days, they still remain, analysts concur.

But the industry is responding to ease MES and ERP integration pains. Today's vendors offer easy-to-implement integration options, the analysts say. Also, the ISA standard SP95 addresses factory ERP communications, which helps ensure systems will operate harmoniously, said ISA's Chip Lee, director of standards, publishing. The standard helps make integration consistent across vendor offerings and companies.

And that kind of consistency helps keep these systems on speaking terms, exchanging vital information and helping manufacturers respond to new demands more efficiently than ever before.

Jean Thilmany is a freelance writer.

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