

Specing Trucks for Fuel Efficiency

How to put your work trucks on a reduced fuel diet.

By Robert Johnson

The high cost of fuel, combined with a growing interest in environmental issues, has many governmental organizations thinking about ways to improve the fuel utilization of the vehicles in their fleets. Tried and true steps for maximizing a vehicle's fuel efficiency include maintaining proper tire pressure, removing unnecessary weight, and following recommended maintenance practices. There are also a number of products available that can be retrofitted to existing vehicles or ordered on new trucks to improve fuel efficiency, including oil bath wheel seals on non-drive axles, synthetic fluids, and free-flow air filters.

With proper planning and training, it is also possible to specify new work trucks and equipment that may be more fuel efficient than existing trucks in the fleet. Some considerations include aerodynamics, total vehicle weight, tire selection, auxiliary power generation, powertrain optimization, and hybrid/alternative fuel vehicles.

Aerodynamics. Aerodynamic truck designs aren't limited to over-the-road sleepers. Most Class 6-8 chassis manufacturers offer factory-installed aero packages that can significantly impact fuel economy. These packages may include roof-mounted air deflectors, side fairings, under-cab-step and fuel-tank skirts, aerodynamic mirrors, low-drag hood configurations, and aero bumpers.

Component positioning is also crucial to aerodynamics. Anything that interrupts the smooth flow of air over and around the vehicle will cause drag. Some of the worst offenders are items such as frame-mounted battery boxes, bypass oil filters, and traditional vertical exhaust stacks with perforated stainless steel heat shields. When possible, try to mount accessory items under the cab or behind the cab skirts. On a straight truck, also consider the use of body nose

total truck weight, starting with the frame. Unless the application calls for a very rigid frame, consider using a high-strength alloy model, which can save weight without sacrificing strength. The suspension is another potential source of weight reduction. Parabolic leaf springs are lighter than conventional leaf springs, and they provide a better ride on appropriate applications. On Class 6-8 trucks, specifying an air suspension will save several hundred pounds.

An oversized fuel tank adds unnecessary weight. Unless the vehicle will be used in an area where fuel isn't easily accessible, why carry around three or four days' worth of fuel? A gallon of gasoline weighs six pounds and a gallon of diesel fuel weighs seven pounds. Factor in the weight of the fuel tank, and carrying 50 extra gallons of fuel could mean needlessly hauling up to 400 pounds.

When specing new vehicles, it's easy to include components and accessories out of habit.

But if the components aren't really needed, they're just taking up space and adding weight. For example, modern batteries and starters are much more efficient than they used to be, yet some purchasing managers still spec four cranking batteries when three would be adequate. The same idea applies to bypass oil filters and auxiliary oil coolers. Newer engine cooling systems and oil filters are more efficient than those of even a few years ago.



The Work Truck Show®, which is an excellent venue for meeting one-on-one with vocational truck and component manufacturers, includes The Green Truck Summit on March 3, 2009 in Chicago. For further information contact the National Truck Equipment Association at www.ntea.com.

cones and/or side transition fairings. Higher fuel prices have made these options cost-effective for a broader range of applications. Depending on the design, installing a bed cover on open-bed trucks, including pickup trucks, dump trucks, and some utility trucks, also may provide significant fuel savings.

Total Vehicle Weight. The more weight the truck carries, the more fuel it burns. There are many ways to reduce

Eliminating an unneeded bypass oil filter will save close to 100 pounds. Stop to think it through before including a potentially outdated spec.

Similarly, look closely at the equipment that will be installed on the vehicle and consider if there are lighter versions available that can get the job done. Also compare bodies. Many manufacturers have developed lighter weight bodies using high-tensile steel or composites. Evaluate if a lighter body would be appropriate for the application.

Tire Selection. Tire selection plays a major role in fuel economy. Consider specifying low rolling-resistance tires. These tires usually have a lower sidewall profile, reducing sidewall flexing and heat build-up, and wasting less energy. The rolling resistance of a tire increases with the load range rating. Put enough tire on the truck to safely carry the load, but avoid over-rating the tires. Also, if the truck normally comes with dual tires on the rear axles, consider specifying wide-base "super single" tires that reduce both rolling resistance and total truck weight. Mount tires on alloy wheels for additional weight savings.

Auxiliary Power Generation. Without equipment, a work truck would be just another truck. But powering hoists, cranes, snowplows, and other vocational equipment can use a lot of energy, which translates to a lot of fuel. If an application requires a limited amount of hydraulic or electric power, a small auxiliary engine generator set may provide sufficient energy to eliminate the need for idling the truck engine for extended periods of time. If electricity is only needed for relatively short periods of time, a static inverter may do the trick.

Powertrain Optimization. The biggest opportunity for improving fuel economy is to properly spec the vehicle's powertrain. A properly specified powertrain ensures that the truck engine operates within its peak efficiency power band at all times (i.e., the engine's rpm is never below the maximum torque point and never above the maximum horsepower point, except during initial launch). Optimizing the powertrain for peak fuel efficiency is not as complex as it may seem. Truck dealers are equipped



Technical advice and product information that's invaluable when specifying new vehicles is plentiful at The Work Truck Show®, which runs from March 4-6 in Chicago. For further information contact the National Truck Equipment Association at www.ntea.com.


with computer software programs that can match engine ratings, transmission gear ratios, and final drive (rear end) gear ratios to achieve the desired performance.

Hybrid and Alternative Fuel Vehicles. Hybrid vehicles have the potential to save fuel by reducing engine idling, recapturing and storing energy that would otherwise be wasted, storing surplus engine power (generated while idling), or utilizing stored energy to eliminate the need for primary energy input (fuel). Hybrid vehicle performance can be significantly impacted by how and where the vehicle is driven. Hybrid vehicles are most efficient in applications with frequent starts and stops, low-speed operations, or extended idle times when operating heavy equipment that's too large to run off an auxiliary engine. Match the hybrid system to the vehicle's duty and drive cycles to see if it will be a good fit.

Alternative fuel vehicles, including those powered by bio-fuels, natural gas, electricity, and propane, are growing in popularity. These alternative fuels do not have the energy density of gasoline or diesel fuel, but in many cases, they have a lower cost per energy unit. In addition, they reduce both the emission of greenhouse gases and dependence on foreign oil. While not suitable for all

purposes, they perform well in specific applications.

The Green Truck Summit held at The Work Truck Show® 2009 will provide cutting-edge information about the future of hybrid and alternative fuel vehicles with a specific focus on how to integrate these vehicles into a fleet. The summit will be held on March 3, 2009, from 9:00 a.m. to 4:30 p.m., at the McCormick Place West Building in Chicago. The Work Truck Show runs March 4-6, 2009. For more information about the Green Truck Summit and The Work Truck Show 2009, contact the National Truck Equipment Association (NTEA) at www.ntea.com or 800-441-6832.

Saving money by saving fuel will be a priority for government agencies of all sizes for the foreseeable future. Procurement professionals can implement many strategies to combat higher fuel costs, including specifying more fuel-efficient work trucks. The bottom line? Plan well, streamline your specs, and stay up-to-date on trends impacting fuel utilization. 

Mr. Johnson is director of fleet relations for the NTEA. Johnson will lead a two-part technical session on specifying work trucks, including fuel economy considerations, at The Work Truck Show® 2009 and 45th Annual NTEA Convention.