Issue 21 Spring 2025

INSIGHT

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

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‘REAL WORLD’ OCCUPATIONAL HEALTH ADVICE FOR BUSINESS

The quarterly magazine from the Tank Storage Association

Also in this issue, we explore digitalisation, occupational health, and the many projects and innovations that are taking place within the bulk storage and energy infrastructure sector.

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

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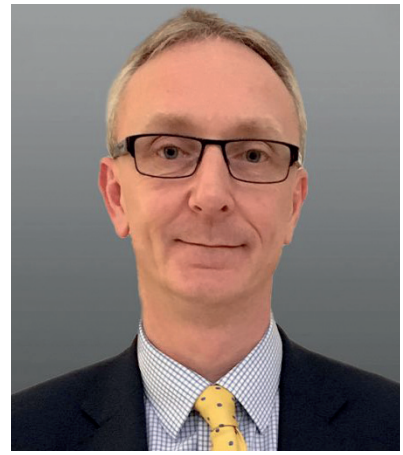

Peter Davidson
Chief Executive, TSA

Welcome to the spring issue of Insight. The UK has a well-developed bulk storage and energy infrastructure sector that supports industrial activities and a complex network of businesses, from domestic industry players to residential consumers and international traders. The chemical, health, steel, construction, food production, agricultural and transport sectors are only some of the constituents of the UK's industrial base that is supported by bulk storage and energy infrastructure. The sector also offers a wide range of career paths across various roles, including those in business, operations, engineering, safety, marketing, IT, supply and trading, and more. In this issue of Insight, we continue to shine a light on the vibrancy and breadth of our industry. I hope you enjoy this new edition of the magazine.

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MAINTAINING THE VALIDITY OF THE PETROLEUM DRIVER PASSPORT

The Petroleum Driver Passport is a guarantee of quality assured training against a standard that terminal operators, distribution companies, drivers, relevant authorities, and all who operate in the industry can rely on.

DFDF
Downstream Fuel Distribution Forum

The Downstream Fuel Distribution Forum (DFDF) provides a platform for the discussion and resolution of issues relating to health and safety as well as training in the downstream fuel distribution sector. Its remit includes facilitating the sharing of good practice and monitoring the transition to new fuels and powertrains, along with the implications of these for safety and training as the sector continues to evolve.

The DFDF brings together major hauliers in the petroleum distribution sector, relevant trade associations, government departments - namely the Department for Transport and the Department for Energy Security and Net Zero - and trade unions, with senior representation from each organisation. As part of its collaborative work on good practice within the industry, the DFDF launched the Petroleum Driver Passport (PDP) Scheme in 2014, a voluntary industry scheme designed to ensure that all tanker drivers in the UK are trained and assessed to a consistent standard in loading, transporting and offloading petroleum products from road tankers. The scheme is managed by the Scottish Qualifications Authority (SQA) in conjunction with the PDP Management Group. It provides the knowledge and skills required by a petroleum tanker driver not covered by ADR, it assesses competence, and it is designed to sit alongside existing tanker driver regulations with a five-year renewal cycle in line with a driver's ADR licence.

The Petroleum Driver Passport (PDP)

The PDP card demonstrates to terminal operators, hauliers, customers and the wider public that petroleum tanker drivers have been trained to the same consistently high and externally verified standard in all aspects of tanker driving, from pre-vehicle checks to loading, driving and discharging. The card is held by the individual driver to allow freedom of movement within the industry. To gain their PDP, drivers are required to undertake practical and classroom training as well as pass a "check, load, drive and unload" practical assessment using a tanker and a multiple-choice exam every five years. Successful completion of both the practical and classroom elements of the training results in the driver gaining the Petroleum Driver Passport card. Although it is renewed on a five-year cycle, a key feature of the PDP is that in order to remain valid during those five years, it requires drivers to undertake and pass an annual practical assessment and undergo a classroom refresher training session subject to independent verification by SQA. It is mandatory that completion of the annual refresher be recorded with SQA.

The Annual Refresher

The annual refresher is an essential feature of the PDP Scheme. It not only demonstrates the validity of the PDP card, but it also ensures that standards are being met. The annual refresher consists of a practical assessment (21P) and classroom training (21T). The classroom training element takes into account changes in legislation and industry practice. The DFDF has also successfully negotiated with the Joint Approvals Unit for Periodic Training (JAUPT) - now the DVSA Training Accreditation team, which is part of the Driver and Vehicle Standards Agency (DVSA) – for the training hours to be recorded for the purposes of the Driver Certificate of Professional Competence (DCPC). To that end, the annual PDP refresher training provides highly relevant DCPC training with no additional training burden on employers. It is important to note that the annual refresher practical assessment must be undertaken no more than four months prior to the annual anniversary date. The anniversary date is the same day and month as the expiry date as stated on the PDP card. In addition, to maintain the validity of the PDP, the annual classroom refresher training must take place within the same calendar year as the annual practical assessment. Therefore, drivers have the full calendar year to complete both classroom and practical elements, i.e. by year end.

To assist in maintaining the validity of the PDP, card holders are now able to sign up for PD Prompts on the PDP website at www.pdpassport.com/pdpassport/PD-Prompts. The service sends reminders when it is time to renew the PDP or when it is time to complete the annual practical assessment.

PDP Card Enforcement

UK terminals are the primary point of enforcement for the PDP Scheme. All terminals issue site-specific loading cards and only permit drivers who are demonstrably trained and competent to be put forward for loading card training. They have a duty of care to ensure that they allow loading rack access only to suitably qualified individuals and the PDP provides demonstrable proof of this. Therefore, drivers must have a PDP card and must have maintained its validity to gain entry to load. In addition, in line with their own spot check procedures, terminal operators may carry out spot checks on the validity of PDP and that annual refresher training has been completed. It is the responsibility of the employer and driver to ensure that the PD Passport remains valid by undertaking and registering with SQA the annual training and practical assessment. And, while it is recognised that in certain circumstances drivers may not complete their annual refresher training and assessment within the specified time period, the appropriate training and assessment should be undertaken at the earliest opportunity to revalidate the PDP. All employers and drivers are, therefore, encouraged to be aware of when the annual practical assessment is due and ensure that it is undertaken no more than four months prior to the annual anniversary date stated on the PDP card with the classroom training being completed within the same calendar year.

Benefits of the PDP

The PDP is a guarantee of quality assured training against a standard that terminal operators, distribution companies, drivers, relevant authorities, and all who operate in the industry can rely on. The PDP Scheme has numerous benefits for all involved parties. It demonstrates that drivers in the sector are consistently trained and assessed to a common, national standard and provides employers with a standard to train all drivers against, irrespective of the training being delivered in-house or externally. In addition, the scheme is linked to ADR and to the Driver Certificate of Professional Competence, therefore providing highly relevant DCPC training with no additional training burden on employers. As regards training providers, the scheme ensures that they have a clear syllabus and a strong PDP approval and assessment process while the industry enjoys improved reputation, high standards in training and safety, and its own proactive code of practice.

For more information on maintaining the validity of the Petroleum Driver Passport and to know more about the annual refresher requirement, please visit www.pdpassport.com

‘REAL WORLD’ OCCUPATIONAL HEALTH ADVICE FOR BUSINESS

Collaborating closely with the HSE and factoring in discussions from its recent Health Summit, CDOIF continues to shape the future of occupational health leadership.

GrainLNG

For those championing occupational health, the challenge lies in creating practical, effective guidance that improves working lives while acknowledging the operational realities businesses face.

When Alan Dillien, Occupational Safety & Human Factors Lead at Grain LNG, was invited to chair the Occupational Health & Safety working group as part of the Chemical & Downstream Oil Industries Forum (CDOIF) in 2022, he saw an opportunity to apply his expertise in real-world, front-line safety solutions.

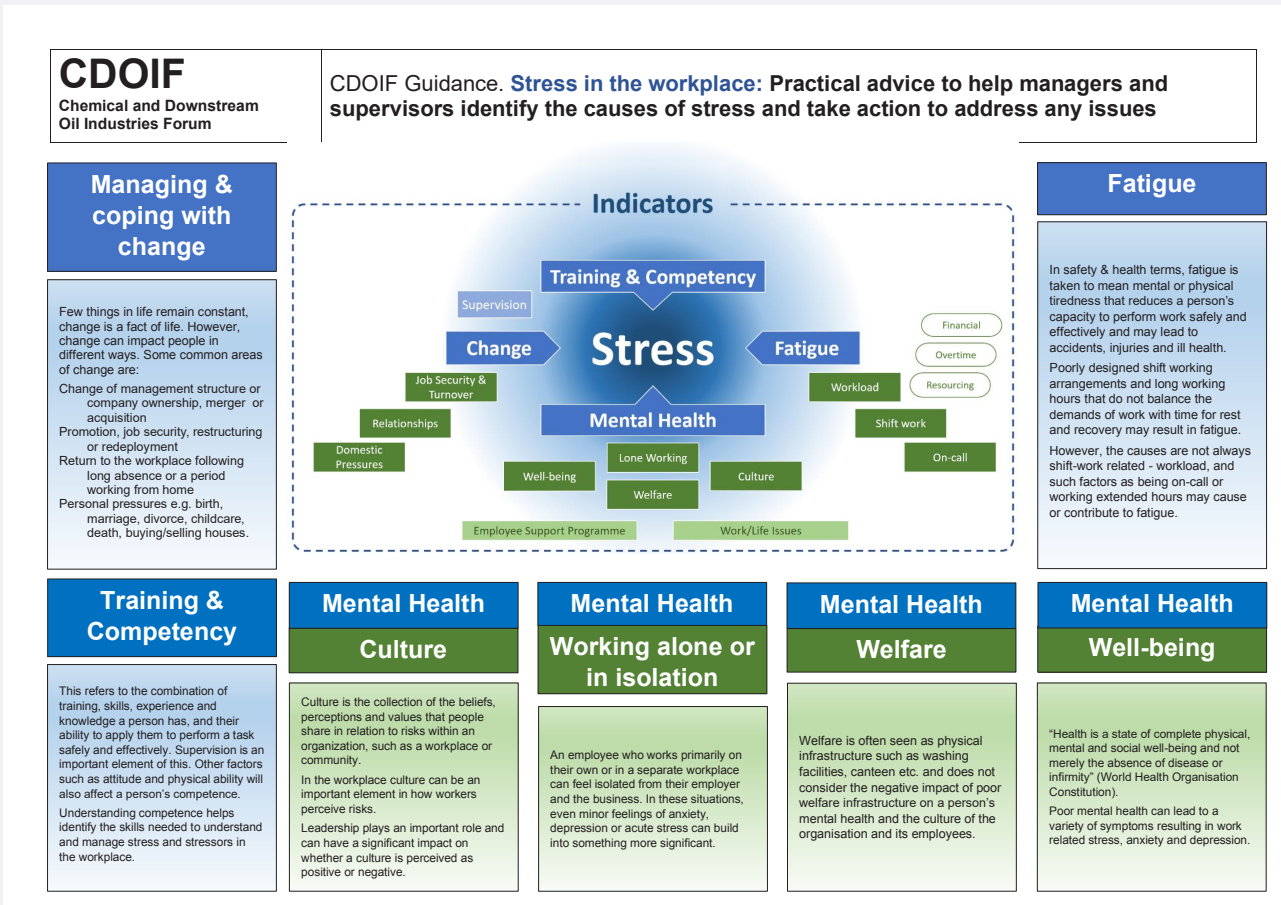
Alan’s experience at Europe’s largest LNG importation terminal, an upper-tier COMAH site, was invaluable. Operating 24/7, year-round, Grain LNG prioritises process and occupational safety, requiring agile, intuitive solutions that are straightforward to implement. “It’s about making it easy for people to do the right thing,” Alan explains. “Humans matter - advice must be based on a deep understanding of how and why people behave the way they do. It needs to be meaningful and easy for front-line staff to use in their daily working lives.”

CDOIF: A Collaborative Approach to Industry Challenges

Grain LNG was already part of the COMAH Strategic Forum (CSF) Leadership Working Group, chaired by the Tank Storage Association but CDOIF represented a new venture for the team. The forum fosters health, safety, and environmental improvements, with a particular focus on the chemical and oil industries, historically considered ‘hard to reach’. CDOIF operates as a collaborative, problem-solving professional community, which identifies key industry issues, agrees collective actions, and develops practical solutions. It has a direct link to the CSF, to escalate major hazard concerns and respond to requests for targeted work.

Alan’s Philosophy: Active Leadership Engagement is Key

Alan approached the role with two core leadership principles. Firstly, the importance of active leadership at all levels: “We need committed leaders ‘on the ground’ as well as in the boardroom. Without visible management buy-in, change won’t happen.” It’s critical for senior leadership to understand and address risks proactively, demonstrating a clear commitment to occupational health. And secondly, the vital importance of engagement with first-line leaders and staff. As Alan



explains, "Advice must be practical and relatable. There's no point in creating guidance if the people who need it don't understand how it helps them. Front-line workers must feel that guidance is relevant, practical, and makes their lives better."

Balancing Occupational Health & Safety Priorities

When Alan joined CDOIF, the HSE (which the forum works closely with) had prioritised three key areas in its occupational health strategy: Stress, Occupational Asthma and Musculoskeletal Disorders (MSD). However, industry stakeholders wanted to retain a balance between health and safety; there were concerns that an occupational health focus might lessen attention towards safety risks. Alan identified a 'win-win' opportunity: aligning with HSE priorities while ensuring a business-focused, results-oriented approach.

Tackling Stress: A Strategic Priority

The working group agreed that stress should be the first focus, in recognition of its far-reaching impact on mental health, wider process safety, as well as business performance. Stress-related issues contribute to many business challenges including increased absenteeism, reduced productivity and higher staff 'churn' rates. Stress, and its causes also have a direct impact on how safely people work. Where people are stressed, accidents are more likely to occur. Using 'mind-mapping' techniques, the working group captured the complex web of stress factors, enabling them to create a structured, actionable framework. The outcome was a clear,

accessible model based on four key contributors to human stress in the workplace. These are:

1. Fatigue
2. Managing & Coping with change
3. Training & Competency (learning new skills or ways of working)
4. Mental health Culture – Working alone or in isolation – Welfare – Wellbeing

Critically, the model considers both work-related and non-work-related matters that businesses have little control over but may affect how individuals behave in the work environment. Throughout, Alan and the CDOIF working group prioritised plain language, visual engagement, and usability, ensuring guidance was clear and could be widely understood. "The simpler the message, the greater the impact," Alan notes. "We wanted to make technical and scientific topics as accessible as possible. That meant clarity (avoiding unnecessary jargon and complex terminology), relevance (with content aligned to real-world workplace conditions) and optimising engagement (with visual aids and structured formats to improve understanding)."

Practical, Non-Technical Guidance for Businesses

CDOIF have now produced a total of seven related guidance notes, all designed around a logical, instinctive 'question-and-answer' framework:

- What is the issue?
- Why should you be concerned? How do you identify a problem?
- What actions should you take?
- How can you implement these measures effectively?

Importantly, these resources do not focus on legal requirements and compliance, which can be found elsewhere. Instead, they focus on practical, actionable steps that businesses can easily adopt. Ruth Sleigh, Principal Inspector at HSE, praised the guidance for its clarity, accessibility, and practical focus: "The CDOIF guidance is simple and straightforward. The use of plain language supports businesses in understanding potential issues of concern and developing real-world solutions to help them manage stress effectively. I encourage businesses to take advantage of a great resource."

The seven guidance documents are now available on the Process Safety Forum website and are designed to stand alone or be used collectively. Collaborating closely with the HSE and factoring in discussions at its recent Health Summit, CDOIF continues to shape the future of occupational health leadership, ensuring that businesses - regardless of size or sector - have the tools and knowledge to create healthier, safer workplaces.

For more information on the CDOIF guidance documents, please visit www.p-s-f2.org.uk

Wendy Weeks, Maritime Security Specialist at Teamwork Security and Training Services

Wendy joined Teamwork Security and Training Services in August 2023 and brings a wealth of experience from a distinguished career spanning nearly four decades. She began her professional journey in 1985 as a Police Officer, serving until 2016. Her tenure included various specialised roles in Uniformed Services. She was the first female Dog Section Officer, worked as a Sex Offenders Manager and also in the Intelligence and Counter-Terrorism (formerly Special Branch) at major transportation hubs including airports and ports.

Following her retirement from the police force, Wendy transitioned into the Civil Service in 2017, serving as a Maritime Security Compliance Inspector with the Department for Transport. This extensive experience laid the groundwork for her role at Teamwork Security and Training Services. Since joining Teamwork Security and Training Services, Wendy has already made a huge impact, contributing her expertise to ensure the security and compliance of ports under the ISPS Code, and delivering various courses to UK Ports including Port Facility Security Officer (PFSO), PFSO refresher training and specialises in Bomb/IED Search, Maritime Policing, Surveillance, and Search training. Wendy has also earned her Dangerous Goods Safety Advisor (DGSA) certification - an impressive achievement that underscores her expertise and dedication to maritime safety. Wendy thrives on helping ports achieve compliance with the ISPS Code, emphasising its critical role in maintaining global maritime security. She finds immense satisfaction in training staff of all roles and backgrounds, ensuring they leave her sessions not only more informed but also thoroughly engaged. For Wendy, there's no better reward than walking out of a classroom knowing her trainees have gained essential skills and enjoyed the process. Wendy is passionate about growing Teamwork Security and Training Services' reach both in the UK and internationally. She envisions developing innovative ways to help ports fully grasp the importance of the ISPS Code and its application, further strengthening maritime security standards worldwide.

To learn more about Teamwork Security and Training Services call 01752 425424, email enqs@teamwork-security.co.uk or visit: teamwork-security.co.uk

WHY TERMINALS NEED DIGITALISATION BEYOND AUTOMATION

As the industry faces increasing regulatory pressures, evolving safety requirements, and the transition to future fuels, tank terminal operators must rethink their approach to digitalisation.

GiZiL

The changing landscape of tank terminals

For decades, tank terminals have played a crucial role in the global energy supply chain, ensuring the safe storage and distribution of fuels and chemicals. However, as the industry faces increasing regulatory pressures, evolving safety requirements, and the transition to future fuels, tank terminal operators must rethink their approach to digitalisation.

Despite the widespread use of automation for process control, the broader concept of digitalisation is often misunderstood or overlooked. Many in the sector equate digitalisation with automating pumps, valves, and sensors, but this is only a fraction of the picture. True digitalisation involves virtualizing infrastructure, integrating real-time data, and leveraging advanced technologies to improve efficiency, safety, regulatory compliance, and sustainability.

One of the biggest challenges facing tank terminals today is the industrial data problem growing issue that limits efficiency, increases costs, and obstructs sustainability efforts. This challenge arises from the complexity and fragmentation of information within terminal operations. Unlike other industrial sectors that have embraced unified digital platforms, tank terminals often rely on a mix of outdated legacy systems, paper-based records, and isolated automation tools. The result is an operational environment where data is scattered, inconsistent, and difficult to access.

The industrial data problem: why tank terminals are struggling

1. Complexity of Operations

Tank terminals manage a vast array of assets, from pipelines and storage tanks to loading arms and monitoring sensors. Each of these elements generates data, but without a centralized system, this information often remains siloed. Operators must manually compile and verify data from multiple sources, leading to inefficiencies and potential errors in decision making.

2. Fragmentation of Data Sources

Many terminals still operate with a mix of paper logs, spreadsheets, and standalone software systems, making it challenging to gain a unified view of operations. Different departments (maintenance, safety, compliance, operations) often use separate data management tools that do not communicate with one another, causing delays, redundancies, and

miscommunication.

3. Inefficiencies and Operational Bottlenecks

Without integrated digital systems, routine maintenance planning becomes reactive rather than proactive, leading to unexpected failures, costly downtime, and unsafe conditions. Inventory management and scheduling suffer due to lack of real-time visibility, creating inefficiencies in supply chain logistics.

4. Increased Costs Due to Poor Data Management

Inefficient data handling results in excessive labour hours spent on manual data entry, verification, and error correction. Without proper predictive analytics, terminals overspend on maintenance and emergency repairs instead of implementing cost-effective preventive measures.

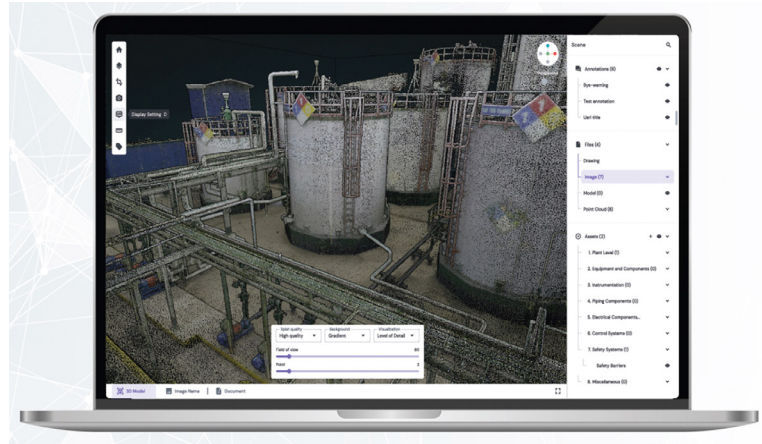
5. Regulatory Compliance Challenges

Tank terminals operate under strict regulatory frameworks requiring precise documentation of emissions, safety procedures, and maintenance logs. With fragmented data, compliance teams struggle to generate accurate reports on time, leading to fines, reputational risks, and legal complications.

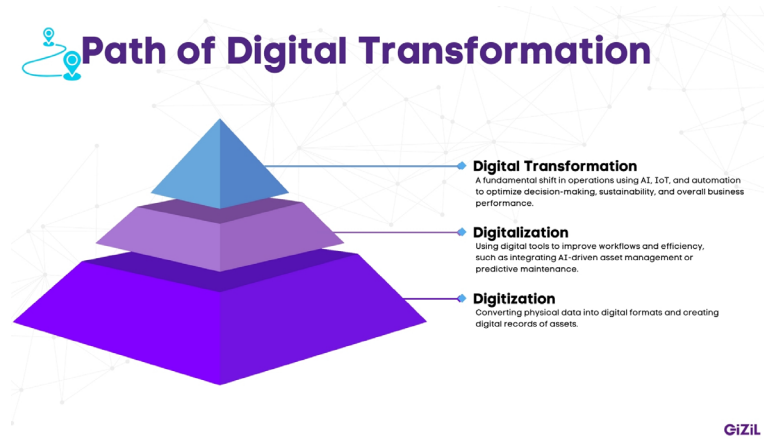
6. Sustainability and Future Fuels Integration

The transition to hydrogen, biofuels, and synthetic fuels adds another

Gizil has developed Virtual Plant (VP) - a digital platform designed specifically for industrial facilities like tank terminals. Unlike traditional 3D modeling, which remains unused after design phases, VP focuses on practical, real-time digitalization that enhances daily operations and long-term strategic planning.



Digitalisation is the transformation of physical operations into digital ecosystems, where data is collected, processed, and utilized to improve decision-making, enhance safety, and optimize efficiency.



layer of complexity to terminal operations. Many legacy systems are not equipped to handle new storage and processing requirements, making it difficult to assess infrastructure readiness for alternative fuels.

7. Cybersecurity Risks

As more industrial systems become connected, cybersecurity threats increase. Many tank terminals lack robust cybersecurity measures, leaving them vulnerable to data breaches and operational disruptions. Without a centralized, secure digital infrastructure, protecting sensitive operational data from cyberattacks becomes a major challenge.

Given these challenges, tank terminals must go beyond automation and embrace a more comprehensive digital transformation. By adopting a virtualized infrastructure, terminals can break down data silos, improve decision-making, and enhance both physical and cyber safety. In the following sections, we explore how digitalisation provides the solution to these issues and why it must be a priority for the industry.

What is digitalisation?

Digitalisation is the transformation of physical operations into digital ecosystems, where data is collected, processed, and utilized to improve decision-making, enhance safety, and optimise efficiency. It is not just about installing sensors or automating pumps - it is about creating an interconnected, data-driven environment where operations can be monitored and controlled intelligently.

For tank terminals, this means moving from fragmented, paper-based, or isolated digital records to integrated platforms where every piece of infrastructure can be accessed remotely, analyzed in real time, and optimized for performance.

Why does infrastructure need to be virtualized?

The need for infrastructure virtualization stems from the increasing complexity of terminal operations. As regulatory requirements grow stricter, safety concerns escalate, and the energy mix shifts toward low-carbon and alternative fuels, traditional methods of managing infrastructure are no longer sufficient.

Here's why tank terminals must virtualize their infrastructure:

1. Operational Efficiency:

Digital models provide real-time asset monitoring and predictive maintenance, reducing downtime and improving throughput. Virtualization allows terminals to optimize workflows, reducing inefficiencies in loading, unloading, and storage operations.

2. Physical and Cyber Safety:

Remote monitoring reduces human exposure to hazardous areas. Integrated cyber protection ensures secure digital operations, safeguarding against hacking and data breaches.

3. Regulatory Compliance:

Digital records provide accurate, auditable logs that simplify compliance reporting. Virtual platforms ensure that safety and environmental regulations are continuously met.

4. Cost Savings:

Optimized operations reduce unplanned maintenance costs. Data-driven insights lower energy consumption and resource waste.

5. Emissions Reductions & Sustainability:

Digitalised operations enable real-time emissions tracking, ensuring compliance with environmental policies. Better process control leads to lower carbon footprints.

6. Futureproofing for Alternative Fuels:

The transition to hydrogen, biofuels, and synthetic fuels requires adaptable infrastructure. Digitalisation helps terminals evaluate and integrate new fuel storage solutions without costly retrofits.

Introducing Virtual Plant (VP): a practical digitalisation solution

To address these challenges, Gizil has developed Virtual Plant (VP)—a digital platform designed specifically for industrial facilities like tank terminals. Unlike traditional 3D modeling, which remains unused after design phases, VP focuses on practical, real-time digitalisation that enhances daily operations and long-term strategic planning. What does VP do?

1. Efficiency:
- Provides real-time asset visibility, reducing downtime and improving throughput.
- Enhance decision-making by making data more accessible to process engineers and terminal operators.

2. Safety:
- Reduces the need for physical inspections, minimizing

worker exposure to hazardous environments.
- Strengthens cybersecurity through a secure, integrated data environment.

3. Regulatory Compliance:
- Automates reporting and documentation for audits.
- Ensures adherence to local and international regulations through real-time monitoring.

4. Cost Reduction:
- Eliminates inefficiencies and reduces maintenance costs.
- Minimizes unnecessary energy consumption, leading to lower operational expenses.

5. Sustainability & Future Fuels:
- Supports the transition to hydrogen and biofuel storage by enabling scalable digital models.
- Enhances environmental monitoring to meet sustainability targets.

The future of tank terminal operations

Tank terminals are at a turning point. While automation has played a key role in improving operations, it is no longer enough to meet today's complex demands. The challenges of fragmented data, regulatory compliance, cybersecurity, and the transition to alternative fuels require a more holistic approach to digital transformation.

Digitalisation - enabled through virtual infrastructure like Virtual Plant - ensures long-term efficiency, safety, compliance, and sustainability.

The energy sector is evolving rapidly, and low-carbon fuels such as hydrogen, biofuels, and synthetic fuels are becoming increasingly viable. Tank terminals must adapt to these changes by implementing scalable digital solutions that can accommodate both traditional fossil fuels and new energy carriers. This transition will not only reduce emissions but also ensure continued relevance and competitiveness in a shifting global market.

Regulatory frameworks are tightening, and compliance is becoming more complex. Traditional manual methods for managing compliance reports and emissions tracking are inefficient and prone to errors. A digitalised infrastructure allows for automated regulatory reporting, real-time tracking, and predictive analytics, helping terminals avoid penalties and maintain a strong industry reputation.

Cybersecurity threats continue to rise as industrial operations become more connected. Without a secure, integrated digital infrastructure, terminals are vulnerable to cyberattacks that could compromise operational safety, financial stability, and data integrity. A well-implemented digital strategy protects against such risks by integrating cybersecurity measures at every level of the operation.

Looking ahead, companies that fully embrace digitalisation will remain resilient, agile, and competitive. By integrating Virtual Plant and similar digital solutions, tank terminals can move beyond automation and into a future of optimized efficiency, enhanced safety, reduced costs, and full regulatory compliance.

The industry must act now to stay ahead of evolving market demands. Digital transformation is no longer optional, it is essential for survival and growth.

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SECOND GENERATION BIOFUELS – MANAGEMENT OF CHANGE IN A CHANGING LANDSCAPE

The UK government has set in place it's ambitions to reach net zero by 2050. To achieve this, a range of energy carriers will be needed to replace more traditional petroleum-based fuels.

First and second generations biofuels are an attractive option for many sectors, including those that are harder to decarbonise. Biofuels also have an advantage that they can utilise existing assets and infrastructure for the import, storage and onward transmission to customers. Bio feedstocks, and the fuel that they produce, can be variable, and can impact the integrity and operation of existing facilities. Significant evaluation has already been carried out for first generation biofuels such as ethanol, FAME and SAF. As the biofuels market is developing, so are the range of biofuels available.

Second generation biofuels are made from non-food biomass, including agricultural and forest residues, lingo-cellulosic biomass, municipal solid wastes, waste oils and animal fats. (Note, the scope of second generation biofuels is variable). Vegetable oil and animal fat processing is a developed process in non-fuel industries such as cosmetics. The process has been adapted for fuels, with UK production import and distribution. InSite have developed several projects for the import, storage and processing of used cooking oil at refineries, including repurposing of existing assets, such as tanks and pumps. However, this market is limited by feedstock availability.

The processing of agricultural and forest residues, lingo-cellulosic biomass and municipal solid wastes to produce liquid fuels is still in its infancy but is rapidly developing. This market has significant growth potential. It will likely involve processing plants local to the feedstock, to reduce transport costs and CO2 footprint. These plants will produce intermediate liquid products that require further refinement, likely in other facilities, to produce transport fuels. There is significant potential to utilise the existing UK bulk liquid storage sector to support this development. However, these new second generation biofuels, and particularly the intermediate liquid products, will have varying properties that need careful consideration for safe and reliable operation of existing assets.

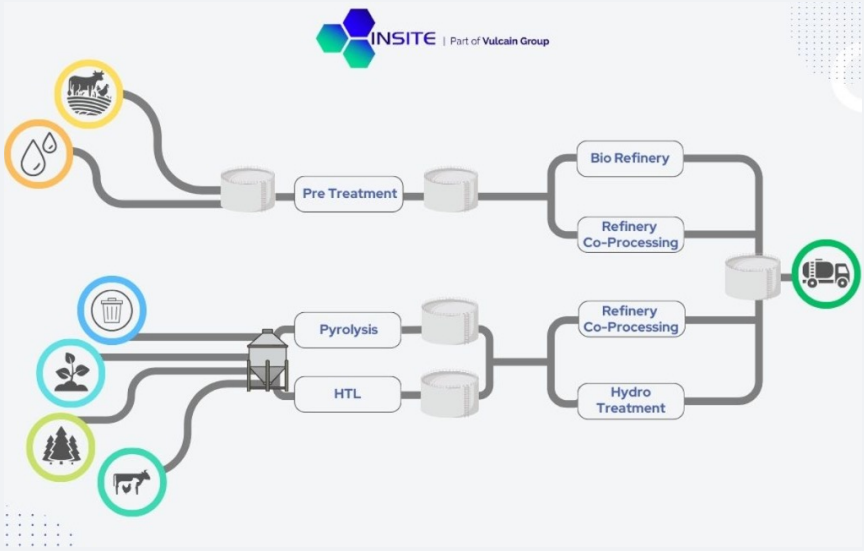
2nd generation biofuel production methods

Currently, there are two main processing routes in development for biomass to liquid fuels. (Note, there is also development on biological treatment, but to date this has been focussed on gas production rather than liquid fuels).

1. **Pyrolysis**. Dried biomass, heated without oxygen, produces a tar-like oil (pyrolysis oil), as well as solid and gas products. Pyrolysis oil contains a high level of oxygen compared to traditional hydrocarbons which has significant corrosion, instability and polymerisation issues. It requires further upgrading to produce finished fuel products. Pyrolysis is not a new technology itself. However, pyrolysis of biomass in the production of liquid fuels is relatively new.
2. **Hydrothermal liquefaction.** Wet biomass is converted to bio-crude under high pressure and creates a tar-like oil (bio-crude). Bio-crude contains a high level of oxygen and impurities that requires further upgrading to produce finished fuel products. The production of liquid fuels from this process is new. There are established processes in the pulp and paper industry for the conversion of wood products,

which produce black liquor (similar to bio-crude).

Pyrolysis oil and bio-crude require further processing to produce finished fuel products. Existing technologies, including hydro-treatment (common in oil refineries), are being adapted for this. InSite have supported a project for the hydro-treatment of pyrolysis oil. However, this is a developing technology. In either case, the oil feedstock, intermediates and finished products will require storage and transport, and there are significant opportunities for the existing bulk liquid storage industry.



Management of change

With any new commodity, a management of change process is required to assess suitability for use in existing oil storage terminals, and any modifications required. InSite have supported this process for a number of clients. An understanding of the commodity is required, as well as the existing facilities and operations. For established commodities, there are usually existing standards/guidelines for safe and reliable handling, in an industrial context. Commodity data (i.e. SDS) and supplier/customer information (i.e. existing supplier export facilities, quality control requirements) is usually also available. This allows an efficient management of change process, taking into account any site-specific requirements.

For new commodities, including second generation biofuels, specific standards/guidelines do not exist, product qualities are variable and developing (as the technologies develop), and there are limited industrial examples.

Potential interactions with petroleum-based fuels may not be fully understood. In this case, a more rigorous management of change process is required, and consideration of the precautionary principle. Where the biofuels market is supported by government incentives/taxes, then the commodity tracking framework must be understood, as well as any requirements from the whole value chain for ESG reporting, for multiple products. As the biofuels market is developing, early players need to consider future changes as part of management of change.

Conclusion

A management of change framework can be used to support the bulk oil storage sector to take advantage of the opportunities that second generation biofuels will provide, whilst still maintaining safe and reliable operation. InSite are well placed to support this process.

Author

Tom Johnston BEng CEng MIChemE is a process engineer with over 25 years' design and operations experience in refining, oil storage and petrochemicals. He was the operations manager at the Milford Haven Refinery before its conversion to an oil storage terminal.

InSite Technical Services Limited provide technical consultancy and engineering design packages. Their services are focused on supporting existing sites, including oil storage facilities, with traditional modification projects, as well as supporting the energy transition.

TRANSFORMING SAFETY IN THE OIL TANK CLEANING INDUSTRY - MITIGATING RISK AND SAFEGUARDING COMPANY VALUE

Insights into our applications to mitigate the release of gases with high GWP factor.

ETS Degassing
MOBILE EMISSION TREATMENT

David Wendel, Managing Director, ETS Degassing

Minimising untreated emissions is crucial for environmental protection and carbon footprint reduction. Industrial operators must ensure that exhaust and residual gases are properly treated to limit volatile organic compounds (VOCs) and hazardous air pollutants (HAPs), which contribute to CO2 emissions. Mobile degassing of tanks, ships, inland barges and pipelines as well as the temporary replacement of stationary vapor recovery units (VRU) during downtimes help to establish more sustainable operations and maintenance in facilities such as tank terminals, storage facilities, refineries and chemical plants.

Hazardous gases and pollutants develop during many industrial processes and often settle and remain in tanks or pipes. If released untreated, residual gases and vapors can harm air quality, the environment, and human health. Proper treatment ensures that pollutants are safely removed and neutralized. Removing residual gases and vapors is especially important for product changes, cleaning, maintenance or repair works as tanks, ships and pipelines need to be gas-free. Instead of simply releasing the gases into the atmosphere, they need to be treated and destroyed properly in an environmentally-friendly manner.

Reducing emissions with mobile and flexible units

With mobile vapor combustion units (VCU), exhaust and residual gases can be destroyed efficiently and sustainably. The mobile incinerator is connected to the component that is to be degassed with piping networks. Pollutants are then separated and destroyed by combusting. Treating and combusting captured gases and vapors thermally in a mobile vapor combustion unit minimizes emissions and reduces them to a significantly lower, environmentally-friendly level. Due to their design as a trailer or container, mobile VCUs can be transported flexibly and can be applied directly where emissions occur – on-site in tank terminals, refineries or chemical plants.

Let's take an LNG fuel tank with a volume of 1,280 m^3 as an example to show the impact of mobile emission treatment and reduction. Normally, the global warming potential (GWP) factor of the LNG in this tank is 60.87 tons, assuming a CO2 equivalent per kilogram of 36 kg. Environmentally-friendly combustion of residual LNG with a mobile VCU reduces the CO2eq factor to just 6.64 tons, cutting emissions by 89%. This demonstrates the crucial role of proper degassing

in minimizing emissions from various storage units.

Efficient mobile degassing and replacement services

At ETS Degassing, we offer customers mobile vapor combustion units in five different combustion capacities for a wide range of applications and use cases. Additional equipment such as mobile nitrogen vaporizers for purging components containing liquified gases, mobile blowers or remote-controlled tank cleaning robots for application in the ATEX Zone 0 complete our holistic offer for the treatment and reduction of industrial emissions. ETS Degassing VCUs destroy gases, gas mixtures and vapors of the explosion groups IIA, IIB and IIC – from gaseous hydrocarbons to organic solvents and hydrogen-containing vapors – with a combustion efficiency of over 99.99% and without open flame, noise or odour. As we deeply care for safety, health and security, our processes are certified after ISO 45001 for occupational health and safety management and ISO 9001 for quality management. We are also proud to be newly ISO 14001-certified for environmental management and sustainable processes. The applications of our technologies are as manifold as the sectors of our customers – tank terminals, refineries, chemical plants, industrial services, marine and shipping and other markets such as the food and fertilizer industries. Our services range from the degassing of single storage tanks, the

ETS Degassing offers customers mobile vapor combustion units in five different combustion capacities for a wide range of applications and use cases.

ETS Degassing can also carry out the temporary replacement of Vapor Recovery Units (VRU) to guarantee operations can continue without downtimes during maintenance or repair of stationary systems.

degassing of pipelines and multiple tanks of all kinds to the degassing of ships and inland barges. We also offer VRU back-up services to replace the stationary emission reduction systems during downtime due to maintenance or repair. This ensures that daily operations can continue without interruption. By applying our mobile nitrogen vaporizer for purging and inerting, we can also offer the degassing of LNG fuel tanks and other components containing liquified gases under pressure. We have successfully completed over 3,000 applications for mobile degassing and replacement services all over Europe.

VRU replacements for TotalEnergies

For our client TotalEnergies, we successfully deployed mobile vapor combustion units at two German tank terminals during VRU maintenance. This ensured continuous emission treatment, preventing environmental risks and operational disruptions. During the VRU downtime, our mobile incinerators combusted the vapors and gases efficiently and environmentally-friendly in order to ensure no safety risks or environmental damages. Thus, the processes in the tank terminals could be uphold safely and without restrictions, avoiding a shutdown of the facilities and possible petrol shortage in the affected regions. For these VRU replacement projects, we were honored with the TotalEnergies Safety Award in the category Safest Contractor Tank Terminal.

Replacement deployment in the Netherlands

In another recent application, we have deployed a mobile vapor combustion unit to a tank terminal in the Netherlands. On short notice and in under 24 hours, we deployed the mobile unit and operation team for the VRU replacement during its temporary downtime. Due to the VRU back-up, the operations in the facility and the loading of tank trucks could be maintained during the repair of the VRU, avoiding a complete shutdown. We can also provide VRU replacement services during ship loading or unloading procedures.

Degassing of storage tanks and LNG fuel tanks

Of course, we also carry out many tank degassing applications – from single tanks to multiple tanks, from storage and underground tanks to cylinder and ball tanks. The range of products stored in the tanks for example includes petrol, crude oil, ammonia or butane. When degassing a tank, we can also apply our European patent for the environmentally-friendly degassing of vacuum and suction trucks. An application that is becoming increasingly important is the degassing of LNG fuel tanks. For example, we have recently degassed an LNG fuel tank on board of a ship in the Netherlands, applying a mobile vapor combustion unit as well as the mobile nitrogen vaporizer for purging and inerting.

Major deployments in the Netherlands

One of our biggest applications in 2024 was the commissioning of an ethylene process facility in the Netherlands. Alongside an intensive project management, we have also provided four mobile vapor combustion units with a total combustion capacity of 30 MW. For this major call-off, we deployed two 10 MW units, two 5 MW units as well as extensive additional equipment such as piping networks, hand fittings, connectors and further components.

Another major call-off of our units was an LNG cool down operations for a big cruise ship in the Port of Rotterdam. We deployed a mobile vapor combustion unit, a mobile nitrogen vaporizer and additional equipment on short notice. After being notified on a Friday evening, our operators and units were already on site on Saturday morning. By noon, we had started the application and had finished it on the night from Saturday to Sunday.

Degassing site in the Port of Duisburg

ETS Degassing also operates a degassing site in the Port of Duisburg, the world's biggest inland port. Permanently equipped with a vapor combustion unit and a nitrogen vaporizer, we offer inland barges, motor tankers and gas tankers a possibility to environmentally-friendly dispose of residual gases in order to prepare the vessels for product changes, maintenance or repair works in the shipyard. The vessels that were recently degassed in the Port of Duisburg carried for example butane, pentene or petrol. In 2024, we successfully completed nearly 190 call-offs, and our teams remain highly active across Europe in early 2025. With upcoming projects in the UK this spring, we continue to support industries in achieving sustainable operations.

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INVESTING IN PEOPLE FOR A STRONG, BRIGHT FUTURE

Continuous improvement is the name of the game in our industry and we believe that mindset applies to our team as much as it does to our clients' sites and business processes.

RAS
Safe | Smart | Sustainable

It's Spring – finally - and it's the season to be investing more time and effort in new growth for a strong bright future - in business as well as in the garden. It's also the time of year for supporting TSA's Apprenticeship Week and Careers Fair when we come together as a sector in a concerted effort to attract the best people to our industry. Why? Because: *"the UK's tank storage sector is the pulse of our day-to-day life. It supports growth and prosperity by importing, exporting, storing and blending a large variety of liquid products that are integral to our daily lives, from transport and heating fuels to chemicals and food-grade products"*.

We have also been busy with our annual graduate recruitment campaign this quarter, working with universities in the North West to highlight the opportunities of working for a company like ours. We have had a very good response and are looking forward to the process of meeting the graduates who might be joining our team later this year.

The importance of investing the time and the energy to recruit into the industry to safeguard the future cannot be underestimated. Encouraging the best young people to join our industry, through either apprenticeships or through graduate entry, should be a priority for all of us and at the most senior levels in our organisations – no matter our size or sector. Once we have found them, we should be enabling our people to be the best that they can be. There are many quotes from many successful business personalities but the one that resonated most with me is from one of the world's most successful entrepreneurs, Bill Gates:

"The key for us, number one, has always been hiring very smart people."
Bill Gates, co-founder of Microsoft Corporation

Mr Gates attributes the success of Microsoft to its most important asset – its people. Finding them, hiring them and then keeping them. For us, as a leading SME consultancy in the complex business of risk management, we depend on our people's abilities, knowledge and expertise. Without them, we know that we wouldn't have a business. And so, we give a lot of attention to recruiting, training and retaining people. Over the years, we have developed some strong business processes for each of those three key aspects of looking after our most valuable asset.

Investing in recruitment
Many years ago, we took the strategic

decision to focus our recruitment on attracting the best young graduates to join our team, develop them and keep them. The main reasons for this decision were to ensure that we could build the right kind of team across a range of disciplines and to ensure a wide spread of knowledge to support our diverse client list. We believed that if we all grew together, with a wide knowledge base and diverse team, we would be stronger and more secure in the longer term. The strategy has paid off for us.

The importance of a multidisciplinary team, of different ages with a diversity of backgrounds cannot be emphasised enough. Although we do tend to recruit mainly STEM graduates, because of the numeric nature of risk assessment and process safety, we know that having different kinds of expertise and experience in the team will ensure that we remove siloed thinking to problem solving – a multidisciplinary team is more efficient and agile in thinking out of the box.

It also removes the danger of group thinking, and it is conducive to a more collaborative working environment which in turn promotes learning and support among the team. We believe this emphasis brings the 'different' together and provides a better quality of service for our clients. Our team has a range of expertise and includes degrees in chemistry, engineering, environmental science, geography, mathematics and biology.

The other aspect of recruitment which I put a big emphasis on is diversity, particularly on having a gender balance in the team. Whilst I am not a strong advocate of positive discrimination, we have invested time and effort in ensuring that how, where and when we advertise for positions, ensures that we attract as many women as men to apply. We will then take on the best applicants, regardless of their gender.

I am proud that in a typically male dominated sector, we have gender parity in our team. Our leadership team is also predominantly female. Why does this matter? It makes business sense. A quick Google search will bring up many recent research papers and articles which show the huge benefits of gender parity in the workplace – here are just a few quotes:

- "Mixed-gender teams produce more novel and impactful scientific research than teams made up of only men or only women". (Kellog Insight – 2022)
- "Achieving equal participation in the workforce could increase the size of the world economy by some $160 trillion, according to a World Bank study. That's almost double the current global GDP." (World Economic Forum 2019)
- "Diverse teams are more likely to constantly reexamine facts and remain objective. [...] Greater diversity may also change the way that entire teams digest information needed to make the best decisions." (Harvard Business Review 2016)

Training to succeed

Continuous improvement is the name of the game in our industry, and we believe that mindset applies to our team as much as it does to our clients' sites and business processes. If our people are our greatest asset, then investing in them and ensuring that they can continuously learn and improve is of great value for all of us.

We have developed a proprietary Competence Framework for our company so that we are intentional about learning and progression for each individual member of the team in their desired field.

We have a more informal buddy system when graduates first join the team to help them integrate into the organisation and ensure that they are working on real, interesting, client work as quickly as possible. We know that the working environment today can be fast-paced and stressful and therefore a helping hand, especially early on in a career, is a very important aspect of looking after our team.

We have a formal mentoring programme to keep an intentional momentum to training and support. We find that this can also be a two-way street for both the mentor and the mentee. Both parties benefit from the time invested and the opportunity to share a challenge and look for solutions in collaboration.

Retaining a high-performing team

Finally, having recruited the best, trained them to be competent and knowledgeable, how do you ensure that you keep them for the long-term and why is that important? Some might think that a regular turnover of staff keeps the company young and fresh. Or that investing too much in training isn't worth it as employees move on and the benefit is felt by other organisations. We don't think that is the case.

In fact, we think the opposite is true. We believe that working together to ensure that we are a great place to work means that we get the best out of our diverse team and it makes for a kinder, more supportive, working environment. It means that we grow expertise, experience and knowledge within the company and keep our people for years. Ultimately, this benefits everyone, not least our clients, which in turn increases revenue and productivity. It creates a trust and warmth which comes across to those we interact with.

How do we retain people? Here are a few things we do that we believe our team values and sees as important:

- We are a people-centric organisation – which means that they always come first. The nature of our work can bring pressure as the need for accuracy and efficiency are constants. The only way we can meet our clients' needs is to ensure that the team is resilient. That kind of strength comes from a close-knit team which works together all the time to carry the weight collectively.
- We endeavour to provide a pleasant working environment for our team ensuring the offices are comfortable and calm. We offer our people hybrid working with a minimum of two days in office, and a flexi-time policy.
- We have a variety of regular social activities as it is important to have fun together through different activities so that there is something for everyone.
- We emphasise the importance of work/life balance and the value of wellbeing for our staff and we provide guidance on this.

These types of investment in people may seem like a 'nice to have' but we believe are fundamental to be able to service our clients to the best of our ability and, most importantly, to secure a strong, bright future for all.

Author

Carolyn Nicholls, Managing Director, RAS Limited.

FUTURE-PROOF FUEL STORAGE: ENSURING SAFETY, EFFICIENCY, AND SUSTAINABILITY FOR A GROWING INDUSTRY

Fuel storage tanks are the unsung heroes in the fuel supply chain, yet their role is critical in ensuring smooth, safe, and efficient operations across multiple industries.

LEDBURY WELDING & ENGINEERING
MANUFACTURERS OF STORAGE TANKS AND VESSELS

As the UK and global markets continue to evolve with technological advances and regulatory shifts, the need for reliable, durable, and sustainable fuel storage solutions has never been more important. As the market leader in fuel storage tanks, Ledbury Welding & Engineering is proud to be at the forefront of this essential sector, providing cutting-edge solutions that meet the highest standards of safety, efficiency, and environmental responsibility.

The critical role of fuel storage tanks in today's economy

In today's fast-paced world, industries ranging from transportation and manufacturing to agriculture and construction rely on fuel storage tanks to ensure a consistent and secure supply of fuel. But as the demands on fuel storage continue to grow, so too must the technology and infrastructure behind it. A few points to consider:

- **Reliability is key**: reliable fuel storage tanks prevent operational downtime by ensuring that businesses always have a steady fuel supply. This is crucial for industries that depend on fuel for day-to-day operations, especially in remote locations or critical services.
- **Safety first**: the safety of both workers and the environment is non-negotiable. Properly designed and constructed fuel storage tanks, compliant with stringent regulations, are vital in preventing accidents, spills, and leaks, which can have catastrophic consequences for businesses and the surrounding communities.
- **The growing need for compliance**: as environmental regulations tighten, the need for tanks that are not only safe but also compliant with emerging standards for emissions and safety grows. This is where innovation in tank design plays a crucial role.

Innovation in fuel storage tank design

At Ledbury Welding & Engineering, we pride ourselves on developing fuel storage tanks that not only meet the demands of today's market but anticipate future challenges. This forward-thinking approach is what sets us apart in the industry. Here's how our tanks are leading the way:

- **Advanced materials and technology**: our tanks are built with the most advanced materials to ensure durability, corrosion resistance, and longevity. With cutting-edge technologies like double-walled construction, secondary containment, and leak detection systems, we

deliver fuel storage solutions that can withstand the harshest environments.

- **Sustainability at the core**: as the world increasingly focuses on sustainability, we have integrated eco-friendly practices into our designs. Our tanks are designed to reduce environmental impact by preventing leaks and minimising the potential for contamination, aligning with both UK and international environmental standards.
- **Smart storage for a smarter future**: the future of fuel storage isn't just about holding fuel safely; it's about making the storage process smarter. Our tanks can be integrated with technology for real-time monitoring and management, providing customers with data-driven insights to improve fuel management and reduce operational costs.

Meeting the needs of a diverse market

Fuel storage tanks are not a one-size-fits-all solution. Different industries and applications have specific requirements, and we have built a range of customisable options to meet those needs.

- **Custom solutions for unique demands**: whether it's a high-capacity storage tank for commercial fuelling stations or a smaller, more compact tank for industrial machinery, we offer tailored solutions designed for efficiency and safety.
- **Focus on the future of transportation**: with the rise of electric vehicles and alternative fuels, the landscape of fuel storage is evolving. As more industries adopt green technologies, we are working on innovative storage solutions for alternative fuels like hydrogen, biofuels, and EV charging infrastructure.
- **Ensuring business continuity**: in an unpredictable world, business continuity is vital. Our tanks are designed to operate under challenging conditions, providing uninterrupted fuel supply to industries that rely on consistent service delivery

The future of fuel storage

The world of fuel storage is changing rapidly. From the rise of new fuel types to increasing regulatory pressures, the challenges and opportunities for the fuel storage sector are expanding. At Ledbury Welding & Engineering, we are committed to staying ahead of these changes, innovating solutions that don't just keep pace with the industry but lead it.

- **Adapting to new regulations**: as regulations around environmental sustainability and safety continue to evolve, we ensure that our products meet or exceed these standards. We're committed to providing solutions that not only help our customers stay compliant but also contribute to a cleaner, safer environment.
- **The shift toward automation and efficiency**: fuel storage and dispensing systems are increasingly being integrated with automation and AI-driven technologies. These advancements offer improved operational efficiency, reduced human error, and better overall management of fuel stocks.
- **The role of industry collaboration**: collaboration between fuel tank manufacturers, suppliers, and regulatory bodies is more important than ever to ensure that storage solutions remain effective, safe, and sustainable. As leaders in the field, we actively engage with industry groups to share knowledge and drive continuous improvement.

Conclusion

The demand for safe, efficient, and sustainable fuel storage solutions is growing, and Ledbury Welding & Engineering is proud to be at the forefront of this vital industry. By embracing innovation, focusing on safety, and committing to sustainability, we are ensuring that the fuel storage tanks of tomorrow are not only a reliable asset but a smart investment for businesses across the UK and beyond. As we look to the future, we continue to push the boundaries of what's possible, ensuring that our customers can rely on us for the best storage solutions for years to come. Together, we're not just storing fuel – we're powering progress.

The voice of the bulk storage and energy infrastructure sector

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