

## Three Shops Leverage Machine-to-Machine Communication, Boost Productivity

The traditional VP operation's block and tackle methods of organizing a shop to maximize production requires years of experience and hands-on manufacturing knowledge, which can be very expensive. Small to mid-sized plants look for alternatives to this costly method, and the "Internet of Things," also known as machine-to-machine (M2M) communication, offers a solution. Using a manufacturing execution system (MES) solution, which can incorporate the MTConnect standard, the teams at three shops—Rose Integration Ltd., Innovative Mechanical Solutions Inc. and Magellan Aerospace Corp.—gained business and increased productivity while increasing utilization of existing shop-floor capacities.

Rose Integration of Carleton Place, Ontario, is a major supplier of precision machined components and complex mechanical assemblies for the defence, security, drilling, mining, nuclear, aerospace, rail and communication markets. The facility consists of 32 machines within 30,000 square feet of floor space and 70 employees.

In 2010, Rose Integration faced a productivity challenge: The plant had limited ability to trace processes, and it had no ability to automatically track and understand what was actually going on at each machine. The management team realized that in order to improve manufacturing productivity and profitability, they needed to more closely monitor the machines on the shop floor and increase efficiency significantly.

Decision makers at Rose Integration looked at a number of MES solutions and determined that Memex Automation's manufacturing enterprise real-time lean information network, MERLIN, best offered what they needed. An M2M communications platform, it tracks overall equipment effectiveness (OEE) with full traceability of the exact clock-time of all defined events of each machine.

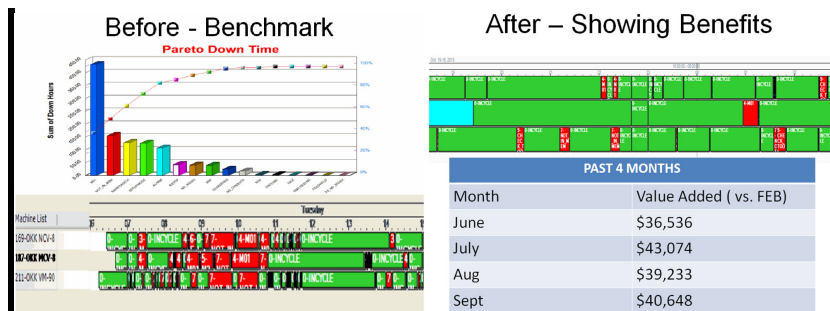
Implementation of the MES allowed the Rose Integration team to measure part-to-part cycle times exactly. By using the MES to precisely analyze each machining event, multiple miniscule areas where cycle times could be improved were identified. The sum of these small improvements was a big gain in efficiency. Rose Integration was able to effect fact-based improvements to shop floor systems and reorganize workflows and resources to generate an increase in OEE of 105 percent, moving from 40-percent OEE to 82-percent OEE over the course of one year.

By optimizing manufacturing processes, Rose Integration maintains a high degree of machine utilization. In 2014, Rose Integration is a top shop with expertise in working with difficult and rare materials such as monel, orkot, Inconel, titanium and magnesium, while demonstrating excellent product traceability and maintaining a reputation for high quality and efficiency.

The business case for investing in an MES is also explained by an example at Magellan Aerospace, located in Kitchener, Ontario. Magellan Aerospace was faced with a machine information puzzle when three machines engineered to meet contracted volumes appeared insufficient. The Magellan team needed to see an automated strip chart of each machine's clock, down to the second, to uncover the root causes of existing performance.

Jonathan Ung, Magellan Aerospace Corp.'s continuous improvement coordinator, says, "The cost of MERLIN was recovered within the first four months of its use at Magellan. Using the MES to monitor a three-machine cell, our team was able to uncover close to 100 hours of idle time per machine per month. The system exposed an inordinate amount of M01—optional stop time—and other idle times on its by-the-second event strip chart. This information permitted us to have a conversation with the operators, set a new threshold and monetize \$40,000 of production time each month."

Magellan went from a 36.9-percent OEE rate to 85-percent OEE. In addition, Magellan saved the capital expenditure of a fourth machine, which the team had thought was necessary before installing the MES.



Magellan machine monitoring downtime (red) before and after showing value.

Innovative Mechanical Solutions Inc. (iMech), an industry leader in the engineering, design and manufacture of custom bearings for the downhole drilling motor industry in the oil and gas sector, uses the MERLIN MES in conjunction with MTConnect to monitor the Okuma machines on its shop floor and increase the efficiency of business operations. iMech’s machined parts are exceptionally hard (56 on the Rockwell hardness scale) and challenging to manufacture. With the accurate measurement and benchmarking of actual cutting times provided by the MES and MTConnect, the plant’s team has made several advantageous changes to their tooling systems and can readily test the real cost benefits of suggested new machining procedures.

The MES provides real-time data and a detailed reporting history, tracking close to 150 data elements, which get summarized into many client-specific key performance indicators (KPIs) from machine performance and stats, to availability, quality, OEE, operators, part counts, work orders, shifts and overall production. This real-time data and detailed reporting history enables the iMech operators and management to make evidence-based business decisions. At iMech, workloads are balanced more effectively across both machines and operators. Because shop floor machines are integrated, via the MES, with iMech’s business accounting ERP system, the company team can follow any customer order through the entire pipeline—from the machine operations to customer invoicing. ERP integration means costs are tracked accurately, allowing better price estimates and increased profit margins.

Dave McPhail, CEO Memex Automation, sums up a value proposition: “Rather than offering one-off expensive custom services installation for every client, we’ve produced an M2M packaged toolkit that benefits all manufacturers. The technological breakthrough here is that MERLIN is an MTConnect-based hardware and software module that does not require programming or setting up of PLCs. The MES leverages the company’s existing investment in plant, equipment and enterprise software.”

In short, MERLIN and MTConnect is an M2M communications platform that helps facilities across a variety of manufacturing verticals uncover hidden plant efficiencies and become more profitable.