



rough operator

VOCATIONAL HAULERS MUST GET THE RIGHT SPEC TO RUN PROFITABLY ON- AND OFF-HIGHWAY.

By JOHN BAXTER

If you're going to run off-road or haul extremely overweight loads, spec'ing a vocational truck to do two different jobs – on-highway and off-highway – and produce the lowest operating cost per mile can be challenging.

Your first step is figuring out your typical haul. Will you face severe off-road terrain? At what grades? Will most of your miles be at highway speeds?

Spec a high enough overall gear ratio that will allow starting with a full load on the steepest grade.

“Vocational trucks typically run at the high end of RPMs, and considerations typically revolve around gradeability and startability,” says Jim Crowcroft, product marketing manager for Sterling Trucks. “While fuel economy may not be as critical an issue with on/off- and off-road vocational customers, cus-

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tomers need to work with their salesperson to spec the most efficient gear set ratio.”

You also need to determine maximum cruise speed, especially if you are going to spend many hours on the highway at 65-plus. To put rpm in the sweet spot at that speed, you'll need the right axle ratio and overdrive transmission top gear.

Spec an 18-speed or 8-Low-Low or similar transmission with a high enough overall ratio to get good startability. If getting the right range from the transmission is a problem, go for a two-speed auxiliary transmission or drive axle arrangement. Ask your salesman about his recommended startability number, based on the grades you'll really see.

Choose an engine designed for vocational use that has the needed wider operating range. Choose transmission ratio spreads based on the engine's torque characteristics or torque rise and its operating range. A 2100-rpm engine with peak torque that hangs in down to 1100 rpm may be ideal, because it needs fewer ratios and will require less shifting.

“The most important facet of correct specification of EPA '02 vocational engines is to get the correct rpm at cruising speed,” says Volvo's Ed Saxman, director of powertrain systems. “Make your salesman aware of your truck's expected cruising speed.”

Salespeople can use software to verify that the engine rpm matches the expected cruising speed. If not, adjust axle ratio, transmission or tire size, Saxman says. Check important parameters such as startability, top gear gradeability and speed on a 1.5 percent grade.

Another item to consider is a specialty transmission. If running a dump, for example, consider spec'ing an Allison transmission designed specifically for hauling over rough terrain with frequent starts.

Jim Sayre of G.L. Sayre Peterbilt and International says his customers believe Allisons perform well even when “you don't have the required startability on paper.” But he warns them to have the right trans-



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mission and axle ratios for steep hill starts.

Frame rails also have to be spec'ed, given the extra twisting the backbone of the truck will endure off road. Most manufacturers offer rails made of thicker metals or with strengthening inserts for a higher rating of resistance to bending movement (RBM).

Spec' the frame to be plenty tough enough, since there's only one chance to build it right. According to Larry Hess of Midway Truck Service, this will improve the ride because of less frame flexing – but over-spec'ing may cut the weight you can haul.

HAULING HEAVY

If planning to haul heavy – especially loads above 110,000 pounds – you need a truck carefully spec'd for this unusual vocation.

One of the primary spec'ing considerations should be the truck's wheelbase. Local length and weight regulations generally dictate the ideal length. “However, you don't want to make the truck's wheelbase any longer than necessary because it reduces maneuverability,” says Stephan Olsen, vocational market segment manager for Kenworth Truck Co.

Properly positioning the fifth wheel is critical for full use of all axles, especially the front. Steve Ginter, marketing vocational brand manager for Mack Trucks, says

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heavy haulers typically spec front axles with ratings of 18,000, 20,000 and 23,000 pounds. The heavier ratings require wide-aspect tires.

Olsen recommends a dual steering gear and a power steering cooler for low-speed maneuvering. Big horsepower is a given. "These trucks can spend extended periods pulling a heavy load up hills at slow speeds," Olsen says, "so the radiator package is critical" – especially with today's engines, which run hotter, thanks to emission controls.

An 18-speed manual transmission is typical, but in very heavy applications, a two-speed auxiliary transmission or two-speed rear axle is an option.

Sayre recommends an 18-speed Fuller or an 8-speed with a Low-Low provided by a deep reduction button. "The key is range, and you should strive for 19:1." Owners need a high enough overall ratio to get started with a full load on the steepest grade.

Mack recommends to heavy haulers the 13- and 18-speed transmissions in its Maxitorque T300 Series because their triple countershafts handle the high torque especially well. Their aluminum cases eliminate the need for a separate oil cooler.

Double reduction rear axles such as Mack's split gear reduction into two parts, reducing stresses and prolonging life.

To haul heavy loads, frame rails typically need to be reinforced, Olsen says. "An inserted $\frac{3}{16}$ -in. frame is usually required for most heavy haul tractors, but you can get two inserts," he said. "The longer the wheelbase and the more axle capacity you add, the more rigid the frame needs to be."

George Steigerwalt of Freightliner of Philadelphia recommends "going up in RBM" for the frame. Heavy haulers often use a $\frac{5}{16}$ -in. main rail and a full, $\frac{1}{4}$ -in. liner. Also use heavier rails when specifying spring suspension because the ride is



If you plan to spend much time on the highway, determine your maximum cruise speed and spec the right axle ratio and overdrive transmission top gear.

harsher, especially when running empty.

Heavy-hauling rear suspensions historically have been mechanical, but air suspensions are gaining popularity. "The ride is better, and you have more operational flexibility," Olsen says.

Some buyers just assume they will destroy a heavy-hauling truck in three or four years, Ginter says. "But you don't have to do this to haul 120,000 to 140,000 pounds," he says. "All you have to do is spec' it properly. That way, it will run for you, and you can still sell it at a reasonable price when you're finished with it." ■

TRUCK SPECS. The trucks included in the spec listings represent the premium owner-operator vocational trucks chosen by each manufacturer. Each includes only a limited range of the available components most often spec'd by owner-operators. Consult a dealer for information on other models and available components; contact information begins on Page 6.