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Deb Keeler, Quality Manager

Controlling Net Contents & Reducing Give-Away

How one company made their balance sheet smell as good as the cookies they bake.

by Teresa Jostes

In Northwest Ohio in a small farm community the sweet smell of baked goods fills the air and it's not bake-off time at the county fair. As you turn off of the main street and approach Consolidated Biscuit Company (CBC) your nose tells you you're close before you get there. The 850,000 sq ft facility employs 1200 people whose mission is to keep your sweet tooth satisfied. Thirteen production lines pump out a staggering 100 million cookies and crackers a day.

CBC is the second-largest privately-held cookie and cracker producer in the US, with 4 production facilities. The first and largest of CBC's plants is in McComb, Ohio, and here in the heart of the upper Midwest manufacturing region this food producer is breaking new ground with an old concept – Statistical Process Control.

CBC has utilized Control Charts for years, but the culture of process control is now permeating the company like the smell of cookies baking. The cost savings attributed to give-aways is confidential, but "substantial".

A walk down the cookie aisle of your grocery store is like reviewing a customer list for CBC. Of course the world-class food companies who trust Consolidated Biscuit to produce their products demand the highest levels of quality for their customers, and CBC delivers.

In addition to the product quality requirements, the food industry has stringent requirements for packaging. Critical-to-Quality Characteristics (CTQ's) of the packaged product include final package weight, product expiration and production lot labeling. If one or more of these CTQ's is not correct, expensive product holds, repackaging or product give-aways can result.

A product give-away results when packages of food are over the labeled package weight. Ideally, every 1-pound package of cookies would weigh exactly 16 ounces. Because the FDA enforces minimum product weight standards, a common practice is to put more product in each package than the label specifies in order to avoid approaching the Minimum Allowable Value (MAV). When this happens, the result is called "give-away" and it's counted in terms of the equivalent number of cases of product that are sent out daily without charge – a few ounces at a time.

The problem

Give-aways were the problem that got the attention of managers at CBC. Statistical Process Control was in place for package weights, but the frequency of

the checks and the location of the scales made for long response times if a problem was found. If packages were found to be below the MAV, product holds, quarantines and repackaging would result. To avoid the time and money that holds cost the company, a little extra product was put in each package (just to be safe). Reducing give-aways represented a significant cost-reduction opportunity, and the newly hired Director of Quality was given the task.

The team

Veteran quality professional Kevin Rackham was new to the company, but not new to the quality field or to team problem-solving. He embraced the opportunity to develop a Statistical Process Control system that could keep pace with the high-volume bakery and he knew that a software solution would probably be required, but before making the first phone call, he recruited a Quality Improvement Team.

The team included packaging operators, the packaging and maintenance managers, quality technicians, manufacturing and industrial engineers, the maintenance manager and an information technology resource. They set out not only to put a software-based SPC system in place of the paper and pencil control charts, but to redesign the process of package weight control altogether.

System Requirements

The team started by defining their system requirements. The stated goal of the team was to develop a "weight monitoring and tracking system which will provide an accurate and reliable means of documenting product weights, ensuring compliance with packaging weight laws."

Weighing stations would need to be portable so they could be used on any line and easily relocated as production lines are reconfigured. It would need to meet all the sanitary requirements of the plant and fit into tight spaces around the production lines. Easy operator sign-in and product SKU selection were important, and no manual data entry should be required – it would be time consuming and an opportunity for errors. Data integrity had to be easy to ensure.

Portable workstations for measuring package weights

As the ideas developed, the possibilities did, too. Package labeling specifications should be accessible from the system so that the latest version was always available on the production floor. Pallet stacking diagrams should be accessible as well. Product lists should be line-specific, to speed the initial operator sign-in.

The software

The team met with representatives from three software companies. While all three could meet the basic requirements of a computerized SPC system, one stood out in terms of the value they could add and the service they could deliver. Hertzler Systems Inc. introduced their GainSeeker Software to the team and could meet all the technical requirements. Users could sign-in by swiping a barcode on their badge. Permission levels could be established. With the right permissions, supervisors could add new users from stations anywhere in the factory. The charting options were beyond what they thought was possible.

The entire team was introduced to the software's capabilities in hands-on training sessions with a Hertzler technician. With a full awareness of GainSeeker's capabilities, the team could finalize their requirements for the software and hardware.

"We really don't know what we did without it."
Deb Keeler, Quality Manager

The hardware

Next, the team designed the data collection station itself. The result was a tall stainless steel and plastic "cart" riding on lockable casters. Each cart houses a personal computer with a keyboard and mouse, a barcode scanner and a scale. A wireless network ensures the ultimate flexibility. Wheel the cart up to the production line, plug in the power cord, swipe your badge and you're only seconds away from weighing the first sample.

At the heart of the system a Microsoft SQL Server Database houses the data in the company's IBM AS/400. Additionally, GainSeeker pulls scheduling information down from the master schedule on the AS/400. When the operator signs in and indicates a packaging line, they are presented with a list of products scheduled for that line on that shift.
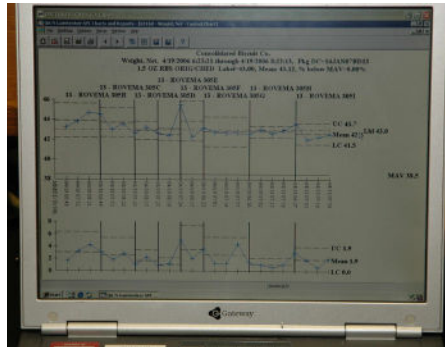

Packaging line X-Bar and R chart sorted by bagger

How it all comes together

In the McComb plant, thirteen production lines feed 2 to 10 baggers on each line. CBC's control plans require 5-piece samples be taken every half-hour from each bagger. To accommodate the volume of samples, thirteen SPC carts are in use now across the facility. A packaging operator takes his or her hourly sample to the cart, swipes a badge, selects the bagger number from a drop-down list, selects from the scheduled products and begins weighing. One bag of cookies is placed on the scale. As soon as the scale stabilizes, the weight is recorded and the operator is prompted to remove the first bag and place the second bag on the scale. After all 5 bags are weighed, if an out of control condition is observed, the operator is prompted to enter the cause of the condition. Additionally, emails are sent to process owners as out of control conditions occur.

Buy-in

The value of this immediate feedback became obvious shortly after the installation of the GainSeeker system. One of two baggers on the same cookie packaging line showed an out-of-control condition. The supervisor and process engineers were notified and began looking for the root cause. The problem was found--not in the bagger, but in the cookies. An upstream dough extruder had a bad bearing which caused the amount of cookie dough dispensed to vary.

In addition to making SPC real-time, work instruction document control has improved using GainSeeker. Operator instructions including pallet patterns and where to place date code labels are now stored electronically. When changing cookie types or package sizes, operators access instructions through GainSeeker that are always available and always the latest revision.
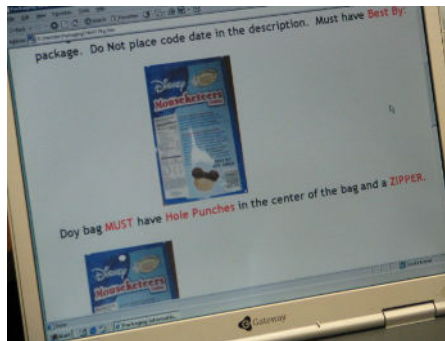
Package labeling instructions for each product are accessed through the GainSeeker application

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"A number of times I've been on the floor when I received an alert to my PDA that a problem was happening on one of the lines. Before arriving at the production line, I had reviewed the control chart and the operator comments and was ready to talk to the operators and supervisor about the problem."
Kevin Rackham, Director of Quality

A key element in CBC's quality system is a daily lot report. At the end of each production shift, a lot report is generated from the GainSeeker system with lot identification and process information. Although lot-specific data is archived in the SPC database, this official document is signed by the production supervisor and is used to document each line's daily performance. The cases of product give-away is calculated by GainSeeker, printed on the daily lot report and then loaded back into the AS/400 for later analysis by a financial analyst .

"We really don't know what we did without it," commented Deb Keeler, the McComb plant's Quality Manager. "People really use the system. Operators are paying more attention to their weights and we [management] have better visibility of what's hap-pening. In the past when there was a problem on the floor, we'd have to come back to the office to look up the product specifications and historical data."

Quality Director Kevin Rackham not only receives emails at his desktop computer but also accesses them on his PDA. In fact, he can access real-time process data about product running in any plant from his PDA via the wire-less network. "A number of times I've been on the floor when I received an alert to my PDA that a problem was happen-ing on one of the lines. Before arriving at the production line, I had reviewed the control chart and the operator comments and was ready to talk to the operators and supervisor about the problem."

Kevin Rackham, Director of Quality, checks his PDA for real-time packaging line performance

The impact

The cost savings resulting from improved process control in packaging paid for the GainSeeker system's purchase and set-up in well under a year—and that doesn't include future process improvement projects that will use the data provided by GainSeeker.

The success in the packaging department has gained the attention of plant leader-ship. Potential applications of GainSeeker and the carts are being explored for use by the maintenance department for documentation of preventative maintenance and for verification of sanitation schedule compliance. Up-stream in the baking and mixing departments, the potential for real-time process control is enormous. In the words of Rackham, "We've only scratched the surface of what GainSeeker can do for us."

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About the Author
Teresa Jostes is a Master Black Belt with more than 10 years experience in Six Sigma. She has a BS in Mechanical Engineering, an MBA and is an ASQ Certified Six Sigma Black Belt. Terri first became involved in Six Sigma during her 12-year career at General Electric. In May 2005, Terri launched Data Driven Decisions, a Six Sigma consulting firm. She is an adjunct professor at Capital University in Columbus, Ohio where she teaches their Six Sigma Black Belt program.

About Hertzler Systems
Hertzler Systems provides seamless, accurate data acquisition solutions for your business enterprise. We have been in this business for over 20 years. We have a large and diverse customer base in service, transactional and manufacturing environments, including Consolidated Biscuit Company, McCormick & Company, and Hormel Foods. Our cus-tomers buy software and services from us because it is a good investment. With our assistance they can easily acquire data from any process, analyze that data in real time, and instantly notify process owners of process variation. These capabilities help them reduce costs, cycle time, errors, and defects, and increase profitability and customer satisfac-tion. These are our core competencies. We turn data into knowledge.