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WHEN ‘NOBODY KNOWS’ IS AN UNACCEPTABLE ANSWER

The television element of my formative years was largely spent watching the output of producer Glen Larson. His works included the likes of The Six Million Dollar Man, Knight Rider, Battlestar Galactica, Magnum PI, Automan and Buck Rogers in the 25th Century, to name but a few.

And then there were the re-runs of TV series from the 1960s, all of which seemed to fall under the staid of either Irwin Allen or Quin Martin. Think of the likes of Voyage to the Bottom of the Sea, The Invaders, Time Tunnel and Land of the Giants, and you’ll have built up a pretty good idea of what, for me, became a golden decade of small screen entertainment.

You’ll have noted, no doubt, a common theme in the genre of these various series, but that’s not to say it was the limit of the output of these legendary producers. Looking through the TV credits for Allen and Martin in particular, it must have been almost impossible through the 1960s to turn on the box and find something they weren’t responsible for. And it’s not as though it was simply a reliance on a tried and tested formula; there was innovation in abundance. And the ideas that they piloted strongly influenced numerous subsequent TV series from other makers.

So what gave these producers the Midas touch? Did they each simply capture the zeitgeist of a particular decade? Was it pure luck? Sometimes it’s enough to let the mystery be exactly that, and just say ‘nobody knows’.

Then of course, there are occasions when ‘nobody knows’ is a completely unacceptable answer, and the state of the economy as we emerge from the pandemic crisis is surely one of those times. In the last few days alone I have read, from different sources, that the UK economy has rebounded strongly, has rebounded more slowly than expected, is on track for a quick recovery, and won't recover to pre-Covid levels for 4-5 years. Ask ten different ‘experts’ and you’ll get ten different answers. And it’s not just that they’re drawing different conclusions from the same data; quite often they’re using their own preferred official and unofficial sources and combinations of data, citing them as being more relevant and more meaningful than any other.

Do the predictions matter? We all know our own businesses; we can see opportunities to innovate and areas where we might steal a march on our competitors. But at the same time, markets turn on confidence, and you don't inspire confidence without consistency. And perhaps that single word brings us back to the question of what made Larsen, Allen and Martin great: consistency. They were always bold, always innovative, always pushing boundaries. It's a lesson we could all learn from.

Mark Simms
Editor

UK IS A EUROPEAN HUB FOR INNOVATION IN 3D PRINTING

A new study from the European Patent Office (EPO) reveals the UK as a leading European country in additive manufacturing (AM) innovation, also known as 3D printing. The UK accounts for 5% of AM patent applications at the European Patent Office (EPO), putting it in second place behind Germany with 19%.

European patent applications for AM increased at an average annual rate of 36% from 2015 to 2018. This is more than ten times greater than the average yearly growth of all applications at the Office combined in the same period (3.5%). The report, entitled ‘Patents and additive manufacturing – Trends in 3D printing technologies’, further demonstrates that Europe is a global leader in AM, with European inventors and businesses accounting for almost half of AM patent applications filed with the EPO in the period from 2010 to 2018.

Digital transformation

“The surge in additive manufacturing is part of the broader, rapid rise of digital technologies overall, confirming that the digital transformation of the economy is fully reflected in patent applications reaching the EPO,” said EPO president António Campinos. “Europe has become a global hub for innovation in fast-growing digital fields, including additive manufacturing technologies. This strength is clearly reflected in the list of top AM applicants, with European inventors and businesses submitting almost half of the patent applications in the past decade.”

The report shows that European countries account for 47% (or 7,863) of all AM inventions for which patent applications were filed at the EPO in the period from 2010 to 2018. The UK shows a high degree of specialisation in AM patenting with an RTA (revealed technological advantage) index of 1.2, which is one of the highest of all European countries, particularly in the digital aspects of AM and in AM application domains.
STARTING POINTS FOR INDUSTRY 4.0

Knowing where to start in the digital transformation of a business is a conundrum that frequently faces production teams with the ambition of automating their workflows to Industry 4.0-ready standards.

MACHINERY SAFETY

Machine safety standards are changing. Both ISO 13849-1 and IEC 62061 are being revised, affecting how cyber security is managed in relation to machinery safety, and with changes on requirements for safety software and risk assessments.

BACK TO BUSINESS

06 As a new survey reveals redundancy plans escalating and prospects for normal trading receding, Make UK is calling on Government to extend the furlough scheme to prevent a jobs bloodbath.

07 Brexit will have significant adverse effects on a UK manufacturing sector highly integrated with the EU single market, and that disruption will have a sizeable negative impact on the wider UK economy.

08 Whether driven by layoffs or to maintain social distancing guidelines, many businesses will likely be re-evaluating ways to eliminate labour-intensive manual operations if they can be automated instead.

09 The phrase “just in time supply chain” probably meant nothing to the average consumer before the coronavirus pandemic. However, Covid has highlighted how important the domestic supply chain is.

10 The manufacturing industry was hit hard by Covid-19, from supply chains to the factory floor. Something has to change now, so that manufacturers can prevent a similar situation from happening again.

11 Whether driven by layoffs or to maintain social distancing guidelines, many businesses will likely be re-evaluating ways to eliminate labour-intensive manual operations if they can be automated instead.

SMART FACTORIES

Machine and Equipment Builders seek new ways to offer more value to customers whilst creating new revenue streams for themselves. Enter, edge computing, as Stratus Technologies’ Greg Hookings explains.

The Factory of the Future will herald important changes in the way we work. Manufacturers are likely to need more people with technological expertise, and fewer with basic shop-floor knowledge.

ON THE FRONT COVER

IKO Linear Motion Rolling Guides are ideal for applications requiring precision positioning, offering excellent quality and being eco-friendly.
Barney Eley, senior application engineer at The Barden Corporation, and Stefan Vogel, sales and applications manager at HQW Precision discuss how bearings take the pressure and handle the heat in the harshest applications.

ENVIRONMENTAL PROTECTION

Glassfibre-reinforced polyester shelters are providing advanced protection for offshore process analysers. Their lightness and corrosion resistance simplified application in the harsh North Sea environment.

CHALLENGES IN FOOD

As digital technologies continue to transform global markets, no industry remains untouched, and food and beverage manufacturing is no exception.

Helping to characterise analytical sensors, a motion sub-system including geared motors controls a new evaluation platform, providing three positioning axes.

What will the digital twin look like in the automation of the future and what role will drive technologies play in this? Dominik Follmann of KEB provides his views.

The choice of enclosure should never be an afterthought, left to the end of the project or under-budgeted, especially in outdoor installations. A suitable enclosure is an important consideration.

The choice of enclosure should never be an afterthought, left to the end of the project or under-budgeted, especially in outdoor installations. A suitable enclosure is an important consideration.

Extension springs – otherwise known as tension springs – are indispensable to many operations. We asked the experts at Lee Spring to tell us all about them.

Our yearning for ever smaller technology is driving big innovation in aerospace, medical and manufacturing technology. However, can space limitations prevent the small from delivering mighty power? Dave Walsha, commercial development office at EMS, shares his insights in powerful miniature motors.

INVESTING IN SKILLS AND TECHNOLOGIES PROVES KEY
Furlough extension is vital to prevent a jobs bloodbath

Britain’s manufacturers are calling on the Government to extend the Job Retention Scheme for strategic industry sectors by six months in order to avoid the loss of highly skilled job losses in manufacturing on a scale not seen since the 1980s. These sectors are of critical importance to the long term health of the economy and their protection is an investment in our industrial future.

The call by Make UK comes on the back of its latest Manufacturing Monitor survey which shows that the number of companies planning to make redundancies in the next six month has risen to 53%. This has continued the sharp rise seen in the last three surveys over an eight week period, rising from 25% to 42% previously and comes despite a gradual improvement in sales and orders. Almost a third of companies (32.3%) are planning to make between 11% and 25% of employees redundant with just under 8% of companies planning to make between a quarter and half their workforce redundant.

In addition, the proportion of companies expecting a return to normal trading to take twelve months or longer has risen from just under a third in the last survey to 42%, while just 15% of companies are now operating at full capacity. Almost a fifth of companies (18.8%) are operating between a quarter and half capacity and just under a third (31.8%) between a half and three quarters.

In response, Make UK wants the Government to extend the furlough scheme by six months, specifically for the automotive and aerospace sectors. In addition to being major employers directly, these high value sectors have long supply chains employing significant numbers of people, with many companies based in regions highly dependent on their success.

According to Make UK forecasts, the motor vehicles sector is forecast to lose 34% of its gross value added this year while ‘other transport’, which is mainly aerospace, is forecast to be 15% lower.

Make UK also stressed that the call for specific measures for these sectors would only be equivalent to measures taken by major European competitors in Germany, France and Italy. For example, to date, the French Government has provided support, including loans, worth €15bn and €8bn to the aerospace and automotive sectors respectively while speculation suggests Italy will shortly announce a car scrappage scheme worth €1bn and a further €10bn to support ongoing furlough schemes across the economy. Germany has a €3,000 subsidy scheme to buy a new electric car whilst a €50bn package has been announced for research and innovation in new technologies such as fuel cells and hydrogen.

In tandem, Make UK also reiterated its call for a National Skills Taskforce to be set up involving the trade unions and other key stakeholders to ensure key skills are retained and redeployed within manufacturing.

Stephen Phipson, chief executive of Make UK, said: “There is no disguising the fact these redundancy plans make for very painful reading. As well as the distressing personal impact on livelihoods across the UK, industry cannot afford to lose these high value skills which will be essential to rebuilding our economy and investing in the industries of the future.

“At present, the prospect of a V shaped recovery for Industry seems remote. Therefore, if we are to mitigate the worst impact of potential job losses Government must extend the furlough scheme for key strategic sectors to provide them with vital breathing space.” He continued: “In addition, Government should consider measures similar to those introduced by competitors to boost demand in the aerospace and automotive industries in particular. These sectors are vital to the future of industry and are at the forefront of developing new technologies which will be essential to the success of our economy.”

SURVEY SHOWS REDUNDANCY PLANS ESCALATING AND PROSPECTS FOR NORMAL TRADING RECEDING

BACK TO BUSINESS
INVESTING IN SKILLS AND TECHNOLOGIES PROVES KEY

As UK businesses look at how they can survive the current crisis, there are lessons to be learned from some of Britain’s oldest companies. Recently celebrating its 100th anniversary, Kingston Engineering, for example, established itself in the devastating aftermath of the First World War, innovated through the Great Depression of the 1930s, evolved through World War Two, and has survived numerous recessions.

The 100 year milestone is testament to the company’s sheer determination to invest and evolve through both the good times and the bad – investments in a skilled team of workers, in facilities and in technologies. Continually evolving not just to meet the needs of the market today but to anticipate the needs of tomorrow, Kingston Engineering has become a leading manufacturer of bespoke power screws and engineering services, all built on its vast engineering heritage.

Excelling in engineering excellence, Kingston Engineering showcases 100 years of skilled, expert and customer focus based history. Through these advancements and changes in technology, the company has maintained its presence in the market and gained global recognition and presence. Adaptable for mechanical power transmission, Kingston’s products conform to the standards of British, European and American requirements, all of Kingston’s products meet ISO 9001-2015 accreditation and are examined thoroughly during the manufacturing process.

The current directors have more than 100 years of experience between them and are continuously engaging in plans to help the company develop. Production director Paul Bielby says: “Kingston Engineering’s screws can be used in a range of applications and across multiple industries. This includes in aerospace, oil and gas, nuclear energy, the chemical and medical fields, and much more. We work closely with both suppliers and end users in order to provide the very best, customised and purpose built screws possible. We also have an ever growing base, with customers all across the UK and even further afield in the US.”

MORE INFORMATION: www.kingston-engineering.co.uk

Brexit will have huge impact on the manufacturing sector

DISRUPTION IN MANUFACTURING SECTOR DUE TO BREXIT WILL HAVE SIZABLE NEGATIVE IMPACT ON UK ECONOMY, NEW REPORT FINDS

Brexit will have significant adverse effects on a UK manufacturing sector highly integrated with the EU single market, and that disruption will have a sizeable negative impact on the wider UK economy, a new report by UK in a Changing Europe finds. The report ‘Manufacturing and Brexit’, which reviews evidence on the effects Brexit on the UK manufacturing sector, finds the effects will be disruptive and negative. The extent of disruption depends on the outcome of the UK-EU negotiations.

A worst-case scenario would be no trade deal between the EU and the UK. This would introduce delays at the UK-EU border and add costs and disrupt tightly interwoven supply chains. Manufacturing will be negatively impacted, and some sectors, such as volume automotive production will particular badly affected, just as they are trying to recover from the slump caused by Covid-19. Few manufacturers have found any benefits from Brexit which, even if a deal is agreed, will cause significant disruption.

Manufactures are especially worried about the UK falling out of common EU regulations. They want UK and EU technical, safety, and other regulations to remain aligned. If they do not, then manufacturers will have to make products to different specifications for the UK and EU markets. They also want an agreement that means they do not have to carry out safety and other tests twice.

There are a big range of potential additional financial costs for companies due to tariffs, customs declarations, certification costs, audits, loss of R&D collaboration, border delays, EU customers switching to other suppliers, visa costs for EU workers, and more. These would all add to the costs of doing business, with no discernible benefit, with some sectors particularly exposed. Nearly half of all goods imports and exports come from or go to the EU.

Many UK manufactures have grown to depend on frictionless trade with the EU to maintain efficient supply chains. EU manufacturing workers often plug key skills gaps, such as in engineering, in the UK.

The importance of manufacturing for the UK economy far outstrips its relatively small size (10% of the UK economy). Manufacturing accounts for a disproportionate share of total exports (45%) and 65% of private sector R&D spending. Some services only exist because they are closely tied to manufacturing. Shocks to UK manufacturing will have a major impact on the broader UK economy.

Professor David Bailey, senior fellow of UK in a Changing Europe, said: “Manufacturing matters. It matters in terms of high-quality jobs, exports, research and development and much more. Much of the sector has already taken a hit through the Covid-19 pandemic and Brexit risks further disruption for manufacturers which they are keen to minimise.”

“A no trade-deal scenario is seen as the worst-case scenario for sectors like automotive given the impact of tariffs. But even a minimal Free Trade Agreement could bring disruption for manufacturers, for example via its impact on supply chains and in terms of regulatory divergence.”

www.kingston-engineering.co.uk
Layoffs and social distancing measures may drive automation

WITH MANY PROCESSES THAT RELY ON MANUAL OPERATIONS NO LONGER POSSIBLE IN COVID-SAFE ENVIRONMENT, MANUFACTURERS WILL NEED TO AUTOMATE

Whether driven by the reduction of in-shop personnel due to layoffs or to maintain social distancing guidelines into the future, many machine shops will likely be re-evaluating ways to eliminate labour-intensive manual operations if they can be automated instead. At the top of this list are secondary finishing operations that are conducted offline to remove excess material on parts fabrication.

Today, much of this work is still performed by hand using oscillating tools, grinders, files, abrasive hand pads and wire brushes. Fortunately, secondary operations such as honing and polishing can be accomplished using a variety of abrasive tools mounted in CNC machine toolholder and carousel without taking the part offline. The better news is that in addition to reducing in-shop labor requirements, completing surface finishing simultaneously in the same operation as machining also speeds production of high-volume parts.

“When the economy begins to recover in the coming months, machine shops are going to be driven to continue to find new ways to increase efficiency and one way is through automating offline processes,” says Tim Urano, quality manager at Wolfram Manufacturing, a company that machines metal parts with complex geometries on 4 and 5-axis machines. “So, any time we can incorporate secondary operations right into the machining process, we save time, money, and also reduce our in-house labour requirements.”

According to Urano, Wolfram Manufacturing produces a variety of custom parts with through-holes and so has automated the cross-hole deburring process. Removal of burrs and sharp edges in cross-drilled holes and other difficult-to-access areas such as undercuts, grooves, slots, or internal holes is critical. Failing to remove burrs can cause blockages or create turbulence in the flow of fluids, lubricants and gases through critical passages.

To do this, the machine shop incorporates Flex-Hones in a variety of sizes in its tool carousels. The Flex-Hone, from Los Angeles-based Brush Research Manufacturing (BRM), is characterised by the small, abrasive globules that are permanently mounted to flexible filaments, the product is a flexible, low cost tool utilised for sophisticated surface cleaning, deburring and edge-blending. The hones are available in a variety of abrasive types, sizes, and grit selections.

Uranosays the hones have been installed for eight years and are used daily, usually several times an hour, on some of the shop’s highest volume parts. “On a given part, we might deploy two to three different size hones, depending on the number of cross port intersections and different hole sizes,” he explains. “It is very easy to put a Flex-Hone in a toolholder, give it a simple toolpath cycle and let it run.”

“Automating cross-hole deburring eliminates a lot of offline work,” Urano adds. “The parts we make are complex and have a lot of intersecting holes, so relying on a person to repeat that process every single time to the quality level required will always introduce some potential inconsistency there. However, if you just let the CNC machine do its work, it will achieve more consistent results.”

The same tool can also be used to create a high surface finish on the internal bores of valve assembly actuators that the shop manufactures. As part of a multi-step process, Wolfram Manufacturing utilises a coarse grit Flex-Hone to smooth out any irregularities left during drilling and finishes the bore with a fine grit hone.

Eliminating machining operations

In addition to honing, there are a variety of other finishing operations that can be automated using abrasive nylon brushes in disc, wheel, cup, and end brush designs. When an application calls for surface finishing, cleaning, polishing, deburring, edge blending or removal of paint, rust or other contamination, these types of tools are the ideal solution. In some cases, these multi-purpose tools can even eliminate machining operations traditionally performed by chamfer tools and face mills.

For JR Precision & Welding, a machine shop in Houston, Texas, the issue of removing large burrs from machined holes in an extremely hard 4140 steel alloy part used as a muzzle brake for firearms was proving a challenge. To remove these burrs, the company decided to automate the process using a 3in diameter abrasive nylon wheel brush with silicon carbide filaments from Brush Research. Muzzle brakes are devices connected to the barrel of a rifle or pistol to help control recoil and the rising of the barrel that normally occurs after firing. The parts utilize slots, vents, holes and baffles to redirect a portion of propellant gases to counter recoil and unwanted muzzle rise. Where and how these holes are placed has a tremendous effect on recoil and muzzle movement. When machining these holes, however, large burrs were forming at the oval-shaped gas ports. The cylinder was made of 4140 steel, which is a 1% chromium molybdenum steel alloy that is generally hardened and tempered to a tensile strength of 850-1000 Mpa.

According to James Mawazeb, director of operations and lead engineer at JR Precision & Welding, the abrasive nylon fit well into the shop’s 5-axis machine holder and existing toolholders. “In addition to removing the large burrs, the wheel brush also provided a soft edge break to the ports so they were not razor sharp without affecting the surface finish,” he says.

Even miniaturised brushes as small as 0.014in in abrasive nylon, carbon steel, stainless steel and diamond abrasive filaments can be used with adaptors on CNC equipment. These tools are ideal for deburring internal and external threads. Internal threads often have micro burrs at hole entrances and exits, on thread crests and on most slot edges. External threads on bolts, screws and spindles have similar issues, particularly at the start of the thread.

Regardless of the type of finishing operation or abrasive tool used, automating secondary processes is one way machine shops can reduce unnecessary in-shop labor to replace lost personnel and to maintain social distancing into the future.

MORE INFORMATION: WWW.BRUSHRESEARCH.COM
Supply chain: the pressure’s on

KEITH KENTISH, GROUP COMMERCIAL DIRECTOR AT TFC SHARES
GUIDANCE FOR MANUFACTURERS ON SUPPLY CHAIN MANAGEMENT,
WHILE THE INDUSTRY IS UNDER THE MICROSCOPE

The phrase “just in time supply chain” probably meant nothing to the average consumer before the coronavirus pandemic. However, Covid-19 has highlighted how important the domestic supply chain is, particularly for essential medical products, for example to produce ventilators for patients in intensive care or the supply of personal protective equipment (PPE) to frontline workers.

In contrast, much of the automotive manufacturing industry ground to a halt, with a ripple effect across the supply chain. The impact has certainly been felt in the fastener market, where according to recent reports, sales are down 50% on average. As the manufacturing industry begins to return to work, manufacturers may now feel added pressure to catch up with a backlog of orders.

The impact of the pandemic has been felt by many businesses, resulting in a multitude of supply chain problems, such as overstocking, lacking the space to store components or assemblies that cannot be moved further on, or struggling to source the parts needed to keep production running. Even the smallest, cheapest component can cause production downtime if not delivered on time, which in turn can damage a manufacturer’s own reputation if assemblies are not delivered on time.

Consolidation

In 2019, market research expert Vanson Bourne found that UK businesses work with an average of 2,598 suppliers, around 50% of which are international. Even before Covid-19, 84% of businesses were struggling to manage supply chain risk. Shorter, simpler supply chains could help streamline things for the future, partly by reducing the number of possible points of failure.

Consolidating your suppliers, for example by turning to vendor managed inventory, could be a new way to run the business, meet budgets, margin enhancement expectations and production KPI’s and help maintain revenues.

Agility

As businesses return to work, they can move to new ways of working, or turn to new technology to help employees work safely and productively. Social distancing may mean more processes move from paper to online processes via EDI and MRP/ERP integration – electronic ordering, for example, means that orders can be placed and processed without anyone having to physically touch them; accurate and efficient.

Discussing with your potential new service provider whether they offer options such as overnight installations, bin pre stocking or pre labelling could help you to access the components you need while minimising time on site and maintaining effective social distancing. Technology can also be used in other ways to help manage inventory on a manufacturing side. Consider this example. A manufacturer has trouble sourcing PPE for staff to work safely on site. When PPE is in stock, it disappears quickly. Implementing a vending solution can help prevent excessive consumption of consumables and introduce ownership so that manufacturers can safely and effectively manage PPE distribution.

Relationships

Small and medium manufacturers may find it particularly difficult to get hold of the parts they need, as they may not carry as much purchasing leverage or may not meet the minimum order value. Establishing relationships with larger supply chain businesses may help smaller businesses to benefit from the leverage of a partner, one that orders regularly and orders big. TFC for example, passes on cost reductions to its customers by purchasing on behalf of numerous businesses from UK distribution, UK wholesale, European and Far East partners.

The supply chain and logistics industry is clearly in for a shake-up. There is currently no clear and comprehensive solution to carry British manufacturing forward. However, by sharing our knowledge, skills and expertise, we can develop creative, effective solutions together.

MORE INFORMATION: WWW.TFC.EU.COM

Manufacturing industry optimistic for recovery from Covid-19 despite supply chain concerns

A new survey from SteelScout has found that more than 60% of professionals in the manufacturing industry expect the sector to recover from Covid-19 and return to business as usual by mid-2021. However, they highlighted issues in the wider supply chain which might impact the recovery, with almost 30% unable to access the materials they need and 36% adding that it is taking longer just to receive a ‘winning quote’.

One key driver behind the confidence in recovery is that 62% of respondents reported having orders waiting to be fulfilled. The orders on hold within SteelScout’s survey base of 100 people exceeded £17m in value. In order to fully understand the impact of lockdown on manufacturers and their supply chains, SteelScout sought the opinions of more than 100 manufacturing professionals to gain insight into the current state of affairs. The survey demonstrated that it has been a tough few months for the sector, with more than half of respondents reporting that they have been working at a reduced capacity or with some staff furloughed. More than 10% of respondents reported whole companies being mothballed and all staff furloughed.

Almost 80% of those surveyed reported that they have adopted new working practices to deal with rules and guidelines around lockdown in the UK. The most common change was remote working, which was used by 49% of those surveyed. Video conferencing, flexible hours and instant messaging have also helped to navigate the impact of Covid-19. To address supply concerns, almost a third had also increased their use of digital platforms in order to secure the materials they need. 22% of businesses pivoted to produce items from masks and screens to medical device parts. Around half of those companies added that they intend to incorporate the products and services into their offer on a long-term basis.

To solve the identified supply issues, greater visibility and more alternatives in the supplier network were the most called for improvements, whilst having an easier method to collect and compare quotes was also selected by many in an effort to reduce basic admin costs and save time.
How can manufacturers future proof against the pandemic?

BUISENSES WILL NEED TO WORK AROUND SKILLS SHORTAGES, DIVERSIFY SUPPLY CHAINS AND USE LOCAL MANUFACTURING

The manufacturing industry, like all sectors, was hit hard by the Covid-19 pandemic, from supply chains to the factory floor. Tim Parkinson, Airedale Springs’ chairman, believes that something has to change now, so that manufacturers can prevent a similar situation from happening again. He said, “Not since the imposition of the three-day week back in the 1970’s has an event forced business to work differently. Any good business should examine its operation, what it does and why; and is it beneficial to the business, its employees and the environment; not just for today but also for tomorrow. The world has changed and so must we.”

So how can businesses protect themselves from being negatively affected by events like these in the future? Parkinson believes that one solution is investing in smart factories. Automation has been a vital component of the manufacturing industry even before the global pandemic, but it’s now clearer than ever that implementing a smart factory can go a long way to prevent issues such as skills and raw material shortages, which are detrimental to productivity and the bottom line.

This is because Industry 4.0 technologies, such as the Internet of Things and autonomous robots, can offer better solutions to manufacturing businesses in the future. These include creating a safe workspace for staff, using virtual reality or remote communication for training, helping to create a more flexible workforce and aiding in the development of innovative processes and systems.

For those businesses that haven’t invested in automation yet – or those that know they could be doing more – the pandemic has proved to be a catalyst for change. For instance, manufacturers need agile and flexible processes if they hope to survive an event such as the coronavirus outbreak. Parkinson comments: “As spring manufacturers, automation is a key feature at Airedale Springs, from the cutting-edge simulation software we use to the latest CNC machines that allows us to manufacture products to our clients’ exact specifications.”

Working around skills shortages

Businesses that relied mainly on personnel during lockdown saw how hard it was to stay open or to conduct business as normally as possible. Automation offers an added degree of safety that is capable of keeping businesses afloat even during the most challenging of circumstances. “Social distancing is likely to remain in place for a while, which means businesses may have to learn to perform with a reduced workforce,” says Parkinson. “The manufacturing industry is already suffering from a skills gap and from a lack of young people interested in manufacturing, which only serves to worsen the problem. Automation ensures that production carries on even if you’re unable to have a fully staffed premise, and it can help you to keep the quality high no matter what.”

So, while the potential of personnel restrictions can lead to limited production (and even shut the facility in its entirety), an investment in automated processes and machinery, as well as on digital technologies, can provide businesses with a great deal of security and prepare them for future issues.

Diversifying supply chains

It’s clear from the outcome of the pandemic that many (if not most) manufacturing businesses around the world were not ready for the massive disruption of the supply chain. “Focusing your supply chain in just one area, for example, can result in your production slowing down or stopping if factories close,” says Parkinson. “This is why many manufacturers struggled when factories in China were shut down – many were relying heavily on those suppliers and were, therefore, left without key materials or products for a long time. This impacted their business massively, as it led to huge delays.”

Investing in several supply chains, then, and more importantly local supply chains is not just important to prevent supply disruptions, it’s also crucial to be able to answer spikes of productivity, such as seasonal bursts.

While there has been an increasing focus on local manufacturing, especially after rising tariffs, the global pandemic appears to have accelerated this and Brexit may further compound this issue. “More businesses are looking for local manufacturers, which are closer to them and capable of delivering a faster turnaround,” says Parkinson. “These short lead times are vital for businesses and allows them to manufacture on demand.”

While relying on globalised manufacturing is not going to go away, we may start to see more onshore production, meaning businesses can better future-proof themselves against delays and downtime. “They will be more in control of their products and won’t have to keep massive inventory, not to mention how they can get the right products to their clients in a timely manner,” Parkinson says. “Automation and robotics have made it easier to manufacture products locally, so it’s likely we’ll continue to see an increase in this, especially as it creates more resilience in supply chains.”

The manufacturing industry is constantly changing and it’s important that manufacturers can keep up with it in order to be successful. “Being flexible is key for this,” says Parkinson. “As the pandemic showed, flexible businesses that were capable of adapting to the unique circumstances and challenges were also able to stay afloat. They were also capable of creating different products, as seen by how manufacturers began to produce ventilators.”

“This flexibility will continue to be just as important in the future. Stores and services are opening but operating in a limited capacity, which makes it more difficult for employees to put their children in daycare or school; this, in turn, leads to conflicts with work schedules. If your staff can work from home, you don’t have to worry about productivity, since they can still do their jobs.”

“The pandemic has raised the talk about flexible working and a business having a better work life balance. Airedale Springs introduced flexible working in 1998 and it has served us well accepting that not all employees can work from home or wish too.”

For Parkinson, it’s crucial that Airedale Springs continues to value a seamless – and efficient – integration of employees and autonomous equipment. He added: “Airedale Springs has remained open throughout the pandemic. Its wide customer base, supported by flexible operations and hardworking staff using the latest in CNC automation allowed the company to keep its customers going. We have learnt lessons and are planning for changes yet to come and will be as ready as we can be for anything in the future because of these measures. Change forces change and we have to embrace it.”

MORE INFORMATION: www.airedalesprings.uk
Shaping the future

THE FACTORY OF THE FUTURE WILL HERALD IMPORTANT CHANGES IN THE WAY WE WORK. MANUFACTURERS LARGE AND SMALL ARE LIKELY TO NEED MORE PEOPLE WITH TECHNOLOGICAL EXPERTISE, AND FEWER WITH BASIC SHOP-FLOOR KNOWLEDGE. REXROTH PRESIDENT, ROLF NAJORK, CONSIDERS THE IMPLICATIONS

The Factory of the Future is not a new phenomenon. There are parallels with the 1990s. Back then, people were concerned about the advent of automation, such as robotic welding in the automotive industry. But what happened was not that jobs disappeared, rather that competences began to change. Once again, we’re going to see a greater need for a shift towards digital skills in the workforce.

In a report published in December 2017 and quoted in the Wall Street Journal (WSJ), research firm Gartner said that by 2022, one in five employees engaged in “mostly non-routine” work will rely in some way on artificial intelligence (AI). Gartner expects AI to quickly create 2.3 million jobs, while eliminating 1.8 million, and also to account for a net two million new jobs by 2025.

In addition, the WSJ cited Infosys, the technology outsourcing and services organisation, which published its own report at Davos in January this year. This, too, pointed to a net employment gain from AI over time. “AI technologies will ultimately create more opportunity for employees than they will eliminate,” it says.

Time to upskill and invest

We’ve discussed this topic with Lina Huertas, head of technology strategy for digital manufacturing at the Manufacturing Technology Centre (MTC). She sees the coming transformation to the world of work as a challenge – but says, if we do the right things, it could make a genuinely positive impact on society.

She points to the bottom-up thinking that the MTC is seeing in some emerging markets: “They’re looking at these developments in terms not just of technology but of society, of their implications for social prosperity and cohesion.

“These markets recognise, that in order to pursue these developments they need to make preparations, and in particular to ensure not just that they develop new skills, but that they retain vital older ones. They see that upskilling and training need to happen alongside technological investment. It’s a good rule for everyone, really.”

A shared commitment to skills

We have already seen how the ‘Factory of the Future’ is creating new business models. We are now being asked not to sell our products to our customers, but to lease them, or to provide them on an as-a-service basis. To sustain this model, we need also to sustain our levels of expertise – not just in the new technologies that are transforming industry, but in the more traditional ones for which we are best known.

It’s incumbent on us, on all manufacturing industry, on national governments, and indeed on everyone reading this, to ensure that we retain and extend the skills we need to take us into the future.

MORE INFORMATION: www.boschrexroth.com

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In certain situations a standard LVDT (Linear Variable Differential Transformer) displacement transducer may not meet the specific requirements of the application and this is when Sensonics says its successful bespoke design service is ideal. Whether for a new application, replacing an obsolete product or when your existing supplier cannot meet your needs, Sensonics has the technical expertise to deliver a cost-effective solution. The company can guide you through the options within its standard range with customisation for a form fit and function match, or develop a new design from scratch.

MORE INFORMATION: www.sensonics.co.uk

Increased safety for control pendants and assembly areas

To use tools and control pendants flexibly in production, they require appropriately long cables and hoses. However, these are often strewn across the floor unprotected and can create a trip hazard. Cable reels with slip rings offer a solution for power transmission but are often only available as a complete package with a custom cable. A further disadvantage is that the fast transmission of data and media can be difficult with slip rings. Therefore, igus has developed the e-spool flex cable reel, which uses a spiral guide instead. It moves a single cable or hose safely and stows it away quickly whilst retaining an end-to-end connection.

MORE INFORMATION: www.igus.co.uk

Schaeffler gives cobots greater range with plug-and-play linear actuators

Industrial robots have long been established as the technology of choice when it comes to efficient automation solutions for a wide range of handling and processing tasks. Now, thanks to a new innovation, owners and users can significantly extend the working range of their robots and cobots (collaborative robots) by installing Schaeffler driven linear units as horizontal axes. Schaeffler offers its customers these linear actuators as customised turnkey solutions, driven either by a ball screw, toothed belt drive or linear motor.

MORE INFORMATION: www.schaeffler.co.uk

Custom LVDT displacement transducer meets OEM needs

In certain situations a standard LVDT (Linear Variable Differential Transformer) displacement transducer may not meet the specific requirements of the application and this is when Sensonics says its successful bespoke design service is ideal. Whether for a new application, replacing an obsolete product or when your existing supplier cannot meet your needs, Sensonics has the technical expertise to deliver a cost-effective solution. The company can guide you through the options within its standard range with customisation for a form fit and function match, or develop a new design from scratch.

MORE INFORMATION: www.sensonics.co.uk
Business models and company methods vary widely between OEMs and the industries they serve, but there is one thing that is always the same; they operate in competitive environments. Spurred on to continuous improvement, each generation of machines offers value and performance improvements over its predecessor.

In the same way that the introduction of PLCs and PACs marked a step change for automation in the plant a generation ago, Edge Computing, as part of the digital transformation era, is revolutionising industrial enterprises today. OEMs can now employ Edge Computing directly, allowing end users to operate at peak performance by analysing data from where it is collected, providing real-time actionable intelligence to managers that can inform decisions to drive improved overall equipment effectiveness (OEE).

The case for deploying analytics at the edge is growing rapidly year on year. A recent report from Gartner shows that today 10% of industrial IoT analytics are completed at the edge, jump forward to 2022 and this number is expected to be 50% and still rising. As edge computing is better understood, and the platforms become simpler to deploy and maintain, more autonomous, and more secure, it becomes increasingly difficult to ignore its clear advantages. Setting out a clear Edge Computing strategy is now vital to maintaining a competitive edge in the future.

Machines-as-a-service

A subscription-based model is becoming increasingly popular as it offers a host of benefits for end users looking to cut costs while improving capabilities. In the first instance, there is a reduction in capital expenditure. The added flexibility offered by this model also means that a new facility, machine line, or machine upgrade can be designed, installed and operational far more quickly than before. This helps meet the rapid, consumer-driven demand for responsive manufacturing, product variants and mass personalisation.

OEMs have two main approaches to the as-a-service model. One approach includes selling the machine at little or no cost and receiving a small sum for every item or product it produces. By implementing Edge Computing with this model, both OEMs and end users benefit from real-time data. The OEM receives consistent data about their machines giving them new intelligence about real-life usage patterns as well as real time visibility into performance which can allow for effective predictive maintenance. By entering into such a service agreement, the OEM becomes an important partner of its end user for the life-time of the machine and receives a steady revenue stream – a firmer financial footing for their own R&D. The second approach to machines-as-a-service would be for a facility owner to purchase a machine from the OEM, opening it up for use by other external end users looking to manufacture a specific product.

The benefit of Edge Computing within both of these approaches are the same. If you are paid a subscription fee for a machine, keeping it ‘always-on’ keeps a continuous revenue stream for OEMs, facility owners and their customers.

But what about existing plant equipment? Edge Computing is a scalable and modular technology. It can help enable equipment manufacturers’ existing applications, such as monitoring and control software, to be consolidated onto a single platform while enabling other critical applications to run on the very same platform. This makes it easier to develop IIoT enabled machines and equipment and, due to the scalable nature of Edge Computing equipment, manufacturers can add future applications to address customers’ evolving digital transformation needs.

With manufacturing, a sector that often sees legacy hardware sticking around for a long time, Edge Computing can help push that first step into digital transformation. By deploying Edge Computing, the communication protocols from legacy devices are converted into language that modern smart devices can understand. Embracing digital transformation without the need for complex retrofitting and redesign or investing in expensive new equipment will be a popular strategy for many end users, and if supported by OEMs, can offer new business models that benefit them too.

Simple, protected and autonomous

With the benefits of Edge Computing plain to see for both OEM and end user, what should your Edge Computing platform do? First, it has to be ready for potentially harsh environments at machine level. From facing the elements on an offshore platform, to hot, dusty, humid, or wet conditions on a factory floor, the edge platform must sit on more robust hardware than traditional IT technology. It must also have inherent security features such as restricted USB ports to help mitigate security threats and easily configured host-based firewalls for network protection.

With an Edge Computing platform that is physically and digitally capable, the next consideration is the implementation and maintenance in an environment likely to have reduced IT support. An effective Edge Computing platform must complete complex tasks autonomously and run virtual machines with fault tolerance capabilities to eliminate unplanned downtime. To achieve this, the solution deployed needs to be simple. Simple to deploy and simple to manage for on-site operators with limited IT know-how. The best platforms should work out of the box and be as simple to install as a games console, while redundancy can be ensured with mirrored data capture and hot swappable components that not only tell you when they must be replaced but can be changed by operators without IT support.

Edge Computing is an essential part of the digital transformation journey. End users understand the need for digitalisation to keep their production process as efficient as possible. The opportunity that now exists for OEMs is to implement edge computing at the machine level and sell solutions that return the value of real-time analytics to machine builders and manufacturers alike. OEMs can now sell not just the capability of the machine, but also the peace of mind of reduced unplanned downtime and the protection of a traditional IT network at the machine level. Importantly, OEMs can sell this in new ways, with advanced service models that help stabilise income for the whole product lifecycle and offer them a firmer footing for ensuring their own continued competitive edge.

Edge Computing can help by meeting the unique needs of both OEMs and end users, using data at the machine level to simultaneously improve efficiency for the end user and reduce maintenance costs for OEMs using a service model. Contact Stratus Technologies for more information on how you can embrace Edge Computing within your Digital Transformation.

Stratus Technologies enables Digital Transformation by delivering Zero-Touch Edge Computing platforms. Platforms that are simple to deploy and manage, protected from threats of interruption and autonomous in operation, ensuring continuous availability of business-critical applications. For more information on the differentiation and competitive advantages offered to the machine world by the IIoT, access the Stratus Technologies white paper: www.stratus.com/smarter-machines
Helping to characterise analytical sensors

When ExpoPharma designed a new Process Analytical Technology (PAT) powder-stream conditioning chute – a full-scale development platform for characterising analytical sensors for use in continuous pharma or similar manufacturing processes – they turned to Mclennan for a standalone Ethernet-based three-axis micropositioning sub-system, complete with planetary gear units, pre-programmed HMI and a temperature controller.

ExpoPharma’s Spectrum Multi-Probe Chute allows multiple PAT technologies to be simultaneously evaluated as a means to economise API software related use and speed production development by providing optimum interfacing for several sensor types that economically gather high-quality data in sequence during the same process stream. The various sensors used provide precise information from the powder stream including chemical structure, identity, particle size, contamination etc.

The three positioning axes, supplied from Mclennan’s distribution partner JVL, are MIS232 series integrated microstepping motors – the novel motion control solution that combines motor, drive, controller and comms in a single package. Fitted with Mclennan’s own range of IP57-M01, 10:1 ratio planetary gear units to provide high resolution angular positioning, each drive micropositions special ‘wheels or flipper-shaped’ end-effectors that are designed to collect sample material from the powder stream and present it to the sensor being assessed through a probe window.

These sensors are typically particle image analysers, Raman spectroscopy probes and a near infrared (NIR) spectrometers. For these diverse and complex analytical sensor types, the characterisation process necessitates its corresponding and different shaped end-effector to manage the sample collection (and for some a PAT probe cleaning regime) with quite different positioning sequences in terms of angular travel, speed, acceleration and deceleration.

Mclennan worked engineer-to-engineer with ExpoPharma from the early stages of product development. Through its system integration capability and experience the ‘distributed’ integrated stepper motor solution was recommended to provide cost and functional advantages, and to maintain the maximum portability requirements specified for the Multi-Probe Chute.

The compact and easily installed standalone solution reduced ExpoPharma’s product development burden and also required much less installation effort through less cabling which furthermore simplified commissioning. And most importantly, JVL’s integrated motor technology is proven to be inherently better protected against electrical noise, which can be a significant problem with traditional ‘centralised’ panel-mounted motion systems where power, signal and communications cabling is typically longer and noise-prone - an especially important requirement for the sensitive sensor equipment under evaluation on the platform.

Electrical installation for the JVL integrated microstepping motors, which are also available as servomotor variants, was simply achieved through onboard M12 connectors for drive power and the daisy-chained Ethernet connection to the HMI. Whilst an ‘open-loop’ microstepping motor solution was used, to boost positional accuracy and to ensure that axis position is always known on power-up (with no homing procedure required), optional absolute encoders were included and conveniently wired directly to the HMI from another M12 connector on the integrated motor. Mclennan also provided the wiring for the temperature controller – each end effector includes a heater and temperature sensor that is used to reduce the possibility of powder material sticking as well as aid the cleaning of PAT probe windows.

Mclennan’s scope of supply covered the programming and commissioning of the complete sub-system for the Multi-Probe Chute with the three motor axes part of a Modbus TCP protocol network segment which also included an MT400 series HMI from Kinco and an EMKO PIDQuadro temperature controller. The three motion axes, pre-programmed for comms interfacing and configuration, are slave to the HMI which is assigned as the sub-network master.

Using Kinco’s HMIware configuration software, Mclennan programmed a series of graphical screens that display or assign values for the positioning axes. There is also provision for manually positioning each axis with jogging and other functions to help develop specific motion sequences used during sensor evaluation. Also slaved to the HMI through the Modbus TCP network segment are the temperature controller’s display, level setting and alarm functions for each of the three end-effector mechanisms. Thus, through the HMI, each axis with its different positional and dynamic motion requirements, and corresponding end-effector temperature settings, are all easily selected, interrogated or diagnosed. As part of its system commissioning service, Mclennan supplied a complete installation and programming manual and also carried out site visits for system evaluation and acceptance testing.

With the evaluation of the various analytical sensor probes managed by ExpoPharma as a further Ethernet network segment, the complete machine combines positioning and machine control capability from Mclennan with ExpoPharma’s considerable expertise as a leading manufacturer of equipment interfaces for process based analytical sensors.

MORE INFORMATION: www.mclennan.co.uk
DO SPACE LIMITATIONS PREVENT THE SMALL FROM DELIVERING MIGHTY POWER? DAVE WALSHA, COMMERCIAL DEVELOPMENT OFFICE AT EMS, SHARES HIS INSIGHTS IN POWERFUL MINIATURE MOTORS

Increasingly stringent efficiency regulations and progressively smaller electronic devices have driven the need for smaller motors. In fact, the world’s smallest motor measures just one nanometre across. However, many modern engineering advancements require small motors that also have high torque and faster actuation times. Small motors are beneficial in industries where low weight is advantageous, such as in plane interior cabin equipment, and in applications where space is limited, such as in handheld medical devices. However, in these applications, size must not compromise performance – whether that’s ensuring cabin seats return upright quickly before plane landing or a surgical tool performs well with minimal exertion required from the surgeon.

Precision is key in the medical industry, where every small movement matters during a procedure. The average surgery lasts around two hours, but certain surgeries, such as heart bypasses or laparoscopic procedures, can take many hours longer. Surgeons must stay alert and perform accurately without fatigue for these long periods of time. Small, lightweight and powerful motors make handheld surgical tools easier to handle and control, easing strain on the surgeon while also performing quickly and accurately. These motors also benefit dentistry, by allowing the dentist to perform with supreme control and precision in tight oral spaces.

Another area of the medical sector where these motors are beneficial is prosthetics, where they can power artificial fingers. The low weight of the motors makes the prosthetic more comfortable to wear, while the small size makes the prosthetic look closer to real human form. The high precision of the motors ensures the user can perform a range everyday tasks unassisted, such as having the ability to hold an egg carefully without breaking it or using force to push a door open.

In the aviation industry, each milligram of weight matters. In fact, a one per cent reduction in weight leads to an estimated 0.75% reduction in fuel consumption. Aerospace engineers who choose small, lightweight and powerful motors to power interior cabin equipment, such as electrically operated seat and window blind adjustment components, such as motors and gearboxes, to form an optimised combination to suit power and space requirements.

DO SPACE LIMITATIONS PREVENT THE SMALL FROM DELIVERING MIGHTY POWER? DAVE WALSHA, COMMERCIAL DEVELOPMENT OFFICE AT EMS, SHARES HIS INSIGHTS IN POWERFUL MINIATURE MOTORS
Today, many companies are talking about the ‘digital twin’ but a concrete definition is still very inconsistent. As a result, digital twins from different manufacturers often do not have the necessary interoperability to use them together. In its simplest form, a digital twin is a virtual model of a process, product or service. This pairing of the physical and digital worlds enables better analysis of data and improved monitoring of systems to prevent problems before they occur, minimise downtime, develop new opportunities and even plan for the future using simulation models.

In the TeDZ project, KEB is searching for possible savings potential and how these can be achieved and made available. KEB’s aim is to provide its customers, and their customers, with easy access to the digital twin and on this basis generate significant added-value for everyone. In the pilot project “Digital Energetic Twin” (DeZ), a sub-project of TeDZ, KEB is researching the different facets of digital twins. In particular, the focus is on the energy-related aspects, for example, an ideal energy efficient design and the optimisation of energy consumption.

With the help of simulation models, KEB also intends to offer its customers the possibility of simulating the behaviour of a machine or plant. This could, for example, involve simulating the behaviour of a drive axis as realistically as possible during the planning phase. In this way, the energy consumption of a drive axis at certain operating points can be precisely predetermined. The models also enable customers to develop and test large parts of the machine control system even before actual commissioning has occurred. This so-called ‘virtual commissioning’ offers significant savings potential, such as time and cost savings during real commissioning later, as well as quality improvements and process reliability through error simulations.

KEB is also concerned with communications and appropriate definition of the semantics for dynamic data, i.e. data that can be acquired from the products at runtime. Due to their sensors and built-in intelligence, drive controllers can provide lots of useful information here, for example, for condition monitoring and predictive maintenance purposes.

The aim is to provide product information such as engineering data or simulation models. This information can also be enhanced with additional data recorded during operation – as a digital representation of KEB products. Standardised access to all this information via an ‘administration shell’ simplifies the integration of the components for customers. This brings advantages throughout the entire product lifecycle, from planning, engineering and commissioning, to servicing and replacement.

KEB is gaining lots of experience in dealing with the technologies mentioned. Working together on the project enables the KEB team and its project partners to develop the technologies themselves and to test these in realistic scenarios in order to finally develop the results into market-ready solutions.

The direct exchange and cooperation with other companies, as well as university and research institutions, makes it possible to “think outside the box” and also ensures that KEB has a comprehensive view during technical implementation. This provides KEB with the opportunity to reflect the results of its work back through various standardisation committees, so that the users of its products and solutions are guaranteed the broadest possible interoperability later on.

More information: www.keb.co.uk
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Vertical mounting helps save space

B&R NOW OFFERS A NEW VERTICAL MOUNT VARIANT OF SUPERTRAK

B&R’s intelligent track system SuperTrak is now available in a vertical-mount variant. This helps to optimise the output per square meter of floor space. If products are only transported on the upper side of the SuperTrak, the weight is not supported magnetically. Instead, the load is transferred directly to the rollers. The shuttles have a much higher payload capacity.

B&R says the SuperTrak power electronics have been repositioned, making them readily accessible from the front even when mounted vertically for easy installation. The connections between SuperTrak segments have also been reinforced to ensure mechanical rigidity and maximum stability and reliability in the vertical orientation.

The independently controlled SuperTrak shuttles can be positioned freely to group products of different sizes and create a multi-pack of different beverages or other products. On a vertically mounted SuperTrak system, this type of solution can be implemented on approximately half the floor space for a significant increase in output per square meter.

B&R’s SuperTrak enables advanced manufacturing concepts that deliver flexible, efficient production at any batch size. The track system was designed specifically for 24/7 operation under harsh industrial conditions. It is highly reliable and safe. Individual segments and shuttles can easily be replaced without having to disassemble the track. Downtime for mechanical changeover can often be eliminated entirely. The impact on overall equipment effectiveness (OEE) is substantial.

MORE INFORMATION: www.br-automation.com

Three-axis handling with tray recirculation system

MK has designed a fully automated system for a customer who required a palletiser with a connected tray recirculation system. This custom solution uses cost-effective standard components and adapted special functions which allows pallet trucks to be used to feed Euro pallets into the system.

The palletiser de-stacks the filled trays from the Euro pallets then feeds them into the recirculation system. They are then conveyed to an index station, where a robot removes the workpieces from the trays. The empty trays are conveyed back to the palletiser, where they are stacked on empty pallets and made available to be transported away. The system is able to recognise and handle different tray types.

MK used its profile range for the transport system with feeding and removal of pallets via heavy-duty roller conveyors. Alignment of tray stacks was achieved using pneumatic positioning units with approach angle attachments. A 3-axis palletiser gantry, consisting of LZR 2005 linear modules with a rotating gripper and balancing stroke completes this. A tray recirculation system, consisting of KTF-P 2010 chain conveyors, was combined with lifting units. Finally, an index station and device is utilised to hold down the trays so the workpieces can be removed by a customer-provided robot.

MORE INFORMATION: www.mkprofiles.co.uk

Less planning effort for material flow solutions

With the inclusion of the new stacker crane and transfer cars in its planning software, Interroll has once again expanded the range of applications of the popular Interroll Layouter Tool. With this application, which can be seamlessly integrated into the AutoCAD design program, planners and system integrators can now visualise even complex conveyor systems end-to-end at the click of a mouse and make them available for quotation and ordering processes. By digitalising the necessary process chain, planning times for customers can be dramatically reduced by up to 90%, depending on the initial situation.

The ability to visualise technical planning has always been one of the central requirements in the project business with modern material flow solutions. But even today, the path from the first plant design to the detailed technical project planning, which leads to the preparation of a quotation and the concrete award of the contract, is in most cases still characterised by time-consuming breaks in the work processes. For example, initial visualisations of the overall solution must later be broken down to all the required individual components of the desired plants. The fact that this process step can be avoided is demonstrated by the Layouter Tool that Interroll makes available free of charge to enable customers worldwide to shorten their planning phase significantly.

“With our application, which can be seamlessly integrated into AutoCAD as a plug-in, planners and system integrators can not only visualize the planned conveyor solution based on the desired parameters,” explains Marcus Dör, global product manager for the modular pallet conveyor platform at Interroll. “The Layouter Tool also simultaneously specifies all the necessary technical components of the respective solution. In addition, the plug-and-play modularity of Interroll’s conveyor platforms ensures that the engineering effort required to put together the overall solution is eliminated.”

The advantages of this approach are impressive: Already with his first design, the AutoCAD user has all the technical information for the desired conveyor solution and, in the case of special framework agreements, even the necessary price information. This means that the planning data can easily be reused for the subsequent quotation or ordering process.

www.interroll.com
Bearings for conveyor belt rollers in adverse operating conditions

Roller bearings are some of the most important components of support and tensioning rollers in conveyor belts. To enable conveyor belt rollers to operate in extreme conditions such as transporting sand or rock for mining, NKE has developed single-row deep groove ball bearings with optimised performance and longer service life compared with standard bearings, reducing downtime for the entire conveyor system.

The new design from NKE is able to sustain operating demands to which conveyor rollers are exposed even where conventional bearings fail. When contaminants infiltrate the interior of the bearing, standard bearings often suffer from a sudden, uncontrolled rise in temperature. The increased temperature impairs the positive lubricant properties, destroys the steel cages and ultimately causes the bearing to seize up. When bearings seize, they in turn block the rollers, the conveyor belt is damaged, and the risk of fire increases.

Despite relatively high contamination levels in these applications, NKE roller bearings for conveyor belt rollers maintain their function even under heavy loads and without increased frictional torque. When contaminants infiltrate the interior of the bearing, standard bearings often suffer from a sudden, uncontrolled rise in temperature. The increased temperature impairs the positive lubricant properties, destroys the steel cages and ultimately causes the bearing to seize up. When bearings seize, they in turn block the rollers, the conveyor belt is damaged, and the risk of fire increases.

MORE INFORMATION: www.nke.at
Safe starting points for

AGV MANUFACTURER REALISES VISION WITH SICK SAFETY SCANNER

If I were you, I wouldn’t start from here” is the punchline of a well-known joke about a hapless man asking for directions from a less-than-helpful passer-by. It’s a conundrum that frequently faces production teams with the ambition of automating their workflows to Industry 4.0-ready standards. All too often, fixed legacy infrastructure and buildings create a bewildering barrier to rethinking conventional linear production processes. However, the growing use of Automated Guided Vehicles and Carts offers the prospect of introducing more flexible materials handling, while dispensing with costly and non-value-added manual handling tasks.

“Everyone is talking about AGVs at the moment,” says Dan Evans, R&D manager at MasterMover. “Nearly everywhere we go, our customers ask us how we are developing our capability in this area.” It’s not surprising; MasterMover has a 20-year pedigree in designing and manufacturing safe and efficient electric tugs that take the effort and danger out of moving wheeled loads, around every kind of production and logistics environment. So, it is a company that most certainly is starting from the right place when it comes to designing AGVs.

“All of our machines are built as pedestrian-operated tugs,” Evans continues. “Our first AGV is no different – it’s almost like an optional upgrade to a standard machine. So, if our customers want to change the AGV’s route temporarily, maybe just for a couple of days, while they do some building work, for example, they don’t need us to come in, or learn how to programme the AGVs themselves, they can just reallocate some resource and pull down the tiller for a few days. Then, go back to AGV mode when it’s all sorted.”

When it came to developing a new AGV, it was safety that was the unequivocal starting point for the team, stresses Evans. MasterMover turned to Sick’s safety laser scanners and its Flexi Soft Safety Controller with EFI Pro Gateway (EtherNet/IP CIP Safety) as the foundation for an integrated and standards-compliant safety design. Sick Flexi Soft is a modular safety controller that allows applications to be developed according to their requirements and complexity. The Sick EFI-pro Gateway is a safe protocol that runs over the standard Ethernet/IP bus system. It can be used in applications requiring up to PLe (EN ISO 13849)/SIL3 (EN 62061).

“We come across the Sick name in almost every industry we work,” Evans continues. “So, we knew our customers would recognise industry-leading safety components onboard. An AGV is first and foremost a safety-driven product. If you don’t get the safety right, then it’s unlikely to deliver the functionality you need.”

Using Sick’s Flexi Soft Safety Controller and Sick Safety Designer software provided an ecosystem for the R&D team to confidently integrate their own safety system. Each standard MasterMover AGV model will use two Sick microScan3 scanners that communicate via EFI Pro to the Flexi Soft controller. Together with Sick’s DFS60 safety encoders, and the Sick Drive Monitor FX3-MOC1, all of these products are integrated into an application achieving PLd (EN ISO 13849)/SIL2 (EN 62061). Sick’s UK machinery safety product manager, Dr Martin Kidman, explains: “The complete MasterMover AGV system achieves a PLd/SIL2 due to safety laser scanner technology. The microScan3 scanners enable an exceptionally wide 275° wide scanning angle with a field range of up to nine metres and the field sets can be configured to support the changing vehicle paths as the AGV turns and changes direction.

“Based on the CIP Safety protocol, EFI-pro is Sick’s safety network for industrial automation. The Sick FX3-MOC Drive Monitor module and EFI Pro Gateway are the links that combine the Sick devices into a one system solution. The dual drives of the AGV system are safely monitored using the Sick safety encoders integrated directly into the FX3-MOC. This information is then used to dynamically change field sizes on the safety laser scanners via EFI Pro communication based on speed and direction.

“Sick Flexi Soft allows the application of complex algorithms and logic so that the AGVs can be configured to work completely independently. If the safety laser scanner detects an obstruction in its warning fields, the safety controller instructs the vehicle control system to slow down and then speed up again once the field is clear, allowing efficient and productive operation. If the inner protective field is breached, the Flexi Soft ensures that all drives are stopped immediately and are prevented from starting up again until it is safe to do so. The Drive Monitor can also safely detect standstill allowing a safe stop rather than complete emergency stop. If risk assessment allows, auto-restart can also be enabled preventing possibly hours of an AGV sat waiting for a manual reset.”

By using the Sick Flexi Soft safety controller with EFI Pro Gateway as the basis for safe communication on the vehicle, there was no need for MasterMover to engineer multiple connections between devices. One standard Ethernet cable is needed per scanner for the EFI Pro communication based on speed and direction.

Evans continues: “We offer a full range of AGV navigation options and try to encourage our customers along the line of what we call ‘natural navigation’ using a laser scanner. It’s more flexible, as you don’t need to have
Industry 4.0

fixed infrastructure such as tape, RFID tags or barcodes, which can impact on reliability. The AGV navigation we are using can tolerate a fair amount of change in the environment. So, for example, forklifts or heavy foot traffic can walk around the AGV quite comfortably. If you have a distribution scenario, where you have got pallets moving around and changing position, and you have got unpredictable objects in the path, we can navigate around that with technology we are using.” MasterMover works with each customer environment to support a full safety risk assessment.

Using the AGV for line side delivery also offers the prospect of working in tandem with the MasterMover PS AGV. With a load capacity of up to 30,000 kg, the PS AGV can be used for pulsed production line automation as an alternative to a conveyor. Using the AGVs together offers a complete alternative to conventional, fixed linear production, says Evans. “Compared to a conveyor system, the cost is reduced significantly, and the production flexibility is increased substantially. At the same time, redeploying operators from non-value-added work, and increasing the weight each AGV can pull, means you can expect good returns on investment.

“That said, for most people it’s about starting the ball rolling. So, our customers can work with us to upgrade just one key process to begin with. Because they are making the least number of changes to the facility, it’s very scalable.”

Now fully developed and available, the MasterMover AGV 300 Tow can carry loads up to 3,000kg. It is ideal for towing kitting trolleys for lineside deliveries, enabling movements of loads to be automated without the need for expensive fixed infrastructure. MasterMover’s AGV model offers customers the opportunity to start with a sole, entry-level AGV with on-board intelligence, right up to a centralised fleet management solution for multiple AGVs managed centrally over WiFi. Evans concludes: “We have perfected our first AGV design and now have a clear roadmap of where we are going with future vehicles to complement our entire product range.”

MORE INFORMATION: www.sick.co.uk

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MACHINERY SAFETY

MECHAN CONTROLS DESIGNS AND MANUFACTURES NON-CONTACT SAFETY SWITCHES, SAFETY INTERLOCKS, SAFETY RELAYS AND LIGHT CURTAINS FOR MACHINE GUARDING APPLICATIONS. WITH ITS LATEST DESIGN, ITS POPULAR EXPANDABLE SAFETY RELAY JUST GOT SMALLER

Four years ago, Mechan Controls successfully launched its innovative, modular EM1 safety relay. The goal was to develop an ‘intelligently simple’ safety relay that was expandable and more importantly, non-programmable. After thousands of units sold into a variety of applications and industries, the decision was made to make further improvements and developments to the existing design.

The main objective of the EM1 was to eliminate fault masking, without the need for programming and this was achieved using the ESM extender module. In order to achieve CAT4, SIL3, PL-e, each dual channel safety device must be connected to its own set of safety inputs. However, this method meant the old EM1 required a considerable amount of space compared to a programmable safety relay.

The second thing Mechan Controls addressed was the limitation on the number of ESM extender modules that could be added. The previous version supports a maximum of 12 modules, and this was due to the power limitations, as each extender module draws power from the EM1 master control unit.

The new EM1 is now a third of the size and features a host of new and technological advances over its predecessor. Mechan Controls’ team of experienced hardware and software engineers have used the latest design methods to reduce the size, double the amount of extender modules that can be added and improve the diagnostic features. It offers dual channel inputs and outputs, and it is expandable up to 25 ESM modules to enable a total of 26 dual channel safety devices to be connected to one system. No programming is required – it’s ready to use straight out of the box – and it provides cross compatibility with the older model.

Each EM1 and ESM includes two cross monitored safety inputs that are designed to accept any dual channel, volt free safety device. These can include grab wires, emergency stops, non-contact safety switches, mechanical interlocks, foot switches and more. Mechan Controls recommends that you connect one dual channel safety device per set of safety inputs to achieve CAT4, SIL3, PL-e.

Improved diagnostic features
The new EM1 design, features advanced software via the use of microcontrollers. This method of design meant Mechan Controls have been able to include more ‘intelligent’ diagnostic checks. These include:

- Improved safety input monitoring, this means each safety channel is now independently checked by the EM1/ESM. If a fault is detected on the safety device, it will now display which channel is faulty, allowing the user to easily diagnose the issue.
- Nuisance tripping detection intelligently checks to see if the signal is a genuine fault. For example, if one channel on the safety device changes state (maybe caused by shock or vibration), it will check to see if this is a one-off fault or recurring. If it detects the signal once and it falls within the specified safe parameters, it will ignore the signal. If the problem occurs 3 consecutive times, the EM1 will go into a fault mode, turning off the output to the machine. The new EM1 has been independently tested and approved by TUV and cULus to CAT4, SIL3, PL-e. Mechan Controls produces a wide selection of machine guard safety products that are suitable for connection with the EM1 safety relay. There extensive range volt-free, non-contact safety switches can cater for ALL non-locking applications.

Based in the UK, Mechan Controls produced its first RFID safety switch in 1972, since which time, it has developed an enviable reputation as an industry leader. Today, tens of thousands of applications worldwide attest to the outstanding reliability of Mechan safety switches and safety interlock systems.

More information: www.mechancontrols.co.uk

Machine safety standards are changing

What does it mean for you? Both ISO 13849-1 and IEC 62061 are being revised and Phoenix Contact reckons it can help you get ready. The company invites you to join our online seminar on 20 August at 11am. You’ll get an insight into new the machinery standards that will begin to come into effect later this year and learn how these significant changes will affect how cyber security is managed in relation to machinery safety. Other changes focus on requirements for safety software and risk assessments. The company will be hosting an online discussion on this subject with Carsten Gregorious from Phoenix Contact Germany. Carsten is a TUEV Expert with over 25 years experience in machinery safety and functional safety as well as being an active member of several standardisation committees such as EN ISO 13849 & IEC 62061.

Take this opportunity to keep up to date with these important changes and understand what you can do to make sure you can comply with these new standards. Phoenix Contact will introduce some new solutions and you will also have the opportunity to take part in a Q&A and get your questions answered.

More information: www.phoenixcontact.com

MORE INFORMATION: www.phoenixcontact.com
Mitsubishi Electric has enhanced the capability of its MELSEC iQ-F series PLCs with two new modules forming the basis of a compact, integrated safety system. The modules simply connect to an FX5U or FX5UC PLC CPU and reduce wiring requirements. Machine builders and systems integrators can easily and quickly implement a safety control system as no programming is necessary.

A key focus in the development of the new modules was to provide simplicity of set-up for the safety application. A rotary switch on the front of the module enables the user to select from nine types of built-in programs, eliminating the need to load or develop the required sequence programs for safety control. This significantly reduces set-up time compared with a conventional architecture. The principle of simplicity also extends to visualization. The PLC’s built-in web server make it easy to monitor the status of both the standard control and safety control system.

As well as simplifying the set-up of the safety application, the new modules also reduce the man-hours required during the engineering phase of a project. The FS5-SF-MU4T5 safety module and FX5-SF-8D14 safety input expansion module connect directly to the PLC. This eliminates the additional wiring that would be required for a traditional safety controller or when constructing a system with safety relays. Connection of the safety I/O has been simplified through the use of spring clamp terminals on the new modules. The new modules enable safety to be integrated directly within the compact PLC – no additional communication options are required. They enable an FX5 PLC to be used to perform both general-purpose and safety control. A single main safety module can be connected to an FX5 CPU to provide 4 safety inputs and 4 safety outputs. An additional two safety input expansion modules can be connected to provide up to 20 safety inputs and 4 safety outputs.

The addition of the new safety modules to an FX5 PLC enables users to build a compact safety system that is certified to Category 4, PL4 and SIL3 international safety standards.

**MORE INFORMATION:** gb3a.mitsubishielectric.com
SKF extends JIS compliant ball bearing units with new 300 series for contaminated environments

The new UC 300 ball bearing units from SKF feature superior sealing and stronger locking and are interchangeable with all JIS (Japanese Industrial Standards) housings. The introduction of the new products extends SKF’s UC range of ball bearing units, offering a comprehensive choice of reliable bearings that are available with short lead times. The new UC 300 is ideal for use in highly contaminated industrial environments, where bearing life can often be shortened through the ingress of process materials such as mud, dust, wood chips or water. To overcome these problems, the UC 300 series is equipped with field-proven sealing technology. It also has a solid base design of housing to minimise areas that might otherwise trap dirt or moisture.

MORE INFORMATION: www.skf.com

A cost-saving alternative to traditional cable glands

Foremost Electronics announces new additions to Icotek’s range of cable entry plates, the KEL-DP 25 version A and KEL-DP 32 version A and B. KEL-DP products offer high cable density and are a simple to use cost saving alternative to traditional cable glands. The KEL-DP is a hygienic design, free of dirt-collecting recesses and provides environmental protection IP65 / UL type 12. The new products fit standard metric M25 and M32 cut-outs and, depending on the model up to 13 different cables can be inserted through a single gland. The KEL-DP range can accommodate cable diameters from 5.2mm to 8mm and are suitable for mounting in enclosure wall thicknesses from 1.5mm to 4mm.

MORE INFORMATION: www.4most.co.uk

IFM launches compact yet versatile signal lamps

Capable of displaying up to seven different colours which are easily visible even in bright lighting conditions and featuring robust IP67 construction, signal lamps in the new DV2100 range from IFM Electronic are an ideal choice for machine and plant status signalling applications even in demanding environments. Their compact size and ease of installation with a single M30 nut means that they are equally well suited for use in new equipment or to replace and upgrade existing light signalling systems. DV2100 signal lamps can be supplied with an integral sounder that generates audible warnings at up to 90dB.

MORE INFORMATION: www.ifm.co.uk
Improving reliability
In harsh applications

BARNEY ELEY, SENIOR APPLICATION ENGINEER AT THE BARDEN CORPORATION, AND STEFAN VOGEL, SALES AND APPLICATIONS MANAGER AT HQW PRECISION DISCUSS HOW BEARINGS TAKE THE PRESSURE AND HANDLE THE HEAT IN THE HARSHEST APPLICATIONS

Throughout industry there is increased demand to improve operational efficiencies and reliability as companies look to protect their bottom lines. One crucial part of machines that needs to be considered are the bearings systems as their design has a fundamental effect on the reliability of a machine, especially in extreme operating environments.

Applications in a vacuum, at high or low temperatures, or a corrosive atmosphere for example, cause issues for standard bearings and they are prone to premature failure. A bearing system comprises many elements including balls, rings and cages and to improve reliability in these conditions, each part needs to be carefully reviewed.

Operating in a vacuum

In ultra-high vacuum environments such as those that are present in manufacturing electronics, semiconductors and LCDs, the pressure can be lower than 10⁻⁷ mbar. Ultra-high vacuum bearings are typically used in actuation equipment within the manufacturing environment. Another typical vacuum application is turbomolecular pumps (TMP) which generate the vacuum for manufacturing environments. In this latter application the bearings are often required to work at high speed.

Lubrication: Lubrication in these conditions is key. At such high vacuums, standard lubrication greases evaporate and also outgas, and the lack of effective lubrication can result in bearing failure. Special lubrication therefore needs to be used. For high vacuum environments (down to approximately 10⁻⁷ mbar) Perfluoropolyether (PFPE) greases can be used as they have a much higher resistance to evaporation. For ultra-high vacuum environments (10⁻⁹ mbar and below) solid lubricants and coatings need to be used.

For medium vacuum environments (around 10⁻² mbar), with careful design and selection of special vacuum grease, bearing systems that deliver long life times of more than 40,000 hours (approximately 5 years) of continual use, and operate at high speeds, can be achieved.

Handling low temperatures

Lubrication: For example, in cryogenic pumping applications with temperatures in the region of -190°C, oil lubrications become waxy resulting in bearing failure. Solid lubrication such as molybdenum disulphide (MoS₂) or tungsten disulphide (WS₂) is ideal for improving reliability. Furthermore, in these applications, the media being pumped can itself act as the lubricant, so the bearings need to be specially configured to operate at these low temperatures using materials that work well with the media.

Materials: One material that can be used to improve a bearing’s fatigue life and wear resistance is SV30 – a martensitic through-hardened, high nitrogen, corrosion-resistant steel. Ceramic balls are also recommended as they deliver superior performance. The inherent mechanical properties of the material mean they provide excellent operation in poor lubrication conditions, and it is far better suited to operate reliably at low temperatures. Cage material should also be chosen to be as wear resistant as possible.

Good options here include Polyether-ether-ketone (PEEK), Polychlorotrifluoroethylene (PCTFE) and Polyamide-imide (PAI) plastics.

Heat treatment: Rings should be specially heat treated to improve dimensional stability at low temperatures.

Internal design: A further consideration for working in low temperatures is the bearing’s internal design. Bearings are designed with a level of radial play, but as temperature reduces, the bearing components undergo thermal contraction and the amount of radial play is therefore reduced. If the level of radial play reduces to zero during operation this will result in bearing failure. Bearings that are intended for low temperature applications should be designed with more radial play at room temperatures to allow for an acceptable level of operating radial play at low temperatures.

Reliability at high temperatures

At the other end of the scale, high temperature applications, such as those used in actuation systems within the aerospace industry can present challenges for standard bearings. Furthermore, temperatures are rising in equipment to bearing failure. Standard greases are often limited to a maximum temperature of around 120°C and some conventional high temperature greases are capable of resisting temperatures of up to 180°C.

However, for applications that require even higher temperatures special fluorinated lubricating greases are available and temperatures in excess of 250°C are attainable. Where liquid lubrication is not possible, solid lubrication is an option which allows for low speed reliable operation at even higher temperatures. In this case MoS₂, WS₂, graphite or Polyfluoroethylene (PTEF) are recommended as solid lubricants as they can tolerate very high temperatures for longer periods of time.

Materials: When it comes to temperatures in excess of 300°C special ring and ball materials are necessary. AISI M50 is a high temperature steel that is typically recommended as it exhibits high wear and fatigue resistance at high temperatures. BG42 is another high temperature steel that has a good hot hardness at 300°C and is commonly specified since it has high levels of corrosion resistance and is also less susceptible to fatigue and wear at extreme temperatures.

High temperature cages are also required and they can be supplied in special polymer materials including PTFE, Polyimide, PAI and PEEK. For high temperature oil lubricated systems bearing cages can also be manufactured from bronze, brass or silver-plated steel.

Coatings and heat treatment: Advanced coatings and surface treatments can be applied to bearings to combat friction, prevent corrosion and reduce wear, thus improving the bearing performance at high temperatures. For example, steel cages can be coated with silver to improve performance and reliability. In the case of lubricant failure/starvation, the silver-plating acts like a solid lubricant, allowing the bearing to continue running for a short period of time or in an emergency situation.

Corrosion resistance

Bearings which are intended for use in a corrosive environment need to be specially configured as they can potentially be exposed to acids, alkalis and salt water among other corrosive chemicals.

Materials: Materials are a vital consideration for corrosive environments. Standard bearing steels readily corrode, leading to early bearing failure. In this case, SV30 ring material with ceramic balls should be considered as they are highly resistant to corrosion. In fact, studies have shown that SV30 material can last many times longer than other corrosion resistant steel in a salt spray environment. In controlled salt-spray tests SV30 steel only shows slight signs of corrosion after 1,000 hours (see graph 1) and SV30’s high corrosion resistance is clearly seen on the test rings. Special ceramic ball materials such as Zirconia and Silicon Carbide can also be used to further increase a bearing’s resistance to corrosive substances.

MORE INFORMATION: bardenbearings.co.uk or hqw.gmbh
Food and beverage manufacturers of all sizes are facing huge operational challenges right now. Sudden increases in consumer demand, shifting expectations, changes in food safety legislation, and emerging technologies, all require companies to be responsive, agile and flexible. There is also the matter of ensuring seamless production continuity, to ensure consumer confidence around maintaining food and beverage supplies. Further, as digital technologies continue to transform global markets, no industry remains untouched, and food and beverage manufacturing is certainly no exception.

Let’s consider how each of these three factors can impact day-to-day operations on the production floor, and how leading manufacturers are adapting to win. In recent years, food and beverage manufacturing regulations have changed significantly across the globe due to technological and scientific advancements. Europe has long been at the forefront of these legislative changes and successful companies will likely be those who stay ahead of the curve by implementing changes sooner rather than later. These companies will avoid both production downtime, and the potential for higher costs associated with refits, when new legislation eventually passes.

Even in our current outcomes-based regulatory framework, reducing cleaning time and ensuring impeccable hygiene standards continue to be key areas of focus. As the physical landscape of manufacturing shifts to accommodate the increased presence of technology, so too will our approaches to safety and cleanliness.

This leads us to our next topic: the presence and proliferation of technology in food production spaces. There’s no denying that we all have a responsibility to implement sustainable environmental practices. But from a commercial perspective, it’s also worth your time to embrace sustainability as millennials and Gen Z begin to dominate the consumer market. The consumers of the future will place huge value on environmental sustainability, and they’ll also go out of their way to support companies who follow environmentally friendly practices. Manufacturers that want to reach this audience will need to implement changes that reflect this shift in consumer priorities and effectively communicate the changes that have been made. To do this, you’ll need to streamline every aspect of your business with a new focus on environmental sustainability.

Whether it’s recycling production materials to close the loop on waste outputs, or reducing the energy consumed during cleaning, every part of your process should be moving towards a more sustainable future, either directly or indirectly. For example, Rittal’s HD enclosures are specifically designed to make them quicker and easier to clean. HD enclosures are typically power washed, so reducing the time it takes to clean them will lower both water and energy usage.

In order to offset the cost increases associated with making these transitions, industry leaders are continuing to refine efficiency-boosting practices like CIP to make production facilities greener.

At this point, we can consider the massive impact that the Internet of Things (IoT) will have on manufacturing is a sure thing. Telstra puts it very clearly when it states that “in an increasingly automated manufacturing environment, having multiple machines communicating with each other and being managed and diagnosed remotely offers benefits that are self-evident”.

These smart machines pose a unique challenge to the food and beverage industry; their delicate circuitry and sensors must be on the production floor but must also be protected from contaminating or being contaminated by the manufacturing process. Additionally, these complex computer systems need to be compliant with current and future food safety regulations and be well-suited to withstand increasingly ambitious CIP procedures.

Now is the time to consider how you can update your existing manufacturing systems to try and account for the changes that are taking place in the industry. Whether it’s investigating new, sustainable production methods, or investing in physical infrastructure that supports new technologies, now is the time to move confidently forward or get left behind. Optimising every piece of the manufacturing puzzle is essential to maintain a competitive advantage.

**MORE INFORMATION:** www.rittal.co.uk
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For outdoor electrical installations, the enclosure is the first line of defence against all weather-related issues. In some locations excessive temperatures are the norm, and perhaps even worse than prolonged heat or cold is daily or seasonal cycling between extremes. Storms can also be an issue, especially if wind-driven rain penetrates covers and seals. A humid atmosphere can be equally challenging, while freezing temperatures, snow and ice have their own ways of causing damage.

Other environmental factors to consider include corrosive or salty atmospheres and the damage that the Sun’s ultraviolet (UV) light can do to some materials. Further hazards applicable to some outdoor applications include impact damage from passing plant or equipment and the risk of vandalism if positioned in a public space.

With all the variables it can be a real headache identifying which enclosure will provide adequate protection. Obviously cost is always a concern, so it is always worth getting some expert guidance at an early stage in any project to make sure the chosen solution matches the potential challenges.

The risk of corrosion is apparent in almost all outdoor applications, which leads most installers to generally prefer enclosures made of high-performance plastic;
rather than metal, which may be prone to rusting should its painted coating be damaged. Polycarbonate is the popular material of choice for many applications as it is strong, does not corrode, can withstand impact, is immune to UV degradation, yet is lightweight and cost effective.

During the initial R&D phase of a project it’s important to consider the level of exposure to the elements the enclosure will face. Some enclosures are going to be under the cover of a large porch or overhang, others may be on the lee side of a building or given some protection by an adjacent structure. Enclosures facing south are most likely to be subject to direct sunlight, while those on other sides of the building will be spared it to some degree. In a crowded environment such as a city centre, there may even be issues relating to reflected sunlight. Some modern architecture famously features concave glass frontages which may have a magnifying effect on reflected sunlight. The heavy traffic found in most cities can also lead to polluted, corrosive atmospheres or expose the enclosure to excessive vibration.

Once the conditions have been assessed an experienced supplier should be able to advise on the best solution. In many cases a well-constructed, IP54 Polycarbonate enclosure may be adequate. However, for tougher applications there are enclosures that have been designed specifically for outdoor use - such as Spelsberg’s GEOS range.

The GEOS range is a lightweight GRP design that is easy to install and provides clear access for fitting and maintaining electrical equipment. It has an impact rating of IK09, so can withstand impacts of 10 joules. There is a choice of IP66 or IP67 sealing and all GEOS enclosures have built-in ‘Drain Protect’ channels which prevent any water, condensate or liquid that makes its way past the seals from accumulating and becoming a problem.

There are ten models within the GEOS range, plus multiple size options and a choice of sidewall measurements. This allows specifiers to choose a model that exactly matches the application needs and meets space constraints. One option that is popular for outside use is the inclusion of a transparent cover, which allows reading of meters and inspection of the electrical equipment inside without having to open the enclosure.

MORE INFORMATION: www.spelsberg.co.uk
Shelters fabricated from glassfibre-reinforced polyester are protecting gas metering instrumentation from the harsh North Sea environment on an offshore platform upgrade project engineered by Oil & Gas Systems ltd. Two outdoor shelters supplied by Intertec Instrumentation provide lightweight and corrosion-resistant protection for gas chromatograph analyzers and process transmitters mounted above new natural gas export pipelines connecting the platform to an onshore UK terminal. The instrumentation provides critical monitoring data on gas quality as part of the custody transfer metering system.

This particular platform upgrade project presented a number of challenges, including the harsh operating environment of the North Sea, and the space and weight restrictions of adding the new facilities onto a working platform. Metering systems for fiscal, allocation and custody transfer applications are a significant part of the systems integration work of OGS - which has a reputation for being able to rapidly design and build efficient solutions for complex project requirements.

Glassfibre-reinforced polyester (GRP) materials were specified to protect the instrumentation. This allowed weight to be reduced significantly compared with metal shelters. GRP construction also provided excellent protection against both the harsh weather in the offshore location, and the local environmental conditions. Intertec Instrumentation was selected to build the custom GRP shelters because of previous good experience of working with the company on projects, including shelters and enclosures already installed in the same gas field.

The lightness of GRP compared to steel helped to reduce the size and weight of the metalwork structure that mounts the shelters directly above the export pipelines.

The location – in the middle of a crowded working platform – also presented access difficulties. So, natural ventilation according to IEC EN DIN 61285 was specified. This eliminates routine maintenance visits that would be required with other shelter ventilation approaches such as fans or an HVAC system.

Efficient convection cycle
To support natural ventilation for safe operation in the hazardous environment, Intertec supplied explosion-proof heaters and installed louvre panels at the top and bottom of shelter walls. This maintains the interior environment a few degrees above ambient temperature, and ensures an efficient convection cycle to meet the air change requirements of OGS. All of the shelter fittings, apart from the finned aluminium bodies of the heaters, are fabricated from 316 stainless steel for corrosion resistance - including the panic bar door opening mechanism.

“It can be a significant challenge to add new facilities into existing processing plants, and especially so when they are located offshore,” says Anthony Dingle, OGS’s sales manager. “Intertec’s ability to design and build custom enclosure solutions was a big help to us in meeting the design constraints of this complex and fast-track offshore instrumentation project.”

In total, two walk-in shelters and two large cabinets were built by Intertec to meet the custom shape, size and weight constraints. Each shelter houses an identical instrumentation system including pressure reduction sample conditioning equipment, a Danalyzer gas chromatograph, Rosemount pressure transmitters, calibration facilities and various safety devices and accessories. The two cabinets house cylinders to supply the required gas for calibration purposes, along with...
associated pressure regulation, measurement instruments, tubing connection and flow control components.

**High thermal resistance**
The GRP material used by Intertec to build the shelters and cabinets is a proprietary multi-layer composite with moulded GRP panels enclosing polyurethane foam insulation, protected by gel-coated surfaces. This composite material has a very high thermal resistance, reducing the amount of energy required to heat equipment. A further benefit of Intertec’s approach to shelter fabrication is an advanced gel-coat, which is applied in a much thicker layer than alternatives such as paint. It protects against ultraviolet (UV), and is highly effective against abrasion. It offers exceptional environmental protection and resistance to ‘corrosion’ (GRP does not rust or degrade in any meaningful way), allowing maintenance-free lifecycles of 30-40 years - more than enough to meet the anticipated cease of production date for the platform.

The gel-coat also incorporates a unique nano-technology treatment that provides conductivity to dissipate static electric charges safely to ground, protecting against sparking in hazardous areas. Developed for Intertec by BÜFA, the coating employs single-wall carbon nanotubes (SWCNTs) to provide conductivity. Because the SWCNTs are only around 1-2 nanometres in diameter, they enhance surface smoothness. The gloss retention after accelerated weathering tests is some 50% better than the previous coating technologies used.

This technology is behind the significant improvement in resistance to UV of Intertec’s shelters. Previously, exposure to high UV levels over the long term could lead to surface roughening – which is sometimes referred to as ‘chalking’ or ‘frosting’. Intertec’s weathering tests have demonstrated that the new coating will withstand extended exposure to very high UV levels, providing hitherto unachievable protection for GRP field enclosures destined for ultra-harsh environments such as offshore platforms, deserts and Arctic environments.

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**INTERTEC’S ABILITY TO BUILD CUSTOM SOLUTIONS WAS A BIG HELP TO US IN MEETING THE DESIGN CONSTRAINTS OF THIS COMPLEX OFFSHORE INSTRUMENTATION PROJECT**

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EXTENSION SPRINGS

WE ASKED THE EXPERTS AT LEE SPRING TO EXPLAIN ALL ABOUT EXTENSION SPRINGS

Extension springs – otherwise known as tension springs – are indispensable to many operations in vehicle applications and elsewhere, for example as returns on engine controls, also farm machinery, horse boxes, caravans, trampolines, garage doors, medical devices, toys, washing machines and white goods, and in the construction industry. They are characterised by a loop or hook on either end which is connected to other components giving them extra strength and manoeuvrability.

An extension spring works by absorbing and storing energy in its coils so that when the two components attached at either end are pulled apart, thus extending the spring, it resists and exerts a similar amount of force. The reason extension springs are commonly used in cars is that many automobile parts use electrical solenoids or hydraulics to power movement one direction only, which later relies on the mechanical retraction force from an extension spring for full cycle.

The extension spring comes in many shapes and sizes, including customised models which are popular with classic car enthusiasts looking for the perfect part. Several types of connector can be specified including full loop, double twisted loop and hook, and Lee Spring’s extension springs can be ordered in a wide range of materials, including corrosion-resistant types which are especially important for vehicles that will be used exposed to the rain.

Extension springs absorb and store energy as well as create a resistance to a pulling force. It is their initial tension that determines how tightly together an extension spring is coiled. This initial tension can be manipulated to achieve the load requirements of a particular application. Extension springs are wound to oppose extension – they are often tightly wound in the no-load position and have hooks, eyes, or other interface geometry at the ends to attach to the components they connect. They are frequently used to provide return force to components that extend in the actuated position.

Extension springs come in a wide array of sizes, from small medical devices to off-road machinery brake springs and are supplied with full diameter loops (either machine or crossover centre) at a random position. Loop openings are approximately one wire diameter and the direction of wind is optional. Lee Stock extension springs are available in both imperial and metric designs.

Other Lee Spring extension spring ends include threaded inserts, extended twist loops, crossover center loops, hooks, expanded eyes, reduced eyes, rectangular ends and teardrop-shaped ends, which can all be produced to vary in distance from the spring body. At the design stage of a custom extension spring, the length of the hooks at each end of the spring can be adjusted in order to precisely obtain the required spring load at any extended position.

Another common type of extension spring is the drawbar spring. In a drawbar, the load is applied at the ends of long steel loops which pass through the spring’s centre and are hooked around the opposite end, thus compressing the spring upon loading. Drawbar springs are excellent for use in potential overload situations and offer a built-in defined stop that will continue to carry a static load after reaching the maximum extended length.

MORE INFORMATION: www.leespring.co.uk
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