TIRE SAFETY AND MAINTENANCE

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2023

BRIDGESTONE Mobility Solutions | Mileage Solutions

AGENDA

- Basic Tire Construction
- Load Carrying Capacity
- Proper Tire and Wheel Inspection
- Inflation Pressure
- Match Mounting & Tire Rotations
- Irregular Wear
- Out of Service Conditions
- Q&A

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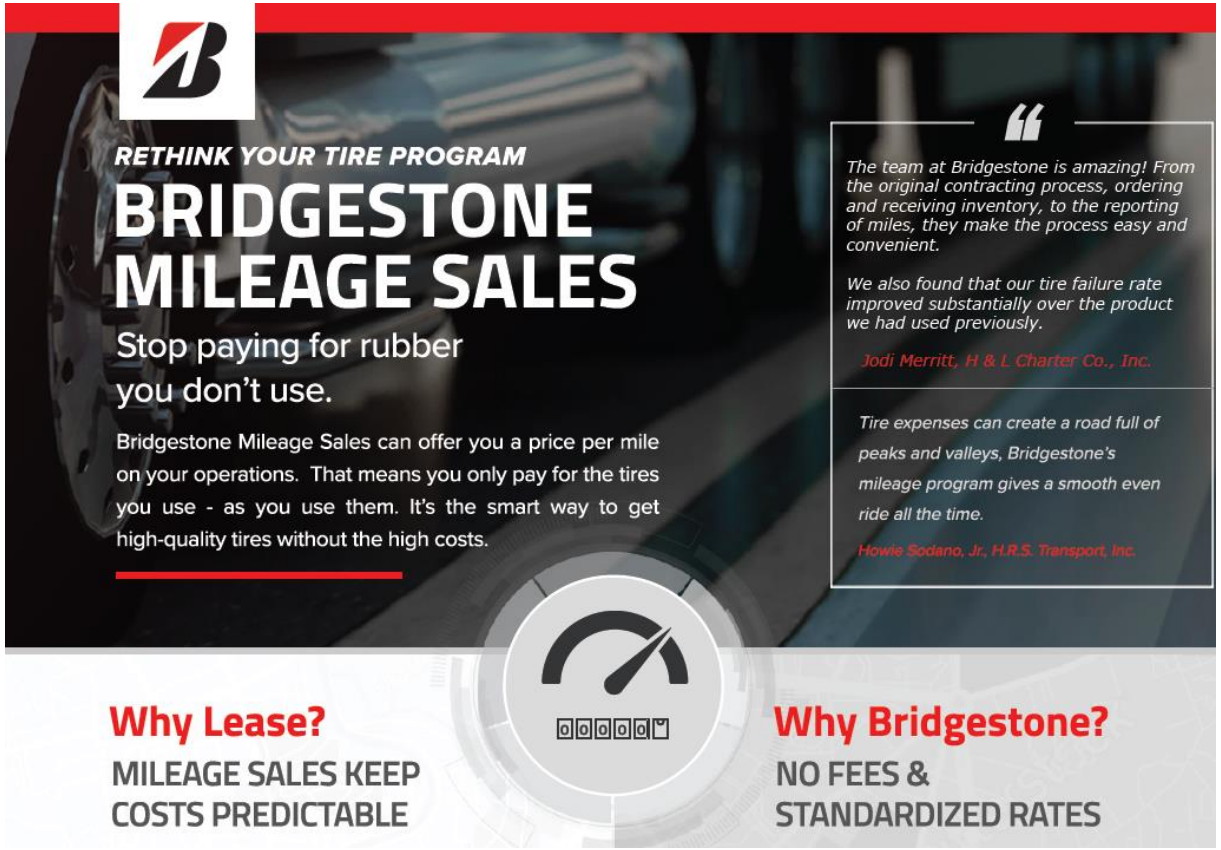

Basic Tire Construction

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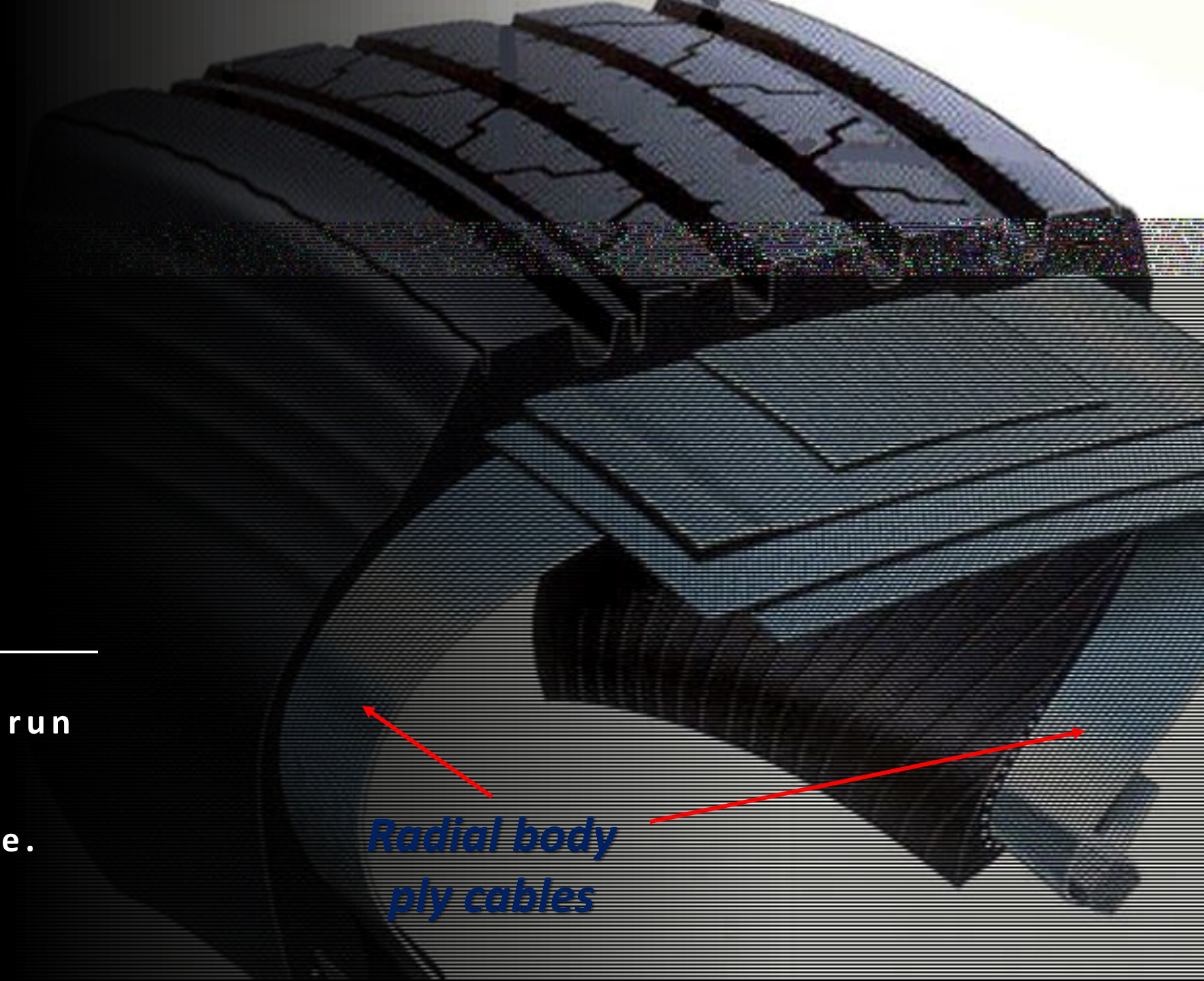
Radial Design (pg 1-1)

Radial body ply cables run from bead-to-bead anchoring themselves around the bead bundle.



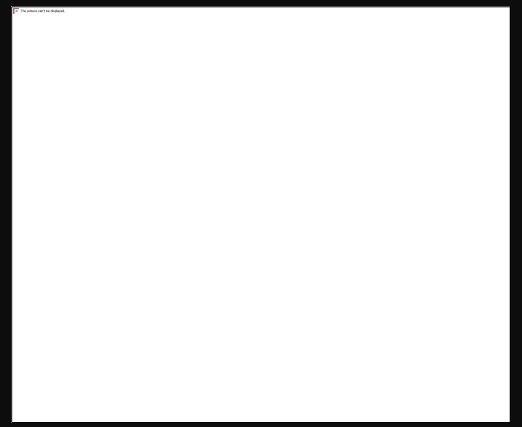
Radial Design (pg 1-1)

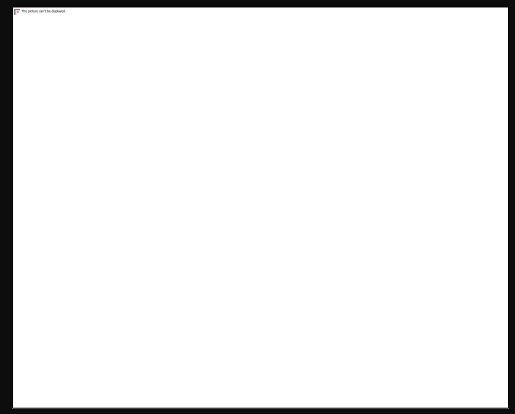
- Radial tires have body ply cables running 90° from an imaginary centerline.

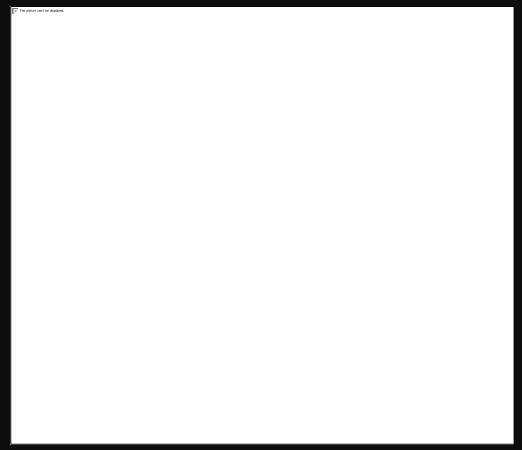
- Radial tires get their name because the radial body ply cables “radiate” outward from the bead of the tire.
  - This construction allows for easier flexing in the sidewall area

- Radial ply cables provide strength to contain the inflation pressure. The cables are sealed and held in alignment by rubber.

- Most medium and heavy commercial truck’s radial ply cables are made of steel.







Components of a Radial Tire (pg 1-2)

Bead Bundle

High strength wire which maintains the bead diameter and holds the tire to the rim or wheel. The bead bundle is also the anchor for the radial body ply.

Belt Package

Stabilizes the tread, provides directional stability and control, strengthens the tire and resists cuts and punctures into the air chamber.

Liner (interior)

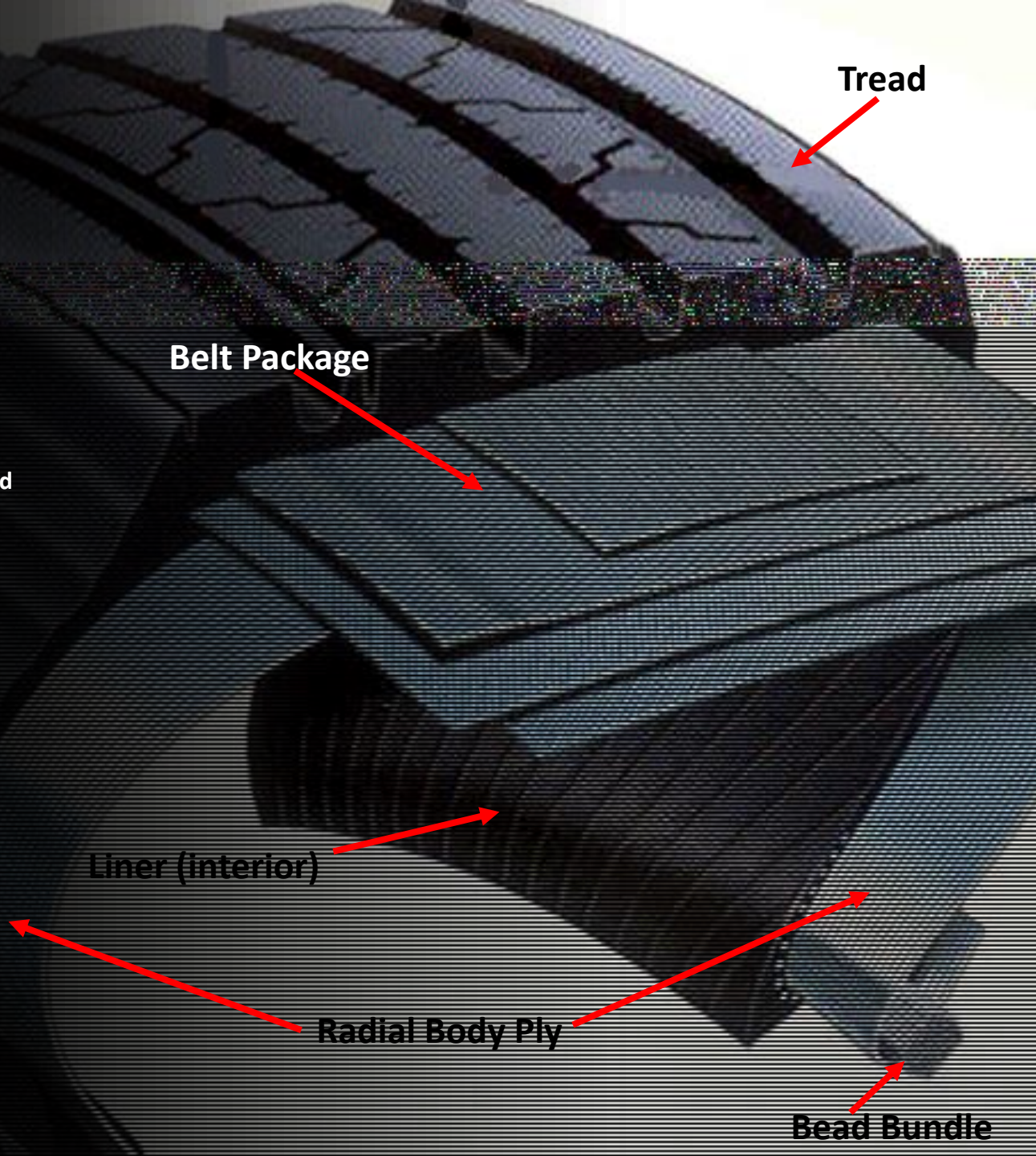
Resists air and moisture infiltration for tubeless tires.

Radial Body Ply

Runs from bead-to-bead and provides strength to contain the inflation pressure.

Tread

Provides traction and a wear surface.



Belt Package with a Full Transition Ply (pg 1-4)

Protector Ply

- Protects other belts from cutting and other damage.

Stabilizer Plies

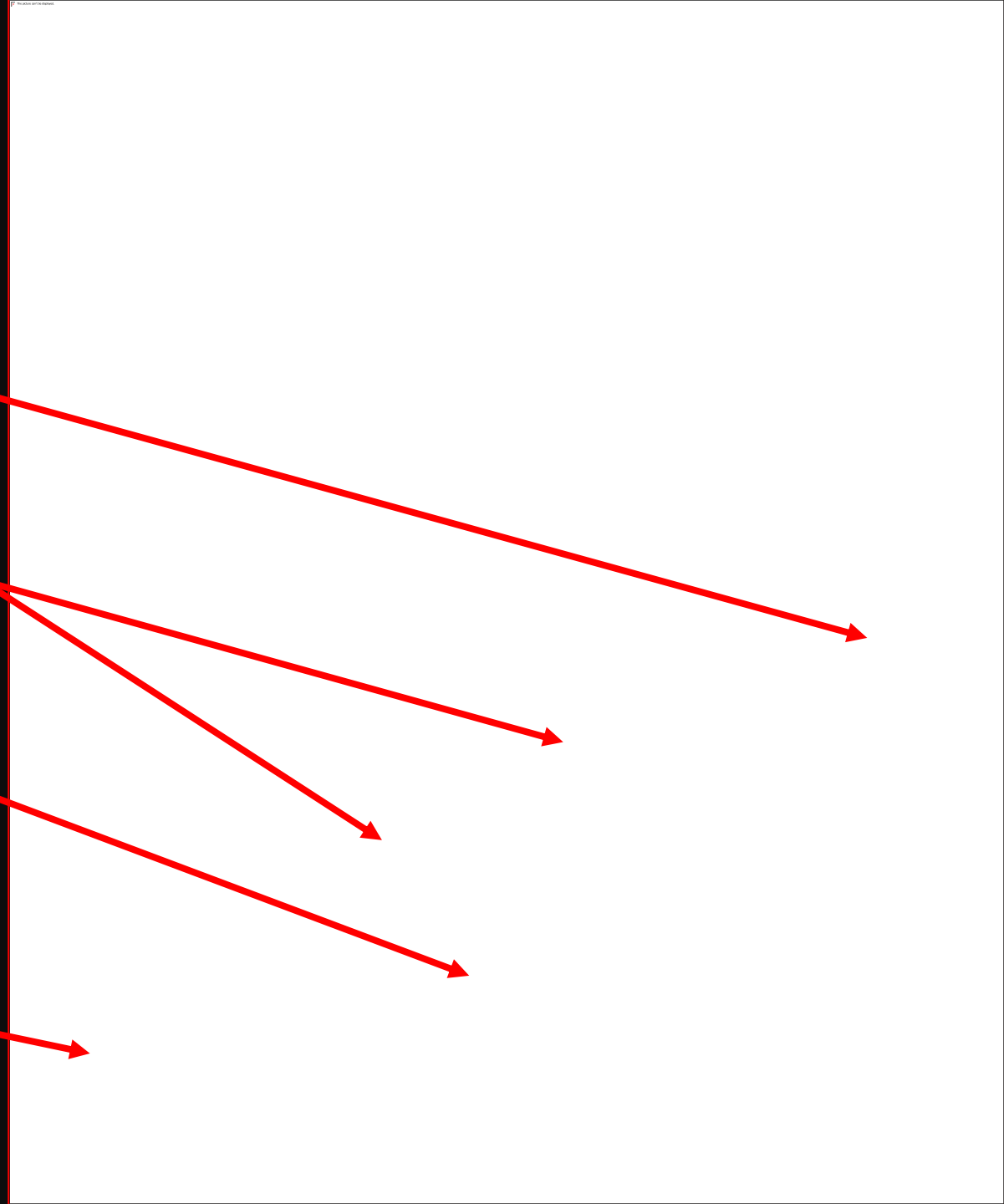
- Sometimes are called “working belts.” They stiffen the tread area and help the tread remain flat on the road.

Transition Ply (Full)

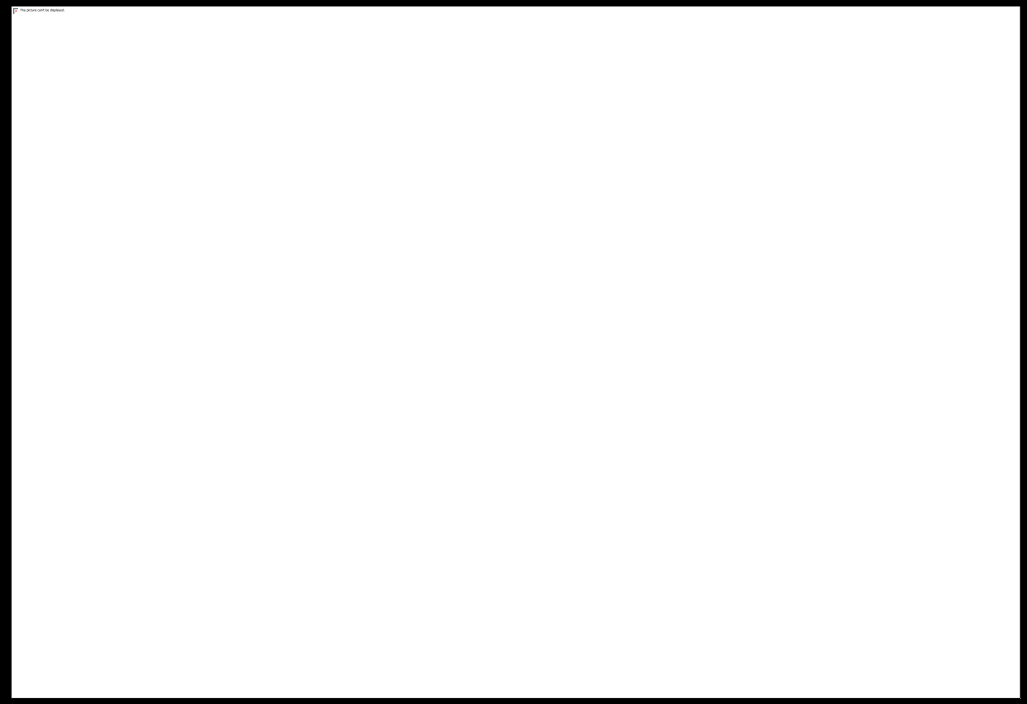
- Used by most tire manufactures, it bridges the high flex sidewall and the low-flex crown of the tire.

Body Ply

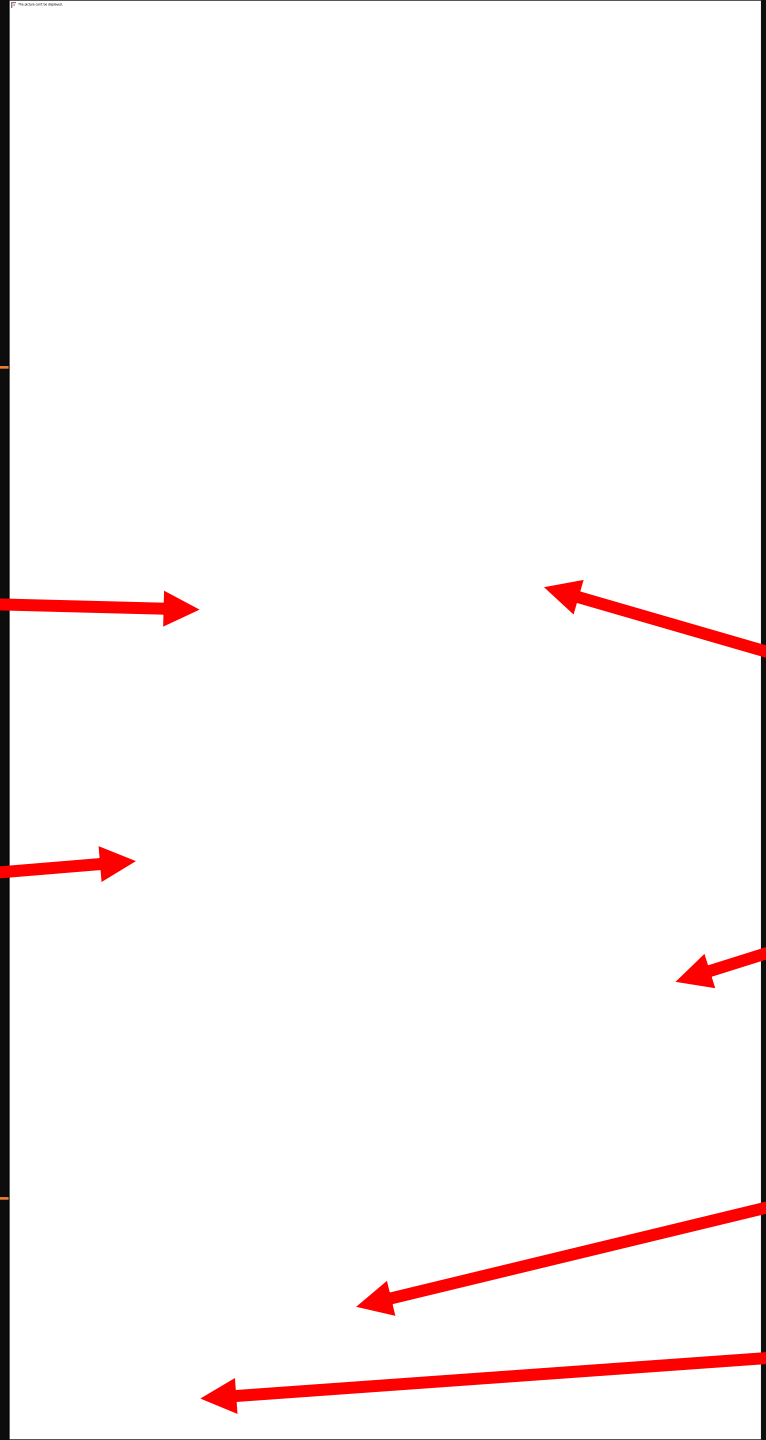
- Runs from bead to bead and provides strength to contain the inflation pressure.



Basic Radial Tire Construction Review (pg 1-4)



Components of the Bead Area (pg 1-3)



Radial Ply 90°

Bead Bundle

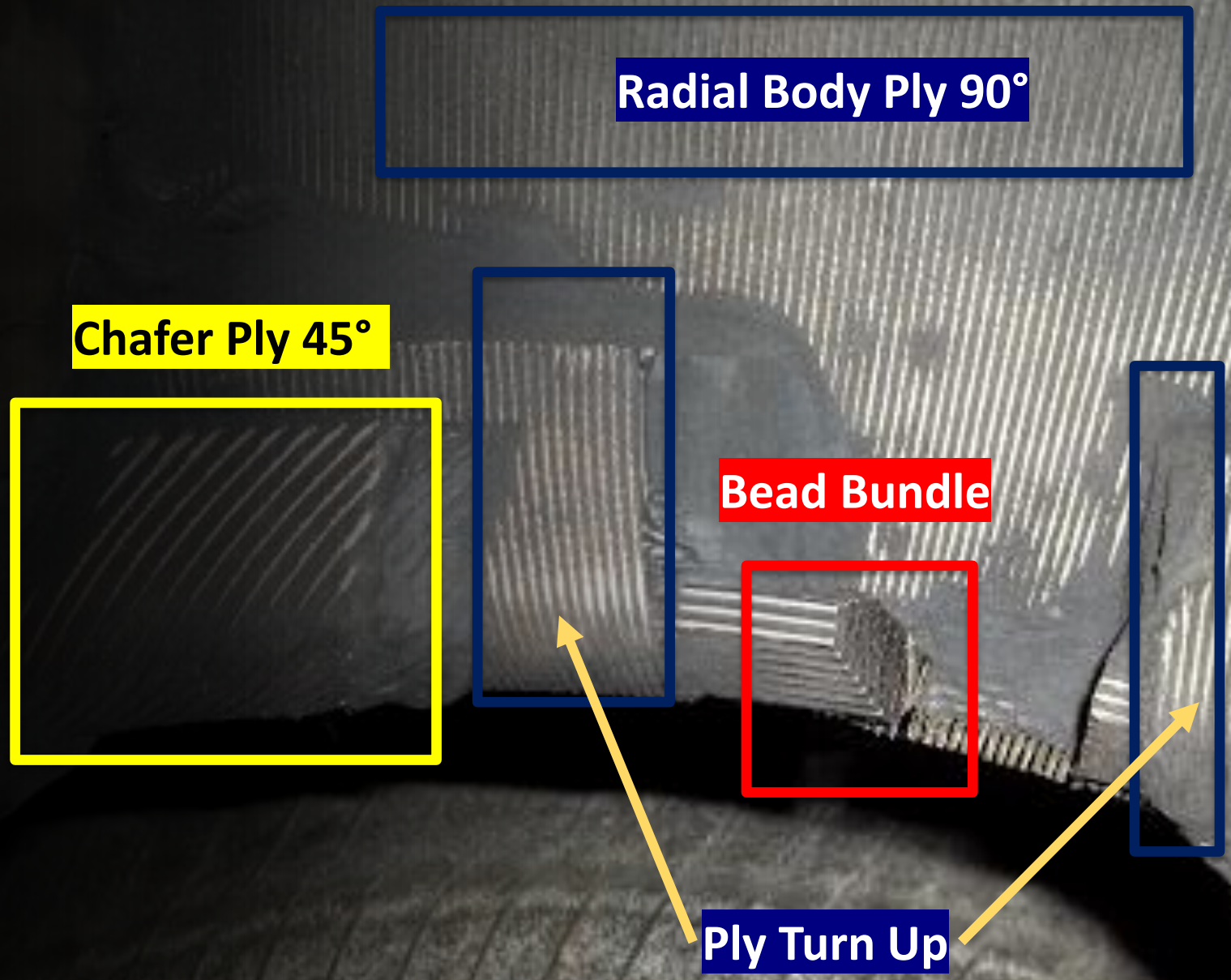
Chafer Ply 45°

Bead Heel

Bead Sole
5° Tube-Tube
15° Tubeless

Bead Toe

Bead / Sidewall Area



Load Carrying Capacity

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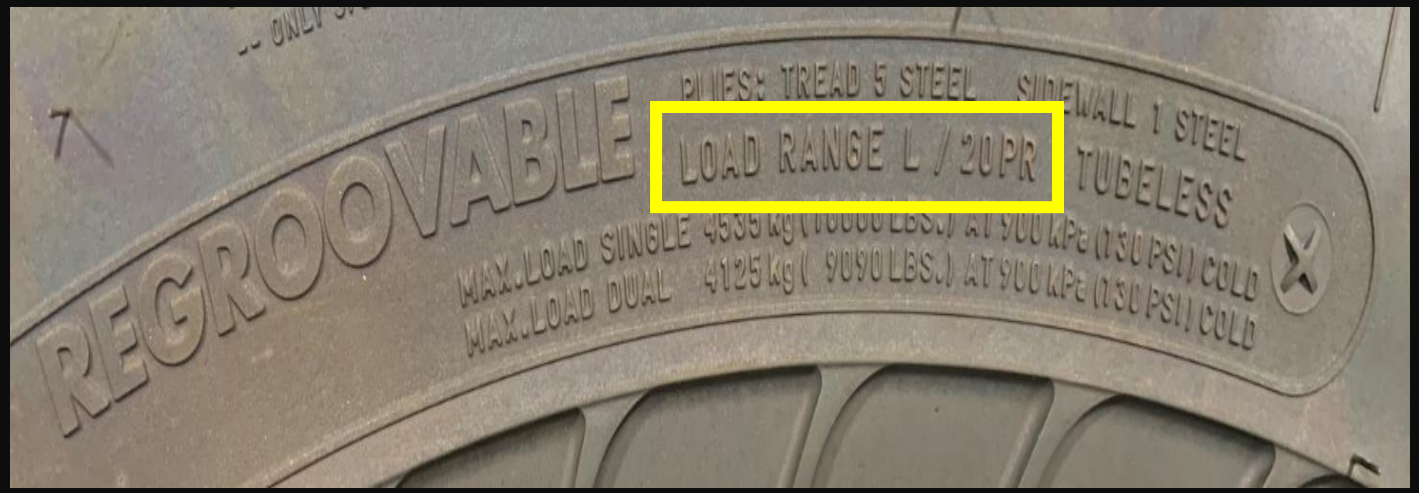
Ply Rating/ Load Range

- The ability of a tire to contain enough inflation pressure to support a specific load is known as "load-carrying capacity."



- "Ply Rating" and "Load Range" mean the same thing and indicate the load-carrying capacity of a tire when properly inflated.

Load Carrying Capacity

- Ply rating
  - *Bias , always in even numbers 10, 12, 14, 16, etc.*
- Load Range
  - *Radial, letters E, F, G, H, etc.*
- The higher the rating (letter or number):
  - *the more load the tire can support when properly inflated.*

Load Carrying Capacity	A	B	C	D	E	F	G	H	J	L
Ply Rating	2	4	6	8	10	12	14	16	18	20

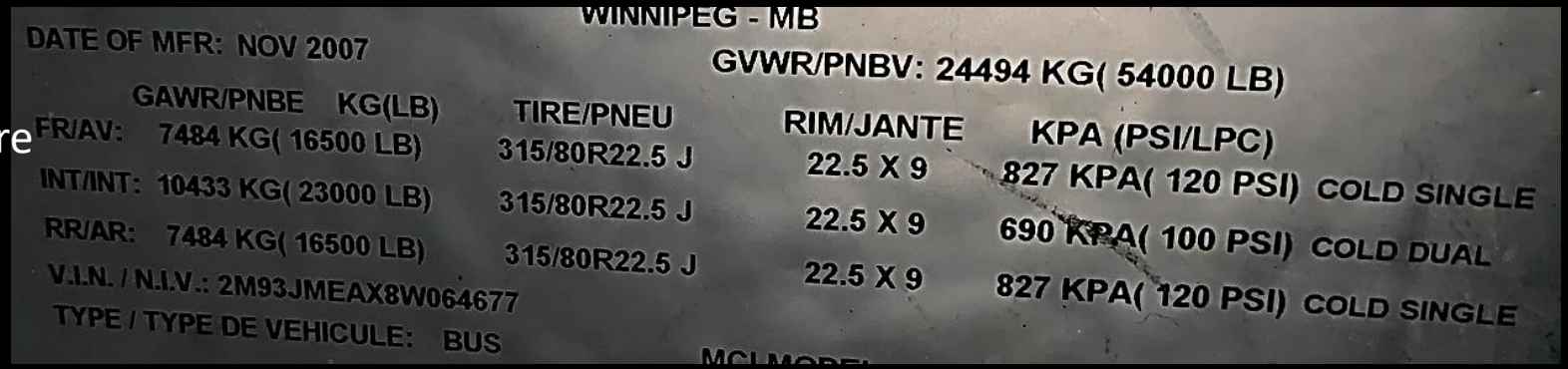
Load Carrying Capacity pg 4-1

Load Carrying Capacity	A	B	C	D	E	F	G	H	J	L
Ply Rating	2	4	6	8	10	12	14	16	18	20

PLACARD KNOWS BEST

Information on Placard:

- Tire Size **AND** Load Range
- Recommended COLD inflation pressure
  - COLD = room temp.
- Axle weight ratings
- Recommended rim size



Load Inflation Table

		kPa	520	550	590	620	660	690	720	760	790	830	860	900
		psi	75	80	85	90	95	100	105	110	115	120	125	130
295/60R22.5	DUAL	kg.			2190	2290	2395	2495	2595	2690	2790	2885	2980	3075 (J) 147
		lb.			4825	5050	5275	5495	5715	5930	6145	6360	6570	6780 (J)
	SINGLE	kg.			2385	2495	2610	2715	2825	2930	3040	3145	3230	3350 (J) 150
		lb.			5260	5505	5750	5990	6230	6465	6700	6930	7160	7390 (J)
315/80R22.5	DUAL	kg.		2575	2650	2750	2900	2970	3070	3150	3270	3450(J) 151	3590	3750(L) 154
		lb.		5675	5840	6070	6395	6545	6770	6940	7210	7610(J)	7910	8270(L)
	SINGLE	kg.		2800	2910	3030	3150	3260	3370	3450	3590	3750(J) 154	3940	4125(L) 157
		lb.		6175	6415	6670	6940	7190	7440	7610	7920	8270(J)	8690	9090(L)

- Know where your pressures need to be
  - Ask your tire supplier for Load & Inflation Tables
  - Also available from several online resources

Proper Tire & Wheel Inspection

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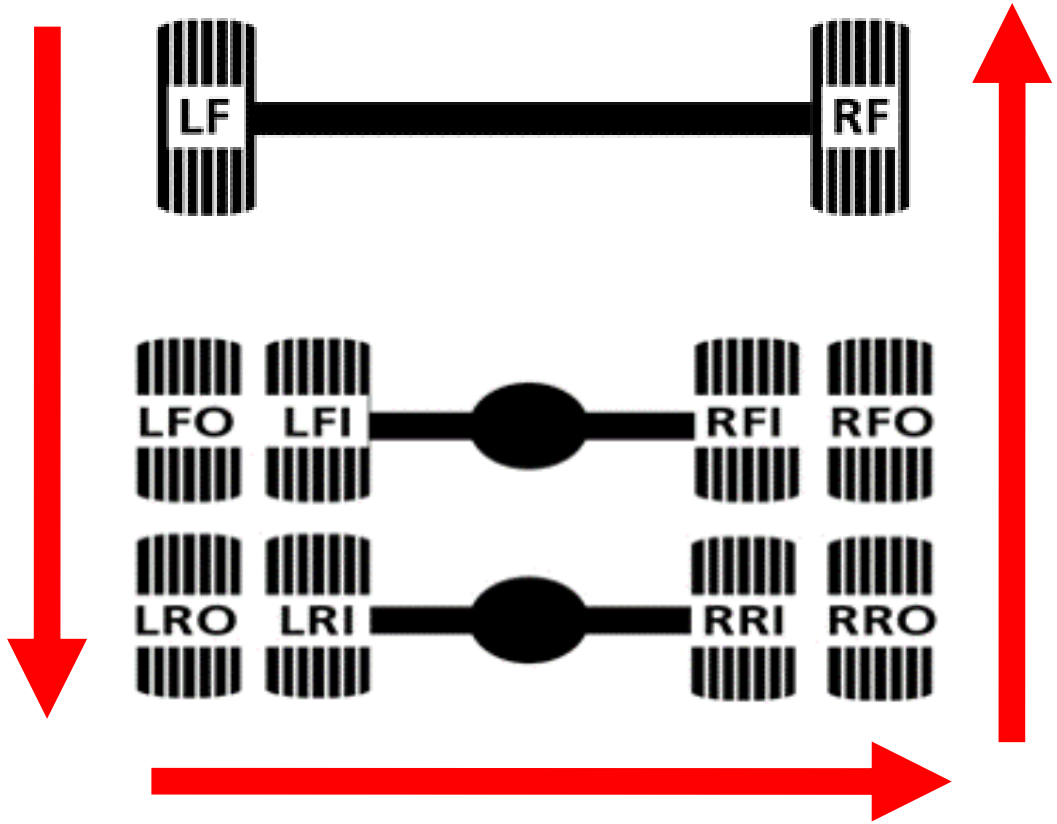
Tools Needed for your Tire Inspection

START

FINISH



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Step 1: Tread Depth

- Tread Depth Inspection
  - STEER - 4/32nd DOT Minimum
  - OTHER - 2/32nd DOT Minimum
- Check at Lowest Point
  - Not on Tread Wear Indicator
- More Tread Remaining:
  - Better Traction, Braking, Lateral Stability, & Casing for Retreading
  - 80% of penetrations occur in the last 10% of useable tread life

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Tread Depth

- During your inspection - avoid Tread Wear Indicators:
- They will give you a false reading on tread height!

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Step 2: Crown Inspection

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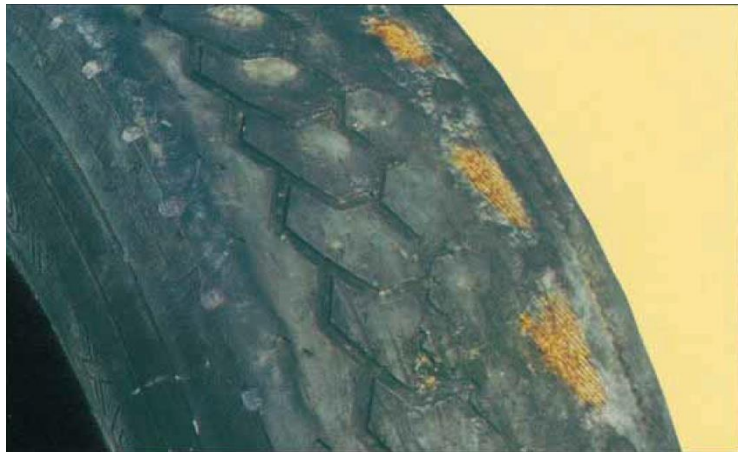
Crown Inspection



- As you inspect the tread area
- Remove all foreign material
- Must be removed and replaced if the following is found:
  - Cuts or punctures to steel
  - Flat spots
  - Tread depth at or below pull point

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CROWN INSPECTION

Many crown punctures can be repaired – but may not be acceptable to fleet protocols. Remember to communicate all tire issues to your fleet Supervisor and engage your Bridgestone Representative for consultation.

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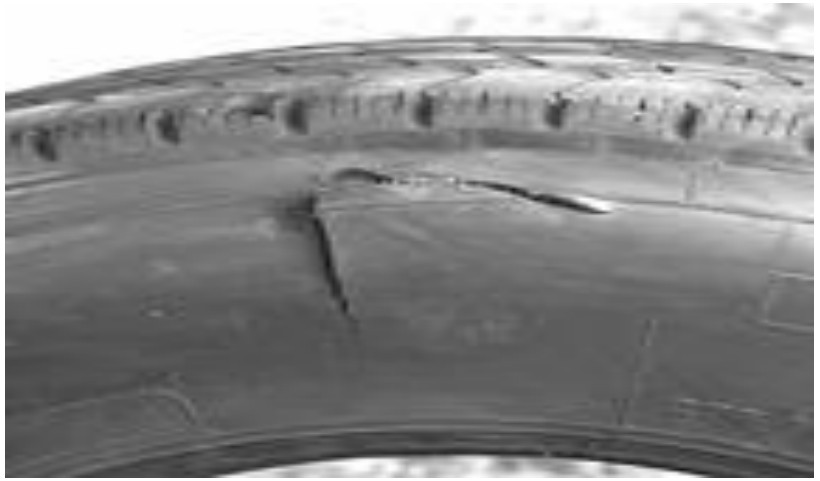
Step 3: SIDEWALL INSPECTION



- As you inspect the Sidewall
- Look for any damage
- Tire must be removed and replaced if the following is found:
  - cuts or cracks into steel
  - sidewall rubber is soft
  - bulge indicating separation

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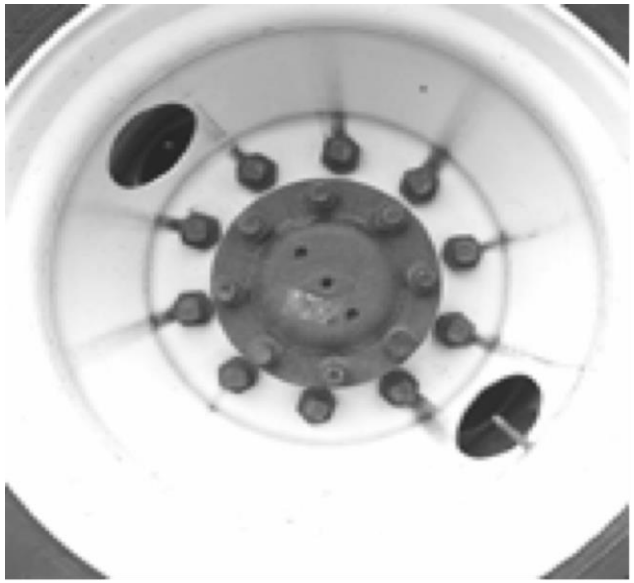
Step #4 WHEEL INSPECTION

- Inspect the rim flange for bent or damaged bead seats
- If found, assembly must be removed and replaced
- Inspect the wheel for rust or any other damage
- Inspect wheel fasteners for signs of damage or loosening



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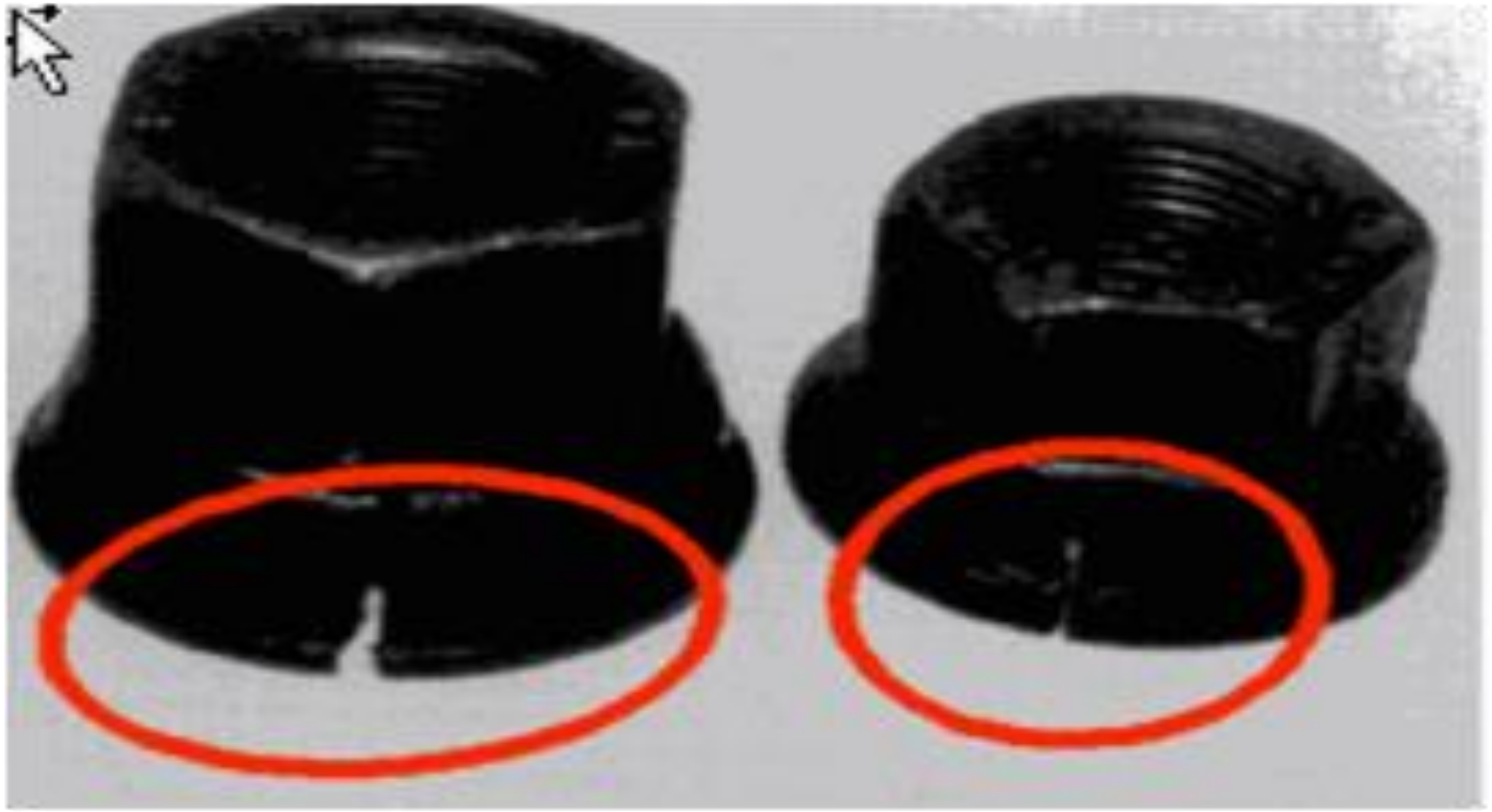
WHEEL INSPECTION

- Inspect the wheel fasteners for any damage



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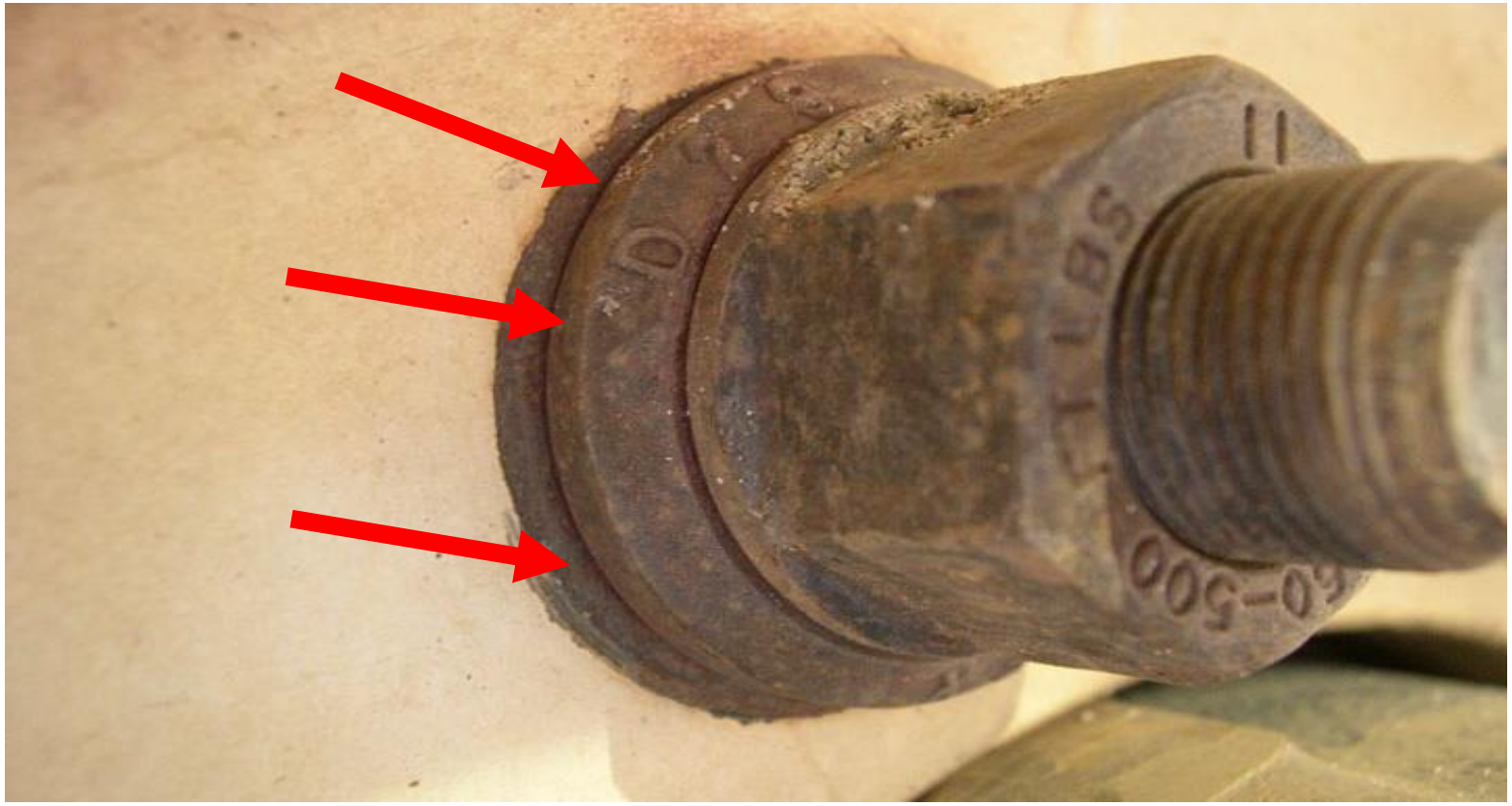
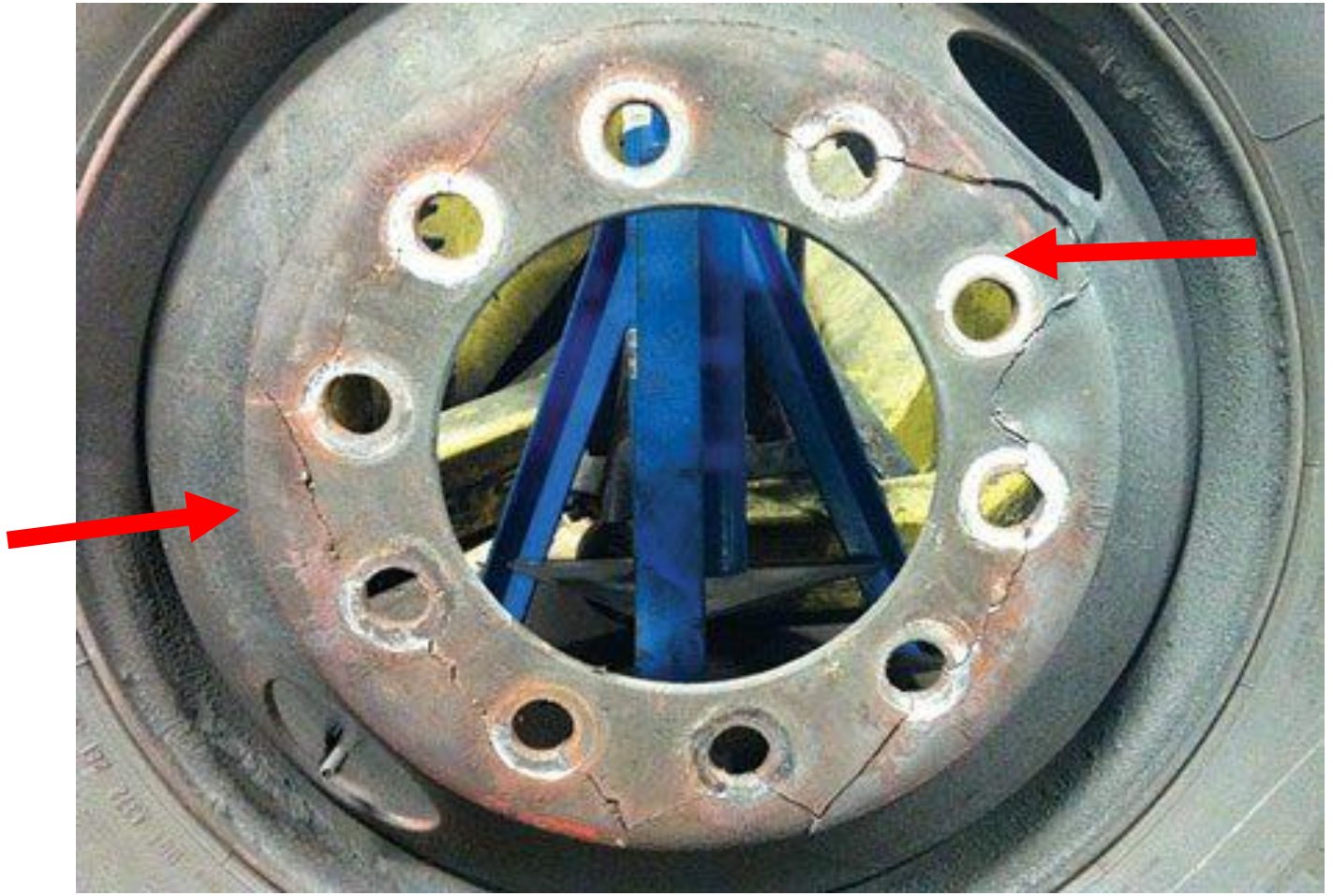
WHEEL INSPECTION

- Make sure wheel fasteners have not walked



WHEEL INSPECTION

- Inspect wheels for signs of damage – especially cracks or burrs.



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Inflation Pressure

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Importance of Inflation Pressure

Inflation Pressure Reduction	Life Reduction
Recommended Pressure	0%
10% Under Inflated	-10%
20% Under Inflated	-25%
30% Under Inflated	-70%
20% Over Inflated	-10%

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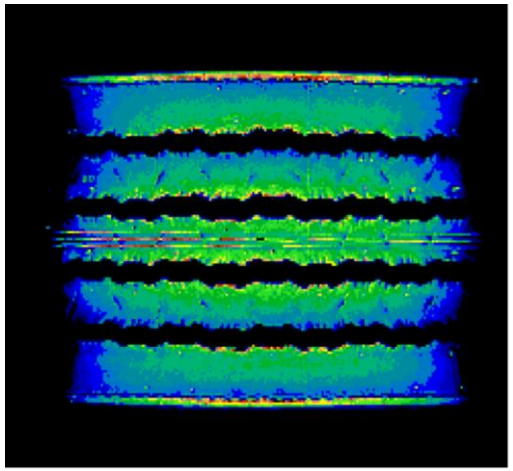
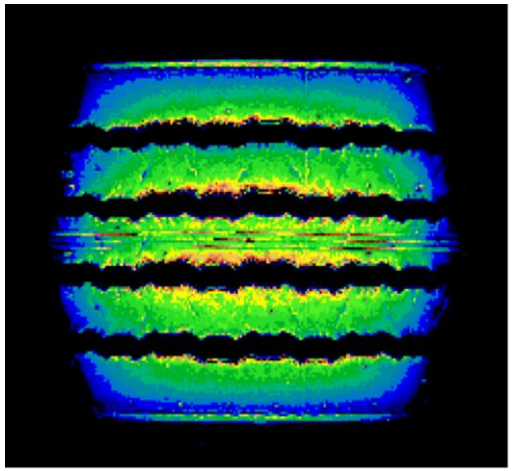
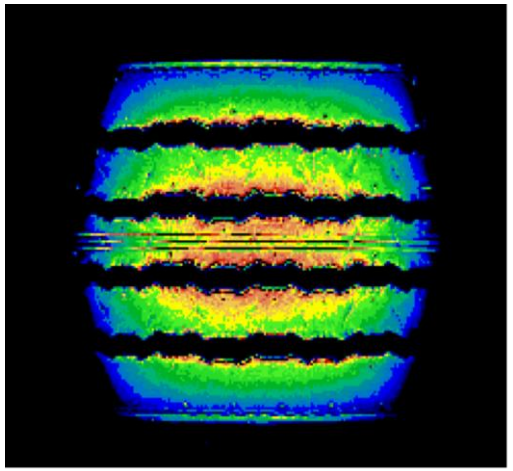
Inflation Pressure

- Single most important factor in tire life
  (Tire does not carry load, AIR carries the load)
  - **Over Inflation and under inflation affect tire footprint**

Under Inflated | **Correct** | **Over Inflated**

Changes in footprint affect:

- Rate of wear -Traction -Casing Life
- Irregular wear -Braking -Fuel Economy

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Do not inflate a Tire that has been run flat without dismounting and inspecting internally

Look what you could find inside?

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Under-inflation and Tire Failure

Discussion: What happens to commercial truck tires when they are run under-inflated?

If the air pressure in a tire is too low, too much of the tire's surface area touches the road, which increases friction. Increased friction causes the tire to overheat, which can lead to premature wear, tread separation and blowouts. Under-inflation is one of the leading causes of irregular wear and catastrophic tire failure.

When any tire in your fleet reaches 80% of proper inflation pressure – it is a FLAT tire and should be immediately removed from service.

NEVER inflate a tire that is 20% under-inflated. Let's watch a video that

Tire Explodes in Repair Shop and Almost Hits Couple || ViralHog - YouTube

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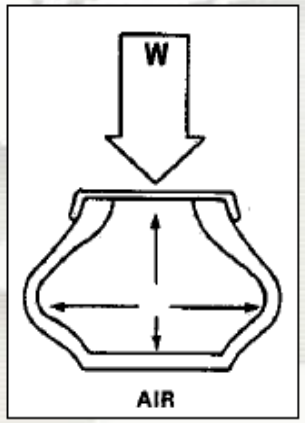
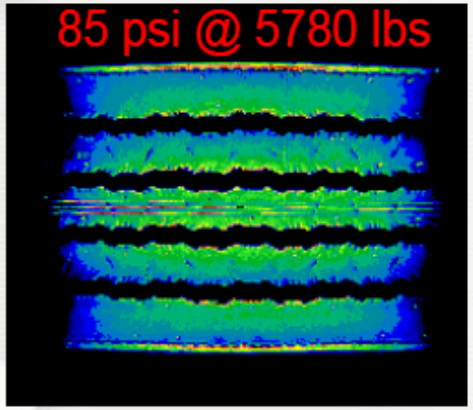
Under-inflation

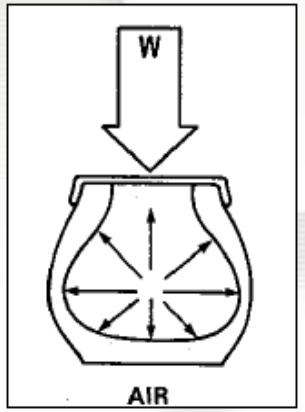
- Tire components
  - Increased flexing
  - Increase heat buildup
  - Premature cord fatigue
- Handling
  - Poor on road feel
  - Loss of traction turns
- Tire Footprint change
  - Nucleus for irregular wear
  - Faster wearing
  - Increase fuel consumption (10 psi = 1%)

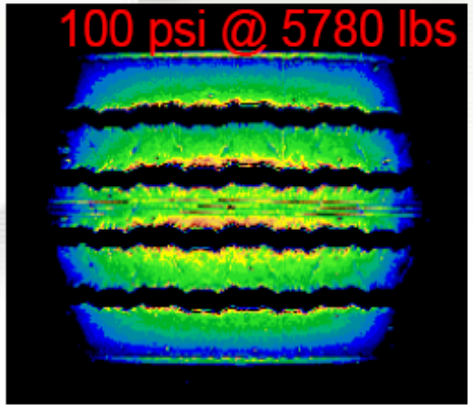
Under Inflated





Correct





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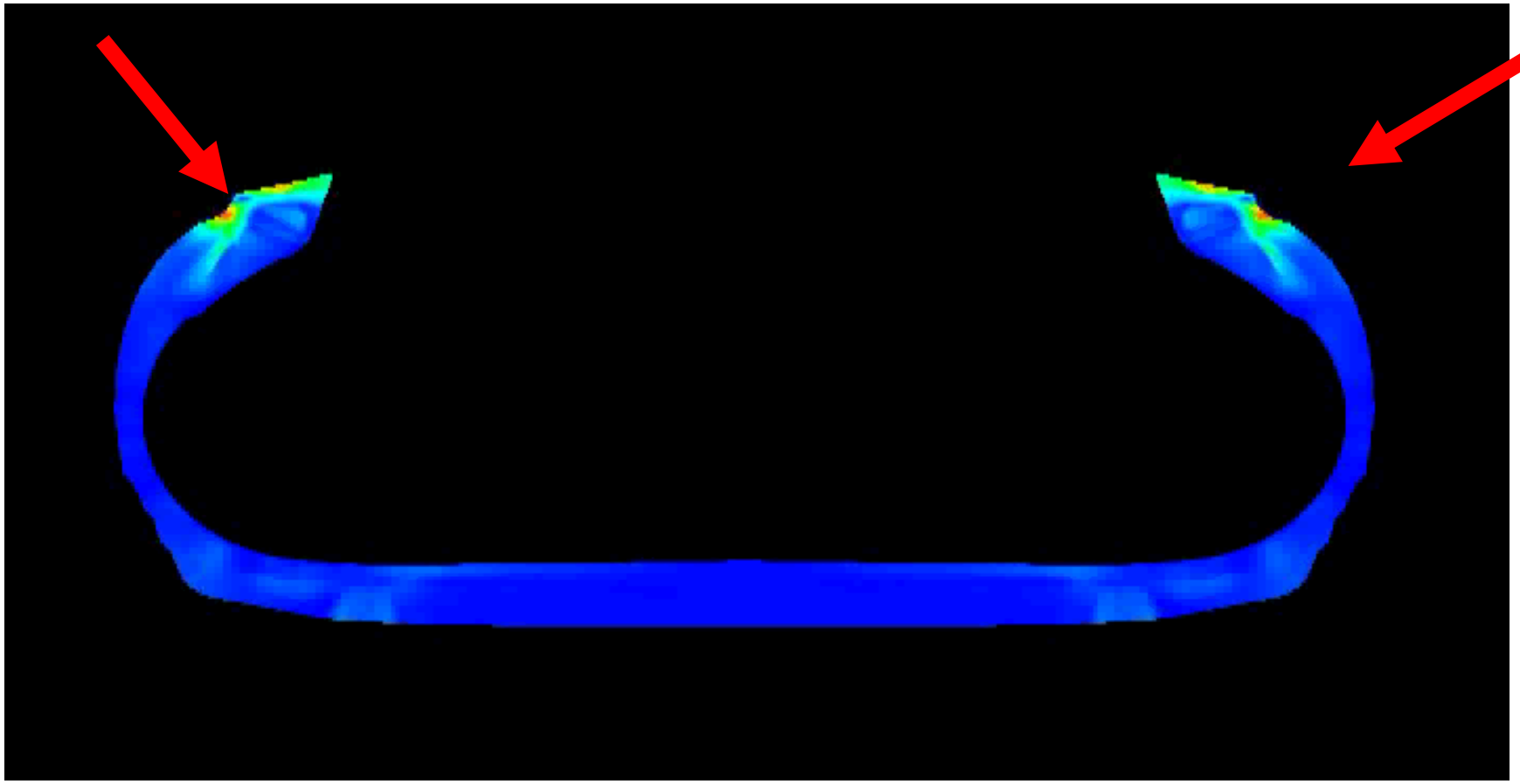
Bead Damage



Bead damage from brake heat and under-inflation is one of the leading causes of casing rejections in the tire industry.

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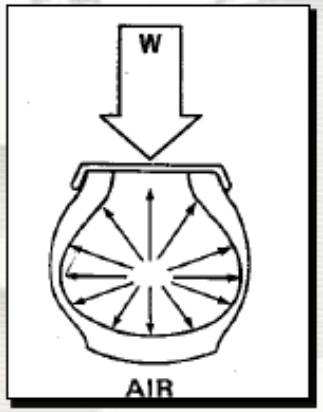
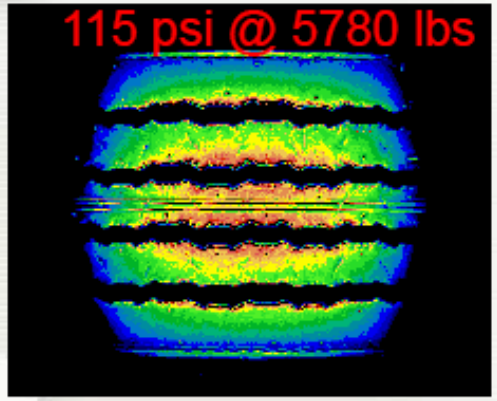
Over Inflation

- Tire components
  - Susceptible to impact breaks
- Handling
  - Reduced Shock absorption
  - Hard, rough ride
- Tire Footprint change
  - Nucleus for irregular wear
  - Reduced dry braking performance

Over Inflated





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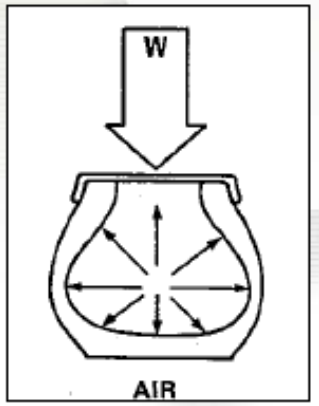

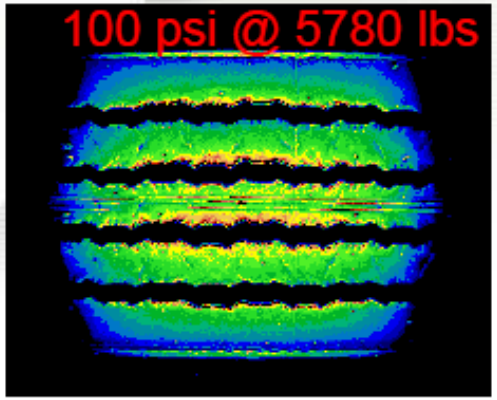

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Dual Mate-Matching

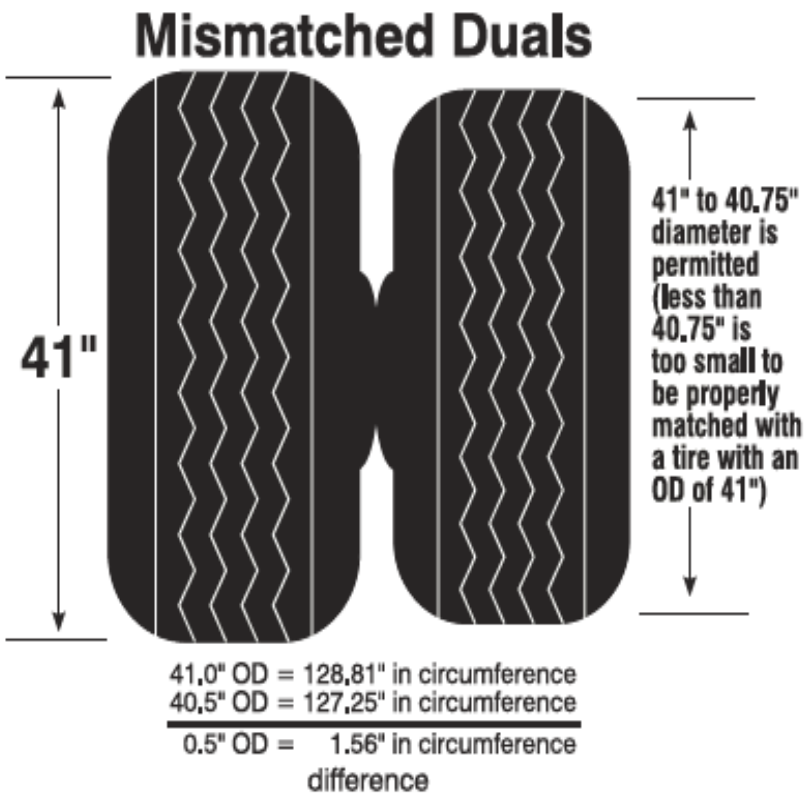
Dual Matching

Tires in dual assemblies should be matched with regard to design and dimensional tolerances as noted below.

Improperly matched duals may result in irregular wear, rapid wear, vehicle mechanical problems and premature tire failure. Failure to match tires in a dual assembly may result in sudden tire destruction.

DUAL MATCHING LIMITS

TIRE CONSTRUCTION	DIAMETER	CIRCUMFERENCE
Radial	0 to 1/4 inch	0 to 3/4 inch



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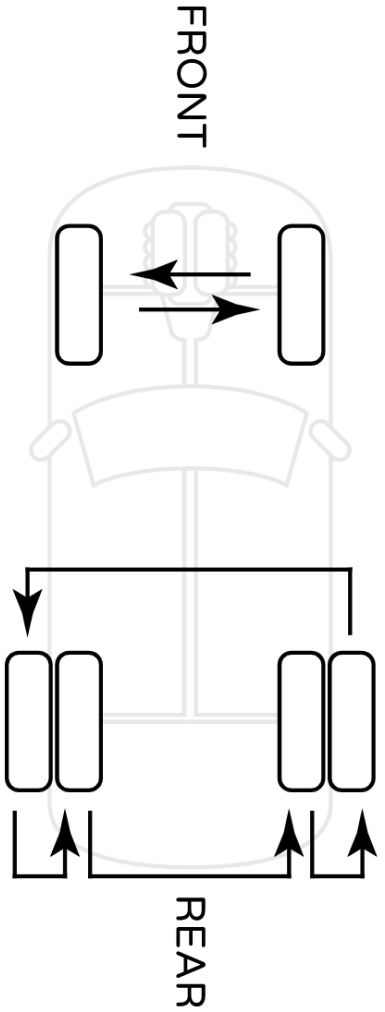
Tire Rotation

Tire rotation is **critical** for ensuring even wear

A few key points to remember…

- Never put brand new tires on the tag axle
- New tires on Steers > Move to Tag @ 9/10 32nds
- New tires or Retreads on drives > flip and rotate from one side to the other @ 50% remaining tread life



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Irregular Wear

https://www.mybridgestoneeducation.com/lms/catalog/4259

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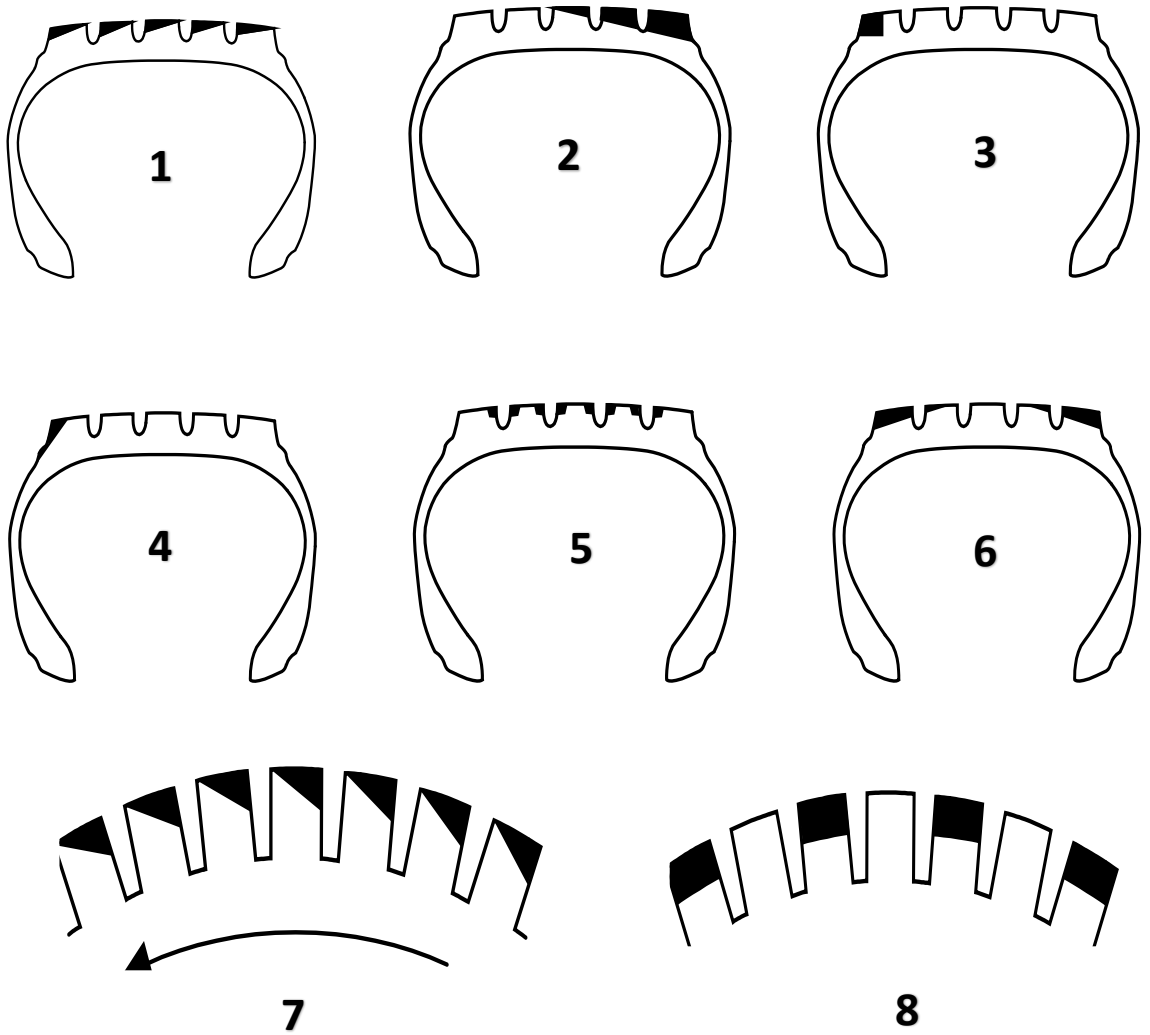
Irregular Wear: 2 Types

- **Consistent Circumferential Irregular Wear**
  - Irregular wear pattern that runs continually all the way around the tire

- **Spotty Irregular Wear**
  - Irregular wear does not run continually all the way around the tire, but instead occurs in various places/ spots on the tire.

Irregular Wear: Consistent Circumferential

1. Feather edge wear
2. One-sided wear
3. Shoulder step/ chamfer wear
4. Shoulder scrubbing / scuffing wear
5. erosion/river/channel wear
6. both shoulder wear
7. heel & toe wear
8. alternate lug wear



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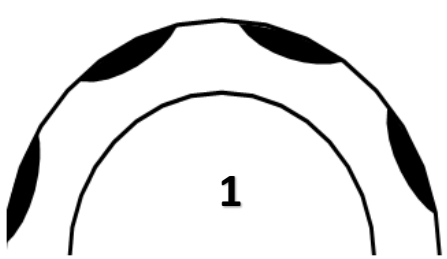
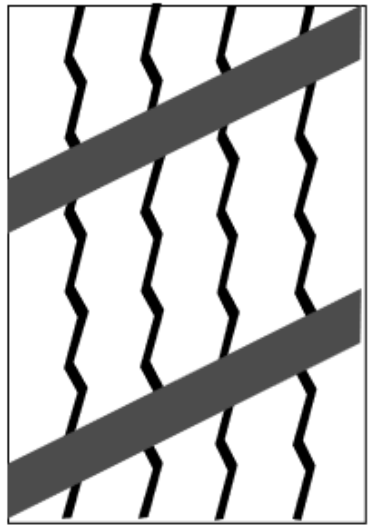
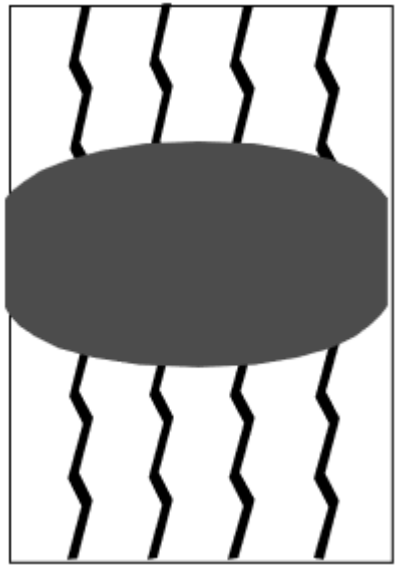
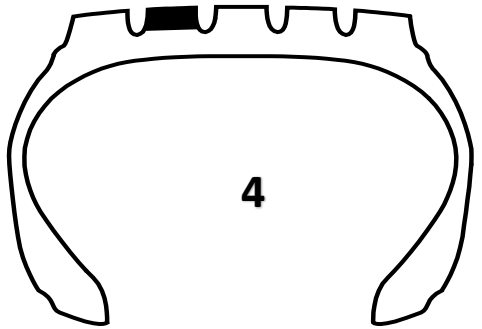
Irregular Wear: Spotty Irregular Wear

1. cupping /scallop wear
2. diagonal wear
3. brake skid/ flat spot wear
4. rib punch









BRIDGESTONE COMMERCIAL

Out of Service Conditions

BRIDGESTONE

https://www.mybridgestoneeducation.com/lms/catalog/4259

Sidewall Curbing/Abrasion

- **Appearance**
  - Abrasion on large areas of sidewall – usually 360 degrees

- **Probable Cause:**
  - Contact with Curbs

BRIDGESTONE COMMERCIAL

Run Flat Damage

- **Appearance**
  - Discoloration, blistering, wrinkling, and/or separation of the inner liner
  - Rubber dust may be present
  - May progress to loss of belt package

- **Probable Cause:**
  - Continued operation in underinflated/overloaded condition

BRIDGESTONE COMMERCIAL

Worn Too Far

- **Appearance**
  - Tire worn to below 2/32nds remaining tread depth
  - Belt package visible

- **Probable Cause:**
  - Tire left in service too long

BRIDGESTONE COMMERCIAL

Sidewall Puncture/Cut

- **Appearance**
  - Puncture/Cut that may or may not penetrate to inner-liner

- **Probable Cause:**
  - Road Hazard

BRIDGESTONE COMMERCIAL

Repair Failure/Improper Repair

- **Appearance**
  - Tire Failure at repair location
- **Probable Cause:**
  - Improper Repair

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Solutions for your journey

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