How a Manufacturing Execution System Can Help You with the Labor Shortage

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Introduction

Automation on the manufacturing shop floor helps increase productivity, visibility, and efficiency, but skilled workers are the essential heart of your operations. You need to attract adept workers despite labor shortages to operate equipment, report production, and inspect parts. The answer to creating an optimal balance of automation and skilled workers lies in using systems designed to measure and automate operations activity so you can keep your facilities on a path to continuous improvement.

Manufacturers worldwide face a significant shortage of skilled labor. Deloitte reports that a record number of unfilled jobs are likely to limit higher productivity and growth this year with an estimated shortfall of 2.1 million skilled jobs by 2030[1].

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[1] 2022 Manufacturing Industry Outlook, Deloitte

"The next generation manufacturing enterprise is here. Manufacturing Execution Systems unburden today's workforce so they can focus on producing parts."

John, Oskin, Chief Executive Officer | Sage Clarity

The pandemic exacerbated the labor shortage as those in manufacturing, along with much of the world's workforce, reassessed their career options. The challenging environment drove fears of new virus variants, increased child care demands, and left workers seeking more flexible work arrangements. A challenge for manufacturers to be sure. With that backdrop, how do you attract and retain skilled workers, operate efficiently, support customers, and drive revenue?

Advancements in Manufacturing Execution Systems (MES) can help you streamline and succeed despite labor shortages. Streamlining and automating your operations can help you increase productivity, onboard employees faster, and access data remotely.

Let's look at some specific MES benefits for manufacturers experiencing labor challenges.

Speed up Onboarding

Every manufacturing facility faces a turnover battle and is challenged by keeping staff levels stable. New employees and temporary workers are continually onboarded to handle urgent needs or seasonal demands. New workers may not know your industry, but you need to ramp them up quickly. Keeping the learning curve as low as possible gives you more flexibility and allows you to train new workers more quickly.

An MES solution helps with an intuitive touch screen interface that provides access to the information they need to quickly get up to speed including:

- Training documentation and videos
- Work instructions and part drawings
- Process steps
- "Call for help" assistance

Example of an MES touch screen interface

MES also has built-in training certification or skills management capabilities. It offers the ability to control when an operator is ready and qualified to run a machine. Certification can be based on completed training or by an efficiency rating. For example, an operator may not be allowed to run a machine alone until they demonstrate a 60% OEE (Overall Equipment Effectiveness) or better. The information gathered by the MES is used with program controls to help you determine what employees to schedule on specific resources.

Automate Production Data Collection and Reporting

When you bring new employees to the shop floor, you probably want them to learn how to operate a specific machine or work cell. Reducing the complexity that comes along with onboarding increases efficiency. Things like figuring out what part number is being made, counting parts with manual math, writing down information, and scrambling to find drawings or images diminishes productivity.

It's also highly unlikely that you can mistake-proof manual processes that have frequent interruptions and handoffs. That looks something like this:

An operator needs to write down production data on a piece of paper collected by another worker. Then it's handed off to another employee to interpret and enter in the system. When errors are found, someone needs to backtrack to see what happened. Workers trying to save time may even wait until the end of their shift to document data making the process even more error prone.

Manual data collection drains productivity and accuracy with issues that include:

- Wrong part number or job is tracked
- Wrong quantities
- Transposed numbers
- Incorrect time
- Over production
- Inaccurate inventory
- Increased need for cycle counting
- Employee job satisfaction

An MES solution automates and streamlines all of that with:

- Automated changeovers—the part number for the item being made comes directly from your PLC (Programmable Logic Controller) system. It eliminates the need for operators to write down or go to a screen and choose what part/job they're working on.
- Automated part counts.
- Alerts—automatically alert workers when scheduled quantities of parts are fulfilled.

As an example, a tube fabricator revealed efficiency gains of 15% after automating data collection, reported by The Fabricator December edition[2]. The system data collected also helps you track operations like down time and scrap and cycle efficiency, so you can implement continuous improvement programs. Ultimately, it translates into making more parts with higher quality and less overhead and labor.

Get Accurate Real-Time Visibility

The data you collect in an MES solution also provides more accurate, real-time information for your business—that you can use to make faster, real-time decisions. The cumulative effect helps you reduce overall labor by:

- Improving inventory accuracy and checking part availability. No more walks to the plant floor.
- Creating visibility into how parts are running, and machines are performing that general managers can see remotely.
- Monitoring performance at individual machines that also allow machine operators to see how their machine is performing. This leads to more efficient and proactive improvements.
- Allowing office workers more flexibility and access to systems so they can work remotely or from home.

[2] The Fabricator, When a Tube Fabrication Operation Needs That Right Count, Dec. 2021

Automate Process Monitoring to Reduce Frequency of Physical Inspections

MES systems also collect process data when parts are made. For example, temperatures, pressures, and vibration levels can be monitored and collected. The information is gathered directly from PLCs on machines or from IoT sensors or actuators. Using statistical process and quality control methodologies and automated part qualification, MES capabilities help you determine when a part is outside acceptable process variables so you can program:

- Turning on a red light
- Turning on an alarm
- Making an announcement over your PA system
- Shutting down a machine
- Opening a door on a conveyer belt to eject parts

The goal is to stop bad parts from moving further down the production line or even from reaching your customers. Automation allows operators to focus on producing parts instead of taking time away from production to do quality checks. Operator efficiency improves and you can reduce the frequency and time spent on quality inspections.

Improve Productivity with Performance Analytics

MES data also provides information to help you understand exactly what activities employees are performing and how efficiently they're operating with detailed data on every operator. You can monitor performance and schedule your best workers where you need them most. You can also determine how to assign workers by experience level or see where work instructions or training is needed for under performance.

Built-in performance analytics like OEE gives you visibility into workstation performance. Workers want to do well and sharing their performance with them can be a motivator. Share successes, reward performance, and motivate your workforce with ranking data created from performance numbers. Inspire friendly competition.

Track the Performance of Your Operations

Tracking your progress with an MES system helps you understand how your business is operating—giving you more clarity on how to adjust and optimize. For example, gaining a better understanding of the number of parts you need to make and how quickly you need to make them. You can track the following:

- The number of workers and shifts you need for production demand
- The quantity of parts you need to manufacture
- When parts batches need to be ready
- What your OEE should be
- Your hiring needs

There's no more guessing so you can make better decisions with more confidence.

Attract Talent with Technology

Employee's love coming to a workplace that has the tools they need to be successful. An easy-to-use operator interface where it's easy to enter data is essential for optimal worker performance and satisfaction. Built in "call for help" capabilities also mean employees get help when they need it. No more wandering around looking for help with shop floor machines.

Will the Future be Lights-Out Manufacturing?

The pandemic not only hindered manufacturing output but also hastened the shift to Industry 4.0, smart factory technology, and concepts like lights-out manufacturing.

Lights-out-manufacturing is when a production facility is completely automated and human intervention is all but eliminated. The actual term "lights-out" comes from the idea that in a fully automated facility, lighting is no longer needed. Automated machines are perfectly content working long hours in the dark. In reality, "lights-out" won't eliminate the need for human labor anytime soon, but it has the potential to reduce repetitive and inefficient tasks.

An MES system helps you reduce your labor footprint with capabilities that include:

- Automated changeovers—collect information about what the PLC system is doing so you can eliminate the need for operators to track changeovers.
- Automated part counts—collect cycle information from the PLC and eliminate counting for your operators.
- Automated label printing—when a pack size is reached and needs a label, MES automatically prints one.
- Automated machine state tracking—the PLC, or a sensor, can tell you when a machine is running, and you can automate uptime/downtime tracking.
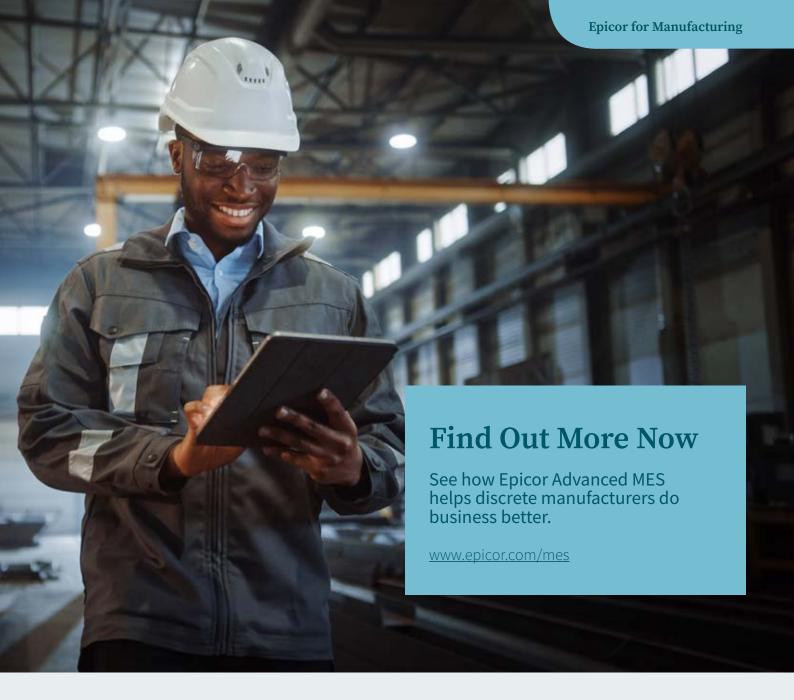
- Alerts and alarms—when something isn't running to spec (too slow, too much downtime, too much scrap, etc.) you can notify the appropriate.
- Root cause analysis—the data collected by MES can be used to implement continuous improvement initiatives and help you reduce waste and inefficiencies.
- Process monitoring—you can capture how a machine is operating and its parts output to reduce the need or frequency of physical quality inspections.
- Automatic part qualification—if conditions at a machine are outside of process parameters, MES may be capable of communicating with it. For example, sending voltage to the machine that opens a gate and ejects a defective part.
- MES can update production status and inventory counts in your ERP system so your office employees, in purchasing or customer service for example, have the flexibility of working remotely.

Conclusion

Forces of the pandemic and a far-reaching labor shortage make it a challenging environment for manufacturers. Manufacturing businesses are fast-tracking the shift to Industry 4.0 and smart factory technology to attract talent and drive more growth and revenue. It's also important to look into how a Manufacturing Execution System can help you improve your capabilities across your operations and lessen the need for human labor.

"We used to run 3-4% scrap. Last month we were down to 1.37%. You can't get much better than that. That's world-class and is largely attributable to [Epicor] Advanced MES."

Dave Rose, Quality Engineer | Johnson Controls

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