ISSUE 46

KNOW +HOW

Aggressive Environments

This edition we delve into the dusty and dirty world of Aggressive Environments. We explore a range of topics from the importance of industrial hose management to the latest bearing innovations perfect for use in the toughest of conditions and how a corn processing application can provide one of harshest test for our sealing experts.

ERIKS In Action

Industrial Gearboxes: unsung heroes

Having rebuilt and refurbished gearboxes since the 1980's using the most advanced and highest quality components. The new SKF Certified Gearbox Repairer status provides ERIKS independent recognition, so our engineering processes comply with the highest standards. Page 10.

In Focus

How to manage hose management

When it comes to hoses, they can often be overlooked until they fail. Understanding these vital and important components is critical to productivity. We help one steel manufacturer do just that with a hose management solution. Page 16.

Debate

Cost of Living Crisis? Nuclear Fuel Investment vs. Wind Power

With a focus on a sustainable and manageable future, the debate continues between Fuel and Wind and which one is best for investment. Could nuclear fuel be left in the shadow of those towering wind farms? Page 46.

Supplement

Building a sustainable future

ERIKS

Quick Maintenance Review

Do you want to know more about bearing maintenance practices? Curious to see how yours compares with those of your peers?

By completing our new dedicated questionnaire, you can review and benchmark your bearing maintenance practices with similar companies from the same industry. Get free issue specific maintenance advice from SKF?

On completion, we will share a tailored maintenance maturity radar chart with you, making it simpler for you to identify areas for improvement. In addition, we will offer you recommendations and suggestions on how to improve identified areas.

SKF Authorized Distributor

New: Go to questionnaire and receive full benchmark report.

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Welcome

What is an 'aggressive environment'? This should conjure up images of dust, dirt, high temperatures and chemicals found in places such as a Quarry or Mine, a Steel Works or Water Treatment site or even a chemical facility however, there are other applications.

When it comes to an aggressive environment there are often applications within what would be considered clean environments - such as the food industry, that fall under the harsh environments banner. For example, in this edition we look at a cereal production application in the food sector whose systems were falling victim to intense and continuous contamination by dirt and debris.

Within ERIKS In Action, learn more about our SKF Certified Gearbox Repair Service accreditation that our specialist gearbox repair centre in Pensnett has achieved, and what that means for you. Also read how we helped bring a leading sugar manufacturer out of the 1950s and into the 21st century; replacing five decades old parts was no easy feat but one we could get 'rolling' on with.

Also in this edition, our In Focus section delves into the topic of 'aggressive environments' and offers insight and innovative solutions that perform better in these harsh and sometimes unforgiving conditions. Rocol guides us through selecting the optimum lubricant solution for your application and operating environment while keeping your budget in mind. We also take a look at how split roller bearings can reduce both downtime and improve on-site safety.

Our Making Industry Work Better section features an update from 3M about protecting users by teaching the importance of changing filters to protect against harmful gases and vapours. We also examine the importance of understanding IP and NEMA ratings and the potential damage that can arise from moisture and dust ingress.

Finally, our Debate piece focuses on the recent Cost of Living Crisis with dramatic rising energy costs; the battle of Nuclear Fuel Investment vs Wind Power has never been more important.

We always enjoy our reader's feedback. So if you would like to comment on the subjects covered, please join the discussion by emailing or tweeting us at @ERIKS_UK.

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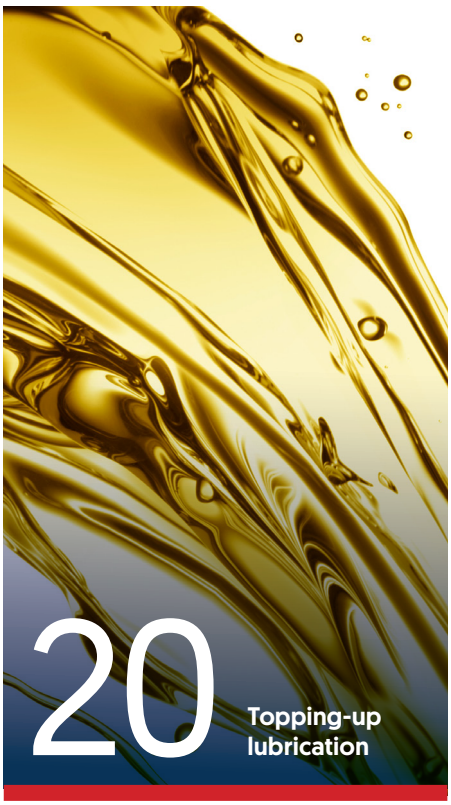
Technology Update

ERIKS in Action

ISSUE 46

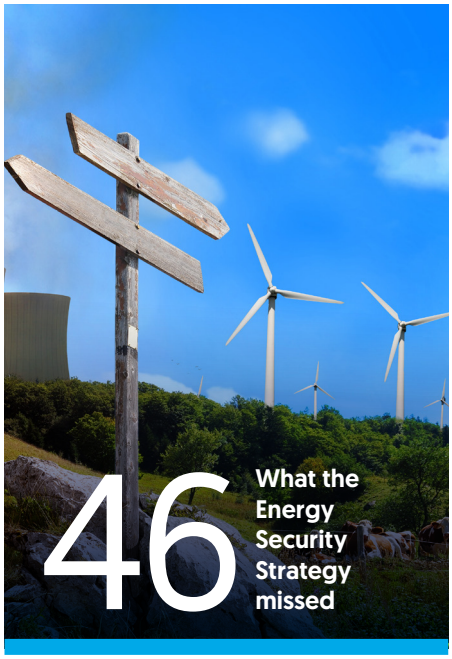
KNOW +HOW

In Focus



Making Industry Work Better

Debate



A wind-powered route to net zero

A study on the future of offshore wind in the UK has been released by the UK department for Business, Energy and Industrial Strategy. The study provides a new framework to illustrate the future deployment of sufficient offshore wind to meet net zero requirements.

The report is part of the Future Offshore Wind Scenarios (FOWS) project. The insights gained from FOWS, combined with the UK Government's Marine Spatial Prioritisation Programme, will inform decisions surrounding the future of the UK's offshore energy.

The findings recognise the importance of floating wind and increasing deployment locations to potentially ease spatial pressures in UK waters. Subsequently, the government has set a target to cut approval times for wind farms from four years to one year in order to speed up the construction process.

UK Energy Minister, Greg Hands says, "This report will help inform the UK's future deployment of renewable energy, reducing our exposure to volatile global gas prices and boosting our energy security".

https://www.marinedataexchange.co.uk/details/3558/summary

https://www.futureoffshorewindscenarios.co.uk/

UN submits sand crisis advice ahead of potential shortage

You may not realise that sand is the second most used global resource with 50 billion tonnes used worldwide each year. The UN has recognised that sand is currently being used at a faster rate than it can be replenished and has suggested 10 strategic recommendations to manage a possible shortage in a report published earlier this year.

The report promotes a monitored approach to governing sand in a managed, responsible and sustainable manner through mapping and reporting sand resources for data-driven decision making, establishing ownership and access to sand resources, and sourcing the material responsibly. They are also advocating for viable alternatives such as recycled construction materials or crushed rock. Switching to alternative materials would help to avoid drastic shortages and promote efficiency and circularity.

The UN hopes that the report will encourage a switch to improved sand management practices via sustainable methods in order to avoid a shortage crisis.

https://wedocs.unep.org/handle/20.500.11822/38362

A new record for UK aluminium recycling

It has been revealed by the Environment Agency that a record 156,000 tonnes of aluminium were recycled in 2021, rising 3% from the previous year.

88% of the total was recycled in either the UK or the EU, reducing exporting emissions and costs. Additionally, more than 4 in 5 beverage cans were able to be recycled, matching the previous year's record.

Executive director at Alupro recycling association, Tom Giddings, had expected to see a fall in recycling rates due to the pandemic restrictions. However, he said "It is positive to see that consumers continued to recycle aluminium packaging in 2021, maintaining their good habits... looking forward to 2022, we hope to see record rates continuing".

All eyes are on next year's figures, where it is anticipated that records could break again, as the industry strives towards their goal of an aluminium packaging recycling rate of 100%.

UK SMEs invest in green solutions to fuel growth

NatWest has introduced a new quarterly report to track and report on the sustainability efforts and investment of UK SMEs with up to 249 employees.

A special focus on green energy investment in the latest NatWest Sustainable Business Tracker has found that 7% of SMEs have already invested in onsite green energy generation and a further 10% are planning to in the coming year to mitigate rises in energy costs.

The biggest planned investments are staff training and electric vehicles – with over a third of SMEs looking at new fleets and charging points by next year.

The report shows that SMEs are seeking solutions to increase efficiency, reduce cost and boost their sustainability knowledge and skills to remain competitive and support future growth.

New routemap to tackle concrete emissions

Concrete accounts for 1.2 per cent of all UK carbon emissions so it has naturally come under the spotlight as a material that needs to change its ways if the construction industry is to reduce its impact on climate change.

In reality, cement, the active ingredient in concrete, is responsible for 90% of the emissions and the Low Carbon Concrete Group [LCCG], part of the Green Construction Board, has grasped the nettle in putting a routemap together to define how to achieve net zero by 2050.

The routemap has seven focus areas to reduce embodied carbon in concrete. The first is to define, classify and benchmark the carbon in concrete much the same as household appliances are rated for energy efficiency. The other six areas fall into how concrete is either made or used and finding ways to improve and decarbonise concrete by optimising processes, achieving efficiencies and adopting new technologies and practices.

Andrew Mulholland, chair of the LCCG, said: There is no one silver bullet to address carbon reduction in the construction industry. The focus of the Routemap is on demonstrating what we can use today in terms of materials, how we can develop better construction methods and how we can utilise clever design approaches, as well as what actions are required and by when to simplify the specification of cement and concrete."

https://www.ice.org.uk/engineering-resources/briefing-sheets/low-carbon-concrete-routemap/

https://www.ice.org.uk/media/200i0yqd/2022-04-26-low-carbon-concrete-routemap-final_rev.pdf

Instant safety improvements stick with LOCTITE Instant Adhesives

Improved safety with no compromise on fixture times, bond strength, versatility, shelf life or temperature resistance. That's the promise for six instant adhesives from the LOCTITE® range, including the new top-of-the-range LOCTITE 402.

In response to changes to regulations and demand from industry, some ingredients found in instant adhesives have been removed. Ingredients identified as carcinogenic, mutagenic and reproductive (CMR) toxins – only present in small amounts in LOCTITE products – have been replaced by LOCTITE with a novel stabilizer package developed in response to customer feedback.

The new LOCTITE 402 instant adhesive with the new formulation delivers ultra-performance and fast setting, even under extreme operating temperatures. Five other LOCTITE instant adhesives with the revised ingredients allow rapid bonding of materials including metals, plastics, elastomers, wood, paper, leather and fabric – with greater safety and peace of mind for users.

Upgraded primers and accelerators are also available to complement the LOCTITE instant adhesives range. This makes it easier than ever to find a LOCTITE product that performs even in challenging situations such as low humidity environments, or for bonding to acidic or hard-to-bond surfaces.

New 3M connected hearing protection headset is nothing to shout about

Now you can work safely and hear clearly, when you wear the new 3M™ Peltor™ WS™ Alert™ X Headset.

Featuring Bluetooth® technology and ambient/environmental microphones, this comfortable headset protects hearing from damaging noise levels, without cutting off the wearer from the outside world. Instead, it allows connection to a mobile phone or other Bluetooth® device, and with a noise-cancelling boom microphone enables conversation at normal volume even in noisy environments.

Communication with nearby colleagues is clearer, and there's no danger of missing the sound of warning signals or approaching vehicles. So in busy, fast-moving work settings such as building sites and warehouses, wearers feel much safer.

With glove-friendly buttons for easier operation, and available as a headband or helmet attachment, the 3M™ Peltor™ WS™ Alert™ X Headset turns hearing protection into a quiet office – that you wear to work.

Click or scan the QR code to discover more about the 3M Peltor headset range.

Positively Different!

Traditional modular rubber mats have connections that nest together. These are considered passive interlocks which can be easily unintentionally pulled apart. To overcome this problem Wearwell has created 24/Seven® LockSafe®, it features connections that snap together creating a positive interlock.

This patented system prevents separation and thereby alleviates the trip hazards associated with loose mats common with traditional rubber matting. 24/Seven® LockSafe® connections allow assembled sections to be rolled up and moved without separation, making maintenance, and repositioning possible. When reconfiguration is needed, these tiles can be "un-zipped" and reassembled.

The 24/Seven® LockSafe® system is made up of large 91 x 91 cm ergonomic rubber tiles to cover large areas quickly. Unlike traditional modular mats where each edging piece has a corner that needs to be trimmed off where it is not required this system has separate ramps and corners, saving time, scrap and quick installation with minimal effort.

New & Improved FORTIX™ Technology for a protected workplace

The risks of injury in machine construction environments make choosing the right personal protective equipment a fundamental requirement. Introducing the New & Improved FORTIX™ Abrasion Resistance Technology - a patented Ansell technology that applies a thin, resilient, and breathable nitrile foam coating to knitted gloves.

The new FORTIX™ coating provides multiphase benefits for workers in dynamic and hazardous workplaces. The enhanced formulation provides you with greater abrasion resistance and increased grip without compromising on dexterity and flexibility which is especially necessary for workers performing labour-intensive activities and even precision tasks. This coating significantly extends the durability and comfort of the glove, reducing the need to remove gloves in between tasks and helping reduce the risk of injuries.

The gloves are also manufactured with reduced water consumption during the coating process as well as reduced greenhouse gas emissions on site, giving you the benefit of a post washed cleaner product with zero residual chemicals and impurities and no irritating substances such as latex. The FORTIX™ coating has also been dermatologically tested by a German recognised lab, giving you the assurance of skin-friendly gloves that contribute to a safer, more productive day at work.

Sacn or click here to learn more about the FORTIX™ Technology and it's solutions.

Altogether now... with Xylem

Single components squeezed together into a solution is no solution at all. But an integrated combination of motor, variable speed drive and pump from Xylem is the perfect answer – for ultimate efficiency in residential and light industrial water supply, and HVAC applications.

The Lowara Smart Pump range from Xylem comprises a Smart Pump with permanent magnet motor, a smart embedded motor drive, and a full range of hydraulic pumps. All perfectly complementary for optimum performance and efficiency.

The motor meets IE5 standards – with best-in-class efficiency far above a standard IE3 asynchronous motor. The smart power drive system (drive and motor) is in the highest efficiency class, capable of operating single, twin or multipump systems. And the hydraulic pumps achieve exceptional Minimum Efficiency Index ratings.

With the drive matching performance to demand, and the smart pumps communicating with other building systems in real time, intelligence doesn't come any smarter, and pumping efficiency doesn't come any easier.

Industrial gearboxes: unsung heroes

SKF Certified Gearbox Rebuilder

Peter Townsend
CoE Lead - Power Transmission
ERIKS

Heavy duty helical, bevel, worm and planetary gearboxes) are among the most common pieces of equipment used in many different industrial applications, from food and beverage, pharmaceutical and quarrying, to mining, power generation and the manufacture of metals and chemicals.

Despite their widespread use and, in many applications, their critical role in power delivery and control mechanisms, they are often overlooked; until such time, that is, when they develop a fault or fail unexpectedly. An expected failure can, at best be inconvenient, and at worst, result in considerable loss of production and unplanned costs, often running to many thousands of pounds.

Gearbox faults generally stem from factors such as incorrect lubrication, poor installation or alignment, overloading and inappropriate maintenance practices. Industrial gearboxes are often subject to high levels of shock loading, vibration and extreme environmental conditions, so harsh operating conditions will rapidly exacerbate the effects caused by imbalance or wear.

An inherent feature of power transmission components has been material degradation, which leads to failure and is often exacerbated by the local environment in which the components operate. Failure of components will lead to downtime, which can be extremely costly for many industrial processes.

Wear is not the only factor to limiting the lifetime of power transmission components. The best manufacturers will advise customers to consider all the factors involved in the mechanics of each application. It's all too easy to specify components based on breaking load, but this does not necessarily ensure that the best solution is found in terms of total service life.

Around 50% of all gearbox faults are caused by bearing failures due to excessive axial and radial loads on, for example, output shafts; similarly, over or under lubrication of bearings, or using the wrong lubricants, can cause overheating or metal-on-metal contact within each bearing.

> “50% of all gearbox faults are caused by bearings”

Gearbox seals generally fail due to high levels of contamination such as dirt and other debris that accumulate around shafts; as each shaft rotates, the dirt and grit is ground into the seal, causing it to abrade. Damage can also occur if shafts are misaligned or if the gearbox is exposed to temperatures outside its operating specification, with the risk that seals will warp.

Gears typically fail due to contaminants mixing with the gearbox lubricants. Contaminants can enter through damaged seals or be produced from within the gearbox itself, for example, from particles generated by metal-on-metal wear. In each case, particles can become trapped between gear teeth, causing heat, wear and potential failure. Problems can also arise if gears have been incorrectly assembled or installed or if they become misaligned during operation due to excessive loads on rotating shafts.

Gearbox repair: the options

Gearboxes either fail catastrophically, causing an immediate loss of power, or gradually exhibit a decline in performance due to component wear; this typically manifests itself as vibration, leading to excessive heat and noise, which should be detectable using standard condition monitoring instruments. Ultimately, even the best-maintained gearbox will eventually reach the stage where refurbishment will be required.

> “Understanding the root cause of gearbox failures”

Although there are many gearbox repair companies, few have the skills, knowledge or resources to analyse and understand the root causes of gearbox failures. Consequently, they will replace parts on a like-for-like basis, or fit low-cost but often sub-standard components, with the inevitable result that the customer is condemned to an endless cycle of breakdown, downtime and repair.

At ERIKS, as an SKF Certified Gearbox Rebuilder, we take a different approach. Our teams have undergone specialised training with an emphasis on root cause failure analysis, bearing installation, lubrication, sealing and condition monitoring. Our objective is simple: to prevent recurring failures and extend gearbox service life.

The repair or refurbishment process begins with a full analysis of the condition of the gearbox, including all component parts, to determine the cause of failure or unexpected wear; this is generally referred to as root cause analysis. Only after a complete check of those components that could have a negative impact on bearing and gearbox service life, do we carry out the necessary repairs to return each gearbox to optimum reliability.

> “Work to exacting standards and specifications”

Our engineering teams work to exacting standards and specifications, using only high-quality components from the original equipment manufacturer, including the most advanced SKF bearings and seals. We are also regularly audited to ensure we comply with all the latest technical and quality requirements.

Our gearbox services extend beyond repair and refurbishment. We can, for example, remove and re-install each gearbox, and can upgrade older gearboxes with the latest components and lubricants to improve capability and lifetime reliability. With each gearbox being supplied with a detailed inspection report that acts as a benchmark for future maintenance and, if specified, condition monitoring inspections.

We’ve been repairing industrial gearboxes since 1982 and have developed an unrivalled level of experience and knowledge. We now provide nationwide coverage from our custom-built engineering facilities, working to the highest quality standards to provide a timely and cost-effective service that helps customers maximise their productivity and profitability.

SKF Certified Rebuilder Gearboxes

SKF Certified Gearbox Rebuilder

As a certified SKF Gearbox Rebuilder we must meet exacting standards and specifications. We use only high quality SKF components and are regularly audited to make sure we comply with all requirements. That means repairs are done right, every time.

Performance advantages

- Lower total cost of ownership from:
  - Increased productivity
  - Decreased downtime
  - Lower maintenance costs
- Extended mean time between failure
- Enhanced reliability

SKF certification advantages

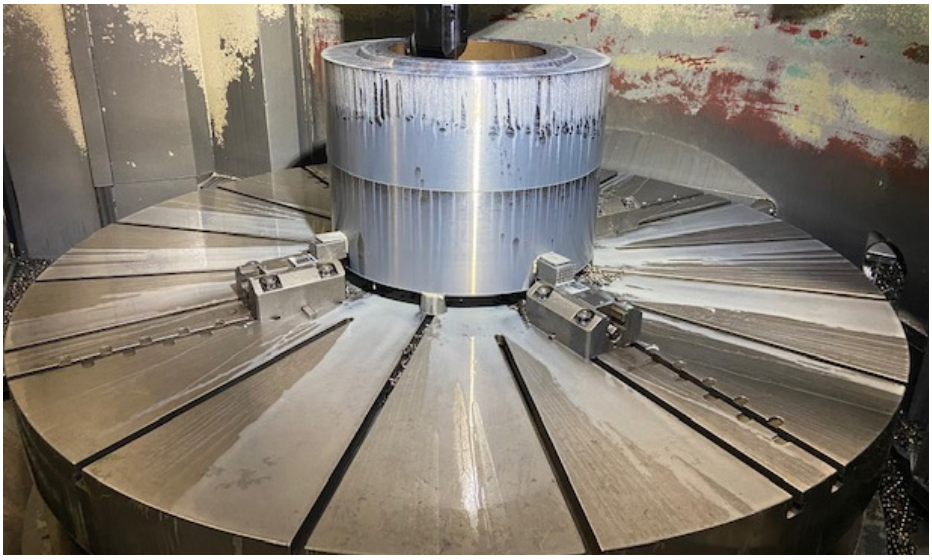
- Conformance to exacting SKF specifications and standards
- Reliable, high-quality rebuilds
- Root cause failure analysis
- Ongoing training
- Access to SKF technology
- Use of quality SKF components
- Auditing and re-certification mandatory

Click or scan the QR code to learn more

Rolling back the years

Mahesh Patel
Engineering Manager
ERIKS

While some people were busy founding Pizza Hut, Elvis Presley was joining the U.S. Army. The EEC (as it was called then) was just starting, and so was the Campaign for Nuclear Disarmament (CND). Meanwhile, in that same busy year (can you guess which one?*, A sugar manufacturer was pressing the start button on their new rotary louvre granulator. Now, in 2022, it was time for ERIKS to step in.



Testing, testing...

Designing, engineering, and manufacturing the new component was only the start of the job. Before it could be installed in the asset, ERIKS – and the customer – had to know for sure that it would perform as effectively and safely as possible.

That's when Non-Destructive Testing came into play.

An NDT Inspection assesses a component's safety, consistency, reliability and other essential factors, without damaging the item during the testing process. NDT can also detect any defects which may have occurred during the manufacturing process.

This was especially critical in this case, as ERIKS was engineering a component from scratch using a new grade of material.

The impressive asset comprises a metal drum 41ft long by 10ft diameter (approx. 12.5m x 3m). The drum is supported on 4 rollers, each weighing 1½ tonnes and operating in pairs. When fully loaded with white sugar crystals, the drum and contents weigh 50 tons (approx. 45 tonnes metric).

Gently tumbling the sugar to remove moisture, the granulator rotates on the rollers at a stately 12 rpm.

It's the kind of enormous and unusual engineering asset which might once have featured on Blue Peter (the children's TV programme that launched in the same year). It's big. It's heavy. And it's clearly well-engineered – because although they didn't know it at the time, it was to prove to have a service life of more than six decades.

For much of that time, maintenance of the asset's taper roller bearings has been carried out by ERIKS. This has included frequent machining of the rollers to maintain their smoothness, as the drum gradually wears them away.

However, over half a century after the initial installation, it has become clear that – due to parts obsolescence – a more comprehensive solution is required.

> "Manufactured to imperial measurements"

A metric make-over

The older the asset has become, the harder it gets to source spare parts – not least because the originals were manufactured to imperial measurements. Even when they can be sourced, the delivery lead time on replacement parts can be as long as 14 weeks.

Eventually, on ERIKS' advice, the customer realised it was time to rethink rather than simply repair.

> "Rethink and replace"

However, replacing the original components with new, metric versions wasn't just a matter of converting the measurements.

Sixty-four years on, the original manufacturing material – BS1760 Grade A – was no longer available. But matching its specification was essential. Too soft, and the rollers would wear too quickly. Too hard and, instead of solving maintenance issues, it would create new ones. Rather than the drum causing wear to the rollers, the rollers would wear the drum. Which would then also need replacing.

While the ERIKS project team assessed the original engineering drawings from the Fifties, converted the measurements to metric and created new manufacturing drawings, a specialist analysed the original materials used, to identify a suitable similar grade.

Find, test, deliver

Maintaining the ratings of the bearings while updating the material required extensive investigation and analysis.

> "Extensive investigation and analysis"

Even when a potential alternative material for casting had been identified, it had to be checked for its suitability through non-destructive testing (NDT), to ensure it would meet all necessary mechanical and chemical certification (see box-out above).

ERIKS' know-how ultimately identified BS3100 Grade AW2 as a suitable material. So, with the drawings completed, the manufacturing could proceed. However, even this wasn't straightforward. The new rollers had to be cast, not forged. This gave ERIKS the challenge of finding a supplier with the necessary skills to produce the pattern, and then to manufacture the roller to the updated and upgraded specification.

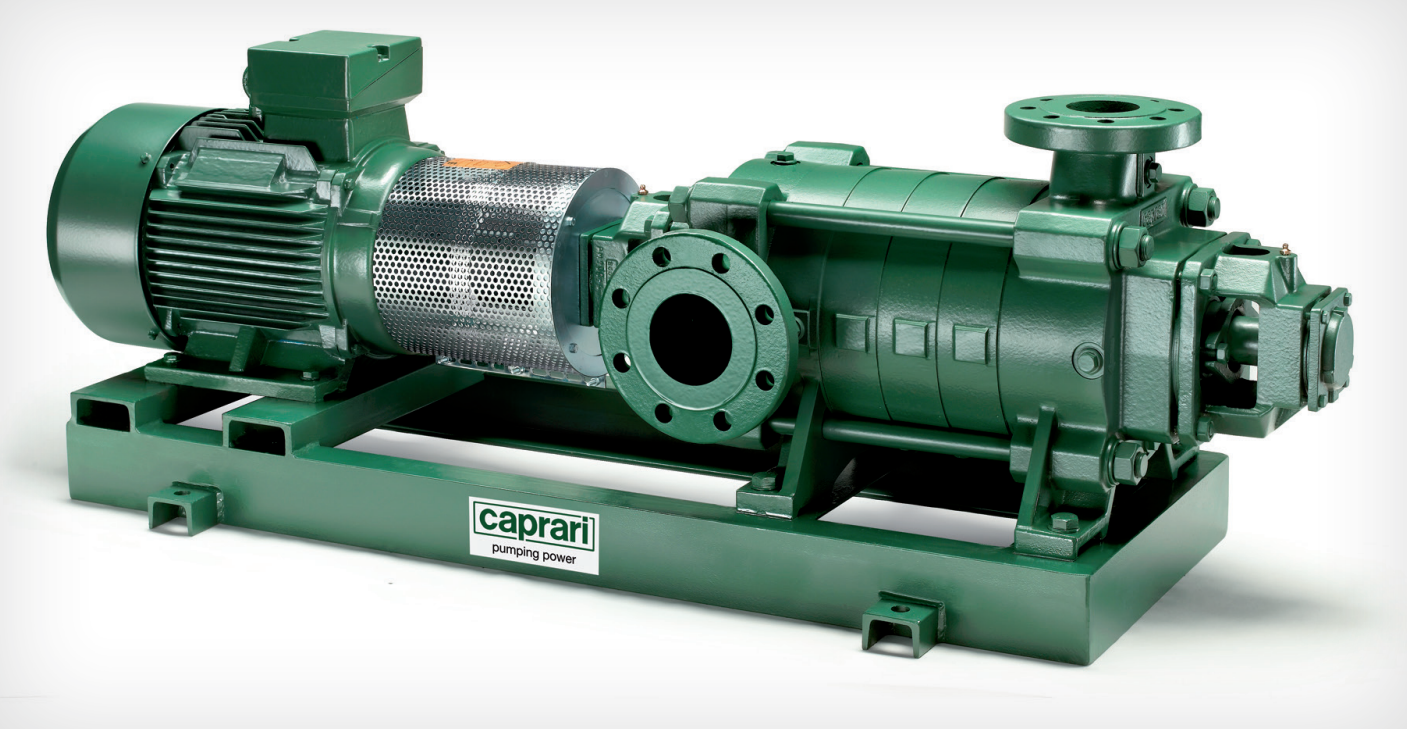
Now, thanks to ERIKS' comprehensive capabilities, the new taper roller bearings are installed and operational, and the customer can look forward to – potentially – another 64 years of smooth operation.

*The year in questions was 1958

Saving the higher cost of hire costs

Adrian Megson
Business Development Manager, Pumps
ERIKS

When is a relatively reliable diesel-driven pump more expensive than an unreliable one? When it's a hired pump. So, when ERIKS replaced a customer's hired pump with a new electric alternative, there were savings all round.



The customer – who operates in the heavy industry sector – uses the pump to pump effluent from a catchment lagoon to their own treatment plant, which is a distance of several miles away. The distance, the static head and the inherent frictional losses in the pipework mean that a high head pump is required.

Historically, two single-stage vertical Mather & Platt pumps had been used: one as a duty pump and one on permanent standby.

The age of the pumps and parts obsolescence also meant there were long lead times for replacement parts, which had to be specially manufactured.

The unreliability and high repair costs eventually drove the customer to take action. But rather than invest in a replacement pump with more efficient technology, their decision was to hire another diesel-driven pump.

> “Shook itself to death”

When rental goes mental

As a short-term solution, hiring a pump was better than nothing. But then the short-term lasted for eight years.

Unfortunately, these pumps required daily routine maintenance (refuelling and checking oil and coolant levels) which meant a one- to two-hour shutdown every day. They were also notoriously unreliable. The high levels of vibration inherent in a single-stage pump resulted in a short Mean Time Between Failure, as the pump virtually shook itself to death. In fact, the vibration was so bad it was impossible to mount the standby pump next to the duty pump – meaning more downtime whenever the pumps needed to be changed.

> “The short-term lasted for eight years”

That was before ERIKS’ engineers identified the scale of the annual hire costs and diesel fuel.

When these figures were presented to the customer, it was obvious another solution was required, and ERIKS were tasked with finding a more cost-effective proposal.

The first recommendation – in the face of ever-increasing diesel fuel charges – was to change to an electric-driven three-stage Caprari pumps, for far smoother and more reliable operation. This would not only reduce fuel costs, but also eliminate the need for daily refuelling and other maintenance. With no need for daily shutdowns, the flow of effluent to the treatment plant would also be constant, making it easier to manage.

The final recommendation was to invest in not one but three of the new electric-driven Caprari pumps, to provide a duty pump, a standby, and a spare.

Everyday savings

The savings resulting from ERIKS’ solution were every day, but far from ordinary.

With a more reliable electric-driven pump installed, every day saw a saving in maintenance costs and downtime. Electric power meant that every day also saw a saving on diesel fuel costs. And every day saw a saving in breakdown and repair costs, as the new solution extended the pump service life from 6 months to 3-4 years.

Even based on fuel prices at the beginning of 2020, the customer would be realising savings of £204,000 per annum on hire fees and diesel. And in line with the recent rises in fuel prices, those savings have hugely increased.

> “Savings of £204,000 per annum”

Repair or replace?

ERIKS always maintains a repair or replace neutrality – carefully and accurately costing both options and giving the customer the choice.

In this case, the cost of replacing the current solution with a new electric-driven Caprari pump and motor together was only the same as the cost of repairing the original Mather & Platt pump. Taking into account the savings on the hire of the ‘temporary’ pump, and the savings in labour costs for refuelling and other maintenance, the most cost-effective decision was obvious.

The customer made the right choice. And the savings compared with the original pump and the ‘temporary’ pump are now significant – and permanent.

How to manage Hose Management

Sam Harper
Application Engineer Supervisor - South
ERIKS

Hydraulic hoses are the critical component within most production systems. They're also the component which can be completely compromised by something as seemingly insignificant as a pinprick. So it's essential that maintenance engineers know the hoses they have, what they do, the condition they're in, and when they should be replaced. But knowing the importance of your hydraulic hose systems is one thing. Managing them is another.

One business in the steel industry has around 2,500 hydraulic hoses to manage. Realising this isn't a job for one person with a spreadsheet, their Reliability Engineer Manager turned to ERIKS Flow Division for their hose management expertise.

ERIKS' response was to initiate a 4-step Hose Management System (HMS) to help save the customer up to £35,000/hr on unplanned downtime.

> "Up to £35,000/hr on unplanned downtime"

Where's my hose?

Before you can manage your hoses, you need to know what hoses you have, and where.

For this steel sector customer, the first stage of the ERIKS HMS meant locating and surveying all their hydraulic hoses. At an optimum rate of 80 hoses a day, that was around 10 days' work for three people – and in this case access for surveys was limited to planned shutdown days only.

> "An effective HMS"

The work was made even more difficult by the exceptionally dirty working environment. Not only new PPE but also new measuring equipment was needed for every working day.

Many of the hoses had been previously identified and tagged, but the information recorded on silicone tags quickly became illegible – or completely erased – due to the operating environment. ERIKS' first proposal was to replace all silicone tags with more hardwearing and long-lasting metal alternatives.

The right hose for the job?

Once a hose has been located and identified, the next step in an effective HMS is to assess if it's the right hose for the job. Does its specification and pressure rating meet the requirements of the application?

In the event of a hose failure, an emergency 'Hose Doctor' will often make a quick-fix, short-term repair using whatever similar hose is available. This hose is likely to fail in less time than the original but – because there's no record of the original and it's correct specification – it will be replaced again and again with a like-for-like hose or with another readily available alternative.

The result is not only reduced Mean Time Between Failures of the hose itself, but also an increased risk of failure for the valves, pumps and other associated equipment, thanks to undue stresses resulting from using an under-specified hose.

Time for a change?

Rubber hoses perish and degrade. The pressures and stresses of the particular application, and the number of cycles the system goes through, also help to dictate how often a hose should be changed. So identifying and recording this is the third stage of the ERIKS Hose Management System.

> “Recommended service life is five years”

For hydraulic hoses in a high-pressure system, the recommended service life is five years. But to be sure each hose is replaced when due, it’s necessary to know when it was installed. And to have a properly maintained database where those dates can be logged and flagged-up.

Fit to burst

Preventing hose failure is more efficient than repairing or replacing failed hoses. Given the pressures in hydraulic systems, it’s also a great deal safer.

ERIKS Flow Division’s initial Hose Management System survey for the steel sector customer – undertaken during shutdowns – spotted several hose issues which would have created significant problems on restart. With the HMS now in place, the knock-on effect of similar issues is greatly reduced.

Without an HMS, the hose could only be identified on removal, meaning a long shutdown because manufacturing the new hose can’t even begin until the old hose has been removed. Now all hoses are logged on the system’s database, the information required to manufacture a replacement hose is quickly accessible. The system need only be shut down for a brief 20 minutes for swapping-out the hose.

With regular hose inspection as the fourth stage of the ERIKS HMS, potential failures can be identified and prevented before they cause problems, shutdowns, and possibly even injury.

An average of 70% of the cost of an emergency hose repair is for the call-out alone. So it makes sense and saves money to manage your hose management more efficiently, with the ERIKS Hose Management System.

Scan or click the QR code to find out more about ERIKS Hose Management Services

Now E stands for Enhanced, Easier and Excellent

Clive Jennings
Regional Sales Manager
SKF

You invented a product over a hundred years ago. You have been developing and improving it ever since. Do you think by now it's got as good as it's going to be? SKF takes a different view. With 115 years' experience in split roller bearings, they never stop looking for – and finding – new ways to make them better: from more efficient, to easier to fit, and even to ensuring greater safety for technicians. The enhanced SKF E-Series Split Roller Bearing is just the latest example of this SKF approach to product improvement.

The 'Cooper' in SKF Cooper refers to Thomas Cooper: inventor in 1907 of the original Split Roller Bearing. Still the market leader over a century later, SKF Cooper split roller bearings have now been improved yet again with a redesign which enhances the versatility and performance of the SKF E-Series.

E for Enhanced

The most significant change from earlier versions of the E-Series is a unique and patented brass cage design, with an additional roller in each half of the bearing. This means the upgraded E-Series offers a even greater load-carrying capacity, but still within the same dimensional envelope as the previous version. So an older bearing can be swapped for the new and improved version, with no adaptation required.

> "Unique and patented"

The additional rollers increase the carrying capacity, of course. But that's not all. They also improve the bearing's service life. And that means the life of the asset is optimised in turn.

These benefits hold true even in the challenging operating environments where the SKF E-Series thrives: in dirty, wet or abrasive applications, in extremes of temperature, and above ground, underground – or even underwater.

E for Easier

The upgraded E-Series shares an important characteristic with all SKF Cooper split roller bearings: it's a bearing of two halves.

Split to the shaft, the E-Series bearing can be easily disassembled into smaller components that are easier to remove, lift and handle. Depending on the size of bearing, a solid version may need days for a team of engineers – perhaps with heavy lifting gear – to remove and replace, including dismounting all associated equipment.

> "Easier, simpler and faster"

The SKF split bearing, on the other hand, is easier, simpler and faster to disassemble, assemble and switch out. This is especially important if the bearing is located in a difficult- to-access or cramped area, and if downtime is particularly costly. In trapped locations such as between the head pulley and gearbox or motor, for example, there's no need to disturb any of the surrounding equipment.

As an added benefit, SKF Cooper split roller bearings have pre-set clearances, so there's no time wasted with on-site adjustments, and no specialist fitting tools are needed.

Since some sources estimate 43% of all workplace accidents occur during maintenance, anything which can speed up, simplify, and reduce the need for maintenance has to be an upgrade worth making.

E for Excellent

Life isn't perfect but a bearing has to be. Especially when there's no guarantee it will be mounted onto a perfectly aligned shaft.

That's why the SKF E-Series is designed to make allowances for shaft misalignment, and still remain perfectly sealed. The cartridge design maintains the seal's alignment without binding to the shaft, and if the shaft suffers misalignment there's no gap created which would allow contamination of the bearing.

> "Remain perfectly sealed"

There's also a choice of SKF bearing sealing options, which can be tailored to suit individual requirements. With standard felt seals at one end of the scale, and high-pressure seals suitable for up to 40m of water at the other, you can expect excellent sealing capabilities whatever your application.

E is for Ongoing

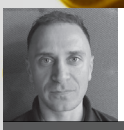
The spelling's not right but the sentiment is. Enhancements to the SKF E-Series have been steadily ongoing for a decade, and will be continuing far into the future.

The company's R&D Department in Kings Lynn is constantly designing and engineering bearings to deliver greater performance and efficiency, longer service life and easier maintenance – as well as creating innovative new designs when new techniques, materials, technologies and applications arise.

Or to put it another way: Enhanced, Easier and Excellent all begin with three letters: SKF.

Click or scan the QR code for more information about the SKF E Series

Topping-up lubrication



Charles Flint
Food Industry & MRO Sector Specialist
moove UK

Lubrication literally oils the wheels of productivity. But with the right expertise behind it, it can do far more – as ERIKS and Moove Lubricants proved for a leading manufacturer of plasterboard and other building products.

The customer had just replaced two motors due to lubrication-related failures – at a combined cost of £13,000. That was all the encouragement they needed to talk to ERIKS about reassessing their lubrication products and practices.

> “Reassessing lubrication products and practices”

So ERIKS called in the experts, and Moove made the next move.

Oil can-do

The right lubricants in the right place at the right time not only help to reduce friction. When Moove assessed the customer's production facility, they identified potential benefits in productivity, safety, energy efficiency, environmental care, and carbon emissions. And it all began with a Site Baseline Survey carried out by Moove's lubricant specialists.

This initial survey is essentially an expert's-eye view of a customer's plant. Moove's experts conduct a walk-around, talk to relevant personnel, gather information on, for example unplanned downtime incidents, and make an initial identification of possible lubricant-related improvements.

> “An expert's eye-view”

It's a taster of the unique Moove Engineering Benefit Proposal, compiled after a full site survey, which looks closely at a huge range of possible improvements, and identifies the most cost-effective, which will deliver the greatest benefits to the customer.

Depending on the size of the customer's site, and the number of assets present, this full site survey can take between a few days, to a few weeks.

Naturally it will consider whether the right lubricants are being used for the right assets. Whether there are upgrades available to enhance performance or increase reliability. It will include thermal imaging, to identify if assets are running too hot. There may also be a recommendation for further in-depth inspections, such as root cause failure analysis, and borescopic inspections.

And Moove's experts will even take a close look at the oil stores, to assess if lubricants are being stored and handled correctly.

Theory into practice

For experienced lubricant specialists, identifying lubrication issues is relatively simple. Proposing cost-effective solutions is more challenging but can be an integral part of the service from Moove.

Depending on the size of the customer's plant and other factors, Moove's support can extend from the Site Baseline Survey which usually brings about a Site Evaluation Report, to their unique Engineering Benefit Proposal and, ultimately, the Implementation Plan, which are the final stages that follow the full site survey.

> "Unique engineering benefit proposal"

The Implementation Plan covers not only the identification of individual asset failure modes – and the selection of the most effective lubricants to help prevent them – but also optimum storage practices and handling techniques, and the most efficient lubrication schedule for maximum reliability, efficiency and productivity.

Building on expertise

For the manufacturer of building products, the Moove Lubricants' survey identified the customer's Table Mill gearbox as the asset with the potential for the greatest improvement in cost savings and carbon reduction. The survey highlighted a range of potential benefits which could be realised by a change of lubricants:

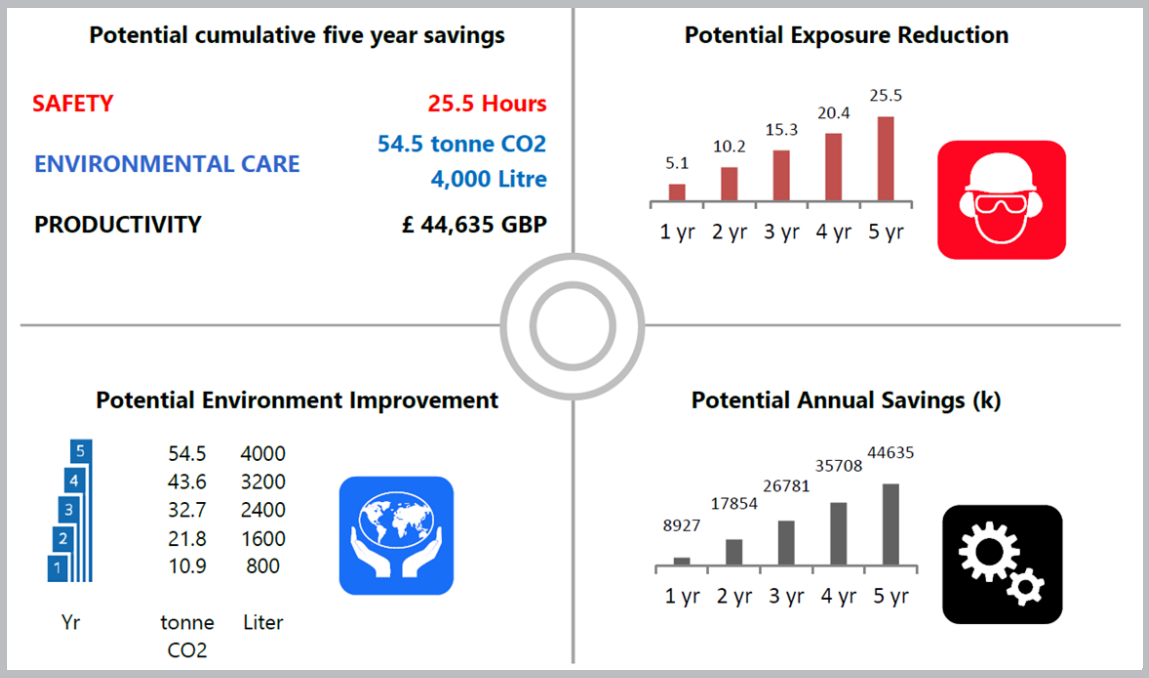
- **Productivity** - Changing to Mobil energy-efficiency lubricants would improve revenue by an estimated £8927 per annum.
- **Energy** - Resulting savings in energy efficiency would amount to £2,185 over the same period
- **Safety** - By reducing the amount of unscheduled downtime and consequent repairs and maintenance, there would be a reduction of 5.1 hours per annum in engineers' exposure to safety risks
- **Environmental** - The reduction in oil consumption as a result of upgrading the lubricants would result in a parallel reduction in waste oil requiring disposal, of 800 litres per annum
- **Carbon footprint** - Lower lubricant consumption would lead to an annual reduction in carbon dioxide emissions of 10.9 tonnes.

As most synthetic oils have a service life of five years, the customer was also shown the potential cumulative 5-year savings of adhering to Moove's recommendations. These would be a direct result of longer oil drain intervals, lower traction coefficients, and improved wear protection leading to enhanced reliability. The headline savings included:

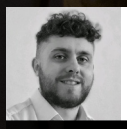
- Productivity - £44,635
- CO2 – 54.5 tonnes
- Waste oil – 4,000 litres

If this kind of survey – and these kind of savings – could benefit your site, a call to your usual ERIKS contact will start the wheels moving. Just like a well-chosen lubricant.

Customer Benefit Summary (excl. Energy Savings)



A time-saving new angle on roller bearings



James Goodgame
ERX PBU - Rotating Equipment Commercial Team
ERIKS

Baking is essential for bricks – to make them solid, strong and hard-wearing. For bearings, it's not so desirable. That's why, with temperatures approaching 100°C and large amounts of fine dust in the atmosphere, split roller bearings in a brickworks' hot air blower were frequently failing. With every bearing replacement causing a day's lost production, the customer's maintenance engineers had hit a brick wall.

Before bricks can be baked, their moisture content has to be reduced – ideally to below 2%. This is achieved using a hot air blower which recirculates air from the brick kiln. However, while the hot air is good for the bricks it's bad for the fan bearings. The seals quickly become hardened as a result of operating temperatures of 80-100°C. And the fine brick dust present in the operating environment soon bypasses the failed seals, and finds its way into the bearings themselves – leading inevitably to bearing failure.

In this particular application, replacing the bearings was a time-consuming task.

> "Replacing the bearings was time-consuming"

Accessing the failed bearing and installing a new one meant dismounting the blower fan and the transmission, before the shaft could be lifted out of the way and the replacement installed.

A split decision

Even with a split roller bearing (SRB), replacing a failed bearing took the customer 10 hours and involved several maintenance engineers. That meant 10 hours of lost production, and several days' worth of labour costs.

No wonder they immediately saw the benefits of a Timken angled SRB.

The 'classic' SRB simplifies maintenance and saves time. But the drive shaft still has to be lifted so the bearing can be installed. A smaller and lighter asset may be suitable for manual lifting, but that's a potential safety risk for the engineers involved. A larger drive may even require lifting equipment – which means more expense, and possible access issues if a crane is needed.

So when it comes to changing a bearing in this kind of 'trapped' application, the Timken angled SRB changes everything.

> "Timken angled SRB changes everything"

Look at it another way

A roller bearing with an angled split, like the Timken SNQ, makes it possible to swap out a bearing without lifting the shaft. The shaft does, though, still need support – so the base of the angled Timken SRB housing has been strengthened (using 250-grade cast iron) to ensure there's no compromise in performance.

The new Timken SNQ split roller bearings are currently available for shafts of up to 6" (150mm) diameter, in both metric and imperial sizes. The bearings in the new range have also been designed to be completely interchangeable with any existing SN and SD units. For all trapped applications where downtime for maintenance is a critical issue, switching to the time-saving angled SRB is easy.

However, for the customer with the brickworks, it wasn't only downtime for replacing the bearings which was the issue. It was also the bearings' repeated and frequent failure in the first place.

The Timken SNQ angled SRBs solved that problem too.

Bulletproof sealing

Fine dust entering the bearings was the main cause of the customer's bearing failures.

The high operating temperatures in the brickworks caused the bearing seals to harden, giving the ever-present fine brisk dust an easy way into the bearings.

But the new SNQ bearings feature high-performance seals made from Kevlar: the same material used for bulletproof vests. These Kevlar KPS seals are highly resistant to high temperatures, so maintain their sealing qualities – and their protection against the ingress of dust – for far longer than conventional seals.

> "High-performance Kevlar seals"

The KPS seals also run at the speed of the bearing. Which means despite their more effective sealing, they don't reduce the speed of the shaft or compromise the asset's performance.

Swings, roundabouts, and bearings

The Timken SNQ angled split SRBs are more expensive than standard SRBs. But the higher ticket price has to be weighed against the lower maintenance costs, increased uptime, and faster, easier bearing replacement.

For this particular application, replacing failed bearings had previously taken 10 hours. With the new angled split bearing solution, this was reduced to just two hours. Which looks like a significant saving from any angle.

Lubrication made PFEasy

Shaun Heys
Marketing Communications Manager
ROCOL

Did you know that 70% of bearing failures are due to lubrication errors? And did you know that, surprisingly, it's not always too little grease that's the problem, but sometimes too much? Using a grease that's unsuited to the operating conditions can be an issue too. Especially in more extreme operating environments. But whatever the initial issue, it's almost always going to lead on to a much bigger and much more expensive problem – like bearing failure, unscheduled downtime, lost production, and bearing replacement. One way to make life easier is to change to PFPE greases – such as Sapphire Endure and new Sapphire Ultra from ROCOL.

PFPEs – known as perfluoropolyethers if you want to impress people – are highly inert. When they're used as the basis for a grease, this helps to make them highly resistant to things which can cause problems for non-PFPE lubricants. It also makes them less likely to cause problems for whatever they come into contact with, unlike more aggressive conventional lubricants.

ROCOL Sapphire Endure has been a great success with many customers in the food industry. They need an NSF-registered lubricant which can not only cope with very high temperatures, but also with wet conditions resulting from frequent washdowns.

> "A new ROCOL grease"

Now, for customers in other, non-food industry sectors, there's a new ROCOL grease available with similar qualities. But without the NSF certification and price premium.

The choice is yours

With two ROCOL PFPE greases to choose from, you can select the optimum lubricating solution for your application, your operating environment and your budget. And you'll be safe in the knowledge that whichever lubricant you choose, you'll be choosing all kinds of advantages over standard greases.

> "The optimum lubricating solution"

Both ROCOL Sapphire Endure and new Sapphire Ultra are PFPE-based chemically inert greases. They're also both far more resistant to washdowns than standard

greases, which means grease has to be topped-up far less often.

When a bearing does eventually need re-lubricating, it needs far less of Sapphire Endure or Sapphire Ultra than it would need of a standard grease. Where around a third of a bearing needs to be filled with conventional grease for effective lubrication, only approximately a fifth needs to be filled when using one of the ROCOL Sapphire greases.

That not only saves on the cost of lubricant, but – because the grease is less likely to be washed out (and there's less to be washed out) – also reduces the likelihood and level of potential environmental contamination.

Baked-in temperature resistance

High temperatures aren't found only in the food industry. For example, bricks get baked. And paint is dried in stoves. So across a wide range of industry sectors, lubricants can be subjected to very high temperatures. Which means Sapphire Ultra doesn't need NSF registration to be invaluable. Instead, it can be the go-to grease wherever operating temperatures rise as high as +280°C (or drop as low as -25°C), and where water, chemicals and steam are present.

> "Subjected to very high temperatures"

For anti-friction and plain bearings, small gears, slides, pins, valves, plungers and screws, ROCOL Sapphire Ultra offers high temperature-, water-, chemical- and oxidation-resistance, and all while using less lubricant.

That's food for thought for more than just the food industry.

Click or scan the QR code for more information on Rocol's PFPE range

When problems melt away

A leading automotive component manufacturer was facing issues with rejection of components.

Their powder-coating conveyor was operating almost continually, in temperatures of 240°C.

The high temperature was causing base oil to separate from the lubricating grease used on trolley bearings, and to drip onto the conveyor track below.

By switching to ROCOL Sapphire Ultra – a non-melting grease with no drop point – the problem of separation and dripping was eliminated. At the same time, the lubricant's exceptionally long service life extended the lubrication intervals, and reduced labour costs as well as downtime.

The customer's Head of Operations described the benefits to their production process of the new lubricant: 'After 4 months, we found our grease to be in good and sticky condition, with the lubricating film already forming inside the balls of the trolley bearings. Since then we've had no dripping issue, thus giving us a cost saving of almost 50% – or around £1,500 a year.'

Four belts braced for the harshest conditions

Henning Von Der Haar
Key Account Manager Power Transmission Group Industry Section
Continental CONTITECH

Life is tough for drive belts, and getting tougher all the time. Wind turbines, recycling plants, ventilation systems, compressors, Hyperloop transportation and intralogistics all demand ever more powerful and more efficient power transmission solutions. Their components have to work extremely hard, often under harsh and demanding conditions – and drive belts are no exception.

That's why heavy-duty timing belts, made from synthetic or natural rubber with a carbon tension member, have become increasingly popular. As an alternative to chain drives, they're ideal when high levels of power and torque are needed, as they transmit power reliably and efficiently even in extreme applications.

> "Alternative to chain drives"

But as four heavy-duty drive belts from Continental prove, that's not the limit of what they can stretch to.

Geared-up for belts

Heavy-duty Continental timing belts have even been used to replace an entire gearbox. As part of a wind turbine's rotor blade construction, Continental belts were specially designed to allow adjustment of the blades without the need for gears or hydraulics.

The low-wear, low-noise, special-purpose belts have a stable structure, durable design and low-maintenance characteristics. And a key advantage in offshore wind turbines permanently exposed to salty sea air is their high level of corrosion resistance compared to conventional designs.

In addition, the belts' steel cords result in neutral running properties, making them extremely resilient. A lifetime of up to 12,000,000 reverse bending cycles is easily achievable.

The secret of heavy-duty success

As original equipment or replacement parts, Continental's Synchrochain Carbon and Synchroforce Carbon heavy-duty belts are amongst the most powerful timing belts available.

> "The most powerful timing belts available"

Their secret is their carbon / polyurethane or rubber blend.

The Synchrochain Carbon is a reliable, efficient alternative to chain drives for the agricultural sector, where combine harvesters and other farm machinery are subject to extreme loads yet need to work reliably throughout the season. This heavy-duty belt ensures clean, smooth, exceptionally reliable power transmission, even at high torque and under heavy dynamic loads.

The Synchrochain Carbon belt is also found in construction machinery, forestry applications and energy systems. And the same belt is even being employed in a Hyperloop mobility technology research project: coping with the drive system's high acceleration forces and operation in a vacuum.

Oil-wear and abrasion-resistant

The Synchroforce Carbon is Continental's first ever oil-resistant rubber timing belt. Also resistant to wear and abrasion, it has a carbon tension member at its core which, combined with hard rubber teeth, greatly reduces the risk of ratcheting.

> "First ever oil-resistant rubber timing belt"

The belt reliably transmits not only high power levels but also rotational movements with great angular precision. Its high tensile strength and dynamic load capacity give it high power density, and enable synchronous drive configurations in very confined spaces. So it's well suited to small, low-weight drive systems – such as skid conveyors on painting lines, and in shredders subject to extreme and uneven loads.

The Synchroforce Carbon also greatly enhances pump operation across a variety of applications, as a heavy-duty timing belt. Using a timing belt allows the pump to operate oil-free, and the belt drive results in a very robust, low-maintenance pump construction.

Both the Synchroforce and Synchrochain belts are also ideal for sorting, distribution and order picking applications in intralogistics, where they are used for roller conveyors transporting heavier goods such as engine blocks.

V. quiet and V. high-performing

Suitable for use in virtually any industrial application – including fans and compressors – the heavy-duty Conti V FO Pioneer V-belt features a modern EPDM material, with a polyester tension member and a cotton cover fabric for stability. Available in lengths up to 5 metres, it offers strong, permanent power transmission and very quiet running, in a compact design of light yet durable construction.

The Conti-V Advance is another Continental V-belt option, purpose-designed for heavy-duty industrial applications such as drive systems. A wrapped narrow-section V-belt with a reinforced polyester tension member, fibre-reinforced CR synthetic rubber compound and double fabric jacket, the Conti-V Advance can be found in compressors, fans, construction machinery and garden appliances. It is also suitable as a clutch belt.

As well as superior overall efficiency, it offers over 40% higher performance potential than standard V-belts. And enables drive systems employing sets of belts to be built with a slimmer design and fewer belts. Its fibre-reinforced compound makes it suitable for reverse flexing, and the greater length stability has the additional effect of reducing maintenance, as re-tensioning is not necessary.

4 belts. 1 manufacturer. And only 1 distributor to contact, of course.

Click or scan the QR code to learn more about Continental Belts

When the going gets tough

Dennis Briggs-Price
UK Aftermarket Field Sales Manager
MOTION & CONTROL
NSK

Bearings keep machines and equipment moving. But what happens when everything else is doing its best to stop them? In mining, quarrying, steelmaking and construction, it can seem as if invasive contaminants, excessive heat and heavy loads are all out to get your bearings and compromise their service life. Luckily NSK is on your side.

In any industry, downtime is the enemy. And in heavy industries operating in aggressive environments, the enemy has plenty of weapons.

In mines and quarries, debris and contamination can easily penetrate poorly specified bearings. And in steel foundries, metal particles or debris can contaminate lubricant and create dents in the rolling surfaces of bearings – leading eventually to cracking and surface flaking.

> “Bearing selection is critical”

So, to have any chance of winning the battle, avoiding unwanted maintenance and repair costs, and preserving bottom-line profitability, bearing selection is critical.

Self-preservation

On the battlefield that's an aggressive operating environment, NSK Self-Lube® bearings stand out for their survival skills. It's not only their state-of-the-art design, but also their construction material, lubricant and seals.

And by selecting NSK Self-Lube® bearings with triple lip seal and shaft end protectors, downtime and repair costs can be reduced even further.

> “Downtime and repair costs can be reduced”

The NSK triple-lip seal is a one-piece moulded nitrile seal with three lips, bonded

to a protective outer steel pressing secured in the outer ring. Self-Lube® bearing inserts also have a locating groove to allow the easy fitting of an optional end cap, to protect the bearing from external contamination.

> “Up to the challenge”

Steel yourself

There's no room for weakness in the steel industry. But NSK's long-life Super-TF spherical roller bearings are more than up to the challenge.

Their specially-developed Super-TF bearing steel has the proven ability to reduce surface-originated flaking from contaminated lubricant. So the bearings increase service life and uptime significantly, even in very high load applications.

In 2017, independent testing certified that Super-TF bearing steel can improve the basic dynamic load rating in roller bearings by 23%. That equates to an effective doubling of fatigue life in comparison with standard steel bearings.

Drums beaten

NSK bearings have successfully solved problems and saved money for many customers in the mining and quarrying sector.

One operator was experiencing frequent reliability problems with the bearing units assembled in a vibrating drum. These bearings suffer exposure to sand that often completely covers the units. Following a comprehensive failed bearing analysis, NSK proposed Self-Lube® bearing units with triple lip seals – which increased the operating life by a factor of 10 against the previous solution.

Another company supplying ready-mixed concrete and other construction materials invited NSK to perform an similar review of failed lower bearings on its augur screw pump. This pump transfers an abrasive mixture of ash, sand, glass, fibres and metal grit into containers.

NSK's engineers discovered the contact seal that runs against the inner ring of the bearing had worn away, allowing contamination into the bearing. Further problems included heavy cage corrosion and absence of lubrication. The ingress of fine dust and particulates had most likely soaked up any grease and created a grinding paste, which then eroded the rubber seal.

NSK recommended Self-Lube® bearing units, with the inclusion of a small disc plate and additional seal. This minor redesign not only helped to stop most of the contamination but – as it features a path for debris to escape – also significantly reduced pressure on the bearing seal.

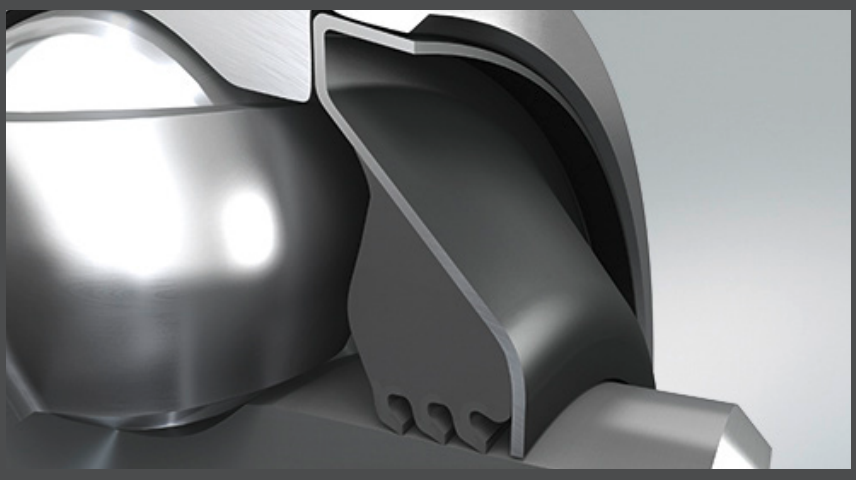
Put through the mill

NSK roller bearings have proved equally effective in the steel industry.

One steel manufacturer was experiencing cold rolling mill bearing failures every 3-4 months. Analysis of the failed bearings and grease samples by NSK's engineers revealed that the rolling mill's highly contaminated operating conditions were the cause of the bearing failures, costly unplanned shutdowns and reduced production.

NSK's experts recommended Super-TF spherical roller bearings to combat debris in the lubricant. After a four-month trial, the steel plant returned the bearings to NSK's laboratory for inspection, where X-ray fatigue analysis revealed a residual life of 29-50 months. This led to annual savings – from less frequent bearing purchase, reduced downtime and lower maintenance requirements – totalling €16,300.

Life is definitely hard for bearings in many operating environments. But when the going gets tough, tough NSK bearings get going.



It never rains but it pumps

Andy Parker-Bates
Product Manager

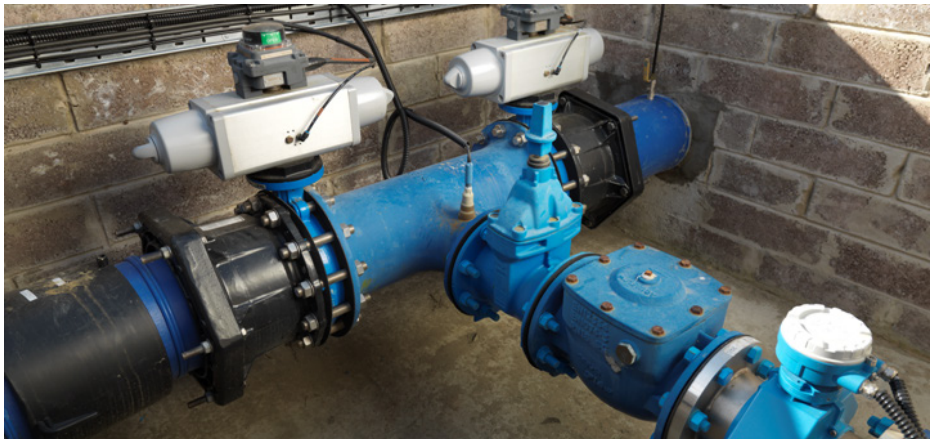
On February 3rd 2021, Guernsey endured one of its wettest and windiest days in recent memory. By the evening, Guernsey Airport had recorded 32.5mm of rain, and more roads were flooded and impassable than Guernsey Police had 'Road Closed' signs available. But through it all, one area of the island kept its head above water, thanks to a remotely operated Festo pneumatic water pumping system.

The Marais Stream pumping station is situated close to St. Peter Port – the island's capital. It's one part of a network of facilities which make up Guernsey Water's infrastructure for the catchment, storage and production of drinking water. And as Andy Benstead, Water Production Manager at Guernsey Water revealed, if the pumping station had not been recently upgraded, 'I can guarantee that there would have been problems.'

More water, less waste

'There were two reasons for the upgrade,' Benstead explained. 'Part age, and part because the area had suffered from a flooding problem. The Marais Stream has a fair catchment area which includes a bank and an insurance company, and without this work they would have been flooded.'

> "'...they would have been flooded'"



Originally built in 1938, the pumping station required an upgrade to allow an increased volume of water to be collected and delivered to the nearby water treatment works, with less going to waste. The whole infrastructure – with the exception of one tank – was changed for equipment that is bigger, more reliable, easier to control, and which can now pump up to 1000 litres per second.

> “Up to 1000 litres per second”

Three in one

The Marais Stream facility is the first multifunctional pumping station on the Island. It incorporates three vital elements: raw water (rainfall) catchment; using stream water to maintain cleanliness of screens at a new Wastewater Treatment Centre; and enabling excess water to be pumped out to sea, to prevent reservoir overloading and localised flooding.

As part of the station's upgrade, Festo supplied three pneumatically operated penstocks, driven by linear actuators. These are located in the incoming channel, to isolate the flow.

Tony Gillard, Business Development Manager at Festo, explains the operation of the system: 'DNC cylinders with rod clamps are used to control the raising and lowering of the penstocks. These distribute the incoming water into the storage basins. From the storage basins, the water is distributed to various parts of the site by butterfly valves operated by pneumatic quarter-turn actuators.'

Automatic improvement

The site is unmanned, and run instead by Festo's CPX automation platform. This is remotely controlled via a SCADA system from the Guernsey Water Offices five miles away.

CPX is a complete automation solution integrating a wide choice of pneumatic and electrical, analogue and digital I/O.

'CPX systems configured for specific requirements are delivered pre-built, tested and ready for installation,' says Gillard, 'enabling system integrators to meet tight deadlines and budgets.'

The platform also offers extra flexibility, as it's capable of being operated as either a self-contained industrial PLC, or as a local unit on a Fieldbus or Industrial Ethernet-based distributed system. With a wide choice of I/O and connector modules, interfacing to process sensors and actuators is easy.

The switch from electric

In the water treatment sector on mainland UK, electric actuators are more common. On the other hand, in petrochemical and industrial applications, pneumatics are the preferred solution. Now their advantages for water treatment and sewage plants are also being realised and, back on the Island, Guernsey Water opted for pneumatically controlled valves.

Pneumatic automation is not only an extremely reliable alternative to electrical automation systems, but also reduces the costs of investment, installation and operation compared with conventional electrical installations.

As Guernsey Water have discovered, pneumatic systems are faster to operate and easier to control. They also save energy, are easier to install and – because of fewer moving parts – improve safety and reliability.

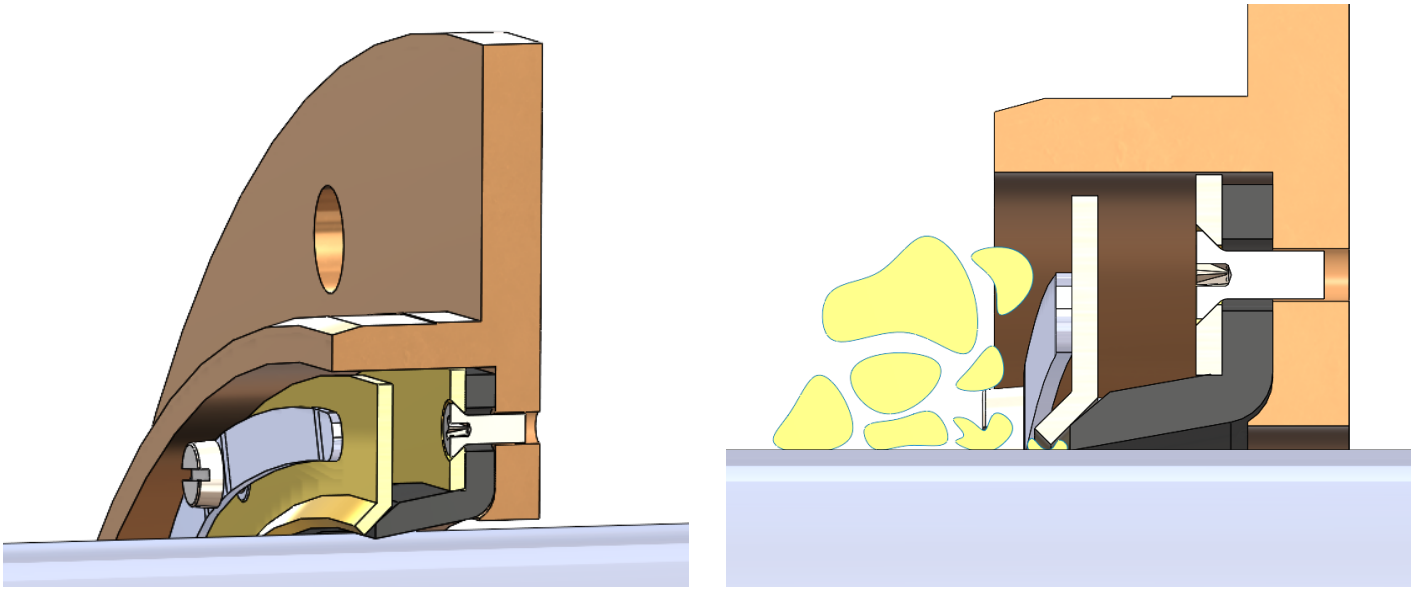
> “Faster to operate and easier to control”

Which, when you're faced with fast-falling rain and fast-rising water, is just what you want to hear.

Seals, designed, delivered: they're yours

Martin Gingles
Industrial Sealing Product Manager
ERIKS

Not as catchy as the lyrics to Stevie Wonder's original song, maybe. But as a service from the ERIKS Technical Campus in Warrington, they're just as much of a hit. Because when a customer has a unique bearing sealing problem, an off-the-shelf seal won't cure it. But a unique seal designed by ERIKS will deliver the ideal solution.



All bearing seals are designed to do something basically similar: keep the good stuff – lubricant – within the bearing where it can do its job. And keep the bad stuff – dust, dirt and fluids – outside the bearing, where it can't do any damage. Obviously, the seal has to be matched to the bearing in terms of size. But it also has to be matched to the operating environment, to ensure it's up to any challenges it presents.

That's where the ERIKS Technical Campus comes in.

The science of seals

If you need help with finding the best seal for your application, you'd expect to have engineers involved. What you might not expect are scientists. At the Warrington campus, you get both.

ERIKS engineers have the know-how to understand the application requirements across a huge range of client's assets. ERIKS materials scientists know how to identify or develop the polymers which will create the most effective sealing material for a specific operating environment.

They use advanced analytical equipment and techniques – including ThermoGraphic Analysis and Differential Scanning Calorimetry. And they combine this with extensive practical industrial experience, to provide recommendations of more effective alternatives and unique solutions.

> "Finding the best seal for your application"

On-site CAD modelling is then used to confirm their findings, followed by engineering, manufacturing, and testing of samples. So, by the time a new seal is installed, not only the scientists and engineers, but also – and most importantly – the customer, will be absolutely sure it's the right seal for the job.

Cereal killer of bearings

One customer who benefited from the know-how available from the ERIKS Technical Campus is a major cereal producer.

An early stage of their production process involves crushing corn kernels using a 4mtr-long roller. Although this is effective at crushing corn, at the same time the corn's hardness, brittleness and abrasiveness make it very effective at giving the roller's bearings a battering.

When small pieces of corn split off, and dust and debris were produced, they were finding their way into the bearing. Meanwhile, frequent washdowns were not only succeeding in removing that dirt and debris, but also in removing grease from the bearing housing. Not surprisingly, seal and bearing damage and failure soon followed.

Repair or replacement of failed seals was made even more difficult due to the nature of their construction. As one-piece seals, they could only be removed once the gearbox, housing and bearings had also been removed. And the size of the bearings made that a job for heavy-lifting equipment, with all the associated problems of access and additional cost.

ERIKS devised a seal solution which cut the problems down to size and cut the time for replacing a seal from one day (with two engineers) to one hour.

A split decision

The most radical aspect of the ERIKS solution was the decision to utilise a split seal. This eliminates the need to remove connected assets providing easier access to remove and replace the seal.

The seal is also designed to absorb the inevitable damage caused by the aggressive operating conditions. So instead of the bearing taking the battering, the seal takes the strain. And that means a far easier and less costly replacement when the time comes.

The seal also effectively prevents washdown wash-out of the bearing grease, which again helps to prolong bearing life.

Now when seal replacement is required, it's quick and easy. Every seal designed and manufactured at the Warrington site is allocated a unique part number and recorded in an ERP database. When the customer requests a replacement and gives the relevant part number, a quick database search will provide all the information required to quote for a replacement.

The Benefits continue...

Upon inspection at ERIKS Warrington Campus it is often identified that the multi-component seal can in fact be refurbished by replacing any compromised components which facilitates a quicker and more cost effect solution for the customer.

> "Easier and less costly replacement"

So, when the customer wants to get back to crushing corn, we don't let the grass grow under our feet.

OPTIME is on your side

reddot winner 2021

Sally Sillis
Technology Centre Manager
SCHAEFFLER

Every maintenance engineer can agree that a clearly defined maintenance regime is essential. Especially in harsh industrial environments such as mining, raw material processing, paper and cement production. But a time-based regime is not always the best solution. Condition-based maintenance – of the kind made possible by Schaeffler's OPTIME and other solutions – can be far more cost-effective.

Scan or click the QR Code to learn more about Schaeffler's OPTIME condition-based maintenance solution.

Taking a component offline for maintenance at set periods inevitably means an equipment shutdown – even when there's no immediate need for maintenance to be carried out. It also fails to eliminate the risk of machine failure, as components may deteriorate between scheduled maintenance intervals.

> Components may deteriorate between scheduled maintenance intervals

However, a lifetime solution such as Schaeffler's OPTIME transforms asset maintenance, by adding intelligence to sensors.

Monitoring and assessing the performance, quality, efficiency and status of machinery is the foundation of condition-based maintenance. As components wear, vibration increases until it reaches a threshold that triggers an automatic alert and prompts further investigation regardless of any rigid maintenance schedule – which might come into play too soon. Or too late.

Modern condition monitoring systems are designed with harsh environments in mind, where sensitive electronics have traditionally struggled. This enables an almost immediate return on investment.

> Designed with harsh environments in mind

ROI ASAP

In paper production, extreme humidity and high operating temperatures, coupled with demand for ever-increasing operating speeds, make longer bearing service life vital. Rolling bearings in this environment must withstand shaft deflections, moisture and extreme temperatures, to ensure dependable operation.

A leading global provider of renewable solutions in packaging, biomaterials and paper was experiencing ongoing issues with rolling bearings. Even so they felt the cost of implementing a condition monitoring solution was prohibitive – until the low capital expenditure associated with Schaeffler's OPTIME changed their mind.

Within the first few months of implementing the condition-based monitoring system, their decision proved right. OPTIME indicated problems in no fewer than 16 machines:

enabling early intervention and significant savings on downtime, lost production and repair costs.

A further development to OPTIME is the development of OPTIME C1. Proper lubrication is the key to prevention, and here for example, 80% of rolling bearing premature failures could be prevented, thus providing maintenance crews with key information on all networked lubricators. This enables targeted maintenance of relubrication systems for optimum lubrication efficiency.

Seeing the bigger picture

The cost of condition monitoring solutions will usually be offset by the prevention of consequential damage. Though the success of an installation depends on how well it is tailored to the customer's requirement.

In the steel and metalwork sector, rolling bearings can be affected by high temperatures, high speeds, and excessive exposure to contamination and water. The sector also relies on a wide range of unique equipment, including hot and cold rolling mills, coating units, straightening machines, casting plants, wire mills and converters. This is where a condition monitoring solution such as Schaeffler's ProLink multi-channel system comes into its own.

For example, ProLink can monitor the condition of a wire mill finishing block through vibration measurement – offering versatile options for easy integration and distribution of measured data. To ensure rolling bearings and gear teeth are precisely monitored, a load proportional signal can be evaluated for every gearbox. ProLink also ensures a high level of transparency, and its modular, scalable design makes it highly flexible.

SmartCheck is another Schaeffler solution, ideal for when continuous decentralised monitoring of machinery and process parameters is required. Compact, innovative and modular, it can be used on assemblies where monitoring was previously considered too costly.

> Monitoring was previously considered too costly

Condition-based maintenance solutions of the kind Schaeffler offers are at the heart of Industry 4.0. By providing all the information required for accurately visualising a machine's operating status, they can enable more effective business decision-making, save money, and improve production efficiency.

Even in the most harsh and extreme operating conditions – from raw material extraction and processing, to paper production and pulping or cement production – Schaeffler's condition monitoring solutions get going when the going gets tough.

90 machine failures v 150 sensors

A manufacturer of raw materials including cement, concrete and lime was experiencing around 90 machine failures every year. This had a significant impact on machine uptime, productivity, and maintenance costs.

Schaeffler installed 150 wireless sensors connected to the OPTIME solution, to monitor the customer's motors, fans, pumps, and gearboxes on a largely automated and permanent basis. The resulting data are now analysed to diagnose equipment issues, enable the factoring-in of personnel requirements, and to ensure timely procurement of replacement parts.

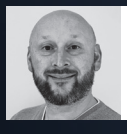
When did you last see your spanner?

‘So where was the spanner at the end of your shift on the 17th of the month?’

‘The last time I saw it was when I put it back in the tool store.’

‘But it wasn’t there the next morning, was it? How do you account for that?’

‘I don’t. I can’t. I demand to talk to my solicitor.’



Tom Morgan
Product Manager
ERIKS

There’s not usually a Line of Duty style interrogation when tools go missing. But perhaps there should be. After all, according to HellermannTyton – suppliers of RFID tracking solutions – a customer in the oil and gas sector using a pen and paper inventory system recently lost £30,000 of assets.

> “Lost £30,000 of assets”

From safety equipment to defibrillators, they were in the store one day and not the next. And even some of those which eventually 'turned up' still cost the customer money because replacements had already been purchased.

But if the customer had been using RFID tags to keep tabs on their assets, there would have been no mystery, no missing items, and no money down the drain.

The tell-tale tag

An RFID tag is small, but packed with information.

Supplied with a preloaded unique number, once scanned into a database it can be uploaded with whatever additional information the user chooses. Depending on the type of asset it's tagging, that could range from a serial number to an asset description. From the name of the installer to a service history.

> "Packed with information"

And, of course, from the name of the last person to return it to the stores, to the last person to take it out again.

Writing wrongs

It's not just the amount of information an RFID tag can hold which makes it so effective. It's also the fact that the information is less likely to be wrong.

Using handwritten labels and manual data entry on a PC opens up the opportunity for errors at every stage of the process. But using an RFID and associated software allows for direct scanning from tag to database, with no delay and no mistakes.

There's not even any need to get up close to the tag or have line of sight. RFID tagging uses a wireless signal which can be picked up from a distance. That not only makes it ideal for hard-to-access assets, but also means an audit of an entire tool store, for example, can be carried out in minutes rather than hours.

The 'anything' tag

Whatever it is, if you need to track it, you can RFID tag it. And once you've tagged it, you'll be able to keep tabs on it.

Some customers tag their PPE, so essential safety equipment won't be missing when it's needed most. Others tag their motors in store, so they can keep a record of when the shafts need to be rotated.

In the food industry, assets can be tagged with special metal-content tags which will show up on metal detectors and X-rays. So contaminated products can be detected before they leave the factory – making product recalls a thing of the past.

In harsh environments, information on RFID tags won't be washed off or corroded away as it can be with ordinary labels and markers.

> "RFID tagging is the complete solution"

From basic tool control or asset management to recording a comprehensive test and inspection routine, RFID tagging is the complete solution just waiting for a problem. And it's solving them already across a wide range of industry sectors.

HellermannTyton RFID tags are already being used, for example, for:

- Inventory and asset location management in the offshore wind industry, where permanent control of assets is critical. It's not easy to 'pop back' to the tool store from somewhere out at sea
- Product labelling of hydraulic hoses in a hazardous environment, where conventional labels become dangerously indecipherable
- Providing labelling in the engineering construction sector where, even after the application of several layers of paint, HellermannTyton RFID tags still prove readable
- Ensuring traceability of components, and logging comprehensive installation information, in the automotive manufacturing industry.

An apple for your assets

Have you spotted a cost-saving, time-saving use for RFID tagging in your own operation? Then download a free demo app of the HellermannTyton software system, for Android or Apple.

GET IT ON Google Play

Download on the App Store

Improve your IP IQ

Victor Harris
Senior Project Manager - Industrial Electronics
ERIKS

If you're ever specifying a motor or inverter for an area where moisture or washdown water is present, you're sure to come across IP and NEMA ratings. So it's useful to know what these ratings mean and why they are important. Here's a brief refresher course for the IP initiated, and an introduction for IP newbies.

First of all: what do IP and NEMA stand for, why are there two rating systems for one product, and what does the rating mean?

IP stands for what the rating is all about: Ingress Protection. NEMA is the initials of the National American Manufacturers' Association – the trade association of electrical manufacturers in the U.S.A. Their rating system does the same job as the IP rating, and some manufacturers will include both in their product spec.

> "'Waterproof' is just marketing speak"

The rating tells you how effective is the product's enclosure in protecting against different types of 'intrusion'. First: hands, fingers and so on. Second: dust, dirt and other foreign bodies. And third: moisture. If a product is described as, for example, 'waterproof' that's just marketing speak. But check its IP / NEMA rating and can you be sure the motor, inverter or other electrical product will be safely up to the job and the operating environment.

All water is wet

Just because a motor, inverter or other electrical product isn't operating in a wet environment doesn't mean it isn't going to get wet. Water is just as wet – and just as challenging – whether it's rainwater, process water, or washdown water.

So the product you're specifying may be operating indoors, in an otherwise dry environment. But if it's subject to washdowns (because it's in a food or beverage production environment, for example) then it's going to need to be IP / NEMA rated. If it isn't, the chances are it will be written-off before you can say 'high-pressure hose.'

> "Safely washdown without worry"

However, choose a product with the correct IP rating – such as a stainless steel super-hygienic motor – and you can safely washdown without worry, and you can save on installation costs too. A lower-rated inverter, IP20 for example, can't be connected directly to a higher-rated motor, because it will need additional protection and an electrical control panel. A higher-rated inverter, IP66 for example, can be mounted directly to the machine, with no additional protection or wiring required.

But what do the rating numbers and letters mean, and which ones will apply to your application? Fortunately the system is simpler than it looks.

> "The quality of resistance to moisture"

Digging the digits

An IP rating is usually given as two digits, with the letters 'IP' in front. The first digit tells you the level of protection against ingress of solid objects (from fingers to dust), and the second the quality of resistance to moisture.

Very occasionally there'll be a letter at the end, which tells you if the product has certified resistance to a specific material or hazard (oil or high voltages, for example).

But generally, all you need to know is that IP00 would mean the product is not rated for protection from foreign bodies / particulates or moisture, while an IP68 product has the highest rating (the scale for foreign bodies runs 0-6; for moisture, 0-8). If there's an 'X' instead of a digit, it means the product hasn't been rated in that category – because it isn't relevant.

There is one other rating (IP69K) which, strictly speaking, is intended for road vehicle applications, but it also finds use in other areas, such as food processing machinery and on some electrical products. That's because it represents a product rated for the highest protection not just against the force of a water jet but also against its pressure.

Now you know the dry facts about IP and NEMA, and how they relate to moisture and water. So next time you're specifying a product, you won't be dropped in at the deep end.

If in doubt, ask for help.

IP e.g.

The full foreign body / particulate and moisture ingress IP scales are here. But below is a brief summary of the lowest, middle and highest moisture protection IP ratings.

1. Protected against vertically falling water drops
3. Protected against spraying water (sprayed at an angle of up to 60° on either side of the vertical)
9. Protected against high-pressure and high-temperature water jets from any direction

Scan or click the QR code to find out more about ERIKS Industrial Electronics

The short cut to optimum short circuit protection

Simon Westwood
Technical Systems Engineer, UK & Nordics
PANDUIT

What happens in an accidental electrical short circuit? A violent, catastrophic explosion; extensive equipment damage; serious risk to plant and personnel. Clearly, cutting corners on short circuit mitigation and protection is not an option. But with the help of Panduit, you can take a short cut to the optimum solution.

Protecting project, people and equipment from short circuit events means investing in short circuit protection which complies with IEC 61914. Do this at the start of the project, and downtime can be reduced, damage to equipment avoided, and the workforce protected from significant injuries or death.

To understand the most effective way to protect against these electrical incidents, you need to know their cause, and just how much damage they can do.

> “Protected from significant injuries”

0.06 seconds from disaster

A short circuit fault can happen when an abnormal connection is made between two nodes of an electric circuit. Short circuit events can create current levels in the region of 200kA. The power cables will be repelled away from each other, unleashing forces which will damage everything in their path.

> “Act faster than 0.06 seconds”

The maximum electro-mechanical stress between the conductors will occur at or before 0.005 second. But typical circuit breakers and other protection devices won't trip and interrupt the fault until between 0.06 and 0.1 second – more than enough time for substantial damage to equipment, and high risk to employees.

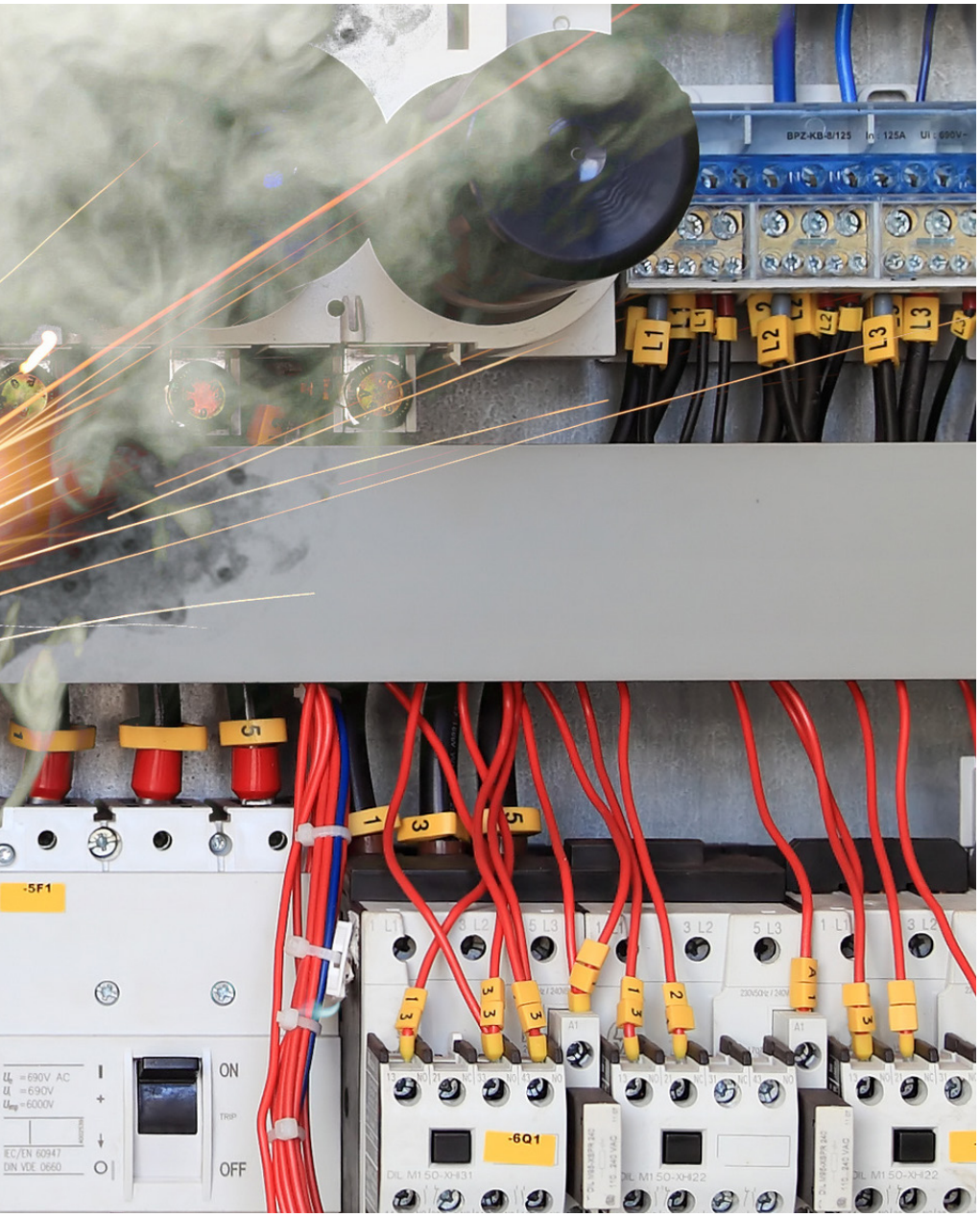
The solution is to act faster than 0.06 seconds.

Setting-up for success

By restraining cables during the first 0.005 second of peak kA – before a circuit breaker trips and interrupts a fault – cable cleats mitigate the effects of the short circuit, and reduce damage and rework.

Cables are generally distributed by cable ladder or cable tray systems – but they are only truly safe and viable when paired with the right cable cleat. So how can you be sure you have the right cleat?

Firstly, the IEC 61914:2015 Standard provides the testing methodology and process to ensure cable cleats' reliability, and ultimate protection in the event of a short circuit. Secondly, Panduit's extensive line of cable cleats provides all the options you need for productivity, reliability and safety – cost-effectively and with minimum installation time.



Cleat or 'cheat'?

Though not widely known as a cable cleat solution, the Panduit Stainless Steel Strap and Cable Tie is proven and tested to comply with IEC 61914. It can also cost less than half the price of traditional cleats, and be installed in half the time.

> "Less than half the price"

Compatible with a variety of cable trays and cables, the Panduit Stainless Steel Buckle Strap Cleat has a low finished profile, and rounded edges to prevent cable damage. It also locks the cut end inside the buckles after tensioning, so no sharp edges are left exposed.

Also made from stainless steel, the Panduit Trefoil Cleat features a nylon insert lock nut to dampen vibration. It has a mounting bracket slot which allows for flexibility of installation, and a removable spacer. There's also a tightening bolt which can be installed from top or bottom.

Alternatively, the corrosion-resistant Panduit Polymer Trefoil Cleat features dual bolt installation, and has rounded edges to protect the cables from damage. Integrated ridges hold the cables in place.

With so many options to choose from, you may need the support of Panduit's dedicated team of Cable Cleat Engineers, who can help with technical and pre-sale support, installation and configuration inquiries, and custom-engineered cleat solutions for demanding applications.

Or contact your usual ERIKS representative to take a short-cut.

Selecting a cable cleat

When selecting Cable Cleats, there are five key factors to consider:

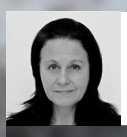
- **Cable layout:** how are the cables arranged and secured?
- **Cable outer diameter:** what diameter is the cable? This measurement is also needed for calculating the potential short circuit forces
- Peak short circuit current rating: in kA
- **Cleat spacing:** in cable tray or ladder
- **Operating environment:** what material and specification features are required e.g. resistance to fire, extreme cold, chemicals, corrosion.

Panduit's Cleat kAlculator™ helps engineers, designers, and installers determine the correct cable cleat for their application in three easy steps. It is available for download from the Apple Store or Google Play, and at Panduit.com/cablecleat

Click or scan the QR code for Panduit's cable cleat solutions

Q. When is a filter not a filter?

A. When it needs changing



Tracey Winspear
Application Engineer - Powered And Supplied Air
3M

There are 3M filters which protect against particles. There are 3M filters which protect against gases and vapours. And for protection against particles and gases there are 3M Combination Filters. But if the filters aren't right for the task, and aren't changed at the right time, then they're a potential health and safety hazard. So how do you know which 3M filter to choose, and when to change a used filter for a new one? We've filtered the available information to give you the guidance.

Essentially there are three main types of filter to use in respiratory PPE:

Particulate filters

3M Particulate Filters consist of a 3D network of fibres which trap particles but allow air through.

> "Trap particles but allow air through"

These filters work better the longer they are used – up to a point. As they become loaded with contaminants it's harder for particles to pass through, but it's also harder for air to do the same – making it more difficult for the wearer to breathe.

When to change

- Filters should be discarded if the shelf life / expiry date has elapsed.
- When the wearer notices more difficulty in breathing. How quickly this happens depends on dust levels in the environment, and the wearer's sensitivity to the change in ease of breathing
- If the filter has any physical damage
- If the filter is unhygienic (e.g. if the wearer has sneezed when wearing it)
- In some working environments (e.g. healthcare) a change of filter may be required after every use, for infection control

Gas and vapour filters

3M Respirator Filters are filled with activated carbon, which absorbs certain gases and organic vapours. Some gases and vapours won't be absorbed by activated carbon alone, so other filter options containing other metals and salts are available. The EN 14387 standard uses a classification system to identify the different types of contaminants these treated carbon grains will capture and 3M filters are colour coded and marked in line with this system.

> "Filled with activated carbon"

- Filters should be discarded if the shelf life / expiry date has elapsed.
- Once opened, the filter must be replaced after 6 months
- If the filter has been in use for 6 months.
- If the wearer notices an unusual smell or taste (Breakthrough)
- If the filter is damaged or unhygienic
- When local or other specific regulations require it

Better safe than sorry

Establishing a filter change schedule – especially for gas and vapour filters – will ensure they are ideally changed before the end of their service life.

> "Establish a filter change routine"

Service life software is available from 3M https://sls.3m.com/, which can calculate a service life for filters based on specific workplace conditions such as contaminant concentration, humidity, temperature, and whether the respirator is used continuously or intermittently.

There may be environments in the workplace where a combination of particulate and gas/vapour protection is required. Here you may wish to consider combination filters which can provide particulate protection alongside a variety of activated carbon gas and vapour filters.

Join the 3M fan club

Wearing a face mask for any length of time can lead to heat and moisture build-up inside the mask. So, the latest 3M innovation is designed to make mask-wearing more comfortable.

The 3M™ Cool Flow™ Fan, 1040 Series, continuously draws exhaled air away from the face , creating a cooling effect on the face whilst reducing heat and moisture build up.

The 3M™ Cool Flow™ Fan, 1040 Series, is optional with the **3M™ Maintenance-Free Reusable Half Mask, 4000+ Series.** This mask, with integrated filters, also has an enhanced exhalation valve assembly, which in laboratory tests, reduced breathing resistance by over 30%*.

Lightweight, well-balanced, and with a soft and flexible face seal, the mask also has easily adjustable straps for a secure and comfortable fit. For protection against different workplace respiratory hazards, there is a choice of 4 versions available.

Filter Type	Colour Code	Type of Contaminant
A	Brown	Organic vapours with boiling point > 65˚C
B	Grey	Inorganic gases and vapours
E	Yellow	Acid gases
K	Green	Ammonia and organic ammonia derivatives
Formaldehyde	Olive Green	Formaldehyde vapour
AX	Brown	Organic vapours with boling point < 65˚C
Hg	Red	Mercury vapour
P	White	Solid and non-volatile liquid aerosols

*Exhalation breathing resistance of 3M™ 4000+ reduced by >30% for 120 lpm peak exhalation flow and >35 % for 160 lpm compared to 3M™ 4000 Series. Results measured by 3M in 2017 under laboratory conditions. Breathing rates shown as an example only.

When pump efficiency is a sticking point

Bob Orme
Senior Technology Expert
LOCTITE

In the paper industry. In power generation. Across the chemicals, mining, oil, gas, and even sugar sectors. Anyone responsible for asset maintenance in a processing operation knows just how production-critical a pump can be. So proactive pump maintenance using innovative solutions can make the difference between efficient productivity and unplanned downtime and lost output.

> “How production-critical a pump can be”

One such solution to eliminate common failure modes and extend the useful life of pumps is a liquid gasketing adhesive like LOCTITE® 518. Conventional pre-cut compression gaskets may shrink, relax, extrude or simply break – any of which will allow leakage between the bearing frame and adapter or stuffing box and pump casing. A liquid gasketing adhesive, on the other hand, fills all the air space between the mating parts, to create the perfect seal. And it has the added benefit of simultaneously eliminating flange face corrosion.

LOCTITE® 518 is a methacrylate-based gasketing product which not only optimises the reliability of the seal, but also speeds up repair due to its low strength and easy removal when dismantling is required.

Many MRO workshops have found repairs taking as little as half the time, thanks to fast cure times which make it quicker to get the repaired pump onto the test bench [see Case Study below]. Application is also easier, as LOCTITE® 518 is a single-component adhesive, which means it can be applied quickly with simply a gun or brush, after the parts have been cleaned with LOCTITE 7063 general purpose parts cleaner.

And to remove the cured product at the next service, all that’s needed is to spray the surface with LOCTITE 7200 cleaner.

Costing less than the traditional cut gasket or other, slow-curing, chemical solutions, the adhesive can be used on all types of pumps – from centrifugal to submersible, and from diaphragm and disc to double-jacket.

In line for less maintenance

A liquid adhesive can help solve another common cause of pump problems: shaft misalignment. Typically leading to premature bearing failure, the issue can be overcome with LOCTITE 290 medium-strength thread-locking adhesive.

The liquid adhesive fills the airspace and unifies the assemblies, which not only helps to resist vibration resulting from misalignment, but also shock, expansion and contraction. The clamp load is maintained and bolts are prevented from loosening, which helps in turn to maintain shaft alignment.

> “Fills the airspace and unifies the assemblies”

An industrial maintenance engineering services facility was dealing with repeated shaft misalignment and failures, on a customer’s centrifugal pump supplying water to a boiler in a commercial building. After cleaning the associated nuts and bolts with LOCTITE SF7603, and aligning the shaft of the motor and pump with a laser, the maintenance specialist applied LOCTITE 290 to the threads before tightening to the correct torque.

The result has been to eliminate misalignment issues between scheduled maintenance services, which take place only once every three years.

More solutions for less maintenance

Pump maintenance is crucial, but also time-consuming, inconvenient and costly. However, innovative and proven adhesive and sealant products such as the LOCTITE range can increase MTBF and shorten maintenance procedures.

> “Increase MTBF and shorten maintenance procedures”

With solutions to prevent bearings from fretting or spinning on their shafts or within housings, others to help prevent corrosion or chemical attack, and – of course – liquid gasketing adhesives, pump maintenance can be optimised, machine uptime maximised, and downtime and lost production minimised.

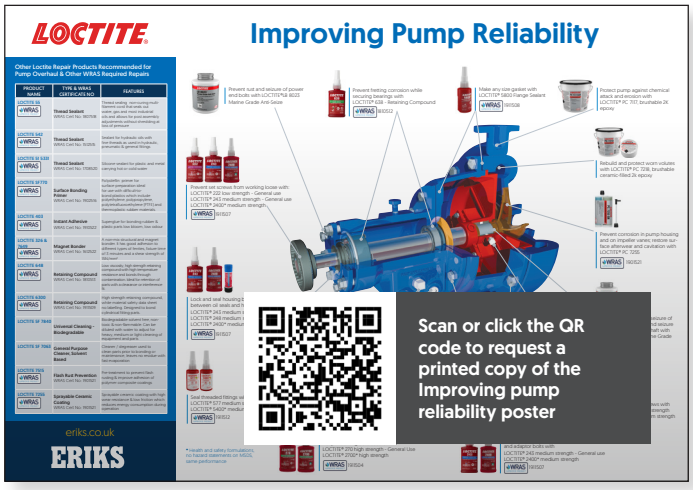
In fact, there are so many LOCTITE products available to improve pump reliability, it needs a poster to show them all. Download your free copy [link], or order from your usual ERIKS contact. And if pump efficiency is a sticking point, stick the poster where you’ll be sure you can’t miss it.

Manufacturing under pressure

A manufacturer of cast iron gearboxes and geared motors was using liquid gasketing on an adapter assembly flange. However, the product in question had two significant disadvantages. Firstly, its slow cure delayed production and testing. And secondly, even after testing, the final seal was poor – resulting in a leakage rate of 5%.

The manufacturer trialled a number of brands, before opting for a LOCTITE gasket sealant which met all their criteria.

Effectively filling all the gaps between the flange surfaces, the LOCTITE sealant cures quickly, allowing close-fitting parts to be instantly pressure-tested to 276kPa [40 psi]. Not only have leaks been eliminated, but disassembly is also now far easier.



What the Energy Security Strategy missed

In April, the UK Government published its long-awaited Energy Security Strategy. It was launched with much fanfare but has subsequently been criticised in many quarters for its vague aspirations and lack of tangible targets, and for failing to address the current energy challenges faced by consumers and industry. Critics also point to the missed opportunities for the development of onshore wind and tidal power, the limited support for improving energy efficiency and the risks from the proposed growth in oil and gas exploration and fracking.

Nonetheless, there is clearly an intention to develop a much stronger UK energy infrastructure, based on a combination of technologies to provide a far greater degree of energy security than we currently enjoy. Developing a secure and dependable infrastructure is, however, only part of the story. To have a realistic chance of achieving the Government's net-zero target of 2050 we need to develop a parallel strategy that significantly reduces both the short- and long-term demand for energy.

According to the Office for National Statistics (ONS), housing accounts for around 37% of all carbon emissions. The strategy document claims that 'by 2025 around 700,000 homes will be upgraded' with energy reducing measures. Unfortunately, this is a drop in the ocean, as a study by the IET and Nottingham Trent University found that there are 26 million homes that will require upgrading by 2050; that means at least one million houses need to be insulated every year, starting now.

Insulating homes and public sector buildings to prevent heat loss is crucial. But we need to go further and look beyond the housing stock. The same ONS report shows that manufacturing accounts for 21% of all carbon emissions, transport and storage for 20%, and electricity, gas, steam and air conditioning supply for the remaining 22%. Sadly, there was little mention of specific measures to help these important sectors in the Energy Security Strategy.

> "Secure and dependable infrastructure"

Despite the lack of Government support for the commercial sectors, companies across industry have taken the initiative in recent years. This has generally been driven by a combination of commercial and environmental imperatives. Measures taken have included reducing heat losses from buildings, fitting energy efficient lighting and the replacement of older motors and pumps with energy efficient devices.

The recent dramatic increases in energy prices are now giving fresh impetus to the drive to find ever more creative ways of minimising energy consumption. The challenge for many companies is that they have already taken the easiest steps; they now need advice and practical assistance to move to the next level.

This is where ERIKS experts can help. They can, for example, run specialised programmes, such as thermographic, steam-trap and compressed air systems surveys, or can review process control parameters, to identify areas for energy savings, potentially linked to enhancements in quality or productivity. They'll bring the know-how and experience to your business that will enable you to reduce your energy demands and costs, often without the need for significant investment in new or alternative technologies.

Although the Energy Security Strategy is a good start, it's far from complete. It has been described by a number of industry experts as 'more of a set of aspirations, rather than a strategy'. Either way, it's now incumbent on all of us, consumers and businesses alike, to take positive steps to reduce our energy demand as quickly as possible, until such time as we have a truly integrated, fully functioning and secure nationwide energy infrastructure.

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Issue 46

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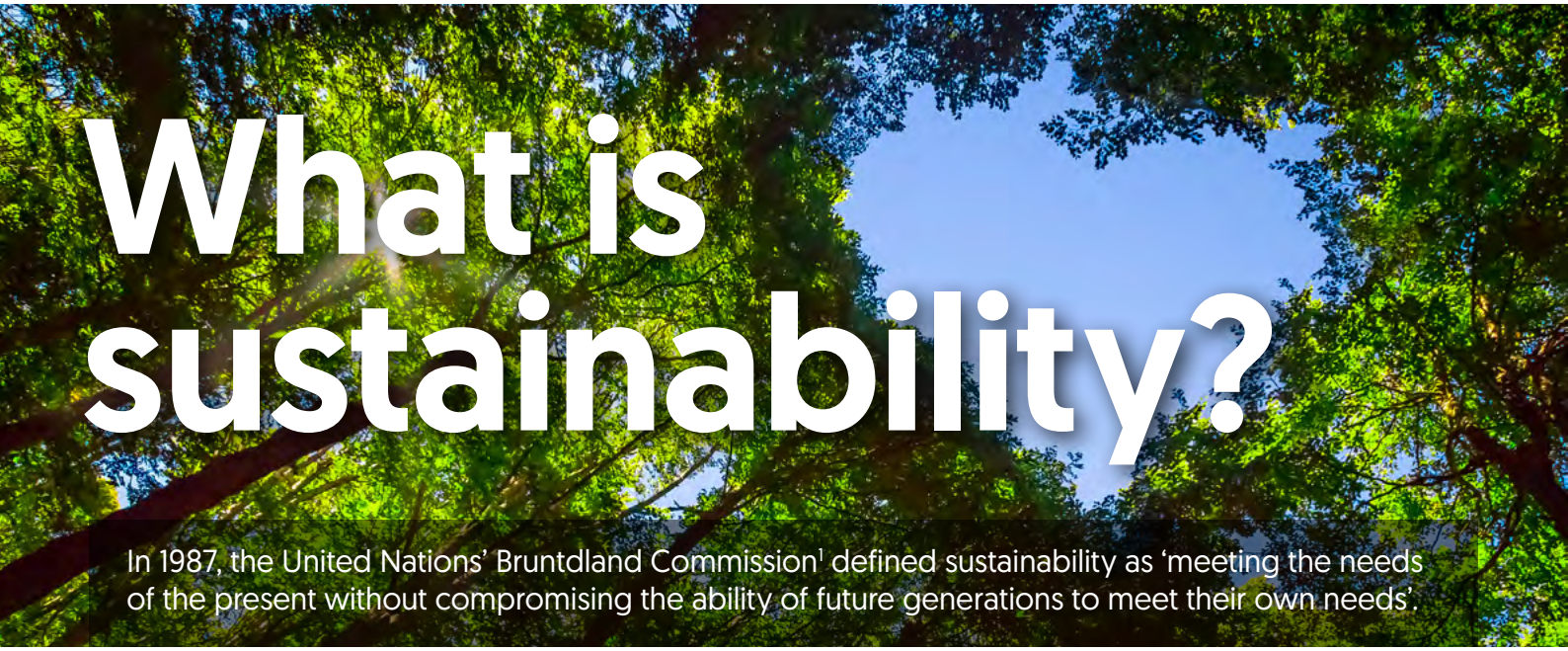


What is sustainability?

In 1987, the United Nations' Bruntdland Commission[1] defined sustainability as 'meeting the needs of the present without compromising the ability of future generations to meet their own needs'.

Although this definition remains valid today, the term sustainability has since become associated with a broad range of interconnected issues, from the extraction and use of natural resources, to economic prosperity, education and access to water and food.

The most critical issue, however, is global warming, as human activities that contribute to climate change alter the planet on which we all depend and thus affect our ability to develop a sustainable way of life.

There can be few people who are unaware of the impact of global warming or of the risks that humankind runs if the rate of warming it not brought under control in the coming decades.

In October 2021, the Boston Consulting group estimated that the global investment to bring the world to net zero by 2050 could be as high as $150 trillion2. To put that in perspective, GDP for the USA in 2021 was $23 trillion; global GDP for the same year was estimated at $94 trillion[3].

These figures are mind-numbing and indicate how tough it's going to be to reach global net zero by 2050. Despite this, we can no longer ignore these issues; we have to hope that governments play their part but for us individuals and businesses doing nothing is no longer an option.

> "Doing nothing is no longer an option"

The good news is that there are many measures we can take that will have a positive impact, both on the rate of global warming and on the quality of our personal lives and business operations.

1: https://www.un.org/en/academic-impact/sustainability

2: Time For Climate Action: https://media-publications.bcg.com/BCG-Executive-Perspectives-Time-for-Climate-Action.pdf

3: Global GDP analysis 2021 from Visual Capitalist: https://www.visualcapitalist.com/visualizing-the-94-trillion-world-economy-in-one-chart/

4: https://www.bcg.com/about/partner-ecosystem/world-economic-forum/ceo-guide-net-zero

Sustainability: cost or investment?

The challenge for many of us is to overcome our natural resistance to change. Our attitudes are often deeply embedded in the way we think and act, based on previous behaviours, or are enshrined in our business practices. There is also the fact that we've been conditioned to consider measures to combat global warming as a cost, not as an investment.

> "Delivering positive outcomes"

In reality, as a growing body of evidence demonstrates, initiatives to reduce the impact of climate change should be viewed as investments that deliver positive outcomes, for the planet, for our organisations and for us and our families.

Analysis by Boston Consulting Group based on official EU data4 shows that companies that transition to net-zero are reaping considerable rewards. They are for example attracting and retaining better talent, creating cost reductions, growing faster than their peers, reducing exposure to regulatory risks, becoming more competitive and benefitting from enhanced access to capital.

An important point is that, in common with all successful business strategies, developing a sustainability strategy has to be based on a holistic long-term plan, with short, medium and long-term tactical plans, milestones and KPIs. Simply taking one small step – installing energy efficient lighting, for example – and doing nothing further may in itself offer some immediate savings but will do little to deliver longer-term value or qualify as a true sustainability strategy.

It's also critical to recognise that sustainability isn't just for big organisations; it's equally important for all companies, large and small. It also needs to be led from the boardroom but be made the responsibility of each employee, while touching every aspect of business operations, from the shop-floor down through the supply chain.

For most companies, large or small, the greatest challenge is often knowing how and where to start.

Getting started on a sustainability strategy

The key to a successful sustainability programme is to understand where you are today, what your sustainability model will look like, and to have a clear set of goals, based on a solid plan and accurate data. It's often best to start small, perhaps reviewing a single operational unit or department, and then to build on each success until all aspects of your business have begun a transition to a sustainable model.

Keep in mind that the objective is not simply to cut costs but to develop a strategy that delivers tangible and long-lasting business improvements, while allowing your organisation to operate sustainably.

Although the definition of 'operating sustainably' will vary widely from company to company, it is essential to have a profound sense of vision and purpose, in terms of sustainability, as this will enable you to focus on the key issues that will make a real difference.

A helping hand from ERIKS

To help you with this process, we offer two sets of dedicated services: our unique Sustainability Design Sprint, and our energy management and sustainability initiatives, through our sister company EM3.

Our EM3 services offer an excellent starting point, as they are targeted at specific industrial processes, such as the operation of boiler, HVAC and compressed air systems.

This enables each project to be clearly defined, with an initial energy audit allowing resources to be focussed on delivering easily measurable energy efficiency savings. (See break-out panel to the right).

> "Step-by-step scalable model"

The advantage of this approach is that it offers a step-by-step, scalable model that allows you to understand the current situation and then evaluate the best options for short as well as long-term solutions.

Similarly, with the Sustainability Design Sprint, our experts work with your team to understand the current situation and identify areas where improvements can be made; they will then set the scope of each project, develop suitable change models, and help you deliver practical solutions that are specific, precisely costed and measurable.

A sustainability strategy will almost certainly encompass a wide range of factors, both strategic and tactical, and is likely to include benchmarking, impact assessments, cultural and behavioural change, training and performance measurement.

Ultimately, it's about taking measures that meet your defined goals. Although these measures can be many and varied, there is almost always a core set of activities that should be considered – 'the low-hanging fruit' that offer the greatest short-term potential.

EM3 boiler efficiency

A process facility, for a leading food and drink company, had two oversized steam boilers powered by heavy fuel oil. These boilers were inefficient by modern standards and produced emissions that were harmful to the environment. The plant also had available a free source of heat from a milk evaporator.

The project initially involved recovering heat from the evaporator condenser to boiler feedwater & CIP. The nest stage was to design a feedwater system where the waste heat from the steam generation could be used to reduce the parasitic steam used in the deaerator. These measures reduced the steam demand onsite.

With the reduced steam demand, it was then possible to upgrade the burners to smaller units that operated on Liquified Natural Gas (LNG). These smaller burners are more efficient, reducing costs and giving cleaner burning, which eliminated the majority of harmful emissions.
The boiler upgrades involved the installation of a boiler feedwater economiser, twin-stage flue gas economisers and upgrade of controls and ancillary components to the latest technologies.

- Energy saving: 8.58 G Wh
- Cost saving: €255,000
- CO_2 reduction: 3,255 tonnes

Energy Efficiency

Energy efficiency is generally the starting point for industrial companies. This is especially true in the current climate of ever rising energy costs, at a time where many businesses are still to see the benefits of switching to renewable sources of energy.

Although making greater use of renewable energy is essential if we're to minimise Carbon emissions, it is equally important to take steps to reduce energy-demand. This can be achieved far more quickly and will produce immediate savings in terms of both operating costs and emissions.

Reducing energy demand

Demand-reduction can be achieved in many ways, from improved building insulation and switching off computers and office equipment overnight, to the optimisation of machine control settings, to reduce operating temperatures, and the adoption of predictive maintenance practices that improve the efficiency of production systems.

The biggest short- and long-term savings, however, can often be found by reviewing the operation of electric motors. Most manufacturing and process facilities will normally have a large number of these devices driving fans, pumps and production equipment.

It's not uncommon to find that a large proportion of motors on any one site are of an uncertain vintage – often ten or twenty years old; although they may appear be running satisfactorily it is likely that they are consuming more energy than necessary and may no longer be compliant with the latest regulations.

Electric Motors

It's estimated that electric motors consume around 65% of all energy used by the industrial sector, with energy consumption accounting for 97% of the total lifetime operating cost of each motor; initial purchase cost and maintenance absorbing the balance of 3%.

> "IE4 motors can significantly reduce energy bills"

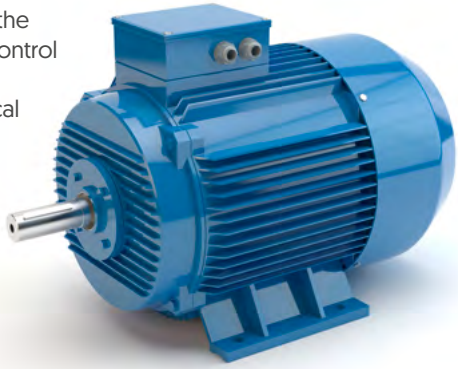
Replacing electric motors with modern, energy-efficient devices can significantly reduce your energy bills. Although it can be difficult to get sign-off on budgets to purchase new motors, there is a strong argument in favour of change.

Consider the fact that even an older low power IE2 compliant 7.5kW motor, which would have cost around £350 a few years ago, will if it's running continuously be consuming over £800 of energy each month. Replacing this device with a modern IE4 compliant motor, even one with a higher capital cost, will start to generate savings and an ROI within a few months; thereafter, the savings return directly to your bottom line.

In a facility with multiple motors, the savings can quickly stack-up – and of course it's not just cost savings but also genuine reductions in the emission of climate-warming gasses.

Motor refurbishment

A factor that is often overlooked is that motor refurbishment or rebuild can also play a valuable role in helping to reduce energy consumption. This is especially true of larger motors, where the replacement cost might be prohibitive. Upgrading the motor with a modern control unit and refurbishing its mechanical and electrical parts can improve its operational efficiency and extend its life still further.



Lighting

Although reducing energy demand can sometimes be as simple as turning lights off and making greater use of natural light, it's not always possible. Factories and busy distribution centres, for example, depend heavily on artificial lighting. Many organisations still use older incandescent, fluorescent and halogen technologies, which are inefficient and prone to frequent failures.

By comparison, modern LED light sources use minimal energy, do not generate heat and are generally guaranteed to have a life of at least 50,000 hours.

> "LED light sources guaranteed life of at least 50,000 hours"

Energy savings can also be realised by adopting effective lighting controls, ranging from simple motion sensors, so that lights automatically switch off if there is nobody in the vicinity, to sophisticated dimming and switching solutions. And of course, properly designed, energy efficient lighting will also help improve working conditions, with lighting colour and intensity that matches the work being carried out by your team.

Lighting Surveys

If you're uncertain where to start, or simply lack the time and resources, then our lighting survey offers a cost-effective solution. Our experts will assess your existing lighting systems, review the health and safety requirement of your staff, look at the available technologies and then provide a carefully costed package of sustainability measures that will help you reduce costs and your Carbon footprint.

Compressed Air

Commonly referred to as the 'forth industrial utility', compressed air is critical to almost all industrial process and operations. As energy costs rise, so too does the cost of generating compressed air.

Money escaping into thin air

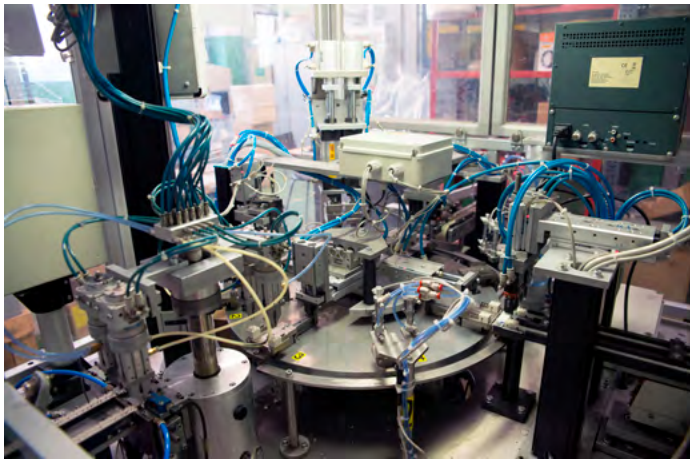
Despite this, the majority of compressed air systems suffer from high levels of leakage; for example, air escaping through leaks in pipes and fittings in a typical factory installation is often around 30% but can be as high as 60%, with a corresponding increase in energy bills. Bear in mind that along with higher operating costs, every kilowatt of energy wasted will generate another 0.5 kg of CO_2.

However, the problem doesn't stop there. It's common for compressors to be left idling, while continuing to consume energy, or being set to run at higher pressures than necessary, again wasting energy. As a general rule, reducing operating pressure by just 1.0 bar will cut energy consumption by 7%.

Helping identify areas for improvement

Clearly, fixing leaks in compressed air systems should be a priority. It's then possible to generate further savings and reductions in Carbon emissions by introducing intelligent control systems that monitor system performance in realtime and can accurately match supply to demand.

In each case, our compressed air experts can help you carry out a full audit, identify areas for improvement and provide the products and support to implement effective and sustainable solutions.



Steam Traps

Although not so widely used as compressed air, steam systems are still a common sight in many industrial facilities, being used for heating, power generation and process duties. Steam traps are widely used to remove condensate and non-condensable gasses. They are, however, often difficult to access and suffer from a number of issues: they can be incorrectly specified or installed, malfunctioning or leaking, or simply not working.

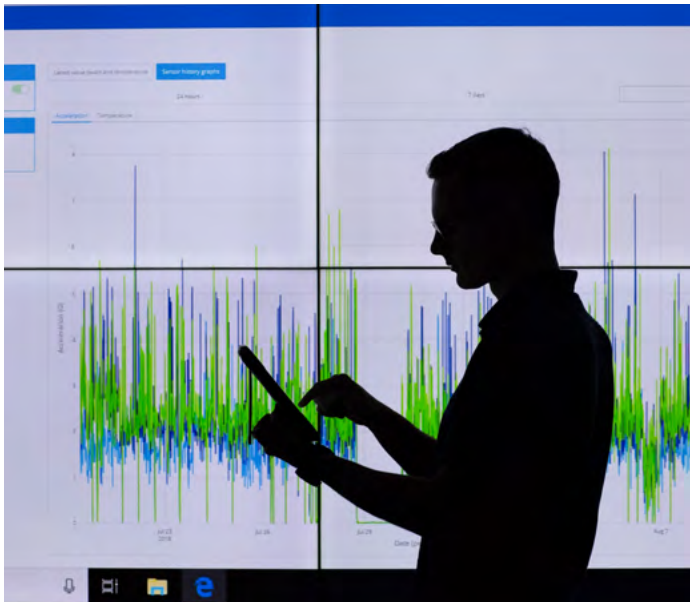
Thousands of pounds being wasted

Whatever the cause, the consequence will be wasted energy and higher than necessary emissions. Our engineers often visit sites where problems with steam traps are leading to thousands of pounds in energy costs being wasted every year, with additional risks to the performance, reliability and safety of other steam system components. Carrying out a steam trap survey will identify potential problems.

> “Enhance operational efficiencies”

We offer a dedicated service, with expert engineers using specialised equipment to investigate problems and offer effective solutions.

Although these might include repair, replacement or the addition of new technologies there will be considerable benefits: a reduction in water use, energy costs and harmful emissions; improved safety; fewer blowdowns; and an improvement in the quality of feedwater which will, in turn, enhance operational efficiencies still further.



Reliability Maintenance

Preventative and reliability maintenance form part of typical sustainability programmes. Ideally, these programmes should also include structured reliability maintenance regimes.

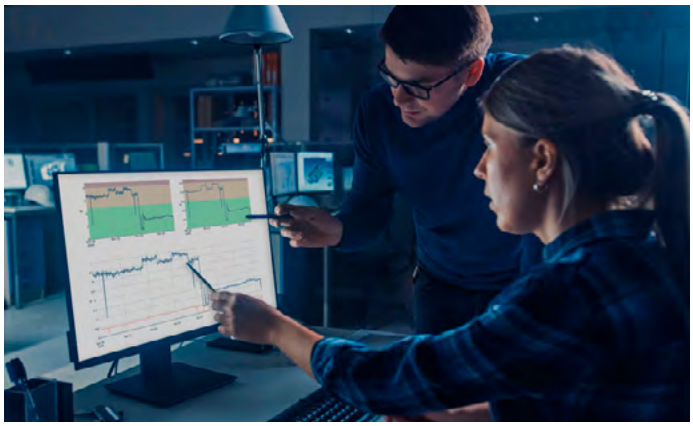
> “Achieve optimal operating status”

These will both help to identify possible issues with existing systems and, once these have been resolved, will ensure that optimal operating status is subsequently achieved.

Intelligent sensors and remote online monitoring

Modern digital technologies, with intelligent sensing and control devices, often with connections to remote monitoring centres, have simplified and automated the task of machine and system operation. With data being captured and analysed in real-time it becomes possible to take a proactive management approach to production processes, with the goal of meeting key sustainability, manufacturing and business objectives.

Our reliability maintenance team offers an integrated package of services, products and solutions to help you with essential monitoring tasks, such as vibration analysis, as well as developing a plant-wide preventative maintenance solution.



From aspiration to long term delivery

In recent years, sustainability has moved from an aspiration, discussed among a few advocates, to a core business discipline that is recognised as being of increasing importance by industrial companies of all sizes and type.

Developing a successful sustainability strategy takes time, energy and resources. It has to be realistic, measurable and adaptable as the needs of your business change. Crucially, it must be action-oriented; it is far better to take action, review the impact, learn from your successes and failures and then continuously improve as you move towards your ultimate goal.

Recognise that, for most companies, understanding, developing and implementing sustainability measures is an imperfect process. Also understand that you're not alone. Growing numbers of organisations around the world are addressing the same challenges; at ERIKS, for example, we're embarking on an ambitious sustainability programme that will transform our business over the next few years.

Success therefore depends on collaboration, knowledge sharing and working with experts to help you deliver real improvements that benefit you, your business, its stakeholders and the planet.

Wherever you are on your sustainability journey, we can offer know-how, advice and practical assistance. For more information talk to one of our experts today.

For more information and support with your sustainability goals contact your local ERIKS Service Centre.

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