Issue 14 Summer 2023

INSIGHT

Tank storage provides an essential interface between sea, road, rail and pipeline logistics.

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WHAT'S NEXT FOR THE BULK STORAGE AND ENERGY INFRASTRUCTURE SECTOR: IN CONVERSATION WITH PETER DAVIDSON

The quarterly magazine from the Tank Storage Association

Also in this issue, we look at the UK Government's new report, Powering Up Britain, skills in the bulk storage and energy infrastructure sector and non-destructive testing for above-ground storage tanks.

Insight is published by the Tank Storage Association, the voice of the UK's bulk storage and energy infrastructure sector.

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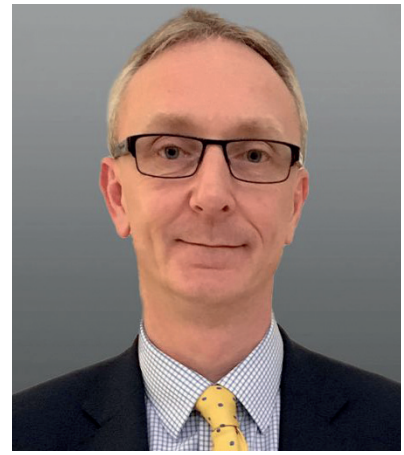

Peter Davidson
Executive Director, TSA

Welcome to the summer issue of Insight. In March, the UK Government set out its plans to enhance energy security, seize the economic opportunities of the transition to climate neutrality, and deliver on its net zero commitments in a new policy paper titled 'Powering Up Britain'. It also published a response to the independent review of its net zero strategy expressing agreement that decisive action is needed to seize the growth opportunity that net zero presents in the 21st century. In this issue of Insight, we explore emerging trends in the supply and demand of petroleum products, the strategic role of the bulk storage and energy infrastructure sector in the energy transition as well as the opportunities for industry as it looks to the future. I hope you enjoy this new edition of the magazine and don't forget to follow us on social media for all our latest news.

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News:

The Tank Storage Association has launched a new Instagram account. Stay up-to-date with all our latest news by connecting with us @uk_tsa.

Online meetings and webinars

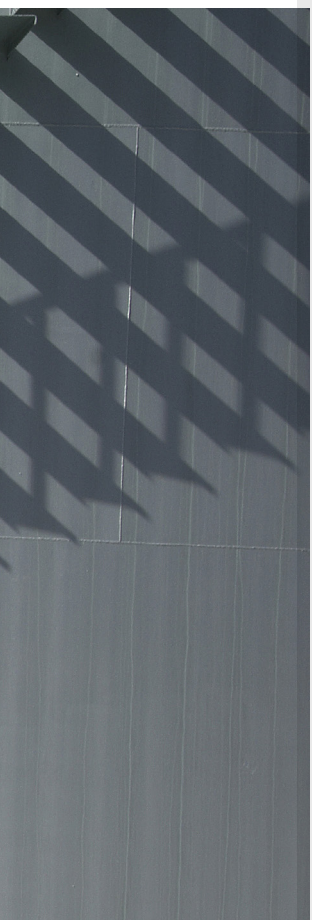
The following meetings will take place online:

- 18 May 2023: TSA Customs & Excise Expert Committee
- 13 June 2023: TSA Sustainability & Energy Transition Comittee
- 27 June 2023: TSA Council
- 29 June 2023: TSA SHE Committee

For more information on TSA's meetings, write to info@tankstorage.org.uk

Discover all the latest events of interest to the bulk storage and energy infrastructure sector by visiting www.tankstorage.org.uk/events

2023 Tank Storage Conference & Exhibition



The Tank Storage Association's Conference & Exhibition will return to the Coventry Building Society Arena on Thursday 21st September 2023. The UK's flagship event for the bulk storage and energy infrastructure sector provides one of the best opportunities for anyone interested in effective and safe bulk liquid storage operations to come together to share knowledge and network.

The conference programme once again will feature top keynote speakers from regulators and industry, as well as subject experts offering delegates thought-provoking discussions and thorough analyses on a range of key industry issues.

Delegates will get the chance to delve deeper into up-to-the-minute topics relevant to the bulk storage and energy infrastructure sector, including Net Zero priorities, the energy transition, climate change adaptation, biofuels and much more.

Peter Davidson, Executive Director of the Tank Storage Association, said: *"This year's event allows us to consider latest innovations and developments in the bulk liquid storage industry, while also highlighting our focus on the future of the sector in the journey to climate neutrality. The tank storage industry is an essential part of the UK's energy infrastructure, providing resilient, innovative and flexible solutions to the energy, industrial, transport and defence sectors. The industry has a key role to play in the energy transition and in creating the necessary infrastructure flexibility to manage change in support of the UK's net-zero goals. Terminals are also an essential part of global infrastructure networks, ensuring that bulk liquids, from transport and heating fuels, chemicals, animal feed and foodstuffs, are supplied when they are needed in the quantities required. As we look to the future, the Conference & Exhibition will provide us with an opportunity to hear from a panel of renowned experts about the challenges and opportunities for our sector against a complex and evolving landscape."*

Registration is now open for delegates. The TSA looks forward to welcoming members, exhibitors and delegates on 21st September 2023. To stay connected until then, please schedule a call with our conference organisers on 01462 488232 or write to info@tankstorage.org.uk.

For all the latest news and updates, follow us on LinkedIn, Twitter and Instagram. To register as a delegate, or book your exhibition stand, visit www.tankstorage.org.uk/conference-exhibition.

THE IMPORTANCE OF STORAGE TERMINALS IN THE RENEWABLE FUEL SUPPLY CHAIN

Phil McEvoy, Managing Director of UM Terminals, discusses the importance of storage terminals in the renewable fuel supply chain.

Phil McEvoy, Managing Director, UM Terminals

Bulk storage terminals play a critical role in the supply chain of renewable fuel production by providing a central location for the storage, blending, and distribution of fuels. These terminals are typically located near transportation hubs such as ports, rail yards, and highways, allowing them to efficiently receive and distribute renewable fuels to end-users. In the context of renewable fuel production, bulk storage terminals are particularly important enabling the efficient storage and distribution of biofuels, which have different properties than traditional petroleum fuels. Biofuels, such as ethanol, Hydrotreated Vegetable Oils (HVOs) and biodiesel, are typically produced in different locations and require specialised storage and handling equipment to ensure their quality and safety.

Bulk storage terminals can also play a key role in the blending of renewable fuels with traditional petroleum fuels, such as gasoline and diesel. This can help to increase the overall use of renewable fuels and reduce greenhouse gas emissions.

For example, ethanol can be blended with gasoline to create a fuel blend known as E10, which contains 10% ethanol and is commonly used in many countries. Similarly, HVO is a drop-in replacement to Ultra-low sulphur diesel, requires no blending with mineral diesel and offsets greenhouse gas emissions by 90%. In addition to their storage and blending functions, bulk storage terminals can also provide a range of value-added services to their customers, such as fuel testing, quality control, and transportation logistics. By offering these services, bulk storage terminals can help to reduce costs and improve efficiency throughout the supply chain.

UM Terminals is taking its value-added services one step further by offering the pre-treatment of biofuel feedstocks. Used cooking oil (UCO) and rendered animal fat are by far the most abundant raw materials to produce HVO and biodiesel in the UK. Our storage terminals act as a consolidation and pre-treatment hub for these materials for several fuel producers that operate globally. Pre-treatment of UCO and tallow is an important step in the production of biofuels helping to improve the quality, reduce shipping costs and improve yield of the final product.

UCO and tallow can contain impurities such as food particles, water, and other contaminants, which can affect the quality of the biofuel. Filtering the oil through a series of screens

and filters can help to remove these impurities and ensure a cleaner, more consistent feedstock. Heating these materials and settling the water impurities also means that the exported materials contain no water solids which reduces shipping costs and helps biofuel refineries be more efficient in increasing product yield. Overall, pre-treatment of UCO and tallow is an important step in the production of high-quality biofuels. By removing impurities, reducing free fatty acids (FFA), and increasing the stability of the oil, pre-treatment can help to improve the yield, efficiency, and quality of the final product. Due to its experience in this area, UM Terminals is seeing a sharp increase in enquiries for its biofuels services, driven by the looming 2030 deadline for the phasing out of new diesel vehicles and the UK government's 2050 target to reach net-zero carbon.

UM Terminals, which has its head office in Liverpool, is ideally positioned to support the varied requirements of its customers, including some of the world's largest blue-chip organisations, from its network of eight terminals strategically located across the UK. The business has a current capacity of over 300,000 cubic metres of bulk liquid storage, but with an ambition to increase this to around 400,000 cubic metres. The UM Terminals' portfolio consists of a broad portfolio of around 40 products including vegetable oils, industrial, food and feed, chemical, fertiliser, fuels, biofuels and base oils.

Value-added services include biofuel feedstock pre-treatment, blending, water dilution, product packing, HMRC bonded warehouse and COMAH compliance. UM Terminals, which is part of the United Molasses Group, prides itself on delivering a customer-centric approach. One aspect of this is our Client Central Services team, headed by Lynn McCoy and based out of Regent Road in Liverpool, providing a service that integrates all weighbridge and administration from across UM's terminals. A dedicated portal gives clients instant access to essential weighbridge documentation and current stock levels for each tank. They also have a secure log-in and can access their data 24/7, 365 days a year via a desktop, tablet or mobile device.

Equally important is ensuring that the business is meeting the labyrinth of quality standards and industry accreditations. UM Terminals has recently undergone an intensive programme of external audits – the first time in over two years that on-site audits had been possible due to the Covid-19 pandemic. Responsibility for preparing for these and other audits rests with Jo Winning, UM Terminals' Quality, Performance & Development Manager, along with Karl Pass, our National Operations Manager. Audits carried out include the Universal Feed Assurance Scheme [UFAS], FSSC 22000, the certification scheme for Food Safety Management Systems, for its Regent Road and Gladstone Dock sites, and the Halal certification for Regent Road. The company's ISO 9001:2015 quality management accreditation was also audited.

Whatever the sector or products, ensuring that UM Terminals continues to innovate, evolve its capabilities and meet and exceed the high standards expected of our industry is vital if we are to maintain our position as one of the leading providers of bulk liquid storage. This is why our team is never willing to rest on its laurels. Our customers come to us with a range of demands, sometimes enabling them to secure further strategic growth and sometimes to meet supply chain challenges necessitating a rethink in the storage provision to ensure business continuity and future resilience.

We are committed to enabling our customers to grow with us and we pride ourselves on our adaptability and, where appropriate, willingness to invest to ensure that the facilities clients require are best-in-class.

About UM Terminals

UM Terminals is part of the United Molasses Group. The Group's other services include the international trading of molasses, the sales and distribution of molasses and the procurement and marketing of vegetable oils for use in the animal feed industry.

For more information, please visit www. umterminals.co.uk

AMBIENT TEMPERATURES – ARE WE AT RISK OF BECOMING COMPLACENT?

With the climate becoming increasingly difficult to accurately predict, it is essential that we are aware of new hazards it can present us with.

When it comes to process safety and the containment of hazardous substances, temperature is an important factor which requires management and control to ensure accidents such as pool fires and flash fires don't occur.

In the UK, when asked about potential risk factors leading to hazards, ambient temperature may not initially spring to mind, but with the dynamic and unpredictable nature of today's climate showing no signs of calming, it is important that we are aware of what can go wrong and where we might need to change our approach to stay on top of these changing temperatures, both high and low. Highs of 40 degrees Celsius were experienced in summer 2022.

How can climate change introduce new hazards?

The general trend with climate change is average air temperatures increasing slowly but surely, but one thing that will remain the same is the flash points (the lowest liquid temperature at which, under certain standardized conditions, a liquid gives off vapours in a quantity such as to be capable of forming an ignitable vapour/air mixture) of the substances being handled. This leads us to think about the potential inevitability of ambient temperatures reaching, and eventually surpassing, the flash points of these substances. For example, Jet A1 has a flash point of 38 degrees Celsius, which usually rules flash fires as non-credible in the UK but we have seen ambient temperatures exceed these levels in recent times. This risk is not exclusive to Jet A1, and leaves us with the task of preparing for greater average temperatures down the line.

How much of a threat is an increase in ambient temperature?

If ambient temperatures on site reach the flash point of a substance handled, this doesn't necessarily mean that a fire or explosion is going to follow, due to several factors. For instance, using Jet A1 as an example again, ambient temperatures may only exceed 38 deg. C for a couple of hours during the day, and during a heatwave temperatures may only rise to these levels for a couple of consecutive days, whereas it would take some time for the entire volume of the liquid in a bulk storage tank to reach the highest air temperature due to the bulk thermal capacity of the liquid. Other factors that retard the storage temperature reaching the flash point include receipt via buried pipelines which is maintained at a low temperature, and the turnover of the liquid in the bulk storage tank.

These factors contribute towards a low likelihood of liquids with moderately high flash points reaching these temperatures, but in the world of safety, anything that isn't impossible should not be brushed under the carpet. The typical review cycle for risk assessment within industry is 5 years. Therefore, with climate change, it is important that sites don't just base their assessments on the current climatic state, but also account for predicted changes that may occur within the following 5 years, and even further into the future. Alongside this, sites need to be aware that different procedures can lead to liquids having the potential to heat up and reach their flash point more readily. Using airports as an example, sampling of fuel via small diameter pipework could lead to volumes of fuel to sit within pipework where it can heat up faster. Because liquids aren't always stored in large tanks in which ambient temperatures would take some time to be reached, it is important to recognise all equipment and processes at the site in question and understand the potential risks and act accordingly.

What can we do in response to changes in ambient temperature?

With temperatures rising, will every site be required to install new equipment to handle more flammable substances? In reality, this is an excessive measure to implement at this moment in time, and a less conservative approach can be taken. An automated alert system could notify workers when ambient temperatures around liquids are reaching potentially dangerous levels. This could subsequently trigger workers to carry out safer procedures, as part of a pre-planned emergency response, which all workers will be aware of and prepared for.

With the climate becoming increasingly difficult to accurately predict, it is essential that we are aware of new hazards it can present us with, as well as how we can be well equipped to adapt to these hazards, both temporary and permanent. Existing industry standard hazard study and risk assessment techniques can be easily applied to consider the effects climate change can introduce.

About RAS Safety Consultants

RAS Ltd is an independent firm of risk specialists established in 1993. RAS are founded on a set of simple principles: recruit the best people in the industry, only work in our areas of expertise, and work with our clients, not for them. It's an approach that has seen them grow from being a handful of specialists in the North West to a rapidly developing company working with the leading companies in the oil & gas, pharmaceuticals and specialist chemical sectors across the world. The RAS team has worked on some of the biggest and most influential projects in the industry, and continues to expand their specialist knowledge.

For more information, please visit www.ras.ltd.uk

WHAT'S NEXT FOR THE BULK STORAGE AND ENERGY INFRASTRUCTURE SECTOR

TSA's Executive Director, Peter Davidson, discusses emerging trends and developments of interest to the bulk storage and energy infrastructuresectorin the UK.

Peter Davidson, Executive Director, Tank Storage Association

The TSA represents the interests of over 60 member companies engaged in bulk storage, energy infrastructure and the provision of products and services to the sector. Collectively, its members operate 302 terminals and distribution hubs in the UK and have over 11 million cubic metres of storage capacity in the United Kingdom (UK) and Republic of Ireland (ROI). TSA's members provide and support an essential interface between sea, road, rail and pipeline logistics for many different substances including transport and heating fuels, chemicals, animal feed and foodstuffs.

Storage capacity is a strategic asset and the bulk storage and energy infrastructure sector plays a vital role in providing services that are critical to the UK consumer. Tell us more about the role of the sector in this context.

Tank storage is an essential part of commodity trading and storage terminals improve the flexibility of supply chains. Terminals may either store single products or multiple products within a single facility and can provide supplementary services such as blending, packaging, canning, drum filling, water treatment and analysis, warehousing, as well as bonded facilities for duty suspended products. Terminal operations are present throughout the world. However, storage hubs have become established in Europe – representing 30% of the world capacity for bulk liquid storage - the United States, Middle East and Asia to provide the necessary storage required for global commerce in bulk liquids. These vital facilities also provide greater resilience within the supply chain by ensuring flexibility to meet demand, particularly in periods where domestic supplies of stored products cannot be guaranteed.

Our members operate a variety of terminals across the UK and the Republic of Ireland, storing both hazardous and non-hazardous liquids (and in some cases gases). Around twenty-two of these terminals are designated by HM Government as Critical National Infrastructure (CNI). Storage capacity also includes strategic reserves held for emergencies and supply disruptions. Terminals also improve the flexibility of the entire supply chain and its ability to respond to market fluctuations by helping to balance out supply and demand and ensuring that critical products are supplied when they are needed in the quantities required.

Terminals are distributed throughout

the UK, in strategic locations, with clusters in the North East and Thames Estuary. The transport energy system's strategic flexibility is heavily reliant on the bulk liquid storage sector, with fuels and hydrocarbon derivatives currently accounting for over 65% of tonnage throughput[1]. In addition, UK demand for diesel and aviation fuel is heavily supported by imports via the bulk liquid storage sector owing to a misalignment between UK production and domestic demand. Also, several regions across the UK, such as the South East and North East of England, are particularly reliant on imports of transport fuels by ship, a large proportion of which are imported from the ARA (Amsterdam-Rotterdam-Antwerp) trading hub.

What trends are emerging with regard to the supply and demand of petroleum products?

While the UK's import supply chain is designed to react quickly to market demands, this demand may be more volatile in the future due to geopolitical challenges. For example, Russia was the second most important source of refined petroleum products in 2021 after the Netherlands and, with regard to diesel specifically, it represented around 34% of all imports and 20% of total UK supply of diesel during the same year[2]. As of 5th December 2022 and 5th February 2023 respectively, the UK has banned the import of Russian oil and oil products, and has further banned UK services including finance, insurance, and shipping from enabling the seaborne transport of Russian oil and oil products globally. In coordination with the G7 and Australia, it has also created a price cap exception to the services ban permitting the maritime services sector to continue facilitating the transport of Russian oil and product by sea to and between third countries, if sold at or under an agreed price (the 'price cap'). At the same time, according to the IEA[3] global oil demand is set to rise by 1.9 mb/d in 2023, to a record 101.7 mb/d, with nearly half the gain from China following the lifting of its Covid restrictions. In addition, product markets, especially diesel, are considered to be most at risk as demand growth recovers[4].

Analysts have reported that global refineries, such as those in the Middle East, have capacity to increase diesel production. However, this means that supply chains will become longer, with subsequent greater reliance on long range large vessels (LV) for product movement. The UK is less well equipped to handle LVs compared to the ARA trading hub which, in turn, is expected to maintain its dominance as a storage hub but may seek to fulfil EU demand as a priority. Of the top 15 average import terminals and refineries in the UK, only eight are capable of LV imports. With an increase in global demand, competition within Europe, and limited LV jetty capability, there will be greater focus on supply according to vessel handling capabilities of import terminals, and greater buffering of inventories will therefore be required.

With regard to strategic stocks, the UK, as a member of the International Energy Agency, is bound by International Energy Agency oil stocking obligations for 90 days of net imports of oil both held in tanks, or national tickets on stock. These strategic reserves ensure that recovery is possible during periods of disruption in supply and provide stability to the global oil market. And the bulk storage and energy infrastructure sector is an essential part of this. It is critical for the UK to ensures that it maintains sufficient domestically located stocks due to the inevitability of changing product flows and to provide the necessary buffering to mitigate against fluctuations due to uncertain supply routes. It is also crucial that considerations focus on resilience measures that may be required for new energy carriers, therefore ensuring domestic security of supply whilst reducing reliance on potentially unstable international sources.

The UK government has recently published an independent review of its net zero strategy. Tell us more.

Earlier this year, the UK Government published former Energy Minister Chris Skidmore MP's independent review into its strategy for achieving net zero by 2050. Titled "MISSION ZERO - Independent Review of Net Zero[5]", the report highlights the need for a "long-term, stable investment plan" in the context of a pro-grow, pro-business transition. In line with

the review's findings, the bulk storage and energy infrastructure sector has been clear that a long-term and stable policy background is essential to engender investor confidence. This approach will avoid delays caused by the lack of transitional infrastructure and provide the resilience and security of supply needed. Expanding storage capacity is a lengthy process that varies by the size of tank and permitting. The bulk liquid storage industry is also capital intensive and the fixed cost element of running bulk liquid storage terminals is very high. The sector employs highly trained specialised personnel in order to meet ongoing safety and environmental standards and regulatory requirements, and invests heavily in the latest technology. It is therefore critical that investors have confidence in the policy and legislative framework in place.

Recommendations in the report include developing a cross-sectoral strategy, by 2025, to support the building and adaptation of infrastructure for electricity, hydrogen, CO_2 and other networks that support the green economy, and reforming planning rules. The review also calls on the government to publish the Low Carbon Fuels Strategy in 2023 and the necessary legislation for the sustainable aviation fuels (SAF) mandate to apply from 2025. It further sets out that the government should continue to work with industry to lay out a clear programme by 2024 to accelerate decarbonisation of the wider freight sector through modal shift and deployment of new technologies, building on the Future of Freight Plan which was published in July 2022. The Tank Storage Association will continue to work with the government and other stakeholders to help to deliver on the opportunities highlighted in the review.

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4. Ibid.
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Author

Peter Davidson is TSA's Executive Director and is responsible for all aspects of advocacy and lobbying on behalf of the sector, and for promoting process safety leadership, helping members achieve excellence in this area and work toward becoming high reliability organisations. Peter works in close collaboration with the UK Government and Regulators and is a leading member of a number of cross-industry committees, Process Safety groups and the Federation of European Tank Storage Associations.

Department for Energy Security and Net Zero publishes Powering Up Britain report

On 30th March, the Department for Energy Security and Net Zero (DESNZ) published its policy paper, titled *'Powering Up Britain'*, setting out government's plans to enhance Great Britain's energy security, seize the economic opportunities of the transition to climate neutrality, and deliver on its net zero commitments. The DESNZ also published the government's response to the recommendations made in the Independent Review of Net Zero, led by former Energy Minister Chris Skidmore MP, expressing agreement that decisive action is needed to seize the growth opportunity that net zero presents in the 21st century. To meet the ambitions set out in the *'Powering Up Britain'* policy paper, the DESNZ will aim to deliver:

- Energy security: setting the UK on a path to greater energy independence.
- Consumer security: bringing bills down, and keeping them affordable, and making wholesale electricity prices among the cheapest in Europe.
- Climate security: supporting industry to move away from expensive and dirty fossil fuels.
- Economic security: playing our part in reducing inflation and boosting growth, delivering high skilled jobs for the future.

New measures to tackle UK emissions include the introduction of a zero-emission vehicle mandate which would require that from 2024 an increasing percentage of manufacturers' new car and van sales are zero emission, and a new *Green Finance Strategy*. The government has also indicated its commitment to carbon capture, utilisation and storage (CCUS), announcing that eight projects have been chosen to proceed to the next stage of support negotiations. It further announced that fifteen hydrogen projects have progressed to the next application round for funding under the £240m Net Zero Hydrogen Fund. Ambitions also include that of ramping up nuclear capacity to up to 24GW by 2050, developing up to 50GW of offshore wind by 2030, quintupling solar power by 2035 and phasing out all new and replacement natural gas boilers by 2035 at the latest. A revised set of energy national policy statements for consultation, covering overarching energy, renewables, electricity networks, gas generation, and pipelines, will be published in due course.

The *'Powering Up Britain'* report can be accessed at www.gov.uk/government/publications/powering-up-britain. The report acts as an introduction to *'Powering Up Britain: Energy Security Plan'*, and *'Powering Up Britain: Net Zero Growth Plan'*, both of which are complementary and should be read alongside each other.

AN OVERVIEW OF NON-DESTRUCTIVE TESTING (NDT) FOR ABOVE-GROUND STORAGE TANKS

Non-destructive testing (NDT) is a set of techniques used to evaluate materials without causing damage to them.

Adler & Allan
ENVIRONMENTAL RISK REDUCTION

Non-destructive testing (NDT), also known as non-destructive examination (NDE) or non-destructive inspection (NDI), is a set of techniques used to evaluate materials without causing damage to them. This process involves inspecting, testing, or evaluating materials of components or assemblies for discontinuities or differences in characteristics without destroying the serviceability of the part or system. In other words, when the inspection or test is completed, the part can still be used. Non-destructive testing is a common practice in fuel storage to detect and assess potential problems like corrosion, stress, cracking and pitting in fuel tanks and pipework. By recognising potential issues, it is possible to take preventive action or replace the tank before any spills or leaks occur. The goal of non-destructive testing is to ensure that critical infrastructure is properly maintained in order to avoid catastrophic accidents.

Early adoption of good non-destructive testing procedures saves time, money and reputation

Non-destructive testing is a cost-efficient and reliable method of performing essential inspections of your fuel systems without causing any harm or destruction. This prevents your assets from being damaged in the process of inspection and provides peace of mind that the risk of any contaminants to the environment has been minimised. Implementing a detailed non-destructive testing process can help you to:

- Reduce downtime of your operations while keeping you compliant.
- Remain compliant with EEMUA 159 and API 653 guidance.
- Lower maintenance costs in the longer term.
- Adopt best working practices with safety as top priority.
- As soon as a storage tank is built and installed, a comprehensive maintenance cycle should start. This consists of regular visual inspections, and implementing planned preventive maintenance to keep the tank and containment to the required condition.

Based on these inspections and established non-destructive testing results, calculations are made for the remaining lifetime of your storage tank. By implementing the correct maintenance and inspection regimes, the lifecycle of your tank can potentially be prolonged.

Convenient, accurate and sustainable

Non-destructive testing can detect flaws and differences in materials that negate the need to employ destructive

methods. This makes testing of fuel storage tanks convenient, accurate and sustainable - elements that other methods of testing don't offer.

Non-destructive testing can aid in the early detection of stress points and wear and tear before failure happens, prolonging the lifespan of your resources. This significantly lowers the likelihood of interruptions due to problems with storage tanks.

Carrying out non-destructive testing on your storage tanks can provide trend-based information on deterioration, helping to predict where the worst issues might be found and successfully prevent a pollution incident.

Complying with EEMUA 159 and API 653

Staying compliant and following regulations is essential. A planned non-destructive testing schedule can prove compliance with the guidance established in EEMUA 159 and API 653 standards.

The guidance in EEMUA 159 and API 653 covers above-ground, flat-bottomed storage tanks and details the inspection, maintenance, and repair of these storage tanks. It offers guidance on the inspection and maintenance of tanks built to BS, EN or API standards for the storage of petroleum.

These world-renowned standards define the best engineering practices for safe and effective tank storage operations. Following them and implementing their suggested strategies can give you peace of mind that your fuel storage tank and infrastructure is in sound operational condition. Various methods of non-destructive inspection can be used without causing disruption, allowing businesses to keep their vital infrastructure functioning without interruption.

The Health and Safety Executive (HSE) recommends that non-destructive testing on fuel storage tanks is carried out at least every 10 years, depending on the last inspection or inspection report, or when the tanks were built.

External inspections

API 653

All tanks shall be given a visual external inspection by an authorised inspector. This inspection shall be called the external inspection and must be conducted at least every 5 years, or the quarter corrosion rate life of the shell. Tanks may be in operation during this inspection.

EEMUA 159

According to table B.3, external inspections range from 1-year to 15-year intervals. Factors include climate and type of product stored in the tanks. For example:

- Crude oil and refined products with no internal liner - 5 years
- Finished products with internal liner - 8 years
- Jet A with internal liner - 10 years

Internal inspections

API 653

Based on the bottom corrosion rate, not to exceed 20 years.

EEMUA 159

According to table B.3, internal inspections range from 3-year to 20-year intervals. Factors include climate and type of product.

Different methods of non-destructive testing for different materials

Each method of non-destructive testing uses a different technique to examine the subject material.

Visual testing

Visual testing is a widely-used form of non-destructive testing that involves examining a specimen to see if any issues are visible without needing to cause damage. This is a great way of spotting corrosion, cracks, welding defects, deformation, and more.

In cases where it is not possible for an inspector to access hazardous or hard-to-reach areas, drones are often employed instead.

Ultrasonic testing (UT)

Ultrasonic testing is a technique used to examine the internal structure of materials by sending high-frequency sound waves through the material in order to measure the reflected response. It covers a wide range of frequencies, usually between 500 KHz and 50 MHz. This method can be used to discover characteristics of the

material such as its thickness, density, and composition, as well as any flaws, cracks, or other defects. There are different types of ultrasonic testing, such as pulse-echo testing, immersion testing, guided wave testing, and phased array ultrasonic testing.

Magnetic flux leakage (MFL)
Magnetic flux leakage is a magnetic method of non-destructive testing that is used to detect corrosion, pitting and wall loss in steel structures. It is commonly used for inspecting storage tank floors in the petrochemical industry, but can also be used on pipeline inspections.

This approach involves utilising a strong magnet to generate a magnetic field that saturates metal structures like storage tanks and pipelines. Sensors are then used to identify magnetic flux leakage, which could be a sign of wear caused by pitting, erosion, or corrosion.

Liquid penetrant testing (PT)
Liquid penetrant testing is designed to detect any surface-level flaws. The process involves applying a low-viscosity liquid to the area in question and wiping away any excess. After a period of time, a special developer is applied that allows the penetrant to be drawn up to the surface. The specimen is then left to sit for a predetermined amount of time to allow the developer to take effect. A visual check can be done to see if the dye is present. For fluorescent dyes, ultraviolet light is necessary to detect it.

Magnetic particle testing (MT)
Magnetic particle testing utilises magnetic fields to detect imperfections close to the surface of ferromagnetic materials. These fields can be generated either with permanent magnet or by running an electric current through an electromagnet.

Any cracks in the object being examined are made visible by the leakage of the magnetic flux lines, and this can be detected by using magnetic particles that are drawn to the surface.

Electromagnetic testing (ET)
Electromagnetic testing (eddy current testing) is carried out using a specially designed coil that is energised with an alternating current that creates a changing magnetic field surrounding the coil. The coil is placed within the proximity of a test surface, where the changing magnetic field permeates the conductive material.

Eddy current testing can used for crack detection on coated welds and for determining the thickness of non-conductive coatings.

Our team are ready to help
Non-destructive testing is a widely-used, beneficial method for businesses to assess the characteristics of items, components, constructions, or systems without doing any harm. There are several types of NDT available depending on the scenario.

The advantages of non-destructive testing in terms of efficiency, cost-effectiveness, and safety are causing it to become the preferred choice for uncovering flaws in fuel storage and infrastructure.

With inspectors certified to EEMUA 159 and API 653 standards, our specialist tank integrity inspection team are able to provide non-destructive testing services for your storage tanks.

About Adler and Allan
Our tank services include inspection, tank and line testing, non-destructive testing, cleaning and decommissioning of any storage tank type, in any sector including MoD, data centres, forecourts, utilities, rail and chemical sectors.

The expertise we bring prolongs the life of your tank, protecting your fuel from contamination and degradation, no matter what its purpose or capacity.

Ensuring compliance with structural integrity and inspection regulations, our experts are also EEMUA 159 accredited, members of OFTEC and the Water Jetting Association and have confined space entry qualifications.

For more information, please visit www.adlerandallan.co.uk

TSA appoints new President and Vice-President

Wilma Kelly, HSE Director at Certas Energy, has been elected as the new President of the Tank Storage Association, the trade association representing all aspects of the UK's bulk storage and energy infrastructure industry. Wilma succeeds Adrian Jackson, Chief Executive of the Oil and Pipelines Agency.

Arun Sriskanda, Managing Director at Oikos Storage, has been elected to the position of Vice-President, and will also join the Board of Directors of the TSA.

The Presidency and Vice-Presidency transferred at the TSA's Annual General Meeting, which was held on 29th March 2023.

Wilma Kelly said: "I am honoured to take on the role of President of the Tank Storage Association and I would like to thank Adrian Jackson for all his hard work, dedication and support over the past two years. I look forward to building on his success and taking the Association forward. The Tank Storage Association plays a leading role in several industry, regulatory and Government forums and works to ensure that members' interests are at the top of the agenda. My priorities will be to continue to boost our connections whilst championing the value and benefits of this vital industry. I will be focusing on supporting the energy transition and ensuring the skills and resources for the future, particularly at a time of transformational progress for our sector."

Arun Sriskanda said: "I am delighted to be taking on the role of Vice-President at this important time for our sector. I look forward to working together with the Association's membership on the issues that matter most to us and helping to deliver the exciting new initiatives we are setting out for the months and years ahead. Thank you for the warm welcome from the existing TSA Board Members."

About the Tank Storage Association

The Tank Storage Association (TSA) represents the interests of over 60 member companies engaged in the storage of bulk liquids and the provision of products and services to the sector. Collectively, its members operate 302 terminals and distribution hubs in the UK and have over 11 million cubic metres of storage capacity in the United Kingdom (UK) and Republic of Ireland (ROI). TSA's members provide and support an essential interface between sea, road, rail and pipeline logistics for many different substances including transport and heating fuels, chemicals, animal feed and foodstuffs.

For more information, please visit www.tankstorage.org.uk

SAFE TRANSFER SYSTEMS MADE POSSIBLE THROUGH CONTINUOUS ADVANCEMENTS IN HOSE, CONNECTOR AND LOADING TECHNOLOGIES

The Novaflex Group is committed to continuous advancement in hose, connector and loading solutions.

JLA® Loading Technology Marine Loading Arm.

The Novaflex® Group is a privately held company committed to continuous advancement in hose, connector and loading solutions through innovation, design excellence and strategic partnership.

Headquartered in Ontario, Canada, with advanced manufacturing facilities in Canada, USA and the UK, Novaflex® - under its Novaflex Safe Transfer Systems (Novaflex STS) banner - focuses on providing the safest and most reliable transfer products available.

Novaflex® draws upon decades of joint experience in the design and application of Dry Release Coupling while still ensuring interchangeability with other systems conforming to N.A.T.O., STANAG, CEFIC and others, to maintain no costly product redundancy.

Having studied industry-wide products, the opportunity was seized to design out all the potential negative elements and further use the experience to incorporate the latest material, design and flow optimization techniques, ultimately delivering significant improvements in real world performance.

The result was the Novaflex Hi-Flow Dry Release Coupling (HDC)® which features increases in flow rates/ reduction in pressure drop, with most sizes showing more than 30% improvement compared to traditional designs whilst providing dramatic increases in pressure connection performance as well as reduced maintenance and increased servicing ease.

Novaflex® has also been busy in further developing the Uni-Chem® Composite hose range, manufactured across three sites in Canada, USA and the UK - a truly major global supplier.

Major investments have been made within the group to increase capacity, in-house testing and compliance capabilities as well as bringing some industry innovations such as Nova-Glow™ to the market.

Nova-Glow™ patented technology is a photoluminescent safety option available across the complete composite hose range. The Nova-Glow™ luminescent marker runs the length of the hose, offering both hazard identification and safety benefits at night or in reduced light/ visibility conditions.

Typically, this could be employed on Ship/Shore, Dockside and Road/Rail

tanker loading stations, especially in areas where contractors or third-party personnel are present who may be unfamiliar with the location. The luminescent marker only requires minimal light exposure to glow through the night-time hours, it is non-toxic and designed to perform for the reasonable service life of the hose.

Novaflex® Composite hoses are manufactured up to 12" inside diameter, making Novaflex® one of very few manufacturers to produce such a size range and in compliance with industry standard EN 13765:2018.

In North America, Novaflex® are proud to partner with and represent JLA® Loading Technology Marine Loading Arms, Hose Towers, Hose Reels including a comprehensive range of safety/high efficiency accessories, bringing decades of engineering and service experience for critical marine loading and bunkering equipment to the industry.

About Novaflex

The Novaflex Group® is a privately held company committed to continuous advancement in hose and connector solutions through innovation and design excellence backed by rigorous product proof testing regimes.

To learn more about Novaflex Group®, visit www.novaflex.com

HDC with Uni-Chem™ Composite Hose.

Nova-Glow™Composite Hose. The Nova-Glow™ luminescent marker runs the length of the hose, offering both hazard identification and safety benefits at night or in reduced light/visibility conditions.

CONTRIBUTING TO THE DECARBONISATION OF THE INDUSTRY

Mobile emissions reduction services reduce hazardous industrial emissions and help the industry on the path to climate neutrality.

ENDEGS Mobile Degassing Technologies

Kai Sievers, CEO, ENDEGS Group

Protecting the environment and stopping increasing global warming are important goals that all parts of society need to contribute to – individuals as well as the economy. Decarbonisation plays an important part for reaching these goals. Decarbonisation describes all measures that are taken to reduce the global carbon footprint – greenhouse gas (GHG) emissions that result from human activity need to be reduced as they heavily impact environment and human health when they get into the atmosphere. Foremost among those hazardous GHG emissions are carbon dioxide (CO_2) and methane (CH_4).

In the Paris Agreement made in 2015, 194 nations agreed on the 1.5° Celsius goal. In 2019, 27 European states challenged themselves to be net zero with their emissions and to become climate-neutral by 2050. In other words, by then no greenhouse gas emissions are to be emitted that are not otherwise compensated. By reducing emissions as much as possible and compensating any remaining emissions, governments as well as industry have set goals and made commitments to reduce carbon emissions. In order to reach the ambitious goal of climate neutrality, all areas of daily life must contribute and reduce their emissions. For example, industry is to further modernise technologies in order to pollute less. There is also a shift towards alternative, greener technologies, fuels and energy sources such as green ammonia, hydrogen or LNG. While progress is being made, more must still be done.

Why it is important to reduce industrial emissions

Having said that, economy and industry worldwide are still major causes for greenhouse gas emissions, for example by burning fossil fuels. It is of uttermost importance for industrial facilities to take action in order to further reduce their emissions and reach the climate goals. For example, hazardous hydrocarbon, VOC (volatile organic compounds) and HAP (hazardous air pollutants) emissions develop in many industrial operations. When they get simply vented into the air, they harm environment and human health at the same time. For example, hazardous emissions develop in operations like tank cleaning, loading procedures, turnarounds and shutdowns, commissioning and decommissioning, and in emergency situations. Therefore, it is important that dangerous emissions caused by industrial processes are immediately treated and are not just vented into the atmosphere. ENDEGS

offers various services to address just this. Applying the innovative ENDEGS technologies for mobile emissions reduction contributes to decarbonisation and helps industrial facilities to significantly mitigate hazardous emissions. The ENDEGS services are environmentally-friendly, sustainable and specialise in the effective elimination of VOC and HAP emissions from venting and flaring within the oil, gas, chemical and petrochemical industry. Our innovative emissions reduction services include mobile degassing, mobile vaporizers with nitrogen tanks and the remote-controlled ATEX Zone 0 robot as a rental service.

How ENDEGS can support industrial facilities in decarbonisation

ENDEGS developed the first portable vapor incinerator worldwide and enabled mobile emissions treatment for the very first time. With over 1,400 successfully completed projects all around the world, ENDEGS is an expert in the effective reduction of industrial emissions.

The innovative vapor combustion units (VCU) are capable of burning all kinds of gases, gas compounds and vapors of the hazard groups IIA, IIB and IIC and make ENDEGS the only company operating in Europe that is able to do so with a combustion rate of over 99.99 % and no open flame. ENDEGS VCUs are ideally suited for the degassing of all types of tanks, containers,

We are proud to be among the 100 most innovative medium-sized companies in Germany as we have received the TOP innovator seal 2023.

Applying the innovative ENDEGS technologies for mobile emissions reduction contributes to decarbonisation and helps industrial facilities to significantly mitigate hazardous emissions.

pipelines, barges, ships, vacuum trucks and all other components used in industrial facilities. Furthermore, they are capable of temporarily replacing vapor recovery units (VRU) in refineries during downtimes. While the ENDEGS units operate, downtimes of facilities are reduced to a necessary minimum and daily operations can continue with only minimal interference.

Nowadays, industrial degassing has become a standard. The challenge now is to adapt technologies to enable wider areas of application. For example, the range of products our customers in the different industries work with are constantly changing. As already mentioned, there is a notable increase in more sustainable products like green ammonia or LNG in order to contribute to decarbonisation. However, those products are more complex to work with as they are highly flammable. Therefore, we now offer the ENDEGS nitrogen services. The ENDEGS fleet of mobile vaporizers with nitrogen tanks can be used to purge and render insert systems and system components containing flammable liquids and gases. ENDEGS also offers the rental of the ATEX Zone 0 robot. The robot is remote-controlled and makes the cleaning of industrial tanks safer as it can be operated from a safe distance. Due to its small size and mobility, the ATEX Zone 0 robot can be used in many industries for a wide variety of materials. It is controlled via two joysticks and a monitor shows every movement in real time.

All ENDEGS services are available individually or in combination to offer customers an all-in-one package to reduce their emissions. With offices in Germany, France, the Netherlands and Saudi Arabia, ENDEGS operates internationally.

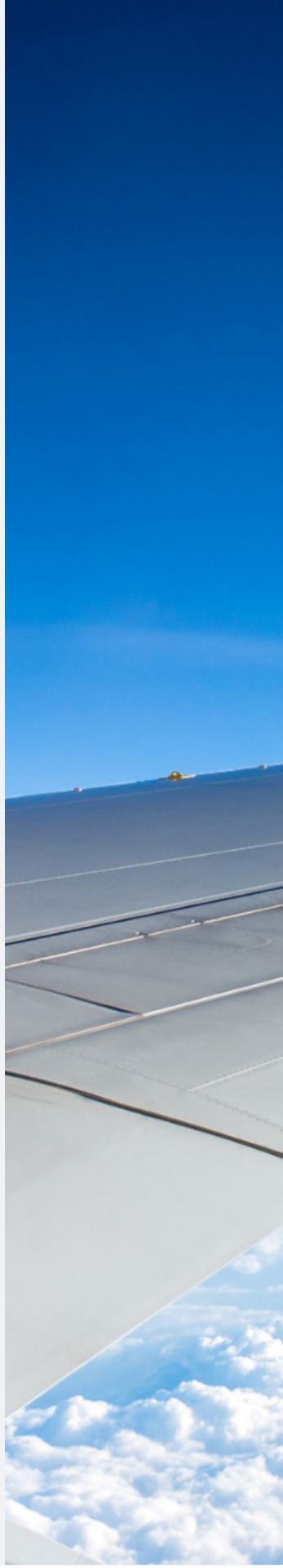
Innovation is the basis for effective decarbonisation

As the example of green ammonia and LNG shows, it is important to always adapt the current technologies in order to make them suitable for new fields of application. This is why we have made innovative processes a priority. In our daily work, we always listen to our customers and their specific needs in order to improve our portfolio.

We are proud to be among the 100 most innovative medium-sized companies in Germany as we have received the TOP innovator seal 2023 – for the third year in a row! Furthermore, ENDEGS recently took part in an innovative competition for decarbonisation in Malaysia. Under the slogan *Race2Decarbonise*, we were chosen as one of 32 companies to personally present our technologies in Kuala Lumpur. The competition was hosted by a major Malaysian oil company in order to work more closely with companies offering sustainable emissions reduction services. ENDEGS finished the *Race2Decarbonise* in a top 20 position out of initially 500 participants with more than 3,000 ideas.

Watch out for our article in the next TSA Insight Magazine edition with more details and exemplary calculations.

For more information, please visit www.endegs.com



Transport Committee report on fuelling the future

On 2nd March, the House of Commons Transport Committee published a new report as part of its inquiry into 'fuelling the future'. The inquiry set out to examine how the Government could meet its aims for transport decarbonisation, what the best fuel choices for each mode are, and what further steps the Government should take to achieve its aims. In its report, the Committee concludes that Sustainable Aviation Fuels (SAF) are the most viable option for the immediate reduction of aviation emissions. In July 2022, the Government published its Jet Zero Strategy, introducing a SAF mandate that will require at least 10 per cent of jet fuel to be made from sustainable sources by 2030. In this light, the Committee urges the Government to invests in low-carbon SAF, which include both biofuels and synthetic fuels, using a 'Contracts for Difference' model to stimulate uptake. With regard to rail transport, the report urges ministers to speed up progress with electrifying the UK's railways lines, noting that only around 38% of the rail network is currently fully electrified, with the Government having committed in 2018 to removing all diesel-only trains by 2040, including freight. It also calls for the Department for Transport to publish a long-term strategy for decarbonising the rail network, with a vision for what proportion of the future network will use electrification, supplemented by hydrogen, battery-powered and bi-mode or tri-mode traction trains. The report =adds that the new strategy should be supported by appropriate costings and a credible delivery plan with targets and milestones. The UK Government has also committed to phasing out new, non-zero emission HGVs weighing 26 tonnes or less by 2035, with all new models sold in the UK to be zero emission by 2040. The Committee calls for the Government to publish a long-term HGV decarbonisation strategy as a matter of priority. It also recognises that the maritime sector presents a significant challenge to decarbonisation and recommends Government's support in relation to the (IMO) International Maritime Organisation's work to develop global standards for construction that will enable new ships to utilise alternative fuels such as ammonia and hydrogen. For private cars and taxis, the Committee reiterates a recommendation from its 2021 zero emission vehicles report noting that the Government should try to ensure no areas across the country are left behind. It further urges the Government to publish its future of rural transport strategy as a matter of priority and for the strategy to include the Government's plan to ensure people living in rural areas have adequate access to charging infrastructure.

The report can be accessed at www.committees.parliament.uk/publications/34205/documents/188123/default/

UNLEASHING YOUR POTENTIAL FOR ENERGY TRANSITION: A MESSAGE FROM JOHN REYNOLDS

Safety leader, John Reynolds, on the challenges process industries and workers face in the energy transition, the opportunities it brings, and why he's driven to prepare candidates in this shifting landscape.

John Reynolds, Managing Director, Reynolds Training Services

Hello there, energy champions! Are you ready to step up and make a meaningful impact in our energy transition future? At Reynolds Training, we are. In fact, we're already doing it. When it comes to preparing our candidates for a career in the Bulk Liquids and Tank Storage sector, we're always thinking about the future. In rising to the challenge of helping people unlock their full potential in the petroleum and petrochemical health and safety industry, we are keenly aware of the energy changes in the pipeline and the long-term transition away from fossil fuels.

With a motivational mindset and a strategic approach, safety providers, process industries and individual workers can navigate this transition together and create a brighter future for ourselves and our planet.

As the world shifts towards sustainable energy sources, industry is mapping the path to 2030 and 2050. At Reynolds Training, we therefore believe it is imperative that those starting or looking to advance their careers in the sector continually evolve in order to position themselves as valuable assets in the evolving energy industry.

So, let's dive in and explore three things we are doing right now that can help:

- Organisational leaders shape their approach to safety training and skills development
- Individuals secure and develop the skills needed for a successful career in this changing landscape

#1 Anticipating the future:
As we embrace energy transition, it's crucial to stay ahead of the curve and anticipate the future of fuels. Biofuels, hydrogen and synthetic fuels are indeed gaining momentum. As we move towards more sustainable and renewable energy options, we need to be prepared to handle, store and transport these emerging alternatives safely and efficiently - and this sentiment applies to governments, organisational leaders and workforces.

Governments need to set the agenda. Industry needs to shape and lead that agenda. Individual workers need to implement that agenda. Because, guess what: when we all work together, we can do great things. With alternative fuels gaining traction, it is incumbent upon all of us in the petroleum and petrochemical industries to have one eye on the road and the other on what's coming down it. At Reynolds Training, for instance,

we are taking positive steps today to secure a safer tomorrow. Atop our agenda is a commitment to provide learners with cutting-edge training programmes that equip them with the knowledge and skills to adapt to these changes with confidence. After all, by being proactive and staying informed, you can position yourself as a valuable asset in the ever-evolving energy industry.

Likewise, organisational leaders and safety providers need to be proactive in anticipating the future of fuels. Steps you can take include:

- Providing site managers and operators with the latest information, best practices and practical skills needed to adapt to changing industry demands.
- Supporting them with experienced instructors who are well-versed in the latest advancements in the energy sector.

Because this is underpinned by training, Reynolds Training is continually infusing its learning programmes with forward-thinking elements to foster positive change.

#2 Adapting to change:

Change is inevitable and energy transition is no exception. By embracing this change and being open to new ideas and perspectives, you can stay relevant and agile in the ever-evolving energy landscape.

This mindset is important as energy transition brings about changes in the way terminals and infrastructure are designed, operated and maintained. As new fuels and technologies emerge, the industry needs to adapt and evolve to meet the changing demands. This requires professionals to be flexible and adaptable in their approach to work.

At Reynolds Training, we recognise the importance of continuous learning and development in keeping up with the changing industry dynamics. Our training programmes are designed to foster a mindset of adaptability and flexibility, enabling candidates to embrace change and be open to new ideas and perspectives.

It is, therefore, key that organisational leaders and operators at 'the coalface' work closely together to understand the changing demands of the industry while undertaking the right training.

#3 Investing in growth:

To thrive in the energy transition future, it's essential to invest in your personal and professional growth. This includes not only honing your technical skills but also developing your soft skills such as leadership, communication and problem-solving. As the energy industry evolves, professionals do indeed need to be well-rounded and adaptable, possessing not only technical expertise but also strong interpersonal skills.

At Reynolds Training, we believe it's all about taking a holistic approach to growth and development. As such, we provide comprehensive training and development programmes that empower you to unlock your full potential. Through a combination of formal training, on-the-job learning and mentoring, we help candidates develop a growth mindset and unleash true capabilities.

By investing in your growth, you can position yourself for success in the changing energy industry.

Energising careers today and tomorrow

Energy transition is a global imperative and, as the industry evolves, it presents both challenges and opportunities. Professionals in the petroleum and petrochemical industry need to stay informed, anticipate the future of fuels, adapt to change and invest in their personal and professional growth to thrive in this changing landscape. So, stay updated, anticipate future fuels, embrace change and invest in personal and professional growth. That way, we can all thrive in the changing landscape of the energy transition future.

Contact Reynolds Training to learn more about its comprehensive training offering and how the safety provider can support your growth in the energy transition era.

Visit: www.reynoldstraining.com;
Email: enquiries@reynoldstraining.com; Call: +44 (0) 1469 558 222

Reynolds
Training Services

Solving the safety puzzle

How to unleash your career potential for energy transition

FUTURE PLANNING

What do we need to do now to prepare for our future fuel landscape in 2050? Workers entering our industry today need to know there is a lifelong career ahead of them.

FUTURE FUELS

What will fuel the future? Will it be biofuels, hydrogen, Lithium-ion, synthetic fuels or something else? We have to be prepared to adapt to any and all potential futures.

FUTURE TERMINALS

What infrastructure will we need by 2040 or 2050? What do we need to do now? With global, political and scientific variables to consider, we have to be adaptable.

FUTURE SKILLS

Our industry needs a clear future vision, led constructively with knowledge and skills at its core. We need to challenge old methods and be willing to work towards change.

READY TO *ENERGISE* YOUR CAREER?

CONTACT REYNOLDS TRAINING FOR MORE HELP AND GUIDANCE

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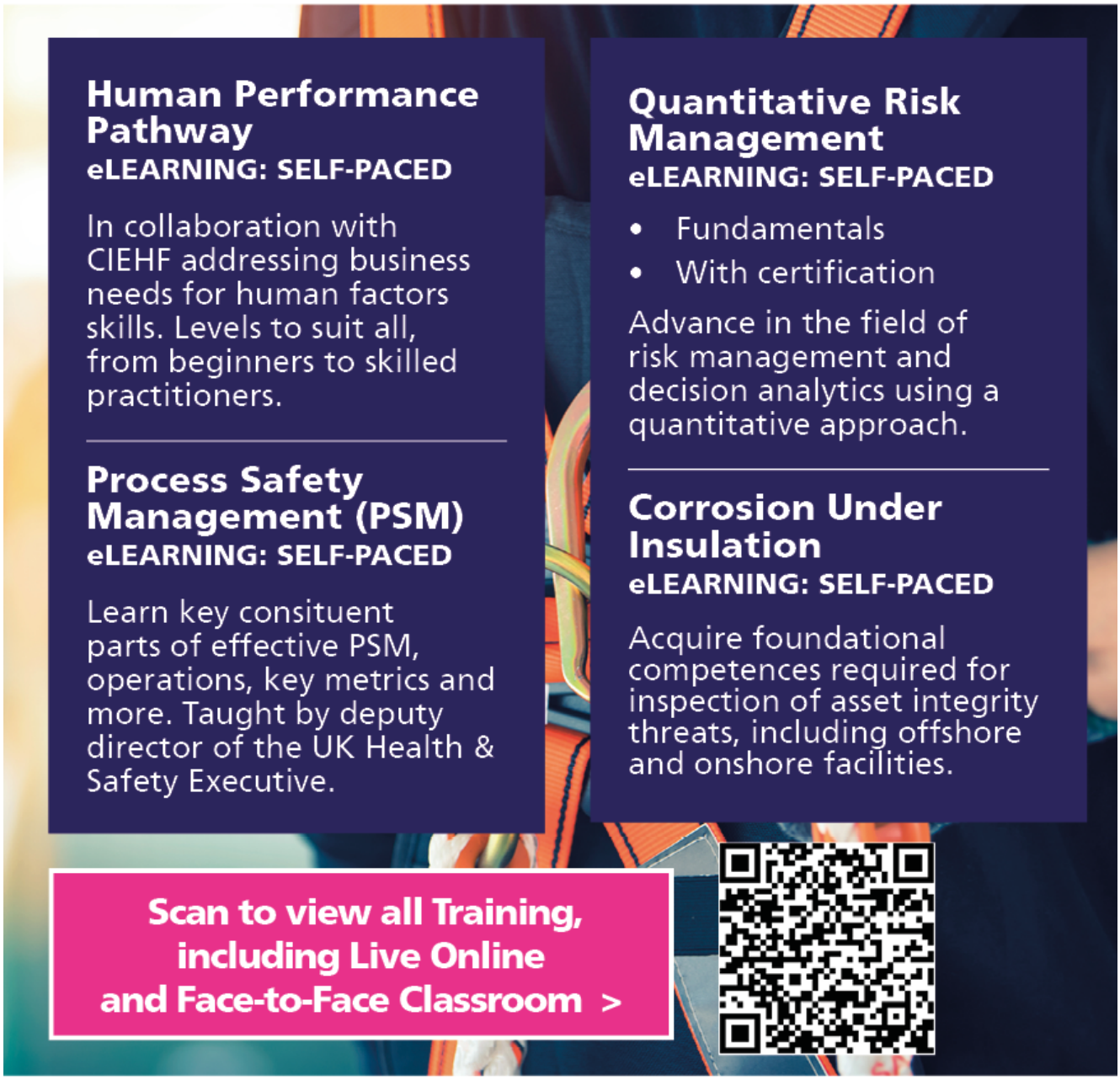

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The voice of the bulk storage and energy infrastructure sector

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