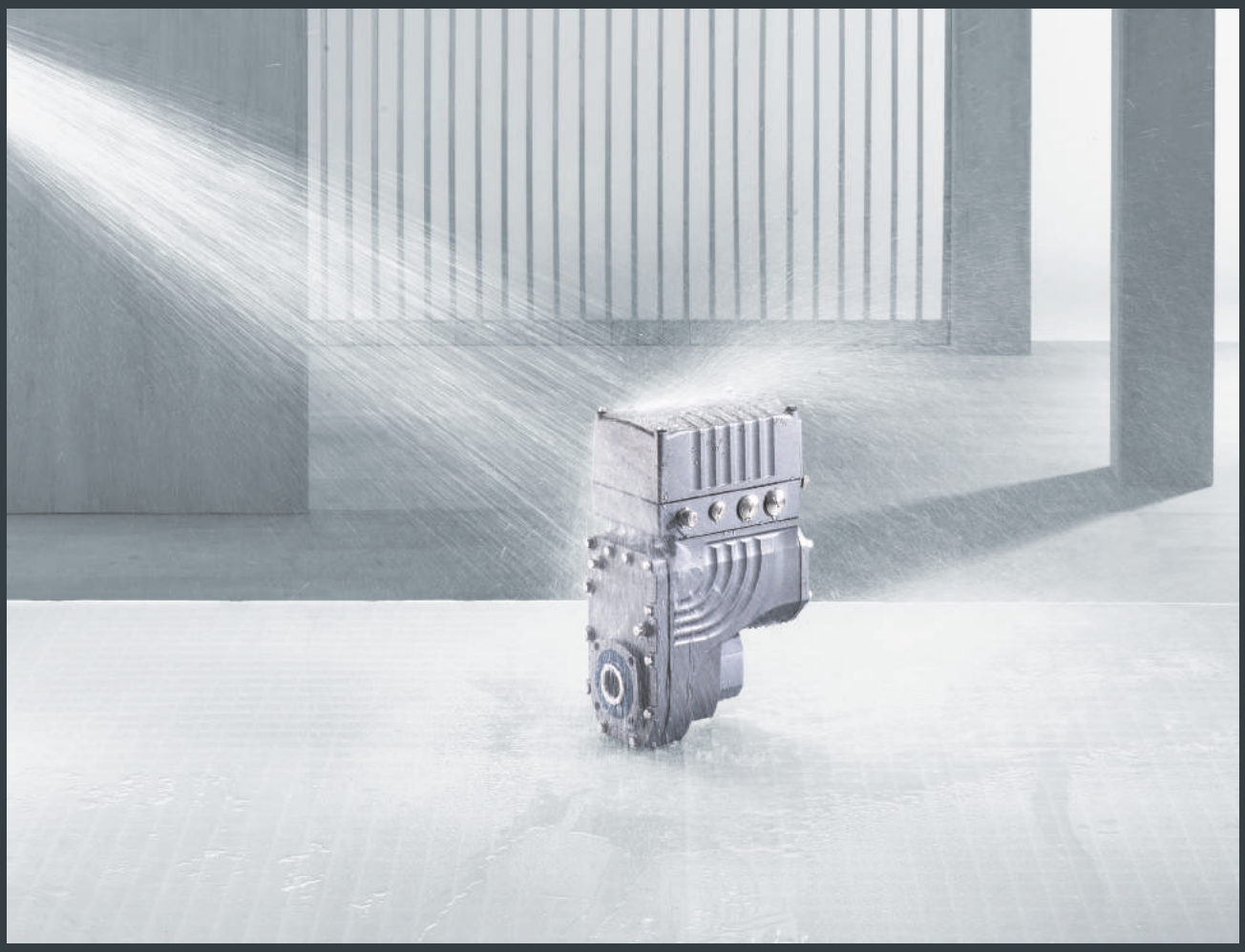
SEW EURODRIVE

Upgrading a food-production facility to minimise the risk of contamination



Introduction

The need for hygienic conditions in food-processing plants is obvious. However, maintaining these conditions when introducing new equipment can be a challenge. In this article, we describe how an upgrade at a chicken-processing plant led to significant improvements.

Food-processing companies set high standards for cleanliness in their production facilities. While they can control their own production environment by implementing strict processes, the installation of externally-sourced equipment that keeps the production lines rolling is a different matter.

According to John Gattellari, National Industry Specialist – Food and Beverage at SEW-EURODRIVE, the cleaning process in these facilities is critical. A variety of caustic chemicals may be used in the wash and sanitizing process. Motors and gear units are rinsed with hot and often high pressure liquid and hence the equipment must be able to withstand exposure to the harsh environment. These units are essential in food-processing plants, as they drive the various materials handling equipment that move food items and packaged products around the production areas.

"The plant has to be spotless and clean. Otherwise, food particles can be caught in the production equipment, creating a biological hazard. The installed equipment needs to cope with the harsh treatment it receives during wash downs," says Gattellari.

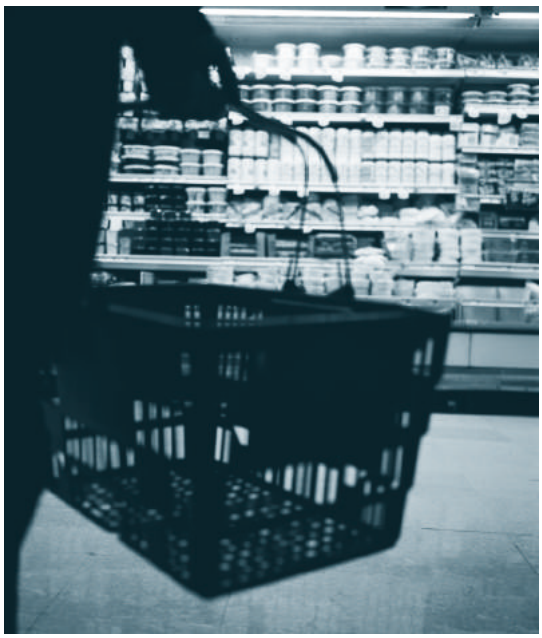


Figure 1

Suppliers, manufacturers, retailers and consumers alike need extra assurance that the food that reaches our tables has been processed in a suitably hygienic manner.

If the motors and gear units are not designed to withstand such a rigorous cleaning process, there is a risk of paint flaking, which is also an obvious health hazard in a food-processing environment. Another potential problem is the possible ingress of fluids that can cause corrosion, leading to mechanical failure or electrical problems.

"This means that it is imperative that the equipment installed must be fit for purpose," says Gattellari. "It must conform to stringent standards if it is to be used in a food-processing plant. It must also be easy to clean."

HACCP compliance

To guarantee that these standards are met, the food-processing industry and its suppliers typically adopt the hazard analysis critical control point (HACCP) risk-management methodology. The methodology can be applied at any stage of the food-manufacturing process.

Many retail food sellers insist on their suppliers being certified by an independent organisation such as HACCP Australia or its international equivalents. It is not only the ingredients and food-processing plants that require evaluation and risk analysis. If the equipment within the plants is certified as fit for purpose, this gives suppliers, manufacturers, retailers and consumers alike extra assurance that the food that reaches our tables has been processed in a suitably hygienic manner.

Gattellari says that this certification is critical for the motors and gear units driving the equipment in food-processing plants. "SEW-EURODRIVE realised this early on, and is endorsed by HACCP Australia in the manufacturing equipment category. Certification demonstrates that the mechatronic drive system MOVIGEAR® type B variant for wet areas that we supply for these projects can be successfully cleaned by the high-pressure hoses and chemicals without any difficulty or detriment to the units."

Frequent audits

In the wet areas and tightly-controlled clean areas of food-processing facilities, these standards are upheld rigorously. Food manufacturers conduct their own audits

and also bring in external auditors to ensure that their facilities meet their own standards and those required by the organisations they supply.

The auditors typically inspect the whole plant, paying attention to all systems and manufacturing processes, including those that govern use of the conveyors, motors and gear units. Such thoroughness is to be expected when the health of consumers is at stake.

Gattellari says that the food industry now prefers drive systems that are HACCP certified. This is in addition to being easy to clean, reliable, and being able to meet the necessary technical and performance requirements.

Applying the knowledge

One site where this approach has been put into practice is the Golden Farms chicken-processing plant at Geelong, in Victoria. Joe Cammaroto, Maintenance Supervisor at Golden Farms, now uses the MOVIGEAR®

Figure 2

MOVIGEAR® Type B variant for wet areas.

type B drive system throughout the large facility, which employs around 400 people and processes up to 100 000 chickens each day.

He agrees that the cleaning step is critical, and says that the whole plant is cleaned every night after production ceases. The consequences of hygiene issues arising in the clean areas of a food-production plant are substantial. At the very least, they could mean delays in production, with associated financial losses. Even more importantly, if contaminated food were sold to the public, the health of our community could be at risk.

Cammaroto says that a number of previously-installed drives remain in the plant. These must be covered up prior to high-pressure cleaning and uncovered again afterwards. Without the covers, the chemicals used in the cleaning process eat the paint away, so each unit must be cleaned separately from the rest of the plant. This extra handling of equipment every day is time consuming and inconvenient.

These older drive systems – which are traditionally in two pieces rather than a single sealed unit – also have the potential to cause contamination. Removing the peeled-off paint and rust from the older drive systems is time consuming and costly. The process has to be painstakingly thorough to overcome the risk of contaminating the food product.

Frequent independent audits assist Cammaroto and his colleagues to check that this risk is minimal. A comprehensive system provides for different audits at three and six-monthly intervals, in addition to annual checks. Auditors verify that processes are being adhered to, and look at the preventative measures that are in place.

To further alleviate the risk, Golden Farms is systematically replacing all the older drive systems as they age and wear out.

“We were looking for an alternative motor and have been introducing the MOVIGEAR® type B to power our conveyors because it is designed and certified for use in hygienic environments,” Cammaroto says. “With its

special coatings, it is washable and the food product can't stick onto it."

As well as using them to replace the older-style motors, Golden Farms now installs them whenever a new conveyor line is added. Cammaroto says that there are now more than 19 of the HACCP-certified units installed.

Installation has proven to be a simple process and has been carried out by the technicians at Golden Farms. The drive motors are horizontally mounted on the left or right side so they can be placed wherever needed within the conveyor system.

"The long-term upgrade project has been straight forward. Several of the motors have been operating for about three years already, and I've been impressed by how long they have lasted. They've been excellent. The units we used prior to the upgrade would have lost paint and begun to rust in that time," says Cammaroto.

No more fiddling in the roof

Hygiene is not the only benefit of the plant's refurbishment. The controller of the MOVIGEAR® drive system is attached in a sealed housing and the speed of each drive can be adjusted in situ.

At Golden Farms, the conveyors move a mix of fresh product and boxed product, so the speeds of the conveyors vary according to where they sit in the manufacturing process. The convenience of being able to adjust the speeds of the drives directly at the conveyor was another reason for upgrading.

"We can adjust the speeds of the conveyors and match them up so you can go from slower to faster. It's more

Figure 3

Behind the scenes, SEW-EURODRIVE's engineers had been working for many years to perfect the design of the MOVIGEAR® for use in wet areas and hygienic environments.

convenient than having a speed controller up in the roof space where you've got to get up and change it," says Cammaroto. "With the MOVIGEAR®, we just undo a bolt at the back of the unit, adjust the speed and replace the bolt. It's a lot easier – very simple."

Designed for the job

Behind the scenes, SEW-EURODRIVE's engineers had been working for many years to perfect the design of the MOVIGEAR® for use in wet areas and hygienic environments. Gattellari says that the result of this endeavour was the mechatronic drive system MOVIGEAR® type B, a compact and totally enclosed system, comprising the gear-unit motor and electronics.

The MOVIGEAR® drive system complies with the international energy standard, IE4 (Super Premium Efficiency), the finless and fanless design eliminates air swirls usually associated with fan cooled motors. There is no distribution of germs and bacteria – a vital requirement in a hygienic environment.

With no fan, there is an added benefit of reduced noise in the production environment. The drive system complies with air cleanliness class 2 according to the international standard ISO 14644-1 and consumes about 50% less energy than conventional drive solutions.

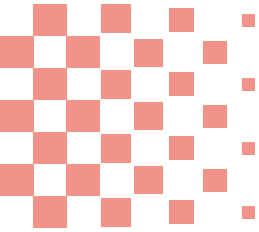
A major issue for gear units and motors in wet areas and hygienic environments is the choice of materials and coatings. While stainless steel components and fixtures are the preferred choice for food-manufacturing facilities, traditional motors and gear units are often supplied with housings made from aluminium or steel. This is due to cost pressures, weight restrictions and component availability.

Traditionally motors and gear units are coated with a paint system that is prone to premature failure when exposed to the harsh and abrasive cleaning regimes. Exposure to the caustic cleaning agents can also cause corrosion within the drive systems. An alternative approach is to employ surface finishes such as Nickel or Teflon, or use of anodising for Aluminium substrates. This gives the motors and gear units superior corrosion-inhibiting properties and abrasion resistance.

The smooth housing of the MOVIGEAR® type B is finished with an 'HP200' treatment which is burned into the surface during the application process. Highly resistant to the cleaning chemicals and high-pressure wash-down the surface finish eliminates the possibility of flaking paint.

These inherent anti-stick properties contribute to a reduction of debris build-up, resulting in faster cleaning times and less system downtime. The standard inclusion of stainless steel shafts, fasteners and auxiliary fittings further enhances the MOVIGEAR® type B anti-corrosive properties. At facilities like Golden Farms, this means that standard cleaning routines can be continued, without the need to cover the drive units before the wash down and uncover them again afterwards.

It was this approach to design that has made the MOVIGEAR® type B eminently suitable for the Golden Farms upgrade project. By introducing a program to replace the older drive systems with HACCP-certified units, the facility has improved efficiencies and minimised risk – a move that satisfies the twin goals of reducing costs and ensuring the health and wellbeing of its customers.



Company background:

The SEW-EURODRIVE group is a global designer and developer of mechanical power transmission systems and motor control electronics, headquartered in Bruchsal, Germany. Its broad spectrum of integrated solutions includes geared motors and gear units, high torque industrial gear units, high-efficiency motors, electronic frequency inverters and servo drive systems, decentralised drive systems, plus engineered solutions and after-sales technical support/training.

The Australian division of SEW-EURODRIVE is headquartered in Melbourne and is supported by a network of offices in Sydney, Brisbane, Mackay, Townsville, Perth and Adelaide. A comprehensive service and technical support centre is located in Melbourne, and is complemented by production, service and assembly facilities in all mainland states. SEW-EURODRIVE offers a full 24 hour emergency breakdown service on its products to put customer's minds at ease. SEW-EURODRIVE can also tailor a training program to equip customers' with a comprehensive set of skills to get the most out of motor and drive technologies and applications. The company's customer base includes large-scale corporations and smaller entrepreneurial enterprises across Australia.

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