

## SECTION 8-B

### BRAKE TROUBLE DIAGNOSIS

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### 8-5 TESTING BRAKES

Brakes must be tested on dry, clean, reasonably smooth and level roadway. A true test of brake performance cannot be made if roadway is wet or greasy, or is covered with loose dirt so that all tires do not grip road equally. A true test cannot be made if roadway is crowned so as to throw weight of car toward wheels on one side, or is so rough that wheels tend to bounce.

Test brakes at different car speeds with both light and heavy pedal pressure; however, *avoid locking the wheels and sliding the tires on roadway*. This practice is injurious to tires and it does not give a true test of brake performance.

Overall brake performance cannot be fully tested with the wheels jacked up. Applying brakes by foot pressure or pedal jack while testing brake drag by hand or with a torque measuring device will aid in getting an equal adjustment at all brake shoes, and should be used during brake adjustment. This procedure, however, does not test the self-energizing action as the primary shoes come in contact with drums, nor the braking action as car weight is transferred forward on deceleration.

### 8-6 EXTERNAL CONDITIONS THAT AFFECT BRAKE PERFORMANCE

In addition to roadway conditions mentioned in the previous paragraph, the following external conditions may affect brake performance

and should be corrected before work is done on the brake mechanism.

*a. Tires.* All tires must be inflated to equal pressure before testing brakes. Tires should be the same size and of approximately equal tread condition. One or more smooth tires combined with tires having good tread patterns will cause an erroneous impression of brake performance.

*b. Car Loading.* Unusual or unequal loading of the car will affect brake performance and must be taken into consideration when judging the condition of brakes.

*c. Front End Alignment.* Misalignment of the front end, particularly in regard to limits on camber and king pin inclination, will cause brake action to appear unequal between sides.

*d. Shock Absorbers.* If shock absorbers are not functioning properly they may permit bouncing of car on quick stops and give the erroneous impression that brakes are too severe.

### 8-7 BRAKE TROUBLE INDICATIONS AND CORRECTIONS

#### **a. Brake Pedal Goes to Toeboard**

(1) *Excessive Brake Shoe Clearance.* Excessive clearance is indicated if a good brake is obtained after pumping brake pedal several times. Condition may be caused by wear of brake linings or by a loose initial adjustment of shoes. Adjust brakes (par. 8-12).

(2) *Fluid Reservoir Empty.* If fluid reservoir is empty, a good brake cannot be obtained by pumping brake pedal. Fill reservoir (par.

8-8) and check for springy pedal action (sub-par. b, below)

(3) *Air in Hydraulic System.* Air in hydraulic system will cause a springy action of brake pedal. If volume of air is large, the pedal will go to toeboard under normal pressure. Bleed hydraulic system (par. 8-9).

(4) *Fluid Leak in Hydraulic System.* A leak in the hydraulic system will allow the pedal to go to the toeboard gradually under continued pressure. An external leak is indicated by loss of fluid in fluid reservoir. Check all brake pipe connections and all wheel cylinders for evidence of fluid loss. If no leaks are found, remove master cylinder and check for scores or other damage in barrel and on primary cup (par. 8-19).

#### **b. Springy, Spongy Action of Brake Pedal**

(1) *Air in Hydraulic System.* Air in system is usually caused by operating brake pedal with low fluid level in master cylinder reservoir; however, air will also enter the system whenever any part of hydraulic system is disconnected. Fill reservoir and bleed hydraulic system (par. 8-9).

(2) *Brake Shoes not Properly Adjusted.* Adjust brake shoes, paying particular attention to anchor pin adjustment for centralization of shoes in drum (par. 8-15).

(3) *Brake Drum Out of Round.* Usually indicated by an unstable action of brake pedal. Check brake drums and true up if necessary (par. 8-17).

#### **c. Brakes Severe on Light Pedal Pressure**

(1) *Brake Shoes not Properly Adjusted.* Adjust brake shoes, paying particular attention to anchor pin adjustment for centralization of shoes in drum (par. 8-15).

(2) *Faulty Brake Linings or Drums.* A small amount of grease or brake fluid on lining will cause grabbing action. Correct the cause and replace lining since these substances cannot be permanently cleaned out of lining (par. 8-16). Charred linings or scored drums cause grabbing action. Replace linings and true up drums (par. 8-17).

(3) *Loose Front Wheel Bearings.* Check for play in bearings with wheels jacked up and adjust if necessary (par. 6-14).

(4) *Loose Brake Backing Plate.* Tighten all backing plates and adjust anchor pins to centralize brake shoes (par. 8-15).

#### **d. Excessive Pedal Pressure Required**

(1) *Brake Shoes Not Properly Centered.* If brake shoes are not concentric with drums they will not make full contact and braking area will be reduced. Adjust brake shoes, paying particular attention to anchor pin adjustment for centralization of shoes in drums (par. 8-15).

(2) *Foreign Substances on Linings.* Grease, oil, paint, or other foreign substances on linings will reduce their gripping qualities and require excessive pedal pressure to stop the car. Replace faulty linings (par. 8-16).

(3) *Improper Brake Lining.* Improper grades of lining lose their gripping qualities after some use. Replace with genuine Buick lining (par. 8-16).

#### **e. Brakes Drag at One Wheel**

(1) *Insufficient Clearance at Brake Shoes.* Adjust anchor pin to centralize shoes in drum and adjust shoes (par. 8-15).

(2) *Weak or Broken Brake Shoe Spring.* Does not allow proper releasing of brake shoes. Replace spring and check brake shoe adjustment (par. 8-15).

(3) *Loose Front Wheel Bearings.* Check for play in bearings with wheel jacked up and adjust if necessary (par. 6-14).

(4) *Wheel Cylinder Piston Stuck or Cups Distorted.* May be caused by dirt in hydraulic fluid, improper fluid, or previous use of a cleaning fluid which is detrimental to rubber parts. Overhaul wheel cylinder and replace any defective parts (par. 8-18). It is also advisable to flush hydraulic system to prevent repetition of trouble (par. 8-10).

(5) *Obstruction in Brake Pipes or Hoses.* Obstruction may be caused by foreign material, damaged pipe, kinked or deteriorated brake hose. Flush hydraulic system (par. 8-10) or replace damaged or defective part as required.

#### **f. Brakes Drag at All Wheels**

(1) *Insufficient Clearance at Brake Shoes.* Adjust anchor pin to centralize shoes in drum and adjust shoes (par. 8-15).

(2) *Master Cylinder Compensating Port Closed.* If the compensating port is plugged by foreign material, or is covered by the piston primary cup when brake pedal is in released position, high pressure will be maintained in hydraulic system and brake shoes will be held in contact with drums. This condition is indicated by lack of normal pedal travel and a very solid feel when pedal is depressed.

Check brake pedal adjustment (par. 8-11). Make certain that pedal is free on shaft and does not bind in floor mat. Replace pedal return spring if weak or broken.

If brake pedal adjustment does not correct the trouble, remove master cylinder for disassembly and thorough cleaning (par. 8-19). **CAUTION:** *Never insert a test wire through compensating port as this may leave a burr which will cut a groove in piston primary cup.*

(3) *Wheel Cylinder Piston Cups Distorted.* If the rubber parts in master cylinder are found to be swollen and distorted (step 2, above), it indicates the presence in hydraulic system of a mineral base oil such as kerosene, gasoline, or engine oil. Such substances will cause all rubber parts to swell and distort, therefore it is usually necessary to thoroughly flush the hydraulic system (par. 8-10) and replace rubber cups in wheel cylinders (par. 8-18).

(4) *Pedal or Master Operating Lever Improperly Installed on Shaft, Dynaflo Car Only.* If pedal and lever are not installed on shaft in proper relation to each other brakes may be kept partially applied (par. 8-11).

#### g. Car Pulls to One Side

(1) *Tires Unequal.* Tires unequally inflated, or having unequal wear of treads or different non-skid tread designs may cause car to pull to one side when brakes are applied. Inflate all tires to specified pressure (par. 6-8). Re-arrange tires if necessary so that tread non-skid characteristics are more nearly equal on both sides of car.

(2) *Brake Shoes Improperly Set.* Although hydraulic brakes are self-equalizing so far as applying pressure at each brake shoe is concerned, the brake shoes will not hold equally if not centered in drums, or if the wear pattern is not uniform on all four brakes. Adjust anchor pin and brake shoes (par. 8-15).

(3) *Loose Front Wheel Bearings.* Check for play in bearings with wheels jacked up and adjust if necessary (par. 6-14).

(4) *Out-of-Round or Scored Brake Drums.* True up or replace as required (par. 8-17).

(5) *Brake Linings Not Matched, or Improperly Placed.* Brake linings must be of same composition on left and right sides of car, otherwise unequal braking action will result. If primary and secondary linings are interchanged at any wheel, unequal braking will be obtained. Replace or change linings as required (par. 8-16).

(6) *Foreign Substances on Some Brake Linings.* Any foreign substance on linings will affect braking action. Thoroughly clean any linings having water, sand, paint, imbedded particles of metal, etc., on surface. Sand or brush the affected surface—do not use any liquid cleaning agent. Linings having oil, grease, or hydraulic fluid on linings cannot be cleaned satisfactorily and must be replaced (par. 8-16).

(7) *Loose Brake Backing Plate.* Tighten all backing plates and adjust anchor pins to centralize brake shoes (par. 8-15).

(8) *Unequal Camber.* If car has a tendency to lead to one side when driven on a level road it will also pull to one side when brakes are applied. Adjust camber to specified limits (par. 6-30).

#### h. Brakes Squeak

(1) *Brake Shoes Not Properly Adjusted.* Adjust brake shoes, paying particular attention to obtaining uniform clearances and correct anchor location (par. 8-15).

(2) *Brake Drum Condition.* Carefully inspect brake drums for out-of-round, scoring, cracks, or hard spots. Rebore any drum if out-of-round or scored (par. 8-17). Replace any drum which is cracked or has hard spots in braking surface.

(3) *Foreign Material Imbedded in Lining.* Metallic particles or grit imbedded in brake lining will cause squeaking. Sand the surfaces of linings and remove all particles of metal. In some cases it may be necessary to dress the lining surfaces with a portable resurfacing machine in order to properly clean the surfaces and insure good contact with brake drums.

(4) *Linings Loose on Brake Shoes.* Replace any rivets that are loose. Lining must be tightly held against brake shoe flange, particularly at the ends (par. 8-16).