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Risk to PTFE as PFAS come under scrutiny

Proposed restrictions on so-called 'forever chemicals' could have serious consequences for the dangerous goods logistics industry.

The European Chemicals Agency (ECHA) is considering a REACH proposal to limit risks to the environment and human health that might result from the manufacture and use of perfluoroalkyl and polyfluoroalkyl substances (PFAS).

PFAS are a class of about 4,700 synthetic chemicals that are widely used in everyday products. But of concern to bulk logistics stakeholders is one particular product in this class; polytetrafluoroethylene (PTFE).

PTFE is a thermoplastic polymer used in the manufacture of vital safety components for tank containers and road tankers, for example, in O-rings, seals and gaskets. PTFE has steadily replaced asbestos thanks to its significantly tighter seal and chemical resistance.

The polymer has one of the lowest coefficients of friction of any known solid material, which makes it an excellent choice in applications that require anti-stick properties or those that are sensitive to wear. Teflon coating for cookware is probably its best known application. PTFE also shows a high resistance to temperature, chemicals and even radiance, as well as having a high impact strength.

However, PFAS have earned the moniker 'forever chemicals' because they do not break down, instead accumulating in the environment and in human bodies.

All PFAS are highly persistent in the environment. Consequently, as long as PFAS continue to be released to the environment, humans and other species will be exposed to ever greater concentrations.

There is currently no equivalent alternative to PTFE for seals and other critical components

Even if all releases of PFAS ceased tomorrow, they would continue to be present in the environment for generations to come.

Their release and mobility in water and air causes contamination to groundwater and drinking water. Certain PFAS are known to accumulate in living things and cause toxic effects. Certain products are toxic for reproduction and can harm the development of foetuses. Several PFAS are believed to be carcinogenic in humans, while some are also suspected of interfering with the human endocrine system.

A group of European countries - Germany, Netherlands, Norway, Sweden, and Denmark – originally proposed a joint REACH restriction to limit the manufacture and use of PFAS, and this is now in its consultation process.

ITCO said a ban on the use of PTFE and other similar materials would have "serious consequences for the safe transport of dangerous goods". The material's superior properties, in terms of seal and chemical resistance, mean that no equivalent alternative currently exists.

Concerned parties are being strongly advised to respond to the ECHA consultation that will close probably in July 2022. Environmentally sound recycling is also to be encouraged.

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Peak season could be worse than 2021

This year's summer peak season cargo surge will be even more chaotic for global supply chains than the 2021 peak shipping season, according to forwarders, traders and shippers surveyed by Container xChange.

The container logistics technology outfit said in its latest survey that 51 percent of respondents expect the 2022 peak season to be "worse" than last year. Some 26 percent predicted this year's peak season would be less chaotic than in 2021, while 22 percent expect the level of "chaos" to be the same.

The peak container shipping season traditionally occurs in the third quarter of each year as retailers build up inventories ahead of the fourth quarter holiday and shopping season. Last year, cargo surges resulted in record container shipping freight rates, delivery delays, port congestion, and reliability of container shipping services.

In terms of container sourcing strategy in 2022 when compared to pre-pandemic times, 56 percent said they had been "growing networks", 38 percent said they had agreed to long-term contracts and 25 percent said they had followed a multi-tender strategy.

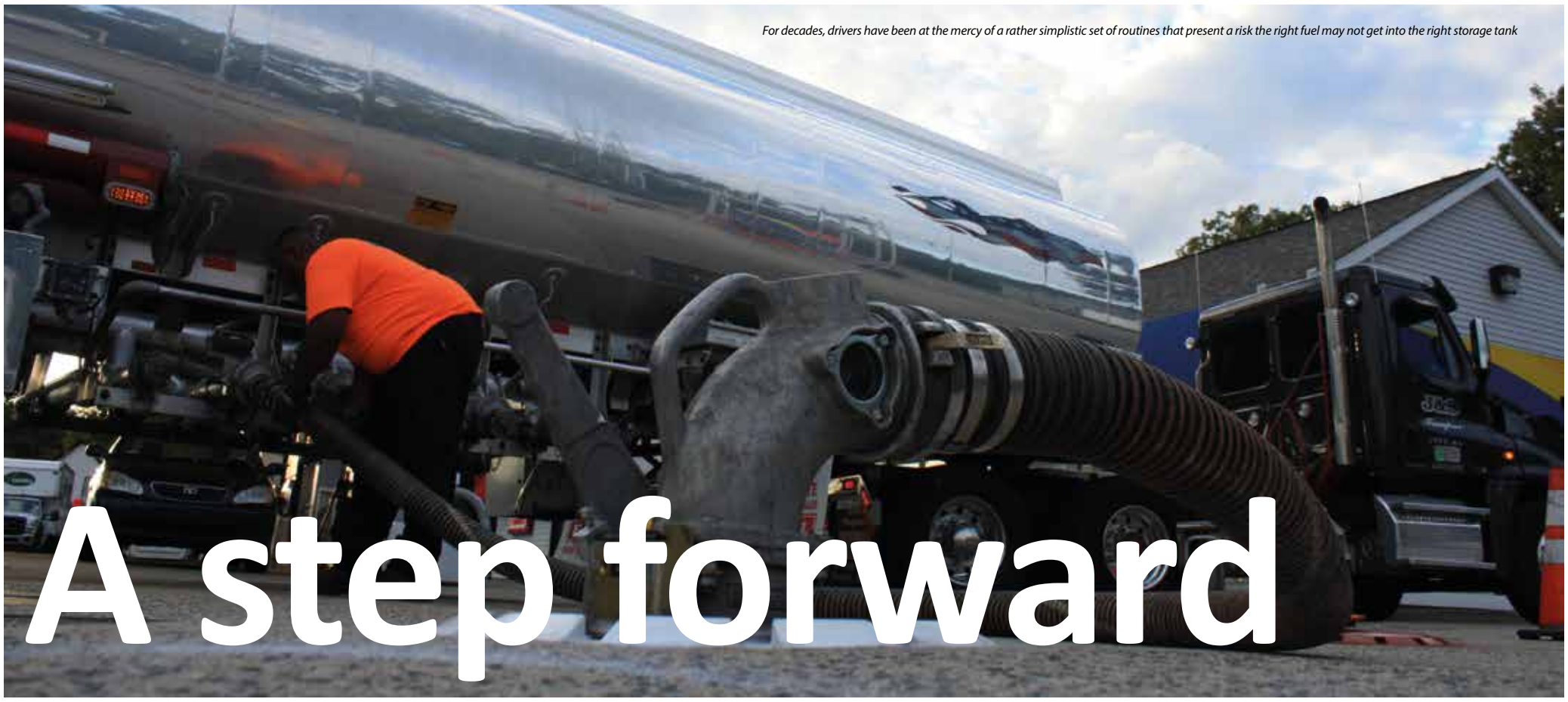
Nearly 38 percent of respondents said they were ensuring clients received enough inventory by shipping early in 2022, while 25 percent were "using alternative shipment routes" and just under 19 percent were contracting long-term slot agreements with carriers.

Surprisingly, 62.5 percent said they were still relying on the spot market or doing nothing specific to ensure shipments reach clients.

Meanwhile, Covid lockdowns in China continue to weigh heavily on trade. Fifty-eight percent of respondents reported that Covid lockdowns in China had made it "hard to produce/ship as much product as planned", suggesting that cargo backlogs and unsatisfied demand are building as China's zero-Covid strategy limits exports to Europe and the US.

Christian Roeloffs, co-founder and CEO, of Container xChange, said one big question is whether China is going to sacrifice its zero Covid-19 policy to get trade and its economy moving again.

"If it does, then there's every sign that we'll see a substantial surge as backlogs of exports are shipped," he commented. "However, there are very few indicators so far that President Xi is willing to compromise health policy to boost trade."



For decades, drivers have been at the mercy of a rather simplistic set of routines that present a risk the right fuel may not get into the right storage tank

A step forward

Next-generation digital tank monitoring systems provide fleet managers and their drivers with improved visibility into their loading/unloading operations, writes Mark Dudley

Managers of fuel-transport fleets and vehicle drivers are among the more significant lynchpins within the global economy.

They unfailingly perform their jobs 24/7, crisscrossing the globe to deliver motor fuels to retail- and commercial-fuelling locations so that the world's drivers can keep their vehicles fuelled and operational.

Imagine how well those fleet drivers would be able to do their jobs if they had the most up-to-date digital tank monitoring technology at their disposal.

Fuel-transport drivers, while extremely conscientious about performing their jobs well, are also human and at potential risk of unintentionally committing errors during a fuel drop. For decades, they have been at the mercy of a rather simplistic set of routines that present a risk the right fuel may not get into the right storage tank every time.

For instance, many fuel-delivery companies have adopted a 'diesel first' approach to unloading a fuel trailer, meaning that the driver is expected to fill the diesel tank first. An 'advancement' in this area occurred with the invention of manually adjustable product-grade indicators (PGIs) that listed diesel, regular gasoline, E85, etc, for the different compartments on the transport, with the driver tasked with resetting the PGI, if necessary, after each new load of fuel was acquired or dropped.

The overriding shortcoming of these outdated manual and analogue-based methods is easy to identify: a rushed driver forgets to unload diesel first or reset the truck's PGIs, which can lead to a whole host of time- and cost-intensive complications down the road.

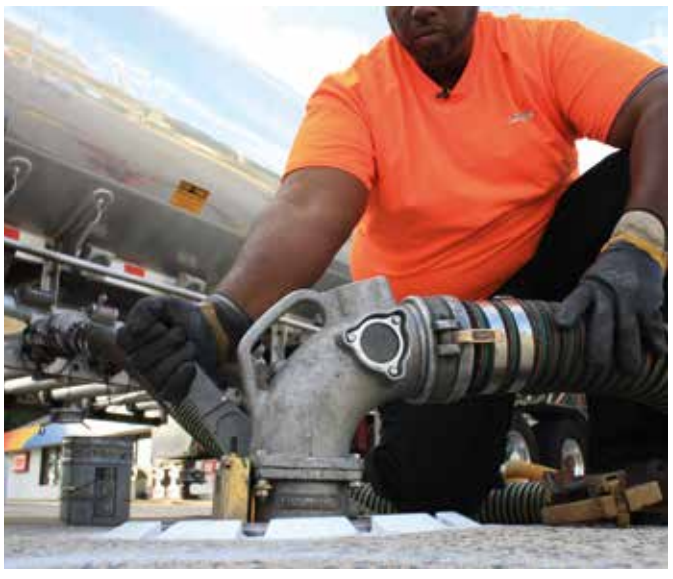
However, recent advancements in the utilisation of digital smart tank monitoring technologies can give fuel-delivery drivers and fleet managers the ability to take advantage of next-generation user interface and wireless communication technology. This digitally engineered tank ecosystem integrates all fuel delivery functions, controls, security, diagnostics and usage history, while significantly mitigating the risk for human error to occur during a delivery.

Know your opponents

Studies of the fuel-transport business have discovered that there are six common loading or unloading risks that can occur at the fuelling site or loading rack. Let's take a closer look at the causes and effects of each:

- **Wrong product loaded into the wrong storage tank:** This occurs most often when a usually conscientious, but oftentimes rushed, driver unloads the wrong trailer compartment into the wrong storage tank, especially if the product-grade markings are unclear. The result is site shutdown while the contaminated fuel is removed and replaced, which is cost-prohibitive for both the site operator and delivery company.
- **Wrong product loaded into wrong trailer compartment:** This is the inverse of the first error, but can have the same deleterious consequences for both the site operator and delivery company: site shutdown and expensive cleanup, maintenance and disposal costs. A delivery company that develops a reputation for regularly being the victim of fuel mis-drops is one that probably won't be in business for very long.
- **Compartment loaded with contaminated fuel at terminal:** This error takes place when a malfunction occurs in the terminal's loading system or if there is an incomplete cleanout of the loading system's hoses, elbows and adaptors. If this fouled fuel makes it to the retail site, a revenue-robbing shutdown is likely to occur, along with the potential for contaminated fuel reaching a customer's fuel tank, which brings with it a whole new set of headaches for the retailer.
- **Product retain results in mixed product:** A series of factors can lead to this error occurring, including unplanned loss of air pressure on the trailer; an uneven parking surface that can cause fuel to be left in the compartment; the driver forgets to unload a compartment; and the driver halts the unloading process too soon. Occurrences like these are harder to detect with analogue tank monitoring systems, or by the performance of a manual 'bucket test' at the conclusion of the unloading process.
- **Fuel retain results in disputed delivery amount:** Everyone wants to get what they pay for, but if the delivery process is dogged by fuel-retain errors, then the retailer can rightly question if the listed amount of fuel on the bill of lading has actually found itself into the storage tanks. Again, if disputed deliveries happen too often – especially with the same customer – the success of the delivery business can be put in peril.
- **Fuel retain results in overfill condition:** Product overfills can be dangerous and costly, so they must be avoided at all costs. Once again, fuel retain is most often the culprit here, with fuel-compartment retain probes able to mitigate the problem, but studies showing that they are installed on only 20 percent of fuel transports in the United States.

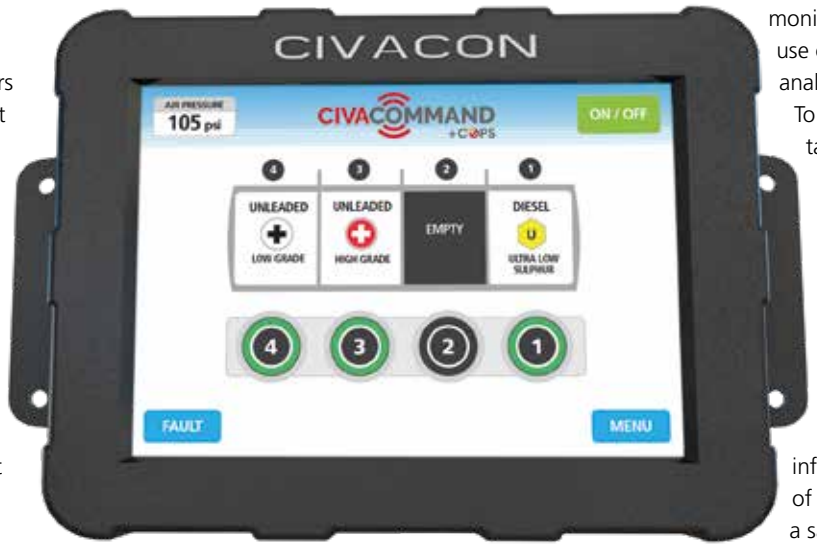
While the truth is that many of these errors only happen in extremely rare cases, the fact remains that the next error may be lurking at the next fuel drop. Transport drivers have done tremendous work in preventing these errors from occurring, but they remain at the mercy of loading and unloading conditions that are often out of their control – at least to the point where they need to rely on less-reliable manual and analogue tank monitoring systems.



Fleet companies and their drivers are an integral part of the motor-fuel supply chain

To the rescue

Knowing the stress that fuel-transport fleets and their drivers can be put under to meet strict delivery schedules, while also ensuring that the right fuel and amount goes into the right tank 100 percent of the time, the developers and manufacturers of tank monitoring equipment and systems have looked for ways to incorporate cutting edge digital technologies into their products. One recent notable example where this is the case is the new CivaCommand Smart Tank System from Civacon, based in Hamilton, Ohio, USA.



Civacon CivaCommand uses wireless communication and digital monitoring to put important delivery information at the fingertips of the driver

The fulcrum of these systems is easy-to-use digital tank monitoring technology that features an easy-to-read graphic touchscreen display that communicates wirelessly with the trailer's fuel-delivery and operation-monitoring components. The touchscreen display, which is securely activated by the driver – even while wearing gloves – via a unique user ID and PIN, consolidates access to the many different control systems on a fuel trailer, including fuel retain, overfill control, on-board monitoring, pneumatic (air pressure) control, product-crossover prevention, system troubleshooting and usage history.

The digital technology enables the system to predict or prevent non-permissive readings, which lets the driver know that the loading process will proceed uninterrupted. The system also provides automatic digital overfill prevention through built-in fault logs that automatically control the valves during all loading and unloading activities.

The system enters delivery mode only after a proper connection between the trailer and storage tank is achieved. Loading only begins if the driver has full permit status, meaning that all vapour connections, overfill components and grounding devices are safely connected and ready for operation. Wireless RFID technology lets the driver undeniably know which product is being loaded into each compartment, with the system halting any delivery operation in which the wrong fuel is being dropped into the wrong tank.

If an incorrect truck-to-tank connection is attempted, the trailer's valves will not open and the delivery will be unable to commence. This eliminates the chance that costly cross-drops and ensuing fuel contamination will occur. Then, the delivery process concludes only when the compartment is completely empty, removing fuel retain from the equation. When the tank compartment is completely empty, the touchscreen notifies the driver that all hoses, elbows and adaptors can be safely disconnected.

The system has been designed to store all of the driver and trailer's historical usage data and information in one location that is accessible on the touchscreen interface. Among the useful stored data includes Fault Logs that, for instance, will indicate how many times potential retain conditions were thwarted, and Equipment Device Status Logs for all elbows, probes, sockets and grounding equipment that are used during a fuel drop. The system's Asset Manager will store and organise performance data, such as total trailer flow time average, non-flow time average and total delivery time average, along with site and driver efficiency reports, which can help fleet managers build a more streamlined delivery process for their drivers.

Conclusion

Fleet companies and their drivers are an integral part of the motor-fuel supply chain – and they all want to perform their jobs to the best of their abilities. In the past, drivers have at times been hamstrung in the pursuit of delivery optimisation by conditions at the fuelling site or loading rack that may affect accurate or reliable monitoring and requiring the use of outdated manual or analogue technologies.

To the rescue comes new tank monitoring technology – such as the Civacon CivaCommand Smart Tank System – that uses wireless communication technology and highly engineered digital monitoring systems to put important delivery information at the fingertips of the driver. This results in a safer, more efficient and reliable delivery process that benefits fleet managers, retail fuellers and, ultimately, the millions of drivers who rely on motor fuels to keep their vehicles running every day.

www.civacon.com

Mark Dudley works for Civacon, based in Hamilton, OH, and has 15 years' experience in the fuel transport industry

The system's Asset Manager can help fleet managers build a more streamlined delivery process for their drivers

Fort Vale's new valve

Fort Vale's new DN100 ball valve is for use on tank containers, road tankers and rail cars.

The 4ins ball is manufactured in 316-grade stainless steel, uses a contained seal carrier design for improved sealing and operational performance and has an MAWP of 16 bar, with an operating temperature range from -40degC to +200degC.

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