

# Checkweighing progress driven by Data collection

THE WAY IN WHICH CHECKWEIGHER DATA IS COLLECTED, COMMUNICATED, MANAGED AND USED HAS CHANGED DRAMATICALLY OVER THE LAST FEW YEARS.

Checkweighers have long been used to collect data for trading standards purposes, to provide evidence that products meet average weights legislation. Historically, this data was printed out and stored as paper records. Then, a few years ago, checkweighers were introduced which, when linked into data communication and management information systems, enabled production staff to capture real-time production data which they could store, access and interrogate electronically and remotely.

Although this may still sound like pretty cutting-edge stuff to the uninitiated, those at the sharp end of checkweighing technology will know that more recently, advances in data management systems and the ways in which data is communicated have edged even further forward.

The first development is that Ethernet has established itself as the industry standard network connection for linking together a number of systems in a production environment. And, as Alan Johnson, group product manager with Spectrum Inspection Systems, parent company of Loma and Cintex, explains, this makes it much easier to link systems together.

"If you've got a device which is Ethernet-ready – which our checkweigher is – it's very easy to connect several systems onto the Ethernet network and give them an address. Then you can start to transmit data quite freely across the network and view that data at any PC that is on the network."

But just as users are getting to grips with Ethernet connections, two other technologies – WiFi and Bluetooth – have appeared on the horizon, threatening to banish network cables from the factory floor altogether.

WiFi creates a 'wireless network', enabling checkweighers to transmit information to a central computer with no need for cables running along the factory floor.

However, Alan Johnson says that this has met with some resistance from manufacturers. "It opens up all sorts of security issues and we've

found it's not been taken up that readily because the IT people say that once you've got it, anything could happen."

It's a view that is echoed by Martin Lymn, global product manager for checkweighing with Thermo Electron. "Our customers are concerned about data security on a wireless connection. They don't want someone sitting in the parking lot intercepting their production statistics."

Some of these concerns are moderated by Bluetooth, another type of wireless connection which works by attaching an aerial to each checkweigher in the network.

"That's a lot safer," says Alan Johnson, "but unfortunately it's a lot more expensive, as for each checkweigher you need a matched aerial."

It's not just cost and security issues that are deterring manufacturers from switching to wireless, either. According to Martin Lymn, the ability of wireless to operate reliably in a real-life production environment is still in question.

"The robustness of the technology in an environment where there are a lot of electrical disturbances going on concerns us and our customers," he says.

## Developments in data management

Data management or management information systems have also advanced considerably compared with just a few years ago.

"It used to be that people like us would supply a bunch of checkweighers and a proprietary PC-based data collection software package which would only talk to our checkweighers, metal detectors and X-ray devices," explains Mr Lymn. "Various competitors historically had similar products. What we're seeing is a shift towards open communications, so manufacturers are not just locked into having a standard PC that talks to checkweighers – they want a more centralised system that can talk to every device on the production line."

In other words, manufacturers want their

checkweighers to be controlled by their own, centralised data management system, rather than a proprietary version supplied to them by the checkweigher manufacturer.

Alan Johnson too, has observed this shift. "Where the interest lies is in having open systems, so manufacturers have the ability to configure screens the way they would want those screens configured in their factory."

To this end, Loma manufactures OPC (Object linking and embedding for Process Control) compliant checkweighers. Loma says that in most cases manufacturers of data management systems can provide OPC compliant interfaces.

"So rather than buying off-the-shelf data management systems, we're essentially providing a system customers can configure themselves so they see exactly the information they want to," explains Mr Johnson.

## Harnessing data for process control

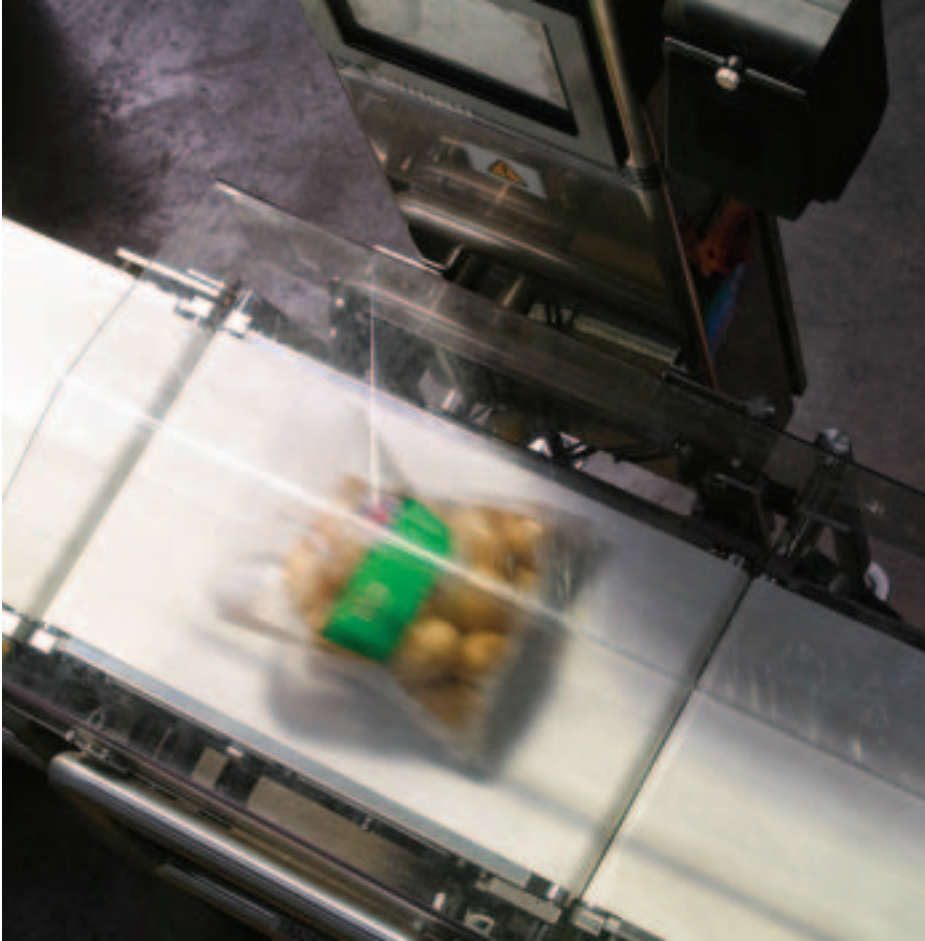
It's not just the way in which data is gathered and transmitted that is changing – it's also the way in which it is used.

## A helping hand with HACCP

A combination metal detector and checkweigher with integrated data management software from Lock Inspection Systems is helping a US-based pâtissier to implement an HACCP programme.

Massachusetts-based Edelweiss markets fine baked goods, cakes and pastries to restaurants, hotels, airlines and in-store bakeries.

The Lock WeighChek checkweigher and MET 30+ metal detector are electrically integrated, allowing settings for both units to be adjusted and data viewed from the checkweigher's control panel. Because the system is networked with the company's management information system, detector and check-



**Handling big bags:** Over 50 Yamato G Series checkweighers have been sold to the potato industry

Checkweighers provide a wealth of data, from basic weight data to line efficiency information and throughput data. While traditionally this information has been collated primarily for trading standards and legislative purposes, manufacturers are increasingly seeing the data as a source of process control.

"You can get a fix on throughput, that is how many packs have gone past," notes Mr Johnson. "If a machine has been idle for a while because of downtime, you can get an angle on line efficiency as well as giveaway. You can look at vari-

ous lines and times in your production process to make a judgement on your giveaway and line efficiency. And you can even compare the efficiency of different shifts."

The most common way in which the checkweigher is used as a process control tool is by providing servo feedback to the filler. So if the filler is trending either upwards or downwards, the checkweigher monitors the trend over time and has the facility, through feedback control, to instruct the filler to increase or decrease the dose. For manufacturers this means greater cost

weigher data can also be accessed from a remote PC or laptop. The real-time status of the machine and product is monitored, so validation and performance reports can be produced and problems identified instantly.

A total of 640 products, in different sizes and packaging, meant Edelweiss needed a system that would offer both flexibility and sensitivity. Lock's combination unit, with DataChek, has unlimited data storage capacity and allows product set-ups to be changed and detector parameters optimised for ultimate sensitivity. Installed at the end of the packing line, the system provides the final check before goods are delivered to customers.

A pusher reject device transfers contaminated, underweight or overweight product from the line onto a table, where it is manually inspected.

efficiencies as product giveaway is reduced.

In itself, the technology is nothing new. Manufacturers in the USA have been using the checkweigher as a process control or efficiency tool for quite a number of years.

European manufacturers have however been slower to harness the checkweigher's process control potential, though Thermo Electron's Martin Lymn says they are now developing a better understanding of the relationship between the checkweigher and up and downstream processes.

"The number of customers buying the servo option has increased, particularly in the UK and Europe, where the checkweigher has historically been a regulation compliance function," he notes.

### Eliminating giveaway

It is nevertheless surprising how long this has taken, given the cost savings that can be accrued by eliminating giveaway.

"We have examples where over a six month period, the checkweigher has actually paid for itself and some, just by offering feedback control to the filler," says Mike Bradley, manager of Mettler Toledo Safeline's product inspection business.

These claims are backed up by Martin Lymn, who says he has had customers in the USA who have had payback from a checkweigher in a matter of weeks, and even days, from reducing their giveaway by what on the face of it seems a fairly small amount, but when multiplied by the number of packs produced in a day, amounts to astronomical raw material savings.

Cleaning is a requisite for any company looking to follow an HACCP programme. At Edelweiss the factory is washed down and sanitised every night, so it was vital that inspection equipment could stand up to cleaning. The Lock metal detector is protected to IP54 while the stainless steel checkweigher meets IP66 requirements.

"There's more to inspection than buying the cheapest system on the market. In actual fact, the purchase price is only part of the package," explains Rifat Cebi, general manager at Edelweiss.

"Metal detection and checkweighing equipment represents a long-term investment. Making wrong decisions can lose valuable business and a cheaper machine that delivers inferior performance and causes frequent downtime can be more of a financial burden in the long run."



**Final check:** Lock WeighChek checkweigher is combined electronically with a metal detector

## CHECKWEIGHING

Although data collection, communication and management might be a key focus for checkweigher manufacturers, there are still other areas of innovation.

As with most production and packaging machinery, speed is always a focus area, particularly in high speed canning applications.

Thermo Electron has now launched a new checkweigher which is capable of weighing cans at speeds of up to 660 a minute.

Marketed as the Ramsey Teorema checkweigher, the machine is accurate to  $\pm 0.7g$ , meeting the accuracy requirements of Europe's R-51 and the US Handbook 44. Features include spacing and acceleration of cans, side-to-side conveyor transfers at infeed and outfeed, controlled feeding and a high-rate reject mechanism.

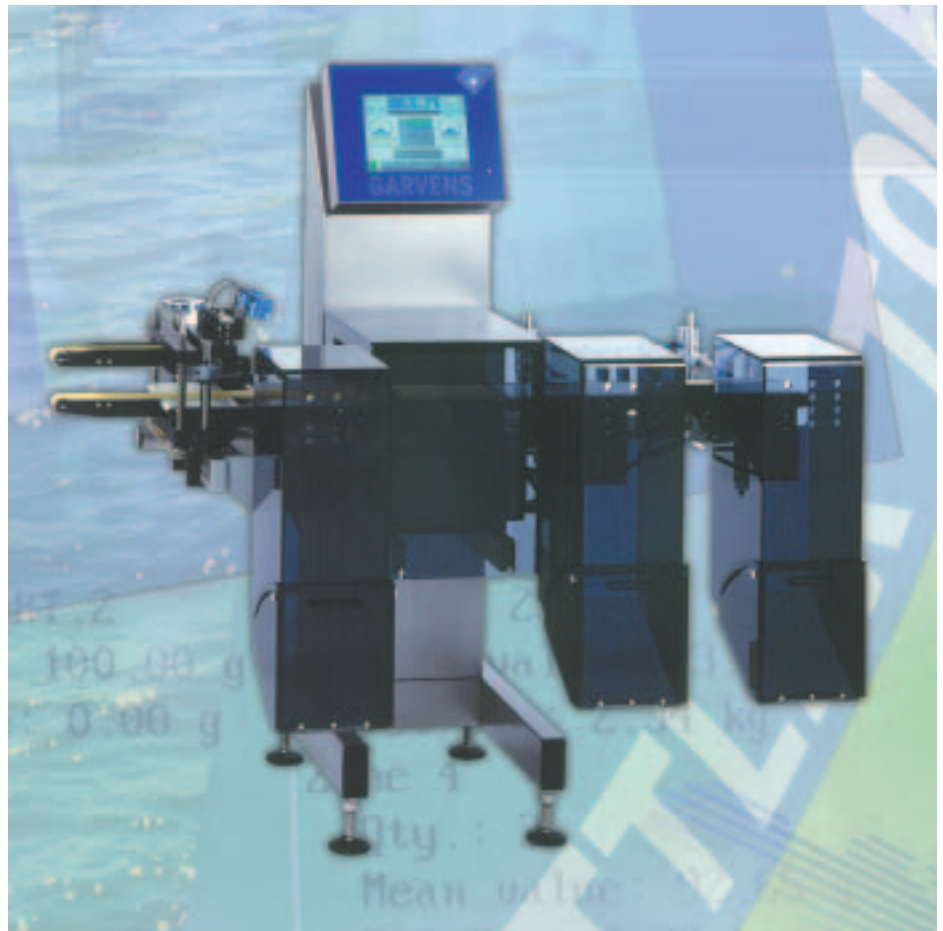
### Reliability rather than speed

In contrast, Loma's Alan Johnson sees the requirement for reliability rather than speed as a driver of technological innovation, as production lines are run a lot more aggressively.

He reports increasing demand from the expanding chilled food industry, where shelf life is particularly critical. "With these sorts of pressures, companies are extremely intolerant of downtime, and producing robust and reliable checkweighers is a must. It's a balance between maintaining accuracy and having drive and conveyor systems which are quite beefy. So you have to over-engineer the motors and drive systems."

In addition, there are still some applications in which checkweighers can struggle, such as awkwardly shaped products or washdown production environments.

To this end, Easiweigh, part of the GSH Group,



**Pharmaceutical checkweigher:** A Mettler Toledo Garvens S2 machine has been installed by Universal Products

has developed a new range of checkweighers specifically for fresh and frozen food production environments, where high humidity levels and irregularly shaped products are common.

The range is particularly suited to weighing objects such as bags of apples because it uses a twin rather than a single loadcell, which provides stability on the weighing plate, and can be rated up to IP67 for full washdown environments. Although other manufacturers are producing IP67 rated systems, Easiweigh claims

that its system is more affordable than most.

The new range operates at speeds of up to 300 products a minute and can achieve accuracy levels of  $\pm 0.3g$ . Operation is via a graphic display panel, from which data can be managed and printed and speeds can be adjusted.

Another company to have mastered awkward products is Yamato Scale, which has sold the potato industry more than 50 of its G Series checkweighers, which are capable of weighing the large 6kg bags.

## High output unit works with eight lanes

A multi-lane checkweighing and metal detection system able to handle 147mm long trays at speeds up to 256 a minute has been purpose built by Sparc Systems for a UK sauce manufacturer to work in line with the thermoformer on which the catering size packs are produced.

Sparc, which builds a wide range of standard checkweighers, developed the line to accept rows of trays directly from the eight lane thermoformer, avoiding the need for merging devices and maintaining throughput without high linear speeds. This in turn ensures higher accuracy.

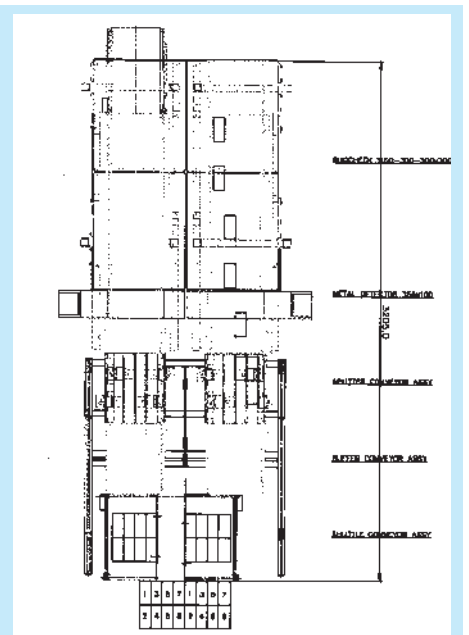
The line, which is in two halves to handle four lanes each, is also particularly compact, measuring some 3.2 metres long, including

the infeed section and the buffer station.

In operation, two rows of eight trays are first accepted by the line's shuttle conveyors, which move left and right to split the 16 packs into two 2 x 4 groups and pass them forward onto the two buffer conveyors.

From here the groups of trays move on to the splitter stations – each with four timing belts – that release the packs singly onto the four-lane, 300mm wide belts of the checkweighers at a pre-set pitch, allowing each pack to be monitored one after the other, first for metal then for weight.

Overhead reject systems and bins are fitted to both halves of the line immediately after the metal detectors and the checkweighers.



## CHECKWEIGHING

The company also provides for the opposite end of the industry, having installed a number of systems for weighing small bags and punnets. It says the G Series is also proving popular within the salad industry – again for large bags and also coupled with metal detectors.

Mettler Toledo Safeline's Mike Bradley reports increasing demand for customised combination systems.

Historically, checkweighers are most commonly supplied as integrated systems in combination with a metal detector. Lock Inspection Systems, for example, says its WeighChek checkweigher is at its most powerful when combined with its MET 30+ metal detector in a fully integrated system. Lock says this allows settings for both units to be adjusted and data to be viewed from one control panel.

### Integration saves space

Now, according to Mike Bradley, companies are asking for combination systems which integrate checkweighers with laser marking and vision systems.

"That means as well as doing the checkweighing, we're marking the products and checking the marking is correct. We can even put batch

data on that links into the checkweigher and is read and confirmed. We call it a QA station rather than a weighing station."

While most of the demand for these systems has come from the pharmaceutical industry, Mr Bradley says he is getting more and more interest from the food industry. "It uses the space for the checkweigher for more than a simple weighing job, reducing the overall footprint. Space is at a premium in any production environment."

Finally, pharmaceutical and personal care products contract filler Universal Products (Lytham) Manufacturing has just installed a Mettler Toledo Garvens S2 Pharma checkweigher to monitor the output from a newly installed Norden tube filler.

The machine is able to accept tubes from 4.5g to 400g and from 45mm to 225mm long and, as well as rejecting incorrect products employs mean value monitoring to allow for the effects of humidity on product density.

The S2 Pharma checkweigher is specifically designed for the pharmaceutical industry and complies with 21 CFR Part II regulations. Accuracy is said to be 0.5g-3g while speed is up to 400 items a minute. ■

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