

Effective automation and a partnership approach to maintain quality

by **Torsten Giese, marketing manager, Ishida Europe Ltd.**

Today's consumers have high quality standards, retailers have rigorous procedures in place to deliver these, and legislation often demands that food companies take reasonable steps to ensure the accuracy of the weight of their packs and that they are free from any type of product contamination.

Product quality and maximum shelf life are of course absolutely vital in the meat sector but quality is also about perception – how a product or pack looks on shelf can be a key part of a purchasing decision.

At the same time, in competitive markets, manufacturers need to do all they can to maximise production throughput and minimise downtime.

However, when it comes to automation, the packing of meat and poultry has not been an easy task. The sticky nature of the products make them difficult to keep moving through an automated system, and large pieces and joints are difficult to place tidily and attractively into trays.

Nevertheless, in recent years equipment suppliers have been increasingly developing solutions to these challenges, particularly to

meet the growing popularity of pre-packed products. Today, there is a variety of solutions available to help meat processors deliver the highest levels of quality and consistency in terms of both their products and their packaging.

Multihead weighers

The weighing of meat and poultry was for a long time a largely manual operation, while the earliest automated solutions used a linear design that still relied on operators to direct and control the supply and flow of product.

Now we are seeing the introduction of traditional circular multihead weighers that incorporate rotating screws to provide a powerful, controlled and fully automatic product feed to the pool and weigh hoppers; the hoppers can also be specified with scraper gates to aid the product transfer from the hoppers into the discharge chute.

Such technology can help to double packing speeds for even the stickiest products, while significantly reducing giveaway thanks to the accuracy of the multihead weighing process. As a result, weighing speeds and accuracy can show an

improvement of approximately 20% compared with the best linear weighing systems.

Most tray formats, however, provide an additional challenge since product in these will be on view to consumers. There is therefore often a need for it be carefully placed and attractively styled in each pack.

This has led to the development of batching equipment, which combines accurate multihead weighing of fresh meat and poultry with manual manipulation to optimise their arrangement and presentation in trays.

After weighing, each accurately-weighed portion is despatched to one of the packing stations on a linear or rotary batching table, where an operator transfers the weighed portion into a tray, styles it and places the tray on a transfer conveyor for sealing, labelling and quality control. The station automatically informs the system once the filled and styled tray has left, triggering the sending of another portion to be packed.

Robot technology

Robot technology is also coming to the fore, with the development of systems that combine weighing and pick and place technologies to grade products of varying weight and pack them to a fixed weight straight into the pack. Product is weighed on a belt weigher and the weight is calculated with previously sorted products to find the best combination. The product is then picked and placed into the appropriate pack.

Multihead technology has also helped in the development of the mixed ingredient ready meals market, with weighers able to weigh a number of different products simultaneously for discharge into the same pack.

Multihead weighers can also handle two target weights at the same time. For instance the weigher can handle both 250g and 1kg of chicken breast fillets – if the multihead can not find a portion that is within the narrow, customer-defined target weight 'window' of



The incorporation of rotating screws into a multihead weigher provide the automated and controlled feed of product for accurate weighing.

250g the weigher can make a combination for a second target weight (in this case 1kg) which can be transferred to a second packing line to pack into a family tray.

This capability to handle two target weights at the same time means there is no need for empty cycles in the weigher and therefore production efficiency can be maintained at a high level.

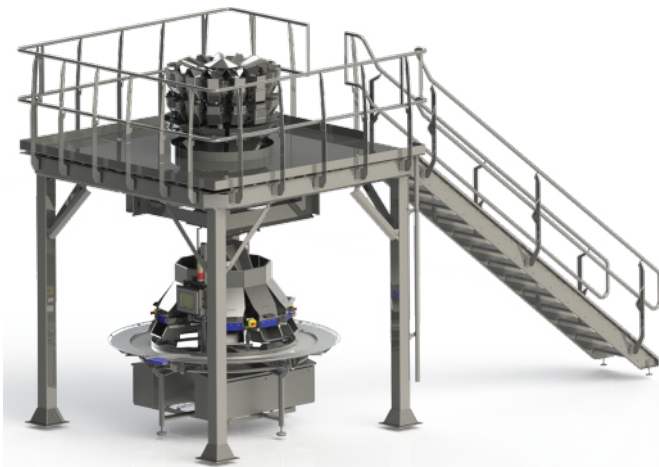
Alongside these developments, weighing technology has continued to be enhanced to enable weighers to deliver even faster speeds and greater weighing accuracy. The introduction of 'booster' hoppers, stepper motors and, more recently, Digital Signal Processing (DSP) and Anti-Floor Vibration have all helped to set new standards.

Checkweighers

Checkweighers are another essential part of the weighing and packing process in order to provide additional evidence that all packs leaving a factory are meeting the relevant legal weight requirements.

At the same time, the continuing
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Batching solutions combine accurate weighing of fresh meat and poultry with manual manipulation to optimise their arrangement and presentation in trays.



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development of checkweighing technology means that checkweighers can play a far more extensive role in the packaging process. Some of the most recent models are now capable of providing a wide range of data monitoring and analysis for every pack that goes across the checkweigher. This can help to improve Overall Equipment Efficiency (OEE), monitor packing line performance, enhance the profitability of production lines and generally enable manufacturers to manage their operations more efficiently.

In the meat sector, for example, this analysis function may highlight the fact that a beef burger is consistently over its target weight. This in turn can help to identify a potential problem in the production process and ensure that action is taken to rectify this sooner rather than later.

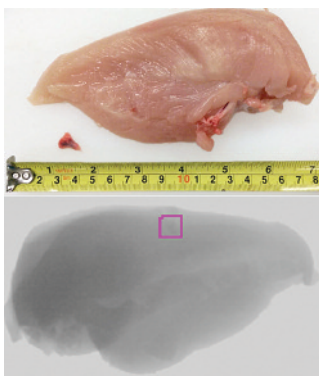
While checkweighers can be combined with metal detectors for enhanced quality control monitoring, for the detection of a wider variety of foreign bodies in packs and its ability to carry out an extensive series of quality control inspections, X-ray technology is becoming particularly popular.

X-ray inspection

X-ray inspection offers huge flexibility and versatility in terms of its inspection capabilities, picking up inconsistencies in materials, in a pack, or in a flow of product passing a given point. It can detect pieces of bone, stone and glass and metals such as iron and stainless steel, as well as dense plastics. The minimum size of particle that can be detected varies from one material to another, depending on the size, density, shape and the type of packaging or product, and the precise capabilities of the X-ray system.

And one of the most important factors in X-ray's versatility is that, unlike metal detectors, machines can also detect a full range of inconsis-

X-ray inspection offers great flexibility in terms of inspection capabilities, for example detecting pieces of bone in chicken fillets.



tencies and foreign bodies in products packed in foil or metallised film. Another benefit of the technology is that X-ray systems can work undeterred in even the harshest of environments, such as humid and wet atmospheres and extreme hot and cold temperatures.

X-ray systems are also ideal for detecting a range of inconsistencies that can also have an adverse effect on quality standards. The technology can identify voids and broken, undersized or missing items in packs; it can spot deformed product, for example a beef burger that has not been formed properly, and packaging such as product in seal. Under-filled compartments in ready meals, product with cracks, and missing metal clips are further examples of imperfections that can also be detected.

In addition, X-ray inspection can perform a number of other functions, such as weight estimation. And one of its advantages in this area against a more traditional weight check using a checkweigher is its ability to spot a problem which weighing alone could not detect.

If a pack is supposed to contain a set number of items of approximately the same size and weight but one piece is considerably over weight and one considerably under, then the total weight of the pack may still be correct but the end consumer will not be satisfied with the overall pack contents.

This high level of quality control extends to the ability to offer full traceability – for example, in the event of a complaint, ERP (Enterprise Resource Planning) or other data systems linked to X-ray inspection can enable retrieval of the X-ray image of a particular pack, establishing beyond doubt whether or not it contained a foreign body or showed a quality issue such as a missing item. It is also very useful for false claims as the system can capture every single image.

Integrated packing line

Pinpoint accuracy, maximising efficiencies and effective detection are all critical to ensuring consistent quality – but what has also become clear over the years is that while the machines that deliver these benefits can operate very successfully in isolation, they will function even better when included as part of a fully integrated packing line, tailored to the precise needs of each application.

Alongside the multihead weigher, checkweigher and X-ray machine therefore, other equipment such as tray denesters, tray fillers and sealers, bag makers, seal testers, label inspection and end-of-line packing equipment can also be linked together to ensure maximum throughput and efficiency.

For this to happen most effec-

tively, it is vital that manufacturers and their suppliers seek to establish mutually beneficial long term working partnerships. In this way, the machinery supplier can be involved in the early stages, developing a complete solution that minimises costs (in terms of reduced manpower and energy requirements, and minimal downtime) while delivering high throughput.



The latest checkweighers can provide a wide range of data monitoring and analysis for an enhanced quality control role.

Just as important, including consideration of the packing operation in the early stages of a launch plan will ensure that the line is fully fit for purpose rather than finding out at the last moment that a new pack design cannot be packed efficiently at high speed. Such close co-operation can also help machinery manu-

facturers to design equipment that is future proof and able to be adapted quickly to handle new products or pack types, or be combined effectively with many other packaging machines. In this way, meat processors will be ideally placed to ensure the highest levels of quality throughout their packing operation. ■