

Best practice in meat conveying

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It is clear that the horse meat and associated beef/pork mislabelling scandals have seriously shaken consumer confidence in the meat industry throughout Europe and beyond. And while the health risks resulting from this story have actually been negligible, it once again puts food standards firmly under the spotlight.

The meat industry therefore faces the challenge of not only complying with increasingly stringent legal regulations in terms of health, hygiene, safety and traceability, but also being seen to be taking every step possible to distance itself from the practices of the past. This applies to operations along the entire length of the supply chain, from farmers to slaughterhouses, from wholesalers to retailers. And meat cutting operations – with their multiple stages of handling, cutting, transporting, carrying and re-handling – are right at the heart of this.

Good food hygiene practices must therefore be maintained, hazard prevention plans implemented, and every precaution taken to minimise risk of bacterial build-up.

Regulations are in place covering issues ranging from the layout, construction and design of cutting plants to personal hygiene facilities, all geared towards maximising hygiene standards at every stage of the process.

In terms of equipment, anything that could come into contact with meat products –

directly or indirectly – must be easy to clean and, where necessary, disinfect (both in terms of ‘cleanability’ and ease of access) and in reasonable condition, i.e. not scored or worn.

These guidelines cover all surfaces on which meat is handled, and one of the most critical pieces of equipment in this respect is the conveyor used to carry materials away from trimming or deboning lines.

Designing hygiene

With hundreds of tonnes of meat being transported every day in larger meat processing operations, this is a critical area requiring particular attention. Cleaning operations are central to maintaining hygiene, but best practice begins with the design of the conveyor unit itself.

In terms of the frame that supports the conveyor, this should be of stainless steel and the design should be as open as possible to allow access for cleaning. Narrow gaps and other hard-to-reach places provide hiding places in which dirt, debris and bacteria can collect, so easy access is key.

Closed compartments present a similar risk and should be avoided; if this is not possible then they should be welded airtight.

Design of the framework should avoid the use of horizontal surfaces where water might collect after cleaning, supporting the growth of bacteria.

This means the use of construction elements such as round tubes. If square

tubes must be employed then these could be turned to an angle of 45°.

All mechanical and other components should be food approved; it is not just a case of taking an off-the-shelf conveyor and installing it in a meat cutting plant. For instance, bearings and other components requiring lubrication must use food approved lubricating grease, and IP65 standard protection on gear motors will enable thorough cleaning by sprayed water.

Choosing the right type

The major component on a conveyor – the part that comes directly into contact with the meat being processed – is of course the belt, and in broad terms there are three types to choose from: solid stainless steel, solid plastic and modular plastic.

For many decades, the solid steel belt was the preferred option, and indeed remains so in some parts of the world, notably the Americas. In recent years however, the significantly lower initial purchase price of plastic belts has seen this technology come to dominate the market.

But today there is a resurgence in interest in steel belts as processors look at how to implement best – in other words ‘most hygienic’ – practice across every aspect of the cutting/trimming/boning operation.

So what makes steel belt more hygienic than other technologies? First and foremost is the material, solid stainless steel.

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Its chemical and bacterial neutrality with food means it poses no threat to either human health or to the taste of food. Durability and corrosion resistance are other important factors; stainless steel systems last for years, even decades.

For meat conveying, the structure of the steel belt is another key advantage. Flat and solid, there are no gaps or textures in which bacteria can hide.

Steel belts are installed in what is called 'endless' form, meaning the two ends are welded together to form the conveyor loop, then ground to effectively remove any trace of the welded joint. This can be done either on site or prior to shipment, depending on

circumstance/preference. But the greatest advantage of steel belt-based meat conveyors is their cleanability. Stainless steel has a dense smooth surface that is inherently easy to clean. It is also a material that can be cleaned and disinfected via many different methods: hot water, pressure, brushes, detergents, chemicals or any combination of these.

Research

The case for the use of stainless steel conveyors in meat processing facilities has been enhanced by the publication of research by Finnish food laboratory VTT

Expert Services Ltd confirming that the risk of problems caused by bacterial build-up can be reduced, simply by upgrading to a stainless steel conveyor.

The research looked at the 'cleanability' of the three basic conveyor types: a stainless steel (AISI 301) conveyor belt, a solid plastic belt, and a plastic conveyor of slat construction. All three were tested in pristine condition and also with knife damage to replicate everyday wear.

A suspension of three types of microbes – *Pseudomonas fragi*, *Candida albicans* and *Listeria innocua*, were chosen to replicate those found in meat processing facilities when cleaning is insufficiently thorough.

The suspension, which also incorporated cow's blood, was applied to the clean belts and left for predetermined periods.

The various belt samples were then cleaned, visual observations made (dirt was clearly visible on the damaged plastic surfaces), swabs taken, and microbial loads assessed using scanning electron microscopy (SEM).

The results were clear. VTT Expert Services' research scientists concluded that 'stainless steel is more cleanable than the two different plastic surfaces tested according to the culturing results. The difference is more significant for damaged surfaces'.

Superior cleanability

One of the greatest threats to a hygienic production environment is the formation of biofilm on work surfaces, and unless cleaning is complete and effective, this can lead to the growth of harmful bacteria and pathogens.

The superior cleanability of stainless steel – not to mention its far greater resistance to damage by bone or knives – offers the potential for those using other belt materials to achieve significant improvements to hygiene. There are commercial benefits too.

The cleanability of stainless steel means conveyor belts can be cleaned and sanitised significantly faster, ensuring high availability – important in multi-shift operations. Short cleaning times also represent best practice in ecological and economical terms, with low water consumption and low use of detergents and other cleaning chemicals.

Implementing best practice in meat conveying may involve a higher initial cost than other technologies, but upgrading to a stainless steel conveyor, purpose designed for the meat industry, makes sense whichever way you look at it.

From a purely financial viewpoint, the combination of long term payback and reduced cleaning costs makes it an attractive return on investment.

Factor in the improved hygiene – at a time when all eyes are on the industry – and it is not difficult to see why more and more operations are going back to solid steel belt conveyors. ■