

Tilmech Mechanical Enterprises - A Typical Story

Small Operator Shows Savings by Using Innovative Aerodynamic Devices

Tilmech (Tilbury Mechanical Enterprises) has proven that use of **Airtab**® vortex generators can save money for long-haul highway fleets. Today, the company is saving more than \$1,000 per year per vehicle in fuel and tire costs through the use of this newly introduced device.

Aerodynamic drag has long been a target for fuel economy on trucks. Streamlined cabs and fairings have made improvements, but there is still the problem of the large flat area at the back of the vehicle and, for tractor trailer units, the gap between the tractor and trailer.

The large area at the back of the vehicle is an area where the air has to rush in, creating a lot of drag and turbulence. The gap between the tractor and the trailer can also create drag when air swirls into this space. The drag from both areas takes engine power to overcome, and therefore fuel.

Tilmech, located in Southern Ontario has a niche market in the automobile sector. All of its driving is done on the 401, between Toronto and Tilbury. It has a small fleet and nearly identical load patterns.

Chuck Atkinson, the co-owner of Tilmech and Manager of Tilmech's Transportation Division, says of fuel economy- "It's one of the things I watch out for, as it can make a big difference to the bottom line. We've been keeping accurate fuel figures for over 9 years. Since we have a consistent load, very flat roads, and normally light traffic, we were able to look at a lot of variables over the years. We measured fuel consumption carefully, and only changed one variable at a time. Our drivers have been very conscious of saving fuel, and have fully cooperated with us in keeping driving patterns the same. "

"For example, initially we tried different governed speeds, and determined that for our combinations, that 95 km per hour was the optimum, and have set all our tractors for that speed." "Naturally, we've got streamlined cabs and have paid attention to aerodynamics."

"We've also tried moving the trailers closer to the tractors to reduce the gap between the two. Truck and trailer manufacturers both said the closer together, the better. So we looked at different distances and found that we could get an improvement in fuel economy running with a separation of 22 inches."

"This caused a big change in the weight distribution on the axles. The front axle was now running at the maximum limit of 12,000 lbs and the drivers found this to be more difficult to control steering. We also went through steering tires very quickly (60,000 miles per set). We backed off the 5th wheel to a point where the fuel penalty and front axle wear were balanced."

"Then we heard about vortex generators which might help to bridge the gap between the tractor and the trailer and reduce aerodynamic drag. I'd seen some on trucks in the USA and wondered what they were and how they worked. We obtained some prototypes **Airtabs**™ from the AeroServe Technologies in Ottawa, and experimented."

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"By installing these devices at the back of the tractor, we found that we could now move the 5th wheel back even farther, and retain the fuel economy, but with significantly improved front axle tire wear. We were quite pleased with gaining on the tire savings without losing ground on the fuel economy."

"The aerodynamics people from Aeroserve worked with us, and listened to our comments about appearance, installation and so on, and provided us with some later prototypes, which is what you see in the photographs. They also suggested to us that there may be some fuel savings by placing **Airtab**® around the back of the trailer. This has shown an overall improvement in fuel economy of about 4% from pre-**Airtabs**™."

"We've been delighted with the overall results. We not only see improvements in our fuel economy from before, but we're also getting more miles from the tires on the front axle. Our drivers have reported that they have better visibility to the back in wet weather. It seems these devices also affect the spray patterns, but we have no way to measure that effect. We also have seen some limited reduction in dirt on the back of the trailer. The devices were easy to install and need no maintenance."

Airtab® come from the aviation industry and are shaped to produce a controlled swirl of air. The ones on trial are designed, shaped and sized for the normal airspeeds that trucks would see, and for the aerodynamics of trucks. The swirl of air made by the device influences the air for some distance above and a long distance downstream.

For the gap between the tractor and the trailer, the effect is to ensure that air is controlled to swirl past the gap and not tumble into the gap from the side or top, creating turbulence and drag. At the back of the trailer, the controlled swirl guides the air into a smooth flow from the side and top. Not only does this prevent the air from tumbling, but it also tricks the air into thinking the trailer has a more streamlined back end than actually exists.

Aeroserve Technologies was delighted. A company spokesman said "We know that these devices work and that facts prove it. The US National Aeronautics and Space Administration (NASA) has carried out extensive wind tunnel tests on these devices for a variety of applications and concluded that they are very effective.

Test track results from the UK by an independent body support our claims. Most over-the-road 'tests' have so many variables (loads, drivers, traffic, weather and so on) that without changing anything on the truck it is normal to see variations of 10% in fuel economy between runs. Our 6-8% savings show up in the long term or very closely monitored tests. Tilmech has a well-developed fuel monitoring program, and an interest in saving money. We're pleased to have such accurate results from a company with years of careful research into fuel savings."

Airtab® complement most existing air management kits on trucks involved in significant amounts of highway driving. They are unique in solving the drag at the back of the vehicle. Projected paybacks for a typical long-distance carrier would be in the order of 6-8 months.