



# COMMERCIAL FLEET TIRE DIGEST

*The authoritative guide to reducing commercial tire expenditures from  
Pressure Systems International,  
the global leader in Automatic Tire Inflation Systems*

VOLUME 12 ISSUE 1

JANUARY 2018

## How to Inspect Your Tires

On March 7, at the Technology and Maintenance Council Annual Meeting and Exhibition in Atlanta, GA Al Cohn will moderate the popular "Fleet Family Feud" during the S-2 Tire and Wheel Study Group session.

Training your drivers and technicians to properly inspect tires is well worth the time and expense because it will save your fleet significant dollars over the long term. Drivers can be the early warning system for alerting maintenance regarding tire concerns.

The number one tire issue drivers should be trained thoroughly about is measuring the air pressure. In order to maximize tire mileage, air pressure must be properly maintained to insure the tire is running down the highway with the correct tire footprint or contact patch. When the tire footprint is distorted due to underinflation and high loads, irregular tire wear will develop leading to premature tire removals. Drivers kicking their tires with their boots or using a club to check their tire pressures is clearly not recommended or endorsed. It is impossible to differentiate between a 70, 80 or 100 psi tire using a baseball bat. A completely flat tire, which is not the norm, is really the only time a club identifies the problem.

The industry definition used by the Commercial Vehicle Safety Alliance (CVSA) and TMC is that a tire is considered flat when the measured air pressure is 20% below the target specification that you have chosen from your tire suppliers' published load tables. If your fleet is running 100 psi in your tires and your driver or technician measures a tire to be at 80 psi, then that tire should be removed from service and thoroughly inspected. There is a reason why the pressure in a tire is so low.

Pressure gauges are not very accurate even when they are brand new; a typical stick gauge is only accurate to +/- 3 psi. Dropping the gauge a few times on the hard concrete will make it even worse. So, in order to be useful, tire gauges need to

be calibrated. Truck stops all have a calibrated air gauge checking station. Your fleet should also have one of these checking stations in the shop and gauges should be checked weekly. If out of spec, either throw the gauge away or purchase stick gauges that are calibratable using the bottom set screw.

Having drivers inspect and check tires for any signs of irregular wear such as depressed wear, cupping and fast shoulder wear will help identify the root cause. Running your fingers across the tread surface is a great way to feel for any signs of uneven wear. It may be caused by running the tire underinflated, having worn suspension components or due to vehicle alignment issues. It could even be that the specific tire make and model is not the best choice for your specific vocation. It is also possible to have a tractor in perfect alignment while the trailer is misaligned. This could lead to irregular wear developing on both steer and drive tires because the trailer forces the tractor to dogleg left or right, which leads to tread scrubbing.

The TMC of the American Trucking Association publishes the definitive guide to identifying specific tire wear conditions and the causes [here](#).

Drivers should also regularly inspect tires for side wall damage, leaking valve stems and if using an automatic tire inflation system, any leaks in hoses.

Training your driver and technicians on Tires 101 is really important to help improve any tire program. Many fleets train their drivers about tires in their first week of employment. This is great, but it should be done on a recurring basis. Check with your tire supplier for assistance in putting on tire classes.

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## Q&A PSI ANSWERS YOUR QUESTIONS

**Q.** When we measure our tire tread depths, depending on the specific spot we are taking the measurement, it can vary by 2/32" within a couple of millimeters. Why?

**A.** Many tires have stone ejectors molded into the bottom of the groove. If the tread depth gauge hits a stone ejector, the measurement will be off around 2/32" on the low side. Measure between the stone ejectors.



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VOLUME 12 ISSUE 2

FEBRUARY 2018

## **Increasing Tire Removal Miles & Improving Fuel Economy**

If you are attending the TMC Annual Meeting and Exhibition in Atlanta next month, plan to attend the S2 Tire-Wheel session on Tuesday, March 6 at 4:45. Al Cohn will be moderating the popular Family Feud panel.

The goal of every good tire program is to maximize tire removal mileage and to maximize vehicle fuel economy. Tires play a major role in increasing vehicle fuel economy. The average price of a commercial truck tire is in the \$400-\$500 range depending on wheel position and tire make/model, therefore getting the most miles out of a tire casing is critical to reducing overall tire cost/mile.

Let's first take a look at ways to increase tire miles. Maintaining proper Inflation pressure is always at the top of this list. When the proper tire pressure is maintained for the life of the tire, the tire footprint is at the designed optimum width and length. The tire footprint is the key to keeping the tire from developing irregular and uneven wear patterns. Tires that generate cupping, high-low lug wear, depressed ribs and diagonal wear patterns lead to premature tire removals and significantly reduce tire removal mileages. Identifying the proper tire inflation pressure is also critical. The correct tire pressure is based on the heaviest load the tire will see in the real world. The corresponding cold tire pressure is then identified by using load/inflation tables published by all the tire companies. Cold tire pressure is based on an ambient temperature of 70° F.

Mismatched tire duals will also lead to early tire removals. Tire duals should be maintained within +/- 5 psi of each other to insure the tire revolutions per mile are as close as possible. When the outside dual is at 100 psi and the inside dual is down to 70 psi (due to some type of leak), the tire revolutions/mile will be significantly different. The 70-psi tire by trying to keep up with the 100-psi tire will start skipping, hopping and dragging as the vehicle runs down the highway. Irregular wear will develop quickly. Even after the situation is corrected, the irregular wear will continue to occur until the tire is changed out.

When replacing dual tires be sure the tire circumference of the two tires is as close

as possible because if they are not, the same issues occur as with dual tires that are running at different pressures.

Irregular trailer tire wear is very common as trailer tires are the most neglected. Automatic tire inflation systems have become the new norm for trailers and dollies. Air is automatically added to any trailer tire that is running at less than the control box pressure setting. Irregular wear is therefore, dramatically reduced and the result is increased tire miles with these systems. Fuel economy is also increased when tires are at the correct operating pressure.

Running tires down to the legal DOT minimum of 4/32" for steers and 2/32" for drive and trailer tires may lead to stone damage and cutting/tearing of the tire casing. It is important to protect your valuable tire casing to increase the probability of a successful retread. Many fleets only run their tires down to the 5-7/32" range in order to protect the casing.

Fuel efficient tires always have a price premium attached compared to the "regular" or baseline tire. The compounds used to keep a tire running as cool as possible typically cost more and these compounds are the secret to fuel efficient tires. In the case of drive tires, the baseline tire may have 32/32" of tread rubber compared to the fuel-efficient version that may come with a decreased 26 or 28/32". The lower tread depth tire generates less heat and will improve fuel economy. However, tire removal mileage will be reduced since the starting point is a shallower tread depth. In linehaul operations, each 32" of rubber can equate to 15,000 or more miles. The potential tradeoff of fuel efficient drive tires is less tire removal miles depending on the initial tread depth.

Work with your local tire professional to choose the best tire options for your fleet to optimize both tire removal miles and fuel economy.

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# COMMERCIAL FLEET TIRE DIGEST

An authoritative guide from Pressure Systems International to help reduce costs, increase safety and improve operational efficiencies associated with tires.

VOLUME 12 ISSUE 3

MARCH 2018

## Telematics and Tires

The TMC S.6 Study Group presented on guidelines for investigating and correction of wheel end thermal events at the Atlanta meeting. "Get Involved"



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Telematics, telematics, telematics! A common word used nowadays in the transportation industry. But, what is it, how does it work, and how is it going to help me?

In the early days of the telematics evolution, most in the transportation industry used it to simply communicate certain items back to the fleet via either satellite or cellular communications. These items initially included location, but other systems quickly came on board such as engine diagnostics and other vehicle metrics.

Fast forward to today. It is rare to have a day go by that doesn't announce the launch of a new telematics product or a company entering the commercial vehicle market. With so many private and for-hire fleets, O/O's, and leasing companies all having different 'hot buttons', it is no wonder why so many of the telematics solutions provide something a little different than the others.

These telematics now present fleets with tremendous opportunities to reduce costs through cost mitigation, preventative/predictive maintenance as well as the ability to analyze data to fine tune maintenance practices. The costs associated with obtaining the data is decreasing from early on and with the various types of data available increasing, developing an ROI that the fleet CFO supports is becoming easier. This is regardless of fleets having their own maintenance or contracting to a 3rd party. With tires being the #2 operational equipment costs behind fuel, combining telematics with tires is an obvious approach to reducing costs. Products like Automatic Tire Inflation Systems (ATIS) and Tire

Pressure Monitoring Systems (TPMS) are becoming the norm (not to mention legally required in most applications depending on where Federal and State legislation goes). As a result, events such as a tire taking air, the notification of low tire pressure or excessive temperature are now readily available for transmission back to operations, bypassing the driver. Unless you are an O/O, most fleets agree that relying on the driver to pass along 'events' is less than desirable. The value of having this information in the fleet manager's hand before the driver drops the unit off at the garage is significant.

The next question for the fleet manager is "What do I do with this alert and who do I send it to?" With the right system in place, many fleets are using this to schedule maintenance before the vehicle arrives at the shop and to better optimize their shop resources. Consider the following example: A truck is driving down the road and the ATIS light comes on and stays on. The fleet operations department knows that there is a service center that the company has a contract with at the next exit. The system can check the inventory of their tires to determine if the correct tire is in stock. An alert is sent to the service station that this vehicle with the tire inflation light on may need a puncture repair or a new tire. This is where all these conversations and sensors pay off - the driver has it already planned out for them and can make the most out of their driving time.

This is just the beginning. Once the pathway for the data is established and the right way of analyzing the data is set up, fleets are poised to attain a whole new level of efficiencies.

## Q&A PSI ANSWERS YOUR QUESTIONS

**Q.** I am considering installing TPMS sensors that attach to the tire valve but concerned about theft. What can be done to make it difficult to hide/protect the sensor ?

**A.** There are a few styles of sensors available. If you want to stay with the valve-stem mounted design, there are some that are theft-resistant and require a special tool to remove. Other options include an internal sensor that is typically banded to the rim, or a wheel mounted design that is attached using the wheel nuts, making removal more difficult. This version may also include a flow-through feature which provides the ability to add air to the tire, without removal of the sensor.



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VOLUME 12 ISSUE 4

APRIL 2018

## Wheel-end Thermal Event Root Causes

Tires are not prone to self-ignition, as a tire must be heated to at least 400°C (750°F) for a period of several minutes prior to ignition.

Source: Wikipedia



One catastrophic wheel-end thermal event can lead to total loss of your trailer and cargo, costing well over \$100K. But how do you determine the root cause when everything is burned to a crisp?

Forensics after a wheel-end thermal event can be very difficult to determine the root cause and, in many cases, inconclusive. Making it even more difficult is that the evidence may have been destroyed by the thermal event. There are many potential contributors to consider plus there could be a combination of these influences involved. For example; Was their sufficient wheel-end lubrication? Was the lubrication contaminated? Were the bearings adjusted correctly? Were the brakes dragging? Was there an issue with the brake valving? Was the tire flat? Was the tire rubbing on the trailer? Did the operator have an influence? Did road debris get lodged causing an issue with the brakes or free rotation of the wheel-end? And the list goes on and on....

TMC's S6 committee, which focuses on chassis and brake systems, assembled a task force at the request of TMC members to investigate the causes of trailer wheel-end thermal events. In effort to gather information a survey was sent to 640 fleets asking for input on their fleet operations as well as specifics on any, and all, thermal events the fleet may have experienced. Of the 640 surveys sent, only 26 surveys were completed and returned. A summary of the 26 completed surveys was reported to the members in March at TMC18 Annual Meeting and Transportation Technology Exhibition in Atlanta, GA. This led to much discussion about the components involved, the responsibility of the drivers and the

operational characteristics of the systems as well as some members sharing their thoughts on the potential root cause(s) of their particular wheel-end thermal event. Given the high level of interest expressed by the fleets in attendance, and the low initial response from the first survey, the group decided to send the surveys again in hopes of gathering more data. We at PSI encourage the fleets to complete and return their survey when received.

As the industry continues to focus on gathering information in hopes of preventing these thermal events, a good place for the fleets to focus is ensuring they have adequate pre-trip inspection procedures that their drivers are completing and documenting. This could prove to be very important to help rule out potential contributors if you find yourself trying to establish a root cause to a wheel-end thermal event.



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## Q&A PSI ANSWERS YOUR QUESTIONS

**Q.** How can you help prevent your tires from potentially contributing to a wheel-end thermal event?

**A.** Underinflated tires will cause the tire to operate at higher temperatures. Maintaining proper tire inflation will help your tires operate within the intended temperature range.



Have a Happy  
and Safe  
Memorial Day.  
Please  
remember all  
men and women  
who have died  
in military  
service to the  
United States.

## **BRAKES, LIGHTS, AND TIRES**

Regardless of the trucking industry events that we attend throughout the year, ATA, NACV, Mid America Trucking Show and gatherings of truckload, LTL, intermodal, private, moving & storage, and tanker fleets, there is typically a seminar session covering the common maintenance issues that are found during vehicle roadside inspections. For most fleets, regardless of their specific trucking niche, the top three maintenance-related issues are consistently brakes, lights, and tires - not necessarily in any particular order. The Commercial Vehicle Safety Alliance (CVSA) concurs that the top violations & resultant citations come from those three.

Since fleets are aware that these issues are prevalent and being scrutinized by CVSA, why do citations continue to be written for them after all these years? That is the \$1000 question.

Light issues should be easily checked by the drivers in their daily vehicle walk-around to confirm that all the lights are working properly. However, many drivers just do not want to take the extra time to have maintenance get the lights repaired/replaced before the trip even though it's clearly a safety issue if some are not functioning. While driving at night recently near a bustling Virginia port, I was amazed at the high percentage of container chassis running with one or more lights out. Newer technologies provide easy light-out detection. Many fleets are including this feature in their specifications.

There is discussion around the responsibility of the driver to determine if the brakes are out of adjustment. Unless the brakes are equipped with some type of visual indicator or electronic sensor (which very few currently are), it is very difficult for a driver to check. Most of the time, this becomes a technician responsibility. Automatic Slack (brake) adjusters (ASA) are mandated, but they still require maintenance and inspection to ensure proper performance. Conversion to air disc brakes provides benefits in this area as compared to conventional drum brakes with ASA's.

Analysis of the CSA tire citation data is very interesting. Tread depth below the

legal limit is one of several major reasons why citations occur when vehicles are inspected. The legal limit is 4/32" for steer tires and 2/32" for all other wheel positions. The big problem with drivers is that they may visually inspect a tire for low tread depth but only look at one small section of the tire. In many cases, the low spot of the tire may be well below the legal limit but the driver happens to be inspecting the tire only at the 12 o'clock position where there is plenty of remaining rubber. Drivers should be trained to measure tire tread depth in several locations around the circumference and in more than one groove. Issues such as a brake skid or fast shoulder wear can create localized areas on a tire that could generate a CVSA violation.

Finding a tire below the legal tread depth during a roadside inspection will place the vehicle out of service. The driver is then obliged to arrange for an expensive roadside service call to get a replacement tire and get back on the road. The same goes for a "flat" tire which is defined as 50% or more below the air pressure molded onto the tire sidewall. A typical 11R22.5 radial tire has a maximum allowable pressure of 120 psi. When the tire is measured to be 60 psi or below, the tire is considered flat and the vehicle is now out of service. The driver is NOT allowed to drive to the next truck stop to get air.

Checking tires with a calibrated pressure gauge during the driver walk-around is clearly worth the time and effort. Any low tire can be either replaced or repaired if the tire is underinflated because of puncture or damage. There is really no excuse for getting a citation for an underinflated or flat tire. Using a billy club or baseball bat to check tires cannot accurately identify the tire inflation pressure. Only if the baseball bat is used to thump a tire with 0 psi will the driver likely be able to tell the tire is completely flat.

Fleets could reduce some of their brake, light and tire citations by running a serious training class for both technicians and drivers. This instruction would also reduce roadside service calls and improve just in time delivery and safety.

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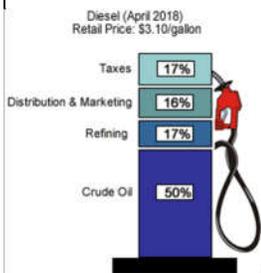
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## Choosing the Optimum Tires for your Fleet

To view verified low rolling resistance (LRR) new tires and retreads go to [Smartway](#)



Source: US Energy Information Administration

It's not easy determining what the best combination of tires is to run in your fleet. The ultimate tire for your operation would be the best of all worlds: great fuel economy, maximum tire removal miles, casings that can handle multiple retreads and traction in all weather conditions. However, tire managers recognize that choosing the best tire is a compromise. Each wheel position, steer, drive, trailer and dolly require different characteristics in order to optimize performance. Different service vocations (ie. Linehaul, P&D, mixed service) also require different tire solutions.

Acquisition price should not be the final decision maker in choosing the proper tire. The entire life cycle cost, from initial mounting to multiple retreads is most important. Tire brand "A" may cost 20% more than tire brand "B", but if casing retreadability is significantly better with brand "A" then the overall cost/mile will clearly favor the tire which initially had a higher purchase price. Fuel economy is another major consideration. If Tire "C" outperformed tire "D" by 3 percent in fuel efficiency, then tire "C" would be able to justify a higher initial buying price.

Every fleet is unique. To determine what tires will perform best for your fleet and generate the lowest cost/mile over its entire life cycle requires a serious tire evaluation. You can't just track a couple of trucks and trailers for the evaluation. There are so many variables that can affect tire performance that unless the test sample size is large enough, you really won't be able to determine which is the best combination of tires. Some of these variables include the vehicle make/model, load, service vocation, tires removed early because of damage/punctures and of course the driver. Industry studies over the years revealed that drivers can influence treadwear by up to 35% depending on how aggressive they drive. The TMC of the Ameri-

can Trucking Association recommends a sample size of 30 tires (if fleet size can accommodate that) to be statistically significant.

This all means that a fleet manager must take the time to really think through any tire evaluation. The worst scenario is running an evaluation for 2 or 3 years and not being able to identify which tire has the overall lowest cost/mile.

With an evaluation of 30 trucks, the tires should all be mounted within a 30-day period to minimize variables associated with weather. In the hottest months, tires will have a faster wear rate and also tend to pick up more puncturing objects. You will need to record vehicle odometers and brand or barcode tires with a unique number. Tire pressures should be checked on a regular basis (with a high quality gauge) as low tire pressures will adversely affect fuel economy, mileage and retreadability. When test tires come out of service, the reason must be identified and final miles recorded. When the casing is sent for retreading, confirm that the casing survived the retread process and confirm which tread design (drive or trailer) was cured onto the casing.

The most difficult issue associated with tracking tires over time is the need to keep detailed records of the test tires. Important data includes the history of mounting, dismounting, repairs, retreading, rotation and final casing removal analysis. Your maintenance associates must be dedicated to the process. It is certainly impossible to track every tire in your fleet but a statistically valid sample size will produce the same results.

Always work with your local tire professionals to help design a tire evaluation program to help you choose the best overall tire combination which makes sense for your specific fleet service vocations.

### Q&A PSI ANSWERS YOUR QUESTIONS

**Q.** My fleet uses tire inflation and relies on the driver to manually report when the warning light is illuminated. Can the tire inflation system be linked into our trailer telematics?

**A.** In most cases, yes. There are a plethora of telematics providers and you will need to work with your vendor to ensure compatibility.

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# COMMERCIAL FLEET TIRE DIGEST

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VOLUME 12 ISSUE 7

JULY 2018

## Widebase Trailer Tires – Maximizing Mileage

The fire that caused widespread devastation in Northern California was started by a flat tire.

Read [article](#).

Widebase or "Super Single\*" tires have been increasing in popularity in recent years. The two most popular widebase tire sizes used in the trailer industry are the 445/50R22.5 and 455/55R22.5 with the 445 being the most popular. The 455 size will support a higher load capacity and is used in very heavy applications.

\*Interesting trivia regarding the term "super single": Super single is a Goodyear copyright that was first introduced years ago but is still used incorrectly by many fleets and as well as trailer manufacturers. Widebase tires is the proper terminology.

The advantages of using a single widebase tire to replace two dual tires include:

- Weight savings
- Fuel economy
- Inventory reduction / tires and wheels

**Weight Savings:** Widebase tires mounted on aluminum wheels can save up to 1000 pounds when mounted on drives and trailers, which can have a big impact to a fleets bottom line most dramatically when additional load can be added.

**Fuel Economy:** Even though you are replacing two tires with one, the characteristics don't translate on a 2:1 ratio. For example, two 11R22.5 duals have approximately 22" of rubber on the ground. A 445/50R22.5 has 445 mm of tread rubber which equates to 17.5" rubber. This is equivalent to 20% less rubber on the highway. Why is this important? For every revolution of a widebase tire the tire is working "harder". Therefore, maintaining proper tire inflation on widebase trailer tires is critical to maximizing mileage and reducing irregular wear. Running dual trailer tires 10% underinflated is not awful because there is still plenty of air to support the typical trailer load. However, running widebase tires 10% underinflated is an issue. These heavier, bigger tires will generate more heat running underinflated/fully loaded at high speeds for an extended period of time and the footprint will change leading to irregular wear and potential tire failures.

When using trailers equipped with widebase tires most fleets will run the popular automatic tire inflation systems because maintaining the recommended tire inflation

ALL the time is so important.

In order to minimize irregular wear on trailer tires (both widebase and duals) be aware of the following;

- Malfunctioning ABS (localized wear and flat spots)
- Out of balance tire/wheel assemblies
- Improper bearing conditions may allow axle end movement leading to misalignment
- Drivers NOT waiting for the complete release of the trailer brakes before driving off
- Improper hub and brake drum conditions which create misalignment
  - Excessive bearing end play
  - Brake drum not seated correctly
  - Mounting faces of hub/drum/wheel not clean
- Trailer alignment
- Proper suspension system maintenance
- Some tire makes/models may be more susceptible to irregular wear

Another important issue with widebase tires is retreading. Over 85% of fleets retread their tires. The cost of a retread is typically one third to one half the value of a new tire. As a result, it is very important to take excellent care of your tire casings. Running tires underinflated is the biggest factor in reducing retreadability of the casing. The excessive heat generated by the additional flexing of the sidewalls in combination with the longer tire footprint (more rubber on the road) when the tire is running with low air pressure will significantly affect the ability of the casing to pass the retread process. A widebase tire is very heavy compared to a dual tire size. The result is there is a lot of heat buildup in a widebase especially if run even 10% underinflated. Fleets report they can usually retread a widebase tire casing one time if air pressure is properly maintained. Also, be aware that in the event of a blowout the rim is typically destroyed beyond repair, which can be very costly especially if it is an aluminum rim.

Always work with your tire professionals to determine if there are advantages of widebase tires for your fleet. TMC offers a recommended practice on this subject, RP251 ("Irregular wear of widebase tires used in trailer position").

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When using trailers equipped with widebase tires most fleets will run the popular automatic tire inflation systems because maintaining the recommended tire inflation ALL the time is so important.

In order to minimize irregular wear on trailer tires (both widebase and duals) be aware of the following;

- Malfunctioning ABS (localized wear and flat spots)
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- Improper bearing conditions may allow axle end movement leading to misalignment
- Drivers NOT waiting for the complete release of the trailer brakes before driving off
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VOLUME 12 ISSUE 9

SEPTEMBER 2018

## Protect Your Tire Casings

Two excellent sources for additional information on retreading is TRIB (Tire Retread Information Bureau, [retread.org](http://retread.org)) and RTA (Retread Tire Association [retreadtire.org](http://retreadtire.org))

More than 85% of all commercial trucking fleets retread their tire casings. Retreads cost between 33% and 60% of a new tire depending on tread depth, design, and compound. It is financially advantageous to a fleet to maximize the number of retreads per casing. Commercial truck tires are designed to survive multiple retreads. It is critical for fleets to have a serious tire program that effectively protects this very valuable tire casing asset. Maintaining proper tire inflation pressure is the most important consideration when trying to maximize the number of retreads. When a tire is running hot due to underinflation, the rubber compounds will deteriorate leading to separations. These compounds will eventually degrade and will not survive the retread process.

Every fleet should fully understand the retread process and choose a reliable retreader. Your retreader should be able to provide you with valuable casing analysis data which will lead to a better overall casing management program.

A visit to your local retreader will aid in understanding their operation and equipment and to ensure it meets your specific needs. Here are the general retreading process steps:

- Casing Inspection
- Buffing
- Casing Repair (including skiving)
- Apply tread
- Curing
- Final Inspection

Casing inspection requires putting the tire on a spreader and thoroughly inspecting both the inside and outside in a well-lighted environment. Since a technician can only identify so many casing issues, most retreaders today also use non-destructive, high tech inspection machines. Ultrasonic inspection machines will identify variations inside the tire casing. High frequency sound waves pass through the casing uniformly when there are no issues. If there is a separation or some other variation in the casing, the sound waves are disrupted and the suspect area is

marked with a crayon. Many retreaders also use shearography machines that use laser imaging to show trapped air within the casing. Separations are identified when trapped air is present. There are also high voltage electronic inspection devices to help identify punctures and X-Ray machines to recognize broken wires.

The buffing process removes the old tread. However, the subsequent repairing step is the key to casing success. Fleets typically have different criteria when it comes to casing repair such as a maximum number of nail hole repairs allowed. Skiving, which is the process of removing the loose rubber, ply and injury on the surface after the buffing operation, requires a reinspection of the buffed casing and cleaning out any injuries.

There are two options when applying the tread; A machine can apply and extrude uncured rubber, or it can apply a precure tread rubber that already has the tread design.

Curing is the final step before final inspection. If uncured rubber was applied to the casing, a mold cure is necessary. When a precure tread compound was applied, the retread is put into a curing chamber. Final inspection involves a person visually inspecting the final product.

The TMC has published a detailed guide to understanding the retread process: RP 224

The best way to determine if your tires are lasting multiple retreads is to do a scrap tire analysis on a regular basis. When you inspect your scrap tire file and discover, for example, that there is too much tread rubber remaining on your second retreads, then you may have a tire durability issue. Maybe for your specific service vocation it may be beneficial to only retread one time as you are clearly not getting your money's worth if there is 9 or 10/32 of rubber remaining on those second retreads.

Always work with your tire professional to help optimize your retread tire program.

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# COMMERCIAL FLEET TIRE DIGEST

An authoritative guide from Pressure Systems International to help reduce costs, increase safety and improve operational efficiencies associated with tires.

VOLUME 12 ISSUE 10

OCTOBER 2018

## Tire Surveys/Inspections: What Can I Learn?



P.S.I. celebrated the company's 25th anniversary during the annual Fleet Technology Event co-sponsored by Meritor and P.S.I. held October 9-10 in San Antonio, TX.

Is it worth the time and effort to do a serious tire survey? The simple answer is YES. Tires are a significant operating expense for every fleet. With the average price of a commercial truck tire in the \$500 price range a tire survey can be crucial in getting the most out of your tires. A comprehensive survey should include tires currently running on vehicles and those sitting in the scrap pile.

Inspections by drivers and technicians on a regular basis are key to identifying both tire and vehicle issues. Regardless of who is performing the survey, they need to have a basic understanding of tread wear. Drivers can also provide additional input, such as vehicle handling, that could be the result of alignment issues, wheel balancing, etc. Inspection of the tires that are still on the vehicle will allow for repairs to be made to the vehicle causing the irregular wear. If you wait until the tires are in the scrap pile, it will likely be too late.

Tires with one sided wear, heavy wear on one shoulder or feather wear across the tread surface are typically related to vehicle alignment issues. For example, a common irregular wear condition is outside shoulder wear on both steer tires which is typically a result of excessive toe-in. Toe is the alignment angle between the two steer tires in the longitudinal direction (see figure 1). Excessive toe-in or toe-out can lead to accelerated tire wear. These tires will require replacement before reaching their full mileage potential.

Another common type of irregular wear found in routine inspections is where one steer tire has outside shoulder wear and the opposite steer tire has inside shoulder wear. This is typically caused by misalignment of the drive axles. When tires develop wavy and cupping type wear around the tread the finger can be pointed to the tire/wheel assembly being out of balance.

When a tire exhibits significant irregular wear 360 degrees around the tread and is a combination of depression, cupping, wavy and heel/toe wear, then the tire has been run substantially underinflated for an extended period. This is commonly found on inside duals where the outside tire is running at the proper inflation pressure while the inside dual may be 30 psi or more below the proper inflation pressure.

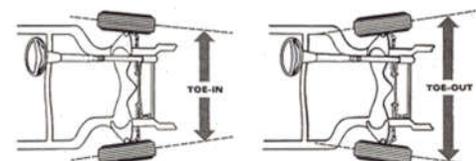
Routine air pressure checks will clearly reveal tires with punctures or leaking valve stems/cores. Getting these tires thoroughly inspected and repaired quickly could save an emergency tire-related roadside service call and preserve the casing.

Inspection of your scrap tire pile will help identify many of these same issues. However, repeating these inspections on a regular basis will help determine if your tire survey and corrective actions are providing the anticipated benefits. Scrap tire inspection is also a good way to determine if you are getting the most out of your retread program. If your goal is to retread every casing two times, your scrap tire pile should be comprised of second worn out retreads. If your analysis reveals that most of the tires in the pile are only retread #1, there is an issue. Why was the tire rejected by the retreader for the second retread? Was it too many nail punctures? Rubber degeneration due to running underinflated?

As an example, one particular fleet's goal was to retread casings two times. Their scrap tire analysis revealed that the tires in the pile were clearly second retreads, however, the tires still had most of their tread depth remaining. These second retreaded tires were wearing faster after only a few months in service. Based on the harsh service vocation this particular fleet operated, it was not worth the cost to retread a second time. Their policy is now to retread just one time!

Another reason for a good tire survey is that fuel economy dramatically declines when tires are not wearing smoothly and evenly. Early identification of these tire problems will improve overall vehicle fuel economy. Training drivers and technicians how to properly and thoroughly inspect and analyze tires will help optimize your tire program and reduce costs. Always work with your local tire professionals who are available for training and help in performing tire surveys.

### Toe In/Toe Out



Source: Tire Information Center

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up our 25th  
anniversary year,  
we wish all our  
associates,  
partners and  
customers a  
Merry  
Christmas and  
Best Wishes  
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## Inspecting Your Wheels

In order to give your tires the best chance to live a long life, they must be mounted on wheels that are free of problems and properly maintained. Proper maintenance and inspection of disc wheels is always important for enhanced vehicle safety and performance.

**Inspecting Wheels During Tire Inspections:** Don't limit your inspection to the tires. Visually check the wheels as well. Look for excessive corrosion buildup, cracks in metal, bent/broken flanges, loose/missing/damaged nuts, bent/stripped studs. Rust streaks indicate loose nuts or improper nut fit.

**Inspecting Wheels During Tire Changes:** A more thorough wheel inspection should be performed during a tire change. After the tire is removed, check all metal surfaces including the tire side of the rim and the mounting area of the disc. Look for any possible out-of-service conditions. Replace damaged wheels, components, nuts, studs and valves. Most fleets replace the valve grommet when changing the tire. Now is the time to completely remove rust and dirt from all surfaces. It is very important to clean the surfaces where the wheels mount together and against the hub or drum, in order to ensure proper clamping. Be certain that the hub pilots are free of corrosion to allow the inner wheel to fully seat against the hub or drum.

**Proper Disc Wheel Mounting:** Always be certain to use the proper nut torque and tightening sequence when attaching wheels. Additionally, never mix wheel mounting styles on a wheel end. Disc wheels are designed for either hub-pilot or stud-pilot designs. While hub-pilot is by far the most common today, there are still some stud-piloted (or ball seat mounted) hubs operating in the market.

**Replacement of Broken Studs:** Ensure the replacement wheel stud is equivalent to the original wheel stud being removed, in

terms of both design and material grade. When replacing studs, the rule of thumb is to replace the broken stud along with the adjacent stud when one stud is broken. If two or more studs are broken then replace ALL studs. Always be sure that the stud is fully seated before attaching the wheel.

Special inspection of the wheel is required when a tire/wheel assembly is subjected to extreme heat. Heat damage can change the metallurgy of both steel and aluminum wheels which could cause the wheels to lose strength and change dimensions. The bead seat and rim flange wheel area may shrink and no longer have the ability, contour and dimension to hold the tire bead on the wheel while under pressure.

The easiest way to confirm if a wheel that ran hot has changed dimensions/contour is to roll the wheel on a smooth, flat surface for at least 10 feet. Any deviation from rolling in a straight line indicates that the dimensions have changed. If the wheel deviates from the straight line or the rim flanges appear damaged, then it is time to remove the wheel from service and scrap. If a rim roll test cannot be conducted, you can still check the rim flanges with a framing square.

Abnormal operating situations, such as vehicle or tire fires, brake malfunctions and wheel bearing degradation, can generate high heat. Additionally, running with little or no air for an extended period may also result in this same condition of undersized bead seats caused by heat. If a tire is suspected of running flat or with little air, the wheel should be inspected to determine if the contour dimensions have changed. The use of automatic tire inflation systems will significantly reduce the probability that a tire will run with little or no air.

The TMC of the American Trucking Associations publishes numerous recommended practices for both steel and aluminum wheels, which are highly recommended for additional information on this subject.



# COMMERCIAL FLEET TIRE DIGEST

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VOLUME 13 ISSUE 1

JANUARY 2019

## Tire and Tire Related Product Testing Considerations

### Did You Know?

Similar to OPEC, there is the Association of Natural Rubber Producing Countries (ANRPC). They represent approximately 90% of the global demand for rubber.

At some point, most fleets regardless of size, are in a position to run a tire evaluation. This could be to evaluate if Tire A has better ROI compared with Tire B. It may be to prove that vehicle fuel economy is significantly improved with a particular tire. Maybe you need to determine if the tire casing from tire manufacture ABC can be retreaded more times versus a tire casing from a different tire manufacturer. Many fleets want to optimize their recommended tire pressure for specific wheel positions and will run an evaluation at two or even three different tire pressure settings. When fleets are determining if automatic tire inflation is the correct solution for their trailers, a typical test would be to run half of the test trailers with ATIS and the other half without any pressure system and measure tire related roadside service call reductions.

It may sound easy to run an evaluation, but in the real world it is always a challenge because there are so many variables to take into account. Vehicle make and model, routes, loads, speeds, terrain, weather and, of course, drivers will impact the results. There is nothing worse than running a tire evaluation for two years to conclude that there is no statistical conclusion.

The fact is that when it comes to tires, stuff happens. Tires get punctured and damaged. Tires get retreaded. When a tire does get punctured and repaired, it may or may not be put back on the same vehicle. It may take weeks or months or it may just disappear from the test program. A damaged tire on the road can be replaced at a truck stop and never be seen again. The TMC of the American Trucking Association's recommended practice for tires states that, if your fleet is large enough, you need at least 30 pieces in each test group at the end of the evaluation to make it statistical-

ly significant. You may need to begin with 50 tires of model A and 50 of model B to ensure that 30 tires of each survive the test.

Once the fleet manager decides exactly what he wants to evaluate or learn from the specific test, it's now time to brainstorm the details of capturing the data and getting buy-in. Drivers have the largest impact on a tire evaluation. Aggressive drivers can negatively impact tire wear by up to 35% depending on their braking and turning. A driver meeting on day one is always a good idea. Explain why you are doing the tire evaluation and how important it is to the fleet. Make the drivers feel special for being chosen to participate. A gift card and hats can go a long way to a successful test. Ask for driver feedback about feel on the road and traction. Welcome their input.

Once the test is ready to begin, try to get all the tires mounted within a couple of weeks. Time of year, for example winter vs. summer, can impact treadwear by as much as 10%. Remember, minimize test variables.

Since we know that tires will disappear over time, determine at what frequency tires should be inspected for tread depth, irregular wear, and tire pressure. If three months is the magic number, then the vehicles in questions should be flagged for inspection wherever they may be physically located. At the end of the test, let's say 24 months, tires should be removed and sent to a specific location for a final and thorough inspection.

The last piece of the puzzle is data analysis. Take the time to use your favorite XLS or database program to review the data and determine the direction your company should be taking regarding tires in the future. Always work with your local tire professional who are experts in running tire and tire related evaluations.

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