

THOROUGH MAINTENANCE PRACTICES SAVE MONEY AND FUEL

Summary Statement

In this report, the effects of proper preventative maintenance to enable lower fuel consumption will be discussed. Operational functions such as driving style, dispatch practices, road conditions, weather, and traffic all effect fuel economy. Consistent, effective vehicle maintenance can deliver big returns for many aspects of fleet costs including unexpected down time, higher repair costs and fuel economy. An efficiently operating truck can help minimize the effects of all these variables.

Background

Equipment that is well maintained, works better than equipment that is neglected. Fleets that maintain their trucks and trailers well have better uptime and therefore, more predictable and lower operating costs. The effect these practices have on fuel consumption has not always been as obvious, but with higher fuel costs, they can contribute significantly to a fleet's overall costs. In the past, repairs may have been conducted generally on a fix as fail basis. But with fuel costs increasing, the costs of continuing to operate trucks with the issues described below can become quite large.



Industry Segment Applicability

The benefits to lower fuel consumption associated with thorough and disciplined maintenance practices are achieved on all commercial vehicle vocations and duty cycles. The more fuel the truck uses during its work, the more to be saved through incorporating the strategies in this paper.

Technical Summary

Below is a list of a few key items important to optimum fuel efficiency:

- **Aerodynamic Panels** – Always maintain the aerodynamic panels that came with the tractor or trailer. These panels, such as, cab top air dams, bumpers, side fairings, and cab extenders contribute to lessen the effects of aerodynamic drag. Aerodynamic drag is the number one factor effecting fuel economy at highway speeds over 50 mph and even contribute to fuel use at lower average speeds. If these panels are damaged, replace or repair them as soon as possible.
- **Tires** – Maintaining correct air pressure in tires equates to fuel savings. For every 10 psi of under-inflation, a 10% reduction in fuel economy can result. Rolling resistance is the number one factor effecting fuel economy below highway speeds. Always specify “fuel efficient, low rolling resistance tires” when purchasing replacement tires and retreads. Don’t replace tires too soon. Although safety comes first and worn tires must be replaced to retain a superior level of safety, a 50% worn tread provides less rolling resistance than that of a new tire, and the rolling resistance decreases up to the time the tire wears out.
- **Wheel Alignments** – Improper wheel alignment can rob fuel efficiency by creating rolling resistance. It also causes premature tire wear. Ensure every tractor & trailer’s wheel alignment is correct.
- **Lubrication** – Maintaining proper oil levels and drive-train lubrication effects mileage. Too little, or too much engine oil can create more friction and rob power. Clean oil lubricates better than dirty oil. Follow the recommended PM schedule to maintain lubrication efficiency. Conventional engine oil and synthetic engine oil has been found to offer very little differences in engine lubrication, with a slight edge to synthetic use in very cold temperatures. Synthetic gear oil, however offers much advantage over conventional gear oil in drive-train components such as rear differentials and transmissions. Choose synthetic for drive-train components. Many fleets incorporate lubrication analysis to determine effectiveness on an ongoing basis for their replacement intervals.
- **Engine Air and Exhaust Restrictions** – A restricted air intake system (air filter, air cooler, & tubing) & exhaust system will decrease engine power output. Check both components at regular PM levels and fix any leaks that occur. These leaks can be particularly hard to find as leaking air is not as noticeable as fuel or oil, but their repair will improve engine operation and fuel efficiency.
- **Air Conditioning** – The air conditioning compressor requires horsepower to operate, lessening the amount available to create and maintain forward momentum. An air conditioning system that is not operating near its optimum efficiency requires even more power. To achieve optimum performance, make sure the condenser & evaporator coils are clean and free from obstructions, the drive belt is in good condition, and the refrigerant level is at the proper level (too full is an issue too).
- **Air Compressor** – The pneumatic system on our equipment is necessary for the operation of the brake & suspension systems. The compressor also uses horsepower to operate. Repair all air leaks to ensure the system is not being overused.

- **Engine Cooling Fan** – The main engine cooling fan requires much power to operate on modern trucks due to the cooling requirements of these ultra low emission power plants. The pneumatic/electric clutch allows the fan to free-wheel when not needed. Ensure the fan-clutch is operating correctly to ensure the fan runs only when needed. A fan that runs constantly causes a significant reduction in economy.
- **Other Engine Accessories** – Items such as the alternator & power steering system uses engine power. Check these systems to provide proper operation. A bad power steering pump, or one low on fluid, can require more power. A malfunctioning alternator can do the same. A bad battery can require the alternator to be overworked, creating more draw on the alternator, using more power and fuel.
- **Diesel particulate filter cleaning** – Somewhere around 200,000 miles is a good time to clean these filters. This will vary on the engine and truck maker and the duty cycle of the vehicle. It has been reported though, that clean filters improve fuel economy by about 2 to 3%.

It is no secret than a properly maintained truck and trailer greatly adds to the overall effectiveness of a fleet. Attention to detail will ensure that your equipment will be as efficient as possible.

Economics

Fuel consumption improvements have been noted to improve by 5 to 10% through the implementation of rigorous maintenance practices across the fleet.

Real World Application

All fleets have some form of maintenance practice and a system to track the work. With higher fuel prices, the benefit of formalizing the system and being disciplined to it becomes more important. One large fleet shared with the NACFE that they have instituted a “truck maintenance intervention program”. With this program, a truck can be diverted to a maintenance facility by a fleet manager if the mpg reported on the vehicle is shown to have decreased. Any driver or technician can also intervene and request that a truck be brought in for service due to fuel economy problems. This practice has resulted in finding a number of problems described above.

Government / Regulatory issues

There are no known obstacles in the U.S. Federal operating territories or states that would prohibit adoption/use of this methodology.

Want more information?

The North American Council for Freight Efficiency is a Non-profit organization dedicated to doubling the freight efficiency of North American goods movement. We pursue this goal in two ways: Improving the quality and reliability of Information and Highlighting the success of high efficiency technologies. This Executive Report is the highest level of study that the Council creates in delivering to this mission. This information is directional in nature and limited in scope to an analysis of a few US fleet operators. Performance results and costs will vary depending on specifications, duty cycle, geography and other criteria. The information contained in this report and the underlying data supportive of the report are intended for the benefit of NACFE members and their fleets. Contact the Council at contact@nacfe.org for more information or simply to comment on this report.