Flexible Manufacturing

MORE THAN JUST AN EQUIPMENT CHANGE, FLEXIBLE MANUFACTURING ALSO REQUIRES A CHANGE IN THINKING • BY RENÉE YOUNG

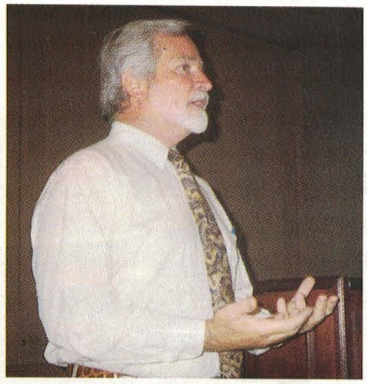
Challenged by an increasing number of product introductions and by the growing demands of food service and club stores for new varieties, today's food manufacturer must become more flexible in order to compete. But doing so successfully requires more than just investing in the latest technology that promises quick changeovers. It's about investing in your product's quality from start to finish.

"When it comes to improving plant flexibility and throughput, nothing comes before quality," says Jerry Claunch, president of Palm Beach Gardens, Fla.-based Claunch & Associates, a consulting firm specializing in improving food manufacturing operations. According to Claunch, whose clients include Pepsi and Kraft, product quality must remain the prime objective, especially as plants continue to look for ways to cut their costs. "Customers expect 100 percent quality, so any improvements or changes made to reduce time and cost must also ensure that customers continue to get quality."

Before attempting to improve the flexibility of a plant, a manufacturer first needs to understand the process of determining where potential loss can occur and where quality can be threatened. One of the first lessons everyone must learn before undertaking change is that losses not only occur because products are rejected or scrapped, but also because of variation from specified tolerances, says Claunch. "When I go into food plants I see a lot of rework, I'm told that it's not a problem because operators don't throw the product away. But what they don't understand is that they are throwing away time," he said. Finding the cause of such variations is the first step to determining what to improve when implementing or improving process flow.

More, different and new — it's the call of today's consumer and the challenge put to food manufacturers, who are employing to a variety of techniques to become more flexible.

Some companies look to automation as the solution, purchasing Clean-in-Place systems to speed up sanitation for example, but there are associated costs to consider — including new equipment, and the expense of installing, configuring, testing and training. "Many companies that are looking to become more flexible don't realize the true costs of bringing automation into their plants," said Patrick Helm, senior manager of packaging with Spartanburg, S.C.-based consulting engineer Lockwood Greene, which designs and constructs food plants. According to Helm, automation can be effectively implemented if management is committed to the steps needed to integrate the technology. But many frequently see it as a quick fix, without taking into account required planning. "Most of this technology is not site-specific, and manufacturers can lose money and time in trying to adapt the equipment to their culture unless they have devised a plan to do so."



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Claunch agrees. "Oftentimes I hear that automation is the key to improving flexibility. But with regard to changeover, it's an expensive way to attack the problem, considering that you typically only get a 15 to 20 percent reduction in changeover time," he said. There are much less expensive ways to improve flexibility, many of which primarily require a change in thinking at both the management and line level.

Effective changeovers

Claunch defines machine changeover time as all the tasks performed from the time the previous run is completed until the new run is producing at the desired efficiency rate. Given that scope definition, managers must look at everything that can be done to reduce downtime from ingredient delivery to equipment calibration.

Most companies have a great deal of what Claunch calls "low hanging fruit" when it comes to changeover time, meaning that they typically find the first 30 percent of time saving easy to identify and implement. Using video recordings of a changeover in action, a manager can usually identify and rectify obvious hold ups. One quick fix is eliminating the threads, instead opting for quick attachments to achieve a tool-less changeover. At the Pepsi PET bottling plant in Riverside, Calif., this fix was chiefly responsible for reducing changeover time from 55 minutes to 38 minutes to eventually just over 4 minutes.

Some other quick fixes involve:

- color coating equipment needed for separate runs.
- purchasing duplicates of equipment that are time-consuming to sanitize between runs.
- placing exchanged equipment on wheels.

No matter how simple the solution, employees must be part of the change. "The difference between success and failure is in the details. People are the details," says Helm. Too often, change is dictated without explanation, or input from the employee. "When implementing change of any kind, the best way to ensure success is to educate employees on how it is going to affect the entire process — how their participation figures into the big picture."

When reviewing the sanitation methods at a milk processing plant in Puerto Rico, Claunch knew that employees needed to buy into any proposed changes if there were to be any gains. "It's vital to provide basic, step-by-step instructions because many employees believe that only their way is best. But if you bargain with them, ask them to try it a week your way, they'll usually adapt when they find that it's easier and more efficient." At the Puerto Rico plant, employees were spending too much time washing down equipment. The problem was that they had

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no documented, systematic method of cleaning. Often, shifts would change and the following shift would redo the areas previously sanitized because there was no way of knowing what had been cleaned and what hadn't. The solution, which reduced sanitation time from 11 hours to 3.25 hours, was to divide the system into zones and provide workers with a checklist and diagrams of each step of the cleaning process. Employees mark or check items once those activities are completed.

"Visual guides, such as laminated job aids located at each piece of equipment, help remind and guide employees through changeovers, sanitation — basically every process. They also break the language barrier many plants face," said Helm. In addition to providing information on specific tasks, Helm advises doing the same with equipment information. Helm cites new computerized maintenance management systems that allow employees to easily access maintenance information from desktop and handheld PCs. Maintenance software such as MaintenanceSuite from Wonderware Corp., not only provides maintenance and performance history of equipment, but also allows managers to incorporate maintenance scheduling into production by predicting possible failure from data from past equipment performance.

Welcoming change

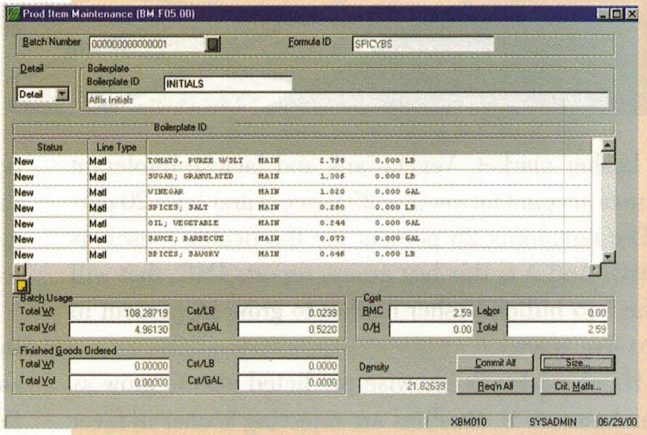
Using such tools to create a flexible environment is necessary in any plant, but is especially critical in producing specialty items like kosher and halal products. Gaining momentum in the United States, these products also demand careful attention to procedure and detail during their manufacture to ensure the end product meets religious requirements.

The Hebrew word "kosher" means "fit or proper." When applied to food, it mean "fit for consumption." The Muslim word "halal" means "proper or permitted." For an increasing number of health-conscious American consumers, kosher and halal simply means food that is pure and good for you. According to Integrating Marketing Communications (IMC), a New York City-based firm that tracks kosher-product sales, there are more than 46,000 kosher-certified products on the market, including such mainstream products as Oreo cookies andBumble Bee tuna. Muslims and other religious groups excluding Jews, comprise 30 percent

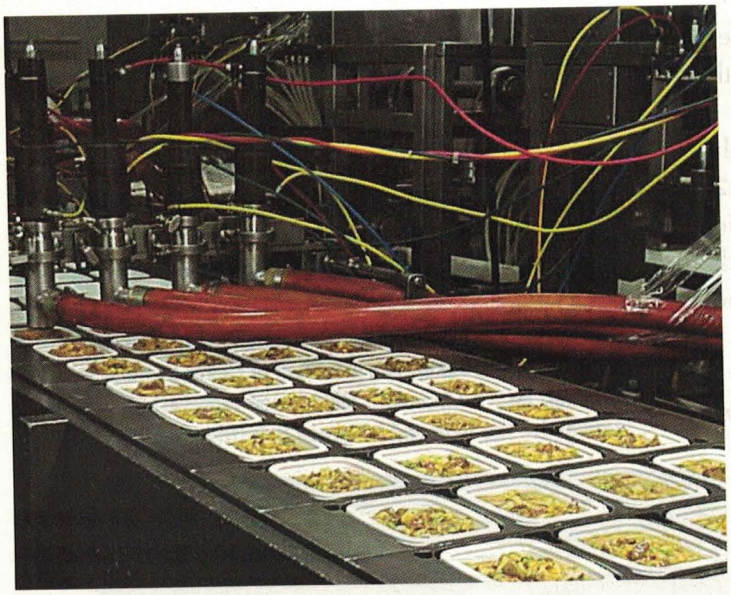
Keeping ingredients in line

Effectively and efficiently managing information - from supplier inventory to projected sales - is essential to flexible manufacturing. That's where integrated software comes into play.

Due to the accelerated growth of his company over the last three years, Bill Baker, vice president of Flavor Systems International, Inc., a Cincinnati, Ohio-based manufacturer of flavorings for the food and beverage Industries, realized that a change was in order for the company's information systems. One problem was that its application systems were becoming unmanageable. "We purchased a generic accounting system that addressed the needs of a typical discrete manufacturer, but being in processing we were continually modifying the system. Even then it would still not address many of our key issues such as yield and loss factors," said Baker. "We would end up invoicing without a true picture of our costs, and that caused a lot of misinformation as well as duplication of work by making adjustments to the general ledger."



With the help of JAAS Systems, a reseller of BatchMaster/Solomon and an IBM business partner, Baker selected BatchMaster/Solomon software to manage sales and production information. Because of the seamless integration with the accounting modules, Flavor Systems has all the information from order processing to general ledger in one system, which allows them to plan their production runs more effectively. Baker cites customization manager as a unique benefit. "Instead of making costly modifications that can never be upgraded, customization manager gives us the capability to tune the system to our needs and protect our long term investment in the package," says Baker.



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of the kosher market. Vegetarians and lactose-intolerant consumers account for another 25 percent and Jews 20 percent. The remaining 25 percent are the health conscious says IMC. And it is this last group, reports IMC, that will help the $45 billion kosher market to grow 15 percent in the next five years.

The Halal market is likewise predicted also to grow as more and more U.S. Muslims are rejecting kosher in favor of foods prepared to their religious requirements. Up until recently, many Muslims accepted kosher because they believed that each animal received a blessing at time of slaughter — a requirement of Islamic law. They are now learning that this is not necessarily true and are less accepting of kosher as a substitute. "The halal market is one of great potential," says Syed Ajaz Hussain, director of technical services with ConAgra Refrigerated Prepared Foods, which recently launched a line of halal products. "The average American Muslim spends over 20 percent of disposable income on food — five percent above the national norm. And the U.S. Muslims population is growing three times faster than other minorities, with the exception of Hispanics."

"For a product to be kosher or halal means much more than having the product blessed by a religious official," says Mary Anne Jackson, founder and president of Deerfield, Ill.-based My Own Meals, a manufacturer of halal and kosher meals. To be considered halal or kosher, products must contain the proper ingredients, be manufactured with the proper equipment, processed under specific guidelines, and certified by both reputable kosher and halal certifying organizations. "The Jewish community has established labeling laws and consumer self-policing groups and the Islamic community is currently working toward establishing similar legislation and watch-dog groups," says Jackson, who has worked with a group of Islamic officials to author a preliminary proposal of such laws. (The proposed guidelines are available by emailing Jackson at sales@halalcertified.com.)

Jackson initiated a meeting between Jewish and Islamic religious authorities to determine the feasibility of establishing dual certification for products. After discussing in minute detail the differing processing procedures, the group concluded that no such certification would appear because the procedures are so different. Some of these differences include the use of certain ingredients that are approved by one group, but not by another. For example, halal products must contain no alcohol and no gelatin or emulsifiers derived

Kosher vs. Halal

Oftentimes Kosher is considered the equivalent of Halal, but there are distinct differences between the two that render many foods Kosher but not Halal. Here are a few:

- Kosher foods may contain alcohol, while all intoxicating alcohols, liquors and wines must be banned from Halal production.
- Gelatin prepared from swine is considered by some to be Kosher, but is forbidden in Halal. This involves not only gelatin used as a food ingredient, but a packaging ingredient as well.
- Meat used in Halal foods must come from animals that were slaughtered while Muslims pronounce the name of Allah.

from pork. Some kosher certifying groups accept such ingredients. If such products are produced on lines before halal products, these lines must be thoroughly sanitized and Muslim-approved before any halal production can begin.

Further complicating matters, both halal and kosher foods are organized according to different levels that each require specific certification. For example, the designation "kosher pareve" means that no milk or meat ingredients are used in the product. Before producing these items, all equipment and utensils must be kashered (boiled or steamed). Jackson remembers one incident in her plant where a spoon previously used in a run involving dairy products was washed in a sink that had been kashered for pareve production. As a result, no pareve items could be washed in that sink. "We needed to close off the sink during production and wash utensils and piping in separate tubs - a situation that demanded the complete cooperation of our entire production team," said Jackson. "No matter the industry, we all have production problems everyday, but in this type of processing it is essential to have your religious supervisor be a part of your team and to have your employees understand the special requirements of this unique production in order to keep mistakes down."

When ConAgra began producing a halal beef and turkey breakfast product in a plant that produced other non-halal pork products, Hussain found that the best approach was to produce the halal product on the first shift, leaving any pork product to be produced later in the day. "If the equipment processed pork first, it was only after the equipment was cleaned and approved by a Muslim that we officially could begin with the turkey and beef, which could waste a day," said Hussain. According to Hussain, it was essential to educate both the management and the line employees of this, as well as sanitation requirements and other aspect of halal-certified production. "This is a new procedure for many and, as a result, we need to host training sessions and provide onsite supervision for employees if the product is to receive reputable certification as halal." Hussain provides training manuals and visual checklists for employees to follow and track production. After learning the sanitation requirements involved, many employees now prefer halal products to others. FE

Palletizing solution encourages flexibility

When a large gum manufacturer recently decided to automate its manufacturing and distribution center, it called on Alvey Systems, Inc., for help in designing a system that is sufficiently flexible to keep up with an explosion in stock keeping units (SKU) resulting from the introduction of new case sizes and weights.

At the time the manufacturer produced some 96 different SKUs, with cases ranging in weight from four to 50 pounds. Increased efficiency and improved ergonomics were key requirements of the system.

Flexible programming is key to the gantry palletizing system's ability to handle a variety of case sizes and weights. Each of five gantries can handle a variety of product with minimal changeover. A five-axis configuration — which includes the X, Y, and Z axes plus rotation and tilt — allows cases, particularly smaller ones, to be placed in a tight pattern that enhances load stability.

After installing the system, the company found it could produce a smaller case. Although the smaller cases didn't exist when the system was first specified, the flexible programming allowed workers to quickly and easily introduce the new case size into two gantry systems, which continue to handle the larger case sizes as well.