Case Study

Shopfloor-Online provides clear downtime

visibility for precision coating of films

Lighthouse
SYSTEMS

Introduction

We will take the example of an organisation where the core manufacturing process is coating. Precision coatings are used in a wide range of touch and vision electronic applications, including membrane switches and for In Mould Decorated (IMD) products in the automotive, telecommunications and domestic appliances sectors. To cater for this demand, the manufacturer requires high levels of productivity and performance from its production machines on the shop floor. Clear visibility of the machines' operations is critical to the on-going success of the production process and this capability enables the company to get the most out of its assets. Downtime is not only the most obvious source of production loss, but it can be the cause of many other knock-on effects in terms of meeting production and delivery commitments, quality issues and softer problems relating to personnel performance and morale. Any one of these will have a detrimental effect on shop floor output. After all, an idle machine is not delivering any value to the business.

Making the initial change

In this example a substrate is unwound, fed through successive coating baths and drying ovens, and then wound back up into finished rolls. The machines have multiple stages performing different operations and, as a result, they are large and complex. They are controlled by PLCs and have some SCADA interfaces to facilitate operator control.

When planning to capture downtime thought had to be given as to how that information would and could be used. There was a need to analyse downtime in many ways, for example:

- Area of the machine
- Stop reason
- Categories like Technical, Process, Mechanical
- Planned or unplanned
- Equipment failures, quality related issues, process related issues

The company had a process in place to collect downtime data already. This was being done manually, using Excel spreadsheets to record and report incidents of downtime. Although producing downtime data to the company, the decision was taken to automate the process to improve the accuracy of the information gained and, therefore increase confidence in the data being presented.

The ability to automatically capture machine failures and stoppages, along with reasons, would deliver a precise account of the production process and therefore the

performance of each machine. The overall picture would be complete and accurate, allowing management decisions to be developed based on sound data.

At the same time, further growth within the business was putting pressure on the production lines. These were now operating 24 hours a day and six or seven days a week. The company drew up a list of needs:

- to provide real-time information to operators, such as stoppages and process parameters
- to allow operators to easily annotate events and record other process information (e.g. log book information, shift handover)
- to provide a real-time reporting system to management (e.g. availability, OEE)
- to provide an analysis tool to process engineers (downtime analysis)
- in future to interface to the ERP system to feedback more accurate information about each job's performance

The company had already completed a successful implementation of a new ERP platform which was able to handle material data with ease but was not able to capture job run timings and stoppages.

Lighthouse Systems offered the best functionality and more opportunity for expansion into other related areas in the longer term. A phased approach would see Lighthouse Systems Shopfloor-Online implemented across all machines. For this company, one of the tangible benefits of Shopfloor-Online is that it can evolve with the business over time. It is one of the few systems that can handle manual and automatic data entry while integrating with other existing platforms to provide the bigger picture. The other great advantage is that, being a web-based application, the information is available to everyone in real-time.

Combining automation with manual processes

By automatically extracting fault events from the PLC, Shopfloor-Online is able to record precisely when the machine stopped, the reason why and when it re-started. However in some cases a PLC could never know why a line is not running e.g. shortage of materials, labour, or orders. Shopfloor-Online automatically captures the stop event and reason from the PLC, but allows operators to annotate the event in greater detail where the PLC doesn't have enough information. Operators can reclassify events and add

comments, all of which provides essential detail for analysis purposes on which to base remedial action.

In connecting Shopfloor-Online to the PLC for downtime, it was easy to get additional information, like meters produced, and detect when the process is running in slow speed. From this Shopfloor-Online calculates actual cycle times, production efficiencies and OEE.

In addition all this data was supplemented with process parameter data. The coating process is very complex and capturing live parameters like temperatures of ovens, tensions on rollers, and feed rates, all go to add depth to the picture. It has allowed operators to see patterns in the data during difficult running phases and identify the cause of process performance problems.

As a convenience, the operator input has also been expanded to include softer information relating to the process, including health and safety issues that go to create an electronic shift handover log. Understanding the extent of downtime and the reasons for it is crucial if an organisation is to achieve excellence in manufacturing. Using this information wisely will focus effort to areas where it is really needed.

What's the result?

Operators now use the system all the time. It is saving them time by capturing the majority of events automatically and provides a useful way to review the process especially over a shift change-over.

Moreover, process engineers and management have live data at their finger tips. They can see production performance reports, run historic downtime analysis as a basis for improvement work and can drill into any run at any time to see what issues occurred and what was done about it.

Everybody has adjusted to the fact that process performance data is visible to all. Initially there was a quick reduction in stoppages through the added focus of the system. Over time, with the analysis tools and the improvement work there has been sustained improvements.

Next moves

Implementation of Shopfloor-Online continues as its downtime automation capability is applied to more machines on the manufacturing shop floor. Once this phase of the project is complete the company will begin automating other functions. An interface to the ERP system is planned to provide more detailed information about each

production run. Also under consideration is the Quality and Concerns module of Shopfloor-Online, that can eliminate paperwork and speed up internal processes.

Lighthouse Systems is one of the world's leading developers of Manufacturing Execution Systems (MES) with offices in London, Singapore, Australia and Rochester, NY. Lighthouse Systems Shopfloor-Online is web based modular software that provides real time visibility of the entire manufacturing operations environment. Applications include Maintenance Management, Concern Management, Quality, SPC, Downtime, OEE, Spoilage and Inventory Traceability. Shopfloor-Online is being used in a wide range of industries with some of the biggest manufacturing companies; it is deployed in 15 languages in 28 countries.

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