With many manufacturers running legacy manufacturing execution systems, a challenge in 2010 will be ensuring that these systems have kept up with new business processes. Readers face questions of whether to update current systems, or simply rip and replace. With a new generation of manufacturing execution software available, they have plenty of options. In this eBook, get advice on determining the ROI of their current MES system, and an overview of the software’s new functionality.

Readers will:

- Find tips for deciding whether to upgrade or replace a current MES
- Read an overview of new functionality in a current MES
- Learn some common MES implementation project challenges
- Discover best practices for getting more out of MES software
Understanding the new generation of MES

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Evaluating your need for an MES upgrade

By Edward Basset, 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.
Apriso is a software company dedicated to providing its manufacturing customers a competitive advantage. It does so by enabling organizations to quickly and easily adjust the execution of manufacturing operations in response to market changes and unexpected events. Apriso’s FlexNet platform provides visibility, adaptability and real-time control of manufacturing operations across the enterprise and supply chain network.

For additional information, please contact us at www.apriso.com.
Interest in Manufacturing 2.0 MES software persists despite recession

By Brenda Cole, Assistant Site Editor

Manufacturing execution systems (MES) software is a critical component of modern manufacturing environments. It collects and analyzes production data, tracks quality control and is often integrated with ERP to monitor manufacturing schedules and ensure delivery of orders. With so much riding on it, manufacturers have good reason to stay on top of the latest MES innovations.

Back in 2007, AMR Research attempted to raise the technological bar for MES, coining one of the year's major buzzwords: Manufacturing 2.0. Following in the vein of Web 2.0, Manufacturing 2.0 referred to next-generation technologies such as blogs, wikis, instant messaging, and user-centric interfaces on the shop floor. It called for a manufacturing service-oriented architecture (SOA) that merges product data management (PDM), process development models and event-based supply chain collaboration with support for mobile and sensor technologies.

According to Gartner research director Simon Jacobson, a coauthor of the 2007 AMR report, the concept was developed in response to growing interest in mobility, SOA-enabled applications, cloud computing and new paradigms for factory training.

Manufacturing 2.0 was also touted as the solution to some of the problems of traditional MES and ERP systems -- rigid architecture, inability to support new lean and Six Sigma initiatives, difficult and costly MES deployments and trouble functioning in multiple manufacturing styles.

Three years later, in the wake of a global recession and financial crisis that devastated many manufacturing industries, where do Manufacturing 2.0 and next-generation MES stand?
Whatever happened to Manufacturing 2.0?

Discussion of Web 2.0 -- and consequently Manufacturing 2.0 -- has been scarce in the economically troubled years since 2007. Faced with shrinking IT budgets, many manufacturers have been forced to postpone or downsize plans to upgrade or replace their existing MES infrastructure.

"You have to understand that a lot of the future thinking had to take a backseat in the last months as we tried to put a bandage on [damage caused by the recession], but this concept still has appeal," said Jacobson. The interest hasn't diminished, but manufacturing software vendors have been slow to apply Web 2.0 concepts, he said. While MES deployments continue to be mostly in-house, some companies want to begin using MES in the cloud to share designs and specifications.

Julie Fraser, principal industry analyst and president of Cambashi Inc., agreed that next-generation MES adoption has been slower than anticipated. "Most [MES] software providers are in a position where they have substantial customer bases and investments with the older style software," Fraser said. "This will not vanish rapidly, and many of these companies are also not terribly well equipped to partner with the companies that might help them enable SOA, business process management [BPM], business activity monitoring [BAM] and social media tools providers."

Fraser has seen recent progress toward Manufacturing 2.0 ideals, however. Some vendors have made strides toward adopting more user-centric interfaces in their MES and ERP software, and mobility is becoming more common through the use of pervasive sensors, networks and computing. Users are starting to add onto their MES and ERP infrastructures incrementally instead of doing "rip and replace" implementations. Product data management and process development tools are also being used together more often in a variety of manufacturing environments, including aerospace, Fraser said.
The state of MES software today

Many of the recent advances in MES technology have their origins in next-generation manufacturing concepts. Supply chain collaboration -- a main tenet of Manufacturing 2.0 -- is one of the most prevalent MES trends seen by the analysts.

"The functionality itself hasn't changed; if you're still on site, you'll need the basics of MES - technology around work orders, scheduling, operations intelligence," Jacobson said. "Where people are starting to think ahead is in moving the need to execute [MES] from a single site to a network."

Greg Gorbach, vice president of collaborative manufacturing at ARC Advisory Group, noted that supply chain collaboration efforts are moving beyond the scope of traditional, in-house MES software.

"It's important to recognize that 'MES' is a term most often applied to a narrow plant-floor application," Gorbach said, "while the biggest trend is toward using an operations platform approach that allows manufacturing operations to tie together all of their plant-floor operations systems, including MES, EAM, etc. and connect to business systems and other processes."

"'MES' is just a part of manufacturing operations management (MOM)," he said. "These systems are being driven from the top down in organizations because manufacturers want to be able to interact with their distributed plant floor more effectively, so as to better respond to their customers and the needs of the marketplace."

Fraser pointed to plant metrics -- which include dashboards, operational intelligence and analytics -- as among the top-selling technologies in manufacturing. "In some cases, [plant metrics are] being integrated with the pieces of MES that allow the people to also do their work -- the BPM and workflow approach," she said.
MES software developments lacking in some areas

Despite these advances, MES software lags in areas that are seeing growing interest from users. According to Jacobson, MES integration with other manufacturing software is a widely requested feature, but few MES vendors have responded. "Everyone talks about integration, but no one's really delivering it," he said.

The blame doesn't fall entirely on the vendors; customers must do the research needed to identify their technology needs and articulate them to vendors, according to Jacobson. "Sometimes, customers aren't sure what they're looking for," he said. "Folks start off saying, 'We need MES,' because that's the way they view manufacturing, but it's more important to be looking at problems within the whole plant."

IT budget cuts in hard economic times have also made many in manufacturing -- an industry already hesitant to invest in software -- even slower to adopt the new technology.

"Manufacturing lags other industries in the use of nearly every technology," Fraser said. "Because production is the mission-critical discipline or area within these companies, it is often slowest to change. Social media and Software as a Service [SaaS] are two obvious areas where other applications are ahead of MES."

Gorbach agreed that manufacturers have been -- and will most likely continue to be -- slow to adopt SaaS technology. "Expect [SaaS adoption] to be difficult at the plant floor level, where the culture needs to change before there will be wide acceptance," he said. "Even then, SaaS will be limited to those applications where it can be shown that sufficient real-time availability can be assured so that manufacturing is not disrupted."

What does the future hold for MES?

The future of MES software depends on the vendors' ability to respond swiftly to customer demands. This is especially true in areas like integration with other software systems, where MES users have been requesting new functionality for some time. "Clients are demanding integration with product lifecycle management (PLM) especially," Jacobson said. "But the tech market is taking a while to respond."
Fraser also predicted that MES integration will play a key role in creating the next generation of MES software. "I expect to see greater integration, collaboration, and even blurring of category lines among the applications and technologies that have played in the plant," she said. Examples of this collaboration include software running in control systems, sensors playing an active role in optimization, inventory management software in the plant and better connections between enterprise and warehouse systems.

Another potential area for MES advances is support for multi-enterprise or outsourced manufacturing models. "The products can do some of that today," Fraser said. "But I expect to see it more formally introduced as a template or function rather than simply one option for how to use more standard plant information functionality."

Manufacturers will be keeping an eye on the Internet and gauging the value of Web 2.0 technologies. According to Gorbach, areas such as social media, virtualization, mobility and visibility will become increasingly important in manufacturing IT.

It will also be a critical time for those looking to make a business case for MES cloud computing. "The next three years will figure out the potential for the cloud," Jacobson said.

Fraser offered some advice to manufacturing IT professionals who are looking to the future of Manufacturing 2.0 and MES software. "Listen and learn from everyone involved [in manufacturing IT decisions], but realize that there will be naysayers and you must not allow them to prevent progress," she said. "Hone your change management skills to deal with the new opportunities you have to leverage the knowledge and skills of every employee in your facility."
Reviewing your MES software strategy: Is your business keeping space?

By Todd R. Weiss, SearchManufacturingERP.com Contributor

Few large manufacturers today would even think of running their operations without a custom-configured manufacturing execution system (MES), but as plants age, are companies making sure that their MES software is staying up to date?

The systems have improved significantly since they were first installed thanks to innovations, expanded user needs, and greater requirements for better, faster and cheaper manufacturing.

So where does this leave a company? And where should organizations begin reviewing their own MES software to be sure that it still has what it takes for business? A good place to begin is with a deep review of everything -- from existing applications to best practices checklists -- and a careful analysis of the company's future demands. Then take a good look at the evolution that's been going on in the MES marketplace to determine whether the business needs to fix or replace critical MES infrastructure.

How to begin an MES evaluation

To make that transition successfully, companies need to do a careful and detailed analysis of every manufacturing process, production step, staff member and system from top to bottom as they look toward keeping their MES software up-to-date, according to Simon Jacobson, an analyst with Boston-based AMR Research.

"The thing that is going to be sort of the game-changer here is that as we see more Web-based systems, you don't have to go workstation to workstation anymore to make changes [throughout a plant]," Jacobson said. "But the culture has never been brought along to use them appropriately." This has often kept some MES from truly bringing all the benefits and savings they are capable of providing.
To make them work most efficiently, it's time to ask all the right questions as you analyze your needs, plants and present capabilities. "The biggest best-practice question to ask here is what business goals are you driving toward and defining with your MES goals," Jacobson said.

Sometimes, upgrading an entire MES is "not as important as putting in a performance management layer as part of the manufacturing architecture," he said. "I think the savvy companies are beginning to realize that MES is just part of the manufacturing equation."

At the same time, the importance of a finely honed MES has never been more apparent. "No longer is it being done in isolation," Jacobson said. "It's being done as part of the end-to-end business. In this economy, the only thing I'm really seeing change in MES is [that] people look for quicker returns. It used to be two to three years on a basic implementation, and now they're trying to do it faster, cheaper and better."

The importance of selecting the right MES software vendor

One of the other critical and challenging things a company has to do as it moves toward updating or replacing an MES is to select the MES software vendor or vendors very carefully, said Greg Gorbach, an analyst with ARC Advisory Group in Dedham, Mass.

"MES is interpreted and defined differently by industry, and the needs are different for different production types," Gorbach said. "Historically, they were created by someone familiar with a particular domain, and they were optimized for that. Many systems today are built to handle a wider range of uses. You need to fit them into your particular environment and your work and operations. It's not so much custom as it is getting the right configuration."

A common problem, though, is that manufacturers often think that their specific processes are so specialized that they want to stick with their own homegrown systems instead of bringing in modern commercial MES applications, Gorbach said.

"Then, down the road, they talk about rolling MES out to multiple factories," he said, and they see the limitations when the homegrown applications can't be easily scaled like new
off-the-shelf products. "They can't appreciate what can be done with today's more modern products."

At that point, company leaders need to know when to take the steps to replace what they have and finally pull the trigger on purchasing the right products. "For those companies that do that analysis, there can be some big benefits," he said.

**Find better MES tools to improve workflow**

Another key to look for in your next or updated MES, Gorbach said, is better collaborative MES tools to keep the workflow on the factory floor going smoothly. One of the latest innovations starting to appear in MES, he said, is Facebook-like webpages that can be stored in Web-based MES production systems. But instead of the pages being about a person, they feature a specific piece of equipment on the manufacturing floor. The collaborative page can include links to the equipment, and it can be made available to the plant manager, service engineers, tech support staff and equipment operators.

"If a problem arises with that piece of equipment, they can open an interactive chat or diagnostics session," Gorbach said. "The page can be oriented around a piece of equipment to work on it. Those are the kinds of things that we're only starting to see coming into this space."

Another big growth area that Gorbach has seen in MES involves add-in connectors that can help companies tie new plant operations into their existing MES software to extend their use and gain new features. That can allow companies to add new manufacturing capabilities without having to replace their costly and complex platforms entirely.

"One thing driving an uptake in business in this area is that companies need to get more information out of their plants, and they need their plants to be well-connected to their businesses," Gorbach said. By adding connectors or another layer of information-gathering software to the existing MES stack, companies can bring in more details about their manufacturing operations in one plant or across all facilities.
"Once they see that," he said, "they begin to see that one plant is performing more efficiently than other plants, so they can see what they need to change" -- and the benefits that can be gained.

The slow economy has made this kind of analysis even more important. "A few years ago, it was not uncommon to buy one system for one facility and then put in more as needed [over time]," Gorbach said. "Now, that's changed to: 'Let's do all 15 plants now and give me a deal.'"

About the Author: Todd R. Weiss is a technology journalist and freelance writer who worked as a staff reporter for Computerworld.com from 2000 to 2008. He spends his spare time working on a book about an unheralded member of the 1957 Milwaukee Braves and watching classic Humphrey Bogart movies. Follow him on Twitter @ TechManTalking.
Best practices for MES software selection and implementation

By Lauren Gibbons Paul, SearchManufacturingERP.com Contributor

A manufacturing execution system (MES) has a lot to offer small and midsized manufacturers by way of increased throughput, reduced scrap and rework, lower costs, and better alignment with customer needs.

Before getting started with an MES project, however, manufacturers need to make sure that they absolutely need an MES, and that the MES software they're about to select meets their business needs.

As an enterprise application, MES requires a significant investment of time and money, although it's not in the ballpark of a full-blown ERP initiative. Some observers estimate the cost of an MES implementation at 20% of a major ERP project.

Discuss with the team why you are thinking of making this investment in MES. "You have to have a joint mindset of why you're doing this," said Maryanne Steidinger, operations management MES/EMI marketing manager for the MES package Invensys Wonderware. "You have to have a problem statement that everyone agrees on." This will help avoid issues related to user acceptance down the line.

Problem statements for why the company is implementing MES could include issues with quality, plant floor equipment being down frequently to continually losing track of work in process. Once the group settles on one or two of these, it is a good time to engage a consultant or systems integrator to help scope out a solution.

Building a business case for MES implementation

Few SMBs place as much emphasis on preparing a formal business plan prior to an implementation as enterprises. But it is still a good idea to put together a business case with expected payback and return on investment to ensure the project yields the expected benefits.
That said, it is tough to base a business case for MES exclusively on hard benefits such as specific cost savings or reduced headcount. "Make your best attempt to account for soft benefits," advises Simon Jacobson, research director, AMR Research. "[Post-implementation] you will have some unanticipated hard benefits. But the bigger piece is the soft benefits like productivity improvements and better customer satisfaction."

**Selecting an MES vendor**

Demand for MES systems has undergone a resurgence, particularly among manufacturers with multiple sites. One key factor in selecting an MES vendor is finding one that focuses on your particular industry and that targets manufacturers of your size.

Start by doing some research on your own, via the Web and organizations such as the MES Association (MESA), which offers resources to help with software selection. Then, if you have not already done so, bring in a consultant with MES experience who is accustomed to working with companies of your size. This should be your go-to person for expressing your needs to potential vendors. Interview several MES vendors and put them to the test, advises Scott Whitlock, president of Flexware Innovation, a systems integrator that specializes in MES and manufacturing intelligence.

"Ask for the vendors to do a demo with your requirements and data in two weeks," Whitlock said. "Take a few of your most difficult situations and ask the vendor to show how [its] software handles that situation, then base your decision on the outcome."

For example, if track and trace is an important function for your company, have the candidate demonstrate that its solution can track all the raw materials that went into a product through assembly and then all the way back through repair, including different-length fields and different numbers of fields.

Don't be shy about pushing the vendor. "If the vendor of the solution cannot do this in two weeks," Whitlock asked, "what hope does an end user have to do this a year from now when they own it and the vendor is gone?"
Implementing MES software

As with all enterprise software implementations, start with a pilot project or two, demonstrate value, assuage user fears, and then scale it. "With MES, you can't just whack it in at 15 sites," Jacobson said. Begin with a targeted pilot. Some vendors offer value-based pilots, as in offering a guarantee that the customer will see x amount of benefit from the pilot or they will return the money.

You will probably want to engage your MES vendor or a systems integrator to help with implementation. Otherwise, you risk getting bogged down in ramp-up issues that the pros could easily handle.

The technical part of the MES implementation usually proceeds pretty smoothly, though the customary glitches and delays can be expected. But the delays are measured in weeks, not months or years, as with large ERP deployments.

The big challenge is managing cultural change. "MES will have a major impact on the organization," Jacobson said. "You are completely changing the way many people used to do their jobs."

This naturally creates unrest. Have your executive sponsor keep harping on the message of why MES is important to your organization's future. This executive should emphasize that the project is not about reducing headcount (unless that is in fact the thrust of your project, in which case, keeping silent on that point might be prudent). These things will go a long way toward getting everyone working together to make the implementation go well.

You can skip the typical generic one- or two-day employee training that would be done after most large projects, Jacobson added. That approach won't get your employees what they most need, which is a blow-by-blow walk-through of how the new system will change their worklife. Train a few power users and have them train their peers on the job.

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ARC View In Dynamic Market

ARC White Paper: L’Oreal Way

A Platform Approach to Manufacturing Operations Management

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