IMPORTANCE OF data coll

Jim Finnerty, Wintriss Controls Group's product manager, explains how implementing automated data collection can improve overall equipment effectiveness – critical for medical manufacturers to maintain productive operations. **BY ELIZABETH ENGLER MODIC**

1 Why is automated data collection important for today's medical manufacturers?

Traceability via documentation is paramount for medical part manufacturers delivering parts to customers. Attempting to manually collect data can be error-prone due to transcription mistakes and operator-to-operator subjectivity. It can also take longer compared with automated data collection methods, which can improve overall equipment effectiveness (OEE) to maintain the most productive operations.

Jim Finnerty

2 What does Wintriss offer for data collection and tracking?

ShopFloorConnect OEE and Data Collection Software collects downtime and production efficiency data from all types of machines, ranging from CNC machines and injection molding machines to lathes and presses in discrete manufacturing, displays the data in real-time, and produces indispensable manufacturing reports, including detailed OEE reports in a variety of formats. The software allows companies to quickly identify and diagnose underperforming machines.

ShopFloorConnect offers a fully automated solution enabling manufacturers to identify and squeeze out inefficiency.

3 How does ShopFloorConnect software monitor OEE?

The formula for calculating OEE is: **availability x performance x quality = OEE**

It factors in those three variables and displays a simple percentage showing the ratio of actual machine output to its theoretical maximum. Traditional OEE calculations are based on the premise that all production losses on machines and processes can be measured and quantified, but these calculations come up short in many applications. While availability and quality metrics can be universally applied to all machine types, difficulty arises when the traditional performance metric is applied to discrete manufacturing processes where the true *ideal production rate* is more dependent on the parts being manufactured than the machine itself. Errors inherent in traditional OEE calculations can be manually factored out on a job-by-job basis, but this task becomes extremely difficult when trying to summarize OEE across a longer period. In addition, the calculations required to properly weight jobs of varying length become very complex.

In applications where a machine must make more than one cycle to produce a part, ShopFloorConnect automatically divides the ideal rate by the number of cycles required to make the part. It keeps a running total of the actual parts produced by the machine and the number of parts that could have been produced accord-

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ection

ing to the ideal rates and multipliers. Performance can be accurately summarized throughout time, regardless of the lengths of jobs that ran on the machine. It automatically weights the percentages according to job length, providing advanced OEE tracking that automatically applies part-specific ideal performance rates. This is critical when measuring OEE for fabrication and machining applications where part complexity determines production rate.

4 How is ShopFloorConnect different from other data collection and OEE solutions?

It's built from standard components that can be customized and communicate with virtually any production machine via wired or wireless Ethernet. It uses the industry-standard Microsoft SQL database so users familiar with that platform can create custom reports from scratch or use one of the existing reports as a template. Reports are automatically distributed and posted and show real-time machine status in any web browser including on mobile devices.

ShopFloorConnect doesn't require client installs and will run on a virtual server (such as VMWare). Multi-plant installations are supported, and the software has an open architecture allowing production data exchange with external systems.

5 What is required to connect a machine and how long does it typically take?

Offering capabilities that set it apart from other OEE solutions, a ShopFloorConnect Machine Interface (SMI) is installed on the machine and automatically collects run hours and cycles and has a place for the operator to log in and specify reasons for downtime. By requiring only an SMI Box and a couple electrical signals to run, it's realistic to be up and running within a day or two. The SMI box is network-ready and can be installed by an electrician in a few hours.

6 Are operators resistant to using it because of how it could reflect on their job performance?

Operators may have some trepidation, but what's collected most often reveals factors outside of an operator's control. For example, perhaps it's identified that there's one particular machine on the line that's consistently experiencing downtime due to some mechanical issue. Then it's time to investigate and perform some needed maintenance. One new feature, ShopFloorConnect PM Tracker, enables users to track important machine preventative maintenance (PM) items by run hours or machine cycles, issuing targeted alerts when an item requires PM, and tracking the maintenance work history for all machines.

7 How long does it take to train operators and what reporting is offered?

The answer does vary, but in some cases, we have had training scheduled just to have the operator decide training wasn't necessary. ShopFloorConnect is easy to use, offering a consistent interface across machines.

RIGHT:
The network-ready and factory configured ShopFloorConnect Machine Interface (SMI 2) connects virtually any machine to the ShopFloorConnect Machine Monitoring Software.

The software's browser-based reporting interface allows users to specify the content, recipients, and frequency of delivery for any of the dozens of reports included. The standard reports are templates that can be configured to include data from a specified time, also from specific machines, operators, part numbers, and/or shift. The individual machine monitoring reports have several report-specific configurable parameters that control report content.

The latest ShopFloorConnect 6.0 version also features a universal interactive Application Program Interface (API) that enables users to set up two-way data sharing with any enterprise resource planning (ERP) or manufacturing execution system (MES) software.

8 How soon can manufacturers expect to get a return on investment (ROI)?

The payback period is largely dependent on the number of machines connected to ShopFloorConnect and the amount of focus the user places on efficiency improvement.

When a user does nothing to reduce downtime other than collect data and provide a live display in the factory showing each machine's efficiency by shift, we've seen a sustained downtime reduction of 5%. With a moderate focus on addressing the root causes of downtime, simply picking the low hanging fruit results in downtime reductions up to 25%.

Using the numbers above, if ShopFloorConnect is monitoring 20 machines that produce at $50/hour when running, run two 8-hour shifts per day, and have a baseline uptime efficiency of 60%, a 5% reduction in downtime saves approximately $115,000/year. A 25% reduction is worth approximately $576,000/year.

9 What are some examples in medtech where ShopFloorConnect improved efficiency?

A contract medical device manufacturer that specializes in complex components including implants, surgical instruments,

and needles started out modestly with the system on four bar-fed CNC machines. Based on what they learned, they were able to focus their downtime reduction efforts and quickly increased efficiency on these machines by 30%. Realizing the value of the collected data, they added their laser cutting and CNC grinding departments, and robotic assembly areas (a total of 85 machines/cells) and achieved similar efficiency increases across the board.

With data now being collected from all machines, they're able to track jobs as they move through the factory and share that information in real time with customers. They also use this capability as a sales tool to attract new customers.

10 Do companies reach a plateau after addressing inefficiencies or can the software continue to help operations?

After a time, especially after the larger downtime reasons are addressed and when efficiency is improved to the point where gains start to flatten out, the real-time production data display capabilities become more important. Maintaining newfound levels of efficiency are allowed by having appropriate personnel able to respond quickly to downtime events via alerts. Managers also can quickly detect areas that are starting to lag behind, allowing them to make more informed personnel deployment and scheduling decisions. TMD

Why data collection

YOU CANNOT FIX WHAT you don't measure, so having a reliable and automated data collection system in place has many benefits for overall equipment effectiveness (OEE) including:

- **Quickly highlights the greatest potential areas of improvement to provide the greatest return on assets; focuses resources where they can make the most impact**
- **Making the most out of a limited amount of investment capital**
- **Avoiding making inappropriate equipment purchases**
- **Freeing up capacity to better compete for new business**
- **Prioritizing lean initiatives**
- **Decreasing costs through waste elimination**
- **Shortening equipment return on investment (ROI) through increased utilization**
- **Reducing investigation time for root cause analysis**
- **Directly tying production efficiencies to fiscal reporting**

Wintriss Controls Group: https://www.wintriss.com; ShopFloorConnect: https://shopfloorconnect.com