

## Taylor Helps Lexmark Slash Scheduling Effort

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### Business Drivers

A year ago when Tonya McQueen sat down on Tuesday morning to develop a schedule for the coming week’s laser printer toner production at Lexmark’s Boulder, Colorado plant, she knew she’d miss dinner. Preparing a one week schedule for review in the plant’s Wednesday production meeting meant at least twelve to sixteen hours of grinding manual labor to generate a draft schedule that would then be reworked in the next day’s production planning meeting.

To make matters worse, the production meeting would then consume at least half a day, followed by several more hours of changes before a final schedule could be distributed. All that work and production scheduling wasn’t even McQueen’s major job. As production supervisor, she was really responsible for overseeing production of more than 5 million pounds of printer toner every year.

Perhaps her only consolation was that her colleague, printer cartridge production supervisor Richard Engelmann, had to endure the same routine to generate his half of the plant’s weekly schedule.

McQueen and Engelmann tried delegating the scheduling tasks, but couldn’t find anyone who knew the product lines and production processes well enough to make the right decisions. Hiring assistants only meant that two more people were subjected to the same grind, with the same outcome. Finally, as part of a Lexmark corporate initiative, they began to look for a way to automate the scheduling process.

A year later, after implementing Taylor Scheduler (TS), McQueen and Engelmann don’t miss dinner to develop production schedules. In fact, developing the schedules now takes minutes rather than hours and has become one of the least time-consuming parts of their jobs.

While McQueen and Engelmann spend only a fraction of the time they used to invest in developing their schedules, the real impact of using TS can be seen in the weekly production scheduling meetings. The pair no longer endure the grueling four or five-hour meetings followed by rounds of schedule revisions.

Now, at 9:30 every Wednesday morning, the two production supervisors meet with their production managers, the plant’s logistic managers and several production engineers. The schedules McQueen and Engelmann have developed are reviewed and modified by the team using TS to evaluate and modify the schedules in real-time as the discussion progresses.

After an hour or so, it’s all over. The schedules have been reviewed, modified, updated and distributed. Everyone can get back to the real work of manufacturing printer toner and cartridges.

While implementing the Taylor advanced production scheduling system has changed McQueen's and Engelmann's jobs, the change didn't happen overnight and benefits for Lexmark go well beyond improving the productivity of two valued employees. Behind these changes are a thorough requirements definition and software evaluation, a meticulous business justification and a carefully managed implementation.

McQueen, Engelmann and IT manager DuWayne Zuehlsdorff reported to their colleagues in other Lexmark divisions that the implementation of TS had not only transformed the

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scheduling process at the Boulder plant, but had met or exceeded projected cost savings and performance improvements as well.

TS went into active use in toner production a year previous and in the printer cartridge area two months later. "In less than 11 months, we met or exceeded our objectives and achieved payback on our investment in buying and implementing the Taylor system," said Zuehlsdorff. "We reduced expenses, deferred or eliminated costs, delayed planned hiring and significantly reduced work-in-process and finished goods inventories."

Added to these financial benefits were many less tangible, but equally important, improvements. "Working with Taylor we've been able to significantly streamline our scheduling processes, eliminate the errors caused by using multiple systems and manual interfaces, economically manage material in smaller time buckets and increase our ability to handle more complex scheduling models as our manufacturing volumes grow and our processes become more complex," said Zuehlsdorff. "By any measure, implementing TS has been a success for Lexmark."

An added benefit for Lexmark's suppliers was improvement in the accuracy of the company's forecasted requirements and a more straightforward reporting process that replaced several older reports with a single online source. The new system is updated automatically as production requirements change.

## The Business Case

Because the Boulder plant hasn't reached full capacity, Lexmark didn't expect to see dramatic savings through improved capacity utilization. The most visible effect on production was the improved coordination between the two main phases of the toner manufacturing process.

To make toner, batches of five or six raw materials are blended, melted and then extruded into pea-sized pellets. This intermediate product is then milled into the powder used as toner in the company's laser printer cartridges. Because the two operations have very different rates and capacities, synchronizing them had been a problem since the plant opened.

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Using the automated scheduling and optimization capabilities in TS also helped Lexmark simplify two other complications in their toner manufacturing process, clean-up of production equipment between batches of different toners and the incorporating short runs of test products for the company's engineering group. Before implementing TS, all of these processes were calculated manually and then worked into the regular production schedule. Now all of these tasks are automatically incorporated into the regular production schedule, minimizing downtime and ensuring that test products are produced on time without jeopardizing regular production.

### Performance Improvement Achieved

Another key to the dramatic improvements in Boulder is Lexmark's success in streamlining the flow of information among its various information systems. Before implementing TS, the planning process included a number of manual steps, the use of several unintegrated systems and "lots of redundant data entry," said Zuehlsdorff. Not only was the process time-consuming, as McQueen and Engelmann would testify, but every step created more possibilities for introducing errors and schedule mismatches into the process.

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Using the Taylor Scheduler in conjunction with Lexmark's other business systems is a critical factor its success and one of the major reasons why the company originally selected Taylor. "Integration was one of our most important considerations in selecting a scheduling system," said Zuehlsdorff. "It's also one of the areas where we devoted a lot of effort during the implementation process."

The most important link between systems is the automated interface between TS and the company's Enterprise Resource Planning (ERP) system. Several years ago Lexmark standardized all its corporate systems, selecting WorldVision from J.D. Edwards. Because all of the modules of the J.D. Edwards product were tightly integrated, Lexmark saw the benefits of integration and wanted to extend them as far as possible. The goal was for the computer systems to accelerate and simplify management and planning processes, not constrain them.

Today production operators in the Boulder plant are barely aware of the information systems that coordinate and drive the plant's manufacturing. Shop floor data collection devices provide all of the necessary information about production runs and job priorities and automate the collection of data about the tasks completed. "Our managers and planners use J.D. Edwards and Taylor directly, but all of the plant-level interfaces are through the data collection system," said Zuehlsdorff. This simplifies deployment and minimizes the costs of providing real-time information to the shop floor.

Because the plant has relatively few products and customers (it's actual customers are contract manufacturers who produce the laser printer cartridges), forecasting is done using an Excel spreadsheet. The forecast is uploaded to the J.D. Edwards system, where the high-level planning and data management is done. Lexmark uses Worldvision to manage inventories, purchase materials, maintain bills of materials and routings and generate high-level material requirements (MRP) plans. By definition, the plans produced don't take actual plant capacity into account.

Lexmark runs its MRP system each night. When a new plan is produced, this information is passed to TS, which generates optimized detailed production schedules. Modified work

order dates and machine utilization data are then passed back to J.D Edwards and MRP is run again with the optimized production times and sequences. This synchronizes all of the inventory data and ensures that managers, planners and suppliers are all working from a single set of inventory plans and production data.

Getting the timing of running the planning and scheduling systems and passing the updated data between them was a process of trial and error, said Zuehlsdorff. “Originally we thought the more current the data was, the more accurate and effective our scheduling would be. We started off passing updates every hour, but we settled back to scheduling and updating once per shift, or three times a day.

We learned that timeliness and accuracy have to be matched to the dynamics of the production process,” he said. “Now our schedules are optimized and current, but the operators don’t see the schedule change every time an order is entered or updated. We bought TS for its power and flexibility, which meant we had to understand just how much of that power we needed where.”

### **Futures of Taylor at Lexmark**

When Zuehlsdorff and the Lexmark implementation team began evaluating advanced production scheduling systems, they compared TS to systems from three other vendors. The Taylor product handily outdistanced its competitors. Key selling features were the highly graphical user interface, the ability to make schedule changes in real-time using the product’s drag and drop scheduling feature and the ease of integration.

While Zuehlsdorff continues to refine his deployment of TS in the Boulder plant, he’s gearing up for a new challenge. Lexmark is building a new toner and cartridge plant in Hungary and he is committed to have TS up and running before the plant goes live. “TS is such a critical part of our success in Boulder that we just naturally decided to deploy it in the new plant as well,” he said.