

Emergency response personnel prepare to transfer Butadiene from the derailed tank car into an empty railcar via OPW Drylok™ dry-disconnect couplers.



## **DRYLOK™ DRY-DISCONNECT COUPLERS FROM OPW ENGINEERED SYSTEMS PLAY A CRITICAL ROLE IN AVERTING A TRAIN-DERAILMENT DISASTER.**

It was a disaster that was going to happen and the only thing still in doubt was just how bad it would end up being. Early on the morning of Nov. 26, 2007, a freight train was heading west on the Kansas City Southern Railroad near the small town of Choudrant, LA, a stone's throw from Ruston in the north-central portion of the state. Sometime around 4 a.m., the train derailed with 10 rail cars leaving the track. Of the cars that derailed, five contained hazardous materials and two of those overturned and slid down an embankment, coming to rest scant feet from U.S. Highway 80, the road that parallels the tracks. These two tank cars were ultimately damaged beyond repair and taken out of service due to the severe damage.

The cars carried 1,3-Butadiene, an industrial chemical that is used in the production of synthetic rubber. Butadiene is a colorless, non-corrosive, mildly aromatic gas that is extremely flammable. It is such a volatile and potentially harmful gas that the Occupational Safety and Health Administration (OSHA) has determined that the permissible exposure for persons working with the chemical may not exceed one part butadiene per one million parts of fresh air, averaged over an eight-hour workday. In fact, exposure to butadiene has been known to cause damage to the central nervous system, along with leading to other symptoms such as blurred vision, vertigo, headache, nausea and fainting. In addition, the American Conference of Governmental Industrial Hygienists (ACGIH) specifically states that butadiene has been known to cause cancer.

When representatives of the Lincoln Parish Fire Protection District, Choudrant Fire Department, Lincoln Parish Sheriff's Department, Louisiana State Police and Choudrant Police responded to the reports of the derailment, they did so with extreme caution. Possibly, the overturned cars had ruptured, releasing the flammable compressed gas into the atmosphere. But when the responders arrived, the cars—miraculously—were still intact with nary a leak detected, thanks to the tank-cars' construction that includes a minimum internal shell thickness of 9/16ths to 11/16ths inches covered in four inches of insulation and thermal protection and a 1/8-inch steel outer jacket. As a precaution, 60 nearby residents were evacuated from their homes, but they were allowed to return 48 hours later when cleanup of the derailment had been completed.



*Two railcars transporting butadiene overturned, slid down an embankment and came to rest between the railroad and a highway. Not a drop of butadiene was lost during the accident or transfer.*

## PLAYING WITH FIRE

Chemicals like butadiene present a conundrum for the companies that produce them, use them in the production of their products and—maybe most importantly—ship them to faraway sites. The most efficient way to get these chemicals from one place to the next remains rail, which has become a safer and safer means of transportation over the years with the number of derailments declining and tank-car ruptures severely reduced over the past 20 years. That still means, however, that the utmost precautions are taken in case of an accident.

Well aware of these potential dangers is Houston-based Texas Petrochemicals (TPC), one of the largest manufacturers of butadiene and other C4 chemical products in the world. TPC ships its butadiene via a series of rail tank cars that it operates on a long-term lease basis. Several years ago, workers at TPC noticed that butadiene residue was remaining on the nipples and couplers used on the standard valve systems at its facilities and other sites where the chemical was loaded and unloaded.

Though these valve systems still met standards established by such regulatory agencies as OSHA, the Environmental Protection Agency (EPA) and the Texas Commission on Environmental Quality (TCEQ), in 2006 TPC initiated a company-wide conversion to Drylok™ dry-disconnect couplers from OPW Engineered Systems, Lebanon, OH.

TPC chose the Dryloks™ not only because of their safety benefits, including significantly reduced emissions, but also because they lowered the average time it takes to hook up loading arms and hoses for product transfer from 30 minutes to 30 seconds, an improvement that has been described as going from the 19th to the 21st century.

## ON THE CALL

When that train derailed in Louisiana last November, the cars that overturned were equipped with OPW Drylok™ couplers. Drylok™ couplings are located in the protective housing of tank cars and were therefore protected from damage during the derailment. The Dryloks™ would play a major role during the butadiene-transfer operation that was necessary during the clean-up process.

“When a derailment occurs, the primary responsibility of our business is community and site-worker protection, and determining if any chemicals have been released from the site,” explained Chip Day, Project Manager for the Center for Toxicology and Environmental Health, LLC, North Little Rock, AR, which responded to the incident. “I assist the railroads in the hazardous materials emergency response operations and site management of the derailment site and make sure the products are transferred properly. I’ve been in this business 26 years and while I haven’t seen it all, I’ve seen a helluva lot so I can usually tell just how bad the incident is based on the types of tank cars involved and the initial reports from the site.”

## Keeping Safety On Track

When Day arrived in Choudrant what he saw was a site with a surrounding community several miles away and a few houses in close proximity to the derailment site that were lucky that the overturned cars did not rupture since two of the five derailed chemical-bearing cars were thrown into a ditch and slid 45 feet down the embankment. After ensuring that no butadiene leak had occurred, Day's next task was to oversee the re-railing and/or righting of the derailed tankcars and coordinating the butadiene transfer from the derailed cars. This meant assisting the Emergency Response Contractors that Kansas City Southern (KCS) had already called to the site; three separate contractors were used—R.J. Corman and Hulcher Service for wrecking operations and United States Environmental Services for the transfer operations. The butadiene would need to be transferred from the damaged cars to replacements that had been brought in on the rail bed, a task made more difficult by the 45-foot difference in elevation from the tracks to the ground. This tricky transfer was made easier due to the fact that the rail cars were equipped with the Drylok™ couplers. They also made the set-up, purging and tear down portion of the job quicker, allowing the residents who had been evacuated to return home within two days.



*OPW Drylok™ couplers equipped on the butadiene railcars allowed for a faster, safer and efficient transfer during the evacuation process.*

“We’re learning quickly that the Dryloks™ can be used in the field,” said Day. “For us, they’re handy because when you purge the transfer hoses, you’re done and you have no product release, and that’s why they were put on the rail cars. In the field, that’s great. We’re still in a learning curve, but I think they’re performing very well. In this incident, the Drylok™ couplings functioned properly during the derailment and transfer operation and no leaks or releases were detected during the transloading operation.”

In fact, Day has known about the benefits of the OPW Dryloks™ for a while now. It seems that when TPC was looking to upgrade the valve systems on its rail fleet, Gary Henneke, Manager of Transportation for the company, called in Day to help him run some field tests on the Dryloks™. Day has subsequently helped train emergency responders for NOVA Chemicals, Calgary, Alberta, one of TPC's largest customers, on the use of the Dryloks™.

“Gary called me and said, ‘We’re looking at using these Dryloks™, why don’t you come down and see what it’s going to take to use them?’” said Day.



*Texas Petrochemicals upgraded its fleet of roughly 600 butadiene-devoted railcars to the Drylok™ dry-disconnect couplers in 2005. In addition to day-to-day benefits, the Drylok™ couplers were helpful during the derailment accident in 2007.*

### Drylok™ couplers provide four major benefits:

- 1. Reduced Emissions:** As the driest disconnect in the industry, the Drylok™ eliminates threaded connections that allow fugitive emissions. It also meets emission requirements set by EPA, OSHA and TCEQ.
- 2. Time Savings:** For Texas Petrochemicals, the average time to connect the loading arm to the railcar valves was reduced from 35-40 minutes down to 35-40 seconds.
- 3. Ergonomic Benefits:** No longer do workers have to use cheater bars, pipe wrenches or hammers to connect the valves. Now they just turn a lever to connect — no heavy lifting or bending over for long periods of time.
- 4. Increased Railcar Safety:** The Drylok™ product is tamper-resistant. This eliminates the possibility of sabotage, theft and contamination. Only the manufactured mating piece allows access to the system.



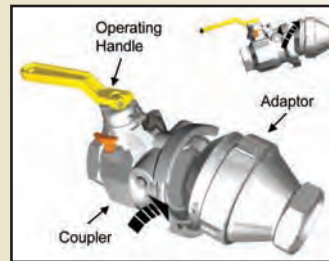
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In order for the Dryloks™ to receive approval for trial use in commerce, the Association of American Railroads (AAR) required TPC to perform tests to document the time it would take to remove the Drylok™ elbow assembly from a leaking valve in the protective housing in order for an emergency capping kit to be installed. Clad in fire-protective clothing, it took Day four-and-a-half minutes to remove the elbow and allow for the installation of the emergency capping kit, a time that satisfied AAR regulations.

“Since then, I’ve conducted training classes for other companies,” said Day. “Interested companies want to talk to somebody who’s been there and either experienced problems with them or really like them, and this is a good product. They’re field-maintainable and I see more and more shippers looking to go into that kind of system in the future.”

For more information on the Drylok™ system, or other products from OPW Engineered Systems, Lebanon, OH, please contact Greg Carrino, Director of Sales & Marketing, at [gcarrino@opw-es.com](mailto:gcarrino@opw-es.com) or (513) 696-1500. You can also go to [www.opw-es.com](http://www.opw-es.com).

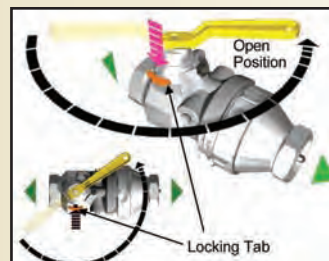
## How Does the Drylok™ Dry Disconnect Coupler Work?



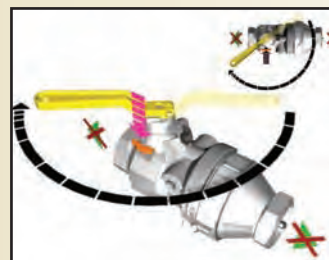
- 1 Push coupler onto adaptor by first engaging lower jaw of coupler under lip of adaptor and tilting the coupler upward to engage top jaw.



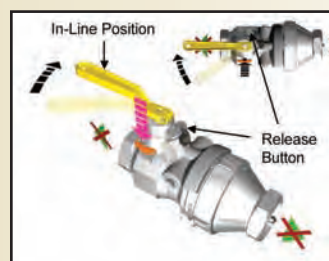
- 2 Turn handle counter-clockwise until lock engages. Coupler and adaptor are locked together but valve is closed.



- 3 Press button on coupler down and turn handle counter-clockwise until it locks. Valve is now open and product will flow.



- 4 To disconnect – press button on coupler and rotate handle clockwise until it locks. Valve is now closed.



- 5 Press button on coupler down and turn handle clockwise to the “in-line” position. Press tab on opposite side of coupler to release the upper jaw and move coupler away.