THE RIGHT STUFF

LOADING • CIVACON HAS LAUNCHED A NEW SYSTEM TO HELP PREVENT PRODUCT CONTAMINATION DURING THE LOADING PROCESS, AS RANDY ROBINSON* EXPLAINS

FUEL TERMINALS ARE beehives of activity – large plots of land criss-crossed by tank trucks and trailers that queue up at loading racks among towering aboveground storage tanks (ASTs). In the course of a year, thousands of trucks will load and unload millions of gallons of varying types of fuel (several grades of gasoline, diesel, biofuels, jet fuel, etc) for customers in the surrounding market.

This delicate ballet of give and take requires strict tracking of the types and volumes of fuels that are arriving and departing. This means that any mixup in the type of fuel that finds its way into specific ASTs or fuel-delivery trailers cannot be tolerated, lest the recipient of the fuel delivery has cause for concern.

Unfortunately, people play a leading role in ensuring that the right fuel finds its way into the right delivery truck in the most time-sensitive way, and, as we all know, human error is always lurking. People are susceptible to committing errors that can leave the integrity of the fuel-supply process in doubt. In fact, the average fuel trailer will be involved in more than 3,600 fuel deliveries per year, creating plenty of opportunities for any number of fuel-delivery issues to arise. With the average trailer having four fuel compartments, there are at least 14,400 annual opportunities per trailer for a failure to occur.

With these figures in mind, what can terminal operators do to ensure that their fuel-loading processes do not result in the wrong fuel ending up in the wrong compartment?

IDENTIFYING ERRORS

When considering fuel-transfer errors at terminals, there are four that stand out, two involving cross-contamination. The most common cause is when a rushed or distracted driver connects the wrong loading arm to the wrong trailer compartment. The chances that this error will occur increase if there are unclear or incorrect product-type markings at the loading rack. In analysing historic delivery data, 1 in 73,000 deliveries is compromised by unintended mixing of gasoline octanes, while one in 182,500 deliveries will feature an instance where gasoline will find its way into a diesel compartment, or vice versa.

The ultimate effect of these types of cross-contamination errors will be the shutdown of fuelling services for several hours at the retail site as the fouled fuel is removed, the storage tank is cleaned and a new batch of fuel is delivered. The site operator incurs unplanned maintenance costs, and loses revenue while the site is shut down. In a worst-case scenario, before the delivery error is discovered, some of the fouled fuel may make its way into vehicles, which can lead to damage to the vehicle's fuelling system.

A common safeguard against these types of fuel mixups is having the driver adhere to a diesel-first unloading regime so that a repeatable routine is established. However, this routine can be thrown off if the driver is rushed or working at a terminal where product types are not clearly marked at the loading rack.

Similar mixups can occur earlier in the process. Terminal operators must take great care that the fuel they receive from their suppliers is transferred into the correct AST. There are instances, though they are relatively rare, where fuel cross-contamination in the AST does occur. Analysis shows that affects about one in every 365,000 fuel-trailer loads. In addition to an incorrect fuel drop, the error can also arise due to a malfunction in the terminal's loading system, or if there is an incomplete cleanout or purge of the loading equipment (hose, elbows, adaptors, etc).

If this contaminated fuel makes its way to the fuelling site, the same harmful effects can be experienced: revenue-robbing site shutdown, cost-prohibitive cleanup and maintenance and potential vehicle damage. In this scenario, the fuel-trailer driver is at the mercy of the terminal, with no recourse but to trust that the information on the bill of lading from the terminal is accurate and that the proper product has been loaded.

ERRORS IN THE TERMINAL

Busy terminals feature lines of trucks patiently waiting in line to access the loading racks. Imagine the frustration, then, when a driver gets to the rack (or is forced to wait longer because other drivers encounter a problematic situation) and gets a non-permissive indication on the terminal's rack monitor. Non-permissive readings can cover a wide range of occurrences, from an inability to achieve a proper static ground to an overfill detection warning – and all of them prevent the loading process from commencing. If the driver cannot easily determine what is causing the non-permissive reading, the driver has to exit the line and either attempt to make a self-diagnosis or call the service department.

'Fuel retains' occur when the truck's tank-monitoring system indicates that one of its product tanks is empty when it really isn't. Product retains create a major safety concern for terminals as a product overfill or cross-contamination may occur. In both instances, the safety and integrity of the fuelling process is compromised, with injuries, environmental damage and vehicle damage among the unpleasant consequences.

MAKING MISTAKES GO AWAY

With the stakes being so high for both the terminal operator and fuel-delivery company, every effort must be made to ensure a seamless fuel-delivery process from both a product and loading-time standpoint. There is now a cutting-edge solution available to answer these challenges.

It can be found in the form of a highly engineered, easy-to-use 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. Through the touchscreen display, the system consolidates the driver's access to the many different control systems on a fuel trailer – including overfill control, on-board monitoring, pneumatic (air pressure) control, product crossover prevention, system troubleshooting and usage history.

The system also has the capability to predict or prevent non-permissive readings, which lets the driver confidently know that the loading process will proceed uninterrupted. This helps cut wait times, which is a huge plus for the transport company and the terminal.

The touchscreen is securely activated by the driver – even when wearing gloves – via a unique user ID and PIN. The system is placed in Loading Mode when a load-rack connection is identified. Loading can only begin if the driver has full permit status, meaning that all vapour connections, overfill components and grounding devices are safe and operational. The driver refers to RFID technology to know which product is loaded into each compartment, with the system knowing, through wireless communication, if the correct fuel is going into the correct tank. This allows the correct compartment valve to open automatically, initiating the unloading process.

If an incorrect truck-to-underground storage tank connection is attempted, the trailer's valves will not open and the delivery will be unable to commence. At the conclusion of the delivery process, which only ceases when the compartment is empty, the touchscreen notifies the driver that all hoses, elbows and adaptors can be safely disconnected.

The system will store all of the driver and trailer's historical usage data and information. Among the useful data that will be stored in the system includes Fault Logs and Equipment Device Status Logs (for all elbows, probes, sockets and grounding equipment). The system's Asset Manager can also 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.

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CIVACON'S CIVACOMMAND MODULE AIMS TO AVOID INADVERTENT PRODUCT CONTAMINATION BY ENSURING THAT ONLY THE RIGHT PRODUCT CAN BE DELIVERED TO THE RIGHT COMPARTMENT OR TANK