

SHOP TIPS

Autolite



VOL. 8, NO. 8

APRIL, 1970



SPRINGTIME... SAFETY-CHECK TIME!

See center insert
for timely promotions!



HELP CUT ACCIDENTS ...

Technical parts and service information published by the Autolite-Ford Parts Division and distributed by Ford and Lincoln-Mercury dealers to assist servicemen in Service Stations, Independent Garages and Fleets.



Be a "doctor" of safety ... give every car a check-up

IN THIS ISSUE

	Page
SPRINGTIME IS SAFETY-CHECK TIME!	
Brakes	3-7
Steering Gear/Tires and Wheels ..	7-9
Springs	9-10
Shock Absorbers	10
Wheel Alignment/Balance	10-11
Lighting System	12-13
Horn	14
Windshield Wipers/Washers	14
Exhaust System	14
Six Benefits From a Complete Safety Inspection	14

Be sure and file this and future bulletins for ready reference. If you have any suggestions for additional information that you would like to see included in this publication, please write to: Autolite-Ford Parts Division of Ford Motor Company, Merchandising Services Dept., P.O. Box 3000, Livonia, Michigan 48151.

The descriptions and specifications contained in this book were in effect at the time the publication was approved for printing. The Ford Motor Company, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change specifications or design without notice and without incurring obligation.



Copyright © 1970 Ford Motor Company
Dearborn, Michigan

THE THEME OF THIS YEAR'S NATIONAL SAFETY PROGRAM IS...

HELP CUT ACCIDENTS— CONTROL YOUR CAR'S CONDITION

Ford Motor Company pioneering and long-time research into the art of designing and building sturdy, dependable vehicles has made it a leader in automotive safety for many years.

But accident statistics prove that it's not enough to just make a "safer car to crash in." *An all-out war must be fought against crashes themselves!*

Therefore, as a service repair outlet, no matter how large or small, you have a particularly important role in this year's National Safety effort to cut accidents . . . accidents that claim more American lives than warfare, natural disasters and crimes of violence combined. Over 1,000 men, women and children are killed every week . . . thousands more disabled.

The toll is rising at such a rate that a concerned public and government are demanding action. And your part in this concerted action is vital! You men in the service industry are asked to do everything possible to help reduce this terrible highway slaughter.

You have the training and the experience, and you meet the motoring public face to face every day.

Now, put all of these plus factors to work by talking Safety Checks *constantly*.

Suggest and urge ALL of your customers to have their car safety checked BEFORE vacation-time arrives.

Make it one of your prime responsibilities to perform as many safety checks as you can promote . . . sell . . . and adequately handle. Help your customers control their cars' operating condition.

This issue of *Shop Tips* will assist you in this all-out effort.

Promote Periodic Safety Checks

YOUR IMPORTANT PART IN SAFETY CHECKING

Safety checks are not intended to take the place of regular periodic maintenance. Every owner is responsible for proper maintenance at recommended time or mileage intervals to keep his car or truck in good, safe running condition.

However, there are some factors that contribute to an unsafe operating condition. One . . . the owner's neglect or "putting off" of the factory recommended periodic maintenance services. Two . . . abuse of the vehicle by the driver. Three . . . the driver who is totally unaware of unsafe and dangerous operating conditions of parts, units or components of his car or truck.

As a result, we strongly urge you to help cut the terrible accident rate by seeing to it that ALL of your customers take full advantage of your safety-check offer. *Not only at vacation time but preferably twice each year.*

Your full cooperation in this year's effort to reduce highway fatalities may not get national recognition, but it certainly will give you the satisfaction of knowing that you and your men had a big hand in making driving safer for everyone.

BRAKES

No doubt about it, Ford Motor Company brakes are rugged and provide thousands of miles of dependable stopping service for the average car owner. Yet, because they are a friction device, brake linings do wear out.

As a result, periodic checking is recommended by all car makers on at least a once a year or 12,000 mile basis. Also, at least every 6 months or 6,000 miles checking of the brake lines, both the metal tubing and flexible hydraulic hoses, plus checking the master cylinder fluid level should be done.

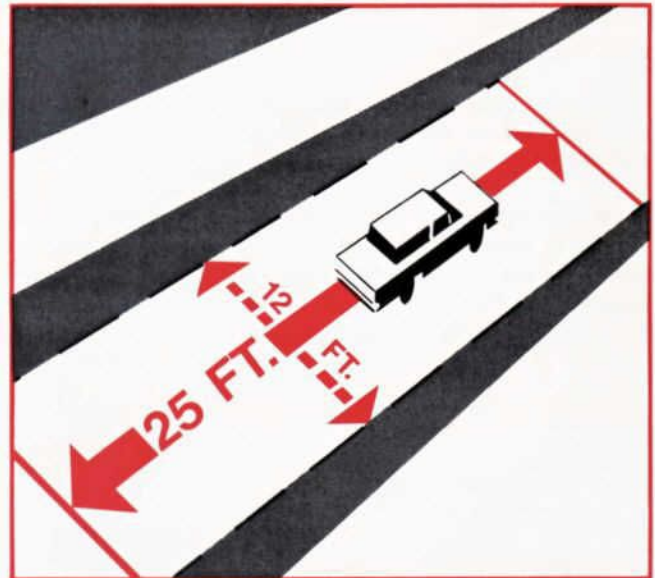


Figure 1—Brake Stopping Distance Ability

CHECKING BRAKE STOPPING DISTANCE

A simple test of the brake stopping distance ability can be performed if you have a safe area in which the test can be conducted. This test **SHOULD NOT** be made on the streets or highways.

At a speed of 20 mph apply the foot brake firmly. The car should come to a smooth, straight stop within 25 feet (the distance called for by most state laws) without pulling to the right or left or causing it to leave a 12 foot wide lane. Maintain firm control of the steering wheel during the test. (See figure 1.)

If the car requires more than 25 feet in which to stop from 20 mph or if the car leaves the 12-foot width lane, it is a direct indication that further inspection of the brake system is absolutely necessary.

Further inspection will also be needed if:

- The brake pedal is low or feels spongy
- Excessive pedal effort is required
- You feel harshness or hear noise
- The brake warning light glows (Dual Brake Systems)

SAFETY CHECKS REVEAL BORDERLINE OPERATING CONDITIONS



HELP CUT ACCIDENTS...

CHECKING HYDRAULIC SYSTEM FOR LEAKAGE

Test the brake hydraulic system for leakage with the car stopped. Leakage may be internal (hydraulic fluid leaking past master cylinder seals) or external.

As shown in figure 2, apply a moderate foot force (40-60 pounds in non-powered systems) or (15-20 pounds in power assisted systems). The pedal must maintain the same pedal height for ONE (1) minute. If not, the brake system should be more thoroughly checked to find the cause.

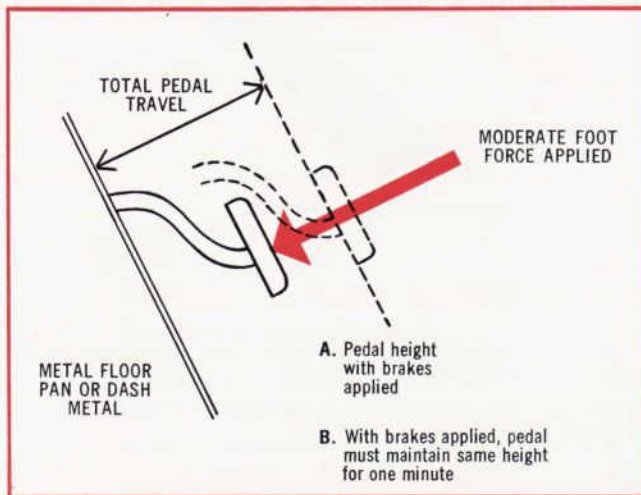


Figure 2—Checking Hydraulic System for Leakage

CHECKING PEDAL RESERVE

Test the pedal reserve with the car stopped. Depress the brake pedal under moderate force. If *less* than $\frac{2}{5}$ of the total available pedal travel remains, the brake system requires further and more complete checking. (See figure 3.)

The cause of low pedal reserve may be:

- Excessive clearance between linings and drum
- Brake linings worn out
- Brakes need adjusting
- Automatic self-adjusters inoperative
- Air in the hydraulic system

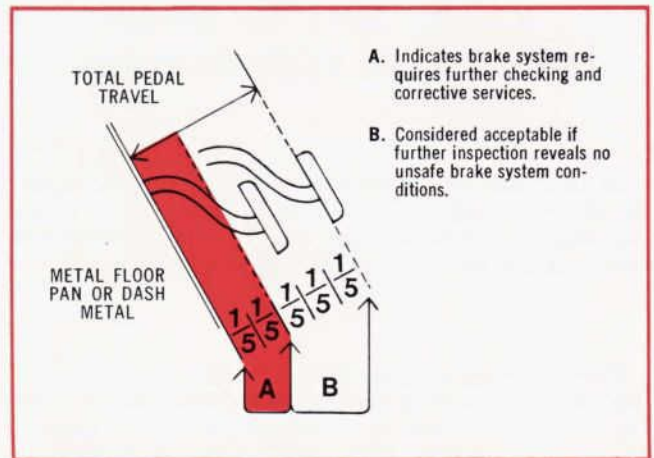


Figure 3—Checking Pedal Reserve

If *pedal height* or *pedal reserve* is *not* within the limits specified, it is suggested that you visually inspect for the following unsafe operating conditions:

- Leakage from the wheel cylinders (a clue that is easy to spot is radial lines of oily looking streaks on the inner sidewalls of the tires) as shown in figure 4.
- Leakage from any of the flexible brake hoses or brake tubing.
- Cracks in the tubing.
- Chafing of the brake flexible hoses.
- Flattened or restricted sections of the tubing caused by damage from road hazards.
- Low hydraulic fluid level of the master cylinder.

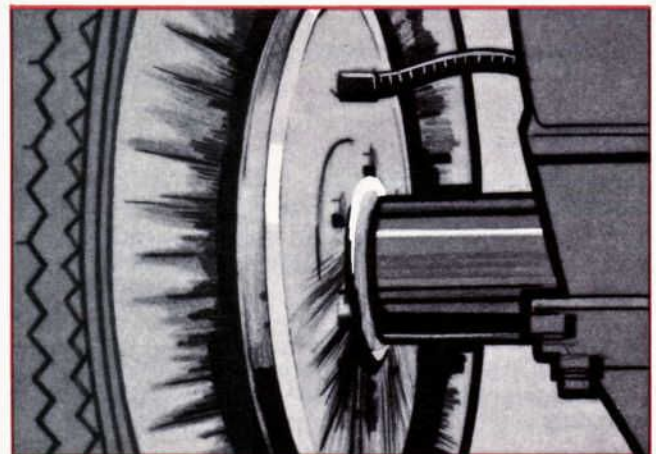


Figure 4—Oily looking Streaks on Inner Sidewall of Tire May Indicate a Leaking Wheel Cylinder.

SAFETY CHECKS UNCOVER HIDDEN MECHANICAL WEAKNESSES

Promote Periodic Safety Checks

Continued

SAFETY CHECK AT ALL POINTS INDICATED

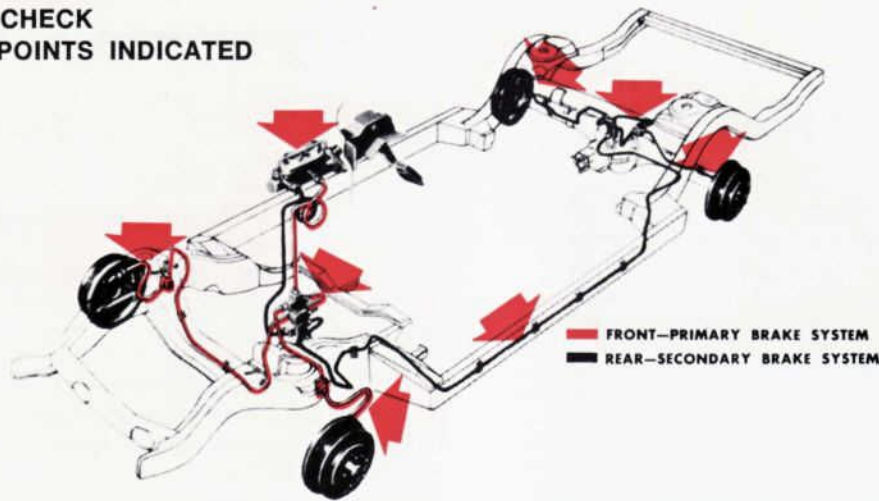


Figure 5—Typical Dual Hydraulic Brake System

CHECKING DUAL HYDRAULIC BRAKES

Test the operation of the brake warning light (if so equipped) which is controlled by the pressure differential valve. On Ford-built cars the warning light will come on (glow) when the ignition key is turned to the START position. This is a quick check of the warning light system and

indicates the bulb is not burned out. Now, turn the key to the ON position. The warning light should go out. Next, apply a moderate force on the brake pedal. If the light now comes on (glows) when the brake pedal is firmly applied, it indicates serious trouble or failure in one of the two hydraulic circuits, either front or rear. (See figures 5 and 6.)

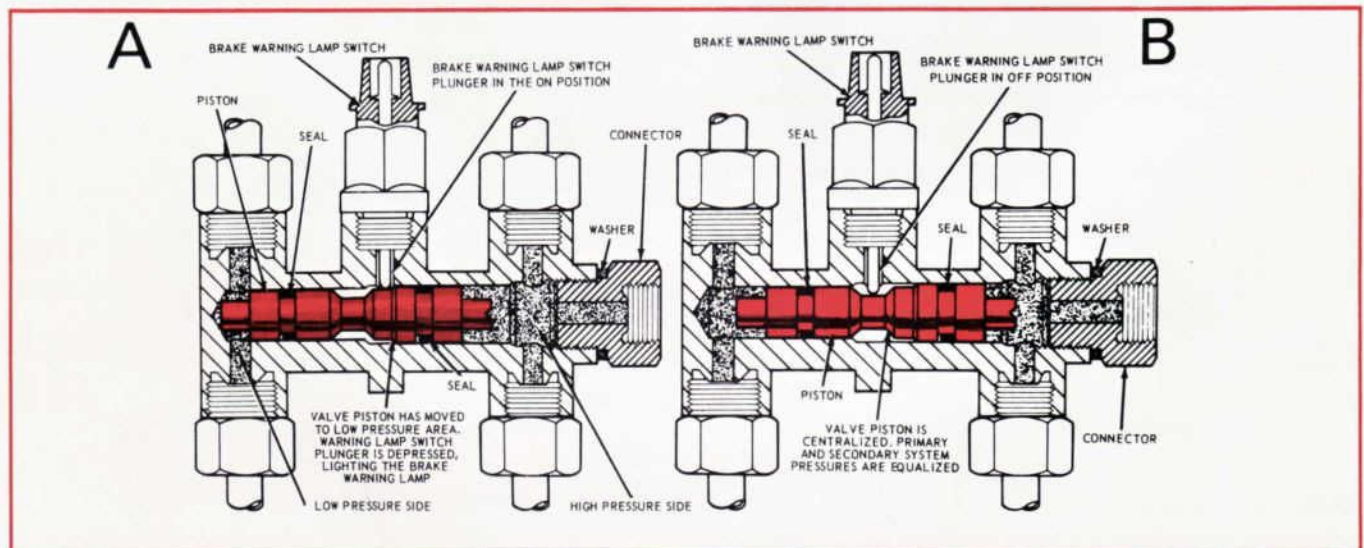


Figure 6—Pressure Differential Valve Assembly Used with Dual Hydraulic Brake (Drum) System. (Note position of valve at "A" causing switch to close contacts and light warning lamp.)

SAFETY CHECKS REVEAL UNSAFE OPERATING CONDITIONS



HELP CUT ACCIDENTS...

CENTERING PRESSURE DIFFERENTIAL VALVE (PRIOR TO 1970)

After the trouble has been located and repaired and the hydraulic system has been bled of all trapped air, the dual brake system warning light will usually continue to glow due to the pressure differential valve remaining in the off-center position.

To center this valve, and turn off the warning light, an unbalance condition must be created in the OPPOSITE BRAKE SYSTEM FROM THE ONE THAT WAS REPAIRED OR BLED LAST.

To do this, turn the ignition switch to the ACC or ON position. Then, loosen the differential valve assembly brake tube nut at the outlet port on the OPPOSITE SIDE of the brake system that was repaired or bled last. Apply the brake pedal slowly to build line pressure until the pressure differential valve moves to a central position. When this occurs, the brake warning light will go out. Immediately tighten the outlet port tube nut and check the level in the master cylinder reservoirs. If necessary, add specified brake fluid to within 1/4 inch of casting top.

CHECKING BRAKE DRUMS OR DISCS

Many of today's cars have a combination of disc-type (caliper) brakes on the front wheels and drum-type brakes on the rear wheels.

Once you've pulled the drums (or pulled a wheel to inspect the disc), inspect the condition of the friction surfaces.

Service is required if:

- The drum or disc friction surfaces have cracks extending to the open edge of the drum or disc. (Hairline heat-check cracks should not be considered.)
- There are cracks on the outside of the drum.
- The drum or disc shows signs of mechanical damage such as scoring; or the drum is distorted, warped, bell-mouthed, barrel shaped or out-of-round, as shown in figure 7.
- The friction surfaces are contaminated with oil, grease, or brake fluid.

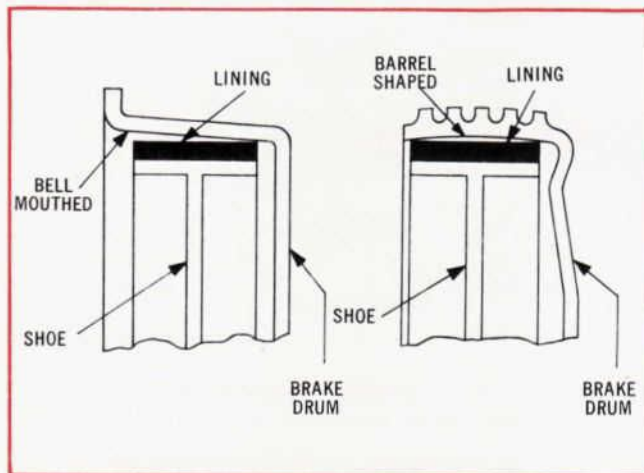


Figure 7—Exaggerated View of Two Bad Drum Conditions

CHECKING BRAKE LININGS OR PADS

For a complete safety check it is recommended that at least one front drum (or wheel) and one rear drum assembly be removed for inspection.

On BONDED linings, measure the lining thickness at the thinnest point. On RIVETED linings check for loose or missing rivets and also measure lining thickness above a rivet head at thinnest point. On WIRE-BACKED linings inspect for wire showing on the friction surfaces of the lining.

Service is required if:

- Linings (or pads) are broken or cracked.
- Parts of the lining are not firmly attached to the shoe.
- Linings (or pads) are contaminated by grease, hydraulic fluid or oil.
- Lining (or pad) wear is excessively uneven.
- The thinnest point on bonded linings is less than 1/32 inch.
- Riveted linings are worn to within 1/32 inch of any rivet head.

CHECKING CONDITION OF VACUUM SYSTEM

Visually inspect the system for collapsed, broken, badly chafed and improperly supported hoses and tubes. Look for loose or broken hose clamps and check all vacuum connections, see figure 8.

To determine if the system is operating properly, first stop the engine. Release parking brake, then apply the brakes several times to destroy all vacuum in the system. After this is done, depress the brake pedal with a moderate force of 15-20 pounds. While maintaining the pedal pressure, START THE ENGINE. The brake pedal should feel that it is falling away slightly, indicating the vacuum system is functioning properly.

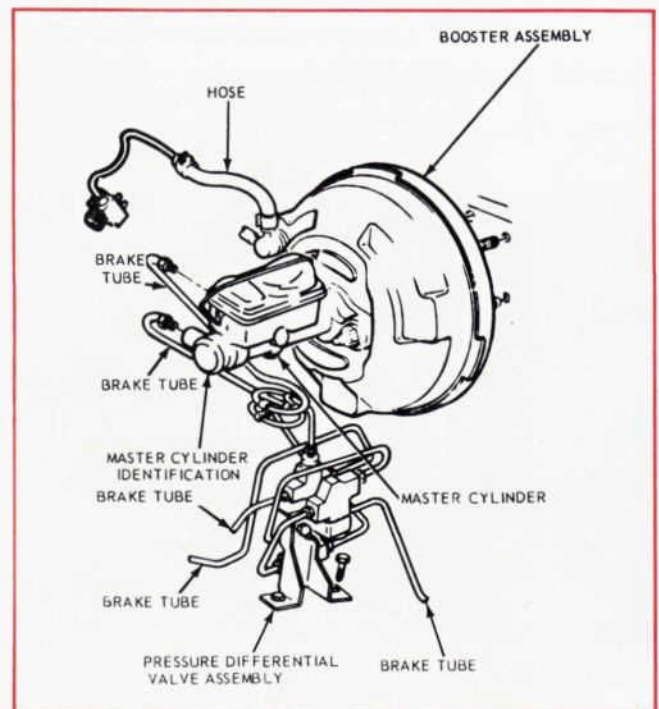


Figure 8—Typical Brake Power Assist and Dual Master Cylinder

SAFETY CHECKS TROUBLESHOOT A CAR'S OVERALL CONDITION

Promote Periodic Safety Checks

Continued

PARKING BRAKE

Apply the parking brake firmly and determine the reserve travel of the hand lever or parking brake foot pedal. Any parking brake should hold a car firmly on all normal inclines or slopes. Adjust if necessary.

STEERING GEAR

The steering system should be checked for excessive wear or poor adjustment of the linkage or steering gear. If the car has power steering, the fluid level and belt tension must be checked and both corrected (if necessary), and the engine must be running before making the following tests:

- First, the car must be on a dry surface. Then, turn the steering wheel through a full right and full left turn and "feel" for a binding or jamming condition. If either condition exists, the owner should be advised that service is absolutely necessary.
- Next, with front wheels in the straight ahead position, turn the steering wheel slowly until the turning motion can be observed at the front wheels. Measure the amount of "free play" or lash. If there is more than TWO (2) inches of total movement at the steering wheel rim before the front road wheels show any sign of movement, then further inspection of the entire steering system should be made to reveal the cause of trouble.

Excessive lash may be caused by:

- Incorrect steering gear adjustment.
- Loose, worn or damaged linkage parts.
- Loose mounting of steering gear to frame or bracket.
- Incorrect front wheel bearing adjustment.

TIRES AND WHEELS

When checking tires *without tread wear indicators*, they are considered worn to an unsafe level when less than 2/32 inch of tread remains when measured in any TWO (2) adjacent

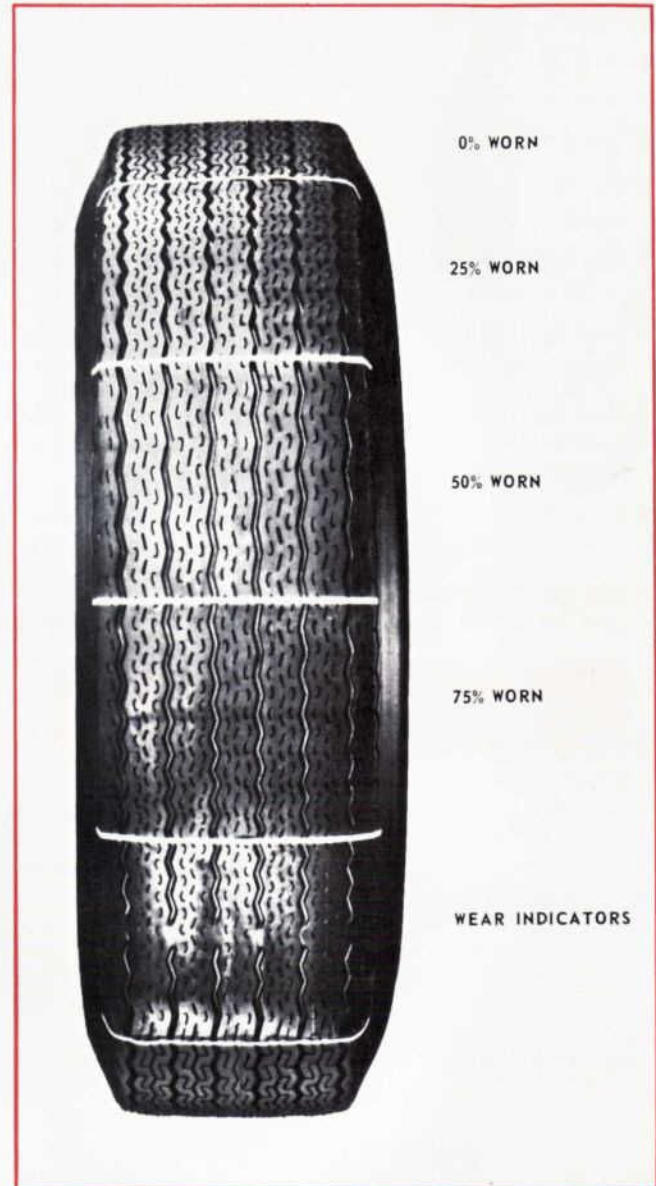


Figure 9—A Tire with Various Stages of Wear. (Note tread indicators showing tire is considered unsafe.)

major grooves at THREE (3) locations spaced approximately equally around outside of tire.

When checking tires *with tread wear indicators*, the tire is considered worn when the tread wear indicators contact the road in any TWO (2) adjacent major grooves at THREE (3) locations spaced approximately equally around the outside of the tire, as shown in figure 9.

SAFETY CHECKS HELP ELIMINATE "KILLERS" FROM THE HIGHWAYS



HELP CUT ACCIDENTS...

TIRES OR WHEELS CONSIDERED UNSAFE

Tires or wheels are also considered unsafe if:

- Tire has worn spot that exposes cord through tread.
- Tire tread has cuts, snags on the sidewall.
- Tire has cracks of ONE (1) inch in any direction and deep enough to expose the cords.
- Tire has visible bumps, bulges or knots; which indicates partial failure or separation of tire structure.
- Tires have been regrooved or recut below original groove depth.
- Tires are not the same size or type on one side of the car as on the other. (Brand or tread design difference is acceptable.)
- Wheel bolts, nuts, studs or lugs are loose, missing or damaged.
- Any part of the wheel is bent, cracked, rewelded or damaged, which will affect safe operation of the car or truck.

CHECKING WHEEL BEARINGS

Wheel bearings out of adjustment can cause wander, erratic front brake action, and noise caused by interference of parts. To check, raise the car off the floor and grasp the front tire at the top and bottom. Attempt to move the wheel assembly inward and outward. If any noticeable movement or looseness is detected, it indicates a bearing adjustment is necessary. Looseness may also be the clue to a bearing that has gone bad. It is therefore suggested that when you do find an unusual amount of looseness, pull the wheel and drum assembly and inspect bearings and cups. (See figures 10 and 11.)

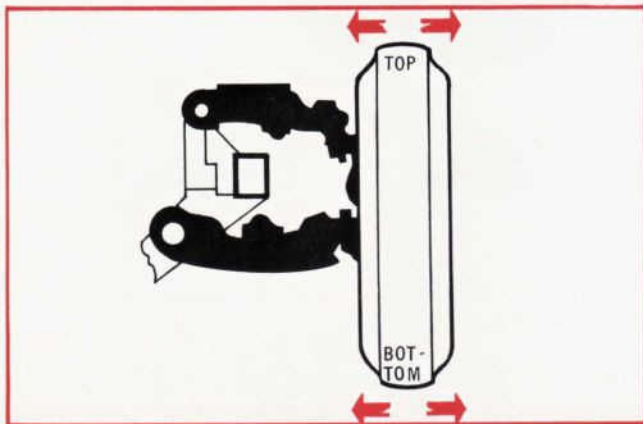


Figure 10—Attempt to Move Wheel Inboard or Outboard to Check for Any Wheel Bearing Free Play

FRONT WHEEL BEARING ADJUSTMENT—FORD-BUILT CARS

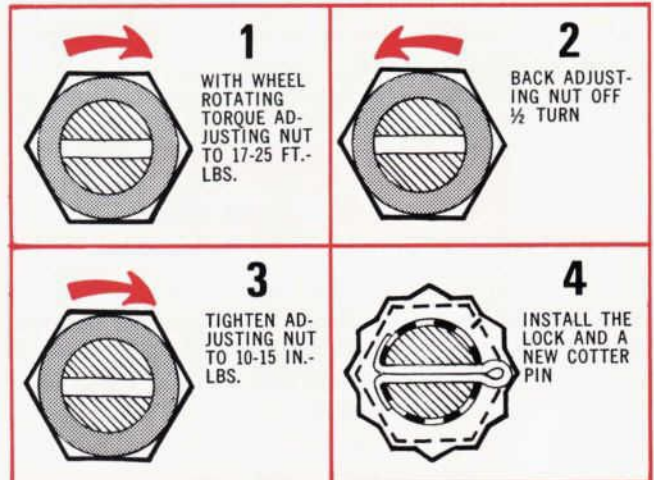


Figure 11—The FOUR Steps Necessary to Properly Adjust Front Wheel Bearings on Ford-built Cars

CHECKING STEERING LINKAGE

Too much free play causes front wheel shimmy, erratic brake action and many unsafe steering control problems. Make sure any looseness detected is not wheel bearing free play. (See figure 12.)

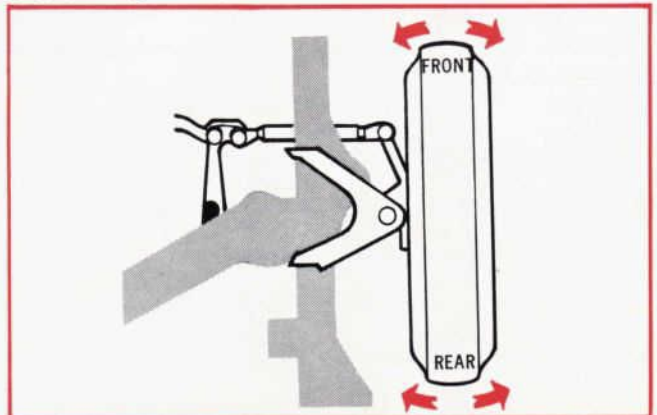


Figure 12—Checking Linkage for Free Play

With the front end lifted properly, grasp the front and rear of the tire and attempt to turn the assembly right and left. NOTE: The brakes should be applied during this inspection either by another person or through the use of a portable brake depressor to eliminate any wheel bearing play.

SAFETY CHECKS ARE CHEAP INSURANCE FOR DRIVERS

**ALERT YOUR
CUSTOMERS TO**

**SHOCK
WAVE
'70**



Autolite
SHOCK ABSORBERS

Buy 3...



**Get
the 4th
FREE**

LIMITED TIME ONLY

**PROMOTE THE
"BUY 3—
GET THE 4TH
FREE"
OFFER!**

Keep your Shock Wave booming! Let your customers know all about Autolite's big money saving shock absorber promotion. Display this attention-getting, full-color Autolite poster in your window now!

Remember—while you save your customers 25%—you maintain your full profit margin with Autolite's Shock Wave '70 offer. When you buy any 12 Autolite Auto-Flex shock absorbers, you pay for 9 at your regular price . . . and the other 3 are yours absolutely free! Act today—this program ends April 30, 1970.

**KEEP YOUR SHOCK WAVE SALES AND PROFITS BOOMING ALL SEASON...
ASK FOR DETAILS AT OUR PARTS COUNTER NOW!**

LAST CHANCE! Be with Autolite's 1970

12 for the Price of 10

Buy 10 fast-moving Autolite FL-10 Oil Filters (popular GM application) . . . get 2 additional oil filters free!

12 for the price of 10

Buy 10 FG-35 Fuel Filters (popular GM application) . . . get 2 additional fuel filters free!

12 for the price of 10

Buy 10 FA-71 Air Filters (popular GM application) . . . get 2 additional air filters free!

PCV VALVE SPECIAL!

Buy the 18-Valve All-Car EV-1000 Assortment—and pay for only 16!

Plus FREE BONUS!

For every EV-1000 PCV valve assortment ordered you receive absolutely free one Autolite FA-71 air filter (popular GM application)!

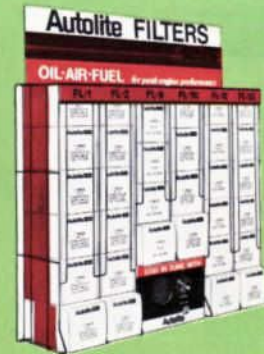


HURRY! PROGRAM ENDS APRIL 30, 1970

a big winner Spring Filter



Get
Autolite's
exclusive
Radio/Rack **FREE!**



Rugged gravity-feed rack with built-in all-transistor solid state radio. You get the rack and the radio absolutely free for your regular price of the filters alone in this fast-moving assortment.

CROSS REFERENCE

AUTOLITE	AC	PUROLATOR	FRAM
FL-10 OIL FILTER	PF-25	PER-49	PH-30
FA-71 AIR FILTER	A348C	AFP-91	CA-326
FG-35 FUEL FILTER	GF-427	P-119	CG-11

FLK-1000 Radio-Rack Filter Assortment	
Quantity	Filter
6	FL-1
6	FL-2
4	FL-9
4	FL-10
6	FL-12
6	FL-22

ORDER NOW—ASK FOR DETAILS AT OUR PARTS COUNTER!

"I've only got two hands...!"

Ever felt like snapping . . . "I've only got two hands!"

In these days of mechanic shortages and increased workloads, instead of repairing, the answer is to replace with Authorized Remanufactured Ford Parts. You'll save time. You'll save money . . . and the new-part quality, guaranteed by a nationally honored warranty, protects customer goodwill.

See us for a complete line of Remanufactured Ford exchange parts.

Replace with the brand that gives you an extra hand!

NATIONAL WARRANTY

Every Remanufactured Ford Part is warranted nationally by the Remanufacturer to be free of defects in materials and workmanship for 90 days or 4000 miles from date of installation, whichever occurs first. Complete OHV engine assemblies are warranted for 12 months or 12,000 miles on passenger vehicles, and 6 months or 12,000 miles on trucks, whichever occurs first. This Warranty includes parts replacement plus related labor.

Ford and Lincoln-Mercury dealers will honor this warranty anywhere in the country.

Remanufactured



Engines · Parts



Promote Periodic Safety Checks

Continued

As a guide to determine maximum limits of free play, you may want to use the following tolerances set forth by the AMA handbook committee:

<u>WHEELS</u>	<u>MAXIMUM FREE PLAY</u>
16-inch or less	¼ inch
17- and 18-inch	⅜ inch
Over 18-inch	½ inch

Any free play over these limits indicates the car or truck requires service or parts replacement of the steering linkage system.

CHECKING BALL JOINTS

Front suspension ball joints must be **UNLOADED** for this safety check inspection. To do this, proceed as follows: Support the front end of the car for this check as shown in figures 13 and 14.

NOTE: Front wheel bearings must be properly adjusted before making this check.

1. Attach checking gauge or a dial indicator to the lower control arm for FORD, MERCURY, THUNDERBIRD, LINCOLN CONTINENTAL and CONTINENTAL MARK III.
2. For COUGAR, FAIRLANE, TORINO, FALCON, MONTEGO and MUSTANG attach a checking gauge or dial indicator to the upper control arm.

NOTE: It will be necessary to refer to the appropriate factory shop manual to get correct ball joint specification tolerances permitted.

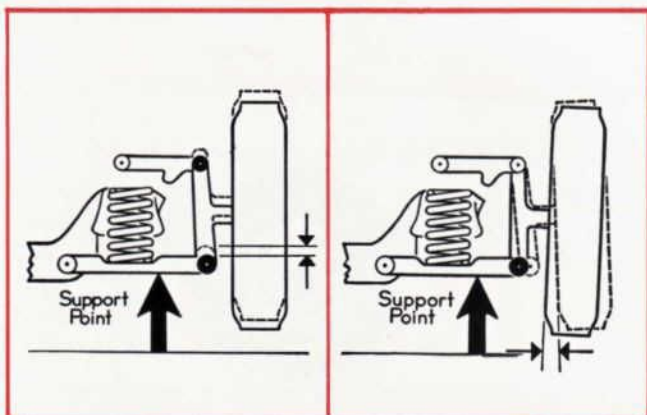


Figure 13—Ball Joint Check—Spring on Lower Arm

When the spring is on the LOWER ARM: (Figure 13)

- The upper ball joint should be replaced if there is any noticeable looseness at the joint.
- The lower ball joint should be replaced if radial (horizontal) play exceeds .250 inches.
- Specifications for axial (vertical) play between lower control arm and spindle must be checked for each vehicle in the appropriate car maker's shop manual.

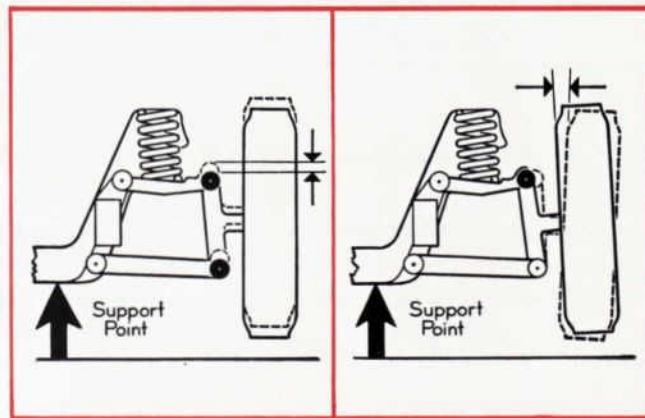


Figure 14—Ball Joint Check—Spring on Upper Arm

When the spring is on the UPPER ARM: (Figure 14)

- The lower ball joint should be replaced if there is any noticeable looseness at the joint.
- The upper ball joint should be replaced if radial (horizontal) play exceeds .250 inches.
- Specifications for axial (vertical) play between the upper arm and spindle must be checked for each vehicle in the appropriate car maker's shop manual.

CHECKING SPRINGS

Sagging springs are most easily detected when they are bad enough to cause the car or truck to ride lower than usual or lean drastically to one side. When this condition is suspected but not so obvious, sagging or weak springs can be checked by following procedures outlined in the appropriate shop manual.

Bad springs are hazardous even if they are not broken, and they can create an unsafe operating condition. Also, they directly affect tire wear, front wheel alignment, decrease shock absorber life and upset headlight beam alignment. Front end camber can change as much as ¾ degrees for every inch of rear spring sag! (See figure 15, page 10.)

SAFETY CHECKS TIP OFF UNSAFE OPERATING CONDITIONS



HELP CUT ACCIDENTS...

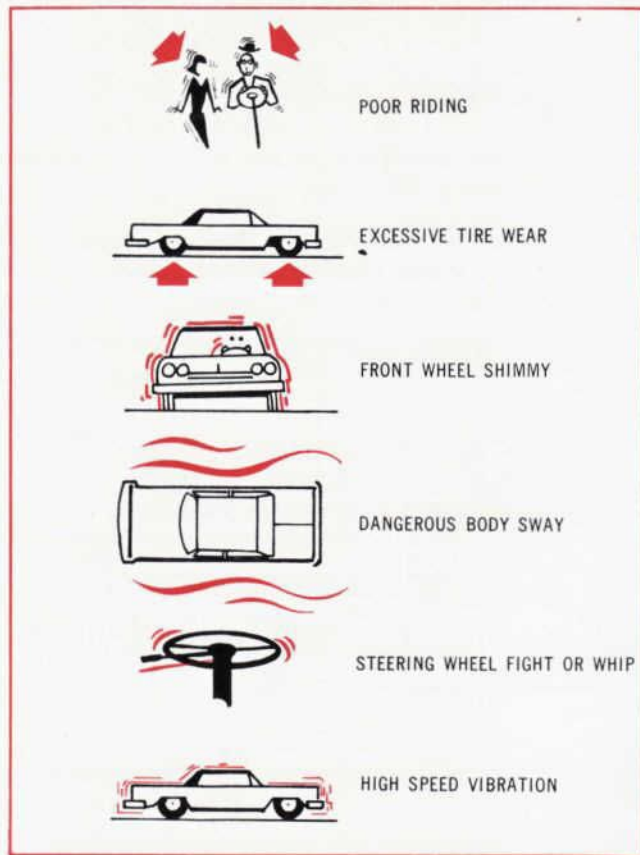


Figure 15—Unsafe Operating Conditions Caused by Weak or Sagging Springs

CHECKING SHOCK ABSORBERS

Few motorists are aware that improperly operating shock absorbers, just as much as a blow-out or steering failure, can cause complete loss of control. And, because they're out of sight under the car, they tend to be forgotten by the owner. Another thing . . . they don't telegraph their failure since the loss of effectiveness is so gradual an owner becomes accustomed to a rougher ride and thus compensates in his driving because of increased instability on curves and corners. Let's face it—"dead" shocks are deadly not only for the driver, but for all of us who travel the roads and expressways of this nation. Two methods for checking shock absorber conditions are listed.

The first method involves detaching the lower end (some cars the upper end) of the shock absorber and holding it as near to vertical as possible. On some cars the shock must be removed from the car to test. Then, try to move the piston rod in and out. Action should be smooth and uniform throughout each stroke. Higher resistance on extension is a normal condition and swish noises are also considered normal.

Erratic action or no resistance on either the up or down stroke indicates the shock is not performing its job properly and should be replaced. If you're not sure of the "feel" of the shock action, repeat the same test on the mating shock at the opposite side of the car or truck and compare results.

The second method is indicated in figure 16. It's not a gimmick. Try it with a car that has good shocks. You won't get that rocking motion. This test *should not be performed on the roads or highways!*

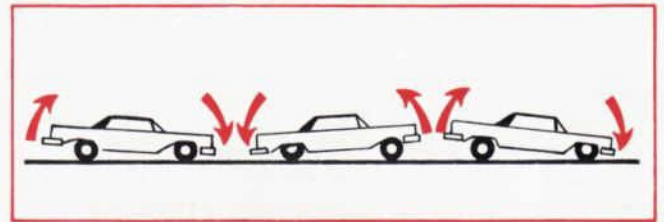


Figure 16—A Method of Checking Shock Action

Drive the car on a smooth pavement or driveway at 10 mph and tap the brake pedal repeatedly. If this sets up a rocking motion with the front end dipping and the rear rising, it is a good indication the shocks are worn out.

WHEEL ALIGNMENT/BALANCE

The modern concept of wheel alignment includes another important factor . . . wheel balancing. The importance of both cannot be minimized from a safety standpoint. No other phase of car operation, when neglected, can be so costly or so dangerous. Poor alignment "eats" tires and causes the driver to "fight" his car's steering system. Wheels out of balance pound the life out of front suspension parts. A bouncing wheel will not hold the road! (See figure 17.)

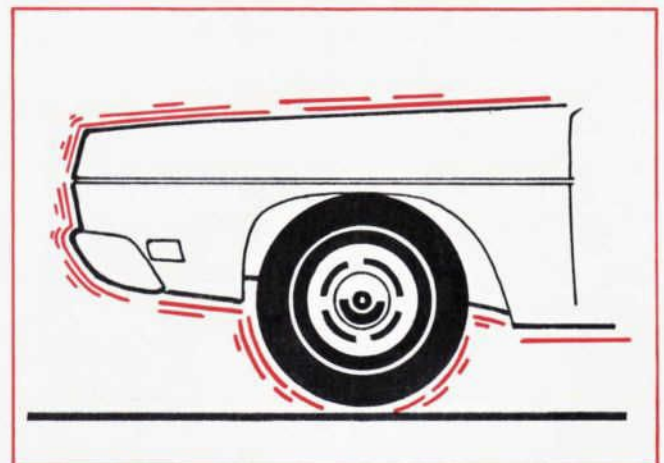


Figure 17—Unbalanced Front Wheels Cause Dangerous Wheel Bounce

SAFETY CHECKS HELP ELIMINATE DANGEROUS OPERATING "BUGS"

Promote Periodic Safety Checks

Continued

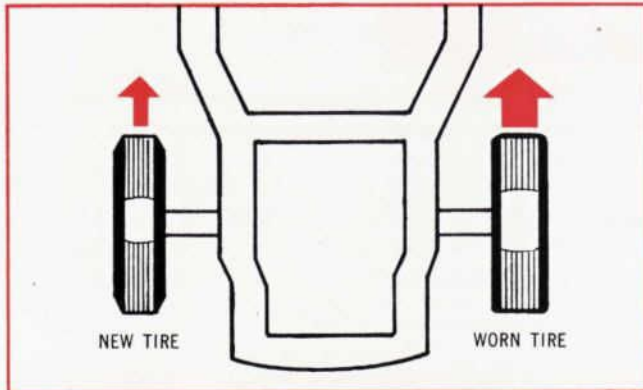


Figure 18—A Badly Worn Tire Has More Rolling Friction

Naturally, during your inspection of the tires, a badly worn tire (tread cupped, tread worn severely, or tread with sharp “saw tooth” edges in one direction) gives a direct clue of front wheels misaligned or out-of-balance or both.

When you spot these conditions during the safety checks, urge your customers to have an alignment and a balance job performed to restore the car’s safe operating condition.

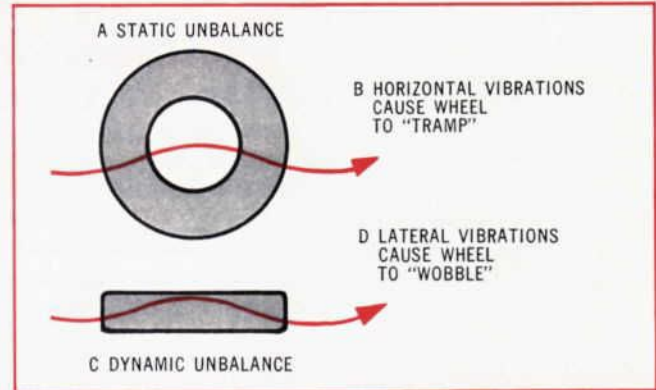


Figure 19—Two Unsafe Conditions of Wheel/Tire Unbalance

Never attempt to align a car with poor tires. If the tread of one front tire is worn smooth, it has more rubber in contact with the road than another tire with a narrower, less worn tread. The worn tire will have more rolling friction than the other tire and will tend to create a “drag” . . . thus causing the car to want to pull to the side. (See figures 18 and 19.)

DIAGNOSIS CHART

SYMPTOM	PROBABLE CAUSE	SYMPTOM	PROBABLE CAUSE
Excessive tire wear on outside shoulder.	Excessive positive camber.	Car tends to wander from side to side.	Improper toe setting. Looseness in steering assembly or ball joints. Uneven caster.
Excessive tire wear on inside shoulder.	Excessive negative camber.	Vehicle swerves or pulls to side when applying brakes.	Uneven caster. Too much negative caster. Brakes need adjustment. Out-of-round brake drum. Defective brakes. Under-inflated tire.
Excessive tire wear on both shoulders.	Rounding curves at high speeds. Under-inflated tires.	Car tends to pull from side to side when taking hands off steering wheel.	Improper camber. Unequal caster. Tires worn unevenly. Tire pressure unequal.
Saw-tooth tire wear.	Too much toe-in or toe-out.	Car is hard to steer.	Tires under-inflated. Power steering defective. Too much positive caster. Steering assembly too tight or binding.
One tire wears more than the other.	Improper camber. Uneven caster. Defective brakes.	Steering has excessive play or looseness.	Loose wheel bearings. Loose ball joints or kingpins. Loose bushings. Loose idler-arm. Loose steering gear assembly. Worn steering gear or steering gear bearings.
Tire treads cupped or dished.	Out-of-round tires. Out-of-balance condition. Too much negative caster.		
Front wheels shimmy.	Out-of-round tires. Out-of-balance condition. Excessive positive caster. Uneven caster.		
Vehicle vibrates.	Defective tires. One or more of all 4 tires out-of-round. One or more of all 4 tires out-of-balance. Drive shaft bent. Drive shaft sprayed with undercoating.		

SAFETY CHECKS ARE FIRST ON THE “FIRING LINE” OF ACCIDENT PREVENTION



HELP CUT ACCIDENTS...

CHECKING LIGHTING SYSTEMS

Bad lights are one of the major safety defects found in states that have either periodic vehicle inspections or random spot checks. In fact, burned out bulbs and/or misaligned headlamps are the Number 1 safety defects as reported by diagnostic centers across the country.

Safety inspect by operating all of the electrical switches to see whether or not bulbs are burned out or fail to light because of open circuits, defective switches or poor grounds in the electrical circuits. Especially make certain the headlamps, high and low beam, and the tail lamps, stop lamps and turn signals are working. If the car is equipped with back-up lamps, place the transmission in reverse gear (engine off) and with

the ignition switch in ON position, check to see that they function. Move the shift lever to a forward drive gear (or drive range) and observe if they go out.

Check parking lamps, side marker lamps, brake warning lamps, cornering lamps and any indicator lamps. Replace burned out bulbs or headlamps. Correct any wiring or grounding failures or replace burned out fuses. Always replace a fuse with one called for by the car maker. Never "step up" fuse capacity.

Checking headlight aim is one of the most important safety checks that should be performed. Urge your customers to have this vital safety item checked and if found incorrect, readjust.

Figure 20—Details of Using an Aiming Screen and Its Location to the Car

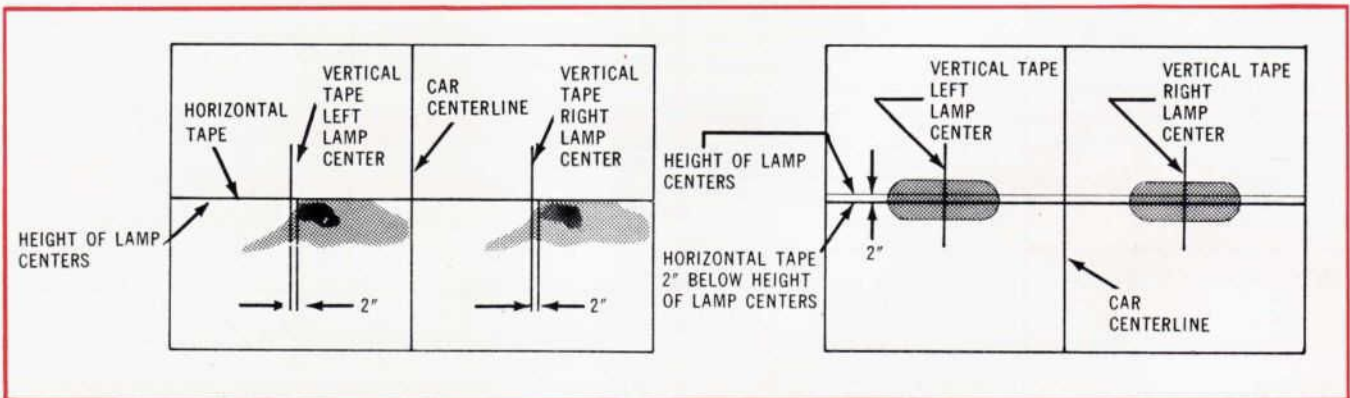
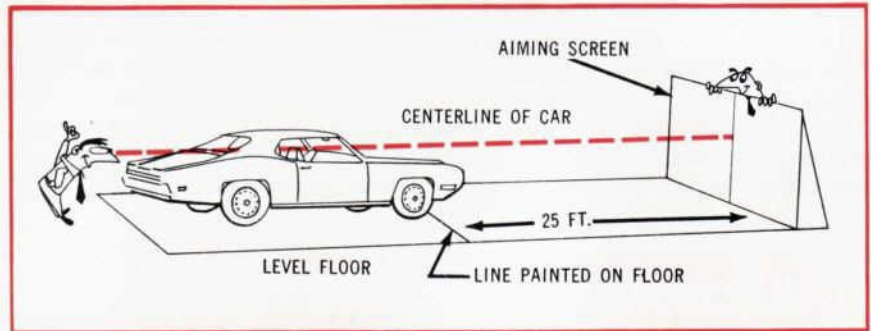


Figure 21—Details of How the Hot Spot Appears When Correctly Aimed for Type 2 Lower Beams

Figure 22—Details of Aiming Screen and How Properly Aimed Type 1 Single Beam Unit Appears on Screen. Note Hot Spot Where Light Intensity is the Highest

CHECKING AND AIMING HEADLIGHTS

Checking headlight aiming can be done with an approved mechanical aimer and there are many good ones on the market, or through means of a screen located in a darkened level area of your service building. It should be five feet high and ten feet wide with a white (dull) surface. Provisions must be made for moving the screen so that it can be aligned

parallel with the rear axle. Adjustable black tapes should be provided and a reference line drawn on the floor directly under the lenses of the lamps to indicate the proper location of the headlamps when they are being aimed. This line should be parallel to the aiming screen and exactly 25 feet from it. See figures 20, 21 and 22 for other details.

SAFETY CHECKS HELP PREVENT UNNECESSARY HIGHWAY TRAGEDIES

Promote Periodic Safety Checks

Continued

TROUBLESHOOTING HEADLIGHT SYSTEM COMPLAINTS

<p>ALL HEADLIGHTS DO NOT LIGHT</p>	<p>CHECK FOR:</p> <ol style="list-style-type: none"> 1. Loose battery cable. 2. Loose quick disconnect or broken wire from the battery to the headlight switch. 3. Defective headlight switch. 4. Disconnected or broken wire from the headlight switch to the beam selector switch. 5. Loose or broken wire to the bulbs. 6. Defective beam selector switch. 7. All headlight bulbs burned out. This may be caused by a defective or improperly adjusted alternator voltage regulator.
<p>INDIVIDUAL LIGHTS DO NOT LIGHT</p>	<p>CHECK FOR:</p> <ol style="list-style-type: none"> 1. Burned out bulb. 2. Loose or broken wires to the bulb. 3. Poor ground.
<p>LIGHTS BURN OUT REPEATEDLY</p>	<p>CHECK FOR:</p> <ol style="list-style-type: none"> 1. Loose or corroded electrical connections. 2. Excessive vibration. 3. Improperly adjusted or defective alternator voltage regulator.
<p>BOTH LOW BEAM HEADLIGHTS DO NOT LIGHT</p>	<p>CHECK FOR:</p> <ol style="list-style-type: none"> 1. Defective beam selector switch. 2. Loose or broken wire to the bulbs. 3. Both low beam filaments burned out.

CHECKING NEUTRAL SAFETY SWITCH

On automatic transmission equipped cars, check the Neutral Safety switch. The starter should operate only in Park or Neutral positions of the shift range lever. To find out if the starter will operate when the lever is in any other drive range, remove the high tension coil wire from the distributor cap tower and ground it to prevent the engine from operating. Then check to see if the safety switch is operating properly by checking in all drive ranges. If necessary, readjust the switch or replace, as shown in figure 23.

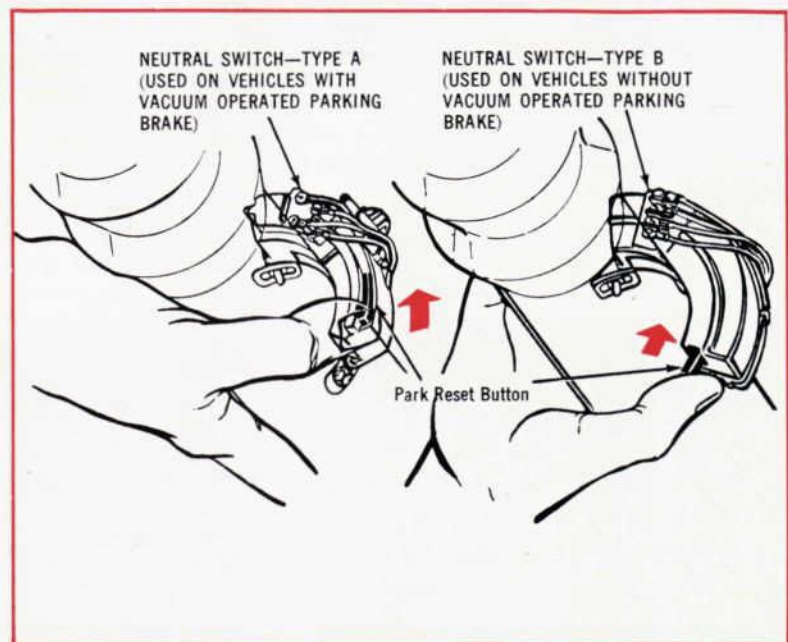


Figure 23—Neutral Safety Switch Used on Late Model Ford-built Cars—Column-Mounted Type

SAFETY CHECKS HELP ELIMINATE ROAD BREAKDOWNS



HELP CUT ACCIDENTS ... Promote Periodic Safety Checks *Continued*

HORN

Make sure that both horns operate at the proper sound level. Horns that do not operate at all pressure points of the horn button (or horn ring or rim of steering wheel) indicate the horn electrical contacts are corroded or damaged and should be repaired as required.

WINDSHIELD WIPERS/WASHERS

Check wipers for satisfactory operation. (If vacuum operated, the engine must be idling and control full on.) Windshield should be free of bugs, oily film or other foreign matter . . . and . . . should be continuously wet when tested.

Wiper motors and blades should pass the following checks:

- Wipers should operate at a wiping rate of 45 cycles (or more) per minute. A *cycle* is a blade movement from *one extreme* of the wiper pattern to the *other and return*.
- Blades should be replaced if windshield is severely streaked after five cycles.
- Wiper blades or arms should be replaced if parts are missing or show signs of severe damage.
- Wiper arms when lifted away from the windshield should return the wiper blades firmly against the glass when released. A contact pressure tester is recommended.

The *windshield washer system* should direct the fluid at the proper target area of the glass. Adjust squirt nozzles if water stream is too low or too high. If hoses or nozzles are plugged, service is required. To clear a plugged condition in the washer system, first disconnect the main water hose to the nozzle outlets. Blow clean compressed air through the outlets opposite to the flow of washer fluid to dislodge any foreign material. Make sure all hoses are open internally, and are not pinched or split. Always have both ends of hoses disconnected when forcing air through them. Check and clean the inlet screen inside the reservoir.

NOTE: *In this article we have covered only the most common safety checks. As a result, we suggest you contact your local authorities to find out if there are additional items to be checked so that the vehicle can pass your own state's Periodic Vehicle Inspection.*

SIX BENEFITS FROM A COMPLETE SAFETY INSPECTION

1. It reminds your customers that certain vital car parts need periodic check-ups, adjustments or servicing; you stress their personal responsibility for driving safely year-round.
2. It uncovers unsafe operating conditions in your customers' cars and provides opportunities for you to correct them.
3. It provides early warning to customers of unnoticed hazards in the making.
4. It serves as a trigger for additional services and products you sell, thus strengthening customer loyalty.
5. It detects mechanical troubles before they become major repair bills.
6. It helps your customers realize more for their cars at trade-in time due to proper maintenance encouraged by periodic safety inspections.

EXHAUST SYSTEM

Safety inspect the muffler, resonators, tail pipe, exhaust pipe and all the supporting brackets while you have the car on a hoist. Look for loose or leaking joints, holes, leaking seams in the muffler or resonators. Excessive rust or corrosion or "layers" of scale on exhaust system components indicates a short life expectancy and replacement is recommended.

Obviously, corrosion attacks the exhaust system from two sources. Corrosion *outside* results from water . . . particularly salt water . . . which is highly corrosive. This problem is even more severe in areas of the country near salt water and of course wherever winter driving conditions prevail.

Corrosion *inside* is the direct result of acid-bearing vapor passing through the exhaust system. (See figure 24.) Magnifying these problems are more two-car families making short trips which doesn't always permit the exhaust system to heat-up properly and eliminate the corrosive elements.

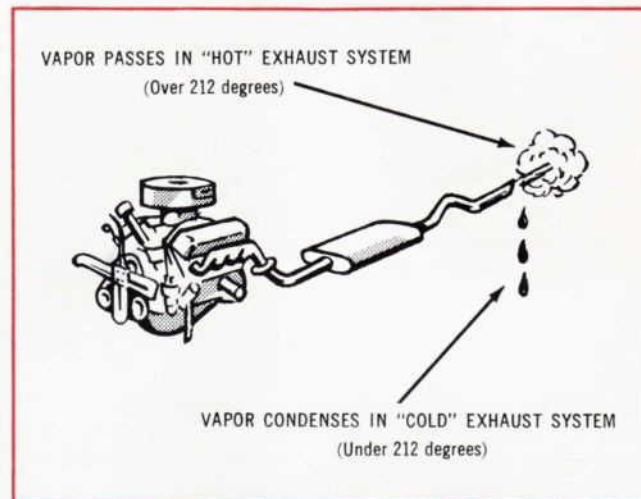


Figure 24—Corrosion Inside the Exhaust System Caused by Acid-bearing Vapor and Low Temperatures

SAFETY INSPECTIONS HELP PROTECT EVERYONE!

Autolite National Advertising...

SECOND QUARTER

"With a 16-to-1 ratio, the pressure on the to shatter bricks. We're tough on spark plugs."

Clint Brawner and Jim McGee were co-chief mechanics for Mario Andretti's record-breaking 1969 Indy 500 championship car. When these experts talk, it pays to listen. "The heat and compression in our turbo-charged Ford engine is tremendous," says Clint Brawner. "Our Autolite plugs have to survive 37,000 brick-busting ignitions a minute. Yet I've never seen one fail." Autolite spark plugs have a special hermetic seal that prevents compression loss under

all operating conditions. They stay sealed despite extremes in heat and pressure. "Racing may be hell on plugs. But you're tougher," says Jim McGee. "When you crawl in traffic, ash deposits build up in the cylinders. Then you speed up, and those deposits splash around and heat bakes them onto the plug tips. You get shorts. Lose power. Waste gas." With Autolite, no problem. Autolite one-wire spark plugs that clean themselves. They

Autolite plugs in our Indy winner was enough But you're tougher on yours."

extended Power Tip reach down into the hottest engine gases. Fouling deposits are burned off before they get a chance to build up. "You got clean plugs, buddy, you got max power." Next time ask for Autolite spark plugs. They pass the toughest test in racing. And the toughest test there is. Your kind of driving.



Co-chief mechanics Jim McGee, left, and Clint Brawner beside Mario Andretti's turbocharged Ford 1969 Indy winner.



We'll be back at Indy for the sixth consecutive year on radio to sponsor the Indy 500 race broadcast and time trials—over 100 million listeners will hear Autolite commercials featuring our 1970 theme "We Pass The Toughest Test." Autolite-equipped cars took the flag at Indy in 1967, 1968 and 1969. The record speaks for itself!



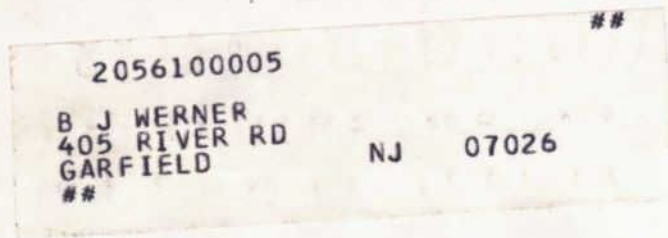
Throughout 1970 Autolite advertising will be directed against specific target audiences... and this year's advertising theme, "We Pass The Toughest Test," will be read again and again by those who most frequently specify replacement parts by name. In the consumer market we'll be concentrating on an audience of car enthusiasts in *Hot Rod*, *Car Craft*, *Car & Driver*, *Motor Trend*, *Road & Track*, *Sports Car Graphic*, *Popular Science*, *Mechanix Illustrated* and *Popular Mechanics*. And we'll be reaching the farm operator through *Farm Journal*, *Progressive Farmer* and *Farm Quarterly*.

COMPLIMENTS OF

HACKENSACK AUTO SALES, INC.

320 RIVER STREET 487-6700
HACKENSACK, NEW JERSEY 07601

BULK RATE
U. S. POSTAGE
PAID
Detroit, Michigan
Permit No. 2284

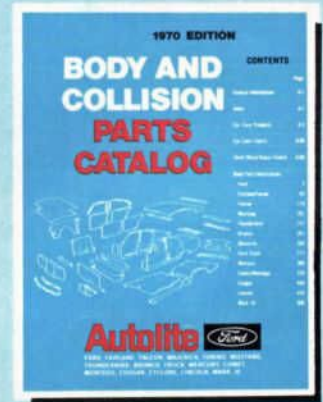
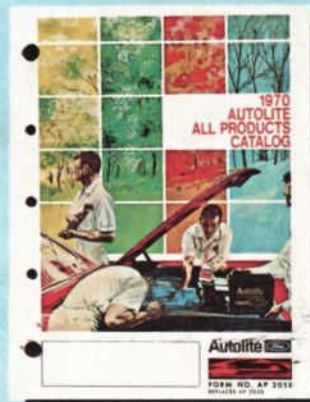


YOUR SOURCE FOR GENUINE FORD AND AUTOLITE ORIGINAL EQUIPMENT PARTS

FREE catalogs and Shop Tips are proof again that we think a lot about YOU!

We appreciate your business and we want to make it easy for you to do business with us. These catalogs are designed to provide a quick reference listing of all fast-moving Autolite-Ford quality replacement parts. In addition, illustrations are included to help identify various parts and show their relationship to adjacent components and assemblies.

IMPORTANT: Your 1970 catalogs will be mailed to you in the near future. A questionnaire has been inserted on the first page of the Ready Reference and the Body & Collision catalogs. Please return the questionnaire with your comments on how we might improve the catalogs.



READY REFERENCE CATALOG: Contains 1961-70 application information for all fast-moving Autolite-Ford quality replacement parts. Covers complete listings of parts from wheels to wipers . . . from clutches to cooling systems . . . and everything in-between.

ALL PRODUCTS CATALOG: This 1970 edition contains applications for 1960-70 American-made cars and light trucks plus imports. Its 11 sections also feature complete listings of shock absorbers; tune-up parts; thermostats; oil, gas, and radiator caps; batteries; oil, air, and fuel filters; to name just a few.

BODY AND COLLISION CATALOG: This valuable edition mailed to Body and Collision Shops contains hundreds of "exploded" body illustrations of 1967-70 Lincoln-Mercury and Ford cars and trucks.



Along with the above catalogs, we provide you with Shop Tips each month to keep you abreast of our current parts promotions and the latest technical service information.