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**Do You Place
a Dollar Value
on Downtime?**

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Do You Place a Dollar Value on Downtime?

If not, then you're likely operating at a disadvantage in an increasingly competitive market. Here's one metalformer's strategy for diminishing downtime, leveraging Industry 4.0 technology, with impressive results to show for it.

BY BRAD F. KUVIN, EDITOR

Any number of ailments and wounds can impact metalforming-shop performance—unusually slow die changeovers, untimely and overly time-consuming press or die repairs, and unexplained and inconvenient expediting of materials are just a few. Shop management can either take a quick and easy Band-Aid approach to healing these wounds and watch them reappear, or focus on root-cause analysis and cure them forever.

At Chicagoland metalformer ODM Tool & Mfg., Inc., a focus on root-cause analysis and a more permanent approach to ensuring optimum shop performance has led to a significant boost in overall equipment effectiveness (OEE), and a corresponding drop in downtime. Several factors contribute, such as better use of predictive and preventive maintenance, and closer policing of activities—die changeovers on presses and cycle times through robotic-welding cells, for example. All of these activities have one common thread: real-time gathering of production data, and visibility of that data by management to enable quick and decisive action. It's a terrific example of Industry 4.0 connectivity impacting the metalforming industry.



ODM has installed ShopFloorConnect data-collection devices on 10 of its presses (top) and on its four robotic-welding cells, providing detailed downtime-runtime analysis to help the metalformer optimize OEE. Data analysis has led to continuous-improvement projects focused on activities such as quick die change and development of ergonomic weld fixtures.

Cost Justification, Due to Downtime Evaluation

If you're not operating as a 'smart shop' today, and lack plans to become one, you're likely a 'dumb shop,' or on your way to becoming one. And I have no doubt that the smartest metalforming shops will likely be those that survive the next industry downturn, whenever that occurs.

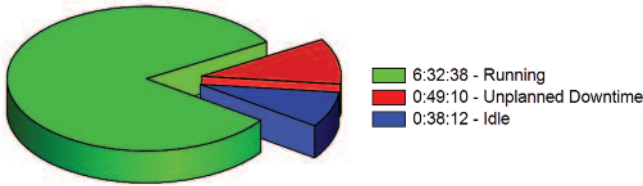
For ODM, the quest to become smart landed on firm ground early in 2015 with an investment in Wintriss' ShopFloorConnect technology. That followed several years of concerted and ongoing efforts to upgrade press controls on its mechanical presses to Wintriss SmartPac 2 units. When asked to explain how management justified the cost of such technology upgrades, Jay

SFC State Summary Charts

Press 15

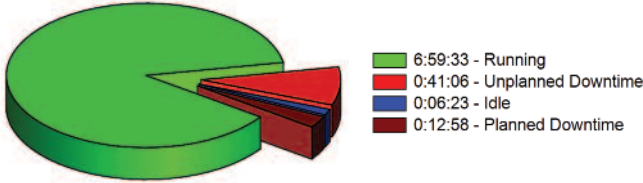
1st Shift

8/3/2016 6:00:00 AM
To
8/3/2016 2:00:00 PM
Uptime = 81.8%



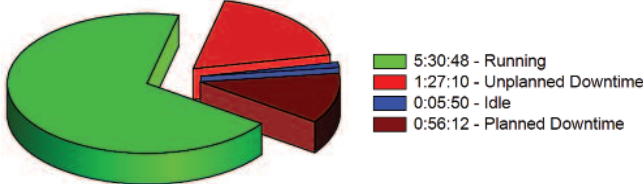
2nd Shift

8/3/2016 2:00:00 PM
To
8/3/2016 10:00:00 PM
Uptime = 87.4%



3rd Shift

8/3/2016 10:00:00 PM
To
8/4/2016 6:00:00 AM
Uptime = 68.9%



SFC Downtime Summary

Machine: Press 15

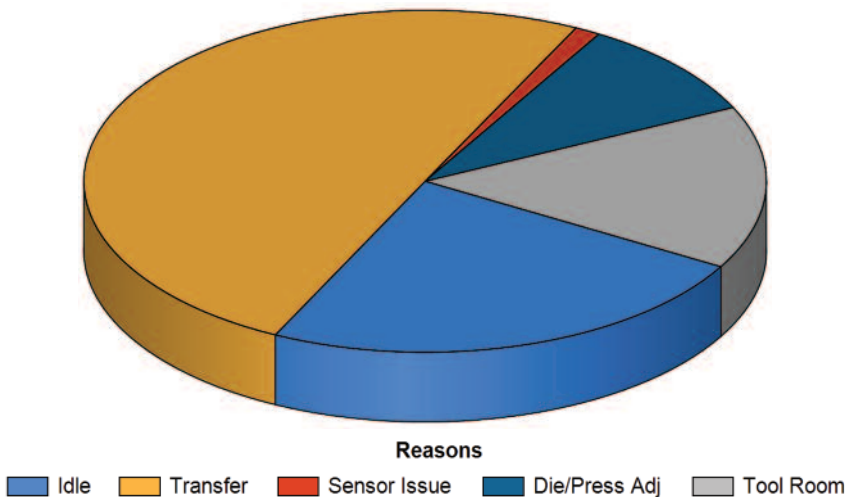
Primary: All

Oper: All

Report Period 7/3/2016 12:00:00 AM To 7/10/2016 12:00:00 AM

Downtime Reason	# of Events	Duration
Transfer	50	6:12:51
Idle	208	2:58:23
Tool Room	2	1:54:55
Die/Press Adj	8	1:10:08
Sensor Issue	4	0:09:12
Totals	272	12:25:29

Downtime by Duration



Examples of the type of data ODM managers receive from ShopFloorConnect—daily and weekly downtime-runtime summaries.

Michaelsen, ODM vice president of operations, says:

“With all of the growth we’ve experienced without adding a lot of new equipment or people, we had to become smarter at managing the assets we already had. The key to accomplishing that was putting a dollar value on downtime, and then committing to a process to ensure that we minimize downtime throughout the plant. Once we established the value of downtime and used our new controls and Industry 4.0 connectivity solution, we quickly (in less than three months) realized a full payback on our control-technology investment.”

ShopFloorConnect employs data-collection technology able to be installed at any machine in the factory, and uses electrical signals from the machines to monitor runtime and parts counts. By inhibiting a machine from operating until the operator has entered a downtime code/reason, managers gain a clear picture of exactly what’s happening at each machine. And, as noted by Michaelsen, when operators know that management is keeping a close tab on operations, the shop tends to run much more effectively. ShopFloorConnect also features an alert feature that sends e-mails or text messages when downtime exceeds what is expected for each machine activity—die changeovers or weld-fix-ure load/ unload, for example.

Connected Presses and Robotic-Welding Cells

Do your shopfloor managers know if the same job runs at the same hit rate every time? Do they know if a value-added assembly job runs at the same cycle time for every lot? And, even if they do know where process inconsistencies lie, do they have any data-based and supported methodology for understanding why the processes fail to run at consistently high levels of efficiency?

Unless you’ve equipped the shop with data-tracking and online analysis tools, chances are that any efforts to fine-tune efficiency are stabs in the

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dark without much data to support those critical decisions. And, often those attempts are made after the fact, when productivity already has suffered and the impact is felt throughout the plant.

“We prefer to fine-tune our processes and react early to prevent big problems late in a run,” says ODM production manager Brandon Enright.

Enright has overseen the installation of SmartPac 2 controls on four of ODM’s 17 mechanical stamping presses (200- to 1500-ton capacity), and ShopFloorConnect on 10 presses and on its four robotic-welding cells. Compared to its older press controls, the SmartPac 2 units “provide added functionality that helps us get back up and running whenever there’s an issue with a press,” says Enright. “For example, we just don’t learn that a sensor has faulted, now we know how it faulted, which is huge in terms of identifying a root cause of the problem more quickly. Also, new tonnage-monitoring functionality allows us to develop a history of the tonnage over a tool’s lifetime, again helping identify early-on when a tool needs maintenance prior to something catastrophic happening.”

A Smart Factory Excels at Continuous Improvement

Asked to identify continuous-improvement projects spurred by its recent data-gathering and analysis efforts, Enright points to a plague common to many metalforming shops: maintenance-related downtime.

“By using the flurry of data we can now collect from the plant floor using ShopFloorConnect,” he shares, “we’ve been able to identify common, recurring issues and conduct detailed root-cause analysis in each case. As a result, in many cases we’ve signed service contracts with vendors to perform monthly, quarterly or annual inspections. And, we fine-tuned our preventive-maintenance activities—all to ensure that we keep the equipment running at optimum performance levels at all times. The improvement in

OEE By Machine (with Primary Ideal Rate)		
Machine: Press 15		Interval: Week
Report Range	From: 7/3/2016 12:00:00 AM	To: 7/10/2016 12:00:00 AM
AVAILABILITY		
Interval Period: 7/3/2016 12:00:00 AM To 7/10/2016 12:00:00 AM		
A. Total Available Time	10,080	min
B. Planned Downtime	4,979	min
C. Net Available Time (A - B)	5,101	min
D. Unplanned Downtime	745	min
E. Operating Time (C - D)	4,356	min
F. Availability (E / C) x 100	85.4	%
PERFORMANCE EFFICIENCY		
G. Total Cycles Run	92,370	cycles
H. Ideal Production Rate	1098.0	cycles/hr
Actual Production Rate (Calculated)	1,272	cycles/hr
Cycle Time	2.83	seconds
I. Performance Efficiency ((G / E) / (H / 60)) x 100	115.9	%
QUALITY RATE		
J. Total Defects (Rework + Scrap)	0	parts
K. Quality Rate ((G - J) / G) x 100	100.0	%
Overall Equipment Effectiveness (OEE) by Tool (F x I x K) Equipment Availability x Performance Efficiency x Quality Rate	98.9	%

OEE reports, by machine, help identify continuous-improvement opportunities, to unearth hidden press time and allow ODM to bring in more work without adding new capital equipment.

OEE has been critical to allowing us to grow—both in new customers, and in the work we’re doing for existing customers—without adding new presses.”

One more example: tracking cycle time through the robotic-welding cells, and identifying inconsistencies that can be tracked back to flawed procedures.

“By knowing immediately if a cell’s throughput is slipping,” Enright says, “we can troubleshoot before things spiral out of control. For example, we’ve identified wear parts on the robots that can inhibit performance, so that we

can replace them in a timely manner. And, we’ve identified processes where the robotic welder works more quickly than the operator tasked with loading and unloading the weld fixtures, causing robot idle time. Again, we assign a dollar value to downtime. In these cases, we might redesign the fixture or provide the operator with special tools to allow him to load/unload more quickly, or look to make his process more ergonomic.

“We’re fine-tuning and reacting,” he summarizes, “rather than fixing big issues late in production runs.” **MF**