Technology’s Impact on Food & Beverage Performance

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From a bean counter’s perspective, maintenance is a cost, and the less cost, the better.

From a production manager’s vantage point, maintenance technicians are the plant equivalent of ER doctors: If they aren’t on duty, machines are going to die.

Product out the door is manufacturing’s key metric, but maintenance technicians, engineers and other support personnel ensure the heartbeat of the plant. Demand for their services is high, as Food Processing’s 2017 Manufacturing Outlook Survey attests: 38.9 percent of participating food companies are actively recruiting maintenance technicians, and 54.8 percent are expanding in-house technical training, either as part of a total productive maintenance program or to groom the next generation of high-skill maintenance personnel.

The real issue is optimizing performance and investing capital where it will have the

Lakeview Farms’ Todd Parker has a browser-equipped tablet that interfaces with a cloud-based CMMS, which has helped achieve efficiency gains in plant maintenance.
biggest impact. Technology has a big role to play. Asked what actions they were taking to optimize plant assets, 17 percent said they were implementing a computerized maintenance management system (CMMS) or similar asset management software.

Lakeview Foods began a new CMMS journey three years ago, converting from a paper-based system. CMMS implementation invariably invites pushback because of the behavior changes it requires and the resentment tracking systems engender. But the timing was right: The Delphos, Ohio, maker of dips, sauces and dessert items was in the process of consolidating three far-flung manufacturing facilities into a 770,000-sq.-ft. building in the northwest Ohio town.

“Each facility had its own maintenance staff, its own CMMS program, its own parts inventory system,” recalls plant engineer Todd Parker. More troubling, work orders were paper based, not electronic; when a job was completed, the work order was placed in a manila folder and filed away, making root cause analysis a “frustrating and time consuming” task, he says.

Transplanted workers also brought with them personal relationships that can upend prioritizing jobs based on greatest need. “The old-fashioned way was for techs to go to the line where the manager was a friend and ignore other areas of the plant,” Parker grimaces. Lacking an advocate,
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ood manufacturers find non-contact level sensors attractive for a number of reasons. Of course, since nothing comes into contact with the material, there’s no risk of equipment interfering with the process or rogue parts breaking off and getting stuck in equipment or contaminating ingredients intended for human consumption. Plus, they provide continuous level measurement for optimizing inventory and preventing silos from running empty. No food manufacturer wants to risk tagging a bad batch due to a missing ingredient.

Today’s most popular non-contact technologies are laser, radar, and 3D scanners. The sensor that might be best for your application is determined by a number of factors including the material being measured, the amount of dust in the environment, the size of the silo, and the desired inventory accuracy. Communications options for getting your needed data can also vary as well as the price of the sensor, its mounting, wiring, and installation costs.
SEE THROUGH SILO WALLS WITH 3D SCANNERS

Using a 3D scanner level sensor is like having Superman’s x-ray vision. With its dust-penetrating technology, you can actually see the topography of what’s inside the silo using the graphical option. The 3D scanner is mounted on top of the silo at an optimal location recommended for superior surface coverage, so the scanner can “see” the utmost material surface. It sends acoustic pulses that sound like chirping crickets to the material surface in a 15°, 30°, or 70° beam angle depending on the model. It then measures and maps the material surface at multiple points to detect uneven topography.

Distance is calculated using advanced algorithms that convert the difference between the timing the echo was sent and received to a distance. Data is sent via 4-20 mA or RS-485 output to software, or if you prefer an HMI / PLC. The included software records the data and calculates level, volume, and mass and creates an optional 3D visual of bin contents. 3D scanners come in a variety of models, which are generally chosen based upon the vessel size, the desired accuracy, the need for a 3D visual, and the operation’s budget.

The 3D scanner is the only level sensor that measures multiple points on the material surface to account for irregular topography. To your operation, that can convert to precise volume measurement within 1% to 3% of total stored volume. For food plants, it offers the added benefit of detecting cone up, cone down, or sidewall buildup. When the MV or MVL models are used, 3D scanners are the only sensor that offers a 3D visual of silo contents. The 3D scanner is a popular choice for waste bins and rendering operations, even used in challenging materials like bloodfeather.

A key advantage of 3D scanners to operational efficiency is volume accuracy in large silos. When silos are over 45 feet in diameter, more than one 3D scanner can be used on a single vessel. The software takes into account measurements taken by multiple sensors and aggregates it to a single volume and single 3D visual.

Download the complete white paper here.
WASHDOWN PNEUMATICS FOR FOOD PROCESSING

High-pressure washdown-rated valves and cylinders from AVENTICS combine hygienic design with a high degree of modularity and flexibility for a solution that’s easy to clean and maintain. Factory-assembled and tested manifolds can be from one to sixteen stations in either discrete multi-pin or direct fieldbus connection.

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Pneumatics
It’s that easy
New Developments in Pneumatic Valve Technology for Packaging Applications

Advances in pneumatic valves enable packaging machine builders to create innovative folding configurations to satisfy market needs.

By Aventics

Pneumatics is widely used in many packaging machines, to drive motion and actuate machine sequences. It is a clean, reliable, compact and lightweight technology that provides a cost-effective solution to help packaging machine designers create innovative systems while staying competitive.

Manifold valve technology plays a central role in the performance and effectiveness of pneumatic systems. Recent developments in this technology have increased their flexibility, modularity and their ability to integrate with and be controlled by the advanced communication bus architectures that are preferred by leading packaging machine OEMs and end-users, enhancing the application value pneumatics technology supplies.

Pneumatics-Driven Packaging Applications

Pneumatics can be particularly effective for any kind of machine motion that combines or includes high-speed, point-to-point movement of the types of products with the weight and size dimensions typically found in packaging machines. This includes indexing, sorting and pick-and-place functions. It is also used for suction cups or non-contact transfer devices.

For example, on cartoning machines pneumatics can drive multiple functions: indexing the infeed of blank cartons onto the process line, driving machine components that help form the folds then close the carton folds, and moving glue guns or other sealing devices. In form, fill, and seal machines, it’s common to have pneumatics
drive clamping devices and heat sealers, as well as tension controllers on rollers discharging the plastic film that forms the bags being sealed.

Several factors continue to make pneumatics broadly appealing to machine builders in the packaging industry. One is cost of ownership: not only are most pneumatics components relatively low-cost to begin with, the systems themselves are relatively easy to maintain and repair and do not require special training or outside specialists, which can add to operating costs.

Pneumatic-driven systems move products through machine sequences at high speeds – typical systems support motion sequences of up to five meters per second, and higher-end cylinders support eleven meters per second; these rates satisfy a significant percentage of throughput rates found in many packaging machine applications, such as pick-and-place systems.

Pneumatic technology is easy to integrate into larger machine designs, is highly modular, lightweight and compact enough to be installed on moving machine elements such as linear modules. And they offer the kind of long-lasting reliability expected from today’s automation technologies. For example, one pneumatics suppliers’ valve series has been tested to operate, without device failure, through 140 million duty cycles.

MANIFOLD VALVES: CONTROL THE FLOW

All pneumatics systems work on the same basic principle: a single air source provides all the air pressure needed for the different components, and it is the valve system that controls the distribution and sequencing of the air to drive individual actuators.

Standard valve systems typically provide directional flow control: air is supplied through one valve to actuate a pneumatic cylinder and drive the motion cycle on a machine device, and the air is released through the manifold following a different path. Most packaging machines use 12-15 station valve manifolds, but more advanced designs are available that support up to 64 valves stations.

Another common valve configuration is called a 3/2 valve, in which a three way valve supplies air to an actuator, and then allows it to exhaust so the actuator retracts. This type of valve configuration can be a more compact design, since some manufacturers allow two 3/2 valves to be paired in one valve slice, for greater flexibility in controlling motion sequences.
Discover the Power of Control

Rice Lake’s new 1280 Enterprise™ Series indicator/controller is the ultimate combination of power and programmability. Its large, color touchscreen vividly displays a highly customizable graphical user interface. Increase efficiency with screens and widgets designed specifically for your application. Seamlessly integrate the 1280 with existing equipment through standard Ethernet TCP/IP, Wi-Fi, Bluetooth® and RS-232/485.

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Call 800-472-6703 or visit www.ricelake.com/1280 to schedule a demo today.
Let’s take a minute to dissect some problems that occur with most batch engines.

The core software that resides in a standard weight indicator is composed of several basic processes. These processes read the A/D (analog to digital converter), provide updates to the display, monitor and read the keypad input or other user interfaces, write and read memory, transmit/receive serial data, monitor digital inputs and update digital outputs. In an indicator with digital I/O, it is typical for core software to also include a batch engine.

Quite simply, a batch engine is designed to control processes, such as adding predetermined amounts of ingredients to a hopper. In the past, however, some have been rather clunky and under-powered. Instead of including sophisticated features, they have often been too general to meet specific demands, or too individualized to embrace all requirements of applications for which they are intended.

This typically stems from limited expectations that were present in past decades when control was simply a read switch on a dial or the control sequence was mostly reliant on external logic. In today’s advanced food processing environment, this is not acceptable. Passing this responsibility on to someone else’s equipment is no longer cost effective or competitive.

Controllers based only on weight reaching a setpoint have evolved. What used to be very crude methods to code, and languages
that require an extensive programming knowledge have become simplified and accessible by a wider audience. In addition, controllers formerly required a programmer to have a deep understanding of weight-based technologies. Recently, across the spectrum of weight-based control, a number of methodologies have emerged in an attempt to meet the needs of weighing applications.

These methods have often fallen short of performing exactly what is required, especially if there is any upstream or downstream control. It seems that setpoints are either too basic or have evolved to become specialized objects that are strung together in an attempt to be one-size-fits-all. For example, in the 1980s, a diagram in a manual typically showed (graphically) the basic concept of control and offered some “canned” sequences for single or multiple products with target, preact, dribble and zero band.

Since then, little has changed with regards to the basic weight setpoint—despite an ever-increasing set of expectations in control applications. Because of this, much of the marketplace is inundated by the implementation of programmable logic controllers (PLCs), even when the application is completely weight-based.

Another problem with using most weight indicators as controllers is there are far too many variables to meet the majority of the controlling process’ needs. Some examples are applications that involve impact loads, free fall and head pressure. Although most batching indicators can deal with these variables, when you actually compound them with operator prompts or inputs, formulas or recipe storage and simultaneous control, then add data capture and reports, it starts to become a very daunting application. And to think we still haven’t dealt with scenarios like what to do when the system is paused, idled or aborted!

In general, a setpoint can be thought of as having a condition that is evaluated, with actions that occur based on the condition being satisfied. Most setpoints in a weight indicator actually have true or false conditions or actions that have been pre-defined. These setpoint events typically are assumptions that have limited flexibility. It is common to find these setpoints to be limited, especially when multiple conditions may need to be simultaneously addressed, and predefined actions are far beyond simple control.

Now, let’s consider a simple solution. Rice Lake Weighing Systems has recently introduced a revolutionary programmable weight controller—the 1280 Enterprise™ Series. It is more than just a controller. The 1280 is also an integrated HMI (hardware with unified programmable software), making it an all-in-one control solution for
weighing applications. In weight-based applications, the 1280, with its powerful batch engine, can operate as a standalone control center. With up to 100 total set-points, and 24 configurable setpoint types, the 1280 automates daily tasks and can handle even the most complex weight-based routines.

For advanced customization and intricacy, Rice Lake’s iRite™ software can be used to create custom applications and data tables for the 1280. This intuitive software uses event-based programming to bring a new level of versatility and simplicity to an operation. Virtually anyone familiar with basic programming can use iRite. Rice Lake created this programming language by incorporating the best features from existing languages, such as Pascal and Ada, and adding a rich set of function calls and built-in types specific to the weighing and batching industry. The result is a language that is easy to learn and use for all programmers, but still familiar in syntax for those who are more experienced.

Sample iRite programs are included with the 1280 to provide the skeleton of working applications. Built in to the controller are templates for checkweighing, counting, recipe and truck in/out applications. Examining these provided applications can quickly familiarize a programmer with iRite and its capabilities, and serve as an excellent starting point for a company’s specific weight-based automation needs.

As the science of control and the design of batch engines continue to evolve, we will inevitably see increased flexibility, functionality and speed in our devices. Machine-to-machine communication will be seamless. User-friendly interfaces will make human-to-machine communication a common, universal language. With Rice Lake’s 1280 weight controller, the future is already here.