

# EMS

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**Asset Performance 4.0 Conference & Exhibition announces Dr. Alexander Broos as one of their keynote speakers**

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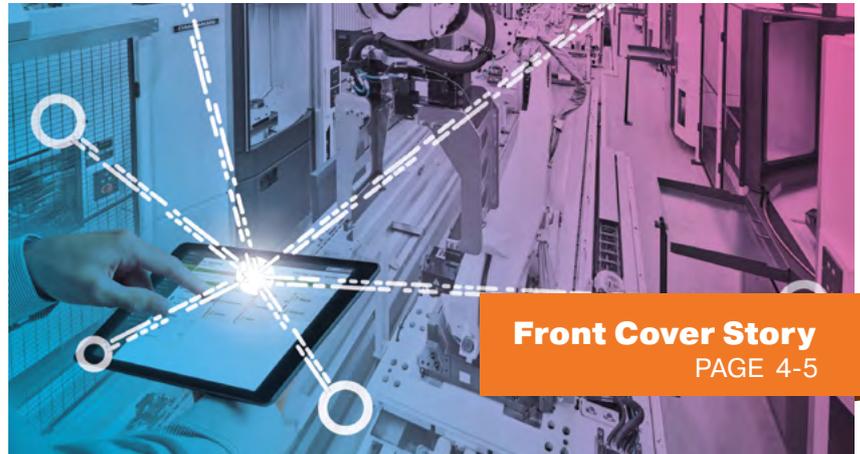
Providers of portable and permanently installed condition monitoring and energy monitoring and optimisation systems. Faraday Predictive systems require no sensors to be mounted on your plant equipment, instead we use the electric motor driving your equipment as the sensor. Simply by measuring the voltage and current drawn by the motor we can identify an astonishing amount of information about developing problems in your equipment, giving you an indication of current condition and predicting future condition for up to three months in the future. We provide easily understood advice on the nature of the fault, how we have diagnosed it, the effects it is likely to have, and what you should do about it. We also quantify the energy being wasted by faults, allowing you to cost-justify corrective work on energy saving grounds.

**For more information see our website or contact us direct.**



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# Asset Performance 4.0 Conference & Exhibition announces Dr. Alexander Broos as one of their keynote speakers

On October 27, Dr. Alexander Broos, Director of the VDW (German Machine Tool Builders' Association) will delight all visitors of the Asset Performance 4.0 Conference with a keynote presentation on the importance of manufacturing technology specifications and the umati community's role in standardising data communication.



Leading up to the conference, he already shared with us his fascinating insights on the rapidly changing world of industrial and manufacturing technology and how data transactions can be managed effectively in the age of industry 4.0. Manufacturing In Our Data-driven Economy Traditionally, big companies collect data in their own proprietary systems. But smaller companies and start-ups don't have the funds to do this and rely on basic off-the-shelf data management systems like Excel.

Times are changing. Manufacturers are wondering why their health data can be sent to their smartphone, but still it seems impossible to link up their milling machine, robot and inspection devices. Thus, there is a growing trend for increased data integration between industrial equipment and devices.

## The Importance Of Trust

Trust is a complicated matter in the industrial sector. There are multiple equipment and shop floor machinery makers and tech companies with different data systems speaking different languages. Often, you find 20-year-old legacy equipment and IT systems running alongside cutting-edge IIoT tech. Those legacy systems took 100,000s or millions of Euros to develop, and nobody is willing to throw away that kind of investment due to connection issues.

Open interfaces such as OPC UA are becoming more prevalent. These are communication frameworks that help transfer signals and data between machines and devices, but require high levels of trust.

In recent years, equipment producers have taken to defining the OPC UA Companion Specifications for their product technologies, making their own

dictionaries. Machine users end up with dozens of different standards, each one needing to be added to their production IT. To counter this, umati promotes and facilitates the implementation of open, standardised interfaces based on OPC UA, built from the bottom up.

Their philosophy is that data should be transmitted and channelled through unified implementation of these multiple standards. Machine makers should be able to test and prove compliance against agreed standards, thus building trust in quality, well-integrated products.

## Building Trust In Open Interfaces

In recent years, groups of equipment producers have taken to defining OPC UA Companion Specifications for their product technologies, creating their own dictionaries. For instance, the dictionary you need for a machine tool would be different to that of a robot, or a paper-mill, or a chemical processor.

In other words, each technology group is producing a new set of standards for their equipment. Machine users, who usually use a variety of equipment and technologies, are ending up with dozens of different standards, and each one needs to be added to their production IT.

## This is where umati comes in.

umati promotes and facilitates the implementation of open, standardised interfaces based on OPC UA, built from the bottom up.

The philosophy of umati is that data should be transmitted and channelled through unified implementation of these multiple standards, with everything set up in the same way. Machine makers should be able to test and prove compliance

against an agreed set of standards, thus making it easier for customers to see they are getting a quality product that will integrate smoothly. This will help to build trust in the way that data is transferred and used.

## The umati Community

umati stands for Universal Machine Technology Interface. It's a community of machinery makers, software producers and customers that combine to promote the use of OPC UA standards.

The aim is to improve standards, as well as provide unification, proof of functionality certification, and easier integration of machine communication. In doing so, umati acts as a quality control body for the industry.

Also high on umati's agenda is Data Security. Currently, OPC UA lacks the tools and mechanisms to provide data security. Users can contact umati's community of experts and avoid having to contact each machine maker individually.

It is difficult to see whether data has been tampered with at the moment. Blockchain may change this soon, but right now - trust is key. As umati is independent of the suppliers, they can help build trust across the community and build data security.



**Data Security Is A High Priority**

One example where umati paves the road is data security. Data must be transmitted and managed securely. Within OPC UA specifications, there already exist mechanisms to provide data security, but currently they are not widely available implemented into commercial controller or software developer kits. So the machinery industry is faced with a choice: wait for the OPC UA providers to embed these security features within their products, or take care of it themselves for the time being. For instance, by relying on appropriate VPN networks to cover the open ends. umati is designed to address these kind of issues.

umati also creates a feedback channel between machine makers and users. Rather than going to each machine maker or technology group individually and asking questions, the user can contact umati for help. By creating a community of experts and helping to standardise machine communication, umati is making life easier for the end users, especially the large number of SMEs amongst them.

In many ways, industrial companies treat data with more respect than personal tech companies like Google, Microsoft, Amazon, etc. In the personal tech sphere, you have to trust those companies with your data, or use a piece of software as a barrier to protect your sensitive data. This isn't the case in the industrial sector, as the big players such as Siemens or Mitsubishi do not have the power or scale to create a closed ecosystem like MS, Apple or Google.

Businesses need to be careful to protect data and put mechanisms in place to encrypt the data. It is difficult to see whether people have tampered with data at the moment. Technologies such as the blockchain may change this in the future, but right now, trust is the key factor. As umati is independent of individual suppliers, we can help to build trust across the community.

**The Asset Performance 4.0 Hybrid Conference & Exhibition offers a unique opportunity to learn how new 4.0 technologies and fundamentals in operations, maintenance and asset management reinforce each other in order to achieve higher equipment reliability and cost performance in asset intensive industries.**

Get ready for 3 inspiring days, during which you can participate in workshops, attend interesting presentations and discover all the newest technologies at the exhibition!

- Three-day conference with in-depth expert presentations
- Deep insights & practical experience during the workshops
- Asset Performance Awards with keynote
- Exhibition with +50 exhibitors
- Extensive networking opportunities with peers and experts
- Choose to participate live in Antwerp or join all sessions online – live or on demand

**When?** 26, 27 and 28 October 2021

**Where?** Flanders Meeting & Convention Center Antwerp, Belgium & online

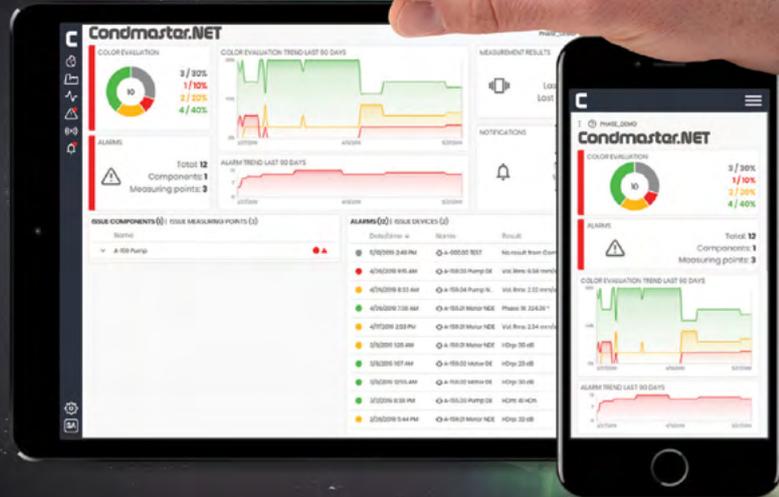
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# BEMAS organises hackathon competition for Asset Performance 4.0 - Predicting failures for ÆVO

Leading up to the Asset Performance 4.0 hybrid Conference and Exhibition, BEMAS, the Belgian Maintenance Association, is organising a hackathon. The purpose of a hackathon is to have an asset owner define a challenge in operations or maintenance. Interested individuals or solution providers then try to formulate a solution using digital tools, such as predictive analytics, AI, IoT...

This year's hackathon challenge is provided by ÆVO, a Dutch company specialising in the maintenance and renovation of bridges, locks and tunnels. "The infrastructure we maintain is almost always critical. The smallest defect can have gigantic consequences for road users or shipping," says director Corné van Dravik.

The service company is prospering, not only because of their fast service in case of corrective interventions, but especially because of their sophisticated preventive maintenance management, which ensures less critical defects. ÆVO is now also looking for ways to trace and even predict defects at an early stage. And in this transition to predictive maintenance, a hackathon is the ideal way to explore the possibilities.

"Initially, we hope that the participants will indeed find patterns that can be used to predict anomalies. Ideally, they will be able to automate the analysis and develop a concept that can be applied to several locks and perhaps even bridges and tunnels. The aim is to further develop the result into a system that can not only predict, but also give an indication of the problem at hand. Only then will we have the state-of-the-art solution of which we dream and with which we can offer our customers maximum added value." concludes Corné van Dravik.

Interested individuals and companies can explore the problem by watching the webinar with Corné van Dravik, who explains the functioning of the company and the overall problem. In a second

recording, Sjoerd Van Agtmael, the System Architect behind this automation project, dives deeper into the technical side and explains how to interpret the available data.

All information is compiled on the Asset Performance 4.0 website, where candidates can also register. Participants are added to the interactive hackathon platform, where all data is available for download. ÆVO will analyse the submitted proposals and select the finalists, who can present their solution during the Asset Performance 4.0 conference on Thursday 28 October.

Those who want to watch the hackathon problem presentation by ÆVO and the presentations by the finalists - online or in Antwerp-, can already register online or in Antwerp via [assetperformance.eu/2021](https://assetperformance.eu/2021)

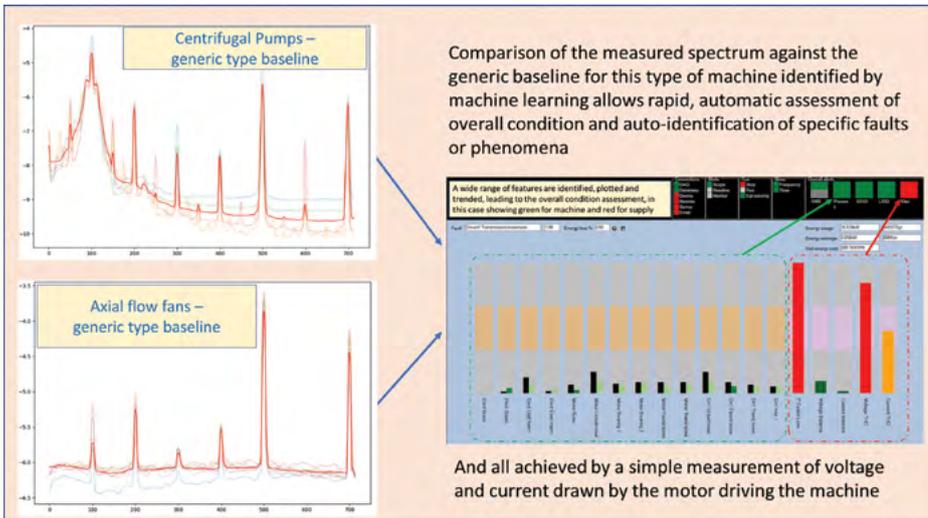
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# How the country's top mathematicians are making your maintenance work easier

The "Model" in Model-Based Voltage and Current (MBVI) systems is a mathematical one



**Sophisticated Condition Monitoring systems** that can automatically diagnose incipient faults in your machines, are made possible by some clever mathematics that take complex machine signals and translate them into readily understandable information. In the best systems, such as the MBVI systems from Faraday Predictive, these reduce all the complex data into the form of simple, actionable advice:

- this is what is wrong with your machine
- this is what you should do about it
- this is the time you have available to do it

These systems encapsulate generations of engineers' experience of the problems machines can suffer, the symptoms machines display when suffering from those problems, and the best ways to deal with those problems. In these days of skills shortages and

ageing population profiles, this captured experience can be invaluable to ensure long term business sustainability.

Modern Mathematicians, building on the foundations started over two centuries ago, are now developing new understandings for the 21st Century, to create even more powerful fault diagnostic systems.

**Vibration Monitoring** systems base their diagnostics on the science of **rotor dynamics** – an understanding of how rotating shafts behave under the influence of forces at different frequencies, which can for example lead to resonant behaviour at critical speeds on some machines.

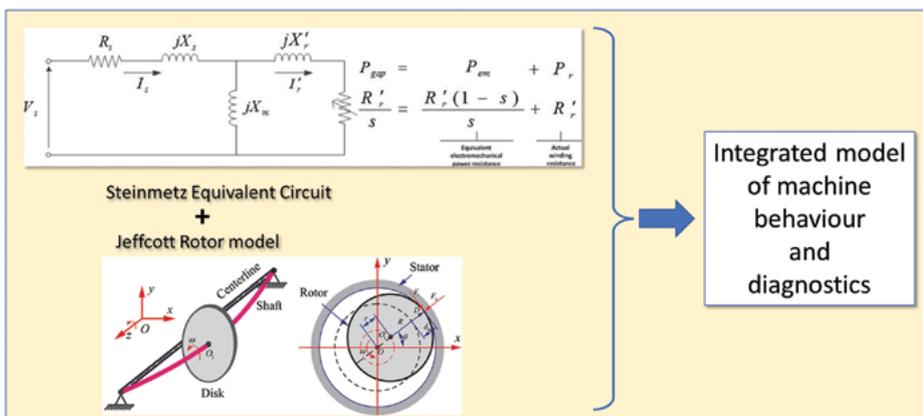
The fundamental calculation of resonant frequencies and other rotor behaviour is based on a mathematical model called the **Jeffcott rotor**, named after Henry Homan Jeffcott, an Irish engineer who developed

the theory of rotor dynamics during the first world war, publishing his framework for lateral vibration in the Philosophical Magazine in 1919. This still forms a key building block for the understanding of rotating machine behaviour to this day, over a century later.

**Electrical Machine analysis**, such as MCSA, is based on a number of models created by engineers such as Charles Steinmetz, working at a similar time to Jeffcott, who created the **Steinmetz Equivalent Circuit** for representing the working of electric induction motors. Working even longer ago, in the 1830s Sir Michael **Faraday's law of induction** predicts how a magnetic field will interact with an electric circuit to produce an electromotive force (EMF)—a phenomenon fundamental to the operation of electric motors and generators. This was built on in the 1860s by James Clerk Maxwell to create the mathematical formula – the **Maxwell-Faraday equation** – that is at the heart of our modern day understanding of the behaviour of electrical machines.

**Faraday Predictive** are now moving this field on further, working with a group of the top mathematicians in the UK, drawn from the universities of Cambridge, Oxford, Bristol, Durham, Leeds and others, to combine the best mathematical understanding of the electrical behaviour of machines with the best mathematical understanding of rotor dynamics, to create an integrated model of the behaviour of complete machines – eg electric motor plus transmission plus driven equipment carrying out a process. This enables diagnostics of the entire machine train just by measuring the voltage and current drawn by the motor.

Different types of machines exhibit different characteristic behaviours, and more mathematics, in the form of machine learning, is used to identify how an individual machine's behaviour compares with what would be expected for this type of machine, as shown in the spectrum diagrams. So a single reading of the voltage and current being drawn by the machine can identify areas of abnormal behaviour and provide advice on how to deal with it. This could be very specific such as identifying higher levels of flow turbulence inside a pump or incorrect tension on a belt drive – a whole range of specific features are identified and trended for each machine as shown in the bar graph.



For a demonstration of this system and what it could tell you about your own machines, contact Faraday Predictive – [info@faradypredictive.com](mailto:info@faradypredictive.com), or call 0333 772 0748

## Reliability services, technologies, support & training

For more than 20 years RMS have provided a comprehensive range of reliability and condition monitoring products, services, support, and professional training solutions.

Our expertise encompasses: Asset Reliability, Vibration Analysis, Motion Amplification, Ultrasound, Thermography, Oil Analysis, Dynamic Balancing, Laser Alignment and Motor Analysis.

Our partnership with industry OEM's highlights the commitment we make to showcasing innovative technologies. One such example is RDI Technologies. Their revolutionary technology, Motion Amplification, is a video-processing product and software package that detects subtle motion and amplifies it to a level visible with the naked eye. RMS is also a UK approved distributor of Emerson/CSI Machinery Health Manager products and solutions.

The Reliability Training Institute is a UK & Ireland accredited Training Organisation for both Mobius Institute (MIBoC) and The British Institute of Non-destructive Testing (BINDT). Professional training courses in Vibration Analysis, Ultrasound and Asset Reliability prepare students to take the ISO certified examination. We use the very latest computer-based simulations and animations to help make even the most complex subjects understandable. Study options include Onsite, Hotel-based, Virtual Instructor-led and Self-paced courses.

[www.rms-reliability.com](http://www.rms-reliability.com)



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- VCAT II, Statham lodge, Lymm - 11th to 15th Oct
- VCAT I, Glenroyal Hotel, Co. Kildare - 18th to 21st Oct
- VCAT III, Stoke by Nayland Hotel, Essex - 15th to 19th Nov (Hybrid)
- VCAT I, Stoke by Nayland Hotel, Essex - 13th to 16th Dec (Hybrid)

##### Ultrasound Analysis (ISO 18436-8)

- UCAT I, Statham lodge, Lymm - 6th to 9th Sept
- UCAT I, The Stoke by Nayland Hotel, Essex - 13th to 16th Dec

**New:** Online self-paced community courses available for VA, Asset Reliability (ARP) and Ultrasound Analysis.

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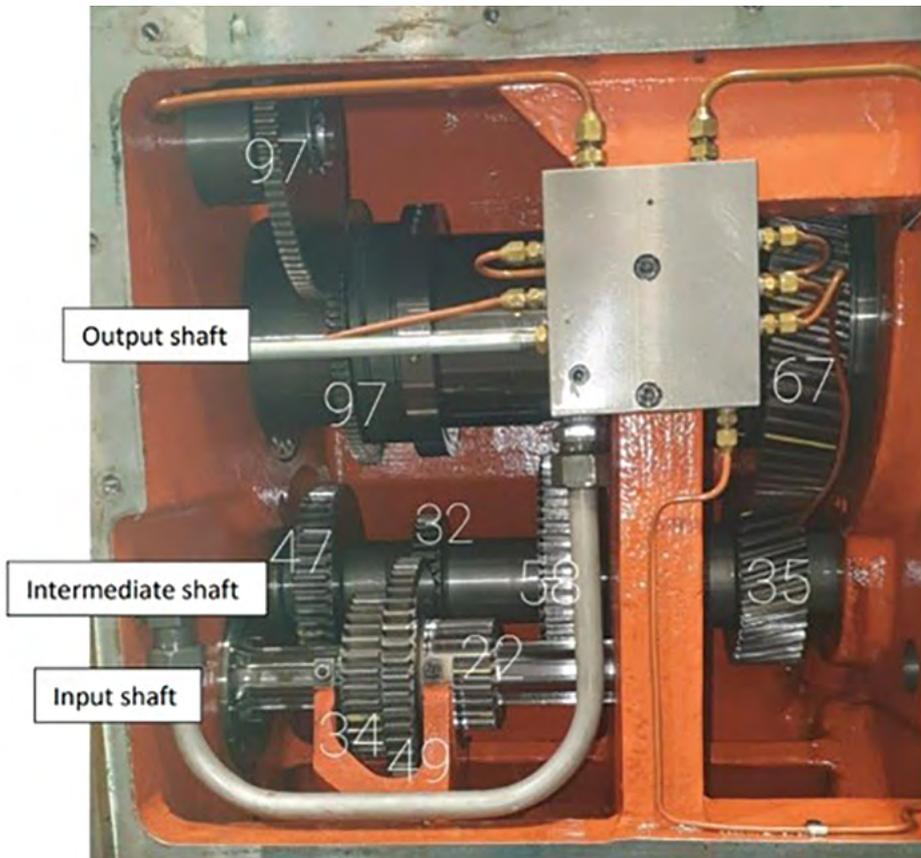


# Avonmouth Engineering Services Save Aerospace Company In Excess Of £100,000

Condition Based Monitoring is a proactive maintenance health check for all types of electromechanical equipment and is crucial for identifying underlying system performance issues without the need to stop production. Avonmouth Engineering Services Ltd, who are experts in this field, were happy to provide the service recently to the UK's leading aerospace company, Leonardo, to investigate a loud noise being generated by a lathe gearbox.

the number, location and specification of the gears and bearings in the gearbox - Avonmouth Engineering Services were able to pinpoint that the exact cause of the excessive vibration was down to one single bearing. Leonardo carried out the bearing change and have confirmed that the machine runs perfectly.

Leonardo was delighted that the problem could be so easily identified and rectified and that the critical piece of machinery is back to optimum performance. Condition Based Monitoring opens up a world of possibilities and opportunity for any business to monitor, diagnose and fully understand how a machine, or elements thereof, are performing in its operational environment. Without the need to cease function or production it is vital to Leonardo's planned maintenance programme with Avonmouth Engineering Services, which includes monthly CBM assessments, annual motor health checks and the service and calibration of manufacturing plant and equipment to minimise downtime and keep the production line moving.



*Internal gearing layout of the lathe*

The lathe is a critical item of plant at Leonardo as it is the first step in the gear machining process.

The cost to purchase a new machine would have far exceeded £100,000 and led to a loss of production.

Avonmouth Engineering Services, who have an integrated service partnership with Leonardo,

carried out detailed vibration analysis on the equipment. Vibration analysis is a non-intrusive method which can be used to detect obscure faults such as unbalance, resonance, misalignment or bearing failure. Combining the results with the technical drawings - which outlined

For more information visit:  
[www.avonmouth-es.co.uk](http://www.avonmouth-es.co.uk)

# Global PPE Leader At The Forefront Of Adherence To Post – Brexit Medical Device Registration

ASAP UK is among the first to follow the new process for Grade I Medical Device registration



Changes in the law post – Brexit regarding the registration of medical devices mean manufacturers, distributors and importers must follow new rules and guidelines. ASAP UK has already created all the necessary product technical files and is working towards meeting the requirements for registration under the new law; the company aims to be among the first to achieve this.

The Medicines and Medical Devices Act 2021, which dictates how the UK medical technology industry is regulated post – Brexit, came into effect on 1st January 2021; a key change is that the Medicines and Healthcare products Regulatory Agency (MHRA) is now solely responsible for registering medical devices for the UK market.

ASAP UK follows closely all legal and regulatory changes; the company's products are Class I Medical Devices and fall under EU Directive 93/42/EEC, which continues to apply in the UK. Class I devices are subject to a grace period and must be registered from 1 January 2022.

The new rules apply only to Great Britain; there are different rules for Northern Ireland. CE marking will continue to be recognised in Great Britain until 30 June 2023.

Madan Natarajan, General Manager at ASAP UK, commented; "Our commitment to adhering to all relevant Standards and Protocols is absolute; indeed, our company is built around this. We will always comply with new laws or changes to existing laws, which is critical to our customers

as they must have complete confidence in our products."

Under the new law, manufacturers based outside the UK must appoint a single UK Responsible Person (UKRP) to register the device with the MHRA; importers and distributors are not required to appoint a UKRP. If a medical device was registered with the MHRA before 1 January 2021 then it does not need to be re-registered.

ASAP UK was founded in 2019 and is part of a group that started in Malaysia as ASAP international in 1988; the company now has a presence in over 80 countries worldwide.

The company is launching its range of Cleanroom gloves at the Cleanroom Technology Conference at the National Conference Centre in Birmingham on September 14th - 15th; ASAP is on Stand E7.

For further information about the new guidance and the role of the MHRA see here [www.gov.uk/guidance/regulating-medical-devices-in-the-uk](http://www.gov.uk/guidance/regulating-medical-devices-in-the-uk).

For further information about ASAP UK please visit:  
[whyasap.co.uk](http://whyasap.co.uk)

# Why a Waste Water Sampling Company chose our Low Maintenance Wastewater Transfer Pumps



This is easily and quickly replaced without the requirement of special training or tools; this is an excellent benefit for 24/7 remote applications such as this where excess amounts of downtime cannot be tolerated and where often only low skilled staff are available to perform urgent repairs.

Being simple to maintain does not detract from their dependability and robustness, the absence of mechanical seals allows the pump to run dry indefinitely without damage. Operating at low speeds with the peristalsis pumping action facilitates self-priming and the handling of viscous fluids without issues. As the unit can run dry it also guarantees sample quality as the pump can be completely emptied of fluid before the next sample is taken preventing cross contamination.

## Wastewater Compliance Monitoring

All factories worldwide produce wastewater in some form. Whether it be from the washing of fruit and vegetables, washdown or rinsing of machines, cooling, or commissioning of equipment. It is the responsibility of the owners and staff to follow guidelines set out to protect people and the environment.

Due to increasing water scarcity, the requirements for trade effluent discharge consent and rising cost of trade effluent disposal, plant owners are seeking ways to reduce the cost of wastewater disposal, monitor waste output and how it can be reduced.

Sampling waste also allows operators to detect process leaks and trace its origin early before there are large losses in revenue. For example, it is possible for high value process liquids such as chemicals, juices, milk, or colourings to enter waste flows through valve leaks, pipework leaks or overflowing of vessels. Detecting this early and reacting not only protects the environment but also protects profits, a big incentive to regularly monitor discharge.

It can be difficult to accurately select a pump for these applications as contaminants are unknown, sometimes forming viscous abrasive sludges or leading to high amounts of dry solids content therefore causing clogging or dry running.

## Continuous Remote Wastewater Monitoring Design

A customer contacted us requiring sampling pumps for 24/7 monitoring across 15 different sites in the UK. They sample wastewater and had experienced issues with other pump technologies due to low water levels causing dry running. In addition to this, there are other complications such as fluctuating inlet pressures and unpredictable solid ingress including twigs, grass, and mud.

The client preferred a low maintenance and reliable pump solution due to the remote location of the pumps. They required the units to self-prime, handle solids without clogging and be quick and low cost to maintain in the event of a failure. The units operate at around 500L/hr at low pressures and are controlled remotely across the various testing locations, while away from site they need to be able to alter the speed, monitor the pump condition and reverse the flow in the event of clogging.

## Our Low Maintenance, Continuous Sampling Pumps

We specified 14 qty AMP 16 peristaltic pumps for this project known for their consistent reliability in slurry, sludge and wastewater applications while also being simple and cost effective to maintain.

Peristaltic pumps are simple in design as there is only one wearing internal part, the hose.

## Peristaltic Pump Benefits over Traditional Positive Displacement Pumps

The absence of valves and seals means that solids up to the size of the internal diameter of the hose can be passed without clogging. In the unlikely event of clogging, the unit is reversible meaning the pump can be unclogged by simply reversing the flow, another big benefit for this customer remotely operating across so many sites.

Peristaltic pumps have all the benefits of positive displacement pumps with few of the weaknesses. Their operation is slip free meaning they can handle both thin and viscous fluids without loss of efficiency, which can be experienced in other pump designs.

We fitted the pumps with hose leakage detectors which sends a signal to a control panel if the internal hose ruptures enabling engineers to perform maintenance quickly.

The modern roller design increases efficiency and reduces power consumption by up to 30% compared to other traditional peristaltic pump designs, this also leads to increased hose life and even with 24/7 operation the sites can expect years of trouble-free operation with maintenance and lubrication intervals as far as 12 months apart.

For more information visit:  
[www.northridgepumps.com](http://www.northridgepumps.com)

# Babcock Wanson Strengthens Its Position As A Leading Provider Of Energy Solutions For Industry With The Acquisition Of Thermigas

Industrial process heating equipment and solutions specialist Babcock Wanson is pleased to announce the acquisition of Thermigas, the French leader of decentralised liquid-heating applications in industrial processes.

The acquisition of Thermigas will allow Babcock Wanson to strengthen its environmental credentials and to deepen its offer with equipment which enables customers to optimise the energy consumption of their processes, thereby saving energy.

Founded in 1989, and taken over in 2005 by Mr. Patrice Le Du, the current CEO, Thermigas will benefit from Babcock Wanson's technical expertise and network of subsidiaries and agencies to accelerate the distribution of its products and develop its service activities on its installed equipment. In addition, its products can be directly combined with Babcock Wanson solutions. The two companies share many common points, including a know-how in combustion, an industrial customer base focused on the food sector and, above all, a philosophy based on the energy performance of its customers and the decarbonisation of industrial processes.

Thermigas has developed a range of products and services around its flagship patented product, the high efficiency gas immersion heater. The company had a turnover of €4 million in 2020 and employs about 20 technicians. This Brittany-based company has two production sites, including a robotic unit, and has a design office and a service structure. The know-how gained from 30 years of

experience in a wide range of industries enables the company to offer highly efficient products, thus contributing to its customers' energy transition.

This is Babcock Wanson's third acquisition since becoming independent from the CNIM Group in 2016, following on from acquisitions in the Netherlands (Reputabel) and Belgium (Maes) which enabled the development of services in these geographical areas. This latest acquisition fully reflects the group's ambitious development strategy, supported by private equity partner FCDE, which focusses on providing ever more energy efficient services and solutions through both organic and external growth.

Patrice Le Du, Managing Director of Thermigas, said: "The takeover of Thermigas by Babcock Wanson allows me to secure the future of the company and its employees, and also to ensure its long-term development. The merger of the two groups will allow me to gradually hand over the reins to the employees of Thermigas, while at the same time providing us with the support and backing of a European group such as Babcock Wanson."

Cyril Fournier-Montgieux, Chairman of Babcock Wanson, adds: "Babcock Wanson and Thermigas share a common business model balanced

between products and services, but also common values: reducing the energy and environmental footprint of our customers. It was therefore an obvious choice for us to welcome Thermigas into the Babcock Wanson Group."

Julien Di Marco, Partner, member of the Board of Directors of FCDE adds: "We are delighted to support the acquisition of a company as complementary as Thermigas for the Babcock Wanson Group. This acquisition, which is the group's third external growth operation since we took a stake in it, just a few months after the acquisition of Maes in Belgium in September 2020, will create strong synergies and strengthen the value proposition in the field of energy performance, which will benefit both the new Babcock Wanson group and its clients."

Babcock Wanson offers a complete range of products and services for boiler houses and other process heating needs, from steam boilers, thermal fluid heaters, rapid steam generators and hot water boilers to VOC and odour treatment by thermal oxidation, water treatment or process air heating solutions. The company aims to help optimise customer's energy production with high quality products and efficient service.

For more information, please contact Babcock Wanson on 020 8953 7111 or [info@babcock-wanson.com](mailto:info@babcock-wanson.com) or go to [www.babcock-wanson.com](http://www.babcock-wanson.com)



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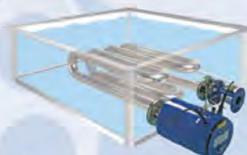
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# Lanemark Brings Heating Benefits To Small Brewery Application

A new gas process heating system from Lanemark Combustion Engineering is now fully operational at a leading micro-brewery in London. Villages Brewery is benefiting from Lanemark technology which plays a key role in a new facility – with particular gains noted in terms of operational efficiency.



"We have installed and commissioned a liquid heating TX 25E burner package on a brewing kettle supplied by Bespoke Brewing Solutions, with whom we liaised closely throughout the project," says Lanemark's Process Burner Sales Manager, Adrian Cadman. "This provides a capacity of 30 hl – or 18 UK barrels – and is now central to Villages Brewery's production."

The Lanemark installation – which utilises the existing natural gas supply and includes an exhaust fan, damper, digital temperature controls and gas valve train – is typical of the company's extensive involvement in the mini- and micro-brewery sector. The burner is installed on the external wall of the circular vessel, firing through the structure into a submerged 2½" nb. stainless steel tubular heat exchanger.

"This takes the form of a helical coil located at the

base of the tank in order to deliver the optimum blend of maximum heat transfer and minimum intrusion into the available space," adds Adrian Cadman. He explains that the exhaust fan then pulls the products of combustion through the system to optimise even distribution of heat.

With the benefit of Lanemark's own TxCalc specification software, which identifies the ideal combination of system components, efficiencies in excess of 80% can be readily achieved, as is the case at Villages Brewery. This is further enhanced by low exhaust temperatures of typically 180°C, which is markedly lower than alternative systems where up to 300°C, reducing efficiency to just 50%, can be noted.

Archie Village, Director at Deptford-based Villages Brewery – which distributes to a wide range of pubs and bottle shops throughout the capital –



highlights the role played by the new installation.

"The facility is now central to all our brewing operations, so it is vital that it performs reliably every time," he says. "The overall aim of the project has been to facilitate an increase in production output while building on the high quality that is at the heart of our reputation – and the Lanemark system is already delivering in both respects."

These are factors that are demonstrated by the ability of the burner installation to raise the temperature of the liquid from a starting point of 65°C to the optimum process value of 102°C in just 66 minutes. The modulating gas and air control of the system then allows the target temperature to be maintained – of particular note in brewing applications where the need to maintain a 'rolling boil' is often vital.

"There has been a steady increase in the number of small brewing operations in the UK over a number of years and we have been able to develop and provide heating solutions that match," comments Lanemark Director, Jeff Foster. "The benefits that are noted at Villages Brewery not only reflect this trend, but are also set to provide the brewer with a reliable platform upon which to build further success."

For more information visit:  
[www.lanemark.com](http://www.lanemark.com)

# Brewery Has No Regrets Following Rebellious Move From Steam To Thermal Fluid

In 2015, with business improving but original process equipment reaching end-of-life, Rebellion Beer Company bucked the trend and, with impartial advice from heat transfer specialist Fulton, replaced its ageing steam boiler for a thermal fluid system. Now, six years on, we approached Rebellion's Mark Gloyens to update us on how brewery life has coped with the switch.



Anyone running a brewery will tell you just how critical the boil phase of the brewing process is; and when Rebellion set out on its journey from steam to thermal, they were warned that they'd never succeed in getting that clean flavour achieved from a steam-driven rolling boil.

"The move from steam to thermal was a leap of faith on our part, but the warnings received from other breweries have been proven to be incorrect!" says Rebellion Beer Company's Mark Gloyens. "Product quality has improved because we now have more control over temperature for the wort boiling process than ever before. We're getting a very good quality boil that is controllable

and we have achieved everything we wanted from the move from steam to thermal fluid".

Thanks to the control and flexibility that the thermal system affords Rebellion, the brewery has had the ability to achieve various size batches as and when required. Until recently, this has enabled them to process research and development batches and has been especially useful throughout the pandemic when, at the beginning, throughput was decimated because pubs were forced to close. However, as lockdowns came and went, Rebellion successfully pivoted its business and started selling direct to the consumer via a home delivery service, which meant throughput very quickly

returned to pre-pandemic levels, currently two to three batches per day, with each boil lasting up to 90 minutes.

"The beauty of the thermal fluid installation is its flexibility and ability to very easily adapt our changing brewing strategies," says Mark. "Historically we would have been doing two brews per day to achieve maximum output, but because of its flexibility, we are now able to shut the thermal fluid heater down for a day per week to deep clean the brewhouse and increase output to three brews per day for the remainder of the week. Something that would have been very difficult to achieve with steam."

Beyond the control and flexibility, there are many other factors that have had a positive impact on Rebellion Beer Company, as Mark explains: "A steam boiler is essentially a pressure vessel and regulations state that pressurised systems must undergo an annual insurance inspection. This inspection would often take the steam boiler offline and mean our brewing processes were down for a day or more, with disruption from the downtime potentially being felt for several days after. Additionally, with even the best water treatment programme in place, steam at pressure can be very corrosive, leading to problems with steam traps, flanges and pipework, which we always seemed to be maintaining and was always therefore another potential for process downtime.

"With thermal being more of a closed loop system, we've not experienced the same issues with leaking gaskets, flanges, etc., making the whole installation not only look but also feel so much more reliable than steam!".

In putting a figure on the annual cost savings

of maintaining a steam system – including servicing, water treatment, chemical dosing, etc. – compared to thermal fluid, Mark Gloyens estimates that the thermal fluid system is much lower and could be at least half that of the previous steam boiler installation. And six years on, Mark estimates that the savings made compared to maintaining the old steam system – and despite the thermal fluid installation being a more expensive capital outlay initially – has certainly contributed significantly to the return on investment, with the investment now fully paid for.

Expanding on the flexibilities of the thermal fluid system, Mark has also announced that Rebellion is about to tap into the existing brewhouse line to create a small-batch development brewery and yeast propagation plant on the site. "It's been such an easy expansion to achieve. We've just been able to tap into the existing thermal fluid line and use the system for another duty without impacting on everything else." says Mark.



The new development line is capable of brewing five hectolitre (500 litre) batches and will enable development or commercial batches – such as strong beers or one-off batches that may not appeal to the wider consumer – to be processed without having to invest in a full 4,000 litre brew.

Summarising, Mark Gloyens says that whenever he's asked if Rebellion is happy with the thermal fluid installation from Fulton, he simply tells them to come and take a look because it speaks

for itself. "It's just a neat, compact installation that's relatively maintenance free and extremely flexible!".

And when asked about his advice to anyone considering a new brewhouse or complete overhaul of existing plant; and perhaps sitting on the fence when it comes to considering steam versus thermal? "You obviously need to consult the experts as we did when we approached Fulton over six years ago. They were completely unbiased because they manufacture both steam and thermal fluid solutions." . says Mark. "But for Rebellion Beer Company, a thermal fluid solution was a no brainer. It's more cost-effective, more reliable, relatively maintenance free and a much neater, more compact system that still provides the quality of heating needed for brewing. It's just a better way of doing it!"



For further information on its range of steam- and thermal-based heat transfer solutions for brewing processes and brewhouses, visit [www.fulton.co.uk](http://www.fulton.co.uk), email [sales@fulton.co.uk](mailto:sales@fulton.co.uk) or call the office on +44 (0)117 972 3322

# Riello supports 100% hydrogen initiative

Through its participation in the Hy4Heat programme, Riello is helping to assess the potential for, and implications of, using 100% hydrogen in the UK gas network as a carbon-free alternative to natural gas.

Independent testing by Enertek International Ltd. indicates that Riello burners operate as reliably and efficiently with hydrogen as they do with natural gas – requiring only a change to the means of flame failure detection.

The Hy4Heat programme is sponsored by the Department for Business, Energy and Industrial Strategy (BEIS) and managed by ARUP+. It is divided into several work packages and Riello was asked to join a consortium and provide burners for Work Package 5, commercial appliances, which includes commercial air heaters and radiant heaters.

The burners supplied for the project were shown to provide comparable performance with hydrogen as with natural gas. Because there are no carbon oxidation ions produced

in hydrogen combustion, the flame failure detection was changed from an ionisation probe to ultra-violet sensors, with a corresponding change to the burner control box. Subsequent development of the original control box now allows direct connection of a UV sensor in place of a flame ionisation probe, further simplifying any modification requirements when exchanging between the two fuels.

The test programme has now reached the point where the appliances are being assessed for EC Type Approval by a Notified Body.

A new 'Publicly Available Specification' (PAS4444) covering hydrogen appliance testing has been developed by BSi within the Hy4Heat programme so the testing is based on this and existing natural gas standards," explained Riello Technical



Director Bernard Dawson. "In fact, there are many factors that need be addressed if hydrogen is to replace natural gas, most of them outside our sphere of influence. So we are focusing on ensuring that safe, efficient combustion equipment is in place when the switch to hydrogen becomes reality," he continued.

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# Flame-Retardant Henkel Adhesives Used On Industry-First A2 Spandrel Panels

Speedpanel, part of the Speedclad group of businesses, has developed a range of insulated composite spandrel panels that provide both extremely quick building encapsulation and fire-retardant properties in accordance with the latest regulations.

Notably, the company worked in close liaison with adhesive expert Henkel to identify the optimum flame-retardant bonding product for the panels. In a construction market still reeling from the tragic Grenfell Tower fire in 2017, the resulting Speedpanel A2 Glass and Speedpanel A2 Aluminium carry an independently certified fire rating of A2-s1 d0, creating a huge USP for the company and opening up vast market potential in both new build and replacement façade projects.

Speedpanel insulated composite panels use adhesives to bond various materials together. However, achieving the required A2-s1 d0 fire rating for the panel was to prove challenging as many adhesives feature solvents, isocyanates or PVC, all of which are highly flammable.

"For this reason, we opted to partner with Henkel, to develop a panel construction using a flame-retardant adhesive," says Fraser Brown, Regional Director at Speedclad. "As a result of our collaboration we now have a suite of industry-first aluminium and glass-faced spandrel panels that have been independently tested by WarringtonFire to achieve A2-s1 d0, in accordance with BS EN 13501-1 2018."

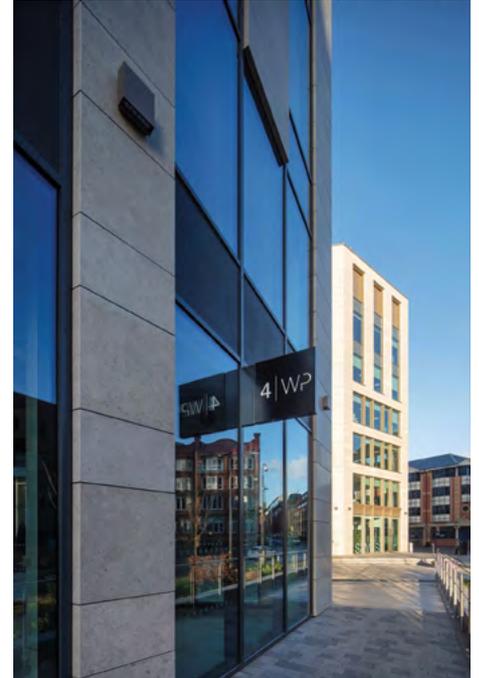
Looking to ban the use of combustible material in the external walls of certain high-rise buildings in England, the Government added Regulation 7(2)

to the Building Regulations In November 2018. It states: "Building work shall be carried out so that materials which become part of an external wall, or specified attachment, of a relevant building are of European Classification A2-s1 d0 or Class A1 classified."

Generally, all materials should comply with a minimum fire classification of A2 s3 d2. However, if a building falls within the 'relevant building' class, this fire classification is redundant and all materials need to be A2-s1 d0 rated, effectively a higher level of classification. 'Relevant buildings' include residential and institutional buildings more than 18m high.

In terms of composition, Speedpanel products feature a combination of various steel trays, insulated cores, proprietary interlayers and front faces. Any composite panel built of several materials and sold as a single panel - even if the materials are individually A1 fire-certified (as is the case with Speedpanel) - will require re-certification as the complete panel.

Speedpanel approached several leading adhesive manufacturers to help it meet requirements. Although a number were prepared to offer solutions that "might" succeed, Henkel differentiated itself by working with Speedpanel to understand the particular application demands.



Following research and trials, Henkel today supplies two types of adhesive for different bonding tasks within the Speedpanel products. Furthermore, Henkel made proposals in terms of suitable application methods that would optimise adhesive quantity and delivery speed: everything from automated spraying to simple pour and spread.

"Without doubt, Henkel's input and technical support throughout the development process proved fundamental to the success we now have," concludes Fraser. "The potential for Speedpanel is truly huge. In addition to traditional builds, there is the enormous BSF [Building Safety Fund] framework, where Speedpanel can provide a key part of the solution."

For more information go to:  
[www.henkel-adhesives.co.uk](http://www.henkel-adhesives.co.uk) and  
[www.speedclad.co.uk](http://www.speedclad.co.uk)

# Leaders in Corrosion Prevention & Sealing Technology, Premier Coatings Ltd, Launch New Website

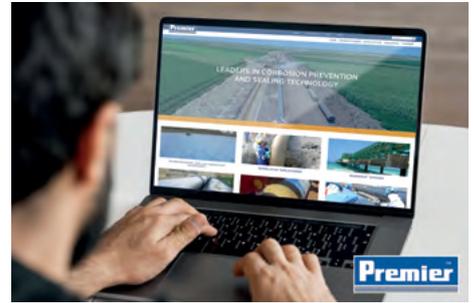
Premier Coatings Ltd., expert manufacturers of corrosion prevention and sealing products, are thrilled to announce the launch of their new website, [premiercoatings.com](http://premiercoatings.com).

The site features an intuitive Surface Preparation Guide, an interactive 'Contacts' page and a new 'Product Finder' which clearly showcases Premier Coatings Ltd.'s bespoke and off the shelf solutions, that provide enduring protection against corrosion and chemical attack to buried and exposed pipes, valves, fittings, steelwork, marine structures, tanks and concrete bunded areas. The helpful filter function on the Product Finder makes finding the right products so much easier! Customers can simply filter through the options to find the best solution for their corrosion prevention needs.

As Premier Coatings Ltd. are specialists in Waterproofing and Gas Resistant Membranes, they are particularly excited to showcase their range of Premseal products & their capabilities on the new website.

Managing Director of Premier Coatings Ltd., Steve Crawley, shared "The launch of our new website is a step in the right direction for Premier Coatings Ltd. Our aim is to keep evolving our brand and highlight all the excellent products and systems we have to offer. Having a world class website is essential to achieving these goals."

For over 39 years, Premier Coatings Ltd. have



been providing industries with long-term corrosion prevention solutions, whatever their requirements. The new website offers customers a pleasant user experience and an intuitive way to easily find what they're looking for. For any product queries or quote requests, visitors to the website are only a couple of clicks away from contacting a member of the expert sales team.

For more information visit:  
[premiercoatings.com](http://premiercoatings.com)

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# Critical security vulnerabilities in Realtek chips affect more than 65 hardware manufacturers

The list of hardware manufacturers affected by the recent Realtek vulnerabilities is rather long: AsusTEK, Belkin, D-Link, Edimax, Hama, Logitech, Netgear and many more equip their Wi-Fi devices with vulnerable software development kits (SDKs) from Realtek.

A vulnerability within the Realtek RTL819xD module allows hackers to gain complete access to the device, installed operating systems and other network devices. "Our security researchers have discovered and analyzed this vulnerability, which affects hundreds of thousands of devices. We notified Realtek, and they immediately responded and provided an appropriate patch. Manufacturers using vulnerable Wi-Fi modules are strongly encouraged to check their devices and provide security patches to their users," said Florian Lukavsky, managing director of IoT Inspector. The security platform probes the firmware of IoT devices such as routers, IP cameras or printers. The company has already published a number of coordinated security advisories with affected manufacturers in the past, thwarting potential hacking attacks. For this particular case, IoT Inspector is making its platform available to potentially affected manufacturers and users for a free check. Only by analyzing each firmware can it be determined whether vulnerable components are still being used.

## Uncontrolled supply chains that serve hundreds of thousands of devices

The chips supplied by Realtek are used by almost all well-known manufacturers and can be found in VoIP and wireless routers, repeaters, IP cameras, and smart lighting controls - just to name a few. A detailed list of affected devices is included in IoT Inspector's advisory, but the list may potentially be much longer. For an exploit to succeed, an attacker usually needs to be on the same Wi-Fi network. However, faulty ISP configurations also expose numerous vulnerable devices directly to

the Internet. A successful attack would provide full control of the Wi-Fi module, as well as root access to the embedded device's operating system. In total, a dozen vulnerabilities were found in the chipset. "There is currently far too little security awareness for devices in these categories - neither among users, nor among manufacturers, who blindly rely on components from other manufacturers in their supply chain without testing them. As a result, these components or products become an unpredictable risk," warns Florian Lukavsky of IoT Inspector. Manufacturers are therefore urged to implement guidelines for IoT supply chain security.

## Regular patches and updates are essential

This is also the conclusion of Forrester's latest study, "The State of IoT Security - 2021". Following corporate website hacks, attacks on IoT devices such as routers, IP cameras and many more rank second in terms of attacks. Complex patch policies on enterprise networks and hard-to-access device environments block timely protection. Moreover, the lack of a physical user interface in the form of a screen makes the need hardly noticeable - unlike a PC, where systems can report necessary patches and updates. According to Forrester, only 38 percent of enterprise security decision makers worldwide have sufficient policies and tools in place to properly manage IoT devices. "We find new security vulnerabilities every day, most of which are directly mandated by manufacturers. The IT security mindset needs to include all devices connected to networks, regular audits and



patches. Sometimes, a patch is itself the source of a new vulnerability. Few affected companies respond as quickly and thoroughly as Realtek. However, manufacturers are now also required to patch vulnerable Realtek components in their devices, while users are urged to check their devices and update them if necessary," concludes Florian Lukavsky of IoT Inspector.

Source: IoT Inspector GmbH

## About IoT Inspector

IoT Inspector's technology enables automated firmware testing of IoT devices for critical security vulnerabilities in just a few clicks. The integrated Compliance Checker simultaneously uncovers violations of international compliance requirements. Vulnerabilities for external attacks and security risks are identified in the shortest possible time and can be remedied in a targeted manner. The solution, which is easy to use via the web interface, detects unknown security risks for manufacturers and distributors of IoT technology. This is especially true for products manufactured by an OEM partner. Infrastructure providers, consulting companies, scientists and system houses also benefit from the offering and can provide added value to their customers.

With IoT Inspector Edu, universities and research institutions can access the entire platform free of charge: <https://www.iot-inspector.com/iot-inspector-edu-students-academia/>.

# The Great Northern Distillery in Ireland with Upgraded Cooling System from ICS Cool Energy

Bespoke approach to cooling improvements at the distillery fermenters contribute to better quality of product and increased production.



ICS Cool Energy, an international market leader specializing in complete temperature control solutions for manufacturing process and facilities applications, delivered efficiency and sustainability focused enhancements to the cooling systems at the Great Northern Distillery in Dundalk, Co. Louth in Ireland. The project involved a tailored approach with temporary cooling installations preceding the permanent, high efficiency and low global warming potential (GWP) system.

"Quality of our products and sustainability of our operations is very important to us," said Brian Watts, distillery manager at the Great Northern Distillery. "Producing high quality single malt whiskey requires precise temperature control throughout the entire process. We were looking for a partner that could help us modernize the existing cooling of our distillery fermenters. We wanted to make sure the new system is tuned to our requirements and would also allow us to

increase production. ICS Cool Energy proved to be experts for the job."

ICS Cool Energy team inspected the distillery's cooling system, which consisted of a cooling tower and an underground tank. The distillery was originally founded on the site of the former Great Northern Brewery in Dundalk, and the site inspection revealed that the fermenters had been bespoke built, with no design data available. The fact that the incoming water temperature is dependent on the ambient temperature, and that there was little operational data available, caused an additional challenge to estimate the cooling demand.

Following the on-site inspection and calculations for the system's requirements, ICS Cool Energy installed a hire Chiller 375 with pump and tank, connecting it to an incumbent heat exchanger installed in the common flow from the cooling

tower to the fermenters. The hire installation gave the Great Northern Distillery the chance to diagnose and adapt the system to their requirements.

"Throughout the following months, we made several modifications to the pumps on both the chilled water and product sides of the fermenters, adjusting the chilled water setpoint until we finally achieved the required result," said Anthony Duff, maintenance manager at the Great Northern Distillery. "The temporary, hire system from ICS Cool Energy gave us the flexibility to keep our production running, while monitoring and adjusting all the system's parameters to determine the most efficient option for a permanent solution."

Following the hire period, the Great Northern Distillery decided to install a permanent Imperium air cooled chiller designed specifically for process applications. The Imperium chiller delivers high performance and reliability thanks to the inverter screw compressor technology and works with low GWP R1234ze refrigerant for reduced environmental footprint.

"To each of the projects, ICS Cool Energy brings the experience from designing and delivering thousands of solutions for distilleries and beverage manufacturing applications of all sizes," said Craig Hodgson, operations manager Ireland at ICS Cool Energy. "We're proud that we had the opportunity to leverage that expertise and help the Great Northern Distillery create the operational environment they needed to make the best quality product."

For more information on ICS Cool Energy complete process temperature control solutions, please visit <https://www.icscoolenergy.com/>

# Cooling tower cleaning and preventive maintenance reduces energy costs

Save cooling tower energy and maintain performance through simple tasks - Gary Dicker, Technical Sales Director, DHD Cooling

A cooling tower allows building owners and operators to take advantage of low cooling water temperatures and higher rates of heat rejection per square metre inherent in evaporative cooling systems. A well maintained cooling tower enables cooling systems to perform at optimum efficiency, reliably and cost-effectively, with contractors who maintain cooling systems able to service their customers with comprehensive and routine cooling tower maintenance programmes that should maintain cooling performance for many years..

Unfortunately, the humble cooling tower is often the forgotten component of the water cooling system when it comes to maintenance, but extremely high up the table when it comes to safety, so while certain tasks are regularly carried out others can be overlooked. A well maintained cooling tower should be able to reliably deliver its design fluid temperature and flow rate relative to the ambient condition indefinitely, but since its heat transfer operation creates a natural "air-scrubber" environment, removing impurities from the cooling air as well as the circulating water, the cooling tower needs regular routine inspections and maintenance to continue performing at its best, and a small deterioration in performance should be expected, but easily managed.

## The importance of heat transfer

Cooling towers use large volumes of ambient air to take heat away from a process through sensible and non-sensible cooling. Non-sensible cooling is a term that describes heat rejection through evaporation, where air will gain moisture until it reaches saturation, which is when the air is fully laden with water at 100% RH. This increase in water content requires energy to occur and this is obtained by taking heat out of the circulating water, reducing the temperature of the water in the process. Sensible cooling also occurs, which is where the colder inlet air reduces the temperature of the water due the difference in the air and water temperature, and in turn heats up as it

travels through the heat exchange media.

Because of this, one of the most critical maintenance activities of cooling systems is to ensure that the heat transfer has the best conditions to occur.

The best conditions mean that the airflow is optimal, the heat exchange surfaces are clean and correctly installed, and the water distribution is balanced and operating correctly.

## Managing airflow

Unless it is a natural draft cooling tower, the airflow will be created by fans which are driven by motors that are either directly attached to the fans or operate through gearboxes or fan belts. Maintenance on the air moving equipment will focus on the condition of the fans themselves, ensuring that the blade angles are set to achieve the necessary airflow if they can be adjusted and that the gearboxes or belts are operating properly with sufficient lubrication in bearings and gearboxes.

The heat exchange media in the cooling tower should be selected to offer the best trade-off between the tendency to foul and the amount of heat exchange surface. Maintenance on these components focuses first on the cleanliness of the heat exchange surfaces, as well as ensuring that the correct type of heat exchange media is being used and that it is properly fitted. Incorrect fill type or poor installation can lead to the packs becoming blocked quickly or could result in higher pressure drops reducing airflow. Poorly fitted fill packs can lead to air bypassing the water through gaps in the fill pack and results in loss of thermal performance and higher drift rates.

## Comprehensive maintenance plan

The distribution systems in cooling towers are also essential to efficient operation. Heat exchange surfaces are only effective if there is a steady flow of water over them, blocked or broken nozzles can



lead to an imbalance of water flow which results in variations of wetting rates or even dry spots throughout the fill where the airflow will be less effective.

Water flow, airflow and heat exchange surface are the essential ingredients in cooling tower thermal performance, but these three critical subsystems don't make up the entire system.

The remaining systems are related to safety, access and containment, which carry a significant importance when concerned with the safe and effective operation of a cooling tower.

These systems include drift eliminators that prevent harmful water droplets from leaving the cooling tower, air inlet honeycombs that prevent direct sunlight from entering the cooling tower and reduce airside contamination, access systems that allow safe access for maintenance and the general fabric of tower to provide containment of fluids and protection to operators.

All these things should be considered in a comprehensive maintenance plan which goes beyond cleanliness to ensure that you have not only a safe system but a high performing system. Cooling towers are ultimately maintainable through a series of interconnected subsystems that can all be relatively easily, and cost effectively replaced. By allowing correctly maintained systems to operate at peak efficiency, they will work safely for many years.

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## Wolf provides certified lighting for safe use in hydrogen atmospheres

Hydrogen - a clean, carbon neutral energy source emitting no CO<sub>2</sub> - is often described as the fuel of the future, though it's already being used across a growing range of applications in the UK and overseas.

While acknowledging that hydrogen's 'green planet' credentials are highly encouraging, technical experts at Wolf Safety believe the risks it can potentially cause should not be underestimated.

Hydrogen is an element which creates a highly hazardous explosive atmosphere, not only because of its low ignition and high combustion properties but also due to its tendency to leak easily from storage tanks. It is increasingly being used to power fuel cell vehicles including buses, trucks and a test train now on trial in Scotland. Future applications could include powering construction machinery, ships, even aircraft.

Wolf Safety, global leaders in the design and manufacture of portable and temporary lighting, are well aware of hydrogen related risks and offer

safe, certified lighting solutions for use in hydrogen atmospheres.

Says Michael Morley, the company's Technical Director: "It is important that while developing new applications for hydrogen in pursuit of green and clean solutions, no-one should lose sight of its potential to cause explosion.

"Engineers and technicians working in locations where hydrogen, or other explosive gases or vapours, could be present can be confident that Wolf has a safe, certified and effective portable and temporary lighting solution which can be tailored to meet their specific needs.

"The use of ATEX or IECEx certified lighting is a vital safety precaution in hydrogen atmospheres."



The company's range of portable lighting, temporary lighting and power distribution solutions includes products already certified for safe use in workplaces where hydrogen gas could be present.

Their range also includes mains and low voltage versions of floodlights and luminaires, battery powered LED work lights, torches, handlamps, head torches and warning lights.

For technical information visit:  
[www.wolfsafety.com](http://www.wolfsafety.com)

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## Five Speedors for Ineos

Ineos, the global chemicals company, has had five new Hart Industrials doors installed at its Newton Aycliffe, Co Durham, site in a project being carried out by Hawkins Construction.

Four Speedor Storms and one Speedor Mini were part of the rebuild and refurbishment of the Ineos facility.

"We have installed 25 doors on the site in recent years," says Gordon Kipling, Hart's regional sales manager. "It is good to see quality and reliability of product remains a priority."

Mr Kipling adds: "Speedor Storm is an external high speed door designed for frequent use in high traffic situations where wind resistance is required on large openings up to 8m.

"The energy saving potential of this door is also particularly high. This fast action roller door has a unique guide system offering wind resistance up to class 5. Speedors improve energy efficiency, maintain a better working environment and temperatures within the building."

They are manufactured under ISO 9001:2015 and their recommended operations mean they are suitable for high usage up to 1 million operations.

Mr Kipling continues: "Hawkins Construction has



been a great partner to work with on this important project and we look forward to working with them again in the future."

www.hartdoors.com

t: + 44 ( 0 ) 191 214 0404

# Tighter budgets strengthen need for efficient tool management

As engineering managers cope with relentless pressure to deliver improved productivity, often with fewer skilled hands and tighter budgets, the benefits of professional tool storage and management become stronger than ever.



Snap-on Industrial's Level 5™ automated total asset management system brings order to any workplace, enabling engineers and technicians to track tools from one central point. It provides complete reports on everything managers or supervisors need to keep an eye on, even advising when a tool needs to be refilled or re-ordered.

The threat of foreign object damage is a real and present danger but Snap-on Level 5 minimises the risk of human error, ensuring greater protection against FOD.

Engineered to track individual tools by user, without bar codes, scanners, RFID tags or other add-ons, the system works at the speed its users demand. Other systems require additional steps to scan or log activity but the Snap-on system does this automatically.

Level 5™ ATC boxes are network ready, using either Ethernet or wireless connection. That enables users to review activity at all Level 5 boxes in your location from one central computer, avoiding the time consuming need to inspect each box. Major benefits include:

- No individual tool scanning required;
- No RFID tags to install or replace;
- No limitations on tool size: from ¼" screwdriver bit to just less than the size of the drawer;
- Intuitive interface, with an easy to use touchscreen

- Audible voice confirmation of tool removal and replacement
- Automatic locking for maximum security
- Errors announced and displayed to indicate incorrect tool position or advise when a drawer is not closed.

The administrator can identify active users, view all boxes on the network, whether they are on or off-line, and see the status of each box including the number of tools issued. System alerts, for example sending e-mails to supervisors, can be customized for lost or broken tools or to meet calibration requirements. Reports can be created on each tool's frequency of use, inspection and calibration dates as well as specific location requirements.

Finding the right tool for the job in hand can take up even more time if the tool is difficult to spot. Snap-on solutions for better visibility include coloured, oil resistant foam inserts in profiled drawers, along with easily identified tool handles.

The more organised the workplace the easier and quicker it is to meet schedules. Snap-on offers complete tool audits to determine what level of tool control each customer needs. Special tool sets can be designed to meet specific requirements.

Cabinet security is essential to efficient tool management. Snap-on's solution to the problem of using keys, which can be lost or shared with others, is simple: don't use keys at all.

Level 5 boxes are equipped with Keyless Access Control, giving users the ease of access they need with security built in. The control system can be configured with magnetic cards, barcodes, PIN numbers and proximity cards. Snap-on's proprietary software enables managers to control access from a system or network.

Says Richard Packham, Director UK & Europe for Snap-on Industrial: "Snap-on's automated system takes tool management to an entirely new level, giving workshop managers and other authorised users easy access to the tools they need for the job in hand while protecting against foreign object damage. The ability to monitor several boxes from one central computer offers managers a huge time saving advantage."

For technical details visit:

[www.snaponlevel5.com](http://www.snaponlevel5.com),

call (01536) 413904

or e-mail:

[ukindustrialmarketing@snapon.com](mailto:ukindustrialmarketing@snapon.com)

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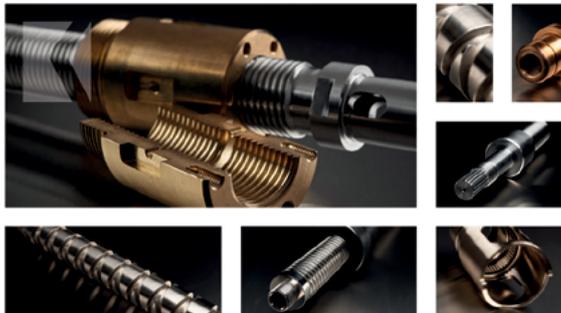
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# Eliminating chatter through vibration analysis

Vibration is all around us. In fact, to the untrained ear, vibration might seem to be part and parcel of the manufacturing environment. To some extent, that's true – vibration is a common by-product of the rotating tools used in milling – but to machine specialists, vibration can lead to chatter and be the cause of poor-quality parts and excessive cycle times.



In order to avoid chatter and eliminate its impacts on performance, including increased tool wear and poor surface quality on components, machine operators spend a significant proportion of their time determining the ideal setup of individual jobs. This approach often centres around trial and error tactics – from reducing speed and adjusting feed rates through to varying axial and radial depths of cut.

This process takes time, but it has always been worth the investment, with the ultimate goal to extend the life of tools and produce more high-quality parts in less time.

In milling environments, more vibration generally means more problems – and the greater the need for adjustment in speed and feed in order to protect parts and setups from failure. Key to overcoming this challenge is vibration analysis – the process of gathering information about vibration which informs the selection of optimal, stable speeds and feeds when machining parts.

## Monitoring machine and tool condition

By monitoring the vibration of tooling and machinery setups, manufacturers can avoid unexpected machining trouble and improve accuracy and output quality.

To achieve this, vibration analysis has four key principles – time domain, frequency domain, joint domain and modal analysis – each of which provides specific information on the working conditions and features of the vibrating part.

Time domain, for instance, measures the amplitude of a vibration signal. Alone, this can make it difficult to identify where the amplitudes happen and, subsequently, isolate and calibrate machines appropriately.

That's where frequency domain comes in, looking at each of these signals – or waves – at set points to understand how its amplitude changes at

distinct frequencies. As many vibration-related challenges occur at specific frequencies, its cause can be better identified based on variations in amplitude at certain frequencies, making these two principles of vibration analysis essential – both of which are paired through the third principle, joint domain.

Finally, modal analysis takes into account the natural frequencies of vibration based on the structural materials of the setup, the machine and the workpiece. In practice, this creates a baseline against which the vibration analysis can accurately identify when, and to what extent, a tool setup and machine are outside of the desired calibration for a specific job.

By carrying out a vibration analysis, machine operators are able to identify the optimum speed for a particular job, using a specific setup on a specific machine.

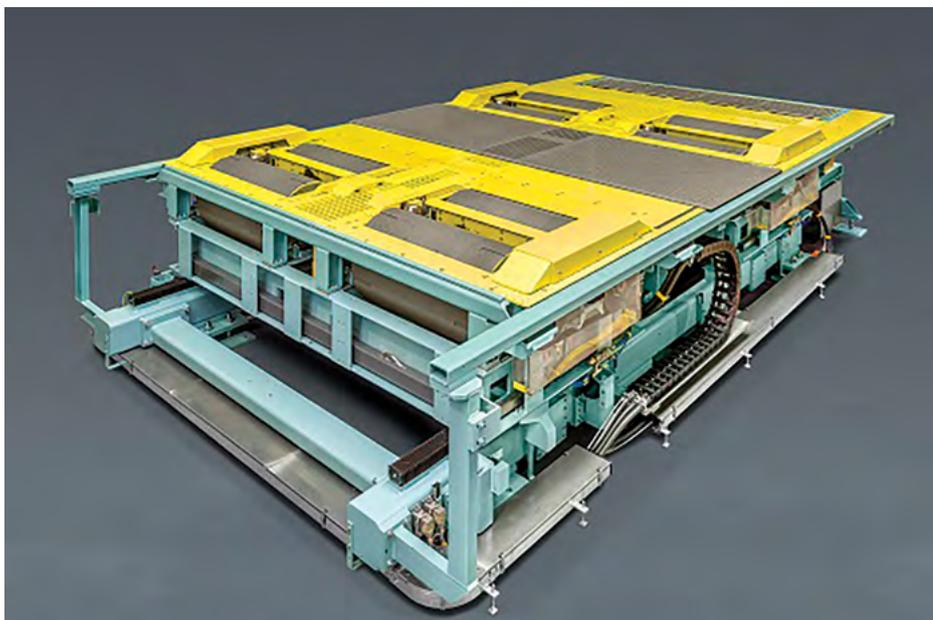
Now, with MSC MillMax® – the milling parameter selection tool from MSC – it is possible to measure vibration frequencies and optimise setups in a matter of minutes. By equipping operators with accurate insight, setup and cycle times can be reduced, efficiency enhanced and quality of output heightened.

MSC MillMax® measures the frequency of each tool and, in almost real-time, displays the results on a digital dashboard which calculates the precise, stable speed, feed rate and width and depth of cut to maximise performance. Alongside this, the system determines the best speeds for surface finish and accuracy.

To discover the full benefits of MSC MillMax®, visit: <https://www.mscdirect.co.uk/MSCMillMax/>

# BEP Europe uses HBK torque meters for the calibration of roller testing systems

BEP Europe in Bruges, a manufacturer of testing systems for assembly lines in the automotive industry, utilises HBK's range of HBM T40B torque meters and a TIM-PN measurement amplifier for the calibration of braking forces in new test benches.



To minimise the error margin of the measurement data as much as possible, BEP has defined a precise procedure for calibration/verification. The manufacturer of test benches uses the measured values of HBK's torque meters as a reference value for the roller test benches.

As part of Burke E. Porter (BEP) Group, BEP Europe is one of the leading manufacturers of testing systems for assembly lines, that are supplied to the plants of practically all the well-known automotive brands. The testing systems are set up at the end of the production lines for the testing and adjustment of various vehicle parts and functions, including brakes, suspension and road handling. They adjust lighting, wheel alignment and test sensors for Advanced Driver Assistance

Systems (ADAS), Adaptive Cruise Control (ACC), Head-up Display (HuD) and assisted parking.

Frank Verschuere, supervisor of the automation department within BEP said: "The roller test benches are equipped with four sets of rollers for four wheels, so that a car wheel sits between two rollers. Each set of rollers is driven by an electric motor. For each set we measure the force brought to bear by the electric motor on the car tyres, so that we can measure both the car's power and the braking force. We also have to take into account the mechanical frictional losses and electric losses in the electric motor."

The test benches and testing procedures are developed according to the end customer's

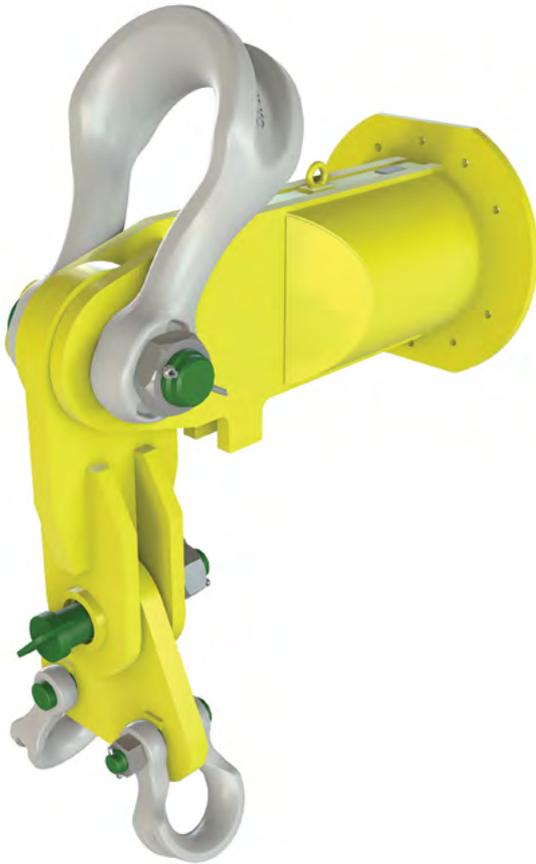
specifications. For every test function a calibration procedure has been developed, to minimize the error margin of the measurement data as far as possible. Within the test benches the HBM torque meters are used for the calibration of braking forces. Since 2002 the T10F torque measurement readers and the MP60 measurement amplifier have also been used. Recently, BEP Europe switched over to the T40B and the TIM-PN measurement amplifier, which - used together - constitute a complete digital torque measurement system. HBK's tools were chosen because of the data processing speed and accuracy of the HBM torque measurement sensors.

"Every roller test bench is subject to calibration after assembly and subsequently at periodic intervals," said Yann Germain, Technical Quality Manager at BEP Europe. "Once the measurements have been executed in accordance with the prescribed procedures, the torque measurement sensor is fitted onto the electric motors' drive. By verifying and calibrating our measurements using a HBM sensor, we know whether the set measured values of our roller test benches fall within the tolerances. The testing systems are also re-calibrated if it turns out that deviations appear in the vehicles' measurement results."

For more information visit  
<http://www.hbkworld.com>

# Modulift Add New Product to Their Portfolio

Due to demand in the lifting industry for more innovative products to make rigging quicker, safer and more efficient.



Modulift, a technical expert and manufacturer in the lifting industry based in the UK, have added a new product to its portfolio that is compatible with their full modular spreader beam range. The Clevis Drop Link and Delta Plate is designed to replace the standard Drop Link for certain specific rigging situations.

The construction of the Clevis Drop Link and Delta Plate makes the product quite unique;

the different size Delta Plates are suitable for various bottom shackles which can be installed in the same Clevis Drop Link, making the product extremely flexible and compatible with a range of shackles. The design assembly is efficient, as the product is supplied in an assembled condition making it quick and easy to assemble on-site with two smaller size shackles replacing one large lower shackle which you would see in a standard spreader configuration. The flexibility enables

variable angles on the bottom slings ranging from 0-45 degree STV.

Harshal Kulkarni, Engineering Manager at Modulift who is leading the development of the product said, "At Modulift, we are always challenging our capabilities and how far we can go in product innovation. Our customers are always at the forefront and this product is extremely efficient in compatibility, cost, flexibility and assembly & design. It's tested and certified in accordance with DNV-ST-0378."

John Baker, Modulift Commercial Director said, "We are continually looking for new ideas to compliment our existing range of products and make rigging more efficient whilst maintaining safety. Feedback from site trials have confirmed that the product is easy to use and saves time rigging up especially when doing repetitive lifts. Our in-house engineering team have been working hard to ensure this product works across all of the Modulift spreader beam range. After a testing 16 months which has been tough for the whole of the lifting industry, things are definitely on the rise for Modulift especially within our bespoke design and manufacture division and we're excited to see what the rest of the year will bring."

[www.modulift.com](http://www.modulift.com)

# Safeguarding lone workers with technology

Communication amongst teams is an essential part of conducting an efficient, effective and safe business.



But when it comes to selecting a communications device to appropriately safeguard the lone workforce, with a growing number of options, choosing the right solution that addresses the needs of employees and the business as a whole, can be challenging. Businesses need a way to combine different functions, such as communication and lone worker protection into one streamlined device.

There are a number of considerations to take into account. For example – do staff need to be contactable all of the time? What if employees work in remote parts of a plant alone, in the evenings or at weekends? For those workers to feel safe and the employer to fulfil its duty of care, there must be a way for them to raise an alarm to get the immediate support they require in the event of an emergency.

Providing lone workers with a communication device to contact staff in an emergency would mitigate some of the risk. But bear in mind that in 2019-2020 there were 20 fatal incidents and 66,000 non-fatal injuries within the manufacturing

sector alone. Having a communication device would certainly be better than nothing at all but if a worker falls from height, gets struck by a moving object or comes into contact with machinery – does a communication device offer enough protection? If workers can't easily inform colleagues where they are, then this form of protection will leave them and the business horribly exposed.

However, providing staff with a device that can raise alerts and can be triggered automatically should they be rendered unconscious, can ensure that staff are better protected. By combining different functions into one streamlined device, workers don't need to carry around multiple different handsets, which can lead to unnecessary expenses when addressing lone worker challenges in isolation.

Most importantly, organisations should work with experts to ensure they have the right device for their requirements and infrastructure setup, for example selecting a lone worker device that works in areas with limited mobile connection if required.

Additionally, panic buttons, tilt and no-motion sensors and other comprehensive lone worker protection functions can all be integrated into one device. Based on smartphone technology, devices can be compact and robust, capable of reliably transmitting communications and alerts over 2G, 3G, 4G and Wi-Fi networks.

While technology is important in detecting an emergency situation, the process that follows to ensure a timely and appropriate resolution to an incident is just as critical. If an incident were to happen, how quickly and easily could the emergency services locate and treat the individual? Consideration of how responders can locate the member of staff in an emergency must therefore be a priority. When seconds count, instant communication is critical to ensure a timely resolution – especially if a worker's life may be at risk. Any lone worker solution should have the ability to provide location information, such as GPS, or for indoor location, WiFi access points or beacons.

There are communication devices available, for example, Smartphones, Digital Radio and IP DECT with integrated lone worker functions to safeguard staff and these can be fine-tuned to suit a business' requirements – which is essential to ensure that the end solution fully addresses the needs and nuances of a company. By working with an unbiased supplier that adopts a consultative approach, businesses can work collaboratively to analyse these components and ensure they get it right for employees, to maximise productivity and safety simultaneously, and to achieve the optimum level of tailored functionality at ease.

**Chris Potts, Marketing Director, ANT Telecom**

For more information visit:  
[www.anttelecom.co.uk](http://www.anttelecom.co.uk)

## Aggregating Combustible Dust Incidents from Around the World

For the fifth year in a row, the team at Dust Safety Science has compiled and analyzed combustible dust incidents from around the world.

As of December 31, 2020, they captured almost 1000 incidents in their incident reports along with a detailed analysis of the materials, industries and equipment involved.

Dust Safety Science aggregates their reports twice a year, and this most recent report includes all incidents they have captured from January 1, 2020, to December 31, 2020. These are broken into fires and explosions occurring both in North America and internationally throughout the world.



To download the full report, click the link below.

<http://bit.ly/Dustsafetyreport2020>

For more information visit: [DustSafetyScience.com](http://DustSafetyScience.com)

## AirBench Releases Vertex VX – Cross-Draught System For Hazardous Areas

AirBench, the UK's leading manufacturer of downdraught benches and cross-draught systems, is pleased to announce the release of VertEx VX – an ATEX rated version of the popular VertEx cross-draught system.

Suitable for zone 22 applications, VX uses the same principles as the VA range but applies ATEX fans and electrical systems alongside fully earthed filtration.

VertEx VX can be installed alongside the VB booth system, allowing the construction of full dust containment booths in zone 22 hazardous areas.



For more information visit:

<https://www.airbench.com>



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# Monitoring Of Indoor Air Quality Needs To Measure More Than Just CO<sub>2</sub>

With ventilation continuing to dominate the news agenda, a leading ventilation specialist is stressing the importance of monitoring pollutants beyond just CO<sub>2</sub>.



CO<sub>2</sub> is a widely used indicator of room occupancy and the need to ventilate, which according to Elta Fans has proved useful in encouraging more engagement with improving IAQ. However, as structures become increasingly energy efficient and airtight, there is a danger that other types of outdoor air pollution will become trapped in these spaces.

There is the risk that if these are not monitored, they will build up to unsafe levels, ultimately undermining the journey towards healthier indoor air. A more sophisticated approach is therefore required to move beyond merely measuring CO<sub>2</sub>, and take into account a wider array of pollutants.

Ana Cross, AHU product manager at Elta Fans, comments: "One of the defining features of the

past 18 months has been a renewed focus on IAQ, and how we can improve the health of our buildings. CO<sub>2</sub> has served as a useful proxy to measure progress in this, but we now need to work towards a more sophisticated approach.

"Other pollutants can come from a range of sources – everything from general traffic, industrial, commercial, agricultural, and domestic activities. As structures become better insulated, we have to ensure that our ventilation systems are equipped to meet this challenge. One cannot mitigate against the invisible, which is where more advanced monitoring becomes key."

Some of the most health-critical pollutants to address are particulate matter (PM), ozone (O<sub>3</sub>), nitrogen dioxide (NO<sub>2</sub>), and total volatile organic

compounds (TVOCs). Given the main source of some of these, natural ventilation such as opening a window can actually have adverse effects in certain locations e.g., city centres. In these circumstances, mechanical ventilation offers the most protection for building occupants.

Alongside pollutants, there is also the issue of relative humidity (RH). Humidity levels in indoor spaces play an important role, from supporting good human health and wellbeing, to helping preserve stored food, electronic equipment, artwork etc. Too high humidity levels can cause damp and condensation problems, and at the opposite end of the scale, too low levels of humidity can lead to a dryness of the skin, eyes, nose and throat.

This is crucial, as the human body's first line of defence against airborne agents (both chemical and biological) is the mucosa lining at the top airways (nose and throat), and if this dries out, the body's immune response becomes compromised. Thus, achieving healthy levels of humidity within an occupied space is an important step towards delivering optimum levels of IAQ for good health and wellbeing.

Ana concludes: "We have seen some positive steps in the right direction over the past 18 months, as awareness surrounding the effects of IAQ increases. However, we need to ensure that this progress continues, and that we start to adopt a more sophisticated approach to monitoring the air inside our buildings."

For more information, please visit:  
<https://eltagroup.com>

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are made from quick drying, lightweight fabrics that come with special ventilation features to control and regulate the heat from your body.

All in all, Snickers Workwear Baselayer clothing will give you the kind of fresh working comfort you wouldn't have thought possible.

Getting more information on the Snickers Workwear clothing range is easy. You can call the Helpline on 01484 854788; check out [www.snickersworkwear.co.uk](http://www.snickersworkwear.co.uk) and download a digital catalogue or email [sales@hultaforsgroup.co.uk](mailto:sales@hultaforsgroup.co.uk)



## Snickers Workwear – Superior, Ergonomic Knee Protection with KneeGuard PRO

World-leading certified Kneeguard™ solutions to protect your knees.



Snickers Workwear's Kneeguard™ is a fully certified, trademarked system for knee protection against kneeling injuries and everyday knocks at work. The combination of Kneeguard™ pads and the Kneeguard PRO positioning system in Snickers workwear trousers is a crucial combination for reliable knee protection.

In Snickers Workwear trousers kneepad pockets, you can adjust the kneepads to different heights to ensure correct positioning - for you - for maximum protection. There's also different types of Kneepads to fit different types of trousers to suit different jobs on site. Such as the specialist kneepads for the Floorlayer trousers and the slim-fit Kneepads specially for the slim-fit trousers.

The unique design features also make the kneepads extremely flexible when you walk, yet they close around your knees when you kneel down – without your knees sliding off when you move around.

With superb impact protection, the market-leading D30° Ergo kneepads are made of a unique material that moulds around your knee to provide enhanced impact protection and are great for tradesmen and women who spend a lot of time working on their knees.

Getting more information on the Snickers Workwear clothing range is easy. You can call the Helpline on 01484 854788; check out [www.snickersworkwear.co.uk](http://www.snickersworkwear.co.uk) and download a digital catalogue or email [sales@hultaforsgroup.co.uk](mailto:sales@hultaforsgroup.co.uk)

# Snickers Workwear Will Stretch Your Visibility.

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part of every man and woman's PPE package – especially in dim, dark or variable light conditions.

Snickers Workwear has an extensive range of garments to suit a wide range of work environments from construction and engineering to handling and logistics; professional trades and lighter manual work; to specialist engineering requiring high standards of certified personal protective clothing.

There's Jackets, Trousers, Shorts, Toolvests, Shirts and Fleece in the LITEWork, FLEXIWork AllroundWork and ProtecWork families - a host of different garments to satisfy the specific requirements of Classes 1, 2 and 3 protection levels.

Instant recognition and continuous protection at work is a life-saver in hazardous conditions. That's why Hi-Vis working clothes are an integral

All these 'outstanding' products combine Snickers Workwear's unrivalled hallmarks of functionality and comfort with the requirements of the EN20471 standard for high visibility warning clothes.

Getting more information on the Snickers Workwear range of ProtecWork and Snickers Workwear Hi-Vis protective wear is easy. You call the Helpline on 01484 854788; check out [www.snickersworkwear.co.uk](http://www.snickersworkwear.co.uk) and download a digital catalogue; or you can email [sales@hultaforsgroup.co.uk](mailto:sales@hultaforsgroup.co.uk)

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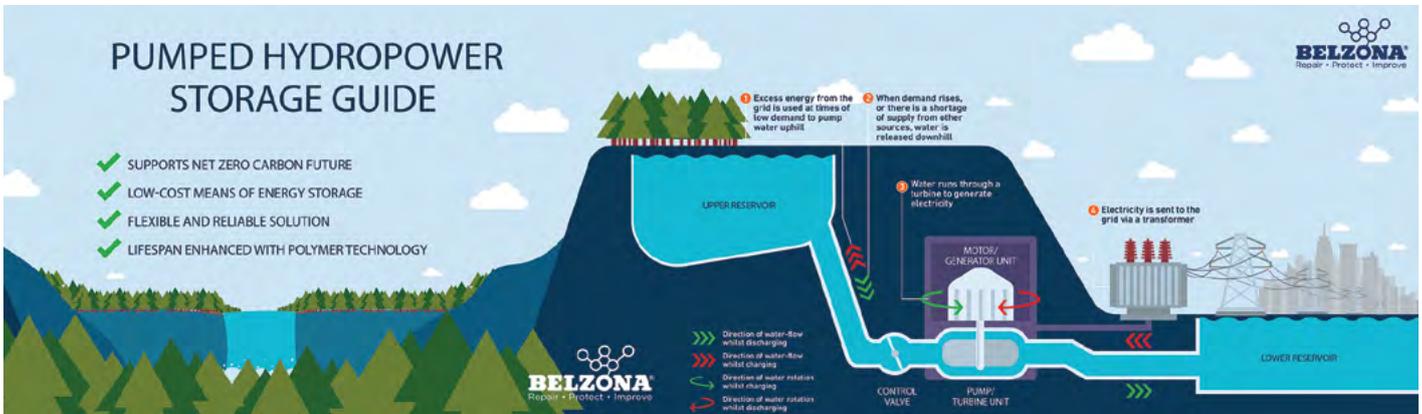


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# Is Simply ‘Maintaining’ Key Assets in Pumped Hydro Storage Power Plants Enough?



## How to Improve Efficiency of Pumped Storage Hydropower Plants

Given the critical role pumped hydro storage plays in being a clean, low-cost and renewable energy storage system, is simply maintaining key hydropower equipment (such as Kaplan and Francis turbines) enough?

Or, should a more rigorous approach be undertaken to intrinsically ‘improve’ the efficiency at pumped storage hydropower plants for the long term?

## The Growing Demand for Pumped Hydropower Storage as a Reliable Electricity Storage System

The demand for renewable energy storage systems has never been greater. While technologies, such as flywheel energy storage and compressed air energy storage are growing in popularity, pumped hydro, first established in the 1890s, is the largest type of grid scale energy storage system in the world.

The 2021 US Hydropower Market Report identifies how in the United States, pumped storage hydropower currently contributes 93% of grid storage.

With COP26, the UN Climate Change Conference, set to be hosted later this year, the discussion of pumped hydropower storage is high on the agenda; and for good reason.

According to the International Energy Agency (IEA) Renewables 2020 Report, hydropower will account for 16% of the world’s electricity generation by 2025. For many countries, a large proportion of this will include pumped hydro storage plants.

For Europe, the IEA’s Report outlines how by 2025, more than half of new hydropower capacity additions

will be pumped storage power plants. The outlook is looking similar for China, with pumped storage accounting for more than half of new hydropower plants between 2023 and 2025.

The evidence is clear: investment into pumped hydro storage is on the rise, globally.

## What are the Advantages of Pumped Hydro Storage?

In its 2020 Energy White Paper, the UK Government outlined how long-duration energy storage technologies, such as pumped hydro storage, play a crucial role in decarbonising the UK’s electricity supply. This will, crucially, help countries such as the UK and many others meet their net zero carbon emissions target by 2050, in line with the Paris Agreement.

In terms of reliability, pumped hydro storage helps to improve grid stability. Given the nature of ‘stored’ electricity, pumped hydro storage provides power whenever it is needed. In this way, it is a proven solution for meeting the reliability, capacity and timing demands of electricity consumers.

For example, according to the Environmental and Energy Study Institute’s 2019 White Paper, pumped storage hydropower is more than 80% energy efficient through a full cycle. The research also highlights how facilities can typically provide 10 hours of electricity, compared to around 6 hours for lithium-ion batteries.

Pumped hydro storage is also an economically beneficial solution. A 2021 Report by Imperial College London (ICL) stated that new pumped hydro projects could save the UK energy system between £44 million and £690 million a year by 2050. This is because, according to ICL, pumped hydro storage, is less expensive than other electricity storage technologies.

## How Does Pumped Hydro Storage Work?

Pumped hydro storage power plants are reversible hydroelectric facilities designed to capture and store electricity until it is required. They use off-peak renewable energy, such as wind and solar power, to pump water from a lower reservoir to a higher reservoir. This takes place during periods when there is more energy being produced on the grid network than is needed.

Once the energy is required again, due to predicted or sudden spikes in demand, the water is then released and flows back through a hydro turbine, generating hydroelectricity.

## Don’t Just Maintain Pumped Hydro Storage Plants, Improve Them

With such a rapid growth in this type of renewable energy storage technology, the IEA says that: ‘To sustain this level, output from existing hydropower plants needs to be maintained; however, substantial amounts of generation will come from fleets that are ageing.’

For example, the report goes on to identify that by 2025, 40% of the world’s hydropower output will be from countries with fleets that are more than 40 years old. It highlights how this is ‘...the age at which the first major refurbishments are undertaken to either maintain or increase performance.’

As there is such a high dependency on this type of energy storage technology, asset owners should deploy appropriate repair solutions to ensure that hydropower plant integrity isn’t simply ‘maintained’, but also significantly ‘improved’ for the long term.

**Key Challenge Areas for Pumped Hydro Storage Power Plants**

One of the key application areas that is subjected to large amounts of wear is the turbine runner. This is found in reaction turbines including Kaplan and Francis turbines. The runner is connected to a generator by a series of shafts and gears.

The turbine runner is responsible for capturing energy from the flowing water. Water is directed tangentially through the runner, which in turn causes it to spin.



*Repair and protection application underway on penstock*

As the turbine runner is used in reverse as a pump during the storage phase as well, all these pieces of equipment are subjected to twice the amount of erosion compared to a standard hydropower turbine.

Similarly, bearings, blades, shafts, valves, end covers and penstocks are also subjected to twice the amount of wear per Gigawatt of energy produced during the pumped storage process.

In addition, wicket gates, stay vanes, spiral casing and draft tubes are also key challenge areas found in pumped hydro storage plants.

If maintenance issues in these key hydropower problem areas are not rectified, this can ultimately lead to reduced efficiency and therefore, profit-loss.

Indeed, in extreme cases this can even lead to asset failures and therefore unplanned shutdowns, whereby the lengthy process of decommissioning and replacing key equipment would ensue.

If it gets to this stage, not only would this seriously limit the hydro plant's ability to serve its primary function, but this would also seriously undermine the environmental benefits of pumped hydro storage.

Asset replacement, rather than improving original

assets, would merely add more waste to the environment, not to mention the resources and energy required to replace them.

One repair method that is commonly employed to address these hydropower challenge areas is welding. A traditional technique, welding is often the go-to repair solution for engineers worldwide. However, it is not without its limitations.

Welding requires extensive hot work, which in turn presents significant safety risks. All flammable substances must be cleared and the area made safe for welding to take place. In many cases, this can interrupt essential operations.

In addition, replacing a damaged asset with the same material will only lead to the same problems reoccurring in the future.

A solution should be sought that not only repairs the damaged assets, but also actively improves and protects them for the long term, all while avoiding the need for hot work.

**Polymeric Repair Solutions and Protective Coatings for Pumped Storage Hydropower**

Pumped hydro storage engineers and asset owners are employing cold-curing polymeric systems as alternative repair and protection solutions for pumped hydro storage equipment.

In order to provide erosion and corrosion protection, two-part epoxy coatings can be deployed to improve the efficiency of different types of fluid handling equipment such as turbine runners.

These types of coatings improve pump efficiency by using hydrophobic technology to repel process fluids and reduce turbulent flow. In fact, efficiency increases of up to 7% have been recorded on new equipment and up to 20% on refurbished equipment.

When compared to polished stainless steel, it was found that Belzona's epoxy coating, Belzona 1341 (Supermentalglide), was 15 times smoother.

For areas that are particularly subjected to high levels of cavitation, such as Kaplan turbine blades, abrasion and cavitation resistant elastomers can be deployed. These two-part polyurethane resins offer an outstanding level of protection against cavitation at ultra-high velocities (up to 115 knots with no damage).

Due to their erosion-resistant properties, ceramic filled coatings provide effective protection of critical equipment, such as spiral casings. These systems facilitate a fast application process, as they can be easily applied by either brush or spray.



*Efficiency improved on Francis turbine runner*

Bearings, shafts, valves, wicket gates and stay vanes can all be repaired and rebuilt with paste grade systems. This includes two-part repair composites that are specially designed for metal repair and resurfacing based on solvent-free epoxy resins reinforced with silicon steel alloys.

These systems can all be applied and cured at room temperature, thus bypassing the need for hot work and the drawbacks this can incur.

**Polymeric Technology: Helping Industries Meet Net Zero Carbon Targets By 2050**

As pumped hydro storage currently represents the overwhelming majority of on-grid electricity storage, it is imperative that asset owners invest in the appropriate technology that goes beyond simply 'maintaining' asset integrity, but actively 'improves' the equipment as well.

By implementing a rigorous repair, protection and improvement strategy, key assets can be given a new lease of life. This is thanks to the efficiency enhancing and long-term erosion and corrosion resistant properties of polymeric materials.

Ultimately, these repair and protection systems support a greener future for the planet; with pumped hydropower storage being a key energy storage solution for helping industries and countries to meet net zero carbon emission targets by 2050, if not before.

For more information on how polymeric systems can help to increase the efficiency of pumped hydro storage power plants, please visit:  
[https://www.belzona.com/en/focus/hydroelectric\\_power.aspx](https://www.belzona.com/en/focus/hydroelectric_power.aspx)

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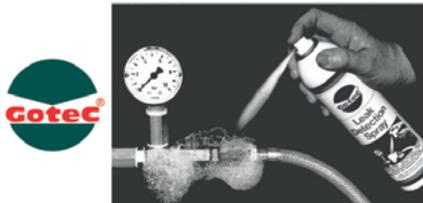
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