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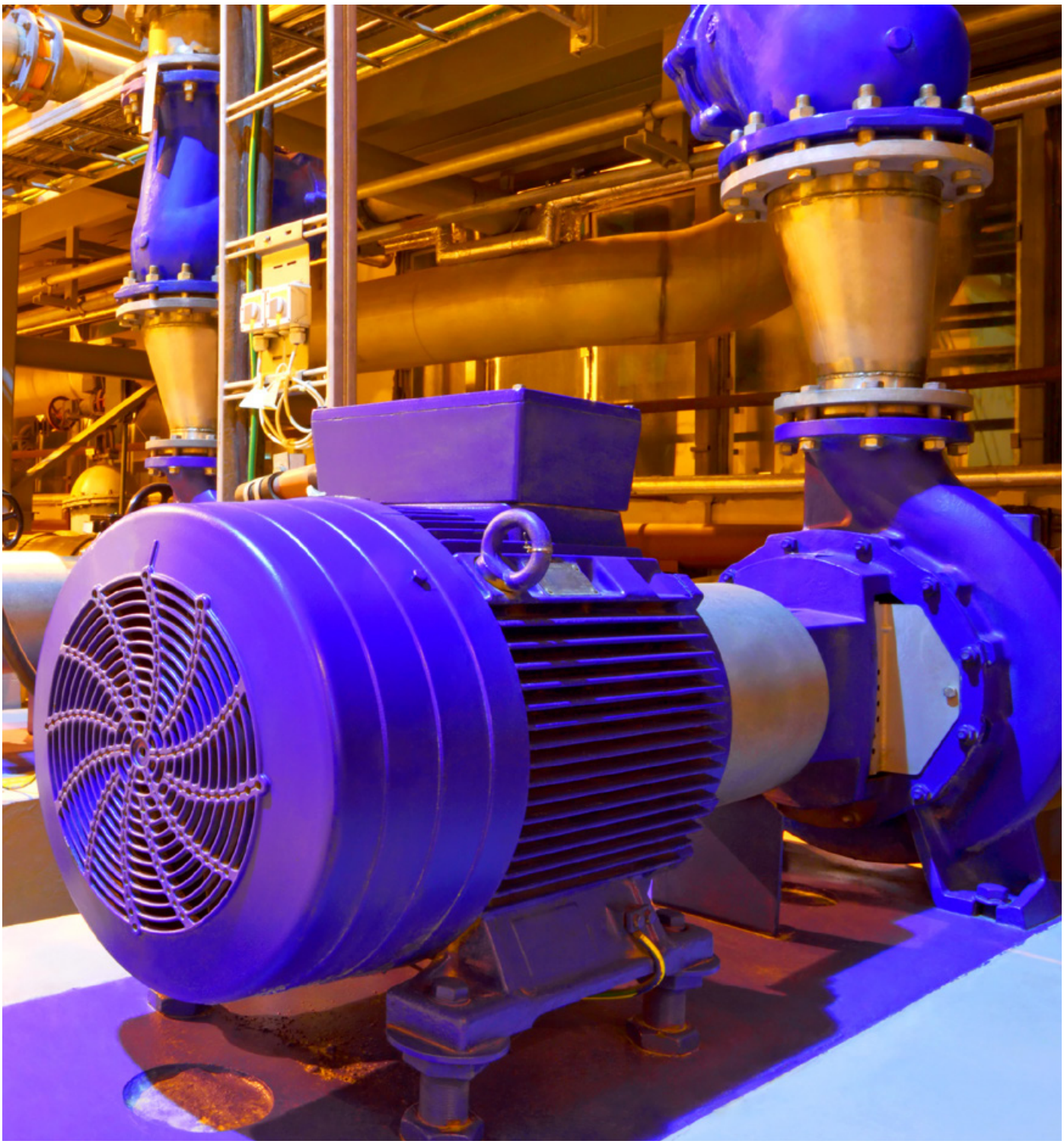
Electrical Review

July/August 2019
Volume 253 | No 7
www.electricalreview.co.uk



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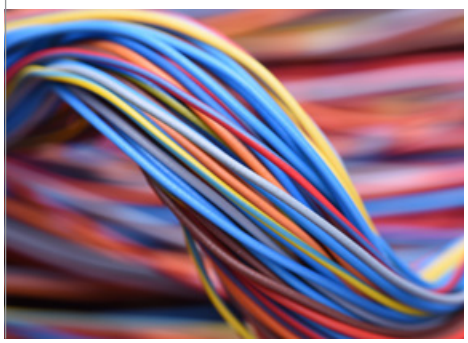

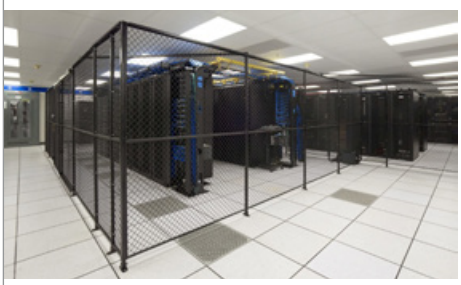

EDITOR: Elinore Mackay
020 8319 1807
elinorem@electricalreview.co.uk

ACTING EDITOR: Kayleigh Hutchins
kayleighh@electricalreview.co.uk

EXECUTIVE EDITOR: Claire Fletcher
clairef@electricalreview.co.uk

PRODUCTION MANAGER: Alex Gold
alexg@sjpbusinessmedia.com

GROUP SALES MANAGER: Sunny Nehru
+44 (0) 207 062 2539
sunnyn@sjpbusinessmedia.com

GROUP ACCOUNT MANAGER: Amanda McCreddie
+44 (0) 207 062 2528
amanda@electricalreview.co.uk

PUBLISHER: Wayne Darroch

PRINTING BY
Buxton

Paid subscription enquiries:
subscriptions@electricalreview.co.uk
SJP Business Media
2nd Floor, 123 Cannon Street
London, EC4N 5AU

Subscription rates:
UK £221 per year, Overseas £262

Electrical Review is a controlled circulation monthly magazine available free to selected personnel at the publisher's discretion. If you wish to apply for regular free copies then please visit: www.electricalreview.co.uk/register

Electrical Review is published by

SJP business media

123 Cannon Street
London, EC4N 5AU
0207 062 2526

ISSN 0013-4384 – All editorial contents © SJP Business Media

abc Average net circulation Jan-Dec 2016 6,162

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Research shows SMEs still affected by late payments

Campaigning body SELECT has said the latest 'late payment' research findings by the Specialist Engineering Contractors (SEC) Group Scotland should be a wake-up call for the Scottish economy.

The research states that SMEs in the construction supply chain in Scotland are still suffering from poor payment performance, and the latest initiatives by the Scottish government, while aimed in the right direction, have not yet had a major impact.

In 2018, SEC Group Scotland carried out an extensive survey on payment practices as they affected engineering firms in Scottish construction. The overwhelming majority of respondents were SMEs.

The research showed that over 60% of public bodies amended payment provisions in the standard forms of construction contract, which often involved extending the payment cycles. The figure for the private sector was 69%. To compound matters, only 28% of firms surveyed reported that they were paid by public bodies within 30 days, whilst in the private sector the figure was only 24%.

Alan Wilson, managing director of SELECT, said, "We entirely support SEC Group Scotland's call to the Scottish government to amend the Procurement Reform (Scotland) Act 2014 to require that all public bodies use project bank accounts (PBAs) so that payments to all suppliers are secure.

"In addition, public bodies should have a statutory duty to ensure 30-day payments are made to all firms in the supply chain. Finally, we agree with the 90% of firms who are supporting the introduction of a construction regulator with powers to impose penalties on poor payers or, in the case of suppliers, to exclude them from bidding for public sector works."

Be part of the EIC's Practical Participation Programme

The Electrical Industries Charity (EIC) is presenting the industry with the opportunity to help those in need by signing up to the Practical Participation Programme (PPP).

The PPP, which is part of the Employee Assistance Programme (EAP) and is funded by powerLottery, offers companies within the electrical sector a chance to get involved by volunteering their time, equipment and materials to provide the best practical support to people in the electrical industry.

Support the EIC, become a partner of PPP, or take part in powerLottery by downloading the EIC powerLottery app and tapping the app to play.

Industry insights showcased at CEF live

The NEC in Birmingham played host to CEF Live 2019 in June, bringing two days of industry insights and trends, product launches, NICEIC Tech Talks and on the day deals to almost 4,000 electrical professionals.

Jaguar LandRover took to the Innovation Zone to explain 'How the iPace was born' and Philips Signify introduced 'Connected lighting'. Aico discussed how changes to BS5839-6:2019 will affect the industry and lighting solutions manufacturer Tamlite explained the health and wellbeing benefits of installing LED lighting.

Topics within the Tech Talk Zone led by the NICEIC included a Q&A session on the biggest changes within the 18th Edition, as well as presentations on SPDs, AFDDs, smart technology and electric vehicle charging.

"The show was a huge success and another step up from the previous two CEF LIVE events we held in 2017 and 2015. It was great to see customers and exhibitors' enthusiasm for the event: there was a palpable buzz across both days," said Andrew Moseley, CEF's commercial director.

Getting the eyes?

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Reliable power for a sustainable world

UK government announces new EV reg consultation

The UK government has announced plans to introduce new regulations that would require all new-build housing to be fitted with electric vehicle (EV) charging points. The plans come in the form of a public consultation, in line with the government's announcement earlier this year to meet net zero emissions by 2050. If made a reality, this legislation would be the first of its kind globally.

The proposals would mean that every new residential building with dedicated car parking spaces would have to offer charge points. Non-residential buildings would also have similar requirements for EV charge point infrastructure.

The plans also include a number of proposals to support electric vehicle drivers and encourage more of the UK public into the EV vehicle market by making it easier and more convenient to charge EVs. This builds on previous steps taken by the government to support EV users, which has seen it offer current drivers up to £500 off the cost of installing a charge point in their home.

Ex-transport secretary Chris Grayling said of the plans, "With record levels of ultra-low emission vehicles on our roads, it is clear there is an appetite for cleaner, greener transport.

"Home charging provides the most convenient and low-cost option for consumers – you can simply plug your car in to charge overnight as you would a mobile phone."

Schneider Electric launches initiative to 'Rethink Energy'

Schneider Electric UK has launched its 'Rethink Energy' initiative, a programme aimed at changing business, consumer and government attitudes to energy waste and help combat climate change.

A Schneider Electric commissioned study of 2,000 UK adults and over 600 UK businesses revealed that just 10% of consumers want to do more to curb their current energy use, while 74% believe they already do enough.

In the same report, 68% of business leaders reported their organisations wasted energy, particularly in the form of inefficient building and office space. Under half (43%) of company chiefs also shared their organisation had not implemented any measures aimed at tackling these inefficiencies in 2018. Schneider Electric's full report will be released later this summer.

To launch its Rethink Energy initiative, Schneider Electric held a panel debate at Tottenham Hotspur's new stadium, one of the world's most energy efficient stadiums.

The debate focused on three key areas: the role for energy in achieving a zero-carbon economy by 2050; the £1 trillion price tag – cost or opportunity; and what will drive change in the UK's demand for energy.

At the event, Mike Hughes, zone president, Schneider Electric UK and Ireland said, "We need to bring energy front of mind. The market needs to take an activist approach to advocate for and instil efficiency and build an investment mindset if we are to achieve the 2050 net zero goal.

"As energy waste becomes more visible, businesses will increasingly be held accountable."

Renewables produce more power than fossil fuels in Q2

For the second consecutive year, renewables produced more power than fossil fuels in the first and second quarters of 2019, says a new report on the European power market from energy data analyst EnAppSys.

The report showed that renewable projects generated 245.8TWh of electricity in the three months to June 30 – 21.3% more than the combined 202.7TWh produced from gas, coal lignite, oil and peat during the same period.

This repeats the pattern seen in 2018, which saw renewables produce 288.4TWh and 252.8TWh in Q1 and Q2 respectively, whilst fossil fuels generated 258.9TWh and 224.8TWh.

EnAppSys said this was part of a trend which has brought increased levels of stability to the European power market

Jean-Paul Harreman, director of EnAppSys BV, commented: "The state of the power fuel mix across Europe has largely stabilised, with levels of renewables no longer seeing large increases and the balance between coal and gas largely staying static.

"This means that the share of generation from fossil fuels, renewables and nuclear have largely remained static since 2017, with renewables providing more than fossil fuels in the first half of the year and this trend reversing in the second half of the year."

Nuclear plants were the dominant player in Europe's power mix during Q2 2019, generating 28.2% of total electricity. Hydro produced 17.5%, gas 17.0%, coal/lignite plants 14.7%, wind 11.5%, solar 6.5% and biomass projects 3.4%. The remainder was made up of oil 0.6%, waste 0.5% and peat 0.1%.


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GOSSAGE

Green, with envy?

The most depressing report in years arrives from comparethemarket.com. It reveals that the 14% of households now overtly trying to 'go green' with their energy supply are being seriously let down by misleading tariffs.

The majority of providers' green efforts focus on electricity, with 37 of the 54 dual fuel green tariffs analysed offering electricity supplied from renewable sources. But only one in five actually comes from 100% renewable sources.

Another 12 tariffs provide either just 15% or 25% of the gas a household consumes from renewable sources – and 30 of these 'green' tariffs do not provide any gas from renewable sources at all.

More than half have no renewable gas component at all, and most of the rest offer only carbon offset schemes in developing countries that have been criticised by environmentalists as ineffective and open to exploitation. One supplier, which even has the word green in its company name, does not state that its energy supply is only from renewable sources in two of its three available tariffs. It all furthers the potential to mislead customers.

It used to be that 'being green' referred to being easily gullible, not to being environmentally aware. I am beginning to wonder if that old definition isn't now taking precedence.

The wealth of nations?

Having a bit of a tidy up, I chanced upon a study issued in 2013 by the Adam Smith Institute, a long established 'free market' lobby group much cited by right wing MPs. The publication is entitled *Policy Study 403: Limits of Windpower.*

Its author, one William Korchinski, was not exactly bullish about the prospects for wind power – hence the title. His conclusion was absolute: "Given increased storage costs, decreased grid reliability and increased operating costs," he felt there was really little future in this method of electricity production.

"Ten per cent is the upper limit" of market size for wind in Britain in the electricity market was his final word. A judgement much cited by backbench Conservative MPs at the time, and regularly since.

In the real world, I see that wind energy last year contributed 18% of British electricity generation, and that this proportion is already being exceeded considerably during this year.

Now I acknowledge that electricity sales are still falling year on year. Primary electricity output fell by 1.8% between 2017 and 2018 alone, so that 18% share is drawn from a smaller overall generation market than was anticipated in 2013.

Even so, we should all demand an explanation from the Adam Smith Institute as to precisely why they published such an ill-informed study just six short years ago, and to know when they intend to publish a public apology for promoting such a load of total rubbish in the first place.

Crying wolf

The Energy Intensive Users Group (EIUG) has been in existence for 20 years. During this time, they have repeated the same simple two mantras: Electricity prices in the UK are too high, and if they aren't reduced immediately, heavy industry will up and leave.

I woke just recently to hear the group's chairman, Stephen Elliott, on the BBC Radio 4's Today programme, claiming that there is "increasing evidence that energy is the single most important swing factor as to whether investments comes to the UK."

So, not workforce skills. Not tax-breaks, like regional location grants. Not good transport infrastructure. Not easy access to a large consumer market. But simply the comparative costs of energy. I really do wonder precisely where that 'increasing evidence' of the overwhelming importance of this single factor is to be found.

Then Elliott – whose day job is running the Chemical Industries Association – went on to claim that: "If you look back over the past decade or so, you could certainly point to businesses that have closed, or moved offshore." All due to higher fuel prices. As ever, no specific company, even from within the chemical industry, is cited as actually having departed these shores just because they couldn't buy electricity cheaply enough.

Again, I really do wonder whether the EIUG could provide us with a few concrete examples where this exodus really has occurred "over the past decade or so." And again, I am beginning to wonder whether all this bombast has substance behind it.

Global warning for Boris

Just about the largest single donation to former foreign secretary Al "Boris" Johnson's campaign to become Prime Minister came from Terence Mordaunt, via his company First Corporate Shipping. Another entity that Mr Mordaunt is a director of is the Global Warming Policy Foundation, probably the most active climate change deniers in the UK.

Is Johnson sympathetic to climate change deniers? As recently as 2015, he wrote in his *Daily Telegraph* column that "global leaders were driven by a primitive fear that the present ambient warm weather is somehow caused by humanity; and that fear – as far as I understand the science – is equally without foundation." What price now for zero carbon emissions by 2050?

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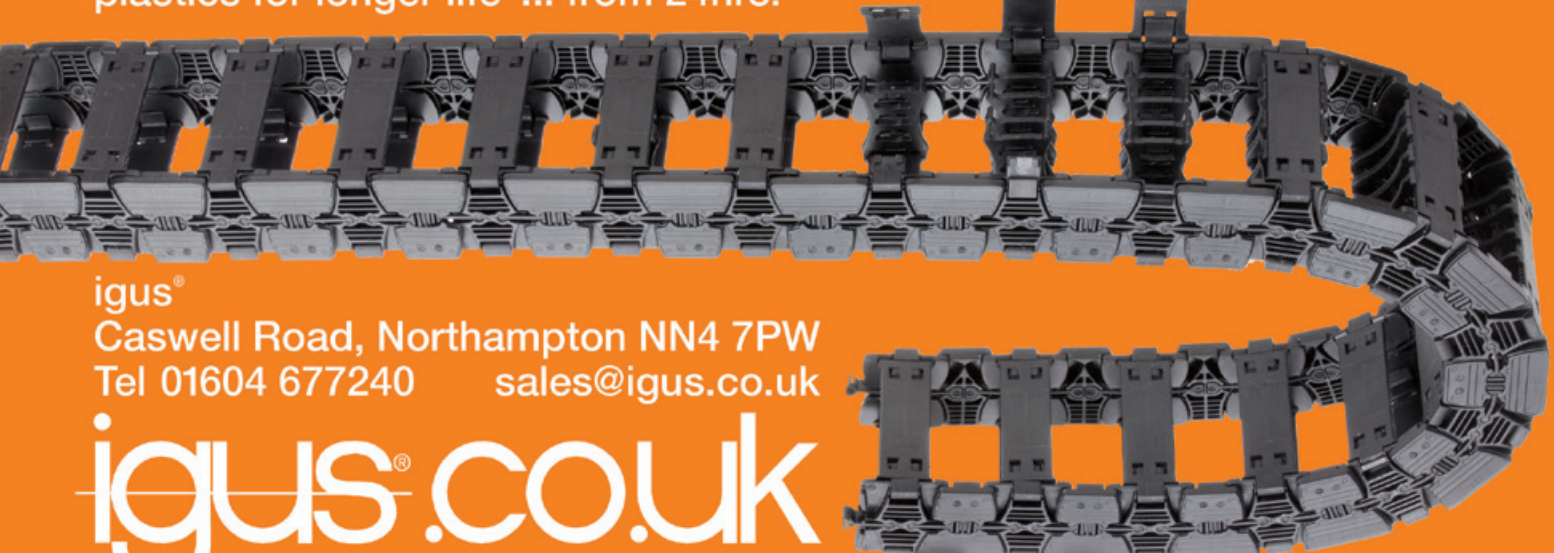

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Improving surge protection

Millions of surge protection units in the field are not providing adequate protection for today's microprocessor-based equipment. As John Mitchell, global business development manager at CP Automation explains, surge protection devices (SPDs) must be brought up to speed.

SPDs are designed to prevent excess voltage appearing at the terminals of sensitive equipment. A voltage spike typically lasts one to 30 microseconds and may reach over 1,000 volts. A longer-term voltage surge can last for seconds, minutes or hours and is caused by power transformer failures such as lost neutral or other power company errors.

High voltage surges are normally covered by surge protectors. However, traditional SPDs do not account for low level transient surges. Don't let the name fool you – these transient surges in the sine wave are very damaging to electrical equipment, as the additional peaks and troughs in the sine wave cause confusion to sensitive devices and machines.

Transient surges can lead to false zero crossings of the sine wave – the instantaneous point at which there is no voltage present. In a sine wave, this normally occurs twice during each cycle. Devices can be falsely triggered because of fast changing signals caused by transients. They detect that the zero point has been crossed, even if it is caused by a transient disturbance in the voltage rather than the normal waveform.

Typical surge protection devices are unable to prevent this confusion, because they are voltage triggered only and therefore unable to detect rapid changes in frequency. Their clamping will only occur at a set point above or below the amplitude of the sine wave and will therefore not act upon low level switching transient events.

VARIABLE FREQUENCY DRIVES

Part of the issue surrounds the increased use of variable frequency drives (VFDs), which control the frequency and voltage supplied to an electric motor. By implementing VFDs, many businesses reduce energy costs. However, VFDs are very susceptible to changes in power quality.

Power quality issues could be caused by an anomalous event, such as a lightning strike to the grid, or by the aforementioned lower level transient surges. If transients are not accounted for, they can lead to confusion in VFDs, such as false zero crossings, false triggering of diodes and timing issues.

A basic SPD may be used alongside a VFD to mitigate the damaging impact of high-power surges, yet many users are still faced with unexplainable lockups, downtime and even some failures in surge protection caused by low level switching transient events.

CNC MACHINES

Modern computer numerical control (CNC) machines are often marketed as requiring much less maintenance than their predecessors. With further development from three axis to five axis models, the increased complexity of processes has not been without its pains. As with VFDs, these machines are also at the mercy of power quality.

To operate effectively, it is imperative that CNC machines are equipped with the ▶

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right tools, settings and programming. The wrong choices can spell disaster for both the product and the CNC machine. One of the most important considerations relates to ensuring good power quality.

A poor power signal can cause issues with random lockups, loss of synchronisation and other 'no trouble found' service calls. Partially, this is due to the computer processors of CNC machining centres becoming more complex. Transient surges can lead to loss of synchronisation and unexplained reboots or resets in CNC machines — a huge headache for factory managers.

> **Improving surge protection may not require an entire overhaul of existing protective equipment**

FIGHTING BACK

To eliminate the effects of low-level switching transient events, transient protection systems, such as SineTamer, offer a new opportunity to protect valuable assets from the transient events that occur millions of times each day. Its frequency attenuation network monitors the frequency, not just the voltage.

The engineered transient disturbance filter is designed to monitor all 360 degrees of the sine wave, making it capable of detecting rapid changes in frequency. This vigilance in turn prevents issues caused by false zero crossings of the sine wave.

ENHANCING EXISTING DEVICES

Improving surge protection may not require an entire overhaul of existing protective equipment. Today, the industry has access to add-on transient dissipation filters (TDFs), which enhance the capabilities of existing surge arrestors.

The new range of devices give existing surge arrestors the ability to track the frequency of electrical current waveforms, and in turn react to transient surges. With this improved insight, low-level transient surges in the electrical system can be detected and filtered before they harm sensitive equipment, all while using old surge protection equipment.

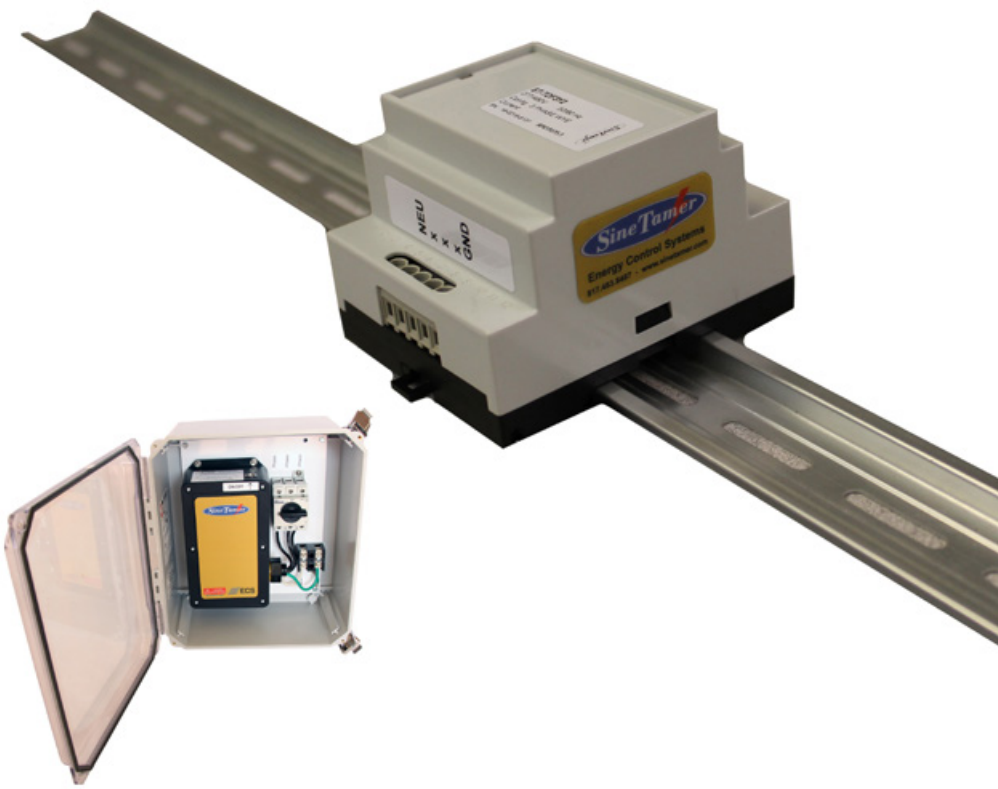
IN PRACTICE

Some businesses have already made the investment in improved surge protection. In fact, one plant manager at a packaging company was experiencing multiple electrical failures across seven plant areas related to programmable logic controllers (PLCs) and power supplies. After implementing a transient disturbance filter, the failures decreased from an average of 55% to zero.

One CNC dealer in Africa experimented by installing a transient disturbance filter on 70 machines. Following the installation, the company reported that over half its usual maintenance-related phone calls and call outs had been eliminated.

In Brazil, a ROMI machine operator experienced a 95% reduction in downtime caused by drive failures and various resets. Similarly, a Mazak operator in Ecuador reported losing $25,000 a month due to programming loss and confusion related events. Following implementation of a transient disturbance filter, the engineering team reported a successful return on investment in just one day.

Whether facility managers choose to completely update their surge protection devices, or take the TDF approach by enhancing what they already have, the bottom line will benefit greatly. Effective power quality filtering results in less downtime, re-boots and general headaches for workers, which enables higher productivity overall.



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A step too far?

Any work at height carries risk. Preventing accidents from falls relies on all stakeholders using an informed, joined-up approach to practices and systems. James Sainsbury, fall protection sales leader for MSA Safety, explains why a holistic approach to safety is needed, and highlights the potential risks of making ill-informed changes to a defined safety system specification.

Gravity is an ever-present force. It doesn't offer second chances. And however diligent safety planning and preparations may be, a fall is always a possibility. With workers' lives at stake, there's simply no excuse for inadequate fall protection systems and personal safety equipment.

ACCIDENT PREVENTION: THE UK PICTURE

Despite the fact that almost all falls from height can be prevented, it's a sobering reminder that they still remain the leading cause of workplace fatalities. The most recent Health and Safety Executive (HSE) statistics show that in 2017 alone, falls accounted for 28% of all UK fatalities in the workplace. Digging deeper, between 2013/14 and 2017/18, falls from a height accounted for more than a quarter of all fatal injuries to workers. That's an average of 37 deaths a year. In addition, a staggering 43,000 non-fatal accidents involved falls from height too.

Over 60% of deaths when working at height involve falls from ladders, scaffolds, working platforms and roof edges and through fragile roofs. It's no wonder that HSE research has also revealed 19% of people think their health and safety is at risk at work (2010).

Whilst the UK, like much of Europe, is a mature market, with comprehensive regulatory standards for safety systems and practices, there is still much room for improvement. Setting realistic safety system budgets, honouring specifications, understanding the suitability and quality of different equipment, accurately assessing risk and training users to be competent are all on the agenda.

CREATING THE PLAN: SPECIFIERS

As the first link in the chain of creating safer working at height, the value of consulting specifier professionals cannot be overstated. The decisions, assessments and recommendations they provide result in the most appropriate fall protection system specification for the

building at the outset: one that will maximise protection for users and allow work at height to be carried out more safely and efficiently.

A system specification can be defined by architects, consultants or engineers, or by safety system industry professionals, such as professional installers. A thorough specification takes account of both the unique risks posed by the structure and the practical access requirements needed for safe work.

It will also mean full compliance with all local and national health and safety and regulatory conditions. Manufacturers, too, can provide consultation and system design, helping to make sure that the very best equipment and system are installed.

CONTROLLING THE PROJECT: CONTRACTORS

One of the most important elements of the specification – at least for contractors – is the independently-calculated budget allowance required to procure and install the recommended system. Unfortunately, specification-switching down-the-line by UK contractors seeking to reduce costs can be problematic. This worrying trend has the potential to put workers' lives at risk. Simply changing or substituting elements for alternatives that are perceived as less costly can be short sighted and dangerous. Any specified system for working at height, and any attendant cost, is usually proposed for sound safety reasons.

High-quality equipment benefits from advanced engineering and rigorous testing, both of which contribute to full compliance and reliable performance. Lesser products may wear, degrade or fail more quickly, requiring premature replacement and increasing Total Cost of Ownership. When equipment is well designed and easy to use, the risks of equipment failure are naturally lower.

PUTTING IT ALL IN PLACE: INSTALLERS

The performance and safety of fall protection equipment depends on correct installation, testing and commissioning. Quality installers have a responsibility to check that only technically competent professionals install equipment. Leading companies are fully familiar with the leading manufacturer systems, are usually accredited, and will have undergone

specialist training to be certain systems are installed exactly in accordance with the manufacturer's guidelines, including all compliance checks at sign-off. Once equipment is installed, the installer will be responsible for commissioning, testing and ongoing maintenance and, in some cases, arranging user training.

> **Whilst the UK, like much of Europe, is a mature market, with comprehensive regulatory standards for safety systems and practices, there is still much room for improvement**

Experienced installers are also used to quickly overcoming any unexpected challenges a building may pose – for example, undertaking a retrofit system installation within an older or historic building. They will also spot and highlight any new risks or findings that may impact the effectiveness of the fall protection system.

CONFIDENT AND CAPABLE: END-USERS

There's no value in provisioning fall protection equipment if workers are unable, or are unwilling, to use it properly. Whilst overseeing safety, risk assessments and method statements for those that work at height falls to the site manager and/or health and safety officer; all equipment users should be 'competent persons'. That means expert PPE and or fall equipment system training from a qualified provider. Can users check equipment before use? Do they know when and how to use it correctly? Do they possess the expertise and confidence to make the right decisions at the right time? Can they execute an agreed rescue plan if needed?

SAFETY AND ACCOUNTABILITY: INEXTRICABLY LINKED

If UK working at height safety statistics are to improve, the sequential chain from specifier through to user requires close scrutiny. At every stage, each party has a duty of care to respect the integrity of what should remain an optimal safety system. Specification-switching and making arbitrary changes to carefully chosen solutions may have serious implications.

Equally, users deserve to feel confident using systems, and must be supported with quality training and rigorous equipment checks. Most falls from height are preventable. All parties engaged in fall protection should be aligned and accountable to keeping workers safe. ER

Pic credit: Sebastian Fröhlich on Unsplash.

New rules

In January, the WEEE regulations were updated to include new products. Ben Storer, senior technical advisor at Valpak, explains what this means for equipment producers.

Keeping Waste Electrical and Electronic Equipment (WEEE) out of landfill and dismantling it for reuse or recycling helps to meet the Circular Economy goals, which aim to replace the traditional linear model of 'take, make and dispose' with a circular system that designs products for reuse and recyclability.

The world has transformed since electrical goods became widely available and, although we have not quite reached a time where labour-saving devices allow us to enjoy unlimited leisure time, our lives are undoubtedly enhanced in ways that were unimaginable 50 years ago. What was missing from those 20th century visions of the future, however, was the recognition that, at some stage, products would reach the end of their lives and need to be disposed of responsibly.

These days, we are all familiar with the targets in place under the WEEE regulations. However, since January this year, changes have come into effect and, under a new Open Scope system, WEEE producers are now required to report on a wider range of items.

UPDATED REGS

Disposing of electrical goods to landfill can result in toxins and chemicals leaking into the earth and water systems. The WEEE regulations were originally introduced in 2007, to divert waste products away from landfill and to increase recycling. The regulations place an obligation on producers to offset the cost of recycling products at the end of their life. In practice, this means reporting on the volume of goods placed on the market, and paying a fee to facilitate recycling.

A 'producer' of electrical and electronic equipment is any business that imports, manufactures, or rebrands electrical or electronic goods for sale in the UK. Around 6,000 businesses were already complying with the regulations, but from 1 January this year, a new band of producers will be tasked with navigating the WEEE regulations for the first time.

Those which are new to the system may find the process confusing to begin with, but it need not be a daunting prospect. The first step is to find a compliance scheme which can help. Although producers are able to manage the reporting aspect themselves, they must register with a specialist compliance scheme, which will purchase recycling evidence on their behalf. Companies which ignore the legislation can be liable for prosecution.

> **From January 1 this year, a new band of producers will be tasked with navigating the WEEE regulations for the first time**

UNDERSTANDING THE CHANGES

Producers need to understand the weight of individual products, excluding batteries and packaging. They may weigh the products in-house, source the weights from manufacturers or suppliers, or use their own recorded weights for their products.

A good compliance scheme will guide producers through the process, taking them through the steps needed to register. Although Open Scope was introduced in January, the first declarations took place in April, and included all the items placed on the market between January and March.

Retailers need to make consumers aware of the importance of recycling old items, and explain where goods can be dropped off for recycling. Packaging must include the crossed-out wheelie bin symbol to show that products should not be sent to landfill.

While the new regulations may seem confusing, they are an important step in protecting the environment from the serious impact of mishandled WEEE. For those who need help, their compliance scheme should be the first port of call. Working collaboratively, producers and recyclers can make a real impact, increase recycling, and protect the environment. ER

OPEN SCOPE – WHAT'S CHANGED?

Since the Environment Agency published its updated Electrical and Electronic Equipment (EEE) Scope Guidance, the number of items falling under the regulations has expanded. At the same time, the UK recycling target is set to rise from 45% of the weight of the EEE products placed on the market, to 65% of the equipment sold (or 85% of the WEEE generated).

Producers which were already signed up for compliance will need to check whether changes affect them. Newly-obligated producers should also assess their stock and take steps to register.

Household luminaires have been added to the list. These include a wide range of products, from garden lighting and lampshades which feature a luminaire (or light source), to table and wall luminaires and ceiling roses.

Other lighting features also feature for the first time. For example: dimmers, light switches and lighting controls used in household lights; fixed installations such as air conditioning units and filtration systems; and small items like fuse boxes, circuit breakers and plugs.

A number of products that were previously included in the scope are undergoing smaller changes. These include a change to the categories assigned to sunbeds and some heat-pumped tumble driers, while producers of power tools will no longer be expected to declare the case.

Be prepared

Lindsay Ellis, partner at Wright Hassall solicitors, explains why businesses must review commercial contracts in time for Brexit.

Although there is still uncertainty surrounding the timing of Brexit, the recent vote to delay the process has given businesses the breathing space needed to review their existing contracts.

Therefore, it is important organisations consider how Brexit might affect existing contracts and not only those proposed to come into force after a decision is made.

EXISTING CONTRACTS

Some businesses could see their supply chains negatively impacted by Brexit and it's important they consider the performance of obligations by, and the cost of performance by, subcontractors and suppliers.

This is especially important for those who will be made responsible for increased costs or delays due to border issues.

Other key areas to consider include; term (and the ability to exit early), territory, currency, tariffs, customs clearance (the consequence of any delays), resources, licensing/consents and tax. Failure to review and plan for these could result in increased costs and/or damage to business performance.

FORCE MAJEURE

A contract typically contains force majeure clauses. Depending on the drafting, these can relieve a party from liability for a breach resulting from 'circumstances beyond its reasonable control'. However, if Brexit was likely when the contract was agreed, it could be argued the parties should have planned for its effects.

Without a specific reference to Brexit, a force majeure clause is unlikely to help of itself, but depending on how the clause was drafted, it might address delays in delivery of goods due to cross-border issues.

COMPLIANCE WITH LAW CLAUSES

Many contracts state that parties must comply with applicable law. In any event, it will be a matter of interpretation whether such a clause could oblige a party to absorb the costs associated with Brexit-related changes in law.

Long-term contracts typically address what will happen if the law changes, often specifying that charges can only be increased in limited circumstances, with the supplier required to consult with the customer before making any necessary changes to the services.

CHANGE CONTROL

Many contracts will contain a clause outlining a procedure if either party wishes to change it, which typically involves discussions, with only necessary legal or technical changes being able to be compelled. Generally, there is no right to terminate if a change is not agreed.

> **"Recent events have shown that the only current certainty with Brexit is more uncertainty"**

Such a clause may help if, for example, the contract must be performed differently to reflect a Brexit-related change in law.

TERMINATION

The contract may include scope for termination, by either party. This may be in connection with circumstances arising from Brexit-related events or a failure to agree a change.

If a contract's termination clause gives a party a right to terminate on relatively short notice, the prospect of termination can always be raised as a means of encouraging negotiation.

COMMON LAW AND FRUSTRATION

Frustration arises where an event, like a change in the law, occurs after the date of the contract, radically transforming the obligations of either party or making it physically or commercially impossible to fulfil the contract.

However, a contract is not frustrated due to inconvenience, hardship, financial loss or when the event should have been foreseen by the parties. As such, it is generally accepted that frustration will not help with Brexit, although it might apply if certain changes in law were to be made subsequently, which would make it impossible to fulfil a contract.

INTERPRETATION AND IMPLIED TERMS

The courts are unlikely to interpret a contract or imply a term to assist a party adversely affected by Brexit and will not relieve a party from the consequences of their poor business practices, if that involves departing from the natural meaning of the contract.

Similarly, the fairness of a proposed implied term, or the fact that the parties would agree to it is insufficient grounds for implying it.

Both interpretation and implication of terms have regard to the background knowledge reasonably available to the parties at the time they entered the contract. If they fail to include Brexit provisions, it might be considered they have accepted any additional costs and risks should lie where they fall.

CHECKLIST FOR DRAFTING FUTURE CONTRACTS

When it comes to drafting future contracts, there are a range of key areas that need to be considered.

It is crucial that territorial references to the EU clarify whether this includes the UK and, where the parties agree that certain events prompt specified consequences (e.g. ▶

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a renegotiation on increases to tariffs), the contract deals with this appropriately.

WHAT ARE THE OPTIONS?

By not drafting contracts that address Brexit uncertainty, there is a risk that a party will be obliged to continue to fulfil its contractual obligations, even if Brexit-related events render it commercially unattractive.

However, doing nothing may be an option for a party who can terminate contracts at short notice or are confident in their ability to perform regardless of Brexit's outcome.

BREXIT CLAUSE

Inserting a 'Brexit clause' into contracts will trigger some change in the parties' rights and obligations when a defined event occurs – this 'if/then' clause attempts to govern the outcome of a change.

Brexit could affect almost every aspect of doing business and the best a Brexit clause may offer is a binding requirement for the parties to try and renegotiate the contract.

> **Some businesses could see their supply chains negatively impacted by Brexit**

For other contracts, it may be possible to specify the consequences of certain events, but with Brexit, there is the risk that events occur that have not been first considered.

MAKING THE NECESSARY CHANGES

Recent events have shown that the only current certainty with Brexit is more uncertainty.

Although it's difficult to predict the full impact of the UK's decision to leave the EU, without careful planning, new and existing commercial contracts could be affected.

Remember, existing obligations within contracts could be negatively impacted and without taking the necessary steps, you are potentially inviting risk. So, seek advice from experienced contract lawyers and begin planning for life after Brexit, sooner rather than later. ER

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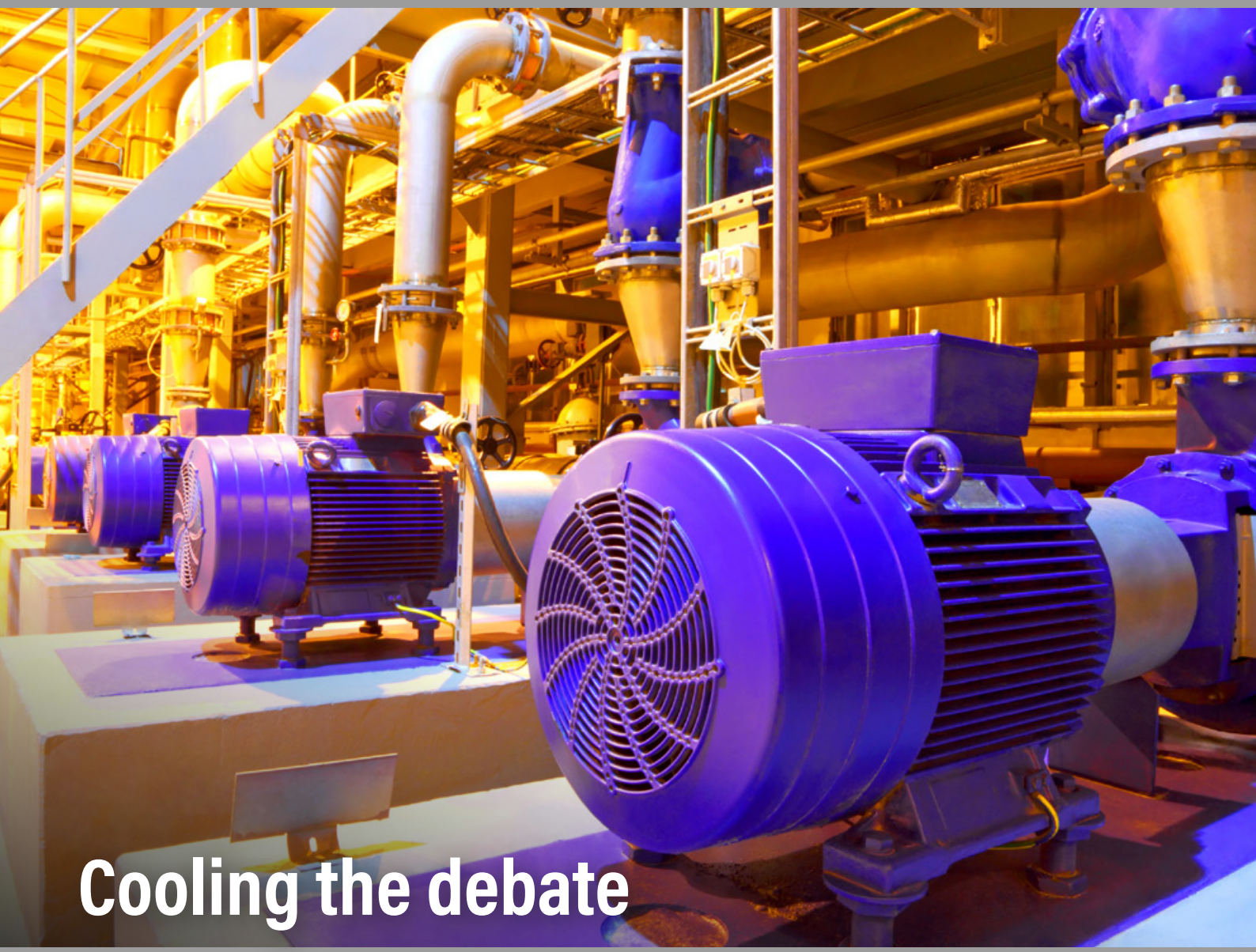


Cooling the debate

Mike Teska, product line manager at Baker Instruments, a Megger company, explores the implications of surge testing electric motors.

For many years, predictive maintenance and motor reliability experts have debated the merits of surge testing. Questions about the benefits and findings of the test have fuelled heated discussions on forums and in boardrooms around the world. Some in the motor reliability community think that the very process of finding insulation weakness in an electric motor by surge testing damages the remaining dielectric insulation so the motor will not continue to operate. Others believe that testing above operating voltage is absolutely necessary to verify insulation integrity, and does not precipitate insulation weaknesses.

So what is the truth? Can surge testing, done properly, help industry reduce costly downtime, or is it just smoke and mirrors? Does the fact that the motor manufacturing and motor repair industries specifically require surge testing to verify insulation integrity outweigh the few that feel that surge testing undermines reliability? Or has there been so much misinformation published that the true benefit of the test has been muddied?

This two-part article outlines the principle, proper performance and insulation effects of surge testing, and the second part includes motor test results that should settle the debate.

PRINCIPLE OF THE SURGE TEST

Whereas the insulation resistance (IR), polarisation index (PI) and HiPot tests are used to detect ground wall problems, the surge test is used to find turn-to-turn insulation weakness. Motor winding insulation failures often start as turn-to-turn failures that eventually damage the ground wall insulation and lead to catastrophic failure. The main claim of surge testing is that it can detect the early stages of a problem before it becomes severe, providing an opportunity to repair or replace without unscheduled downtime.

Turn-to-turn insulation problems can be definitively found with the surge test. The surge test applies a fast rise-time, high-voltage impulse to a winding, which produces a voltage difference between adjacent loops of wire. If the insulation between the two loops of wire is damaged or has been somehow weakened through operation, and if the voltage difference between the wires is high enough, an arc will form between the wires.

This arc shows up as a pattern change in the surge waveform. The surge test is performed with an impulse generator with a display that continuously shows the surge waveform.

The surge waveform is the voltage present across the test leads of the instrument during the test. The indication of a turn-to-turn fault is a rapid shift to the left or a decrease in amplitude of the waveform. The observed waveform is directly related to the coil's inductance. In effect, the coil becomes one of two elements in a tank circuit. This circuit is a LC-type, made up of the coil's inductance (L) and the surge tester's internal capacitance (C).

The inductance (L) of a coil is determined by its geometry (number of turns of wire) and the type of iron core it rests in. The frequency of the wave pattern is determined by:

$$Frequency = \frac{1}{2\pi\sqrt{LC}}$$

This formula implies that when the inductance decreases, the frequency increases.

A surge test detects a fault between turns by observing a jump in the resonant frequency of this LC tank circuit. If the voltage produced by the surge is greater than the weakened dielectric strength of the turn insulation, one or more turns may be shorted out by arcing. This effectively decreases the number of turns in the coil. Fewer working turns reduces the inductance of the coil and increases the frequency of the surge test ringing pattern. The voltage or amplitude of a surge wave pattern is determined by:

$$Voltage = L\frac{di}{dt}$$

Where:
L = coil inductance
di = Delta i (instantaneous change in current)
dt = Delta T (amount of time to change)

Therefore, just as the reduction in L (due to a faulty coil) causes a frequency change, it can also cause an amplitude change. But this assumes di/dt is constant, which is not usually the case in a modern surge test. Typically, when we see the small breakdowns that are useful for predictive maintenance, the amplitude of the surge remains the same, and only the frequency shifts. The surge tester has enough energy to keep the voltage the same into the slightly smaller L caused by the breakdown.

EVOLUTION OF THE SURGE TEST

Surge testing of motor coils has been an industry practice since 1926, when J.L. Rylander published *"A High Frequency Voltage Test for Insulation of Rotating Electrical Apparatus"* in Transactions of the AIEE. In 1926, an indication of a turn-to-turn insulation failure was a drop of coil voltage amplitude. This amplitude was determined by a vacuum tube rectifier circuit using an apparatus the size of a large workbench with rotating spark gaps for switches and large step-up transformers to charge large high-voltage capacitors. As time wore on, there was a need for a compact, portable machine that would produce a high voltage at relatively low currents. At this time, surge technology was not new; however, the machines used for transformer testing were expensive and cumbersome. To meet a growing need for testing, the surge comparison tester was developed. This compared the wave shape of two or more identical windings against a known good winding. This comparison made it possible to study insulation faults as well as find them.

In the 1950s, the surge comparison test was still considered fairly new. It was very useful for finding insulation faults, and it opened up numerous possibilities for improving insulation testing equipment as well as insulating methods. Even in these early days of surge testing, the benign nature of the test was stated in an article written by D.J. Reynolds, R.J. Alke, and L.W. Buchanan of Westinghouse: "Because the energy of the surge is extremely limited, the current through the faulty insulation is so small that no severe burning occurs at the point of weakness." With the amount of testing and information gathering that Westinghouse was doing, one would think that they would not make this statement lightly.

"So what is the truth? Can surge testing help reduce costly downtime, or is it just smoke and mirrors?"

There have been many advances in high-voltage testing since the 1980s. Broad markets and technology developments in the electronics industry have helped manufacturers of motor testing equipment make great strides in modernisation, reliability, and tester sensitivity. Today's high-voltage testers use advanced high-speed electronic evaluation of changes in resistance, leakage current, leakage current versus time, voltage, step voltage, dielectric absorption, frequency response, wave shape, corona inception voltage (CIV) and more, to detect faults at or below the levels of energy the motor is exposed to during operation.

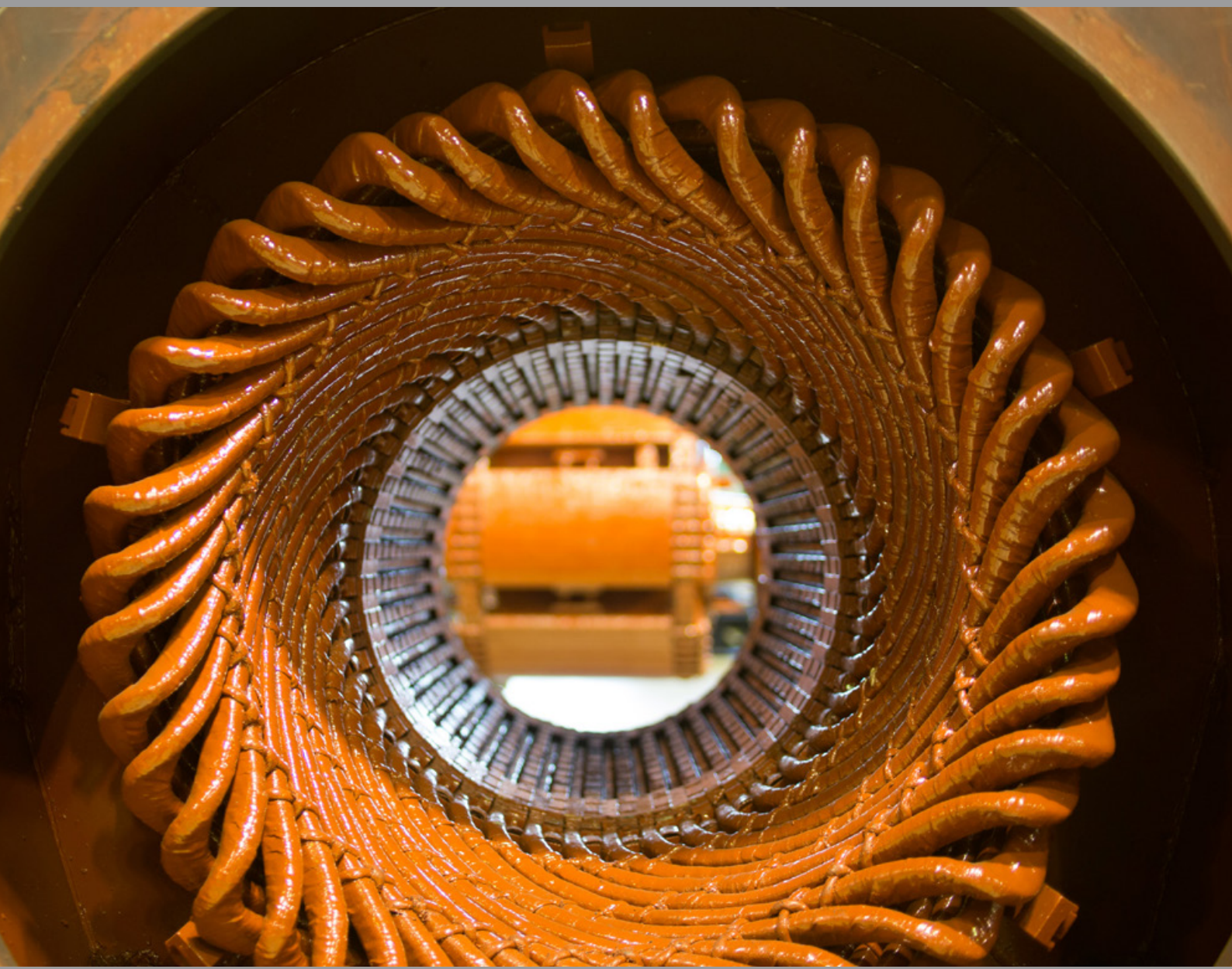
Microprocessor-controlled instantaneous trips allow winding conditions to be evaluated without compromising dielectric integrity. The addition of field-developed PASS/FAIL test criteria makes this type of testing extremely repeatable. One of the major advances is the replacement of heavy step-up transformers with compact and much lighter solid-state, high-voltage power supplies, leading to great improvements in equipment portability. Test equipment that once tipped the scale at more than 500 kg now normally weighs less than 25 kg.

The old surge comparison test, where two windings are compared to a known good "master" winding, has been modernised. Now every surge pulse is digitised and compared to the previously applied pulse. This type of comparison was impossible without computer-analysed waveforms. If any weakness is detected, the test is instantaneously stopped, preserving the dielectric integrity. This gives the test the ability to find micro-faults without human interpretation, and provides a higher level of repeatability. Weaknesses are recorded and stored in a memory bank or database for future reference and further evaluation.

Even with these advances, critics still feel that the surge test can only be safely done at a motor repair facility, and even then some don't want it done at all. So why would you do it? What is the essential benefit of surge testing electric motors? The surge test is the most efficient way to find turn insulation weaknesses. For those who manufacture or rewind motors, being able to manufacture coils free of insulation defects is paramount to reliability. Therefore the surge test is used universally in the manufacture of coils for both small and large motors.

For motors in service, the dielectric strength of the turn insulation slowly decreases with time as the insulation ages. Some factors causing the insulation to age include thermal cycling, vibration, abrasion due to mechanical movement of coils, chemical attack, partial discharge, exposure to damaging transients, exposure to radiation and variable frequency drive operation. For operators of electric motors, confidence that a motor's insulation is sound is necessary to maintain a productive and profitable process. Properly performing a surge test to verify insulation integrity is the easiest and fastest way to confirm motor viability.

The second part of this article, which will appear in a future edition of *Electrical Review*, will look at how to perform surge tests properly, how motors fail, and the benefits that modern surge testing techniques can provide.

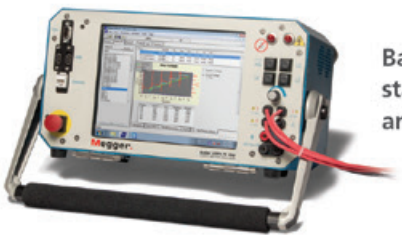


Megger acquires Baker Instruments

In August 2018, electrical testing equipment manufacturer Megger announced the acquisition of Baker Instruments, a world leader in electric motor and rotating machine test and condition assessment, from SKF Group. For over 50 years, Baker has led the electrical motor testing industry and has a recognised leading brand and position in this field. Baker pioneered static and dynamic motor testing for predictive maintenance and troubleshooting.

In line with Megger's drive for continued growth and innovation, the Baker acquisition represents a significant step forward in Megger's strategic expansion. By combining the strengths and product portfolios of the two market leading companies, Megger will be able to deliver a more comprehensive range of best in-class product solutions and services to its global customer base.

Megger's expanded range will include Baker's portable motor analysers and fixed motor monitoring systems, which will help utilities, industry and contractors in over 140 countries to make better decisions about the health of their assets.



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No cutting corners

Paul Nolan, national projects manager from cable management specialist, Unitrunk, discusses the need to maintain the integrity of the cable management specification while maximising other opportunities to reduce installed costs.

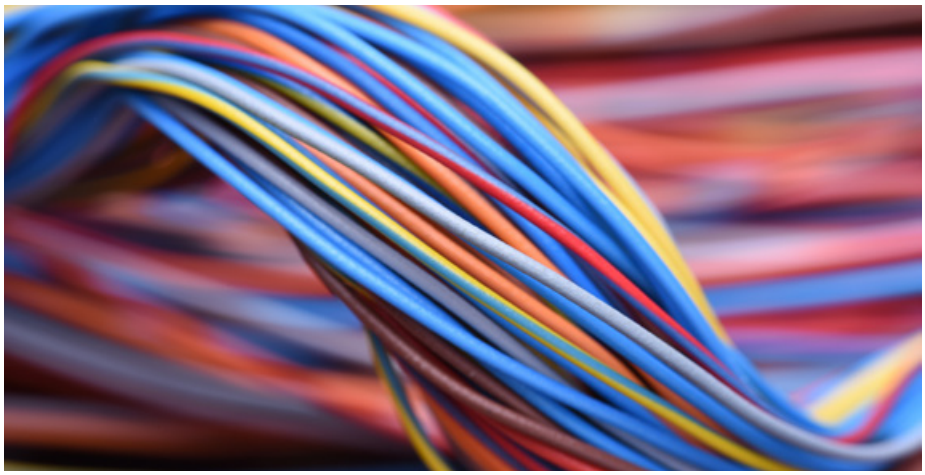
Value engineering has become embedded in construction industry processes as a vital step in ensuring that a project meets quality and buildability requirements, while identifying any opportunities for cost savings and design improvements.

It's an approach that has been instrumental in helping the electrical sector to move away from a copy-and-paste specification methodology, towards a more bespoke consideration of the individual design and performance criteria for the specific project. When done well, and early enough in the project cycle, value engineering can deliver significant cost savings for both materials and labour, along with design improvements that have the potential to overcome space restrictions, service route clashes and technical complexities.

The key point here, however, is that value engineering needs to be carried out at an early stage of design development, ideally with the assistance of experts from the supply chain that can provide workable solutions. As a cable management specialist, it's an area where we often work with customers, across both our Unitrunk business and at our Vantrunk business, which specialises in engineered cable management solutions for extreme environments.

COLLABORATIVE BENEFITS

One of the major benefits of working with a trusted specialist in cable management is that the project specification and delivery team can tap into the supplier's expertise to examine the brief, consider the site-specific challenges of the project and ensure that the finished specification meets the needs of the electrical installation, the building and the end-user. Our aim is to engage with installation teams to understand the project requirements so that we can help them look for ways in which they can reduce the amount of materials they require and/or drive down installation costs by modifying the design for cable management networks.



While cable management is often viewed as a commodity item, it is an essential infrastructure for any electrical installation and, therefore, usually represents significant material costs and site time. A collaborative approach to value engineering can often reduce labour and material costs while aligning the installation more closely to the actual needs of the building.

Unitrunk only sells products through the wholesale channel, but we work direct with contractors to advise on the most appropriate products for their project. By advising the contractor, our team not only supports improved product purchasing decisions and explores opportunities for design improvements, but often also identifies any areas of waste due to over-specification. Ensuring that contractors do not buy more cable management than they really need on-site is a simple way that suppliers can help contractors to make savings and add value to the project.

IDENTIFYING SAVINGS

While it may not always be possible to reduce the cost of the materials used, early engagement with the system supplier can deliver other routes to a more cost-effective installation.

Foremost amongst these is speed of installation. The price of materials only accounts for a relatively small proportion of the installation cost and the ratio of costs accounted for by skilled labour often grows as the scale and complexity of the project increases. As a result, cable management systems that offer faster and easier installation can have a dramatic influence on the installed cost of the project by reducing the number of skilled installers required on-site and increasing the amount of work they can carry out within the course of a working week. For example, Unitrunk's RIS (Rapid Installation Systems) EasyConnect cable basket and UniKlip cable tray systems have been proven to reduce installation times by as much as 50%, slashing costs and reducing the risk of exceeding programme deadlines.

On many projects, it is possible to save both time and material costs by removing unnecessary elements from the specification. This may include reducing the size of the cable management by engineering out redundant capacity specified as 'futureproofing', or it could involve a simple modification to install a divider rather than two separate runs of cable management, thereby reducing both material and installation costs. The use of reduced widths of cable tray often means that support intervals can be extended too, which again, provides both installation cost savings and a reduction in the materials required. ER

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Recycling matters

With the construction sector being one of the largest contributors to waste in the UK, it is crucial that steps are taken to reduce the amount of waste that goes into landfill. Here, Paul Hetherington, CEO at Marshall-Tufflex, discusses the environmental benefits of selecting PVC-U cable management systems manufactured from recycled materials.

Urgent changes are required to limit an irreversible climate change catastrophe, and there are only 12 years to do so; this is according to a landmark report by the UN Intergovernmental Panel on Climate Change (IPCC) released in October 2018. Waste, recycling and landfill have come under the spotlight since, as landfill sites release toxins, leachate and greenhouse gases into the air.

Figures have shown that the construction industry uses around 420 million tonnes of materials each year, and from these materials almost 120 million tonnes are wasted – approximately 60% of the national total.

These figures make it clear that the construction industry has a huge role to play in waste reduction. While changes have been made, a lack of awareness about the options available, as well as some commonly held misconceptions, have in some areas, limited the adoption of more sustainable alternatives.

Plastic in particular has come under intense scrutiny in recent years, largely in part due to the harrowing images shown in the final episode of the BBC series, *Blue Planet II*. The images highlighted the incredibly slow rate that plastic waste degrades, and often ends up in the ocean. Over 80% of marine pollution comes from land-based activities, which is damaging to the marine wildlife.

However, by recycling this plastic instead, it is saved from the fate of the landfill or becoming marine waste, and further pollution to the environment is avoided. Any manufacturing process that allows for this is therefore of huge benefit.

MAKING A DIFFERENCE

Acknowledging this, the PVC-U cable management sector is increasingly introducing recycled content into its production. For example, Marshall-Tufflex is committed to its recycling initiative and has made the conscious decision to do this – with a product portfolio that is been produced using 80% recycled material. This means that the amount of PVC-U being saved from reaching landfill each year by Marshall-Tufflex alone, is the weight of 300 double decker buses.

> **The PVC-U cable management sector is increasingly introducing recycled content into its production**

Marshall-Tufflex is also challenging competitors to follow suit – with a call for the industry to move towards using at least 50% recycled material in manufacture by 2028. This would make a significant impact to the environmental performance of the cable management sector and contribute hugely to a circular economy.

In fact, a study undertaken by Manchester University that enabled companies to estimate the 'cradle to grave' carbon footprint of their products, showed that recycled PVC-U offers a 20-fold reduction in greenhouse gases compared to a virgin product.

THE RIGHT MATERIALS

Of course, buying habits are what influence manufacturers' decisions, so there is a need for specifiers to understand the choices available and ultimately select products that are environmentally responsible. There are a ▶

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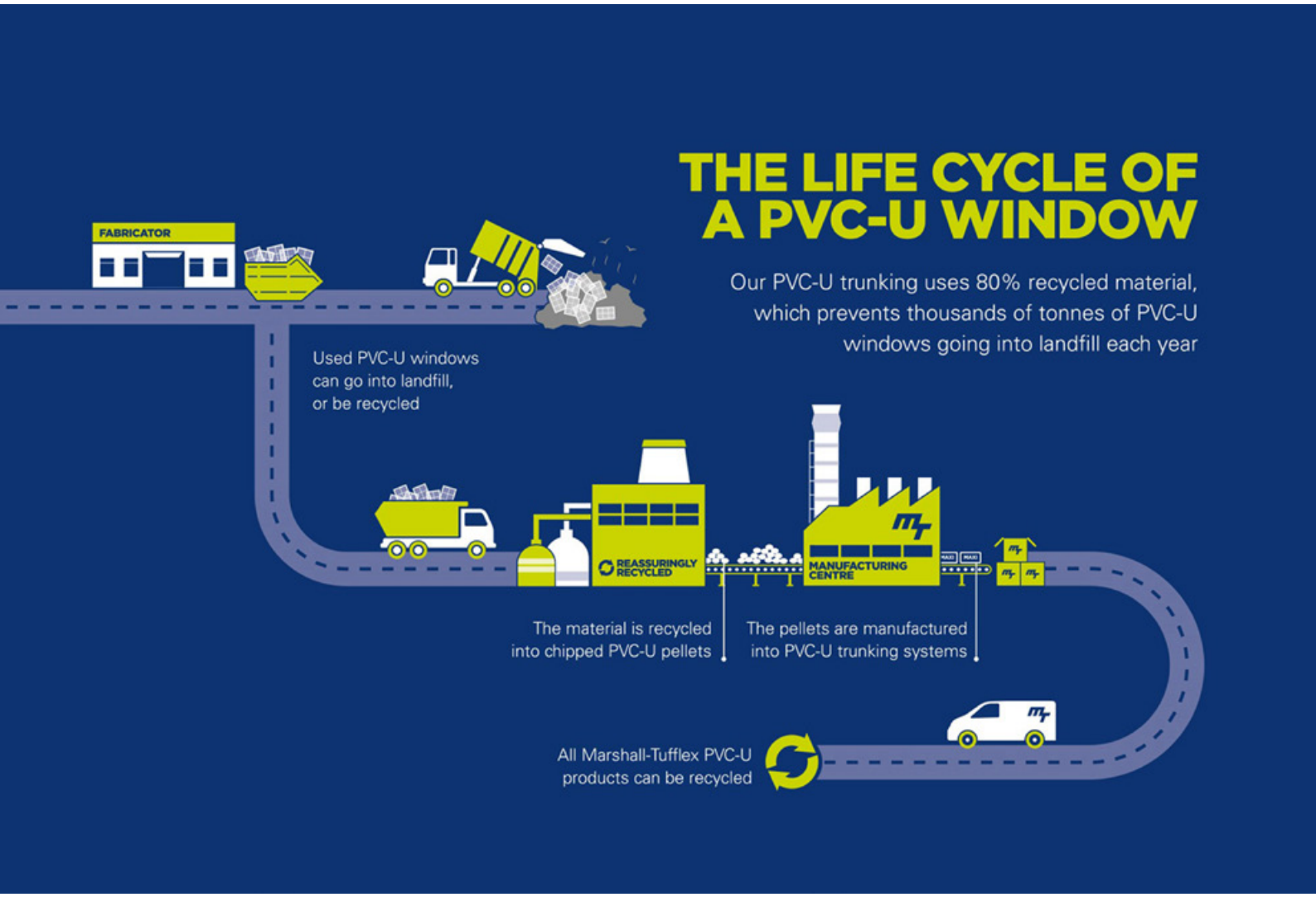

number of factors that need to be taken into account when selecting materials for a build.

Durability is a key priority for specifiers, and unfortunately there is still a common misconception that the use of recycled PVC-U results in a lower quality product. The reality is that the recycled post-industrial waste PVC-U used for cable management systems most commonly originates from window frames – a grade of plastic designed to withstand external elements. Once processed and reused, the material still holds the same characteristics. Strict quality controls from credible manufacturers will constantly monitor the quality of the recycled material and ensure it provides a durable and smooth finish.

The product should also comply with the Registration, Evaluation, Authorisation and restriction of Chemicals (REACH) standards which concern the production and its use of chemicals and their impact on both the environment and human health. Furthermore, the ISO 14001 Environmental Management Accreditation demonstrates that manufacturers have taken steps to reduce their impact on the environment throughout their business.

> **Contractors and specifiers have a role to play in helping prevent further environmental damage over the next decade**

Finally, an effective way for those specifying cable management products to be sure of their environmental impact, is to work with transparent manufacturers who can clearly show how much recycled content is used in each product. Marshall-Tufflex has developed its Recycled PVC-U Calculator for this reason – by entering product codes and quantities, the calculator shows the percentage of recycled material used and how much recycled material in kilograms (kg) has ultimately been saved from landfill.

Contractors and specifiers have a role to play in helping prevent further environmental damage over the next decade. By specifying and installing only PVC-U cable management solutions with recycled content from trusted manufacturers, a significant difference can be made. ER

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How safe are connected vehicles really?

Drawing upon cyber-attacks gone by, Natalie Sauber of Arcadis questions whether connected vehicles will ever be truly safe, and outlines the steps auto manufacturers should be taking to ensure public safety.

It is estimated that by 2022, the global market for connected cars is expected to grow by 270%, with more than 125 million connected passenger cars on the roads.

Numerous advanced technologies come together to progress connected vehicles towards becoming fully autonomous. Connected cars are part of the internet of things (IoT), which can assist with a wide range of potentially useful functions. Advanced sensor technology allows the car to receive real-time traffic updates, as well as collecting weather updates on the go. Similarly, it can receive information on when to make a turn, identify the right speed limit or even assist with smart parking – because

let's face it, we all hate parking.

These applications are designed to enhance the driving experience and open drivers to new possibilities. And just like other IoT systems, connected cars are vulnerable to hacking, data breaches, hijacking and more.

IS CAR HACKING OLD NEWS?

Why do we not hear more about car hacking? For the last couple of years, you couldn't open a newspaper without hearing about a hack. Recently however, it has all gone rather quiet. Has the hacking really stopped? Or have the cars simply improved to be anti-hacking? Unfortunately, no – most auto manufacturers now offer what is called a "hacking bounty", which not only pays good money to the hackers but also stops them publicising their efforts – mostly anyway.

The cars themselves have not really changed; in fact, they are getting more vulnerable. Keyless cars now present a very easy way to hack. The figures shared by the Office for National Statistics (ONS) reveal a whopping 113,037 incidents of 'theft or unauthorised taking of a motor vehicle' in the last year alone.

Most auto manufacturers see security as a roadblock, when really it is an enabler and must be prioritised. No autonomous car will be on the road if it is hackable – think about it, would you let an autonomous taxi pick your kids up from school?

PUBLIC SAFETY IS AT RISK

Disgruntled employees or ex-employees are also a great risk to companies and connected cars. They have access to source code information and much other data which, in the "wrong" hands, can be very dangerous. We've already seen a number of high-profile incidents taking place, including when a disgruntled former Tesla employee made changes to manufacturing source code and exfiltrated sensitive data to outsiders.

The headline news of such hacks is disturbing as they represent a threat toward human life. One hack could take the lives of not just a driver and their passengers, but also pedestrians, bystanders and other drivers on the road. Of course, there is also the financial impact which could run to billions of pounds.

IMPACTS OF CYBER-ATTACKS

The impact of cyber-attacks on connected cars can range from theft to data breaches, location tracking and fraud. However, the most common is unauthorised control over car systems through access points via infotainment systems, a USB connection, Bluetooth connection and of course its cellular network. There have even been incidents where hacks have been carried out via tire-pressure monitoring systems. Not only do the car's internet-connected systems need to be secure, but so too do the internal networks that run within the vehicle.

> **"Most auto manufacturers now offer what is called "hacking bounty", which not only pays good money to the hackers but also stops them publicising their efforts – mostly"**

Cyber-attacks like these, which involve the physical elements inside the car, are worrying. These can be split into low physical risk (i.e. unlocking doors) but can also have far wider reaching consequences impacting human lives – only imagine what might happen at high speed when the vehicle is moving!

It is not just the vehicles which are at risk. The entire ecosystem of smart mobility companies is at risk from cybersecurity vulnerabilities. While car manufacturers are an obvious target, Tier 1 suppliers, telematic service providers, fleet operations, car sharing companies and public and private transportation providers are facing an ever-increasing threat. Even companies that operate commercial ride share fleets are open to fraud attacks. At the end of last year, Uber was fined £116 million for failing to notify drivers that they had been hacked back in 2016.

THE RISE OF BUG BOUNTY HUNTERS

In 2018, GM invited a handful of researchers – commonly dubbed "white hat" hackers – to find loopholes in its vehicles in an effort to find and fix any insecurities. In 2016, Tesla offered between US$100 (£78) and US$10,000 for every bug found in its software, depending on the severity of the breach and its potential ramifications.

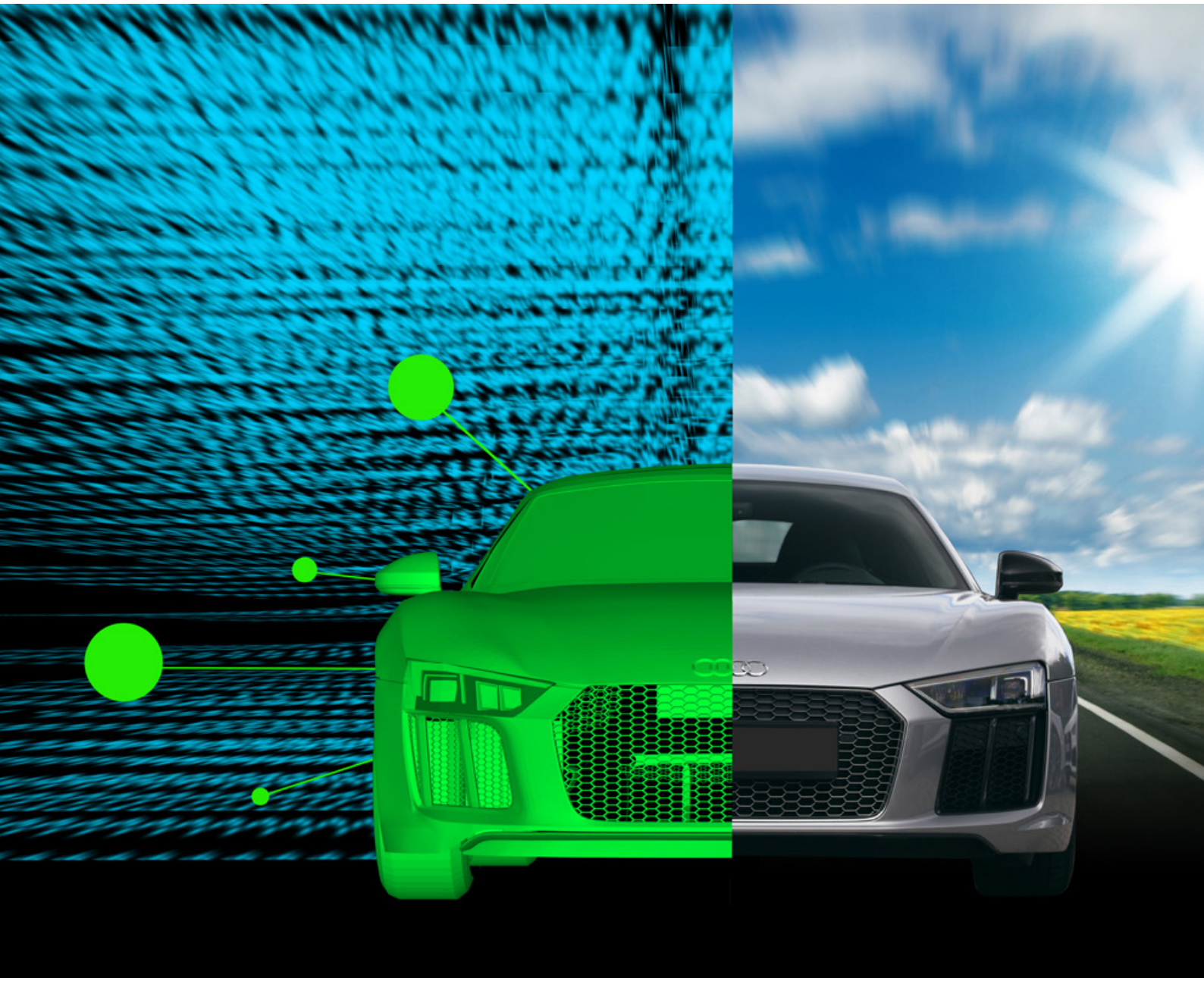
Connected cars have already been successfully hacked. In reality though, these attempts pale in comparison to what is happening in other technology sectors. There is a strong consensus that auto manufacturers have so far stayed ahead of potential attacks, but we don't know for how much longer.

At the moment, automotive hacking has not been that lucrative in terms of financial gain. Of course, as we get more connected vehicles on our roads, the threat of cyber-attack is only set to increase.

But the industry is fighting back. More than 30 companies have joined to form the Auto-ISAC (Information Sharing and Analysis Centre). The ISAC is devoted to tracking, sharing and fighting back against potential cyber threats.

WILL CONNECTED CARS EVER BE SAFE?

Yes, but it will depend on significant investment from auto manufacturers. We also need to see a cultural shift whereby people are more prepared to spend money to protect their own data. Security concerns will always be an issue but, with a collaborative approach across the entire industry, it will be possible to deliver a safe, efficient and accessible way forward for connected and autonomous vehicles for all. ER



Designing the future with digital twins

The use of digital twins is a design method already implemented by the likes of Google and Tesla when it comes to car design, but how can this technology be translated to the data centre? Jonathan Leppard, director at Future Facilities, takes a closer look.

Fully autonomous vehicles are on their way. Already in parts of sunny California and Silicon Valley, cars from companies such as Tesla, Google and BMW are driving around on public roads with no human input. Following the recent news that the Department of Transport is updating its rules and guidance on autonomous cars, we will soon see them on UK roads too.

However, while there has been a lot of talk about LIDAR (Light, Detection and Ranging) and 5G technologies, one key area has been overlooked, that of the data centre. This is a major oversight as data centres will need to be rethought if they are to enable autonomous cars.

Edge data centres in particular, bolstered by 5G's incredibly low latency, are set for huge expansions as we look to support these emerging technologies. This rise in usage and increased computing in edge data centres will need careful management of the huge levels of heat that will be

generated if additional downtimes are to be avoided.

Interestingly, to manage these thermal issues correctly, data centre designs are increasingly turning towards a design method already used by the likes of Google and Tesla for their car design: the digital twin.

DIGITAL TWINS AND CONNECTED CARS

A digital twin, in the simplest sense, is a virtual replica of a real-life installation or scenario that uses data to suggest any changes that are needed. The advantage of a digital twin is that ideas, concepts and solutions can be safely tested, changed and retested very quickly and easily by designers before an update is brought into the physical world.

In the connected car industry, companies such as Nvidia are already using digital twin simulations to train self-driving cars and help them learn difficult road layouts in a virtual world. By repeating training scenarios multiple times in these virtual environments, cars can quickly learn how to deal with difficult situations before deploying a real vehicle on a real street.

Using a similar methodology, data centre designers can use Computational Fluid Dynamics (CFD) to power digital twin simulations of a data centre. Through testing in a virtual environment, designers can quickly test, hone designs and gather data that can inform decisions on creating the most optimum and efficient layout. With the rise of edge data centre computing and the need to very carefully manage heat generation, CFD-powered digital twins are playing a crucial role in ensuring that connected cars have access to the computing power that they need.

Creating a digital twin of a data centre means that highly accurate predictions can be made regarding any changes and updates in the design. By using CFD to model the flow of the air, or water, that is cooling the data centre systems, designers and engineers can develop layouts that maximise the space available; all whilst reducing the risk of any downtime or an outage due to thermal complications.

THE IMPACT OF 5G ON AIRFLOW AND SIMULATION

Looking to the near future, the need for CFD-powered digital twins will become even more important as 5G usage increases. The growth in data and processing taking place outside of centralised data centres is huge. Gartner currently estimates that around 10% of all enterprise data is generated outside of a centralised data centre; however, this number is set to grow to 75% in the next six years. This rapid change will no doubt send power densities soaring as we cram more compute into smaller edge sites, which in turn will put a huge strain on the cooling systems in place.

Failure to provide effective cooling will jeopardise the success of 5G technologies from their very inception. We will certainly need to do better than the average utilisation of current facilities which is around seventy percent.

For instance, while connected cars are one very obvious example of how edge data centres will be used, there are a number of other applications too. In fact, the recent announcement of Google's Stadia suggests that gaming could soon benefit from these capabilities.

With game consoles being run virtually in an edge data centre, issues such as latency, speed and power can be negated. As even more edge computing use cases emerge, demands on the computing power of data centres increase, leading to a huge spike in the level of heat generated. A digital twin then can be used by data centre designers to predict how cooling can be changed to limit or remove any increases in heat in the most efficient way.

> **Data centres will need to be rethought if they are to enable autonomous cars**

By testing out different layouts in a digital twin, designers can safely arrive at the best layout before implementing it in the real world. In addition to this, there's also the benefit of improved communications between the designers and future operations teams. In fact, for the first time, design teams will be able to hand over valuable data which will enable operations teams to better achieve the performance level it was originally designed for.

DESIGNING THE FUTURE

The use of digital twins is a huge benefit to designers. Already, those developing autonomous cars are using them to train vehicles to understand the most complex of road layouts. However, the use of a digital twin will not stop there. For 5G and IoT technologies to bring us into the future, then data centre designers will also need to leverage them too. So, while 5G and IoT technologies will continue to draw attention and headlines, it is vital that we do not overlook the changes to infrastructure that will be needed to power our autonomous, connected future. ER

Balancing act

Franck Blonbou, electrical engineering services manager at Nexans, discusses why power grid asset management must go digital, highlighting how Distribution System Operators (DSOs) can leverage the digital transformation of the energy industry to extract maximum value from their grid assets.

Finding an optimum balance between expenditure and quality of supply has become a tremendous challenge over the past few years for distribution system operators (DSOs). This leaves no doubt that the pressure is on to do more with less in a bid to balance cost, risk and performance. Luckily for power utilities, digital transformation of the energy industry offers new and efficient tools to tackle this challenge.

As the global energy demand continues to grow, the strain on the power grid is becoming higher. The possibility of drastic increases in equipment failures is unacceptable for all aspects of asset management including cost, reliability, and risk. More than ever, operators are facing the growing challenge of providing affordable, sustainable and secure electricity supplies against a background of rapid change in the way that energy is produced, transmitted, distributed and consumed.

However, operating a power grid is becoming increasingly challenging because of the rapidly changing landscape of the energy industry and stricter market regulations. Furthermore, DSOs also have to face a growing number of internal obstacles, including ageing infrastructure, growing budget constraints, and the loss of expertise as highly-skilled and experienced staff retire – the 'knowhow' drain.

Historically, these aspects have been addressed individually, often in silos. Yet the many facets of network maintenance and renewal strategies – such as finance, quality of service, safety, or human resources – interact with each other in complex ways that cannot be easily understood and modelled by asset managers. This is where digital technologies can become a critical decision-making aid for efficient asset management.

STRIKING THE RIGHT BALANCE WITH DATA

When it comes to asset management, information is key. For instance, replacing old equipment before it fails often seems wasteful or simply impossible. Think about the US power grid, where almost 70% of power transformers and transmission lines are over 25 years old. In such cases, maintenance and renewal strategies should be designed on the basis of tangible data and realistic forecasts. Otherwise, it is impossible to find the right balance between minimising the risk of equipment failures, securing acceptable network performance, and efficiently managing capital and operating expenditures.

It's not that the vital information is missing. The information is abundant. But it is distributed across various stakeholders within the DSO organisation, from asset managers to maintenance and engineering teams, from the finance department to human resources. The missing link is the intelligence for collecting and managing this data and then making reliable projections based on it, as there are so many variables to be considered. This is where digital technology can offer asset managers a head start.

There are also new factors to consider, such as the proliferation of renewable energy sources on the one hand and the heavy growth in demand on the other, for example from electric vehicles (EVs). These new factors are having a radical impact on the distribution network lifecycle, particularly on critical components.

> **"The expected benefits associated with innovative approaches to asset management are huge"**

Traditionally, DSOs have designed their network maintenance and renewal strategies according to a siloed approach, with finance, quality of service, safety or human resources regarded as separate functions. Indeed, the complex ways in which these functions interact with each other has historically made it difficult for asset managers to

traverse these silos effectively.

Fortunately, there is light on the horizon. Recent developments in augmented intelligence have resulted in solutions capable of centralising data and generating a digital twin of the complete distribution network. Such a virtual model considers all the constraints imposed by the regulatory environment, business rules, available financial and human resources, and any technical policy in place.

WHY A DIGITAL TWIN IS VITAL FOR ASSET MANAGEMENT

A digital twin accurately reflects the entire network and the processes used to manage it (including inspections, repair and renewal strategies in place), enables the creation and testing of different scenarios and contributes to fully informed decision making based on clear projections.

A key aspect of this technology is the unique capability to deliver interconnected insights that allow asset managers to quickly identify and measure correlations between distribution grid performance, capital expenditure and maintenance costs, as well as risks across all silos. These insights enable power utilities to make trade-offs across capital expenditure (CAPEX) and operational expenditure (OPEX) while mitigating risks and reducing intervention conflicts – all in line with their business objectives.

For the projections to be realistic, digital twins should also factor in the ageing profile and behaviour of electrical assets. Technology such as Nexans' strategic asset management solution, which incorporates Asset, the complex system modelling platform developed by Cosmo Tech, our technology partner, takes into consideration how external factors affect the overall ageing rate and ultimately, the probability of failure. Such factors include location, temperature, humidity, and stable or transient current load.

To cover most of the choices available, Nexans implemented the British DSO CNAIM framework in combination with its own 'apparent age' methodology. Although the CNAIM methodology can measure probability of failure and measure its consequences, the government regulator (Ofgem) recognises the pre-established values and statistics for each asset category and calculation methodology as relevant for a five- to 10-year period only.

Nexans' methodology however, allows asset managers to circumvent this limitation by using asset ageing profiles for each category and network simulation to reproduce weekly real-life activities, failures and associated repairs or replacement.

The simulation measures are based on four themes:

1. **Quality of service**
   Network performance is critical at every point of energy distribution to ensure outage time remains as low as possible. However, planning maintenance for the same assets is mandatory to maintain probability of failure and asset health within the desired range.
2. **Financial performance**
   This normally means analysing how much CAPEX or OPEX is required to execute an asset management strategy. However, efficiency of the distribution network has become a target for DSOs. Energy that is conveyed but not sold is lost revenue for the operator and will indicate poor network quality if this reaches high rates. This is determined by comparing CAPEX, OPEX and monetisation of the potential energy that can be sold.
3. **Safety performance**
   This can be related to several topics such as operational accidents, if numbers of repairs rise, or when the system becomes unbalanced, potentially leading to outages, causing major supply issues for the domestic, business and industrial customers served by the network. Therefore, DSOs must measure the impact of increased failure rate on the network by measuring the potential number of failures per year.
4. **Key HR availability**
   As skilled and experienced staff performing critical maintenance tasks are getting older, key competencies for repairs and renewal are increasingly harder to secure when establishing long-term strategies. The availability of maintenance technicians and engineers is therefore a key KPI.

The expected benefits associated with innovative approaches to asset management are huge and have the potential to take this crucial area to a new level of efficiency. To achieve this, DSOs will need a bigger toolbox to move from the traditional 'connect and forget' concept towards a 'connect and manage' one. Those operators that embrace digital asset management as a gateway to better decision-making and a fundamental driver of value will gain competitive advantage and outperform their competitors.

Staying in sync

Enzo Greco, chief strategy officer at NIyte Software, outlines some simple steps to ensure the efficiency of your critical infrastructure.

Efficiency is a critical metric for any organisation. For data centres, it is often defining, as efficiency is central to their operating model. We are able to measure inputs, processes and outputs with incredible ease, with sensors, machine learning, and dashboards making the manual labour and guesswork of a few short years ago barely a bad memory.

Now workflow, analytics, a building-to-rack approach, remote management, and holistic capacity management all align and feed into a corporate awareness that allows facilities, infrastructure, and business to operate as a truly seamless and sleek organism. But this only happens when the business is in sync with itself, its processes and people pulling together and working with consistent, end-to-end information with clear goals.

Here are five steps that any organisation can begin putting into practice today to become infrastructure efficient and ready to be as dynamic as the business and market dictates.

1. Acquire an end-to-end workflow and understand all points on the journey

Traditionally, Data Centre Infrastructure Management (DCIM) and Building Management Systems (BMS) have been silos with distinct workflow systems. But there are significant benefits to these systems

being integrated. Integration promotes efficiency and visibility. For example, when the two systems are aware of each other it enables key functions such as:

- Automating failure recovery, especially in remote facilities where we don't have the luxury of "walking the halls"
- Providing accurate and automated provisioning for everything from the critical infrastructure (power, cooling, space) to the virtualised applications themselves
- Providing holistic alarm and alert management – making it intelligent and end-to-end: Wherever an event arises, it is important to correlate all the different alarms and alerts to provide context and identify the root cause as quickly and accurately as possible
- Managing service requests holistically. For example, what workloads are at risk when a chiller undergoes maintenance, either planned or unplanned? This is a straightforward yet common use case that exemplifies the requirements and benefits of end-to-end visibility and workflow.

2. Gain richer analytics to understand more of your universe

As any data centre manager and head of computing infrastructure knows, the scale and complexity of a modern data centre necessitates rich, multivariate analytics from a variety of sources: Virtual, edge, colocation, and including both BMS and DCIM.

All this information (and there is a tremendous amount) should be incorporated in order to manage processes, discern patterns, analyse possible outcomes, increase efficiency and head off problems before they happen.

There simply are too many inputs with too many possible ideal outcomes to manage data centres traditionally; analytics are ideally and uniquely suited to addressing this challenge and opportunity.

3. Take a holistic 'building-to-rack' approach

With common visualisation and consistent terminology of everything from buildings to racks to workloads, and everything in between, capacity management and accurate reporting are simplified, and systems are easier to use for all concerned.

The value to business are many: Increased availability, greater optimisation and efficiency, and the ability to make better management decisions. All-in-all, taking the zoomed-out to zoomed-in approach enables the business to see all things in the right place and to the right plan when it comes to measuring and operating the facility best.

4. Enjoy remote management

The outsized growth of edge computing (growing far quicker than any other infrastructure segment) is driving many key requirements, none more so than remote visibility and management. Smaller, dispersed facilities are often unmanned – so a manager does not have the luxury of being on-premise to solve for problems then and there.

> **"The outsized growth of edge computing is driving many key requirements, none more so than remote visibility and management"**

Automation is vital for smooth-running facilities under a wide variety of expected and unexpected scenarios, with BMS and DCIM integration being required. For example, holistic alarm and alert management: If a manager isn't there, they've got to be able to discover what's going on at the remote facility in near real-time to avoid disaster and speed recovery. Further, edge computing is driving analytics as a way of "self-learning" the numerous issues that may arise.

5. Create holistic capacity management

You can't do a good job with capacity planning if you're just looking at the facility and not the applications, users, the demand, and so forth. Dynamic environments demand visibility into what it costs to run a workload on-premise, in the cloud, and in a colocation facility, so decisions can be made for the best optimisation of resources.

Complete information across both BMS and DCIM is required for determining the best decisions for commissioning and decommissioning, scheduled maintenance, inventory control, and power and thermal changes.

An underlying requirement for the above is for the organisation to have an understanding of their assets, both physical and virtual: What they are, where they are, their current state and the context around them.

Consider the simple example of servers: How many are there? Where are they? How much free capacity do they have? Do they have the right versions of software to run that shiny new ERP system? Are they "secure", in the many ways we can define that?

Asset management becomes ever more important with the growth of edge computing, as this is a critical, growing, yet often "hidden" part of your computing fabric. The first step in any journey should be to discover and categorise the numerous assets every organisation has.

A carefully considered infrastructure efficiency plan will increasingly have automation and intelligence built in so that critical infrastructure never falls into a critically-endangered state that risks imperilling business systems or customer service delivery.

Far from being a concern to only the key critical infrastructure or data centre team, an understanding of how to drive efficiencies should in fact now be on the agenda for the senior leadership team given the criticality of technology infrastructure to every facet of business delivery in the information age.

It all starts with simple steps. Even if a technology partner is required to implement the right process, it's now within the capabilities of non-specialists to manage infrastructure assets and maintain optimal efficiency given the sophisticated tools available to large enterprises and data centre service consumers alike. ER

Two-pronged attack

Neil Baldwin, managing director at ESP, takes a look at the fire alarm systems market and how new two-wire technology could help save installers time and money.

Fire alarm systems are broadly divided into two main groupings – "conventional" fire alarm systems and analogue addressable "intelligent" systems – with each type best suited to different kinds of premises.

Conventional, or four-wire, fire alarm systems have been traditionally used in smaller properties such as shops and restaurants. They work by dividing the building into a number of detection zones, with the detectors and call points within each zone hardwired on dedicated two-core cable to the control panel. There may be multiple detectors on a single zone.

A separate two-core, fire-protected cable for the alarm's sounders is required, as they are wired on different circuits. If a detector is activated, the control panel identifies the circuit that contains the triggered device and so indicates the zone from which the fire alarm has originated, but the area then has to be manually searched to pinpoint the individual device.

In large buildings, this could mean that over 50 zones would be needed to correctly protect the property to the prevailing industry standards – proving a costly and time-consuming exercise.

Because the majority of conventional detectors are simple two state devices, they can only be in either a normal or fire condition. Although modern components and quality system design can play a part in reducing potential problems, it is not uncommon for conventional systems to generate unwanted alarms.

Addressable or "intelligent" fire alarm systems overcome these limitations and are designed for large commercial premises and more complex networked systems. They are more expensive and more complicated than conventional four-wire systems, having increased flexibility, intelligence, speed of identification, and scope of control.

In addressable systems, different types of initiating devices are wired in one or more single loops around the premises, requiring less cabling than conventional systems, with each detector or call point having its own unique address.

The fire control panel receives information and status reports from each device and indicates its exact location if there is a fault, contamination or activation via smoke or heat detection. As these control panels have become more sophisticated and more powerful, they are capable of handling an increasing number of loops per panel and it is possible to network numerous panels together to increase the capacity.

Because analogue addressable fire alarm systems offer a greater degree of flexibility, intelligence, speed of identification and the extent of control, they are the preferred option for specifiers and contractors working on bigger and more intricate projects, as they overcome the limitations of conventional fire alarm systems.

> **The latest technology sees the introduction of two-wire fire alarm systems which are aimed at small to medium contractors**

The latest technology sees the introduction of two-wire fire alarm systems, which are aimed at small to medium contractors, offering them a highly flexible and adaptable system that will save them time and money on the installation process.

Two-wire fire alarm systems are based on

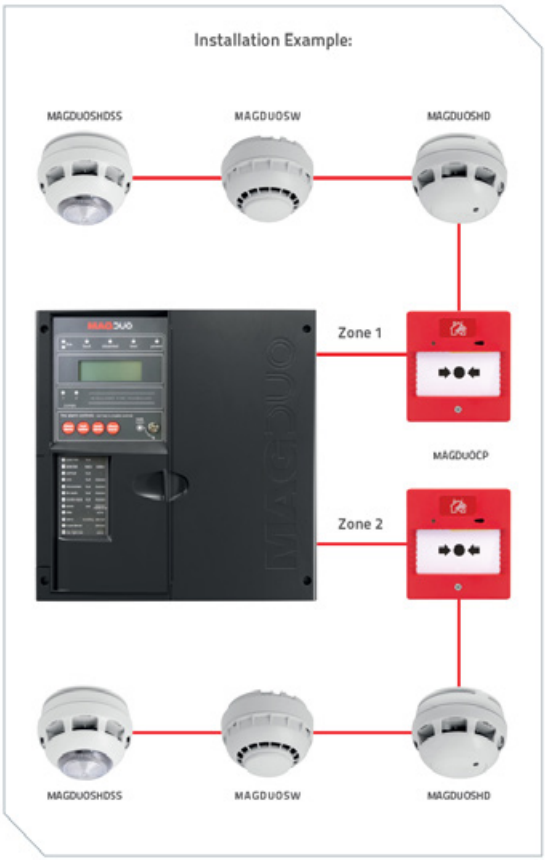
standard conventional system technology. However, unlike standard conventional four wired systems where the detectors, call points and alarm devices for each zone are wired on separate circuits, the new intelligent two-wire technology allows all devices to be wired on the same set of two-core zone cables back to the control panel. This enables it to use a single circuit per zone both for detection and to power the sounders. This advanced technology can reduce both installation and material cost.

A key benefit that is offered with some of these types of systems is an alarm confirmation feature which offers the ability to select a confirmation period for individual detectors and therefore confirm if the smoke/heat detected is an actual fire – and not a false alarm.

Using these built-in alarm confirmation features, until an alarm has been confirmed within an individual area, only that area is evacuated. At the same time, if an alarm is confirmed in a common area, the device initiates a full alarm evacuating all surrounding areas. This unique conventional panel feature is vital where two-stage alarms are required.

Another major plus with some systems on the market is a special flexi-detector which adds further versatility and convenience to this type of alarm system. Offering different modes of fire detection including combined heat and smoke, these detectors are also available with an inbuilt sounder or inbuilt sounder strobe, which will assist with a compact install solution (as the detector and sounder is all-in-one as opposed to separate units). Due to the different options, the flexi-detector offers convenience to installers, as they will not be required to carry a complete range of devices.

Because two-wire systems offer adaptability, speed of installation and cost-effectiveness, they provide an ideal fire alarm solution for a range of small to medium sized projects such as restaurants, retail outlets, schools, offices, apartments and hotels.



AIRFLOW LAUNCHES THE FIRST SMART MODULAR FAN

Airflow has launched iCONsmart, the first app-controlled range of modular fans. The quiet and efficient, IPX5-rated axial fan offers a simple installation and provides users with air quality insights to help identify issues and ensure a healthy indoor environment.

The iCONsmart is a modular residential ventilation solution with connected capabilities and full Quiet Mark approval. It features a smart integrated flow sensor that will automatically adjust to the specific installation situation.

The flow sensor also ensures consistent performance throughout the life of the system as it will automatically adapt to changing wind back pressures to maintain the correct level of ventilation.

The iCONsmart is linked to the myAirflow app that provides an easy to use interface for contractors and users. During installation, the app guides the installer through the setup process to configure elements such as the activation range, overrun duration and silent hours.

Airflow • 01494 525252
www.airflow.com

ENCLOSURE CUSTOMISATION SERVICE FROM BCL ENCLOSURES

BCL Enclosures is offering a specialist customisation service for ABS enclosures.

The process of obtaining samples is quick and simple; companies only need supply brief details of the application they require the custom enclosure for, specify which enclosure from the BCL ranges they are thinking of using and send in a drawing with apertures, lugs and other features marked in millimetres.

Any size slot, hole or aperture is possible within the confines of maintaining the structural integrity of the enclosure itself. BCL Enclosures then supplies one or two samples back to the customer free of charge. There is a small minimum order value of £25, with no set-up fee.

Turnaround time on orders ranges from seven to 14 working days.

BCL Enclosures • 01423 879787
www.bclenclosures.com

ARCO 400 OFFERS 20% TIME SAVING AT THE PUSH OF A BUTTON

ARCO 400 is the universal test set for recloser controls – it simplifies commissioning and maintenance considerably.

OMICRON has now added the new 'Run All' functionality to make testing of recloser controls even more efficient. It ensures faster loading of test plans and automated execution of tests. This results in a significantly higher test speed, which can save up to 20% in time compared to the previous version.

In addition, ARCO Control's proven testing tools have been extended to include a function for generating harmonics.

With this ground-breaking solution, users will easily master the challenge of testing all settings to ensure correct functionality in less than 12 minutes (including the test setup) and in any weather condition. Furthermore, GPS synchronised injections to test distribution automation schemes are also possible.

OMICRON • 01785 848 100
www.omicronenergy.com

NEW SMART LIGHTING SWITCH SOLUTIONS FROM LMS DATA

LMS Data has announced its new range of SmartPower lighting switch solutions for both residential and business installations. The flush-mounted switches are designed to not only look good in any type of installation, but also be fitted as direct replacements for traditional, manually operating single or multi-gang light switches. Traditional wiring means they are easy to wire into place, but the LMS Data SmartPower switches also feature built-in 'intelligence'.

Integral WiFi (802.11/g/n) means they connect to the customer's existing wireless broadband, allowing full integration with smart home apps and devices.

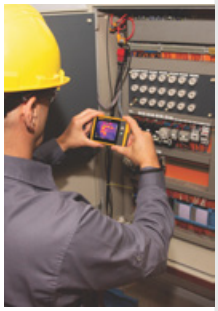
Being a flush-mounted, touch sensitive design means no mechanical parts to break; LMS Data lighting is also illuminated, meaning it's easy to locate in dark or dimly lit areas, and available in a number of gang sizes to suit the installation.

LMS Data • sales@lmsdata.com
www.lmsdata.com

NEW POCKET THERMAL IMAGER FROM FLUKE

Fluke has introduced a pocket-sized thermal imager as the first line of defence for easy troubleshooting for electricians and industrial maintenance personnel. The professional-grade Fluke PTi120 pocket thermal imager offers quick temperature scans of electrical panels and equipment, pumps and motors, building systems, HVAC and process control equipment for hot spots and cold spots that can indicate early signs of trouble.

The PTi120 offers simple point-and-shoot technology. With fully radiometric measurement, it provides 120 x 90 infrared resolution. The Fluke Connect asset tagging eliminates the sorting and organising of infrared images by simply scanning the asset's QR code or barcode. The 3.5in LCD touchscreen display enables simple adjustment of blending of the infrared image with a visible image by the sliding of a finger across the screen. It provides a temperature measurement range from -20°C to +150°C.



Fluke • 020 7942 0708
www.fluke.co.uk

MARSHALL-TUFFLEX EXTENDS FIREFLY FIRE CLIPS RANGE

To help meet the requirements of the updated BS 7671 IET Wiring Regulations, Marshall-Tufflex has extended its range of Firefly fire clips. In the event of a fire, the clips are designed to prevent cables falling and creating a hazard.

The Firefly range now includes clips suitable for use on Marshall-Tufflex Maxi, Mono, Twin165, Twin Plus, Sterling Profile, Sterling Curve and Odyssey trunking systems. The clips fix to walls or ceilings and with a spring-loaded design are quick and easy to install.

The Firefly fire clips are fire resistant above 1,000°C for up to 120 minutes and feature rounded ends to prevent damage to cables and injury to installers. The range includes both internal versions that are fitted within the trunking prior to cable installation and externally fitted variants for a fast and simple retrofit.

Marshall-Tufflex • 01424 856600
www.marshall-tufflex.com

THREE-PHASE FANTASY FROM METREL

Working on three-phase systems is more dangerous than working on single-phase domestic circuits. Making and breaking connections can be a risky business particularly when you are working live.

How much better would it be if you could make the connections once and switch the connections remotely? Metrel has introduced a three-phase active switch adapter A1507 to make this fantasy a reality when used with either of the Metrel touch screen multi-function testers, MI3152 and MI3155. The testing automation comes from the Autosequence function of both testers.

You make the connections, ensure the Bluetooth connection between tester and switch adapter. Set up the test parameters, and once the test sequence is complete, decide the validity of the results and whether to save them for downloading into the certificate. The connection to the installation is simply made using croc clips, or, even more conveniently, using a CEE 5-P 16 A or 32 A plug.

Metrel • 01924 245000
www.metrel.co.uk

ESP LAUNCHES NEW GUARDCAM WIFI SECURITY FLOODLIGHT

ESP has introduced the GuardCam combined WiFi security camera and LED floodlight, which allows remote viewing, monitoring and notifications via the specially developed ESP GuardCamDECO app.

The new system is an all-in-one PIR floodlight, camera and DVR system, which offers an ideal low-energy external area protection solution for domestic and commercial applications.

It incorporates a high definition 1080p digital camera for superior quality images. The 16 SMD LED security lamp offers 5,000k colour light with 1,500 lumens, to produce a high quality, cool white light output. Flexibility to adjust the LED lamp and PIR is also featured. The PIR sensor provides 180^0 x 10m coverage.

The system is straightforward to install, and GuardCam has the option to deliver motion activation notifications via the app whilst recording the activation. The system comes supplied with an 8GB Micro SD card for recording video clips and this is expandable up to 32GB.

ESP • 01527 515150
www.espuk.com

NEW MODE WIRING ACCESSORIES FROM SCOLMORE

Scolmore's Click Mode range of contemporary, white wiring accessories was developed to be a high quality, flexible and modern solution for virtually any domestic wiring requirement.

The Mode accessory plate has been designed to fit easily into traditional and contemporary designs alike. The modular design allows installers flexibility in creating dedicated wiring solutions.

Scolmore has invested in Mode since it was launched, introducing products in visually contrasting versions to meet with Part M regulations. In 2016, the company added the Mode locating plug socket to the range, to assist people with impaired vision or poor hand to eye coordination to more easily insert a plug into a socket. Other innovations for the range include the addition of USB sockets – now available in one- and two-gang, and single and twin USB options. In 2018, a three-pin safety shutter socket, which exceeds the required safety standards, was launched.

Scolmore • 01827 63454
www.scolmore.com

TRIDONIC'S SLE EXCITE SERIES PROVIDES THE RIGHT LIGHT

Tridonic's new LED modules in the seventh-generation SLE Excite (EXC) series meet the needs of demanding applications in food, fashion and art.

All Tridonic's components are developed in a strict qualification process and patented phosphors optimise the interplay between efficiency and colour rendering.

In the Food series, the colours of Gold, Gold+, Meat, Meat+, Fish and Fruit are available allowing food to be displayed to the best effect. Retail fashion shops can benefit from the properties of the Fashion module, which makes textiles appear in their vibrant, natural colours thanks to its special spectra. The Art light colour puts exhibits and objects centre stage and highlights their natural colours.

The modules are more efficient thanks to a chip upgrade and they now deliver up to 191 lumens per watt, making them up to 16% more efficient.

Tridonic • 01256 374300
www.tridonic.com

VERTIV INTRODUCES THE VERTIV LIEBERT GXT5

Vertiv has introduced the Vertiv Liebert GXT5, a technology update to the family of rackmount, online uninterruptible power supply (UPS) systems. The Liebert GXT5 is designed to ensure availability in today's increasingly mission critical small IT environments and edge locations that enable important emerging applications such as 5G, virtual and augmented reality, and the Internet of Things.

The Liebert GXT5 has a power factor of up to 1.0 on select models, and is more efficient in both on-line (up to 95%) and Active ECO mode (up to 98%). All Liebert GXT5 models are Energy Star 2.0 certified.

Along with the highest level of equipment protection available in a rack configuration, the Liebert GXT5 offers a three-year full coverage factory warranty for the UPS and battery. The Liebert GXT5 UPS can be managed remotely and has individually controlled sockets and remote reset and on/off capabilities.

Vertiv • 023 8061 0311
www.vertiv.com

WIELAND ELECTRIC USES LIFI FOR IN-HOUSE PRODUCTION

Wieland Electric's HQ in Bamberg, Germany is using optical data transfer for its electronic components production line for transmission of data to the machine controller and for the collection of operating data between LiFi sender and receiver.

Configuration data is sent to the machine while information on output or faults is sent back to the Wieland operating data collection system. The connection to the data network is carried out with the optical communication solution Trulifi 6013 from Signify, which creates a safe point-to-point connection and enables transmission rates of 250 Mbps in one direction and two 250 Mbps in two directions.

The company is currently investigating how the technological benefits can be utilised in industrial environments. The electronics company uses the new data transmission standard in its in-house production to gain experience and include it in the development of LiFi for industrial communication.

Wieland Electric • 01483 531213
www.wieland.co.uk

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