

Reducing trailer drag

Scientifically developed SmartTruck reduces fuel burn for Con-Way.

BY ERIC KULISCH

In September 2010, Con-Way Truckload began testing an innovative device that installs under truck trailers to improve air flow around the vehicle and reduce turbulence.

The device, called an under-tray, is produced by a company called SmartTruck and was developed with the help of the Environmental Protection Agency's Oak Ridge National Laboratory, the SmartWay program, NASA, and Pepsico, which operates a private fleet.

The Oak Ridge Lab's Cray super-computers determined that the under-tray system saves much more fuel than side skirts frequently seen on trucks today to improve their aerodynamics, Randy Mullett, vice president of government relations and public affairs at parent company Con-Way Inc., said during a recent presentation.

The under-tray system minimizes drag caused by the low-pressure wake behind the trailer and its suspension system, primarily by injecting high-energy airflow into the trailer wake.

In the past 15 months, Con-way Truckload has installed under-tray equipment on 1,200 trailers and is very satisfied with the results so far, Randy Cornell, vice president of maintenance, said in an e-mail response.

"Our overall miles per gallon is improving every month, but we believe it's due to a combination of things we've done, i.e. new equipment, more driver training, SmartTruck aerodynamic devices, etc.," he said, while declining to specifically disclose the mileage benefits attributed to the under-trays for competitive reasons.

Owner-operators used by Con-Way Truckload have claimed dramatic improvements in fuel efficiency when pulling a trailer with an under-tray system, Cornell said. Drivers have also noticed that trailers with the device don't tend to drift as much on the road, he added.

The base system used by Con-Way improves fuel economy by 7 percent, according to SmartTruck. A combination of the under-tray and side fairings, on the back edge and roof of the trailer, delivers a 10 percent improvement in miles per gallon. And an economy version minus a deflector by the rear guard, improves fuel mileage

5.5 percent.

The company originally had to address some installation challenges. Early versions of the device took more than five hours to install, but SmartTruck was able to bring installation time under 90 minutes by modifying certain components and procedures, Cornell said.

During the trial period, Con-Way experienced damage to the devices because they were hung too low on the trailer or were too big. SmartTruck, based on Con-Way's feedback, came up with new designs and modifications that eliminated the damage issues, he said.

SmartTruck, at Con-Way's request, recently improved the installation process further by pre-manufacturing one piece so it could be bolted, rather than welded, on to save more time, Cornell said.

Con-Way has not had to repair or replace any units with the new design and is currently in the process of updating about 200 trailers with the old system.

Side skirts tend to be less expensive than the under-tray system, but Cornell said they take longer to install and block access to the underside of the trailer for maintenance and safety inspection purposes. They act as a disincentive for drivers to properly complete their pre-trip inspection because they are not likely to crawl under the trailer to get a better view.

Side skirts and other aerodynamic technologies also block the proper flow of cool air over temperature-sensitive tires and brake systems, according to SmartTruck.

Con-Way Truckload, which averages 6.5 miles per gallon on its 2,700 vehicles, continues to install the EPA certified under-tray system on new trailers as they come into the fleet, Cornell said.

SmartTruck says it wants to reduce the drag coefficient for a Class 8 tractor-trailer to less than that of a sports car.

The company also partnered with Michelin to understand the effects of tires on aerodynamics. Testing found that using wide single tires along with the under-tray system components improved trailer aerodynamics, and led to a 0.75 percent to 1 percent gain in fuel efficiency.

The president of SmartTruck is Mitch

Greenberg, who used to head SmartWay for the EPA.

SmartTruck says it has about 35 active customers including Landstar, Kraft Foods, Turk Enterprises and Hirschbach Motor Lines.

Swift Transportation, a major truckload carrier, was an early development partner and is evaluating whether to purchase units, according to the SmartTruck Website. Other fleets evaluating the SmartTruck system include Schneider National, U.S. Xpress and Fremont Contract Carriers.

SmartTruck is also working with trailer manufacturers such as Wabash, Hyundai, Great Dane and Vanguard to include the under-tray system as an option for new equipment, Greenberg said via e-mail.

Under-tray prices vary depending on the volume purchased, but the economy version is more affordable than, or towards the low end of, side skirt pricing, he added.

Side skirts still remain a popular accessory in the industry for reducing drag. C.R. England, which operates the largest temperature-controlled fleet in North America, has installed side skirts on all new trailers, which it says yields up to a 5 percent improvement in fuel efficiency.

Wal-Mart, the largest private fleet-operator in the United States, has purchased 3,000 skirted trailers in the past two years, according to its 2011 Global Sustainability Report.

C.R. England of Salt Lake City was one of six companies recognized last year by SmartWay for its "green" initiatives. The carrier announced in October that it is equipping all new Cascadia model tractors from Freightliner with a new aerodynamic kit that can improve driving efficiency by as much as 0.1 miles per gallon.

The truckload carrier has also cut its fuel use through the use of ultra-lightweight day cabs for short-haul applications, low-resistance tires, aluminum instead of steel wheels and other steps.

Swift, the largest truckload carrier in North America in terms of power units, continues to pursue ways to improve the aerodynamics and reduce the weight of its vehicles to maximize fuel economy even though officials say the biggest future gains will come from better planning and asset utilization.

The biggest weapon in its arsenal for combating fuel use is a small group of fewer than 50 specially outfitted trucks that haul beer on a dedicated run for a distributor one way and other products on the return leg, Swift Vice President David Berry said.

The motor carrier reengineered its routes so there wouldn't be the need for a sleeper cab and could use a lighter day cab. It also

outfitted the vehicles with a smaller horsepower engine, which further cuts down on the vehicle's weight. The streamlined truck also has low-resistance tires, side skirts and a trailer tail.

The smaller engine gives up some power on hills, but the trucks do not travel over big mountains.

"We're willing to make that tradeoff on performance for the fuel economy and weight" reduction, Berry told *American Shipper*.

The lower weight means the truck can haul two more pallets of beer than a normal tractor-trailer, he said at an EPA freight conference in November.

Manufacturer ATDynamics said reducing rear drag with its trailer tails is certified to cut fuel consumption by 6.6 percent at 65 mph. The savings are maximized when used in conjunction with side skirts. The company claims the collapsible, thermoplastic device saves truckers more than eight gallons of fuel for every 1,000 miles traveled at highway speeds. For high-mileage fleets, the trailer tail pays for itself in one year, it says.

Last September, Robert Heath Trucking became the first refrigerated carrier to install trailer tails on its entire fleet, according to ATDynamics. The carrier has more than 300 big rigs in service.

As of mid-October, ATDynamics had sold more than 5,000 units. In 2012 it plans to partner with original equipment manufacturers to install trailer tails on new trucks, launch a version for trucks with roll doors, and allow motor carriers to sample up to 200 devices risk free.

In addition to modifying their equipment, sophisticated carriers are making better use of software to match drivers with loads and reduce out-of-route miles.

Berry said the biggest gains in emission and fuel reduction will come from coaching drivers on efficient driving practices and optimization software that identifies the best routes to take, where to refuel at the best price and the available driver best positioned to pick up a load.

Automating the process is essential because with only 25 drivers and corresponding loads there are 15 septillion possible dispatching combinations, he said during his presentation.

Swift has 17,000 tractors, 48,000 trailers and 5,800 intermodal containers, as well as flatbed, cross-border, oversize cargo and international logistics services that all need to be coordinated with assets that are tracked via their GPS coordinates.

"As sophisticated as we are, we're just on first base. There's a ton of opportunity out there. Lots of room for improvement," Berry said. ■



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