

# MERLIN Creates a 42% Productivity Increase And reduces operator overtime by 100 hours/month

## MAZAK PROFILE

Mazak produces the world's most advanced Multi-Tasking, 5-axis turning and milling machines. It operates from an 800,000 square foot North American Headquarters and Technology Center in Florence, Kentucky with a production rate of 200 Units per month.

Mazak in its quest to enhance productivity sought to improve manufacturing efficiency, particularly in machine availability and the associated downtime. Mazak executives recognized the value of MTConnect® (an Association for Manufacturing Technology machine communication standard), in facilitating plant-wide integration and enhancing automation.

## BUSINESS SITUATION

Mazak's IT department initiated the efficiency drive by implementing MTConnect® with an aim to accurately determine machine availability by using Overall Equipment Effectiveness (OEE) as a standard measurement.

"This total embrace of MTConnect® is intended to make a statement," said Brian Papke, President of Mazak, who personally drove the project.

"We want to be a leader in both promoting and implementing MTConnect®. We want our example to show the importance of moving toward data-driven manufacturing. MTConnect® is an essential part of what makes data driven manufacturing possible."

## TECHNICAL SITUATION

MTConnect®, is an open royalty-free standard aimed at fostering greater interoperability between manufacturing devices and software applications. Legacy machines require a different solution to connect to modern communication capabilities.

To overcome this limitation, Ben Schawe, Vice President of Manufacturing at Mazak, began the hunt for a commercially available software package that could produce meaningful reports for both production and management teams to act upon. The company formed a comprehensive task force to evaluate commercially available software solutions. After an exhaustive search, through an unanimous vote Mazak's evaluation committee selected MERLIN.

"We ended up choosing MERLIN for its ability to collect data using MTConnect® adapters and through their Universal Machine Interface circuit board for legacy machines. This advanced technology board can capture direct signals from the machine and translates it into MTConnect® standard code. This combination meant that every machine on the shop floor could be MTConnect® compatible for a common technology analysis platform. In particular, we like MERLIN's ability to display and report on information related to downtime and answer questions such as 'Why is the machine not running and what can we do to get it running?'" said Schawe.



MERLIN is an IIoT  
Shop-Floor-To-Top-Floor  
communications platform  
that provides manufacturing  
analytics in Real-Time.

## SOLUTION

MERLIN made an almost instant impact at Mazak. A series of 60-inch display monitors presented real-time utilization data in a test section containing a cross-section of equipment in the Florence plant. This helped establish a performance benchmark and related training protocols that could easily expand across the massive machine-tool manufacturing plant.

MERLIN's easily interpreted, visual report format provides shop floor operators at-a-glance information on how machine tool conditions are influencing efficiency. Bar graphs that summarize activity across a number of machines simultaneously inform supervisors and managers of trends useful for decision-making and long-term planning, such as when to schedule refresher training.

A majority of the reports focus on a specific machine as well as performance-based gauges and readouts, which resemble a car's speedometer. MERLIN can show program stops, feed holds, spindle overrides, tool changes and other reasons why a machine is not running. Other reports present graphs that compare all of the machines connected to MERLIN according to a variety of critical metrics such as uptime, and stoppages by category.

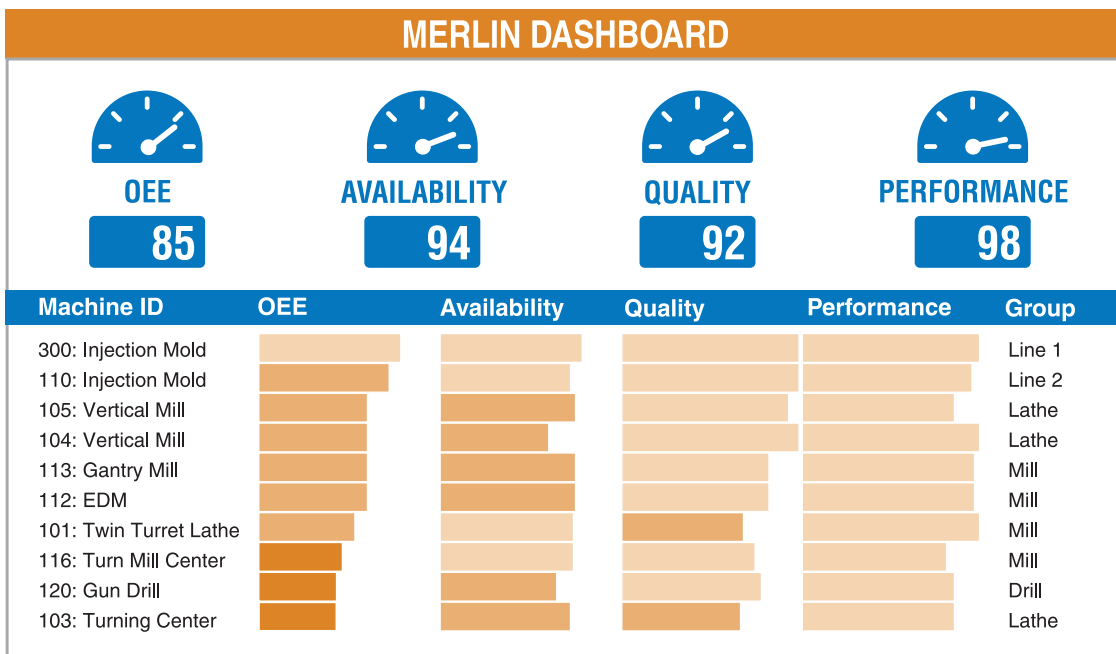
For the first time, top management and everyone across Mazak's shop floor have access to the same actionable reports. "Almost as soon as we had the MERLIN reports out on the plant floor we saw a 6% increase in utilization," said Schawe. "This was true low-hanging fruit. Not doing anything else — just having our operators aware of how their time management affected machine utilization — we got dramatic payback." For example, the data collected indicated that some tools were frequently

wearing out, and the simple solution was having duplicates ready at tool magazines. This quick fix saved time because operators were no longer wandering the plant enabling the machines to keep operating at peak capacity.

Analyzing this data provides opportunities to reduce or eliminate many of these stoppages, which improves overall utilization. At team production meetings Mazak personnel are able to identify and easily fix several downtime-related inefficiencies.

Some of Mazak's analysis of MERLIN data was surprising, according to Schawe. In one instance, a number of part programs included optional stops, originally added so that operators could check tool wear periodically or measure a critical part feature during the prove-out phase. However, when the part went into production these optional stops were never removed and operators simply got in the habit of restarting the machine at these points in the program. The high occurrence of stoppages linked to these programmed stops showed up in MERLIN reports and were easily identified. Systematically editing the part programs to remove these unnecessary optional stops was an easy way to recover lost production time.

"The data just flows," he said. "We have full visibility of production both electronically and posted on production boards. The office staff can see statuses and we can relay direct information to customers. Utilizing the web services capability of MERLIN even enhances information dissemination as various devices can access data within their browsers and dashboards."



**Overall Equipment Effectiveness (OEE) metric is a critical tool in manufacturing.**

## BENEFITS

- As reported MERLIN-related efforts reduced downtime and yielded a 42% improvement in utilization for the monitored machines in the first six months
- Mazak reduced operator overtime by 100 hours per month
- 400 hours per month of previously outsourced work was returned to Mazak
- Leverage MERLIN's ability to take the guesswork out of tracking machine utilization
- 75 standard MERLIN reports are sent out automatically to a variety of departments, cell and management on a daily, weekly and monthly basis through an email alert engine — including daily production, quality, constraints, throughput, operator and utilization metrics

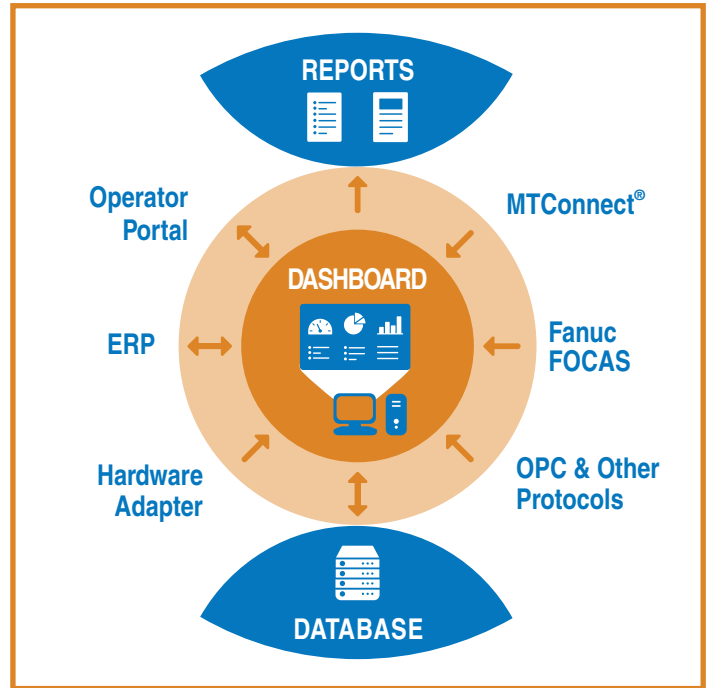
*“We can tell at a glance how we are doing,  
and the basis is in real-time and historical data.*

*There is so much information, accurate and detailed,  
all easily accessed whereas before it was  
difficult to find information if it was even available”*

*- Ben Schawe, Vice President of Manufacturing, Mazak*

# MEMEX

## Mazak VIP



**MEMEX is an IIoT leader  
that offers MERLIN,  
an Industrial Internet of Things  
software communications platform  
that provides  
manufacturing analytics  
in Real-Time.**

## MEMEX - A Value Inspired Partner

MERLIN's plant productivity results impressed Mazak to the extent that it named MEMEX to its exclusive Value Inspired Partner (VIP) program. Mazak selects VIP Partners that share its same forward-thinking approach to manufacturing. According to the company, MEMEX makes the perfect VIP Partner because Mazak knows first-hand how the company can help create factories of the future today. And, like Mazak, MEMEX believes in continuous innovation, boosting manufacturing productivity via digital interconnectedness and helping customers achieve the best possible competitive advantage.

The partner announcement underscores how Mazak is paving the way in digital resource productivity via its iSMART Factory concept, an all-encompassing vision that harnesses the power of connectivity to optimize manufacturing operations at every level.

As a VIP partner, MEMEX will continue to collaborate with Mazak on ways to transform its iSMART Factory. The two companies will also work together to make data-driven manufacturing highly accessible to Mazak customers. MERLIN plays a critical role in the iSMART Factory concept by allowing Mazak to monitor its productivity and overall equipment effectiveness metrics from anywhere, and on any device in Real-Time. The MTConnect® open communications protocol works in conjunction with MERLIN to harvest data from all the different production floor machines, cells, assembly stations, devices and processes.

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## ABOUT MEMEX™

The Industrial Internet of Things (IIoT) powered by machine to machine (M2M) connectivity coupled with software capable of collecting, analyzing, and intelligently presenting streams of manufacturing data represents no less than the next Industrial Revolution. MEMEX with its visionary attitude has been on the leading-edge of the convergence of the industry trends in Computing Power, Connectivity of Machines, Industry Standards, Advanced Software Technology, and Manufacturing Domain Expertise. Leading this transformation is MEMEX Inc., the developer of MERLIN, an award winning IIoT technology platform that delivers tangible increases in manufacturing productivity in Real-Time.

MEMEX, with its comprehensive understanding of the manufacturing industry, is the global leader in machine to machine connectivity solutions.

Committed to its mission of “Successfully transforming factories of today into factories of the future” and encouraged by the rapid adoption and success of MERLIN, MEMEX is relentlessly pursuing the development of increasingly innovative solutions suitable in the IIoT era. MEMEX envisions converting every machine into a node on the corporate network, thereby, creating visibility from shop-floor-to-top-floor.

MEMEX, with its deep commitment towards machine connectivity, offers solutions that are focused on finding hidden capacity by measuring and managing Real-Time data. This empowers MEMEX's customers to effectively quantify and manage OEE, reduce costs and incorporate strategies for continuous lean improvement.



### PRODUCTIVITY

10%-50% average productivity increase



### PROFITS

20% + profit improvement based on just a 10% increase in OEE



### PAYBACK

payback in less than four months with an Internal Rate of Return (IRR) greater than 300%



### CONNECTIVITY

connects to any machine, old or new

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Contact MEMEX to implement IIoT data-driven manufacturing now.



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**MEMEX**  
Measuring Manufacturing Excellence™

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