



ELIMINATING FUEL -TRANSFER ERRORS AT THE LOADING TERMINAL



Fuel terminals are beehives of activity – large plots of land crisscrossed by tank trucks and trailers that queue up at loading racks situated 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.) to 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 have 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, but 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 fuel-delivery failure mode 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 THE ERRORS

When considering fuel-transfer errors at terminals, there are four that stand out:

1. *Incorrect product is loaded into wrong trailer compartment*

The most common cause of this error is when a rushed or distracted transport 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, one-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 bright, touch screen display of the new CivaCommand Smart Tank System from Civacon, clearly shows each product grade loaded



Getting the right product into the right underground tank at the retail site is critical. RFID tagged fills and the Smart Elbow of the CivaCommand System's Cross-Over Prevention (COPS) option assures error free drops

The ultimate effect of these types of cross-contamination loading errors will be the shutdown of fueling 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. Anytime tanks need to be emptied, cleaned and refilled, the site operator incurs unplanned maintenance costs, as well as incurring lost revenue due to the site being 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 fueling system that will affect the driver's ability to operate the vehicle.

A common safeguard against these types of fuel mix-ups 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.

2. *Compartment loaded with contaminated fuel*

Terminal operators must take great care to guarantee 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. Delivery analyses show that when this does happen it means that about one in every 365,000 fuel-trailer loads will feature contaminated fuel. In addition to an incorrect fuel drop, the error



Clearly identified loading arms and driver attention to attaching the right arm to the proper compartment are key to preventing dangerous mis-match mistakes during loading

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 fueling site, the same harmful effects can be experienced as outlined in the first error above: 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.

3. A non-permissive reading increases wait time – and frustration

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. More frustrating can be the fact that the driver can't easily determine what is causing the non-permissive reading. When that happens, the driver has to exit the line and either attempt to make a self-diagnosis or call to his service department, hoping a solution is readily available.

4. A retain condition compromises loading safety

Fuel retains occur when the transport's tank-monitoring system indicates that one of its product tanks is empty when it really is not. When this condition occurs, the driver may hook up to the terminal thinking he can load 3,000 gallons of product into the tank, when the actual capacity may only be 2,900 gallons. In other words, product retains create a major safety concern for terminals in that a product overfill or cross-contamination may occur. In both instances, the safety and integrity of the fueling 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. Thankfully, 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 down 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 vapor 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.

CONCLUSION

Terminal operators and fuel-delivery companies have a symbiotic relationship. They must work together to achieve their individual goals, so what is good for one is usually good for both. That means it benefits both of them to find the best ways to ensure that no mixups occur when storing and transferring motor fuels. The development and availability of a new fuel-delivery monitoring system that takes advantage of the latest digital technology should prove to be a win-win situation for this relationship. If utilised properly, the result will be fewer delivery errors and greater satisfaction from the retailers and drivers that they ultimately service.

FOR MORE INFORMATION

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Safety and productivity are paramount at the terminal. This CivaCommand equipped trailer waiting to load proactively knows there will be nothing to prevent its loading; like retained product, or an overfill detection or ground fault