

Advanced Composite Construction Changing the Truck Body Business

For many years, metal construction has dominated the truck body industry. The perceived durability of steel, in particular, ensured that metal truck bodies were the default choice. While most of the providers of metallic bodies have emphasized steel construction, there have been some who migrated to aluminum in an effort to reduce weight.

There is, however, a third material option that has gained a great deal of support – composites. Today, composite materials have been successfully employed in the manufacturing of a wide range of truck bodies for many of the nation’s largest service fleets and utilities. Line bodies, service bodies, inserts, toppers, and tonneau covers are now all widely available with composite materials. Designed and manufactured to handle the same loads as steel bodies, the composite bodies are now proven to deliver a wide range of benefits, including lighter weight, easier maintenance and repair, corrosion resistance, and greatly extended service life.

What Are Composites

A composite material (or shortened to composite, which is the common name) is a material made from two or more materials with significantly different physical or chemical properties that, when combined, produce a material with characteristics different from the individual components. These individual components remain separate and distinct within the finished structure, but combined they deliver a material that may provide any number of advantages – lighter weight, higher strength, improved durability, corrosion resistance, and quality of appearance.

Composite materials have been used in industrial products for over half a century in such diverse applications as walkway grating, railing and ladders, large tanks and vessels, shelving, and more. Composite truck bodies first found their way into the marketplace in the mid-70s, and over the past 40 years have been proven to deliver outstanding long-term durability and value. The composite used in many truck bodies is created using a proprietary hand-laid technique, ensuring a high level of consistency in strength and durability. This process involves several different layers – gel coat (which provides a long-term attractive finish), a specially formulated resin (for long-term durability and corrosion resistance), and one-piece fiberglass mat (whose weave provides outstanding bi-directional strength). The application of heat is often used to finalize the melding of the fiberglass and resin.

The Benefits of Composite Truck Bodies – Weight Reduction

Composite truck bodies have been a mainstay in the market for more than 40 years based on several key benefits that derive from their unique construction. The first of these benefits is their lighter weight, up to 50% less than steel bodies:

Construction	Key Dimensions	Weight
Composite body with aluminum understructure	Standard 56" Pack height 42" Pack depth 15"	578 lbs.
Steel body and with steel understructure	Standard 56" Pack height 40" Pack depth 14.5"	1256 lbs.

Comparison of Weight of Typical Composite and Steel Service Bodies

And that reduced weight can have a significant impact on fuel consumption:

Truck Model	Truck Weight (Lbs.)	Weight – Steel Service Body (Lbs.)	Weight – Composite Service Body (Lbs.)	Weight Savings (Lbs.)	Additional MPG
F-250 (4x2)	5,432	1,234	520	714	7.1 – 14.2%
F-350 (4X2)	5,501	1,374	712	662	6.6 – 13.2%

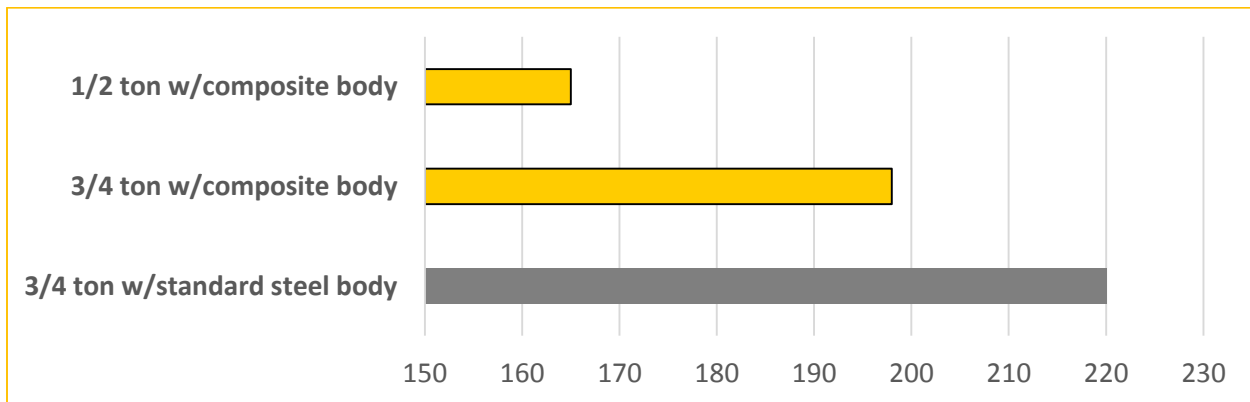
Projected Fuel Savings Realized By Employing Lightweight Composite Service Bodies

In addition, the reduced weight of a composite body can also let an operator increase a truck’s overall payload, and in some cases even allow that operator to move down a size class. And moving to a lower GVWR can mean a great deal when it comes to fuel consumption.

Truck Class	GVWR Range	Average MPG	Impact On Fuel Economy
3	10,001-14,000	10.5	24% reduction (from class 4)
4	14,001-16,000	8.5	8% reduction (from class 5)
5	16,001-19,500	7.9	13% reduction (from class 6)
6	19,501-26,000	7.0	9% reduction (from class 7)
7	26,001-33,000	6.4	

Projected Fuel Savings Realized By Using Lightweight Composite Service Bodies To Move Down A GVWR Class

There are other benefits associated with lightweight composite bodies, above and beyond fuel savings. In addition to impacting fuel consumption, the lighter weight of these bodies reduces the wear of brakes, shocks, and suspension components, impacting maintenance and repair requirements. In addition, because composite service bodies are lighter than comparative steel bodies, braking distance is reduced, adding to the overall safer operation of the vehicle.



Stopping Distance – Truck Traveling at 60 MPH, Dry Conditions

- 1/2 Ton w/Composite Body - Weight: 4,932 lbs. Stopping Distance: 165 feet*
- 3/4 Ton w/Composite Body - Weight: 5,917 lbs. Stopping Distance: 198 feet*
- 3/4 Ton w/Steel Body - Weight: 6,573 lbs. Stopping Distance: 220 feet*

*Source – BrandFX Body Company Engineering

Braking distance is no small consideration in the safe operation of a work truck. In a large number of accident investigations, over-grossed vehicles are cited as a contributing cause.

The Benefits of Composite Truck Bodies – Longer Life Cycle

Unlike steel, whose strength is a linear factor of its weight, these advanced composites' strength is derived from the design and construction of their glass-resin matrices. Over the years, composite truck bodies have consistently been proven to provide a significantly longer service life than conventional bodies, remaining on the job for 20 years or more. Based on their long-term durability, these bodies are often transferred from a retired vehicle to a new one several times, adding to their overall life cycle value.



17-Year Old Composite Service Body

The durability of these bodies is based on the strength of the composite material itself, which cannot be dented. This material is also highly corrosion resistant, making it virtually impervious to road salts and chemicals. In addition, these bodies' gelcoat finish helps to maintain the body's quality appearance even after years of demanding duty. This benefit is often a prime consideration for any organization that wants its vehicles to represent its brand in a quality and professional manner.

Composite Truck Bodies – Cost Vs. Life Cycle Value

While a new composite body may often cost up to 15-20% more than a similar steel body, the difference in purchase price is more than justified by its superior life cycle value. This value is based on the following key factors:

- Life of the composite body and the ability to transfer a composite body over various chassis
- Fuel savings, which can be in excess of \$1,600 for a single truck driven only 25,000 miles/year over 5 years
- Reduced maintenance costs based on less wear on brakes, shocks, and suspension components

Composite Truck Bodies – In Summary

Combining a unique combination of light weight, high strength, outstanding durability, and a lasting quality appearance, composite truck bodies have clearly established a position in the marketplace. The reduced maintenance requirements, fuel savings, and long-term value provided by these advanced body designs are in line with operators' goals of improving the overall performance of their fleets. Based on that alignment, the future of composite truck bodies is bright.