

Food Logistics

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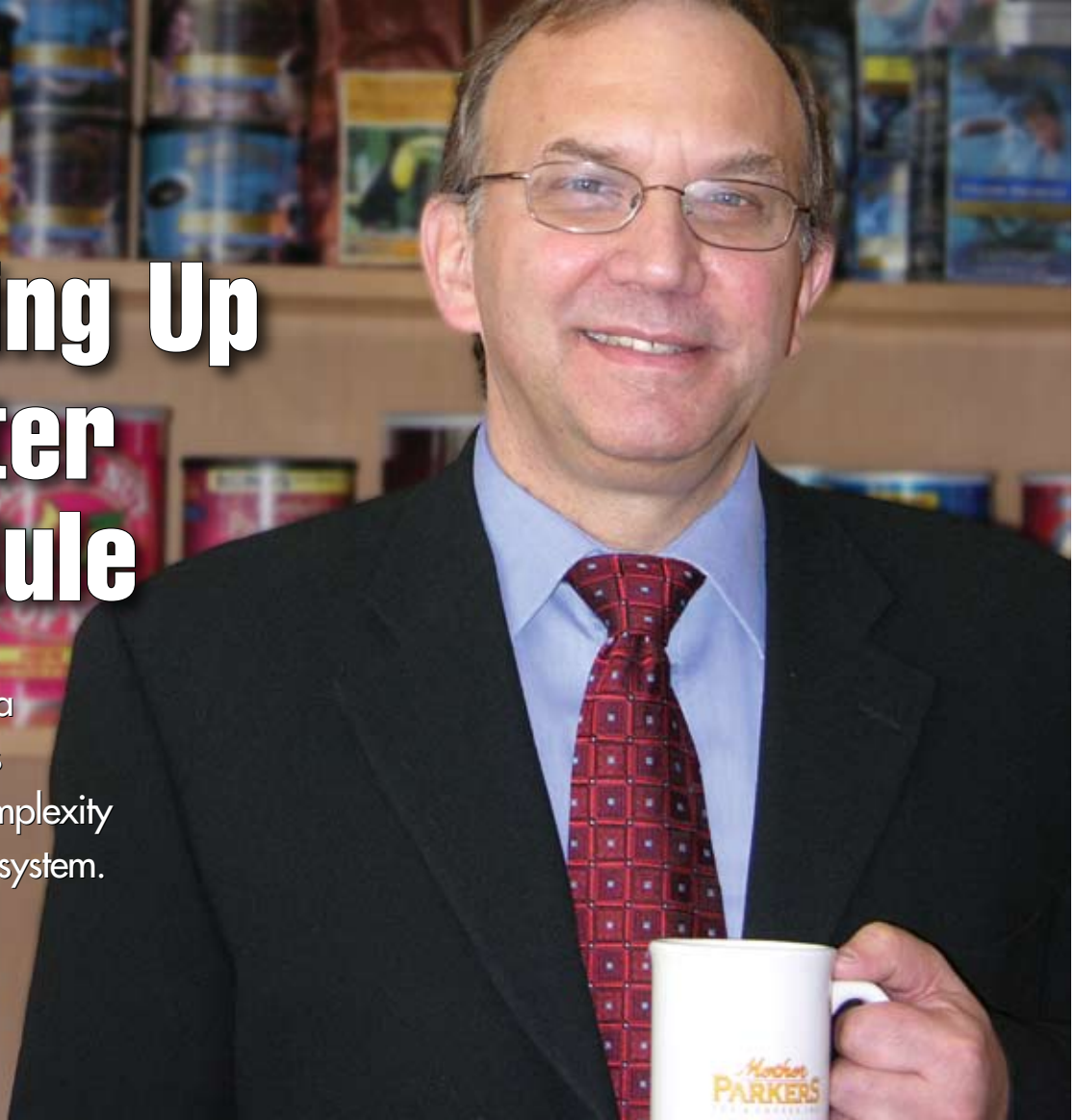
Will Kappel, vice president of supply chain for Mother Parkers Coffee and Tea Co., tackles manufacturing complexity with a scheduling system.



Brewing Up A Better Schedule

Mother Parkers Tea and Coffee tackles manufacturing complexity with a scheduling system.

BY KATHERINE DOHERTY



For most manufacturers, production scheduling is more of an art than a science. With so many variables—changing consumer demand, seasonality and promotions, to new a few—and information coming from a variety of sources—demand planners, plant managers, sales representatives, etc.—it’s hard to believe that any organization can accurately plan more than a day ahead.

But forecasting doesn’t have to be a guessing game, as Mother Parkers Tea and Coffee Co., a Canadian-based tea and coffee producer, found out. You may not recognize the name, but chances are you’ve had a cup of its coffee as Mother Parkers provides private-label blends for many leading grocery and restaurant chains in the United States.

In Canada, the 94-year old company is renowned for its own brands, including Higgins and Burke as well as its namesake, Mother Parkers Coffee and Mother Parkers Tea. It also produces private-label brands for a number of lines. The company operates three manufacturing facilities—separate coffee and tea plants in Mississauga and Ajax, both in the greater Toronto area, and another coffee plant in Fort Worth, TX.



The two coffee plants produce finished product at a rate of more than 50 million tons per year, making Mother Parkers the largest privately held coffee and tea manufacturer in North America.

Scheduling these products on shared facilities is a challenge because of the variety—some 3,500 SKUs—and the need to respond quickly to changing customer demand.

“In the Mississauga plant, we do everything from very large runs for our biggest customers to make-to-order runs that can be as little as 30 cases,” says Will Kappel, the company’s vice president of supply chain. “We bring in un-roasted green coffee in burlap sacks from around the world to produce about 100 different blends. We have to schedule the run, roast, grind, de-gas, blend and package the product. Sounds very easy—just follow the sequence and you’re set.”

But coffee processing is not that simple, Kappel says. In fact, it’s a complex process. “The cycle times on each product can be very different. We can have a whole bean coffee that has a very fast cycle time through the plant, say 20 minutes from roasting to packaging. But in another situation, that same roasted product may not be packed for 24 hours.

“We’ve got five roasters and hundreds of tanks, and every single lot of coffee is uniquely produced and running through the facility at a different rate. We have to monitor quality control because of tempering and degassing times, which complicates the process. Any change in production schedule can have a large impact on throughput because we have multi-layers of movement of product through our network,” he says.

How to manage complexity? A few years ago, Mother Parkers launched an initiative to improve schedule attainment, reduce costs and inventory levels, while maintaining customer service. The company boasts a case fill rate of 99.3 percent plus, so its high service level gave it a competitive advantage, but at a cost.

"Internally, we had to maintain that service painfully," says Kappel. "Our objective was to find a scheduling solution that allowed us to forecast better, combine like blends so that our packing lines were producing on a more consistent basis, and combine and sequence through the roasters, so that the roaster would be operating on a continuous basis."

In addition, the company wanted to be able to continue to grow its business.

"If you're in the branded business, you create marketing programs to grow your business and find new forms of distribution, but in the private-label business, your business grows as fast as your customers can grow it," says Kappel.

"We can't grow any faster than our current customers.

"Last year we added a major convenience store customer and manage two-thirds of their volume, and we took over that business seamlessly. And we recently got all of our plants organic certified because we see huge growth in organic products. So we're trying to better manage all of this complexity, and do it more cost-effectively."

Small Steps, Big Payoff

Realizing that it could not attain its goals internally, the company turned to Supply Chain Consultants Inc., a software and consulting company based in Wilmington, DE, to

improve demand planning and forecasting. SCC first did an assessment of Mother Parkers' supply chain to determine what processes needed to be improved, according to Tom Leonarski, SCC's senior consultant, food industry.

"Mother Parkers faced problems that are typical among manufacturers," says Leonarski. "While every company is unique, most of our clients tell us that they've got too much inventory and are not meeting customer demand. It boils down to a lack of communication within the organization."

Part of the forecasting problem is the number of sources involved in the process. A demand planner may produce a forecast, but it is run by the sales reps, sales managers and plant managers, who all might modify the plan. A statistical analysis of historical data may not take into account outside variables—changes in customer demand, marketing programs—or last minute customer orders, such as Mother Parkers often has for its private-label lines.

"Unlike our branded business, where we were able to schedule a week or two at a time, we are only a day or two out on the private-label lines," says Kappel. "We are very order-driven and every single day at the plant is different, so on Monday, we don't know what we'll be producing on Friday. We've got some great employees who know the coffee business really well and were good at forecasting, but we needed to do a better job in schedule attainment."

SCC helped Mother Parkers optimize its scheduling by taking deliberate and incremental steps at each of its plants. Each step resulted in gains that could be measured and then institutionalized. The first step was to consolidate the data required for day-to-day planning. This was followed by simulation capability that allowed the users to measure the effect of changes to the schedule.

"This step is important because you have multi-layers of movement of product through the network, and it's difficult to figure out the effect of change in one part of the schedule on the overall plan," says Leonarski. "In addition, many companies can make the same product in several plants, so depending upon demand, you may have to offload some of that production to another plant."

The final step was to optimize the scheduling. SCC developed unique scheduling algorithms suited for tightly coupled scheduling problems that Mother Parkers often encounters. Applying these algorithms has provided dramatic improvements in schedule attainment, schedule visibility and stability. Leonarski points



Coffee Processing: A Balancing Act

Mother Parkers Tea and Coffee implemented the scheduling techniques in stages at its Mississauga plant, starting with packing lines, then the grinders and bins and most recently, the roasters. Will Kappel, the company's vice president of supply chain, has been overseeing the project for the past five years.

How are you doing your scheduling today?

Kappel: Every morning, we download all our coffee inventory positions across the entire system, so we know what our starting bin inventories are. We have all of the orders from our ERP system, all the demand, whether it's an actual order or an inventory adjustment, and the schedulers get to see the total demand.

The plant features 26 packaging lines, so for each line the schedulers optimize packaging. Each line flows through a unique set of bins and grinders, and then works back through another set of bins for holding and tempering and then back again through one of five roasters. The product can be produced on any roaster, so the system gives a series of preference tables to determine which roaster to use.

It might say that, for a certain blend, you can only make that on two of the five roasters—and out of those two, you should prefer one for whatever reason. It knows that out of your 10 grinders, three can make that particular grind—it might be a really fine grind for an espresso or for a vending machine, so it knows which grinders it can tap into.

How does it do that?

Kappel: The system understands the plumbing of the plant, so it knows which bins and lines can feed certain grinders and what packaging lines are available. It goes through and searches the best availability and combination throughout the system.

How flexible is the system?

Kappel: The system generates the schedule, but it allows the scheduler to make changes if needed, so it's very flexible.

How accurate is the forecast?

Kappel: We've been hitting 99 percent attainment on a daily basis—and last week we hit 100 percent, which I've never seen before. We've seen a 20-point improvement in schedule attainment, plus a dramatic improvement in scheduling capability. And now we can monitor and measure schedule attainment at each level of manufacturing.

What were some of the benefits of working with SCC?

Kappel: SCC has the technical expertise that we don't have, so they worked with our folks to model the system and develop the scheduling tools. They learned our business very well and were able to translate that into an optimization algorithm. The tools are not unique, but our application is, and they successfully translated it into the tool.



ROASTER REVIEW: Elizabeth Soo, manager of manufacturing systems, Kappel and Dan Beaumont, manager of production/inventory planning, review the roaster schedule in the control room.

out that Mother Parkers did not implement any new software during the process, but was able to develop the scheduling application with an existing package the company already used.

“We don’t have to sell software because we can find early improvements without it. If your forecasting is better, you’re not making more product than you need, so your inventory goes down. Then you’ve got capacity to react to one-off orders or orders that are higher than the forecast, so you can react to changes in the marketplace,” says Leonarski. “You’ve got fewer changeovers and less waste—and changes on the line are usually very expensive and time consuming.

“Whenever we start a project we go do an assessment and figure out what the company’s pain points are,” he adds. “We zero in on areas like demand planning and days of supply and look for ‘low-hanging fruit.’ We like to attack this in a six-step method and have the savings of each implementation finance the next one.”

Early on in the process, Mother Parkers was able to significantly reduce inventory. “With the improved visibility in the schedule, we saved several millions of dollars in inventory reductions. We continue to see the process improving,” says Kappel.

In addition, the Mother Parkers continues to provide the highest levels of service to its customers.

SCC’s six steps are:

- Analyzing the demand stream—looking at historical patterns, demand



WALK THE LINE: Tim Wilson, can line operator, and Beaumont discuss line status.

variations among different products lines, seasonality and order sizes.

- Creating an inventory profile—identifying the relevant inventory attributes such as product, package, production date, amount and warehouse and manufacturing locations.

- Creating a demand planning process that can be routinely executed—deciding on a level of aggregation that generates a statistical forecast without losing too much detail and identifying the persons or functions that contribute changes to the demand plan.

- Create a model to balance supply with demand—constraints and cost factors such as manufacturing facilities, transportation resources, contract facilities

and other resources can be balanced with revenue or margin optimization to find the balance point in keeping with business objectives.

- Implement an ongoing sales and operations planning process—far more than a “monthly meeting,” S&OP is the way effective supply chains are managed on a daily basis, providing a disciplined way of responding to change while minimizing disruption in the day-to-day operations.

- Building an ATP (available to promise) capability—in this final step, companies build additional quantitative and communications structures to provide specific calculations and reporting procedures for your most common promise transactions. ☘

Coffee Facts

- Coffee is one of the largest commodity industries in the world, second only to oil. Coffee is indigenous to the highlands of Ethiopia and the Boma plateau in the Sudan. Production is concentrated in the tropics of Cancer and Capricorn, with



CUPPING TABLE: Roasted coffee samples from this hour’s production, ready for cupping (tasting).

South and Central America and Africa being the largest growers.

- Coffees, like wine grapes, get much of their flavor from specific growing conditions and preparation methods of each producing region. Ideal growing conditions include: volcanic rich soil, cool temperatures, tropical rains and a high altitude.

- Coffee is grown at numerous elevations along mountains—to about 7,000 feet. Midway up the mountains, at about 4,500 feet elevation, is where the best quality beans are grown—these are called “strictly hard beans.”

- Coffee grows on trees. Individual trees take approximately five years to mature. The average height of a coffee tree is kept trimmed from four to six feet. This eases picking and maintains quality.

Of course, as with fruit trees, the best

quality fruit is found at the center of the tree. Crops begin with the flowering of the trees, and approximately five to six months later, the fruit is ready for harvesting. It takes five years for a coffee tree to bear its first crop.

- Bright white flowers signal the beginning of the growing season. The fruit matures to a bright red cherry. These cherries are harvested by hand and sent to a processing facility, where they are milled, washed, sorted and dried. At this point, they are ready for exporting. Raw coffee beans are shipped to roasting facilities in burlap sacks.

- A coffee tree will yield, on average, one pound of coffee per year. Interestingly, about 3,500 coffee beans are needed to produce one pound of roasted coffee.

Source: Mother Parkers Tea and Coffee.

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