Successful Finite Scheduling Applications

Improving the On-Time Odds

By Bronwyn Fryer

When you're in the business of manufacturing state-of-the art induction heating equipment for the likes of the U.S. Department of Defense, General Motors, Chrysler and Ford, it's important to keep your customers satisfied. but without the right production scheduling system to keep the thousands of tasks, parts, and people in order, making on-time deliveries to customers can be difficult.

This was the experience of Inductoheat, Madison Heights, MI, a manufacturer of custom induction heating equipment. The company makes a wide variety of induction heating systems that are used to harden the steel used in vehicle parts such as front wheel drives, axle shafts, hubs, gears and rotors. A single $1 million custom-made induction heat machine—such as the one manufactured for use during Operation Desert Storm—can include as many as 5,000 custom-fitted parts, which must be either procured or custom-designed, then assembled, interconnected and tested before the product can ship. To design, manufacture, test and ship such a machine involves some 8,000 to 10,000 hours of concentrated time spread throughout Inductoheat's 25 "work centers," including engineering, manufacturing, purchasing, and testing.

"You simply can't control such a huge manufacturing operation using a manual scheduling system," says production manager Jerome (Jerry) Sinkowski, a 20-year veteran of the company. "If you're trying to load 400 hours worth of work per day into a department with a capacity of only 380 hours, something simply won't get finished. But most scheduling systems don't take such limitations into consideration."

Since the installation of a new, PC-based, finite capacity scheduling system called ***JobTime Plus*** from JobTime Systems, Sinkowski has been able to improve the accuracy of scheduling in all departments across the 160-employee company. The result has been an ability to predict ship dates accurately. Inductoheat now claims a 100 percent improvement in on-time delivery to customers, and a reduction in order backlog by 20 weeks.

The Prediction Problem

Prior to the installation of the finite capacity scheduling system, customers would place their orders through the sales people, who would offer a rough estimate of the delivery date. Then Sinkowski had to produce a manufacturing schedule for the job, a jigsaw puzzle of more than 10,000 variables that the company would struggle to live by. Unfortunately, none of the scheduling systems Sinkowski used took the limitations of certain factors into consideration—especially fluctuating ones, such as employee availability in any given department.

As a result, employees frequently spent weekends and holidays rushing to get shipments out the door; overtime was the norm rather than the exception. Sometimes the last-minute hurry resulted in errors in the final product. And in spite of the employees' best efforts, very few of the orders actually met the projected delivery date; this was especially problematic, since on-time delivery is critical to the customers' businesses. "Some customers were unhappy with us because we failed to deliver as promised," recalls Sinkowski. "It lost us some sales."

Sinkowski spent years working with a multitude of PC-based scheduling methods. "At first, I did my scheduling using a spreadsheet to do a rough-cut capacity plan," he recalls. "It was really crude—I was lucky if I was 30 percent accurate." Then he switched to a project management system which didn't help much either. "The project management system didn't consider actual capacity—it was designed to track processes with no consideration for weekly or daily capacity over an extended period of time. It was a good tracking tool, but it couldn't handle our real world manufacturing environment."

Likewise, the company's MRP system, while doing a good job of maintaining a bill of materials file and inventory files, wasn't able to deal with fluctuating department capacity. The MRP may tell you what materials you need, but if you don't have the people to put them together, what good does it do you?" he asks. "Besides, for MRP to really work, you have to have a near-fantasy set of conditions like dealing with only one product, and a demand and lead time that never changes."

Real World Requirements

John Stoll, former vice-president of operations of Inductoheat and current president of an associated company, Lepel, says he spent "years" looking for a finite capacity scheduling system that could solve the company's scheduling Problems. "The real world of a manufacturing environment is constantly changing," says Stoll. "Conventional scheduling systems don't work because they tell you what's happened in the past.

I'm not interested in the past; I'm interested in what's going to happen in the future. We needed a finite capacity system that could help us work with our existing capacity, and make more accurate delivery predictions."

The job-shop environment required not only a hard-to-find finite capacity scheduling system, but one that combined ease of use with extreme flexibility, and that would allow Sinkowski to incorporate, view and report on all aspects of the manufacturing process in different ways. When finite capacity scheduling systems began appearing on the market a few years ago, either their price tags rendered them far too expensive to be considered, or they were far too detailed to fit Inductoheat's needs ("like killing a fly with a nuclear weapon," says Stoll), which made them enormously costly to update and maintain.

When Stoll first heard of ***JobTime Plus*** in 1987, he felt it was "the perfect chassis" for the real world scheduling system needed.

The software was installed on Sinkowski's Everex 386, and the developer worked closely with Inductoheat to bring operations under the control of the scheduling system. Schedules are produced once a week. Sinkowski uses the system to schedule every task for every direct labor department in the company.

Flexibility and Accuracy

To monitor and review the schedule, Sinkowski meets With representatives from each work center three times a week. they discuss the status of jobs and pass on information about potential bottlenecks in their area. "I listen to the experts from each department; they look at the time budget, and have the opportunity to say whether the time allotted is correct. If they need more or fewer hours to complete a task, I revise the schedule to reflect their requirements," he notes.

Then working with the system's menu-driven user interface, Sinkowski enters new job names and the estimated time budget according to the advice from the department heads. Each job is broken down into tasks for each department according to available hours. These tasks include engineering hours for the release of bills of material and assembly drawings, procurement time for purchased material, manufacturing assembly time and test hours for each system. The final schedule is distributed to the managers, who can assign tasks to employees and make changes as necessary. Each subassembly within a specific job is scheduled to be finished before the main machine assembly can begin. "We need all the pieces of the puzzle finished before we attempt to put it together," says Sinkowski. "The schedule does a great job for us in this respect."

Flexibility, says Sinkowski, is all-important in maintaining promised delivery dates. "A finite schedule is like an accordion that goes in and out," he explains. "It has to take into consideration all the tasks you have going on at a given time." The system allows Sinkowski to account for all the critical "little things" that can create a bottleneck and throw a schedule off—such as an employee illness, a late procurement, or a machine that breaks down—and allows the company to make immediate adjustments to the schedule or find alternative solutions, such as hiring outside contractors.

Since accuracy is also critical, Sinkowski schedules hours required per piece. The software allows him to schedule to the minute on each task. "I like this system because I'm in control of knowing where I am at any given job," says Sinkowski. "I can know at a glance if a task is finished in engineering, if material is purchased, how many hours it's in manufacturing, how long it will take to do a test, and what the projected start and finish date for each work center is."

Bottom-Line Results

The successful implementation of the finite capacity system has produced some important bottom-line results. "Our throughput is much better," notes Sinkowski. "Our on-time delivery has improved 100 percent and in a custom machine environment, that's phenomenal."

The improved throughput has dramatically improved customer relations. Sinkowski claims that his ability to accurately predict a delivery date has gone from below 30 percent accuracy to at least 95 percent accuracy. As a result, customers are not only happier, but "downright impressed." "Since most of our deliveries are on time, customers that were unhappy before are very happy with us now," he says. "We can give them accurate reports of the completion date of a job.

The scheduler has also smoothed internal difficulties. Formerly, it was easy to lose track of tasks because much of the information, such as procurement data, had to come from outside vendors and suppliers. With all the relevant sales, proposed vendor and procurement data incorporated into the new system, all the managers can keep everything under a watchful eye.

With the smoother operations and improved on-time deliveries, employee morale is better. Shop floor employees are assured that they won't run out of work; seeing their tasks for the next three weeks, or over six months, makes them feel more comfortable, says Sinkowski. Working weekends to force a delivery is seldom necessary, and since tasks are done correctly rather than in a rush, quality has also improved. In addition, overtime is used less, and more judiciously. *We still have our (hot' jobs, but now we know which areas to concentrate on months in advance,) he notes.

Perhaps the most telling improvement is in the company's bottom-line. Prior to the installation of the system, the company was growing so fast that it was impossible to keep track of everything going on. Today, the company is well on track, and 1990 profits reached record highs.

However, Sinkowski concludes, you can't really measure the profitability of a company in dollars alone. *We've shipped more out the door; we've made sure everyone's busy; we can tell our customers that our goal is to ship 95 percent on-time, and we reach that goal.

All of that makes a difference."

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