

Improved Aerodynamics A Glance at Clean Freight Strategies

Energy & Fuel Savings

Aerodynamic Long Haul Combination Truck

Gallons Saved
=
1,651 gallons

CO₂ Savings
=
16.7 Metric tons

Increase in Fuel
Economy
=
11%

New MPG
(original 6 mpg)
=
6.6 mpg

Fuel Cost Savings
=
\$6,276



Using a streamlined-profile tractor with aerodynamic devices can improve fuel economy by over 3 percent and will reduce fuel costs by over \$2,000. When adding an aerodynamic trailer, you can get up to an 11 percent increase in fuel economy, saving 16 metric tons of carbon dioxide.

What is the challenge?

Aerodynamic drag (wind resistance) accounts for most truck energy losses at highway speeds. Reducing drag improves fuel efficiency. The longer the drive and the higher the speed, the greater the potential efficiency benefits become. Manufacturers have made significant progress over the past two decades in reducing the drag coefficient (a measure of wind resistance) of a typical freight truck from about 0.8 to about 0.65 – an improvement of nearly 20 percent. Additional efforts to improve aerodynamics could result in an additional or a total of 25 percent reduction in the drag. This could have a significant impact on fuel economy. For example, cutting drag by 20 percent could boost fuel economy up to 15 percent at highway speed.

What is the solution?

A number of options exist to improve aerodynamics and improve fuel efficiency.

Tractor Aerodynamics

Truck tractor aerodynamic options:

- Roof fairings (an integrated air deflector mounted on the top of the cab)
- Side extender fairings (to reduce the gap between the tractor and the trailer)
- Side tank fairings
- Aerodynamic front bumper (to reduce air flow beneath the truck).
- Aerodynamic mirrors

Truck manufacturers offer aerodynamic models that include a streamlined front profile, sloped hood, and a full package of add-on devices. Selecting these features for a typical tractor model can improve fuel economy by over 3 percent. However when improving a classic combination truck with no aerodynamic features, one can see up to a 15 percent increase in fuel economy.

Next Steps

1 Trucking firms can specify aerodynamic options when purchasing a new truck and consider adding aerodynamic devices to existing trucks and trailers. Some aerodynamic options are standard on many trucks, like a streamlined hood. Others can be purchased and installed for an additional cost.

2 For more information on aerodynamic devices, contact your local truck dealer, truck equipment vendor, or trucking association.

Improved Aerodynamics

Trailer Aerodynamics

Truck trailer aerodynamic options:

- Gap Reducer (these devices affix to the front of the trailer to minimize the gap between the tractor and trailer, minimizing air turbulence in turn)
- Side Skirts (these panels hang down from the sides of a trailer at the bottom edge to enclose as much as the open space between the rear wheels of the tractor and the wheels of the trailer)
- Cargo Configuration (reduce drag by arranging cargo as low and smooth as possible)
- Wheelbase and fifth-wheel settings (positioning the trailer as close to the rear of the tractor as possible to reduce tractor-trailer gap). For freight carried on flat bed trailers, securing loose tarpaulins and closing the curtains on curtain-sided trailers can improve fuel economy by up to 2.5 percent and 4.5 percent, respectively.

Gap reducers that decrease the trailer gap from 45 to 25 inches can improve fuel economy as much as 2 percent. According to the manufacturers, the addition of trailer side skirts can also improve fuel economy by up to 5 percent.

Single Unit Truck Aerodynamics

Single unit truck aerodynamic options

- Streamlined front profile with sloped hood to reduce drag
- Rounded air deflector can be added to van-style bodies to reduce drag

When using rounded air deflectors, manufacturers claim fuel savings of up to 5 percent, which reduces annual fuel use by about 80 gallons and saves over \$100 in fuel costs. Single unit trucks with higher annual mileage could realize even larger benefits.

Savings and benefits

An aerodynamic long-haul combination truck can realize a fuel economy increase of 11 percent, as compared to a typical long-haul combination truck. This would result in about 1,600 gallons saved, reducing fuel costs by over \$6,000 and saving 16 metric tons of carbon dioxide. A single unit aerodynamic truck improves fuel economy by 5 percent, saving 76 gallons and nearly 1 metric ton of carbon dioxide. The initial expense of installing aerodynamic features can be quickly recouped through fuel savings.

Aerodynamic Trailer Annual Savings

Fuel Economy Increase	3.6 %
New MPG (original MPG of 6)	6.2 mpg
Fuel Cost Saving	\$2,200

Single Unit Truck Annual Savings

Fuel Economy Increase	5%
New MPG (original MPG of 8.54)	8.97 mpg
Fuel Cost Saving	\$285
Gallons Saved	76 gallons
CO ₂ Savings	0.76 metric tons