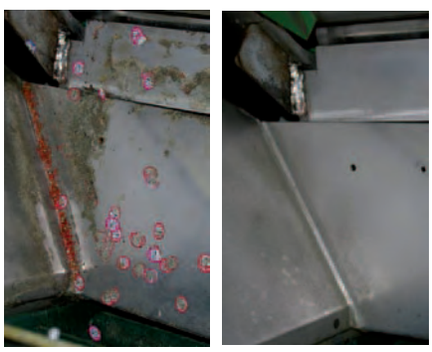
Dry ice cuts machine maintenance by 60%

By turning to cryogenic (dry ice) cleaning, fruit pre-packer Turners PPL reckons it has cut the time to strip down, clean, refurbish and reassemble its weighing and packing machines from five days to two – an amazing 60%.

Antony Taylor, head of operations at the Newmarket plant, states that the site supplies around 85% of Tesco's citrus fruit, pre-packing around 50 million units per year, but that it is not without its challenges. "Citrus fruit is a very messy product for machines," he points out. "In a matter of hours, the wax coating applied to fruit is deposited on parts of the machine and ancillary equipment. Similarly, sticky labels add to this problem."

So, with the machines running 24/7, getting cleaning and maintenance slick is clearly critical to operations – including in terms of food hygiene and safety. However, Taylor explains that, although, in an ideal world, machines would be taken out of service every six months for stripping down and cleaning, because of the waxing that approach would lead to "a huge number of operational and engineering



issues … due to increasing faults and general breakdowns".

Before finding the dry ice solution, he was using high-pressure washers – and incurring the downtime necessitated for disassembling the machines, removing parts to an external cleaning area, washing them, then moving the parts to the maintenance workshop before refurbishing and re-assembly. "This whole process took two engineers five days. Also, an unexpected breakdown on a second machine could result in a failure to meet the delivery schedule," says Taylor.

Then came Polar ICS, whose technology is based on cryogenic blasting, in which tiny dry ice pellets are accelerated in compressed air to strike surfaces at the speed of sound, embrittling coatings before vapourising and lifting them clear, without waste. Taylor recalls how the demonstration on one of his machines took just four hours, instead of two to three days, because all work was done in-situ, without stripping down or removal from the line.

"After being dry ice blasted, the machine parts and weighing systems looked brand new," he says. "The operator from Polar ICS cleaned all parts of the machine by switching to different shaped nozzles. I was so impressed that we are currently considering whether we can use Polar ICS to clean other non-machine assets, including cold storage racking, walls and ceilings."

And he adds: "We've now set up a revised maintenance and cleaning plan. Once a fortnight, a Polar ICS service engineer cleans two machines in situ, which takes one day. This means that our preventive maintenance on any one machine now takes just one to two days."

Steelworks saves thousands on bearings

Savings of a staggering €372,558 per annum are being reported on an annealing process line accumulator sheave at a major UK steelworks, following bespoke redesign of the bearing assembly.

According to technicians at the unnamed plant, the line concerned was experiencing unplanned downtime of around 17 hours per year, at a cost of €21,915 per hour. Each stoppage also meant that heavy lifting gear had to be hired and additional maintenance staff employed.

After analysing the failed bearings, NSK engineers redesigned the assembly to make it more robust, using crane sheave bearings normally used for quarries, ports and building sites. NSK says it selected these bearings for their high load capacity and good levels

of sealing, both of which made them ideal for the arduous conditions in steel making.

Trials proved that maintenance-free operating life was more than three times longer than that of the original bearings. Indeed, according to an NSK spokesperson, the calculations show an operating life of at least five years.

"We knew from previous steel industry experience that crane sheave bearings would deliver the optimum solution in this application," he says. "They are essentially full complement cylindrical roller bearings, offering an advanced sealing system that minimises grease leakage, and increases resistance to the entry of water and other substances."

Their ability to provide reliable life in difficult environments is partly due to machined holes, on the inner and outer rings, that allow greasing while the bearing is in place. In addition, the bearings are supplied with phosphate surface treatment to improve resistance to corrosion.

Corus opens doors on high power gearboxes

Hybrid gearboxes, installed to open and close fume capture doors at Corus steelworks' iron desulphurisation plant in Scunthorpe, have proved themselves strong, durable and capable of very high torque, despite low energy input.

Previously, the site used two wet scrubbers to remove fumes generated by the iron preparation and desulphurisation processes, but, when these were becoming inefficient, Corus commissioned a bag filter plant. Heavy doors were designed to close and contain the fumes, while the extraction system draws them away, but the gearboxes to drive the doors had to be very compact to fit into the space.

Jon Snaith, general manager at Brevini UK, says his organisation designed and built a solution that met all the application requirements, using its Posiplan BPH range of planetary and

helical hybrid technology shaft-mounted gearboxes. "Posiplan offers the best of both worlds, delivering higher capacities from smaller units, which allows for a significant increase in capacity over a more traditional design," says Snaith.

"Different sized motors are available and are selected using motor performance curves to ensure maximum efficiency," he explains.

The result is a gearbox that combines the low weight, high speed and high reduction ratio characteristics of planetary gear stages on the input side, but with the higher capacity, strength, durability and torque of bevel helical gears on the output side. It was also constructed using labyrinth sealing technology and high performance bearings to extend operating life in this harsh application environment.

Brevini supplied four of these units for the filter plant, each with a reduction ratio 2,813.5:1 and fitted with a tiny 1.5kW motor. They run at a low speed of 0.5 rpm, providing output torque of 22,000Nm. Corus also went for the shaft-mounted design, to avoid the limitations of exposed transmission alternatives, using belts, chains or pulleys, which don't fare well in harsh environments.

Choppers cut Severn Trent costs

Vaughan chopper pumps, supplied by P&M Pumps, have cut costs caused by unplanned maintenance at Severn Trent Water's Netheridge, Gloucester treatment works, and are now also achieving significant savings on energy consumption.

The problem, according to works flow technician Jeff Beddall, was blockages and leaking glands on the existing pumps, installed to pump raw sewage from 20 metres below ground from wet wells to the inlet works.

To complicate matters, he explains that they were housed in a dry well classified as a 'confined space', requiring engineers to have breathing apparatus for health and safety. Unsurprisingly, contractors' maintenance costs were high – in fact, around £100,000 for just one year.

Initially, Severn Trent Water operated one Vaughan chopper pump on a trial basis, and that unit is now being used as a stand-by on variable speed drive. Following the trial, additional pumps (12in discharge PE12Us, with 90kW, 970rpm motors) were installed and the process now involves four chopper pumps, operating continuously at fixed speed.

Says Beddall: "We have achieved significant savings on labour and electricity [and] the blockages and leaking glands with the original pumps have been eliminated."

P&M Pumps advises that retrofitting a chopper pump into a problem area improves the whole process and is self-financing, with payback periods of less than one year.

Hose pump distils solution

Plant engineers at whisky manufacturer Chivas Regal say they selected a Verderflex Dura 10 peristaltic hose pump for a lime-dosing water treatment application at the Glenlivet plant, because of its suitability for dosing abrasive and viscous fluids.

Ewan Fraser, engineering manager, says it was the best solution – noting that lime is abrasive and viscous, causing problems for progressing cavity and diaphragm pumps.

His chosen pump is abrasion-resistant and ensures smooth passage of the liquid. It also prevents settling, due to its peristaltic action. Further, the lime can be mixed on site, as solids in the liquid stream present no problem. And, because of its linear flow characteristic, it is also ideal for feedback speed control, which minimises chemical usage.

But there are a few other aspects worth attention. First, the Dura has a novel drive that Verder claims provides a 70% smaller footprint than similar pumps. Secondly, it offers very good reliability, due to its rigid drive connection. Thirdly, the rotor is mounted directly over its bearings, so there is no overhung load. Also, it doesn't require any shims, so installation is simple and power consumption low.

And two more points. First, because this pump has a low operating temperature, hose life is claimed to be 40% better – helped by its reinforced layer construction. Secondly, the bearing is sealed for life and positioned to centrally absorb forces – further enhancing durability of pump and drive.