Tire Safety: Benefits of Temperature & Pressure Monitoring

By: Gary Rothstein

Tires play a critical role in the handling, maneuvering and braking of any motor vehicle. No matter what the type…RV, SUV, EMS vehicle or commercial truck, tires are the only thing that contacts the road. Obviously, there is much more than just the vehicle resting on those tires…its overall safe operation is as well. By following some basic tire safety practices, you will not only drive with a greater degree of security, you will extend the usable life of your tire investment considerably.

Tire Manufacturers Agree

It is commonly agreed that a primary cause of early tire breakdown and poor tread life is under-inflation. Low tire pressure not only causes excessive heat build-up in the tire, creating dangerous driving conditions, but also shortens tire life. Unwanted heat will rapidly increase tread-wear and can even tear down retreads and destroy tire casings. As much as 90% of all tire breakdowns is the direct result of tire under-inflation

The Low Pressure Problem

Under-inflation of tires is a serious safety concern because it forces excessive flexing on the sidewalls. This additional strain on the tire can build up more internal heat, resulting in the aforementioned hazards and premature tire failure. Research completed by the U.S. National Traffic and Safety Administration shows that one in three cars or light trucks are being driven with at least one significantly under-inflated tire. These improperly inflated tires wear out more quickly because they put more drag on the road (rolling resistance). This also leads to a reduction in fuel economy, something most individuals and fleet owners definitely want to avoid.

Pressure Influences Tread Wear

Maintaining proper tire pressure levels improves tread mileage as indicated below:

• A continuous 10% over-inflation reduces tread wear by 5%

• Tire Life will be reduced by 30% if constantly under-inflated by 20%

• For every 10 PSI (pounds per square inch) under-inflated, fuel consumption is increased 0.5%

• A continuous 20% under-inflation decreases tread wear by 25%

By example, consider at an average price of a $250, a 20% under-inflated commercial truck or RV tire costs about $50 each in lost usage. Add in the costs of downtime, repairs and service fees; the picture becomes even clearer.

Fuel Efficiency Impact

Tire inflation also has a direct impact on fuel efficiency, since under-inflated tires can consume a greater percentage of each gallon of fuel just because of rolling resistance. The US Department of Energy advises that tires can account for as much as a 3.3% difference in fuel efficiency. The Department of Transportation's (D.O.T.) studies have shown that the United States could save over 4.2 million gallons of fuel per day… just by keeping tires properly inflated!

Managing Fleet Maintenance Costs

Tires can account for as much as 36% of a vehicle's maintenance cost. Yet this essential maintenance procedure, of regularly checking tire pressure, is one of the most difficult to enforce. Even the best preventive maintenance programs will discover truck drivers and even maintenance personnel will often short cut this time consuming procedure. In certain cases some tires are skipped, assuming if a few are good, the rest are as well. In other cases, this extremely important procedure is ignored entirely. With tires usually being the highest maintenance expense, can any fleet afford to ignore the direct cost consequence of poorly maintained tires?

Make Checking a Habit

To guarantee the greatest tire life, keep them properly inflated at all times. For smaller vehicles driven locally, check the tires at a minimum of once a month. If you travel longer distance for work or play, check the tires more often. If you're a truck driver accustomed to "thumping tires," consider that this practice is unreliable and unsafe. An under-inflated tire is extremely difficult to detect by visual inspection or by thumping. Utilizing either of these methods is an accident waiting to happen. Don't guess, don't thump, measure with a quality tire gauge or a real-time tire monitoring system.

Dealing with Duals

Vehicles with dual tires have a hidden tire (inner tire position) behind the outside tire. They are more difficult to reach and easier to neglect. Checking the air pressure of the inside tires is an utter necessity. Even if an inside tire is completely flat, it will be supported by the outside tire, making it appear properly inflated. In the case of a flat inside rear tire, which appears properly inflated, the outer tire is doing all the work. The result is a tire at major risk to overheat, rupture or if a retread, the possibility of the tread releasing from the casing…something that leads to major highway accidents.

Wireless Tire Pressure Monitoring

In the case of multi-tire motor vehicles such as commercial trucks, RVs, fire trucks and EMS vehicles, there are many tires to monitor. This in itself makes for time-consuming work, plus these tires need to be checked much more often. By the nature of these types of vehicles, they are often in consistent use, over longer traveling distance, in demanding environments and isolated travel areas. To help with the task of supervising tires, there are products called Tire Pressure Monitoring Systems, sometimes referred to as TPMS. Utilizing a wireless sensor (which is either screwed directly onto the valve-stem or mounted internally in the tire) each individual tire on the vehicle can be monitored in real time. The actual pressure levels and temperature are then displayed on a small unit in the cab.

If you are considering investing in a Tire Pressure Monitoring System (TPMS), at a minimum look for these feature and capabilities:

• Alerts when tire pressure is too low
• Alerts when tire pressure is too high
• Alerts when the tire temperature is too high (heat is what destroys tires!)
• Alerts driver with both visual and auditory warnings
• Capable of monitoring both the vehicle and a trailer

Other things to consider when evaluating TPMS solutions:

• Are the wireless tire-sensors internally or externally mounted? - External mount tire sensors are easier to install, easily removable in case of a tire change and can be moved to a spare if need be. The more tires you have, the greater the savings; it is costly to dismount/remount internal type sensors, as apposed to external.

• Does it monitor the tires continuously, even when parked? - Tire pressure is most accurate when the tire is cold, before the vehicle is moving. Knowing the pressure level before setting

out on a long trip can prevent uncertainty later on down the road.

• Are the pressure (high and low) and the tire temperature alert levels adjustable by the user? - Setting the trigger levels can be advantageous for applications with varying loads, such as a truck/trailer combination. Some vehicles experience tire cupping after a load change that can also cause uneven and excessive wear.

• Does it monitor tire temperature? – For safety reasons, it is very important to know tire temperature. A tire can be as much as 30% under-inflated and still appear to be normal (rolling resistance increases the heat, which in turn expands the tire). This is the same reason we measure pressure when the tires are cold.

General Tire Safety Recommendations

• Follow inflation guidelines indicated on tire sidewall, while making sure they are rated to support more than the gross weight of the vehicle

• Commercial trucks, trailers and RV's require an accurate reading (of the fully loaded weight) for proper tire inflation to carry those loads. These types of vehicles are usually weighed to obtain an accurate reading.

• Check the pressure on all tires including those on the tow vehicle, trailers, 5th wheels, etc.

• Check pressure when the tires are cold, prior to driving the vehicle

• Replace tires every three to 5 years (regardless of mileage)

• Visibly inspect tires for blemishes, uneven wear and tire pressure at least every 30 days.

By monitoring your vehicles tires, you will increase their life, reduce fuel consumption and provide unprecedented value in improved handling and ultimate safety.

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