

Weight Reduction

A Glance at Clean Freight Strategies

Energy and Fuel Savings

Gallons Saved
=
240 gallons

CO₂ Savings
=
2.44 Metric tons

Fuel Cost Savings
=
\$912



Choosing lighter-weight tractor and trailer components can reduce truck weight by thousands of pounds. Reducing 3,000 pounds from a heavy truck could save 240 gallons of fuel each year, eliminating from 2 metric tons of greenhouse gas emissions annually.

What is the challenge?

Truck fuel consumption increases with the weight of the vehicle. Many truck components are typically made of heavier material, such as steel. Heavier trucks require more fuel to accelerate and to climb hills, and may reduce the amount of cargo that can be carried.

What is the solution?

Every 10 percent drop in truck weight reduces fuel use between 5 and 10 percent. Generally, an empty truck makes up about one-third of the total weight of the truck. Using aluminum, metal alloys, metal matrix composites, and other lightweight components where appropriate can reduce empty truck weight (known as “tare weight”), improve fuel efficiency, and reduce greenhouse gas emissions.

Most truck manufacturers offer lightweight tractor models that are 1,000 or more pounds lighter than comparable models. Lighter-weight models combine different weight-saving options that may include:

- Cast aluminum alloy wheels can save about 40 pounds each for total savings of about 400 pounds
- Aluminum axle hubs can save over 120 pounds compared to ductile iron or steel
- Centrifuse brake drums can save nearly 100 pounds compared to standard brake drums
- Aluminum clutch housing can save about 50 pounds compared to iron clutch housing
- Composite front axle leaf springs can save about 70 pounds compared to steel springs
- Aluminum cab frames can save hundreds of pounds compared to standard steel frames
- Downsizing to a smaller, lighter-weight engine can save over 700 pounds

Truck trailers offer additional options for weight savings. Lightweight components that can reduce empty trailer weight by 2,000 pounds or more may include:

- Aluminum roof bows save about 100 pounds compared to steel
- Aluminum floor crossmembers save approximately 160 pounds compared to steel

Next Steps

1 When specifying new trucks, trucking fleets should consider the lightest-weight components that will suit the application and where appropriate, buy lighter-weight versions of standard truck models. One manufacturer, for example, offers a day-cab tractor that weighs 2,100 pounds less than the base model.

1 continued Another manufacturer offers a 1,200 pound lighter version of a popular sleeper model, intended for dry and liquid bulk haulers as well as other weight sensitive operations.

2 Most truck manufacturers and dealers can provide additional information on weight-saving options.

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- Aluminum floor saves about 375 pounds compared to 1-3/8" laminate hardwood
- Aluminum side posts save approximately 300 pounds compared to steel
- Aluminum hubs or light weight cast iron hubs save about 30 pounds per axle compared to standard cast iron hubs
- Light weight brake drums save about 45 pounds per axle compared to standard cast iron brake drums
- Eight aluminum wheels save about 225 pounds compared to eight steel wheels
- Composite trailer springs can save about 70 pounds compared to steel springs

Lighter-weight alternative materials can cost more. Therefore, use of lighter-weight truck options is more common in freight applications that are weight-sensitive, like heavy-goods and refrigerated foods. However, virtually any truck fleet could employ weight saving strategies.

Savings and Benefits

Trimming 3,000 pounds from a heavy truck (about four percent of its loaded weight) with lighter-weight components could save 240 gallons of fuel each year. Saving this much fuel would eliminate between 2 metric tons of greenhouse gas emissions per year. Trucks that employ more weight-saving options would save more. In addition, in weight-sensitive applications, lightweight components can allow more cargo and increased productivity.