MICHELIN TECH TALK

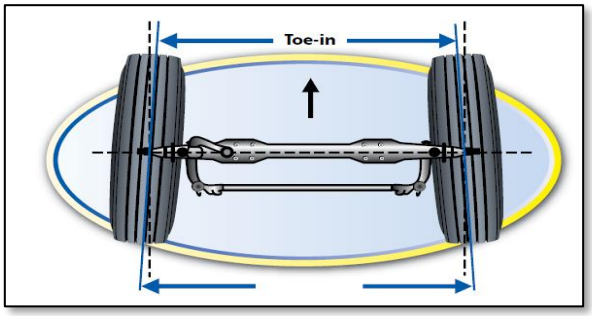
ISSUE NO: 01.032025

IRREGULAR WEAR ON TRUCK & BUS TYRE

Customers are particularly concerned about irregular tyre wear, especially regarding trucks and buses, where safety and performance are critical.
This tech talk will explore the reasons behind irregular tire wear and its effects, offering insights that can enhance operational efficiency and bolster safety protocols.
Irregular wear on tires for trucks and buses can stem from multiple factors, including mechanical problems, inadequate tire maintenance, and driving conditions and habits.

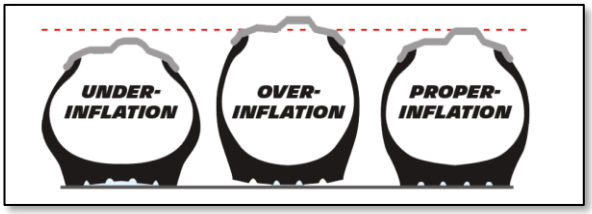
1. Mechanical Problems

- **Misalignment –** When wheels or axles are misaligned, it can lead to irregular wear like Feather wear & Slope wear (Excessive toe and Camber)
- **Suspension & Steering** – Improperly mount Shock Absorbers, Worn out Springs Bushings and Improperly inflated air suspension can affect the tire contact patch leading to irregular wear.
- **Faulty Wheel Bearings** – Bearings that are loose, damaged or not properly lubricated would result in irregular wear.
- **Braking system issues–** Out of round brake assembly, Slow-release valve, brake drum run out can lead to flat spots or irregular wear. Dragging Brakes generates excessive heat, which causes tread wear on one side.
- **Unbalanced Wheels –** This condition can result in vibrations and irregular wear, especially impacting steering tyres.
- **Bent Rims or Axles** – Leads to improper rolling and irregular wear.



2. Inadequate Tire Maintenance

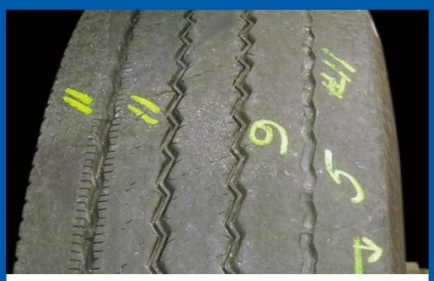
- **Incorrect Air Pressure** – Overinflation causes center wear, while underinflation results in shoulder wear.
- **Mismatched Tires** – Using different tread depths or brands on the same axle can cause irregular wear.
- **Improper Tire Rotation** – Failure to rotate tyres regularly can lead to irregular wear patterns.



3. Driving Conditions & Habits

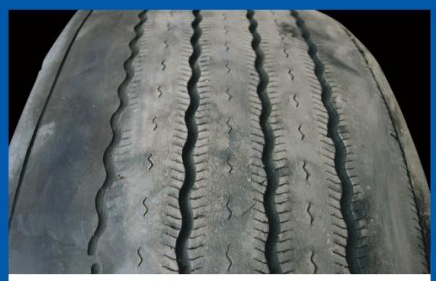
- **Frequent Hard Braking & Acceleration** – Causes flat spots and irregular wear.
- **Overloading** – Puts excessive stress on tyres, leading to wear on specific areas.
- **Poor Road Conditions** – Potholes, rough roads, and debris contribute to irregular wear.
- **Sharp Turns & Cornering** – Excessive lateral forces wear out shoulders unevenly.

IRREGULAR WEAR ON RADIAL STEER TYRE



One Sided Wear

Appearance	Wear increasing from one side to the other.
Probable Cause	Out of alignment specification parameters (camber, toe, axle parallelism).
Corrective Action	Check alignment and inspect for worn parts.
Tire Disposition	Continue to run until minimum tread depth is reached.



Shoulder Step Wear

Appearance	Partial or full depression of the inside or outside shoulder tread rib.
Probable Cause	This condition is common on radial tires in slow wearing operations.
Corrective Action	None
Tire Disposition	Continue to run or rotate.

Erosion/River Wear

Appearance	Circumferential worn area situated on the sides of the tread ribs.
Probable Cause	Condition most commonly occurs on slow-wearing radial tires in steer or trailer position (free rolling).
Corrective Action	None
Tire Disposition	Continue to run.

Depression Wear
(Intermediate)

Appearance	One or more interior ribs (not center) depressed more than adjacent ribs.
Probable Cause	Incorrect air pressure, worn mechanical part, or non-uniformity such as mismount.
Corrective Action	Check air pressure and mechanical issues.
Tire Disposition	Rotate or retread.

Diagonal Wear

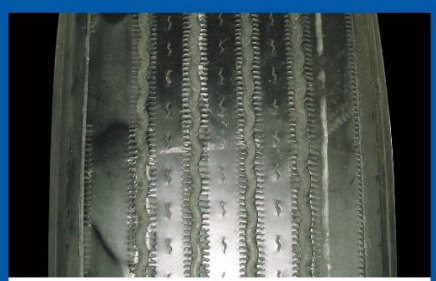
Appearance	Manifests in the form of oblique wear patches. Can appear singularly or repeat around the circumference of the tire.
Probable Cause	Misalignment, radial and lateral runout, severely out of balance, loose wheel bearings or steering parts.
Corrective Action	Check for mismount and worn parts.
Tire Disposition	Reverse direction of tire or retread.

Feathering

Appearance	Feathering at the edge of the tread ribs.
Probable Cause	Usually the result of continued exposure to lateral force, such as excessive toe. Can also form as a result of counter-steering to compensate for drive axle misalignment.
Corrective Action	Check alignment.
Tire Disposition	Rotate to another position or retread.

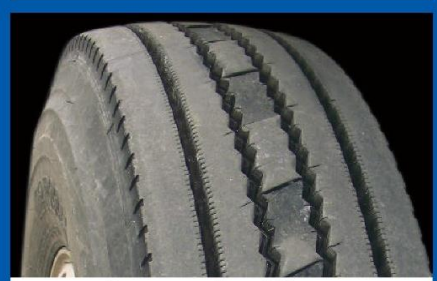
Multiple Flat Spotting Wear

Appearance	Multiple radially worn areas around the tire.
Probable Cause	Faulty shocks, loose/worn wheel bearings, severe balance issues, mismatched pressures or tire diameters, excessive high-speed empty operation.
Corrective Action	Check for mechanical issue; check air pressure.
Tire Disposition	Continue to run or retread.



Depression Wear
(Shoulder)

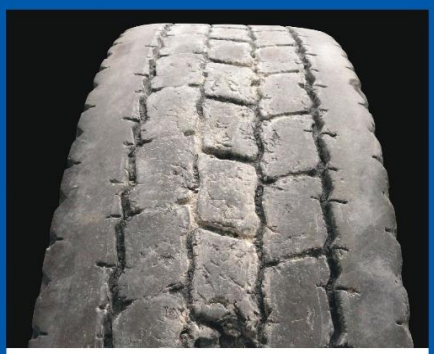
Appearance	Localized wear patch on the shoulder rib of the tire. This patch can repeat around the circumference of the tire.
Probable Cause	Faulty shocks, lateral runout, loose wheel bearings, mismount, severe balance issue.
Corrective Action	Check for mechanical problem.
Tire Disposition	Continue to run, rotate or retread.



Depression Wear
(Center)

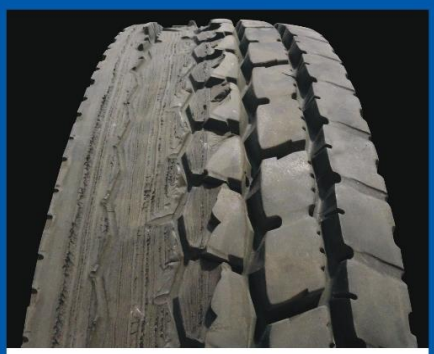
Appearance	Circumferential depression wear of the center tread rib.
Probable Cause	Overloaded/underinflated, faulty shocks, loose wheel bearings, mismount, high speed empty haul conditions.
Corrective Action	Check air pressures/load weight and worn parts.
Tire Disposition	Continue to run, rotate or retread.

IRREGULAR WEAR ON RADIAL DRIVE TYRE



Multiple Cuts/Chunking

Appearance	Numerous small cuts to the tread surface with portions of tread removed, giving a rough appearance.
Probable Cause	Vehicle operation on rough surfaces (misapplication of tread compound).
Corrective Action	Review tire selection and operation.
Tire Disposition	Minor damage; should return to service. Consult retreader for possible repair and retread.



Vehicle/Spin Damage

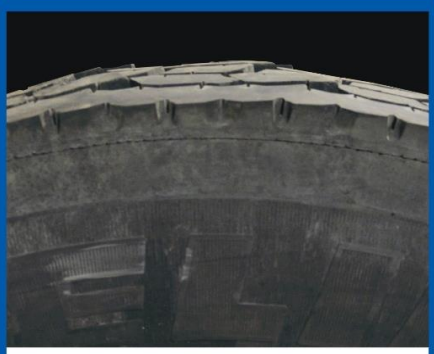
Appearance	Cuts or lines 360 degrees around the tire.
Probable Cause	Contact with vehicle components (mud flap brackets, bumpers), or spinning the tires on ice or loose road surface.
Corrective Action	Analyze cause. Ensure tire does not contact vehicle components. Review driver practices.
Tire Disposition	Return to service if damage is not below base of tread groove. If deeper, retread or scrap.

Brake Skid Damage

Appearance	Localized spot of excessive wear across tread face showing abrasion marks. Damage may extend into casing.
Probable Cause	New brakes (not worn in), unbalanced brake system, frozen brake lines, driver abuse.
Corrective Action	Check brake system.
Tire Disposition	May be repaired or retreaded if casing is undamaged; otherwise, scrap.

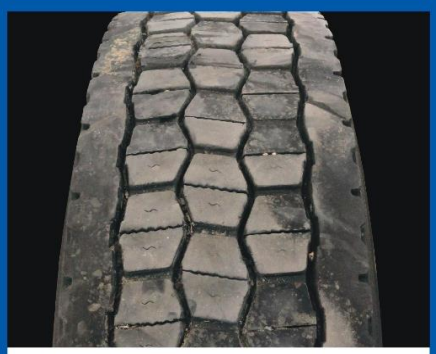
Stone Retention / Drilling

Appearance	Stones or gravel embedded between tread blocks, sometimes reaching steel cables.
Probable Cause	Condition is common with vehicles operating on gravel surfaces. Overinflation, misapplication of the tire.
Corrective Action	Remove stones & return to service. Maintain proper inflation pressures.
Tire Disposition	Continue to run unless there are multiple spots reaching steel cables. Consult retreader or tire manufacturer.



Heel / Toe Wear

Appearance	Each lug around tire worn high to low from front to back edge.
Probable Cause	Mismatched inflation pressure or tire diameters in a dual assembly. High torque conditions, mountainous terrains, and high inflation pressures aggravate this condition.
Corrective Action	Review tire maintenance practices. Consult tire manufacturer when selecting tire for operation.
Tire Disposition	Continue to run. If severe, change direction of rotation.



Cupping / Scallop / Alternate Lug Wear

Appearance	Localized cupped-out areas of fast wear around the tire. Alternate lugs worn to different tread depths around the tire.
Probable Cause	Mismatched inflation pressure or tire diameters in a dual assembly. Aggravated by slow rate of wear, poorly maintained suspension components.
Corrective Action	Check for mechanical problem.
Tire Disposition	Check for worn components, inflation pressures and matching tread depths.

IRREGULAR WEAR ON RADIAL TRAILER TYRE

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Depression Wear
(Intermediate)

Appearance	One or more interior ribs (not center) worn below adjacent ribs around the tire's circumference.
Probable Cause	Worn suspension components, mismatched dual diameter or inflation pressures, under-inflation, improper bearing adjustment. Aggravated by high speed/light loads.
Corrective Action	Diagnose mechanical condition and correct.
Tire Disposition	Continue to run until pull point, then retread.

Diagonal Wear

Appearance	Localized flat spots worn diagonally across the tread, often repeating around the tire.
Probable Cause	Improper bearing adjustment, misalignment, mismatched dual tire diameter and/or inflation pressure. May start as brake skid. Aggravated by high speed/light loads.
Corrective Action	Analyze cause and correct.
Tire Disposition	Reverse direction of rotation. If excessive, submit for retreading.

Brake Skid Damage

Appearance	Localized spot of excessive wear across tread face showing abrasion marks. Damage may extend into casing.
Probable Cause	New brakes (not worn in), unbalanced brake system, frozen brake lines, driver abuse.
Corrective Action	Check brake system.
Tire Disposition	May be repaired or retreaded if casing is undamaged; otherwise, scrap.

Depression Wear
(Shoulder)

Appearance	Localized areas of wear in shoulder, generally less than 12" in length.
Probable Cause	Improper inflation pressure or tire mismounted on wheel. Can also be caused by some other type of wheel end imbalance.
Corrective Action	Review tire and wheel end maintenance practices.
Tire Disposition	Continue to run until pull point, then retread.

Shoulder Step Wear

Appearance	Tire worn on edge of one shoulder, greater than 12" in circumference.
Probable Cause	Excessive camber, misaligned or damaged axle, improper bearing adjustment.
Corrective Action	Diagnose misalignment and/or mechanical condition and correct.
Tire Disposition	Reverse direction of rotation. If excessive, submit for retreading.

Cupping / Scallop Wear

Appearance	Random areas of fast wear around the tire. Erractic in some instances.
Probable Cause	Mismatched inflation pressure or tire diameters in a dual assembly. Aggravated by high speeds/light loads, poorly maintained suspension components.
Corrective Action	Check for worn components, inflation pressures and matching tread depths.
Tire Disposition	Continue to run until pull point, then retread.