Make sure your trailer wheels are also made for towing. Passenger car wheels, for example, are not designed to handle the higher air pressures needed for trailer tires.

Separation Anxiety

The subject of tires is hard to escape these days. It seems every TV newscast or daily paper has a story on faulty automobile tires. As a result of negative publicity and a plethora of litigation, the tire industry is in the middle of self-analysis. Manufacturers, industry organizations and regulators are now coming forward with new recommendations concerning tire selection, maintenance and replacement.

Since knowledge and proper equipment are the keys to a pleasant, trouble-free towing experience, we decided to take a fresh and in-depth look at tires for trailers. The new information and thinking we uncovered from manufacturers surprised us.

For example, though your trailer's tires may sport plenty of tread and have healthy-looking sidewalls (that are free of cracks), the same tires may be disintegrating from within, manufacturers tell us. Like time bombs, tires can let go without warning.

A blowout on a single-axle trailer can spell disaster. A sudden shift in weight can create an unstable load and trigger a rollover. Yet, even on a tandem- or triple-axle trailer, the results can be unpleasant, and may spark a chain reaction as the remaining tires bear an overwhelming load and fail as a result.

Before we explore why seemingly sound trailer tires can fail, let's talk about selecting the right tires for your trailer in the first place. When it comes to trailer tires, what you don't know can hurt you.

THE RIGHT TIRES

When purchasing or replacing trailer tires, look for the ST (Special Trailer) designation. Avoid using a passenger car (P) tire or light truck (LT) tires, as these do not have stiff, beefy sidewalls and other structural components to provide stability and handle the stress and dynamics imposed by a trailered load.

Modern ST tires feature materials and construction to meet the higher load requirements and unique demands of trailering.

"The major difference is reflected in the polyester cords used in ST tires," said Tim Fry, senior development engineer with Goodyear Tire & Rubber Co. in Akron, Ohio. "These cords are bigger than they would be for a comparable P or LT tire. Typically, the steel wire also has a larger diameter or a greater tensile strength to meet the additional load requirements.

"Because of the heavier construction for an equal volume of air space, an ST tire is designed to carry more load (than a P or LT)," says Fry.

What's more, the ratings on ST tires are standardized for axle ratings on trailers, according to Leo Garbarino, regional sales director for Carlisle Tire and Wheel Co. of Aiken, South Carolina. "If you have a 5000-pound axle, use an ST tire rated at 2540 pounds, so that two tires will meet the 5000 pound requirement in weight-carrying capacity," said Garbarino. "A P or LT tire is not rated the same way, so determining the load capacity can be difficult."

All the trailer tires bear the "ST" prefix. This means the tires have been built to withstand the loads, stresses, and dynamics of towing.

If the combined tire ratings do not meet the axle ratings, the tires will eventually fail-perhaps in a catastrophic blowout.

Bias ply trailer tires normally have two belts of steel in the tread area and extra sidewall cords to add stiffness. Most tires also include nylon belts to help resist separation caused by overloading, underinflation or excessive speed.

FAILURE ANALYSIS

Even properly rated tires can fail. The No. 1 cause is underinflation. This is particularly true of an ST tire, which relies on proper inflation to live up to its load rating. Without enough air pressure, an ST sidewall will not function as designed, and will eventually fail, usually in the form of a sidewall blowout. Tires lose approximately 1 psi per month as well as 1 psi for every 10-degree drop in temperature.

Overinflation is also hard on a tire, causing irregular wear and possibly a blowout. Yet, you can't always spot improper inflation with a visual inspection, so check your tires frequently with an accurate air-pressure gauge.

Long-term fatigue can also weaken a trailer tire. There are a number of factors that accelerate fatigue, but heat buildup from towing at high speeds is one of the main culprits, according to Fry.

"If you trailer nonstop from Phoenix, Arizona, to Las Vegas, in 100-degree temperatures at 65 mph, you use up much of the resources of that tire, and you don't realize it," said Fry.

Fry is not talking about wearing out the tread. It is the tire's construction that is breaking down. As heat builds up, the tire's structure starts to disintegrate and weaken. Over the course of several trips, this load-carrying capacity gradually decreases, according to Fry. Incidentally, all ST tires have a maximum speed rating of 65 mph.

One key to extending tire life on a tandem- or tri-axle trailer is to ensure that the trailer is riding level, thus distributing the load equally among all the tires. If the trailer tongue sits too high, the rear tires may bear the brunt of the load: with the trailer tongue too low, the front tires may be unduly

stressed.

OLD MAN TIME

Time and the elements can also weaken a tire. The structural components and bonding agents slowly break down. This is due primarily to internal air pressure forcing oxidation of the tire materials. Ultraviolet rays also attack the rubber on a tire left exposed to the sun. As a result, a 15-year-old tire that was rarely used may look virtually new, but because of the ravages of time and elements, it does not have the same strength as when it was new, according to Fry.

"As an estimate, in about three years roughly one-third of a tire's strength is gone, just because of the normal process of aging," Fry claimed. "We believe three to five years is the projected life of normal trailer tires."

REPAIRING ST TIRES

Should you repair a flat trailer tire? The answer depends on the size of the puncture, its location and method of repair.

If it is a small hole in the tread area, it can be successfully patched. However, if it is a jagged cut or a puncture in the sidewall, replace the tire.

There is only one way to properly repair a flat tire, and it is important to have it fixed as quickly as possible. You must remove the tire and patch it from the inside. You must also plug the hole from the outside. If moisture gets into the tire and reaches the steel belt, the steel will begin to rust in seven to 14 days. Three months later, the rust will cause a weak spot in the tire. That will lead to a separation.

Whenever you repair or replace a tire, always put on a new valve stem. Heat and age deteriorate the rubber in the stem and this results in leakage.

RADIAL VS. BIAS PLY

One old wives' tale has it that you should never put radial tires on a trailer. The sidewalls on radials, the tale goes, are too soft, allowing the trailer to squirm all over the road. Conventional bias ply tires are the way to go. . . or are they?

Today's trailer tires are available in both bias ply and radial versions. While both perform nicely, the two should never be mixed on a trailer.

While radials were frowned upon at one time, today there is wide-spread acceptance of these tires. Which should you use? The decision hinges on your towing style, according to Ray Evans, executive vice president for engineering, marketing and sales of Titan Tire Corp. in Mogadore, Ohio. "While it is true that a bias-ply tire can provide more side-to-side stability than a radial, a bias ply also runs hotter than a radial," said Evans. "If you are pulling a heavy load, and need an extra measure of stability, use a bias ply."

"On the other hand, if you do a lot of long-distance towing with a relatively light load at high speeds, the radial design may be better for you because it stays cooler than a bias ply," he said. The cooler the tire stays, the less it will fatigue.

IDENTIFY THE LOAD RANGE

The most critical factor in choosing a trailer tire is load range. You can find the load range molded into the sidewall of every tire. For towing, look for C, D and E load ranges.

Load ranges are based on specific inflation pressures. With a higher inflation pressure, the tire can carry more weight. Therefore, a load-range C tire is at its peak load capacity when inflated to its maximum pressure of 50 psi. In range D, you need to be at 65 psi to handle the increased load capacity. Load-range E tires must be set at 80 psi.

Trailer Tire Load Limits (in lbs.) at Various Inflation Pressures

PSI	35	50	65	80
ST115/80/13	880 (B)	1100 (C)		
ST165/80/13	990 (B)	1230 (C)		
ST175/80/13	1100 (B)	1360 (C)		
ST185/80/13	1200 (B)	1480 (C)		
ST195/80/14	1320 (B)	1610 (C)		
ST205/80/14	1430 (B)	1760 (C)	2040 (D)	
ST215/80/14	1520 (B)	1870 (C)		
ST205/75/15	1480 (B)	1820 (C)	2150 (D)	
ST225/75/15	1760 (B)	2150 (C)	2540 (D)	2840 (E)
ST215/80/16	1820 (B)	2200 (C)	2600 (D)	2910 (E)
ST235/80/16	2090 (B)	2600 (C)	3000 (D)	3420 (E)

This table (above) shows the relationship between air pressure and load capacity for popular sizes of trailer tires. The capacities apply equally to radial and bias ply versions. The letters following some capacities indicate the load range.

In order to select the proper load range, you must first weigh your trailer fully loaded. This means full of water, LPG and gear. Go to a truck stop or public scale and weigh the entire rig. While you are there, weigh each axle separately. This will let you know if you have exceeded the tow rating of your tow vehicle or are overloading one of the trailer axles.

There are other considerations in picking ST tires. For the trailer tires to manage the weight, all must be identical. Do not mix bias and radials tires. What's more, the load range and size of each tire should be the same. And each should have the same amount of tread wear. This becomes critical when replacing a tire.

When replacing a single tire, always run the same size outside diameter tires on the same axle. A smaller- diameter tire will carry more weight, and may become overloaded.

After a blowout on a tandem-axle trailer, you should replace both tires on

that side. The remaining tire was likely subjected to excessive loading and, as a consequence, may fail in the near future.

MAINTENANCE TIPS
When a trailer is in long-term storage, there are steps you can take to add life to the tires.

- Put the trailer on blocks to take weight off the tires.
- Lower the air pressure.
- Keep the tires covered to protect them from the sun's ultraviolet light.

When taking the trailer out of storage, make sure there are no cracks in the grooves and no wire showing. Cracks in the sidewall could indicate interior damage or separations in the tire.

MAXIMUM PSI?
As indicated earlier, maximum load range is attained only when the tire is at its maximum air pressure. Yet, should you maintain maximum pressure even if you are towing below the load range of the tires?

Tire manufacturers differ on this point. "You should maintain the maximum pressure at all times," says Carlisle's Garbarino. "There is no advantage to taking air out of the tire. With maximum pressure, the tire will perform and wear better, and you will get better mileage. Reduce the psi, and you compromise the functionality of the tire."

Titan Tire's Evans feels differently. "If you want a little softer ride, drop the psi a bit," he says. However, he cautions that: "They have to know the actual load."

"Trailer owners should set the pressure according to the load," says Goodyear's Fry, who provided the tire pressure vs. load chart that accompanies this story. "Yet, this is not easy to do without weighing the trailer."

"Once the weight is accurately determined, the pressure should be set when the tire is cold, not when it is hot."

All the manufacturers agree on one point: If you do not know the exact weight of your trailer, keep the ST tires at the maximum cold psi.

Based on updated thinking, there are ultimately three keys to avoiding tire trouble while towing: (1) Make sure your rig is equipped with the proper tires: (2) maintain the tires meticulously: and (3) replace trailer tires every three to five years, whether they look like they're worn out or not.

As my grandfather used to say, take care of your equipment, and it will take care of you.

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