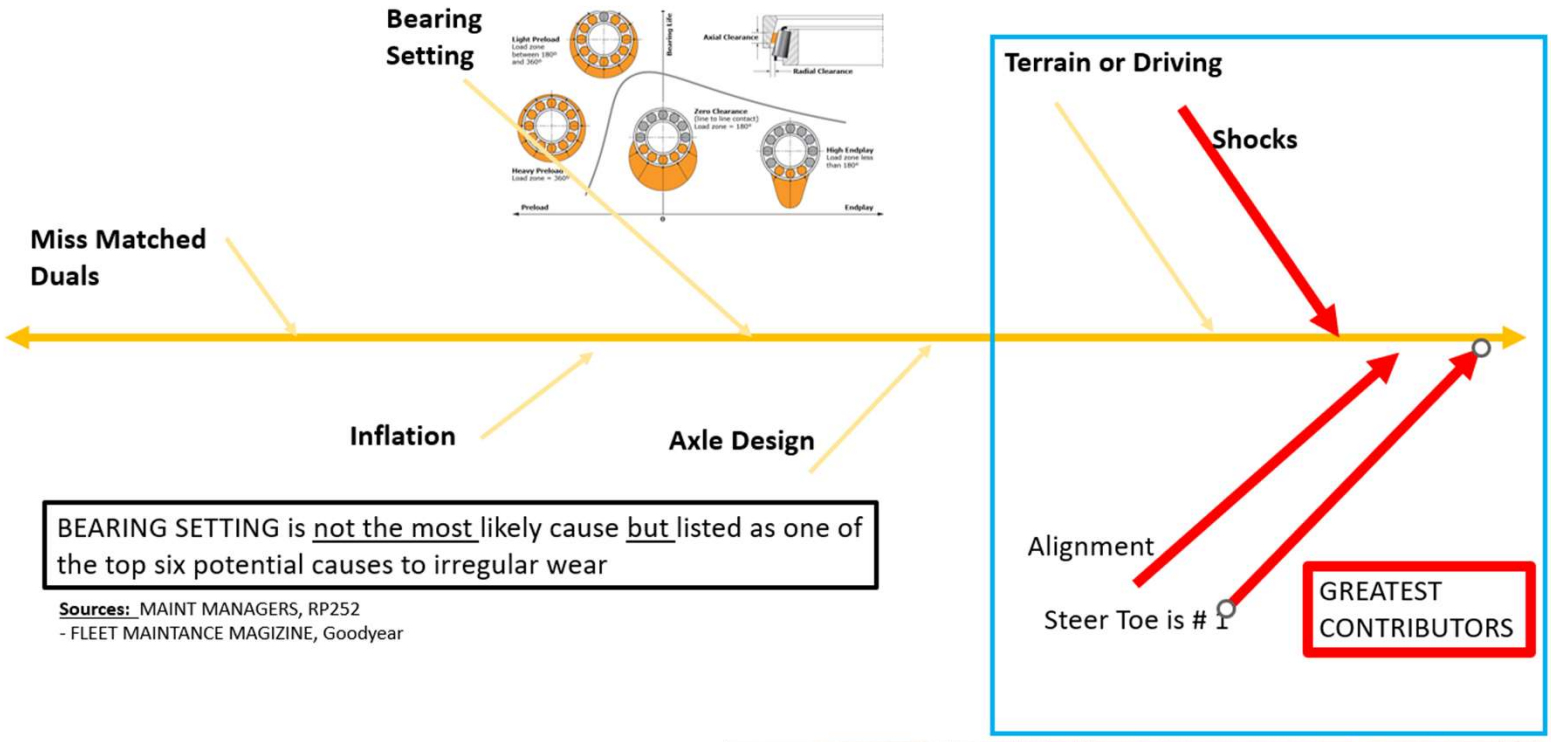
PRESET HUBS SAVE TIRE COSTS

Causes for Irregular Tire Wear (RP252)	% of all causes	Difficulty to Control or Fix
Alignment	17%	
Terrain or Driving	14%	Driver / Route dependent
Axle Design	10%	If buying new
HUB Setting .001-.005"	10%	Assumes Preset Hubs
Mismatched Duals	7%	
Tire Inflation	7%	
Damaged/Worn Suspension	5%	



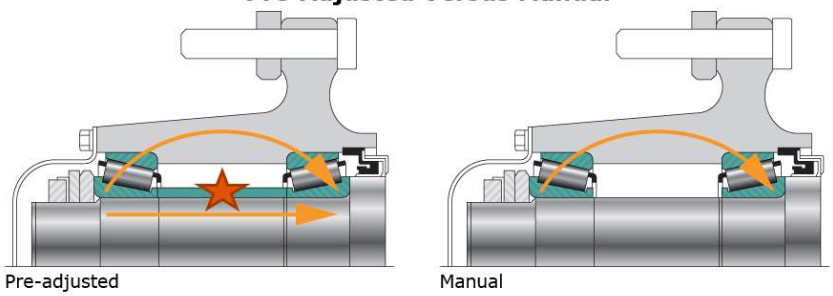
BEARING SETTING is not the most likely cause but listed as one of the top six potential causes to irregular wear

Sources: MAINT MANAGERS, RP252
- FLEET MAINTANCE MAGIZINE, Goodyear

13 types with endplay as a potential cause

Steer	cupping scallop wear
TRAILER	cupping scallop wear
TRAILER	Diagonal wear
TRAILER	erratic depression wear
TRAILER	malfunctioning flat spot wear
Steer	One sided wear
TRAILER	One sided wear
Drive	rapid shoulder one shoulder
TRAILER	rapid shoulder wear one shoulder
Steer	rib depression punch wear
Drive	Shoulder step Chanfer wear
TRAILER	Shoulder step Chanfer wear
Steer	spot wear

Pre-Adjusted Versus Manual



Pre-adjusted

Manual

Pre-Adjusted: Set-Right™ Proven Setting Control

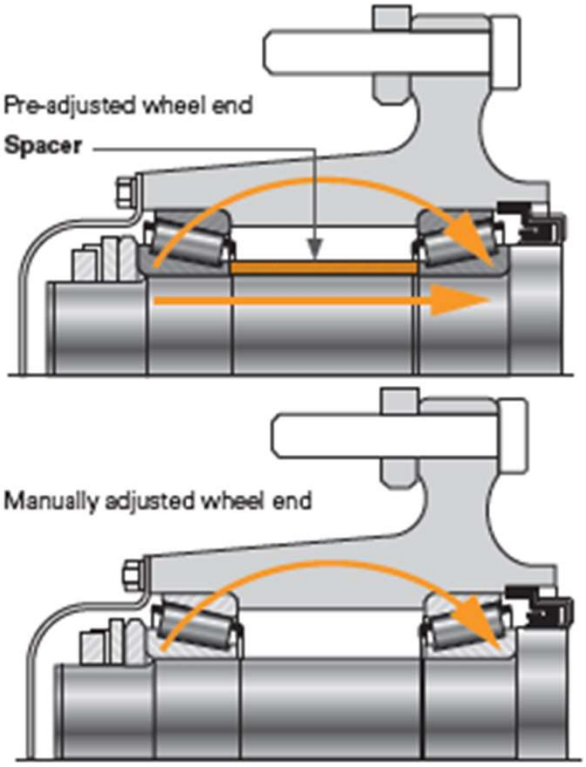


Fig. 1: Comparison of a pre-adjusted wheel end (with spacer) and a manually adjusted wheel end (no spacer)

Fig. 2: Common types of spacers

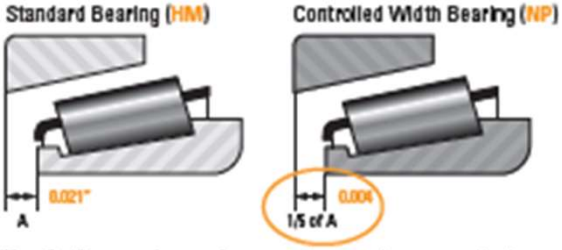


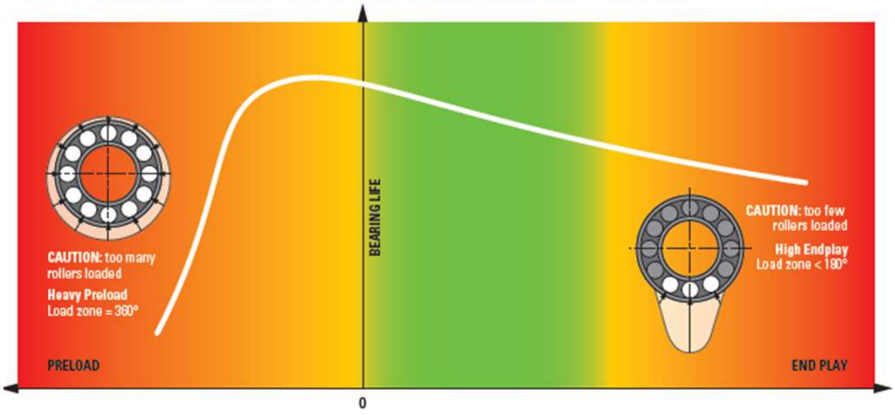
Fig. 3: Comparison of a standard and a controlled width bearing

WHEEL-END COMPONENT PERFORMANCE

Bearing setting too loose = excessive endplay that can lead to seal leakage or tire wear
Bearing setting too tight = excessive preload that can lead to hub burn up or wheel separation

OPTIMAL BEARING LIFE

Never use standard bearings with a spacer as they will double the possible setting range.



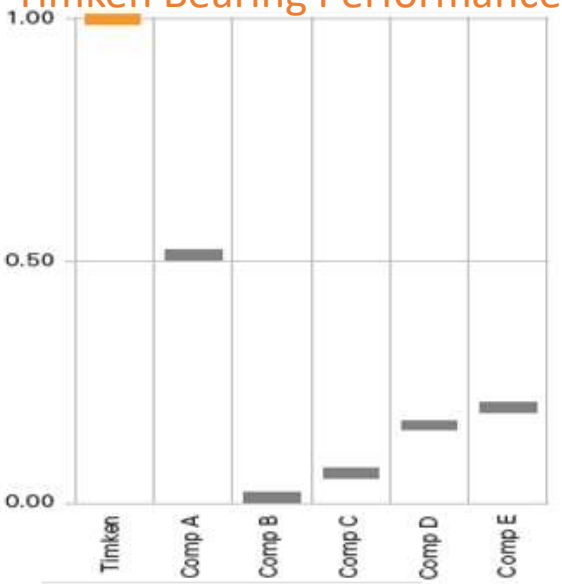
RED SHADED AREAS HAVE A HIGHER LIKELIHOOD OF: Hub burn up, seal leaks, tire wear, wheel seperation

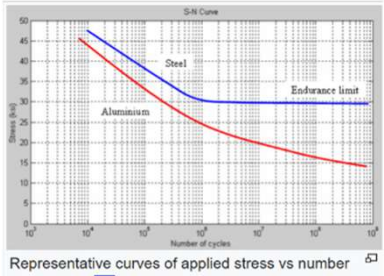
- CATISTROPHIC EVENTS ARE MORE LIKLEY AT THE EXTREMES.
  TOO TIGHT or **TOO LOOSE**

Why Timken Hubs

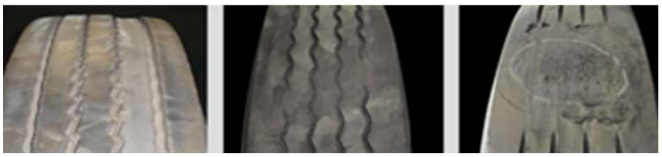
- Timken Bearings inside for trusted performance
- Ease of installation saving shop time
  - 1 Torque for techs to remember with pro-torque style nuts
- **More precise setting minimizes extremes, assuring safety for your fleet**
- Iron durability avoids the risk of cup spin
- Tighter run out
  - Protects against bearing misalignment and irregular tire wear
  - Improves drum run-in

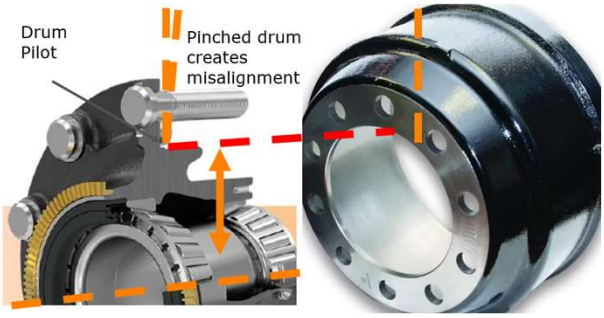
Timken Bearing Performance



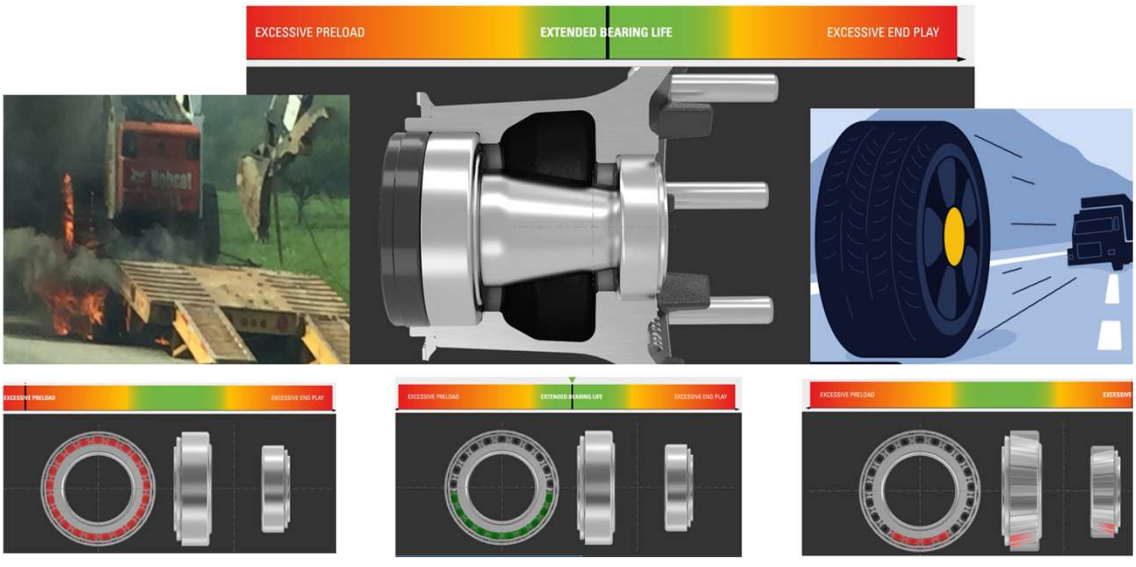


Representative curves of applied stress vs number of cycles for steel (showing an endurance limit) and aluminium (showing no such limit).





Set Right™ Tolerances Consistently Assure Bearing Setting to Avoid Hub Disasters



TIMKEN

TIMKEN CV WHEEL HUBS

Introducing Timken® Pre-Adjusted Hub Assembly

Simplify installation and help improve the performance of commercial vehicles.

Each Timken® pre-adjusted hub assembly comes pre-assembled with Timken® Tapered Roller Bearings with Set-Right® tolerances, a precision spacer and a premium seal – so you can trust that it will keep turning reliably for more miles.

All components are properly installed and housed in an iron hub for added durability and endurance, giving you peace of mind.

TIMKEN PART NUMBER	CV PRE-ADJUSTED HUBS (LOADED)	SETS INCLUDED
FF1HUBPA	Front FF1 (5.06") Pre-Adjusted Hub Loaded	SET428 / SET427
FF2HUBPA	Front FF2 (5.44") Pre-Adjusted Hub Loaded	SET428 / SET427
FL1HUBPA	Front FL1 Pre-Adjusted Hub Loaded	SET445 / SET446
RD1HUBPA	Drive Pre-Adjusted Hub Loaded	SET430 / SET429
TN1HUBPA	Trailer TN Pre- Adjusted Hub Loaded	SET427 / SET431
TP1HUBPA	Trailer TP Pre- Adjusted Hub Loaded	SET432 / SET432
TIMKEN PART NUMBER	**CV MANUAL ADJUSTED HUBS (LOADED)**	**SETS INCLUDED**
FF1HUBA	Front FF1 (5.06") Manual Adjusted Hub Loaded	SET406 / SET413
FF2HUBA	Front FF2 (5.44") Manual Adjusted Hub Loaded	SET406 / SET413
FL1HUBA	Front FL Manual Adjusted Hub Loaded	SET423 / SET424
RD1HUBA	Drive Manual Adjusted Hub Loaded	SET401 / SET403
TN1HUBA	Trailer TN Manual Adjusted Hub Loaded	SET413 / SET414
TP1HUBA	Trailer TP Manual Adjusted Hub Loaded	SET415 / SET415
TIMKEN PART NUMBER	**CV MANUAL ADJUSTED HUBS (INCLUDES CUPS/RACES ONLY)**	**CUP/RACES**
FF1HUB	Front FF1 (5.06") Manual Adjusted Hub Includes Cups/Races only	HM212011 / 3720
FF2HUB	Front FF2 (5.44") Manual Adjusted Hub Includes Cups/Races only	HM212011 / 3720
FL1HUB	Front FL Manual Adjusted Hub Includes Cups/Races only	6420 / 552A
RD1HUB	Drive Manual Adjusted Hub Includes Cups/Races only	592A / 572
TN1HUB	Trailer TN Manual Adjusted Hub Includes Cups/Races only Hub	HM212011 / 10
TP1HUB	Trailer TP Manual Adjusted Hub Includes Cups/Races only Hub	HM518410

INTERCHANGE

TIMKEN		CONMET			WEBB
Iron Hub/Long Studs		Stud Length	Iron	Aluminum	Iron
RD1HUBPA	Drive Pre-Adjusted Hub Loaded	Short Stud	10082218	10082216	26432-5T-2200P
		Long Stud	10082219	10082217	26431-3T
FF1HUBPA	Front FF1 (5.06") Pre-Adjusted Hub Loaded	Short Stud	10082210	10082206	25062-3T-2200P
		Long Stud	10082211	10082207	25062-3T-2300P
		Short Stud		10082208	25061-OT
		Long Stud		10082209	
FF2HUBPA	Front FF2 (5.44") Pre-Adjusted Hub Loaded	Short Stud	10082204	10082200	25202-1T-2300P
		Long Stud	10082205	10082201	25202-3T-2300P
		Short Stud		10082202	25202-3T-2200P
		Long Stud		10082203	
FL1HUBPA	Front FL1 Pre-Adjusted Hub Loaded 5.30" Wheel Inset	Short Stud	10082214	10082212	25302-7T-2300P
		Long Stud	10082215	10082213	
TN1HUBPA	Trailer TN Pre- Adjusted Hub Loaded	Short Stud	10082226	10082224	21032-3T-2200P
		Long Stud	10082227	10082225	21032-5T-2200P
		Short Stud	10086804	10086810	
		Long Stud	10086805	10086811	
TN1HUB	Trailer TN Manual Adjusted Hub Includes Cups/Races only	Short Stud	10082251	10082249	20231-3T
		Long Stud	10082252	10082250	20231-5T
TP1HUBPA	Trailer TP Pre-Adjusted Hub Loaded	Short Stud	10082230	10082228	23032-3T-2200P
		Long Stud	10082231	10082229	23032-5T-2200P
		Short Stud	10086807	10086813	
		Long Stud	10086808	10086814	
TP1HUB	Trailer TP Manual Adjusted Hub Includes Cups/Races only	Short Stud	10082255	10082253	23431-3T
		Long Stud	10082256	10082254	23431-5T

TIMKEN

APPLICATION GUIDE TO TIMKEN HUBS

Spindle	ROW	Type	MileMate SETS	HUB BASE #	PRE-ADJUSTED PRESET HUB	MANUAL ADJUSTED	RACE ONLY
FF (Steer)	Inner Row	Cone	Set 427	FF1HUB 5.06" OFFSET FF2HUB 5.44" OFFSET	add PA SUFFIX	add A SUFFIX	NO SUFFIX
		Race	Set 427				
	Outer Row	Cone	Set 428				
		Race	Set 428				
R (Drive)	Inner Row	Cone	Set 429	RD1HUB			
		Race	Set 429				
	Outer Row	Cone	Set 430				
		Race	Set 430				
TN (Trailer)	Inner Row	Cone	Set 431	TN1HUB			
		Cup	Set 431				
	Outer Row	Cone	Set 427				
		Cup	Set 427				
TP (Trailer)	Inner & Outer Rows	Cone	Set 432	TP1HUB			
		Cup	Set 432				
FL (Steer)	Inner Row	Cone	Set 445	FL1HUB			
		Race	Set 445				
	Outer Row	Cone	Set 446				
		Race	Set 446				

LOCK NUT PRECEDURE WITH PRESET HUBS

- The simplest lock nut is a Pro-Torque or Clip Stye because techs only need to remember one torque. **300 Ft-lbs.**
- The P/N table below shows clip style nuts

TIMKEN SPINDLE NUT P/N	STEMCO Pro-Torq®	Axilok®	DESCRIPTION	SOCKET SIZE	TIMKEN REPLACEMENT KEEPER P/N
FFT1SPINDLENUT	448-4836	AX12-1500	1.500" - 12 TPI	2-1/2" - 6 Point	FFT1KEEPER
FFD1SPINDLENUT	448-4837	AX18-1500	1.500" - 18 TPI	2-1/2" - 6 Point	FFD1KEEPER
RD1SPINDLENUT	449-4973	AX12-3250	3.250" - 12 TPI	4-3/8" - 8 Point	RD1KEEPER
TN1SPINDLENUT	447-4743	AX16-2625	2.625" - 16 TPI	3-3/4" - 8 Point	TN1KEEPER
TP1SPINDLENUT	447-4723	AX12-3480	3.480" - 12 TPI	4-13/16" - 8 Point	TP1KEEPER

INSTALLATION PROCEDURE FOR PRESET HUBS

Spindle nuts can be used with preset hub assemblies. When using the spindle nuts with preset hub assemblies, follow the hub manufacturer's installation instructions. Minimum torque specification for the spindle nut is 300 ft/lbs. when used to retain a preset hub assembly. Install the keeper into the spindle nut. If the keeper will not align with the spindle keyway and nut grooves, you must advance the spindle nut to engage the keeper. Never back off the spindle nut to align the keeper on a preset hub application.

Greater Cross Section for holding power

300 FT-lbs: Steer drive and Trailer

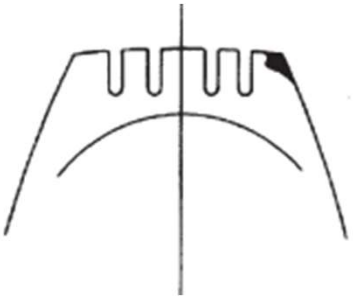
500FT-lbs: drive and Trailer

3- piece nut (JAM NUT) systems on a Preset hub

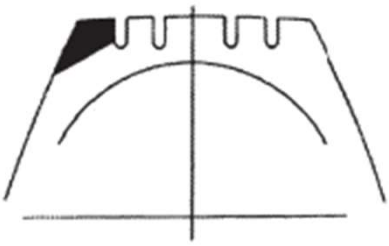
Inner nut: 300 FT-lbs.
Outer nut: 200 FT-LBS
ALWAYS TIGHTEN TO ENGAGE TABS OR HOLES

TYPES OF IRREGULAR TIRE WEAR AVOIDED BY USING PRESET

STEER TIRES

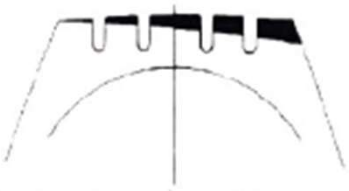


Shoulder chamfer :



FULL Shoulder Wear :

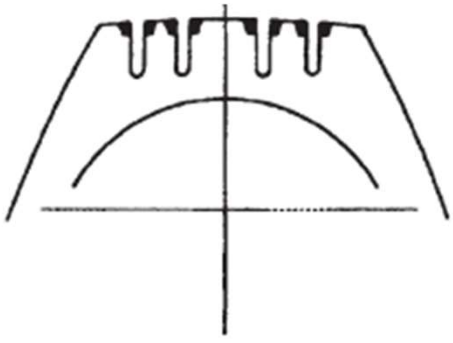
Causes: Side scrub from improper toe, damaged steering components, Suspension component compression or extension Improper seated bead install, Dry 5th wh



One sided- Starts from either shoulder to the middle :

Causes :Drive axle misalignment in combination with Worn king pins or improper bearing setting. Often associated with feather wear

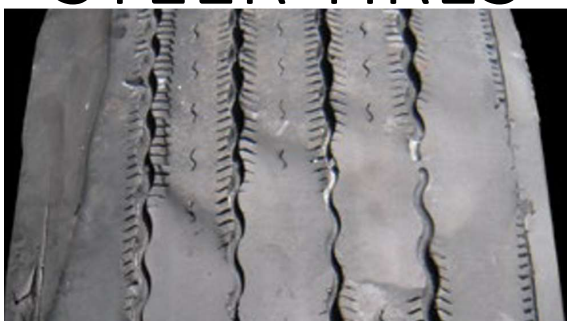
Causes: Excessive Toe-in, improper alignment, damaged suspension components or bent tie rods Dry 5th wh



Erosion river wear:

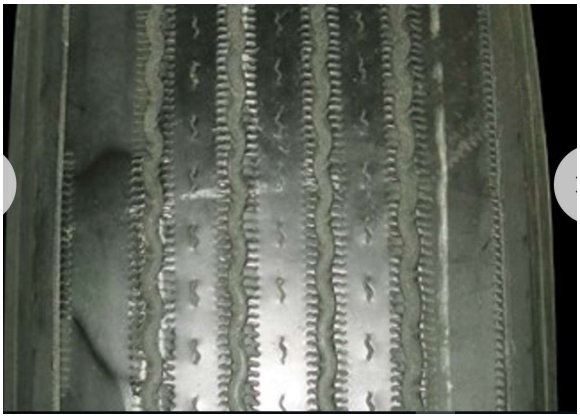
Causes: Slow radial wear –free rolling axle in line haul with light loads & enfrequent turning Tire construction not suited for application

STEER TIRES

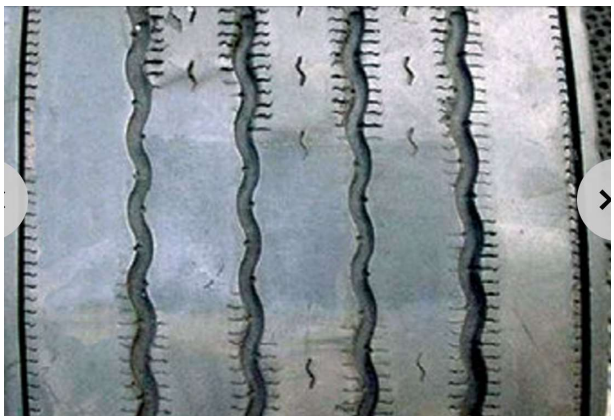


DIAGONAL WEAR: Starts as oblique wear patches
Can be localized or repeat around the tire.
Causes: Misalignment, severe out of balance, loose bearing endplay

CENTER DEPRESSION WEAR OF CENTER TREAD RIB:
Causes: under inflation, overloaded, bad shocks, loose bearings, mis mount, hi speed empty haul



SHOULDER DEPRESSION WEAR:
Localized on shoulder rib. It can be a single patch or repeat around tire
Causes: Lateral runout, loose bearings, mis mount, severe balancing issue



FLAT SPOTTING:Mult. Radial worn areas around tire
Causes: Bad Shocs, loose bearings, severe out of balance, mismatched pressures or duals, excessive high speed empth haul

STEER TIRES

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 nonuniformity such as mismount.

CORRECTIVE ACTION
Check air pressure and mechanical issues.

TIRE DISPOSITION
Rotate or retread.

DIAGONAL WEAR

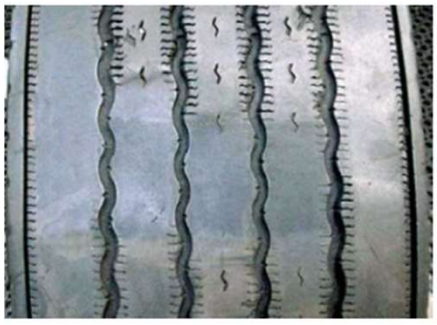
APPEARANCE
Manifests in the form of oblique wear patches. Can appear singularly or repeat around the circumference of the tire.

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.

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.

STEER TIRES

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.

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.

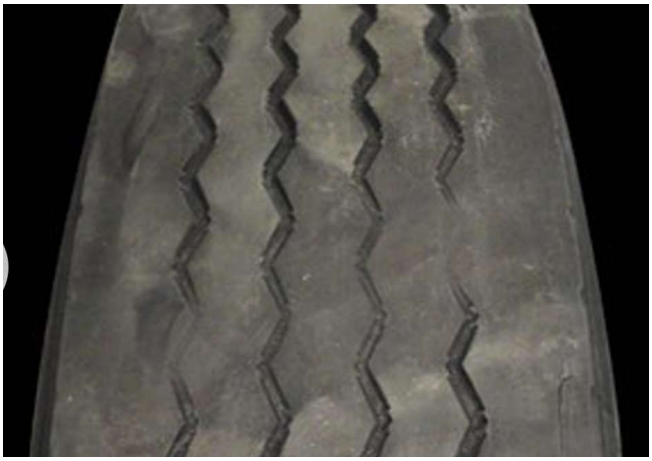
CORRECTIVE ACTION
Check air pressures/load weight and worn parts.

TIRE DISPOSITION
Continue to run, rotate or retread.

TRAILER TIRES

Intermediate depression wear- One or more interior ribs (not centered) worn below adjacent ribs
Causes: Worn suspension parts, mis matched duals, inflation pressure, underinflation, excessive bearing end play

SHOULDER STEP: Worn on 1 edge more than 12” around
Causes: Excessive cambur, misaligned or damaged axle, loose bearing end play



DIAGONAL WEAR: Localized flat spots worn diagonally across tread, often repeating around tire
Causes: Improper bearing setting, Mismatch duals, misalignment, Starts as brake skid, aggravated by light loads

TRAILER TIRES

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, underinflation, 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

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

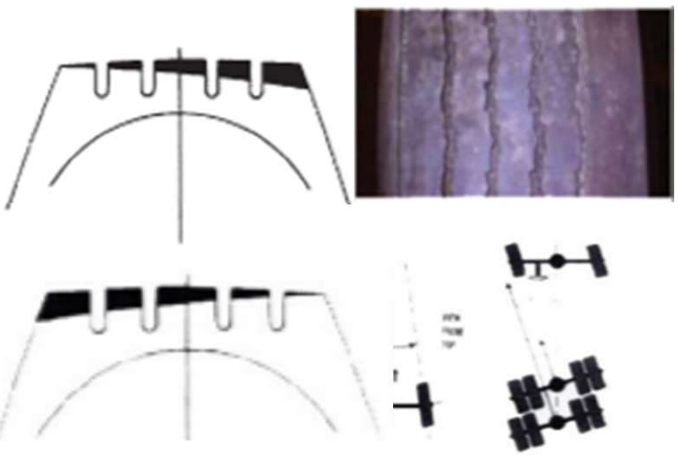
APPEARANCE
Random areas of fast wear around the tire. Erratic in some instances.

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.

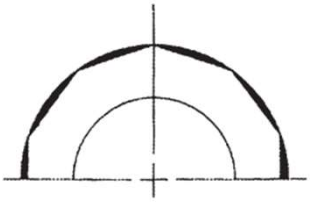
ALL TIRES



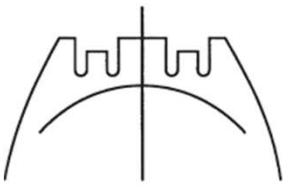
ONE SIDED WEAR: excessive wear from one shoulder toward center tread. It can be associated with feather wear and happen in both directions on both inside or outside dual

Causes: improper alignment, worn king pins, bearing setting, excessive axle loads dry 5th wheel, drive axle alignment

CUPPING / SCALLOP WEAR



1. Assembly out of balance
2. Non concentric mounting, non-uniformity or out of round
3. Lack of shock absorber control
4. Loose kingpin or improper wheel bearing adjustment
5. Underinflation

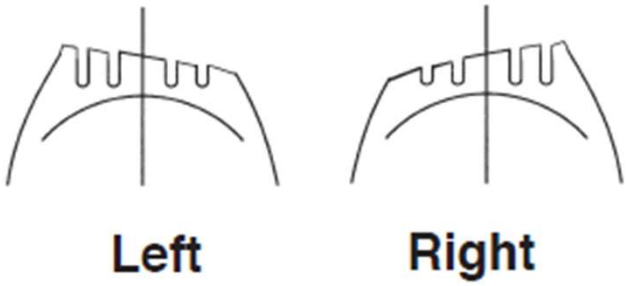


1. Assembly out of balance
2. Low Pressure
3. Hi Speed/light loads
4. Improper bead seating
5. Loos bearings/Excessive endplay
6. Lack of shock absorber control

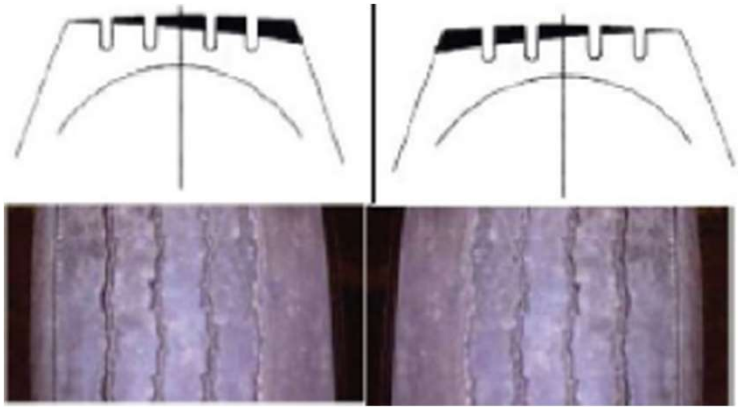
1. Lack of shock absorber control
2. Improper bead seating
3. Loos bearings/Excessive endplay
4. Assembly out of balance
5. Low Pressure
6. Hi Speed/light loads

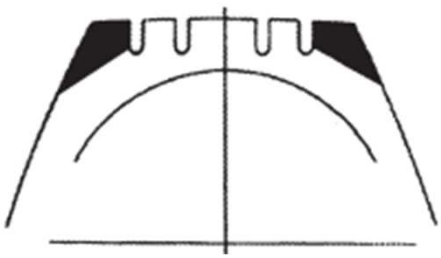
ALL TIRES

Toe in wear



1. Improper alignment, specifically Toe out
2. Aggravated wheel brg adjustment and/or steering components
3. Improper selection of steering arms to match vehicle wheel base

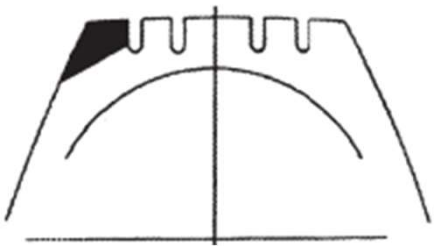




1. Over inflation
2. Incorrect rim width

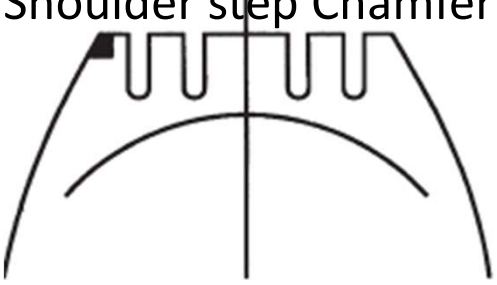
DRIVE TIRES

Rapid shoulder wear one side



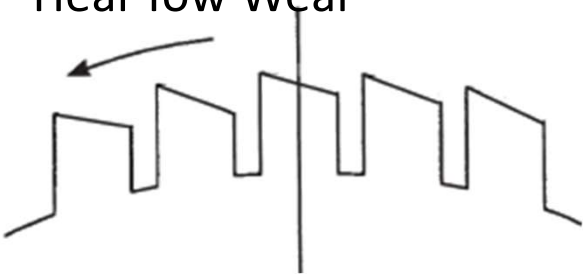
1. Miss-Adjusted wheel bearing
2. Axle Camber
3. Non-concentric tire mounting

Shoulder step Chamfer Wear



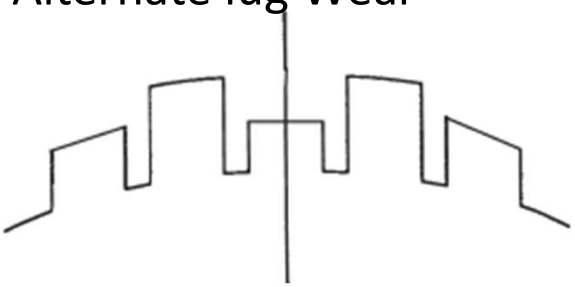
1. Slow rates of wear
2. Worn damaged suspension cpnts
3. Worn improper wh. Bearing adjustment
4. Axle Camber
5. Shifting loads/road conditions

Heal Tow Wear



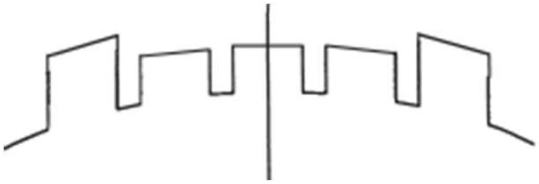
1. Mismatched inflation pressure
2. Mismatched diameter of duals
3. Aggravated delivery conditions mountainous terrain
4. Aggravated hi-torque with deep tread lug tires

Alternate lug Wear



1. Mismatched inflation pressure
2. Mismatched diameter of duals
3. Variation of tire loads
4. Pick up delivery operations
5. Aggravated slow rate tread wear
6. Improperly maintained suspension components

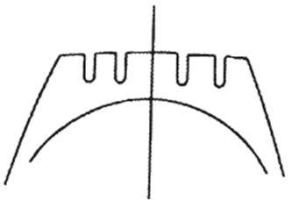
Brake SKid Wear



1. Aggressive braking / driving habits
2. Heavy axle loads . Hi HP engine torque
3. Mal-functioning / unbalanced brakes

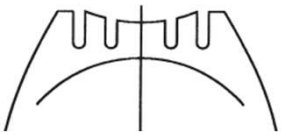
Drive tires

Overall fast wear



1. Improper tread design selection
2. Aggressive driving habits
3. Heavy axle loads
4. High horsepower/high torque engine
5. Vehicle configuration
    1. **(single axle drives such as 4x2, 6x2 or long wheel base vehicles)**
6. Severity and frequency of turns
7. Abrasive road surface
8. Mountainous terrain

Brake Skid



1. Aggressive braking
2. Malfunctioning unbalanced brakes

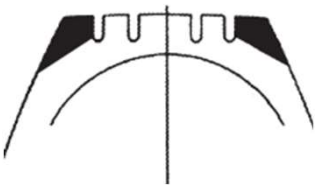
Diagonal wear

1. Mis mounted / wheel to trailer
2. Improper wh. Bearing adjustment
3. Mismatched duals
4. Pre-existing wear
5. Aggravated hi speed/empty or light loads

Multi flat spot wear

1. Uneven dual loading
2. Improper wheel brg adjustment (loose)
3. Imbalance
4. Suspension and bad shocks
5. Abuse of trailer brakes
6. Aggravated hi speed/empty or light loads

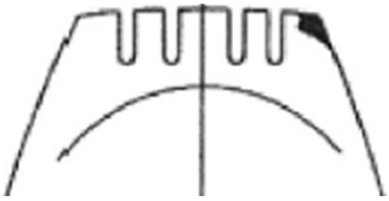
Rapid shoulder wear Both shoulders



1. Overinflation
2. Misapplication design for application
3. Improper inflation
4. Shifting loads
5. Axle Camber
6. Worn Suspension parts
7. Loose bearing
8. Road conditions

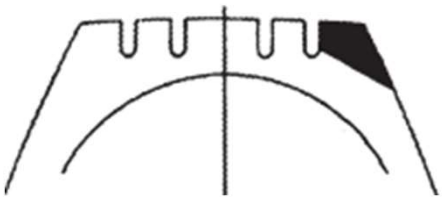
Drive tires

Shoulder step/ Chanfer wear



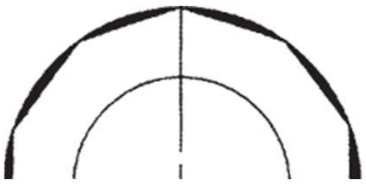
1. Typical radial tire wear in slow wearing applications
2. Tread Desing or application
3. Improper inflation
4. Shifting loads
5. Axle camber
6. Worn / Damaged suspension components
7. Improper wh bearing adjustment
8. Road conditions

Rapid Shoulder wear
- One shoulder



1. Edge wear aggravated by poor alignment
2. Misaligned bent axle
3. Misadjusted wheel bearing
4. Aggravated by worn suspension parts
5. Non-Concentric tire mounting

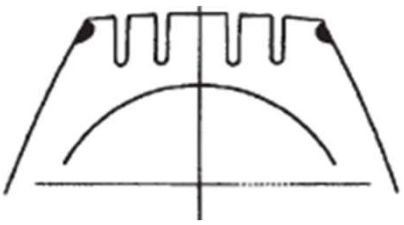
Multi flat spot wear



1. Out of balance
2. Nonconcentric mounting/uniformity or out of round
3. Worn/damaged suspension parts
4. Improper wh. Bearing adjustment
5. Under inflation

Drive tires

Shoulder scrubbing/
Scuffing wear

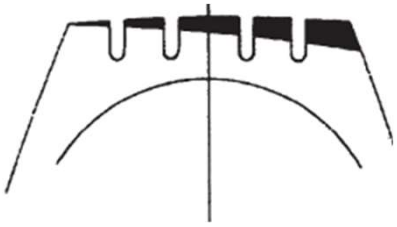


1. Lateral scuffing of tread (abrasion / cracks from loaded spread of multi axle trailers

Erratic Depression wear

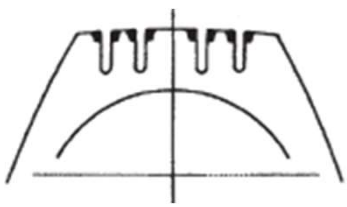
1. Lack of Shock absorber control
2. Mismatched duals
3. Mismatched inflation of duals
4. Improper wh brg adjustment
5. Non-Uniformity of rotating assembly
6. Aggravated hi speed driving / light loads

One sided wear



1. Improper alignment
2. Improper wh brg adjustment
3. Excessive axle loads
4. Tire edge wear aggravated by driver /trailer operation

Erosion / River wear



1. Slow rate of rad. Tire wear on free rolling axle in line haul with light loads and infrequent turns
2. Individual tire design and construction

DRIVE TIRES

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.

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

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.

DRIVE TIRES

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, underinflation, 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

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.

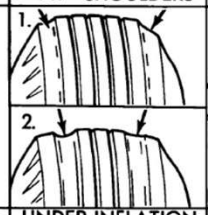
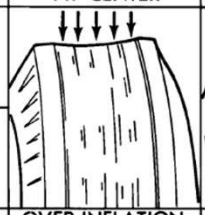
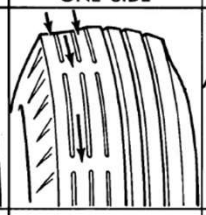
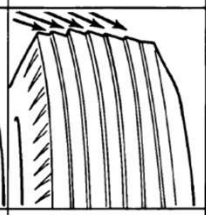
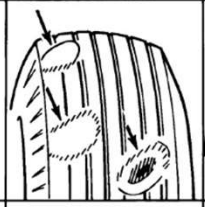
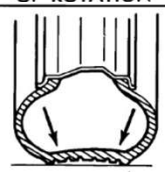
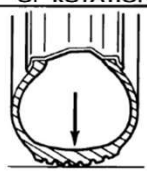
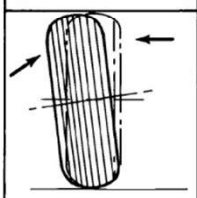
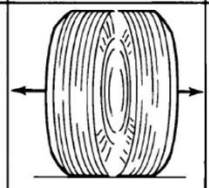
CUPPING / SCALLOP WEAR

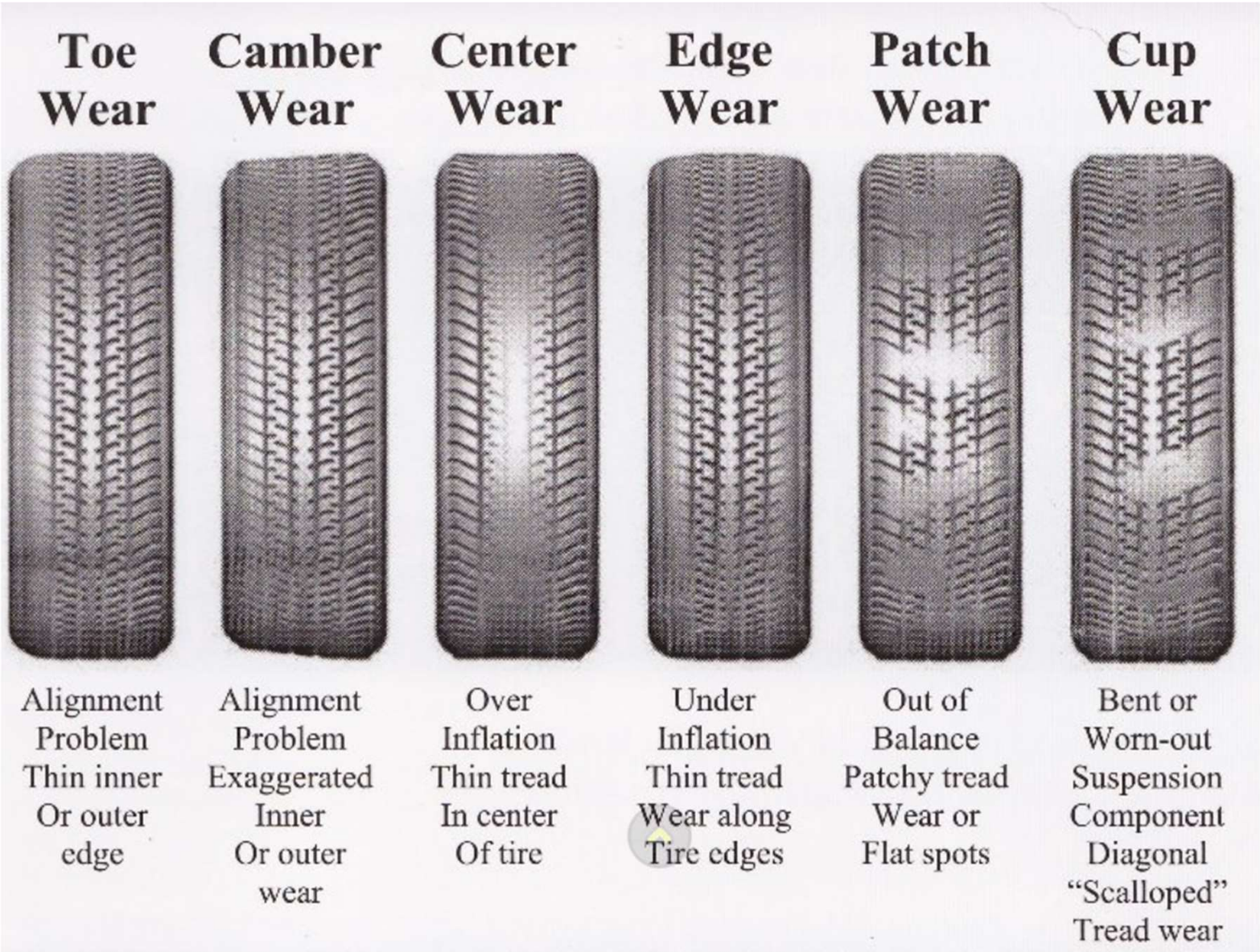
APPEARANCE
Random areas of fast wear around the tire. Erratic in some instances.

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.

CONDITION	RAPID WEAR AT SHOULDERS	RAPID WEAR AT CENTER	CRACKED TREADS	WEAR ON ONE SIDE	FEATHERED EDGE	BALD SPOTS	SCALLOPED WEAR
EFFECT							
CAUSE	UNDER-INFLATION OR LACK OF ROTATION 	OVER-INFLATION OR LACK OF ROTATION 	UNDER-INFLATION OR EXCESSIVE SPEED*	EXCESSIVE CAMBER 	INCORRECT TOE 	UNBALANCED WHEEL  OR TIRE DEFECT *	LACK OF ROTATION OF TIRES OR WORN OR OUT-OF-ALIGNMENT SUSPENSION.
CORRECTION	ADJUST PRESSURE TO SPECIFICATIONS WHEN TIRES ARE COOL ROTATE TIRES			ADJUST CAMBER TO SPECIFICATIONS	ADJUST TOE-IN TO SPECIFICATIONS	DYNAMIC OR STATIC BALANCE WHEELS	ROTATE TIRES AND INSPECT SUSPENSION SEE GROUP 2



[Irregular Tire Wear 101 | MICHELIN COMMERCIAL TIRES]