



# INSIGHT



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

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## DEALING WITH REGULATORY UNCERTAINTY IN HYDROGEN TECHNOLOGY DEPLOYMENT

The quarterly magazine from the Tank Storage Association

Also in this issue, we delve deeper into the current safety debate and explore the many innovations and initiatives 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** Executive Director, TSA

Welcome to the autumn issue of Insight. As our sector innovates and the range of products and services offered by terminals evolve, careful consideration needs to be given to how we can continue to focus on safety and ensure that it is managed effectively. We must always ensure that protecting people and the environment are at the forefront of all that we do. As a leading member of the COMAH Strategic Forum, Process Safety Forum, the Chemical and Downstream Oil Industries Forum, and several Energy Institute technical committees, the TSA is at the centre of discussions in this context. And through our dedicated committees, we continue to positively engage in the development of new guidance and standards. For this issue, we delve deeper into the current safety debate and explore the many innovations and initiatives that are taking place within our sector.

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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:

- 12 September 2023: TSA Sustainability & Energy Transition Committee
- 5 October 2023: TSA Council
- 12 October 2023: TSA SHE Committee
- 23 November 2023: TSA Customs & Excise Expert Committee

For more information on TSA's meetings, write to [info@tankstorage.org.uk](mailto: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](http://www.tankstorage.org.uk/events)



## Tank Storage Association launches new podcast

The Tank Storage Association (TSA) has launched a brand-new podcast, Terminals Talk, exploring the topics that matter the most to the terminals industry. In every episode, the TSA covers a big question in 45 minutes or less, from bulk storage and energy infrastructure trends, to technology, skills and pathways for tomorrow.

In the first episode, the TSA discusses the recent publication by the Department for Energy Security and Net Zero of its policy paper, 'Powering Up Britain', setting out plans to secure the UK's future energy needs, seize the economic opportunities of the energy transition, and deliver on the Government's net zero commitments. The episode further explores what's next for the bulk storage and energy infrastructure sector and the trends that are emerging with regard to the supply and demand of liquid products in the UK.

The second episode of Terminals Talk, released over the summer, explores the connection between leadership and process safety, touching upon the work of the COMAH Strategic Forum, a high-level joint industry and regulator forum established in 2013 to improve major accident hazard leadership, management and raise standards across the industry.

Further episodes touching on the issues that matter the most to the terminals industry, will be released in the coming months.

Peter Davidson, Executive Director of the Tank Storage Association, said: *"Terminals Talk provides us with an opportunity to connect more widely with the bulk storage and energy infrastructure sector and beyond. 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. Our goal is to showcase the innovation and critical role of our sector, now and in the future. Terminals Talk addresses a different theme in each episode and features a range of experts who delve into topics such as resilience, sustainability, mental wellbeing in the sector, skills and much more."*

Terminals Talk is available on all major platforms, including Apple Podcasts and Spotify. It is also available on the Tank Storage Association's website: [www.tankstorage.org.uk/media-centre/podcasts](http://www.tankstorage.org.uk/media-centre/podcasts)

# DEALING WITH REGULATORY UNCERTAINTY IN HYDROGEN TECHNOLOGY DEPLOYMENT

Ian Travers, discusses regulatory uncertainty in hydrogen technology deployment and two groundbreaking OECD reports.

Ian Travers **Limited**

[Ian Travers, Process Safety Consultant, Ian Travers Limited](#)



Hydrogen is seen as a significant contributor to decarbonisation by offering a low carbon alternative to existing hydrocarbon fuels and a means to capture energy from renewables and utilise it when needed. However, hydrogen's reputation as dangerous precedes its deployment in the rapid technological roll out designed to meet national and global the carbon neutral policies and governmental CO<sub>2</sub> reduction targets. Societal risk aversion, in turn, can directly influence regulatory policy and practices which, if applied over cautiously, can disproportionately impede or prohibit deployment of energy transition technology compared to the currently accepted risks from hydrocarbon fuels.

Two new groundbreaking reports from the OECD tackle this issue head on and provide insights into the dilemma of balancing the risks from the impact of climate change against the risk from hydrogen-based technology within our communities by making recommendations to regulators on a sensible, proportionate and

risk-based approach to safety and environmental control.

The first report 'Understanding and Applying the Precautionary Principle in the Energy Transition'<sup>1</sup> examines how the precautionary principle can be used to support flexible decision-making by helping regulators and operators manage risk through positive action. The precautionary principle advocates giving the benefit of doubt to protection in the face of risk uncertainty, where there is a lack of scientific evidence on the hazards and the degree of harm which could arise if the hazard is not effectively controlled.

The report states: '*The precautionary principle envisages a scenario where a risk is known to exist, but its probability and magnitude of harm are uncertain or unknown. Now widely applied and with a global reach, the precautionary principle is often invoked whenever the scientific evidence surrounding the safety of a given technology is not conclusive. This report therefore strengthens the case that the precautionary principle supports – and is an important element of – risk-based regulation.*' The report advocates a sensible adoption of the precautionary principle when making regulatory choices. It concludes: '*Hydrogen has been in use for over a century, albeit mostly concentrated in industrial applications, and much is known about its physical behaviour, even though specific technologies used in the energy transition are largely*

*new. This means that safety issues are mostly understood and do not warrant excessive precaution.'*

This conclusion underpins the ambition that, in the face of the dramatic and global consequences of climate change, regulators need to adopt an enabling approach to hydrogen technology rather than take an overcautious stance. To paraphrase Ken Rivers, past President of the UK Petroleum Industry Association and past President of the Institution of Chemical Engineers, safety should not be a game of tennis between industry and regulators where the ball is constantly hit between the two sides, but should be the shared ambition of all parties working together, in alignment, to achieve a shared goal.

The second report 'Risk-based Regulatory Design for the Safe Use of Hydrogen'<sup>2</sup> analyses trends, risks, and regulation of hydrogen technologies across economies. It supports the use of low-emission hydrogen, as part of the energy transition, by making recommendations for effective risk-based regulation, regulatory delivery and governance.

This report is packed with scientific evidence and research on the risks associated with hydrogen and the global strategies being adopted around the world to ensure the safe transition to low carbon economies. It should be the 'handbook' for all regulators engaged in navigating through the maze of regulatory risk

decisions. The positive approach to grasping the regulatory challenges associated with hydrogen gives confidence that the perceived catastrophic risks from hydrogen are, in reality, no worse than, and in some cases less than, conventional fuels. It is just that now we have much more sophisticated tools to undertake risk analysis that were not available when gasoline and LPG, coal and fuel oil, were deployed on a mass scale.

The report underlines the point that *'a smooth deployment [of hydrogen] will require an enabling regulatory framework that is innovation-friendly, consistent, and agile, based on up-to-date evidence on actual risks'*.

The report, which was prepared at the request of the Dutch government, provides an in-depth analysis of the hazards, risks, accident histories, safety standards and regulatory approaches to five typical scenarios involving the deployment of hydrogen technology:

- Scenario 1 – Production: leakage from pipes connected to electrolyzers.
- Scenario 2 – Pipeline transport: leakage from high pressure pipeline.
- Scenario 3 – Road transport: hydrogen leakage in a confined space/ built environment.
- Scenario 4 – Mobility and partially confined spaces: examples of this scenario include a hydrogen city bus driving in a tunnel involved in a collision accident.

- Scenario 5 – Mobility and partially confined spaces: accidents at a hydrogen refuelling station.

The report draws six main conclusions:

- Advances in knowledge and technologies allow for a better management of hydrogen risks.
- Holistic risk assessments can ensure regulation effectively balances the multiple risks at stake.
- Additional caution should be applied where necessary and when risks are still largely unknown.
- Risk-focused regulatory delivery can reduce unnecessary regulatory burdens.
- Effective communication and guidance can support public trust and an enabling investment climate.
- Role clarity, effective co-ordination and sufficient resources can empower public institutions to keep pace with changes.

The report indicates that regulators are now much better equipped, through scientific knowledge and risk analysis tools, to make judgements about safe deployment of hydrogen compared with its predecessors. It should not be the case that, in the past, 'ignorance was bliss' in safety regulation of existing hydrocarbon fuels because we knew no better. We have learnt some painful lessons over the years about the safety of conventional hydrocarbon fuels



in their extraction, manufacture, distribution and storage, as illustrated by disasters such as Piper Alpha, BP Texas City, Buncefield and Deepwater Horizon. And there will be, sadly, more to come. It is just that we are familiar with these risks and accept that accidents and incidents are the cost some of us have to pay for continued widescale access to these energy sources.

The report pays particular attention to the default regulatory response to hazardous technologies and examines regulatory governance and delivery in the energy transition. It stresses that technological innovations often develop more quickly than the regulations that govern them, and this gives rise to a pacing problem, opening up gaps between the scope of regulations and the risk profile of the new technology.

Holistic risk assessments can ensure that the regulation of hydrogen also balances hydrogen's role in mitigating the risks of climate change. A proportionate approach by regulators is required, taking account of all benefits as well as risks. Regulatory strategies should not discriminate against hydrogen and demand higher levels of safety than is required of high-carbon, existing technologies.

Focusing on outcomes, rather than prescribing detailed procedures, can support efficient licensing, inspection and enforcement practices.

The key is ensuring effective regulation utilising adequate technical requirements, based on the latest research and technological advances, and supported

through well targeted, risk-based enforcement. An outcome-based approach is essential to permitting and licensing, focussing on both the objectives of the technology and its contribution to decarbonisation, as well as the risks. Licensing processes and conditions should be kept to the minimum, making procedures more proportionate and streamlined. Zoning policies should allow for the use of hydrogen in a risk-proportionate way.

To build trust and support investment, effective and open communication is essential. Accepting that there are risks associated with hydrogen, there are often large gaps between risk perceptions and science-based risk assessments. The report concludes that *'clear engagement and messaging on risks and safety measures can promote correct perceptions and build public support and trust for a transition to hydrogen. Clear guidance for zoning officials, permitting and inspection bodies, and one-stop shops can be used to facilitate hydrogen roll-out'*.

A lack of clarity on respective roles between authorities involved in regulating the risks from hydrogen is seen as an impediment to the effective implementation of hydrogen technology. Legislative frameworks should provide a clear mandate, powers and objectives for all authorities involved with hydrogen. It is essential that there is effective co-ordination across levels of government to strengthen regulatory co-operation and consistency. Furthermore, resourcing frameworks should be sufficiently agile to allow bodies to act on new mandates and recruit or develop necessary skills.

These two reports highlight the challenges involved in the effective deployment and regulation of hydrogen technologies needed to combat climate change. The insights and recommendations they contain provide the groundwork for regulators and industry to achieve a shared outcome of a proportionate and risk-based solution to the energy transition.

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1. OECD (2023). Understanding and Applying the Precautionary Principle in the Energy Transition. OECD Publishing, Paris <http://doi.org/10.1787/5b14362c-en>
2. OECD (2023). Risk-based Regulatory Design for the Safe Use of Hydrogen. OECD Publishing, Paris <http://doi.org/10.1787/46d2da5e-en>

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For more information, please visit [www.iantravers.co.uk](http://www.iantravers.co.uk)



## Tank Storage Association publishes 2023 Annual Review

The Tank Storage Association (TSA) has published its 2023 Annual Review of the UK's bulk storage and energy infrastructure sector. Published since 2015, the annual publication continues to provide a broad range of statistics and valuable insights on terminals, process safety, occupational health and safety as well as the industry's contribution to the UK economy.

In 2022, the bulk liquid storage sector generated £3.6 billion in revenue and planned investment over the next five years is estimated at over £732 million. The industry also employs around 8,540 highly skilled, specialised people. Through its skills base, training and technological expertise, the sector continues to work efficiently, effectively and safely.

TSA members operate 309 terminals across the UK and the Republic of Ireland, providing 10,220,015 m<sup>3</sup> of storage capacity for both hazardous and non-hazardous liquids. Twenty-two of these terminals are designated by the UK Government as Critical National Infrastructure (CNI) due to their importance in providing energy to industrial, transport and defence markets. In addition, storage capacity includes strategic reserves held for emergencies and supply disruptions. The vast majority of storage capacity is for oil and its derivatives, with chemicals having the second largest storage capacity and around 76,439 m<sup>3</sup> is for foodstuff and animal feed.

Depending upon the type and volume of products stored, the terminal may be regulated under the Control of Major Accident Hazards (COMAH) Regulations and designated as either upper or lower tier. Fifty-nine of the terminals operated by TSA's member companies are designated as COMAH upper tier and twenty-seven as COMAH lower tier.

Movement of material into or out of terminals is either by seagoing vessel, inland barge, road tanker, rail tanker or pipeline. TSA members safely execute over a million movements each year. By far, the greatest number of movements is carried out by road tanker. However, this is not representative of the volume of product moved. Whilst there are far fewer movements by ship - around 9,000 each year - than road tanker, the volume of product moved by sea going vessels is much higher. 2022 also saw an aggregated throughput of just 88 million tonnes, a ~3.5% increase from the previous year.

In addition, the tank storage sector continued to maintain very high standards of occupational safety during 2022, remaining one of the safest industries in the UK with proportionally fewer injuries than almost all other sectors.

For more information, please visit [www.tankstorage.org.uk/](http://www.tankstorage.org.uk/)

# COMAH STRATEGIC FORUM – BUILDING ON SUCCESS

**The CSF now has ten demonstrably successful years under its belt, and this is due to strong leadership and the willingness, enthusiasm and dedication of its ever-widening membership.**

Martyn Lyons, Managing Director,  
TR3 Consulting



The COMAH Strategic Forum (CSF), originally established in 2013, now has ten demonstrably successful years under its belt, and this is due to strong leadership and the willingness, enthusiasm and dedication of its ever-widening membership.

Back in 2013, the idea was to bring the Competent Authorities and 'chemicals sector' together to discuss matters of strategic importance in the management of major hazards. Since then, however, the remit of CSF has grown from a place of discussion to a place of decision and action, where strategic topics are decided and follow up action agreed. The forum provides a platform and framework within which the various bodies involved in managing major hazards in the UK can openly discuss, debate and agree objectives and prioritize action plans.

Key to its success has been the open and frank debate and discussions and the mature relationship that has developed over the years between Regulators and the regulated in

managing major hazards. The sharing of different experiences, insights and perspectives has undeniably led to better outcomes as well as mutual credibility and trust built up through delivery on promised action.

As the forum's influence has grown, so has its membership. The original Competent Authorities comprising, HSE, EA, SEPA and NRW, have now been joined by the Office for Nuclear Regulation (ONR). The major Trade Associations, in the sector, CIA, UKPIA, CBA and, of course, TSA, were joined by Liquid Gas UK and BCGA. The Unite union added a further dimension to the forum.

The scope has also widened beyond the 'chemicals sector' to embrace all onshore COMAH operators. At the present time, the forum's reach through the trade associations extends to about half of all UK onshore COMAH sites.

A key underpinning achievement was agreeing a vision for success that was shared by both the Competent Authorities and industry. This common vision provides clarity on what CSF aims to achieve and enables the forum to focus action on delivering those outcomes.

The "vision" was published in July 2015 and re-endorsed in 2018. The main points are:

- Thriving safe and sustainable sector with a regulatory regime that supports business growth,



- high standards and strong compliance
- Good COMAH performance is seen as good business
- Principles of Process Safety Leadership and lessons of Buncefield are embedded in way business manages major hazard risks
- Confidence is underpinned by greater transparency in public reporting and sharing learning
- Consistent good performance and evidence of continuous improvement results in earned recognition and proportionate regulatory scrutiny
- Standards and expectations are clear giving business certainty. Business holds itself to account
- Regulators operate in a joined-up way and adopt a consistent, risk based and proportionate approach

### What and where next

After seven years as the extremely successful and highly respected Chair of the CSF, Ken Rivers stood down and Gus Carroll was appointed as the new Chair in 2021. Quickly realising that CSF had been incredibly successful, the big question, recognising the comprehensive scope and magnitude of the work being conducted by the various CSF working groups, was what and where next.

A strategy workshop involving all CSF members was held in 2022 to discuss, debate and agree what was going well and where perhaps there were

areas that could be further enhanced. A comprehensive SWOT analysis was produced, leading to an agreement to conduct an independent strategic review of CSF.

### CSF strategic review

The scope of the independent strategic review was agreed. This would need to include, among others, a review of the governance and vision of the CSF taking due regard for the tripartite nature of the forum and the relationship between the forum and its working groups. It was also agreed for the review to contain recommendations focused on the robustness of decision-making and actions, including the composition of working groups and how work is delivered. In addition, the review would have to identify whether the CSF has the capacity to deliver on its commitments, primarily through the working group structure, and to ensure that its work plans are suitably prioritised. Finally, it was agreed for the review to place particular emphasis on ensuring the CSF maintains its original purpose, as set out in the CSF vision statement.

I was asked to undertake the independent strategic review and met with the CSF Steering Group in early 2023 to discuss and agree how to conduct it. A list of cross-sectional organisations, both from the CSF membership and from those organisations supporting and assisting CSF, was agreed as a representative sample for me to

discuss the scope of the review with and a defined question set, so as to provide structure to the ensuing discussions with each organisation. Following my discussions with selected organisations, I presented my final report to the CSF in May, which detailed my key findings, common themes and recommendations.

### Key findings and common themes

When interviewing the selected CSF member (and affiliated) organisations, it was clear that there were a number of common themes and views, as well as individual views, that members were keen to express.

For one, it is clear that the CSF is well liked and respected and is seen as an extremely valuable, 'safe' and collaborative forum for round table open discussion on COMAH related issues with Regulators and relevant stakeholders, where the relevant parties can be 'aligned but not joined'. And there is pride that the forum exists and that it has been running for some 10 years with demonstrable success achieved. There is also pride that this type of collaborative approach may not exist in other countries, while a particular benefit is seen in that the forum enables difficult issues to be discussed, even if the result is an agreement to disagree in certain areas. Members have also a good understanding of the objectives of CSF i.e. to provide assurance that the objectives of the COMAH regulations are met, Major Accident Hazards are managed such



that public relations, reputations, assets and people are protected, with continuous improvement in personal and process safety performance. And, in doing so, that regulation is proportionate and prioritised and industry is sustained, with priorities jointly agreed by Regulators and the regulated to achieve this.

Looking ahead, there is a strong desire for the CSF to continue to build on the success it has achieved. The Summer 2022 workshop recognized that a number of improvements should be considered to achieve this, including the CSF review. The 3 Cs (Coherent, Consistent and Capable) were agreed by most members as the correct themes to take the CSF forward for the next 1-5 years. There was, however, a suggestion that a 4<sup>th</sup> C - 'Collaboration' - could be included given the considerable value in the collaborative and collegiate way in which the CSF operates, enabling good professional relationships to be formed and maintained between

the people who represent the various organizations that are members of the Forum.

From the review, it is also clear that focus should be on both the 'here and now' in terms of COMAH and managing Major Accident Hazards (e.g. ageing assets, skills issues, repurposing of assets to cope with energy transition etc.), whilst also being aware of the impact of emerging technologies that will likely be regulated by COMAH. A targeted and prioritised approach to key initiatives was also seen as beneficial as the CSF look to the future, along with a focus on participation in Working Groups and on timely and targeted deliverables from these. In terms of collaboration and partnership, findings point to the benefit of engaging with other forums with regard to specific topic areas and initiatives. And, the need for renewed emphasis on communications and awareness of the important work of the CSF, both internally and externally, is evident.

## Recommendations

Based on the discussions I held with the 15 selected CSF member (and affiliated) organizations and the views they expressed, summarized above, my recommendations have been set out in four main areas, namely:

1. Organization, Structure and Governance
2. 'Focus and Prioritisation
3. Visibility
4. Widening the CSF membership

### 1. Organization, Structure and Governance

My recommendations under this key area include the establishment of an executive level steering group to oversee the CSF and provide direction and visible leadership to the Working Groups. The group would also be tasked to draft a Strategic Plan, to be reviewed yearly and to be shared, debated and agreed with input from all CSF members, incorporating a reviewed Vision Statement to cover the next 1-5 years of CSF, recognizing that 'growth' within CSF will continue to evolve, particularly in light of the energy transition, decarbonization and Net Zero. Recommendations in this area also include the need to focus on establishing collaborative links with other relevant forums to allow these forums, for example, to take on board non-COMAH (and therefore non-CSF) related issues and allow for useful exchanges on issues and technologies beyond the capability of CSF.



## 2. Focus and Prioritisation

My recommendations under this key area include an analysis of the number and effectiveness of all Working Groups, ensuring that they have and are completing targeted, deliverable outputs in a timely and efficient manner. In addition, the implementation of a review mechanism for all Working Groups to measure their effectiveness and success would be beneficial.

## 3. Visibility

In terms of visibility, my recommendations in this area focus on how best to communicate about the work of the CSF, both internally and externally, as well as widen outreach through, for example, a dedicated website, a newsletter for members and the CSF annual conference.

## 4. Widening the CSF membership

Currently, membership of CSF only covers approximately 50% of COMAH sites. Representation from other upper tier and lower tier COMAH sites would be beneficial to both the CSF and those not currently represented.

The above is the essence of the report I presented to the all-member CSF meeting in May 2023. My recommendations were debated, agreed and endorsed. An order of priority to tackle these recommendations was also agreed.

The CSF and its members will now work through and deliver on these,

whilst, of course, continuing with the valuable work of the CSF.

There is no doubt in my mind that the creation, evolution and the future of the CSF has been, and will continue to be, of enormous importance and significance to Regulators, the regulated and all relevant stakeholders - and consequently to society. I wish the CSF and its members every success in both their current and future activities.

### About the COMAH Strategic Forum

Established in 2013, the COMAH Strategic Forum is a high level joint industry and regulator forum working to improve major accident hazard leadership, management and raise standards across the industry. This joint forum provides industry and the Competent Authority (CA) with a means for strategic discussion on how they can work together to provide leadership and encourage continuous improvement in the inspection, management and control (including emergency preparedness and response) of major accident hazards across the onshore industries. The forum's partners engage collaboratively to identify and share best practice and, where necessary, to commission the development of new guidance.

You can engage with CSF through its annual 'open meetings'. The aim of the CSF Open Meetings is to "engage the unengaged". Its target audience is therefore operators of sites with

the potential to cause a major hazard accident but who are not affiliated with the current CSF member Trade Associations.

If your organisation is a member of an existing Process Safety Forum (PSF) trade association, you should contact them. A list of participating trade associations is available on the PSF website: [www.p-s-f2.org.uk](http://www.p-s-f2.org.uk)

The Tank Storage Association (TSA) is a member of the COMAH Strategic Forum.

### Author

Martyn Lyons is Managing Director of TR3 Consulting Ltd and has over 35 years of experience in the European Tank Storage Industry. He was formerly CEO of Inter Terminals Ltd and a past President of the Tank Storage Association (TSA). Following the Buncefield fire and explosion in 2005, he represented TSA on the Buncefield Standards Task Group and Process Safety Leadership Group. Martyn is a professional marine and mechanical engineer and is a member of the Institute of Marine Engineering, Science and Technology and a member of the International Institute of Risk and Safety Management.

# NATECH HAZARDS – HOW CAN WE EFFECTIVELY UNDERSTAND AND ASSESS THE RISKS?

As the frequency and severity of natural hazards increase due to climate change, it becomes crucial to effectively understand and assess the risk associated with NaTech events.



Natural Hazards Triggering Technological Accidents (NaTechs) lie at the intersection of the natural environment and industrial activities, potentially resulting in severe consequences for both human safety and the environment. As the frequency and severity of natural hazards increase due to climate change, it becomes crucial to effectively understand and assess the risk associated with NaTech events. By implementing proper safeguards and risk reduction strategies, industries and communities can mitigate potential disasters caused by these hazards.

## What is a NaTech Hazard?

Firstly, we must understand what is meant by the term 'natural hazard'. Natural hazards are extreme events that occur within the natural environment and pose a risk to society and/or the wider environment. In general, threats from these hazards are categorised between people, goods and environment. In certain scenarios, a domino effect can lead to a secondary hazard, for instance, an earthquake may trigger a landslide,

and in turn a volcanic eruption (e.g., the 1980 Mount St Helens eruption). The possibility of secondary hazards must be understood when responding to natural hazards.

The term NaTech refers to instances in which natural hazards initiate events which challenge the safety and operation at hazardous installations. An example of this would be loss of utilities, a significant risk associated with most natural hazards due to issues such as downed power lines, burst water/gas lines etc. This may impact a site's ability to operate normally and safely under these conditions. Any impact a natural hazard can have on a site which has the potential to impact the safe operation of the site is therefore considered a NaTech risk. So, how do we assess this risk?

## Understanding and Assessing the Risk

There is a series of questions we must ask ourselves when assessing NaTech risk:

- **What are the natural hazards of concern?** Only once you know where the risks are coming from can we begin to understand and plan for them.
- **What are the consequences of the natural hazard, both direct and indirect?** Direct consequences include situations such as physical loss of containment due to damage caused by the natural hazard. Indirect consequences are those





which can occur when the site itself is not impacted by the initial event. The consequences of natural hazards can impact a widespread area and can result in the loss of utilities or site access which may then have a knock-on effect at the site, e.g., due to loss of power, or water. By understanding these events, the risk picture can begin to form with sites understanding areas of vulnerability to natural hazards. It is also vital to ensure that any secondary hazards are identified as the design may be suitable for the primary hazard but not the secondary hazard.

- **What is the risk of this natural hazard?** – What is the possibility of the natural hazards you have discussed leading to a NaTech event? It is important to be aware of the likelihood of these events happening, though a low likelihood does not negate the need for sufficient measures to be implemented.
- **What safeguards are in place to mitigate the risk?** Any site handling hazardous substances should have safeguards in place covering a range of hazards. It is important to note that NaTech hazards may be responsible for the loss of multiple safeguards. Sites should understand the impact of NaTechs on the current safeguards and determine whether any safeguards are designed to be operational in the event of a NaTech incident.
- **What more can be done to reduce the risk?** Can any additional NaTech-specific safeguards be implemented? Not all barriers are designed to function in a NaTech event, so users should be cautious when crediting existing barriers.
- **An additional question to consider is the impact of Climate Change** - It is important that efforts are made to implement measures that will provide safety down the line, using climate change forecasts to determine what the risk may look like for the site in the future.

The topic is a complex one, extending much further than discussed here. RAS is contributing to efforts to tackle this issue and will be presenting a paper, *“NaTech Hazards – What are they? Why should we care? And what can we do?”* at IChemE’s Hazards 33 Process Safety Conference in Birmingham on Thursday 9<sup>th</sup> November.

For more information, please visit [www.ras.ltd.uk](http://www.ras.ltd.uk)

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# DECARBONISING THE INDUSTRY WITH INNOVATIVE TECHNOLOGIES

**Mobile emissions reduction services support the industry in the effort of emitting less greenhouse gas emissions and significantly lowering the carbon footprint.**

Kai Sievers, founder ENDEGS GmbH



The decarbonisation of industry is an important factor to contribute to environmental protection by reducing the global carbon footprint. Decarbonisation describes all measures to reduce the greenhouse gas (GHG) emissions that result from human activity. As they heavily impact environment as well as human health, it is important to lower the emission of GHGs like carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>). Economy and industry are still major causes for greenhouse gas emissions, although many actions have already been taken to reduce industrial emissions. Therefore, industrial decarbonisation is an important part of reaching environmental goals like climate neutrality by 2050.

Since 2007, ENDEGS helps industrial facilities to reduce their carbon footprint by offering a range of innovative and efficient emissions reduction technologies. ENDEGS services are environmentally-friendly, sustainable and efficiently destroy hydrocarbons as well as VOC and HAP emissions. In fact, we

have developed the first possibility for mobile degassing world-wide in 2008 and are today the only company operating in Europe that offers mobile incinerators capable of destroying all gases, gas mixtures and vapors of the explosion groups IIA, IIB and IIC with a combustion rate of more than 99.99 % and without open flame.

With over 1,600 successfully completed projects all around the world, ENDEGS is an expert in the effective reduction of industrial emissions – whether it is by degassing all types of tanks, containers, pipelines and vessels and other components or by temporarily replacing stationary vapor recovery systems. Furthermore, we offer a mobile vaporizer with nitrogen tank that enables the treatment of components that contain liquified gases under pressure like LNG, ammonia, propane or hydrogen with a high risk of inflaming and explosion as well as the rental of the ATEX Zone 0 robot that ensures a remote-controlled and safe cleaning of industrial tanks from a safe distance.

## **Significantly reduce your emissions with ENDEGS mobile degassing units**

Our mobile incinerators are an innovation in themselves and we constantly aim to improve them and expand their areas of application as the range of products used in the different industries changes quiet regularly and some of those substances are more complex to treat than conventional ones. Thus,

ENDEGS vapor combustion units are ideally suited for the emissions treatment of all common products that are applied in industries like oil, gas, chemical and petrochemical as well as the food and fertilizer industries.

Let's have a look at some of our successfully completed projects in the first part of 2023 to illustrate the advantages of applying ENDEGS mobile emissions reduction services. In a project in Germany, we have carried out the degassing of a gasoline storage tank with a volume of 4,000 m<sup>3</sup>. Venting the 1.2 tons of gasoline would have meant emitting a carbon dioxide equivalent of 96 tons, but by instead combusting the product we have saved CO<sub>2</sub>/e of 92 tons.

In another project in the Netherlands, we have degassed a crude oil tank with a volume of 40,000 m<sup>3</sup>. During this project, we have treated 10 tons of crude oil, combusting 33 tons of CO<sub>2</sub>. Had this amount been vented, it would have meant a CO<sub>2</sub> equivalent of 800 tons. But by instead combusting it with our mobile incinerators, we have saved 767 tons of CO<sub>2</sub>/e.

### **Temporary replacement of stationary emissions reduction systems helps to avoid shutdowns**

ENDEGS mobile vapor combustion units are also capable of temporarily replacing stationary emissions reduction systems such as vapor recovery units (VRU) during downtimes due to failure or

maintenance. This way, operations in the facility can keep going as usual or with only minimal interference and do not need to be shut down.

The example of a recent project in a refinery helps to understand the advantages of applying ENDEGS mobile incinerators for VRU replacements. During the 18 days project, we have treated 1.2 tons of gasoline and diesel per day and have combusted a total of 71.3 tons of CO<sub>2</sub>. Had it been vented, that would have meant a CO<sub>2</sub>/e of 1,728 tons – but by replacing the VRU with our mobile vapor combustion unit, we have saved a CO<sub>2</sub> equivalent of 1,657 tons.

### **Efficient degassing of vessels and ships**

Our mobile vapor combustion units are also perfectly suited for the degassing of vessels. In Duisport, the Port of Duisburg in Germany, ENDEGS created the first legal option for the environmentally friendly degassing of tankers in the Rhine. For this, we have also initiated a change in the legal provision in the ADN (international carriage of dangerous goods on inland waterways) and in various committees.

By degassing an inland gas tanker loaded with propane in a tank with a volume of 3,000 m<sup>3</sup>, we have for example combusted 79,596 tons of CO<sub>2</sub>, saving an CO<sub>2</sub> equivalence of 1,850 compared to a CO<sub>2</sub>/e of 1,929,60 would it have been vented. Another project we have carried out this year is

the degassing of a seagoing vessel in Amsterdam to prepare it for loading. Venting the 17,5 tons of naphtha would have meant a CO<sub>2</sub>/e of 7,008 tons – by instead combusting the naphtha with our mobile incinerators, we have saved a CO<sub>2</sub> equivalent of 6,718.92 tons.

As shown by these numbers, applying innovative services for the reduction of industrial emissions is a future driver for reaching the goal of net-zero by 2050 as well as for fulfilling ESG (environmental, social, and governance) criteria. Being aware of your emissions and caring for reducing them brings many advantages for industrial facilities, above all improved health and safety for employees and surroundings, better CO<sub>2</sub>/e footprint and a better ESG score.

Only together can we make a change and improve air quality.

For more information, please visit [www.endegs.com](http://www.endegs.com)



# TANK STORAGE - LEADING THE FIELD IN PROCESS SAFETY

The TSA recently published its Annual Review for 2022 and we, at Reynolds Training, were glad to see a clear emphasis on Process Safety and, particularly, in the role leadership plays in this.

John Reynolds, Managing Director,  
Reynolds Training Services



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he TSA recently published its Annual Review for 2022 and we, at Reynolds Training, were glad to see a clear emphasis on Process Safety and, particularly, in the role Leadership plays in this.

This reasserts the importance of Process Safety Leadership underpinning the importance of the Leadership Charter launched in 2020. As we know, the TSA continues to preside over the Process Safety Leadership Working Group of the COMAH Strategic Forum, which embraces and promotes the principles of Process Safety with particular emphasis on the important role of leadership.

As the TSA's Annual Report makes clear, the levels of Process Safety performance are very good in our industry, but complacency and too much self-confidence could very quickly change that, so we have to remain vigilant. Something we are, thankfully, very good at.

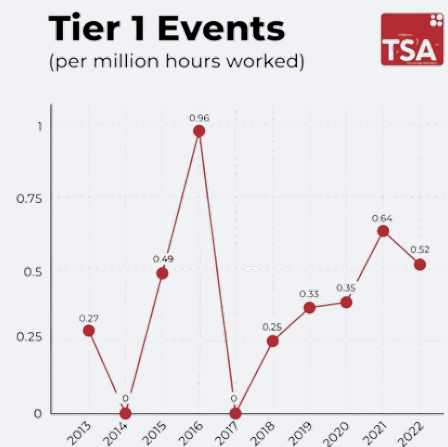
To help the entire industry maintain

these levels, the TSA collates information about incidents and shares them through its network. Accurate reporting - and I can't stress the 'accurate' part of that enough - helps us all to monitor and compare our performance and throws the spotlight onto potential emerging issues. That's in everyone's interest!

## Tier 1 Events

Tier 1 events are those which result in a significant loss of containment of a hazardous substance. There were just two such events reported to the TSA in the whole of 2022, demonstrating that, in the vast majority of cases, our vigilance and process safety measures are working well.

**Tier 1 Events**  
(per million hours worked)



Any loss of containment events at a tank storage facility are a cause for concern, so the TSA also runs their Significant Indicators programme to collect data on barrier failures - because barriers are crucial to well-managed and effective Process Safety.

The creation and maintenance of any Process Safety plan cannot be left as the sole preserve of safety specialists within an organisation. It involves the entirety of the Plant, all the People and the entire Process.

Embedding best practice is something that needs to take place within every tier of a business and an important tenet of effective Process Safety Leadership is that this commitment has to come from the top.

### The Role of Barriers

When the HSE issued their booklet entitled 'The Major Hazard Regulatory Model', they provided an overview of Hazard Management which they termed 'The Big Picture'. The five key areas of The Big Picture begin with Leadership and the priority of control measures and barriers:

1. **Leadership** incorporates in-depth knowledge of plant, process and people in designing Major Hazard Control Measures or Barriers that can be deployed to prevent and mitigate against loss of containment. More on these Barriers later.
2. We need to identify the **hazards**. This is critical, if your Process Safety systems don't identify the hazards (and potential hazards), you cannot assess the risk or control it.
3. Assess the **risks**. This includes looking at 'Challenges to Integrity', the consequences of any loss of containment and the probability of it occurring. Using this sort of

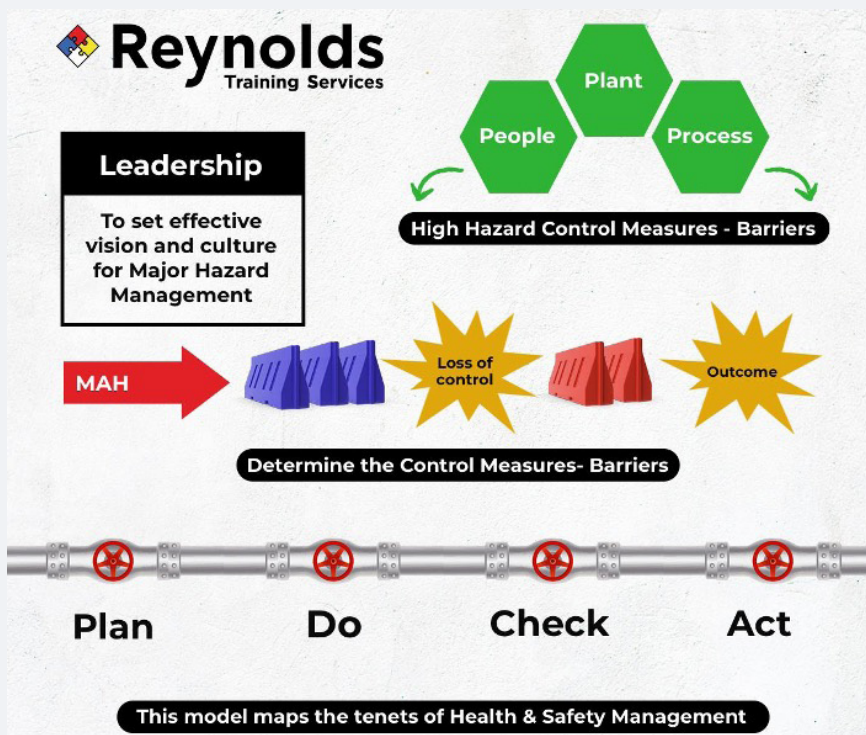
information, it's possible to create a Risk Profile for the task.

4. Creating suitable **Control Barriers**. These Barriers will require the consolidation of contributions from across the plant, throughout the process and all of the people. If everyone follows the Hazard Regulatory Model at every level and at every stage, then the probability of an event is at its lowest.
5. **Checking, Measuring and Reviewing**. This final stage helps of it occurring. Using this sort of information, it's possible to create barriers are working as intended, that any new developments are incorporated and that any failures or incidents are fully investigated.

### The Role of Leadership

Leadership should be empowering. It should set an effective vision and culture for Process Safety, in which everyone takes ownership of their own responsibilities to themselves, each other, their employer and wider environment. Leadership plays a critical and very specific role in the prevention of catastrophic failures. The challenge for organisations is defining what they need from leaders to produce Process Safety excellence. There are four Essential Competencies to ensure the success of this effective Process Safety Leadership, namely:

1. Have the conviction to lead safely
2. Understand how Process Safety works
3. Develop the ability to influence and encourage people



4. Retain and practise good leadership skills

Supervision must also be integral to the development, implementation and maintenance of good internal Process Safety Management. Supervisors need to communicate clearly and frequently with people throughout your process, including from Operations, Maintenance, Management and any External Stakeholders to ensure that Process Safety objectives are established, measured and reported.

Supervisors need to:

- Influence the training and competency of staff.
- Delegate Process Safety tasks and track performance.
- Be responsible for Process Safety KPIs
- Ensure review of the Process Safety programme.
- Influence and educate other

departments and leaders to ensure program requirements are met.

So, as you see, effective leadership in Process Safety Management requires a never-ending and methodical approach; it requires the engagement of everyone on-site, from the cleaning cupboard right up to the board room; it requires businesses to be open and honest and to share best practice.

**Safety Doesn't Happen by Accident**

As the figures in the TSA Annual Report demonstrate, we, in the Bulk Storage sector, are clearly very good at maintaining these rigorous standards - which speaks volumes about the quality of leadership in our sector, as well as the commitment of staff at every level.

And, what's more, as the HSE RIDDOR figures the report shares show us - compared to other business sectors

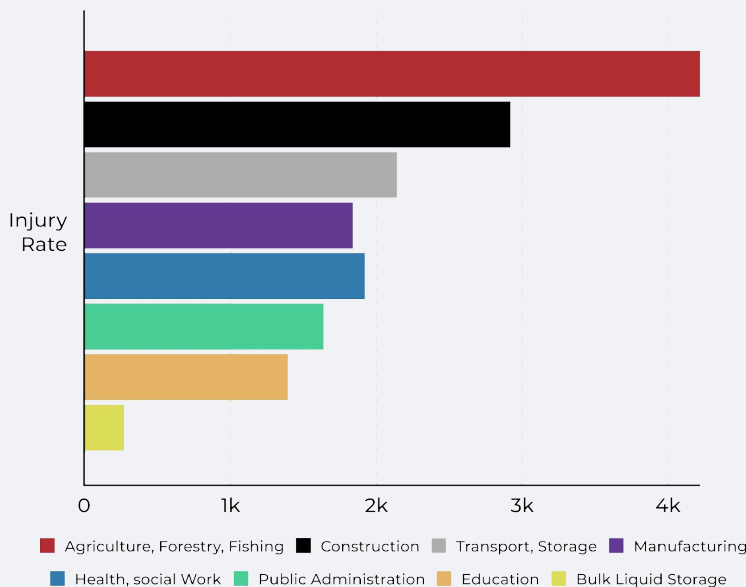
- we are maintaining very highest standards of occupational safety. Meaning that bulk storage remains one of the safest industries in the UK.

This level of professionalism and commitment is what we try to instil in all of our learners here at Reynolds Training. Everyone on site is responsible for the health and safety of themselves and the workers around them. We are committed to preparing our learners to enjoy a long and safe career working in our industry. That's why we built the NCPM, which is the UK's first fully-operational bulk liquid training facility, while learners can step into a 3D world with Virtual Reynolds.

These are just the latest developments in our mission to give learners the knowledge, skills and experience they need to continue the great work of keeping the bulk liquids flowing through the infrastructure of our country, in a safe, efficient and profitable way.

If you're interested in these training developments, you can learn more at our new website: [www.reynoldstraining.com](http://www.reynoldstraining.com)

**Workplace injury rate** (per 100,000 workers)







## Hazchem Safety announces investment in warehouse expansion

Hazchem Safety, a leading provider of safety solutions and personal protective equipment (PPE), has announced its expansion with a significant seven-figure investment in a new state-of-the-art building in Buckingham, England, solidifying its commitment to meeting the evolving needs of its customers and accommodating future growth. The new facility sees a significant increase in square footage, effectively doubling both the warehouse and office space. The warehouse has expanded from 11,000 square feet to 30,000 square feet, allowing Hazchem Safety to store up to £5 million worth of stock. This substantial expansion ensures that the company can cater to a larger volume of customers, while significantly reducing stock-outs and improving lead times.

Marlon Douglass, Sales Manager, Hazchem Safety, said: *"We are excited to unveil our expanded premises, which represents a significant milestone in Hazchem Safety's journey. The increased warehouse space and stockholding capacity will enable us to meet the growing demands of our customers, improve our operational efficiency, and ensure an even higher level of service excellence. It is a key part of our business growth as it allows Hazchem to take on new larger contracts as we support our customers that require a greater volume of PPE solutions for their employees."* The warehouse expansion not only facilitates increased stock capacity but also

opens up opportunities for additional growth in the southern region by over 100%, with the capability to cater to new contracts from large energy companies. The new facility allows Hazchem Safety to double its current stock holding over time, positioning the company as a leading supplier in the industry. In addition to the enhanced warehousing capabilities, the expanded premises include a spacious showroom and meeting room, designed to provide a customer-centric environment.

Customers can now visit Hazchem Safety's southern premises to explore a wide range of PPE solutions, view samples, and collaborate with the company's expert team to design bespoke garments. This investment in a dedicated space reflects Hazchem Safety's commitment to providing exceptional customer service and ensuring that clients have access to the latest safety innovations. Hazchem Safety, with offices and distribution sites in Aberdeen and Brackley, was founded in 1978 and has grown to be the UK's leading supplier of workwear and PPE for hazardous environments within the energy sector. Hazchem offers its own range of ORKA® Technical Workwear – a range of flame retardant and hi-vis workwear designed for the offshore oil and gas industries and its HAZTEC® technical workwear brand. Its original ORKA® Magnus overall is a best seller and industry benchmark and all products are available through its UK sites and trade counter in Dyce, Aberdeen.



# UM TERMINALS ENHANCES ENGINEERING CAPABILITY

**UM Terminals has expanded its engineering capability as part of the company's wider strategic growth plans.**



[Phil McEvoy, Managing Director,  
UM Terminals](#)



UM Terminals has expanded its engineering capability as part of the company's wider strategic growth plans. The additional competency within the business means that it can now manage over 80 per cent of its asset integrity inspections and assessments. The new in-house capability includes:

- Non-Destructive testing
- PCN L2 Ultrasonic testing, MPI and DPI
- EEMUA 159, API 653, API 570 assessors
- Rope Access
- Shotblasting & weld preparation
- Scaffolding
- Insulation
- Small civil works

As part of the business's ongoing investment in IT, it has developed its own bespoke software package that can manage all aspects of task management of integrity inspections. The software package provides mobile working for UM's technicians so that data can be inputted live into the system, while integrity performance KPIs are also updated and can be

viewed in real-time in dashboard format. UM Terminals maintains a broad portfolio of around 40 products that it stores including vegetable oils, industrial, food and feed, chemical, fertiliser, fuels, biofuels and base oils. It achieves this operating out of 8 terminals, strategically located across the UK, with 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. Value-added services include biofuel feedstock pre-treatment, blending, water dilution, product packing, HMRC bonded warehouse and COMAH compliance.

UM Terminals has also increased its project team to enhance its ability to solve complex problems for customers through engineering design and quick turnaround of projects. This is an important contributory factor in the decision of many of UM Terminals' customers choosing it as its bulk liquid storage partner.

The handling of Hydrotreated Vegetable Oils (HVOs) is an increasingly important part of UM Terminals' business. It is the most popular renewable liquid fuel of choice as it is a drop-in replacement for mineral diesel. A key driver for the growing interest in HVOs is the looming 2030 deadline for the phasing out of new diesel vehicles and the UK government's 2050 target to reach net-zero carbon.

Phil McEvoy, UM Terminals' Managing Director, said: "UM differentiates itself by reacting quickly to customer enquiries and we pride ourselves on engineering solutions to difficult and complex challenges presented to us by our customers. This fast and efficient approach makes UM terminals very easy to do business with and provides an advantage within the tank storage market. We are committed to ongoing investment and enhancements to the range of services and solutions available to our customers. The recent investment in growing our engineering and project capability is a prime example of this in action. The investment is in two principal areas, firstly recruiting the additional personnel and expertise that enable us to continue to meet and exceed the expectations of our customers, and, secondly, we also continue to develop our IT and software capability, a key part of which is giving our teams and our customers access to real-time data that drives continuous business improvement."

#### **About UM Terminals**

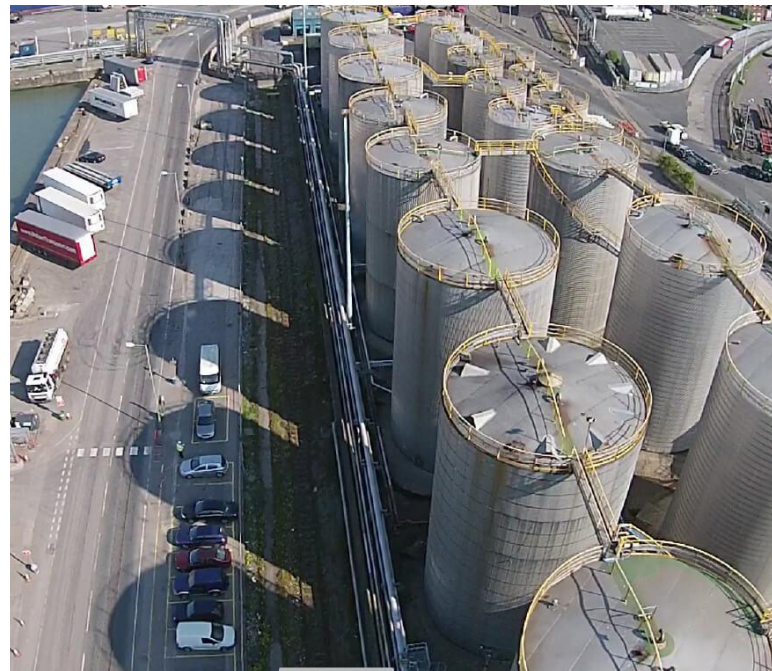
UM Terminals is part of the United Molasses Group. The Group's other services include the international trading of molasses, the sales and distribution of molasses and the procurement and marketing of vegetable oils for use in the animal feed industry.

For more information, please visit [www.umterminals.co.uk](http://www.umterminals.co.uk)

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# The voice of the bulk storage and energy infrastructure sector



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