

TruckWings[®]



CASE STUDY: How Ryder Validated TruckWings Technology Fuel Savings Through a Rigorous On-Road Test



Scope of data



2.7
million miles

Proven results



4.1%
improved MPG

Reduce Emissions



25,000+
pounds CO₂ eliminated



Ryder's commitment to long-term customer success

Ryder System, Inc. is a leading logistics and transportation company whose mission is to provide innovative fleet management and supply chain solutions that are reliable, safe, and efficient. Ryder leases more than 235,000 vehicles a year to customers ranging from small businesses to large, national enterprises.

Ryder has a strong history of leveraging emerging technologies that help make its business and, ultimately, its customers' businesses more efficient and competitive. The company regularly explores and evaluates new vehicles, new technologies, and early-stage development products that could directly benefit customers long-term by improving fuel economy, enhancing safety, minimizing environmental impacts, and reducing operating costs.



The Challenge: Improving Vehicle Fuel Economy

Fuel is one of the largest and most unpredictable costs for Ryder's customers, driving interest in solutions that can improve fuel economy in existing fleets. The pursuit of enhanced fuel efficiency not only reduces operating costs, but also aligns with customers' growing interest in greener, more eco-friendly solutions.

24%

Average percentage of total fleet operational cost that is allocated to fuel

According to a 2019 study by the American Transportation Research Institute (ATRI)



The Solution: Reducing Drag with TruckWings Active Aerodynamics

Ryder identified TruckWings tractor-mounted aerodynamic device as a potential solution for improving fuel efficiency of its vehicles. TruckWings technology closes the gap between the tractor and trailer to increase fuel efficiency and improve stability. The device automatically deploys and retracts without any driver interaction to reduce drag at highway speeds while still allowing for in-city maneuverability.

Before rolling them out fleetwide and to customers, Ryder wanted to ensure the effectiveness of TruckWings devices through comprehensive testing under real-world road conditions. The company has a dedicated team of internal resources devoted to a rigorous approach to new-product testing that would further validate the promoted fuel savings of TruckWings devices.



System deploys at 52 mph for maximum fuel savings



System retracts below 50 mph for maximum clearance

| The Evaluation

Ryder worked with the TruckWings engineering team to design a robust on-road test to quantify the benefits of the devices. Based on industry-recommended practices for fuel-economy tests, the evaluation would compare the relative performance of a truck before and after a TruckWings device was installed.

Sixty identical trucks across five Ryder locations in the Southwest region were selected for the evaluation in order to minimize the impact of disrupting drivers and routes. To balance variables such as temperature and fuel quality, the trucks were randomly split into control and test groups per site.

Test Equipment

Tractor Specification

- > Freightliner Cascadia Day Cab
- > Tandem Drive Axle
- > Roof Fairing & Cab Extenders
- > 54" Average Tractor-Trailer Gap

Trailer Specification

- > 53' Dry Van
- > Side Skirts

TruckWings Device Specification

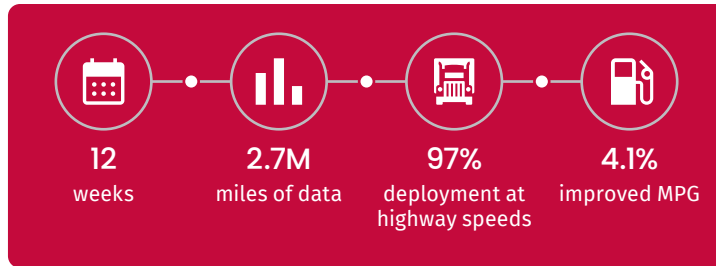
- > 34" Tractor-Trailer Gap Coverage
- > Fully Automated Deployment
- > On-Board Telematics Device
- > Patented Folding Panel Design
- > 5052 Aerospace-Grade Aluminum Frame with Integrated Actuators

Methodology

A six-week baseline period was run to capture data on mileage and fuel economy in normal operations. After TruckWings devices were installed on 30 trucks, a six-week pilot test was conducted. Throughout the pilot period, live telematics were monitored to track automated deployment and uptime. Fuel mileage was compiled weekly using Ryder's data for each truck. The final fuel savings calculations compared the relative fuel consumption between the control and test groups in the pilot segment against the same delta in the baseline segment. The companies established a benchmark for success in the pilot of fuel savings of 4% or more on vehicles equipped with TruckWings devices.

Simultaneously, a third-party firm was brought in to conduct computational fluid dynamics (CFD) simulations to visualize and assess the aerodynamic performance of TruckWings systems. CFD is the industry-standard method for predicting drag on commercial vehicles. The U.S. Environmental Protection Agency also accepts CFD simulations to quantify the benefits of add-on technologies to tractor-trailers.

| The Results



Over 12 weeks, the test collected nearly 2.7 million miles of data. TruckWings devices were deployed on approximately 560,000 miles of open-road driving. TruckLabs set a target that TruckWings would be open at least 70% of the time on all miles driven. Ryder pilot trucks came in well above that with 86% overall operational deployment. In addition, Ryder test trucks saw 97% deployment at highway speeds, above the 90% target. During the pilot, there was no downtime due to mechanical issues with the technology.

| Test Trucks Beat Fuel Economy Benchmark

Ryder realized a net miles per gallon improvement of 4.1% over the course of the pilot, which was predicted by the modeling done through the independent CFD analysis. The simulations demonstrated a wind-averaged drag reduction of 7.4% with a predicted fuel economy improvement of 4.1% at 65 mph and fully loaded.

Ryder saved an estimated 3,456 gallons of diesel fuel during the pilot. This would equate to saving 1,130 gallons of diesel and eliminating more than 25,000 pounds of carbon dioxide emissions per truck per year.

“Ryder takes new-product testing seriously. The wings ran without any issues and the fuel economy results came in above what we were promised. It’s been a great experience so far.”

Mike Plasencia, group director of RyderVentures and new product strategy at Ryder

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