Keeping the production line running smoothly

Reliability and consistency of performance with reduced and less frequent downtime have always been drivers of food and beverage manufacturing lines; and as pressure continues on the bottom line, the reduction of losses at any point during production continues to be vital.

Keeping the plant running smoothly is fundamental for any plant operator or factory manager who also increasingly has to contend with more complex and high throughput processes. In the bid to run the most efficient line, operators must gather the right, timely information and assess it, in order to ensure minimal downtime and improve the quality of throughput. And, these tasks are combined with that of monitoring energy consumption and waste.

“Companies operating process plants are concerned with the economic efficiency of plant operation as a ratio of earnings and cost,” confirmed Simon Ellam of Siemens Industry Automation. “All factors that contribute to this equation need to be optimised: throughput, plant availability and product quality. All factors that impact on this equation have to be minimised: operating costs and maintenance costs, energy consumption and raw material consumption, off-spec products, emissions, safety risks and environmental pollution.”

To this end, many devices and technologies have been developed to provide the necessary information. Siemens Industry Automation, the giant of process control and monitoring, has recently introduced what it describes as the ‘world’s most compact mass flow meter’ and worked with Royal Unibrew in Denmark to field test the device.

The Sitrans FC430 Coriolis digital flowmeter has been developed to provide multi-parameter measurement while saving space within the plant. It can be used for measuring any liquid or gas in applications such as filling, batch control, blending and dosing. It offers an accuracy of 0.1% and low pressure loss, while a 100 Hertz signal transfer ensures that the data it collects passes rapidly to where it is needed.

“False readings, lack of repeatability and problematic installation are some of the issues food and beverage plant operators face when it comes to liquid and gas measurements, so Siemens designed the Sitrans FC430 to combat these,” said Danny Ronson, product manager, Siemens Industry Automation.

A 30% increase in production plus a reduction in staffing resulted in a six month pay back on investment for Pinnacle Foods, the UK meat and poultry processor, which opted for a complete product handling system from UPM Conveyors.

UPM Conveyors took responsibility for the turnkey project, which involved the handling of meat and poultry from Goods In through to band saws (including inspection and sieving); dicers, flakers, mincers, and undersize screening as well as an Octofrost Freezer Tunnel and a multihead weigher, bagger and packing, with an output of 3 tonnes per hour, 24/7.

UPM Conveyors has also developed a new version of its Rotary Table (Lazy Susan), which is designed to operate as an integrated part of a product handling system or to act as a stand alone unit to act as a buffer when required for accumulating and unloading product.
LINE EFFICIENCY

Level measurement

Baumer has introduced a new LBFS level switch as an alternative to widely used vibratory level switches. It can be used to measure the product levels in tanks or pipes and can be fitted in any desired position. It is designed not to be disturbed by flow, turbulence, bubbles or foaming, or suspended solids, nor variations in conductivity, temperature and pressure. Offered with a wide operating temperature range of -40°C to +115°C, the LBFS level switch can be used for overflow prevention, protecting pumps against dry running, and during the separation of oil-water mixtures.

A chock-full production line needs to work tirelessly, maintaining a consistent and uniform flow rate without ever breaking down. ABB’s extensive array of drives, motors, PLCs and robots ensures that machinery performs at its optimum, hour-by-hour, all year round, helping manufacturers improve productivity, product quality and worker safety. To savor the sweet taste of improved productivity, visit www.abb.com

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unfermented wort is boiled in the brew kettle with the hops and other additives, which can cause some proteins to denature and coagulate. When the boil is complete, the wort is transferred at high velocity to the whirlpool vessel, which forces much of the solid material to separate and settle into a cone shape at the centre of the tank. At this point, prior to the wort being transferred to the wort cooler ready and prepared for fermentation, the concentration of sugar in the wort must be quantified in order to assess the brewhouse yield. For an eight-month period, the Sitrans FC430 took measurements in this area, which is subject to fluctuating flow rates and temperatures.

“The Sitrans FC430 provides density and temperature readings accurately, reliably and with good response times, which is exactly what our brewery needs,” said Jakob Agerbo Bach, Royal Unibrew’s maintenance manager, who confirmed that the Sitrans FC430 provided comparable readings to its existing Coriolis flowmeters and for mass and density, its readings were more accurate than older models under dynamic flow conditions.

In Germany, the Colbitzer Heidebrauerei turned to SensoTech to help ensure the safety and optimal wort quality of its brew as the cold wort leaves the cooling chamber. At this point a LiquiSonic Plato system, immersion type sensor with Varivent connection was installed directly inside the DN50 pipe after the cooling process to measure the concentration of the liquid wort.

“Before mixing the wort with yeast, it is important to check its original gravity content again to ensure quality,” said Birgit Diesing, brew master at Baumer has introduced a new LBFS level switch as an alternative to widely used vibratory level switches. It can be used to measure the product levels in tanks or pipes and can be fitted in any desired position. It is designed not to be disturbed by flow, turbulence, bubbles or foaming, or suspended solids, nor variations in conductivity, temperature and pressure. Offered with a wide operating temperature range of -40°C to +115°C, the LBFS level switch can be used for overflow prevention, protecting pumps against dry running, and during the separation of oil-water mixtures.

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“Before mixing the wort with yeast, it is important to check its original gravity content again to ensure quality,” said Birgit Diesing, brew master at
Colbitzer Heidebrauerei. “If the measurement is correct, the beer production can continue to run in the fermenting room, and potentially, many valuable litres of beer can be saved through the detection of any ‘overdose’.”

Completely made of stainless steel, the LiquiSonic Plato device determines the concentration of wort using sonic velocity measurement and can operate maintenance-free for prolonged periods, according to SensoTech. Measurement of the wort concentration is calculated by a controller, which is connected to the sensor via a bus cable. This controller can measure up to 256 different types of beer and be connected to up to four sensors, which makes it possible to conduct further inline measurements of original gravity such as at the lauter tun, wort boiler, filter of filler. Sonic velocity measurement has been developed to provide fast and precise, in line measurement of °Plato or °Brix even under difficult process conditions.

“It was not only the high measuring accuracy of +/-0.05 °Pl and the reliability of the LiquiSonic Plato that convinced us, but also its user friendliness,” said Ms Diesing. “After installation of the sensor, the controller immediately showed the actual wort concentration. We are so satisfied that we have decided to install further measuring points at the filler for monitoring and controlling the phase separation, for example.”

For standard volumetric and mass flow measurement of conductive and non-conductive liquids, gases and vapours, even in applications that are prone to pressure and temperature fluctuations, Krohne has introduced its new Optiswirl 4070 C flowmeter. The all-in-one, multivariable instrument combines a vortex flow sensor with built-in temperature compensation and optionally available integrated pressure compensation in a two-wire configuration.

The Optiswirl 4070 C features a non-wearing, fully welded stainless steel structure that is highly resistant to corrosion, as well as high pressures and temperatures, and comes with an Intelligent Signal Processing System that allows for stable flow readings while eliminating noise and incorrect readings. Another innovation from Krohne that is designed to help manufacturers monitor the flow of liquid even when there is gas present in the liquid, is the Optimass 6400 twin bent tube Coriolis mass flowmeter, which consistently measures flow even when the liquid medium contains gas that would usually dampen the amplitude of the measuring tube. This dampening can lead to inconsistent sensor amplitudes that interfere with the electronics’ capability to determine the actual resonant frequency and therefore flow. According to Krohne, while other mass flowmeters ‘freeze’ their last stable reading to cover the loss of measurement, the Optimass 6400 is equipped with an advanced Entrained Gas Management (EGM) feature, which allows it to follow and correct the reading for varying amplitudes.

The Optimass 6400 with EGM can measure entrained gas up to 100% of the volume of the medium and continue to provide an actual measured reading. It operates in high temperatures up to +400°C as well as in cryogenic applications down to -200°C.

Energy checks

Energy is an increasingly important production parameter and if the production line is running smoothly, there are material for conveyor components

To boost productivity and support improvements in safety of conveying systems plus a reduction in maintenance, Quadrant’s new Tivar polyethylene bearing grade Tivar HPV, ultra high molecular weight polyethylene has been developed for wear components that are subject to challenging production environments, high loads or aggressive cleaning agents.

Tivar HPV features a built-in dry lubricant that gives it a Limiting Pressure Velocity value that is said to be 18% higher than competitive materials, resulting in reduced pressure sensitivity. According to Quadrant, as a result, components made with Tivar HPV show improved sliding behaviour and high wear and abrasion resistance. This avoids excessive wear and deformation of parts to support the longest possible lifecycle in conveyors, and give cost, time and safety benefits. The Food Contact compliant material is suitable for all touch points in a conveyor system where friction and wear appears, such as chain guides, sliding strips and guides, rollers, single and multiple corner wear bends, and straight guides.
significant opportunities for reducing energy consumption and therefore costs.

To ensure a stable energy supply for production, Mitsubishi Electric has developed its Energy Control Pack (ECP) solution, which enables a wide range of energy-related information from automation systems to be collected and displayed, thus providing an accurate overview of the energy usage of individual machines or drives. Units that are not required urgently can be switched off based on this data analysis while relevant information can be utilised during production planning. This process is designed to stabilise the energy supply and bring unity, especially in complex systems that might include multiple locations.

“Users often start with one production area and then reinvest the savings in gradually expanding the scalable ECP effectively providing a form of start-up finance enabling the optimisation of energy production to be carried out in stages,” said Christoph Behler, senior business development manager, Mitsubishi Electric Europe, who highlighted that users have already managed to reduce peak loads by eight to 30% and drive down energy costs by five to 15%, with an average peak load reduction of 13%. The average payback time for the ECP is 10 to 11 months. The ECP can be used as a monitoring tool in order to improve plant as well as production reliability. It creates the conditions necessary for optimising production values throughout the operation, increase production efficiency, and reduce maintenance and service costs, according to Mitsubishi Electric. It is available in three different basic versions: from ECP Compact that includes around 80% predetermined functions; ECP Modular – consisting of separate, individually configurable function blocks; and ECP Open, which is tailor-made for developers and adapted to suit each individual application based on the results of a feasibility study.

SKF’s new Energy Monitoring Service – Pump Systems can bring savings of between 5% and 20% a year for a process that is regularly monitored and one that is not monitored, respectively.

“The SKF Energy Monitoring Service – Pump Systems was developed to provide customers with insight about the operational efficiency of their pump systems,” said Eric Huston, global business manager, Asset & Energy Management, SKF. “Many pump systems are inefficient, so the identified savings can be significant.”

At one customer, SKF identified an energy improvement potential of 70% for one factory by monitoring only eight out of the company’s 300 pumps. Through monitoring and optimising the efficiency of the eight pumps, it was calculated that the factory could reduce its annual electricity demand by up to 2,500MWh, corresponding to 1% of the factory’s total electricity use.

Rockwell Automation has also developed a new tool with energy efficiency in mind. The tool allows manufacturers to use mobile devices or computers to calculate the potential savings that can be derived from the use of variable frequency drives, power pumps and fans.

The free mobile application, gives operators the ability to compare conventional methods, such as valves for pump control and dampers for fan control, or variable frequency drives and calculate the estimated cost savings. Users can enter the minimum or flow percentages, annual operating hours, cost per kilowatt, or other information about their own factory, or use the sample data provided by Rockwell Automation that is built into the tool.

“With the increasing prices of energy, manufacturing executives can no longer ignore the impact energy reductions can have on an organisation’s bottom line,” said Nuris Ismail, senior research associate, Aberdeen Group. “We have found that business capabilities and tools designed to cut wasteful energy consumption can help them surpass energy and operating margin goals, as well as improve their operating equipment effectiveness by as much as 89%.”

Multi-product manufacturer, Farmor of France, has invested in a second RevoPortioner from Marel Townsend in order to meet increased production of its meat products.

The first RevoPortioner bought in 2008 provides highly flexible production and allows the different meat portioning drums to be changed over quickly. The RevoPortioner’s low pressure portioning mechanism opens up opportunities for many innovative products to be created using the technology, and its clean production, reduced energy and water consumption were also reasons behind Farmor’s decision.

“The arrival of the first RevoPortioner in 2008 enabled our research and development department to develop new products that meet even more closely the expectations of today’s consumers,” said Jean-Claude Le Du, industrial director at Farmor. “We saw an increase in our yields and better working conditions for our employees. It is for these reasons that we have again invested in Marel Townsend Further Processing.”

Further portioning for meat

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Integration for enhanced plant performance

At Anuga FoodTec earlier this year, Tetra Pak, which was celebrating its 50th birthday during the year that Food & Beverage International was launched, introduced its new iLineXT family of solutions, which is designed to enable production integration, for the first time, across the factory floor, and deliver benefits in performance and safety.

The iLine XT integrates palletisers, pallet wrappers and laser guided vehicles, as well as printers and labellers for distribution units into the packaging line via Tetra Pak’s Line Controller 30 Plus, which acts as a hub that interfaces with each piece of equipment. Drawing on enablers such as Ethernet and a Rockwell Automation platform, the iLineXT also allows operations to be integrated with customers’ enterprise resource planning (ERP) systems. In addition, when used in conjunction with Tetra Pak’s Tetra PlantMaster, the iLine XT enables integration with processing operations and even interfacing to customer warehouse management systems.

iLine XT brings to producers new levels of control like the ability to oversee and control the line set-up from one location and use real time dynamic feedback to manage priorities across different lines. It delivers flexible palletising patterns, fast change-over between different product formats and pallet configurations, increased pallet stability and pallet wrappers that pre-stretch film to deliver up to 30% reductions in wrapping costs.

In addition, the new iLine XT marking solutions allow simple, secure and end-to-end package traceability. Printers and labellers are fully integrated with the production line, identifying the package, multipack, tray and pallet, while automatic data management ensures there is no risk of coding errors. It’s a combination that increases overall equipment effectiveness, improves traceability and reduces customer system costs.

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