Tackling the issue of food waste on the factory floor

Food waste is a growing issue for manufacturing companies and is one where decisions on production machinery can have a significant impact on overall efficiency. Inspection technologies such as checkweighing, x-ray, metal detectors and label vision systems can be used for more than just food safety purposes.

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Leading to significant bottom line savings, and a 55% reduction in product giveaway, Sparc's Sentinel checkweigher inspects and removes overfilled and incomplete packages.

Beyond quality control, modern systems are capable of driving down or eliminating food loss, leading to bottom line savings while meeting CSR targets.

An estimated 1.3 billion tons of food is wasted globally each year – one third of all food produced for human consumption – causing immense financial, ethical and environmental costs. A common assumption is that a majority of this figure is attributed to both consumers and retailers. However, the manufacturing sector plays a big part, with a 2016 report suggesting UK suppliers are responsible for a bulk of the nation's food waste.

In four years, a number of businesses have made progress in tackling the issue thanks to heightened public awareness and subsequent environmental initiatives. What is more, manufacturers are increasingly recognising the influence food waste has on gross profit. A multitude of actions have been executed to prevent the problem, from training employees and optimising production systems, to improving storage and shelf-life.

As a result, a recent study by Waste and Resources Action Programme (WRAP) discovered that food waste in the UK fell by 480,000 tonnes between 2015 and 2018, a greater rate of progress than over the preceding five years. But despite a reduction of 4% within the supply chain, which shows positive overall progress, WRAP's report highlights that there is still a way to go if the global goal of cutting wastage in half by 2030 is to be reached.

Wasted food products cost UK food manufacturers approximately £1.2 billion each year.

The origin of factory food waste

Waste can arise at all stages of the production process and, as is often the case, can easily be avoided if a more detailed approach to prevention planning is taken. Manufacturing drivers include stringent specifications, whereby slightly off-spec but perfectly edible food is thrown straight into the bin. This may occur due to labelling defects, or simply because of increasingly high aesthetic expectations from consumers and retailers.

Peelings, trimmings and discarded meat cuts are other common problems that create waste, as is poor factory floor layout, overstocking and overproduction, bulk buying and backflushing. And yet, according to WRAP, machinery performance problems

are one of the main culprits. To put this into perspective, product blockages and mechanical mishandling account for up to three quarters of the total food wasted by ready meal and chilled product manufacturers, a sector that is accountable for 12% of total loss in the food and beverage supply chain.

Research estimates that wasted product costs UK food manufacturers approximately £1.2 billion each year, meaning preventative measures could have a direct impact on a company's bottom line. But it is not just profit margins that are affected. Poor management practices can threaten brand image, especially given the rising number of consumers who consider a company's social and environmental pursuits when purchasing items.

In fact, a recent survey found that nearly two thirds of participants prefer buying products from firms standing for a purpose that reflect their beliefs, while 62% are drawn to brands that are focused on improving the environment.

By incorporating CSR and sustainability principles into waste management strategies, companies could help turn food waste into value. Considering machinery performance problems are one of the leading causes of this wide-reaching issue, it is safe to assume that investment in high-end machinery with automated processes could pay dividends in the long run.

Diminish false rejects with inspection innovation

In the case of inspection systems, one of the most common sources of waste is false rejects, which occur when a perfectly good product is identified as containing a contaminant or incorrect weight. Reliable industry estimates put the cost per line of false rejects at up to £14,000, depending on the scale of the problem.

When specifying inspection systems, reliability and accuracy is paramount. Line vibrations can cause false readings, resulting in the rejection of otherwise functional products. For this reason, Sparc designed its x-ray, metal detection, checkweighing and combination systems to avoid factory floor interruptions.

Equipment such as the Apollo (x-ray), Cerberus (metal detection and checkweigher) and Theia (x-ray and checkweigher) have been built with a 6mm thick steel sheeting framework. Sparc engineers maintain that this heavier framework reduces environmental vibrations, significantly reducing the risk of false contaminant and weight rejects.

Checkweighing systems come with their own unique set of benefits including the potential to reuse non-conforming products. For example, Sparc's combination units are equipped with independent reject mechanisms with dual bins to separate contaminant and weight rejects. If a weight reject, operatives can simply rework the product and send it through to secondary packaging, diminishing the frequency of false rejects and waste.

Vision technology for recall reduction

As well as false rejects, recalls of unsafe products are a rising problem and can damage a company's reputation while generating costly waste. Recent figures from the Food Standards Agency (FSA) note a 35% rise in recalls in the UK, with food alerts up 52% to 73. Yet, there is currently no concrete evidence that food is becoming more unsafe.

Opinions are divided on the reason for the surge in product withdrawals. Often it comes down to incorrect labelling at the point of sale. This can be due to wrong data input, poor quality printing, damaged labels, illegible barcodes, products that do not match packaging, inconsistencies or contaminants.

As commonplace as they might be, the implications of recalls are widespread for factories and food production companies, impacting areas including consumer health, brand reputation and profits.

Since label-related defects are the most common culprit, investing in vision technology is advisable as part of a food safety programme. Sparc can assist food manufacturers by integrating an advanced label inspection system into their inspection systems, including combination units.

As well as actively inspecting for allergen ID codes, these label systems also check product descriptions, bar codes, lot numbers and date codes.

Mis-labelled products are automatically pushed into a rejection bin, safeguarding against potentially business critical events. Information on all rejected products is automatically tracked by Sparc's advanced data collection software.

Another obvious but often underestimated way to address food loss is by reducing product giveaway, a feature that is achieved with precision checkweighing technology. Sparc's Sentinel checkweigher, for example, accurately inspects and removes overfilled and incomplete packages. In some cases, customers have reported a 55% reduction in product giveaway, leading to significant bottom line savings.

Slight labelling defects which occur within a manufacturing facility can result in perfectly edible food being wasted.

To further reduce waste, multiple checkweighers in a manufacturing plant can also be networked over a secure Ethernet. This enables the results to be pooled across multiple lines of identical product groups and pack sizes and calculate an average batch weight. A controlled feedback signal to upstream equipment used to portion food products specifies when to increase or decrease the fill quantity, eliminating the need for human intervention.

Taking traceability to a new level with automatic testing

Machinery performance issues are also a major cause of factory food waste. False rejects, machinery stoppages and – worst case scenario – product recalls can swiftly have an adverse effect on profitability and brand reputation. Therefore, inspection system performance and failsafe capability should be tested regularly, with results kept on record to support traceability. However, manual practices can impact on productivity and are subjected to human error.

Forming an important part of manufacturing due diligence, automatic testing offers a repeatable methodology to ensure an x-ray system, checkweigher or metal detector is working as it should be.

All Sparc systems feature an innovative, failsafe, paperless, fully auditable COP test routine. Rather than relying on operatives to schedule, perform, document and submit inspection performance checks, the machines pre-configure every test by retailer and product being inspected, alerting QA managers each time an evaluation is overdue.

Operatives simply select from a list of pre-programmed retailer COP parameters. Once a test is performed, a dated due diligence report is created and signed by the operative on the HMI screen. By using automation to follow these principles, it is impossible to bypass a step in the process, increasing the transparency and traceability of machine performance audits and leaving no room for error.

This is only one of the more recent developments in inspection equipment with a direct bearing on productivity. It serves to demonstrate that both food safety and cost and wastage do not pull the food industry in opposite directions. In the same way that integrated combination systems work in unity, technological improvements to automated inspection machinery can help to improve efficiency, drive down production costs and tackle the ongoing issue of food waste. ■

References are available from the author on request