## HYDRAULIC BRAKE TROUBLE SHOOTING

### BRAKE INSPECTION & TESTING

Inspect brakes at frequent intervals for pedal reserve (clearance between pedal pad and toeboard with pedal firmly depressed, while brakes are cold). Increase pedal reserve by adjusting brake shoe to drum (or disc) clearance. Brakes should be tested on dry, clean, reasonably smooth level roadway (not with wheels jacked up). Test at different speeds both with light and heavy pressure. *CAUTION – Do not lock wheels and slide tires on roadway.*

### CONDITIONS AFFECTING BRAKE PERFORMANCE

1) Right and left tires must be of same size with approximately the same tread pattern.

2) Car must be loaded equally as heavily loaded wheels require more braking power.

3) Loose front wheel bearing will permit drum or disc to tilt causing spotty contact with linings and erratic brake action.

4) Misalignment of front (particularly camber and king pin inclination) will result in unequal action between wheels.

5) Faulty shock absorbers permit car to bounce on quick stop and will give the impression that brakes are too severe.

6) Lining must be fitted to drum, and shoes must be placed on backing plate for proper contact with drum.

### TROUBLE SHOOTING DRUM BRAKES

**LOW PEDAL OR EXCESSIVE TRAVEL**

Brake shoe clearance excessive. Low fluid level. Air in system. Fluid leak. Master cylinder internal leak. Improper brake fluid.

**SPONGY PEDAL**

Air in system. Shoe anchors not properly adjusted. Out of round brake drum. Shoes do not have full contact with drum on cars with non-adjustable anchors.

**BRAKES GRAB**

Front wheel bearings loose. Backing plate loose. Excessive dust in brakes. Charred linings or scored drums. Grease or brake fluid on lining. Primary and secondary lining reversed.

**HARD PEDAL**

Shoe anchor pins not properly adjusted. Grease or fluid on linings. Improper brake lining. Improper brake fluid.

Pedal linkage binding. Swollen cylinder cups. Cylinder pistons sticking.

**POWER BRAKE UNIT DOES NOT BOOST**

1) **Test For Power Unit Operation** – Stop engine and apply pedal pressure several times to remove all vacuum from system. Hold pressure on pedal and start engine. Pedal will move slightly forward when cylinder is operating.

2) **Power Unit Does Not Operate** – Vacuum check valve stuck closed. Vacuum pipe bent, broken, or clogged. Blocked air inlet. Air valve sticking in power piston.

3) **Power Unit Operates But Braking Action Not Normal** – Fluid low. Glazed, dirty, or oily linings.

**ONE WHEEL DRAGS**

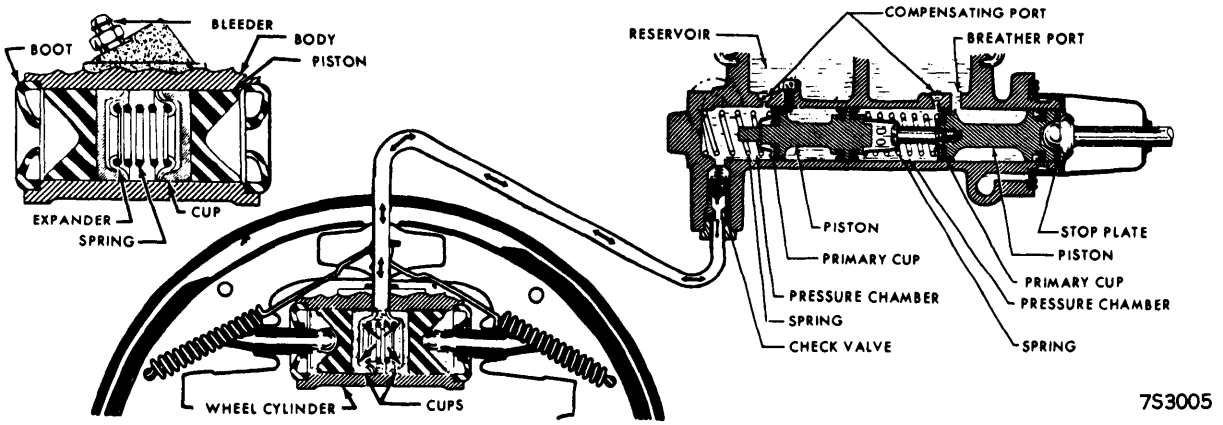
Front wheel bearings loose. Shoes adjusted too tight. Shoe return spring broken or weak. Piston stuck or cups distorted. Clogged line or hose.

**ALL WHEELS DRAG**

Shoes adjusted too tight. Master cylinder compensating hole clogged. Wheel cylinder cups distorted. Incorrect adjustment on master cylinder pushrod. Master cylinder pushrod or linkage binding. Swollen cylinder cups. Power unit internal springs weak or broken. Power unit rubber cups and "O" ring seals dry.

**CAR PULLS TO ONE SIDE**

Tire treads not matched between right and left sides. Anchor pins incorrectly set. Shoes without full drum contact on cars with non-adjustable anchors. Front wheel bearings loose. Drums out-of-round or scored. Lining not matched or improperly placed. Foreign substance on brake lining.




HYDRAULIC BRAKE SYSTEM (TYPICAL)

## HYDRAULIC BRAKE TROUBLE SHOOTING (Cont.)

### BRAKES SQUEAK OR NOISY

Shoes not correctly adjusted. Drums out-of-round, scored or cracked. Foreign material imbedded in lining. Lining loose on shoe. Bent backing plate. Improper lining. Shoes scraping on backing plate.

### BRAKES FADE (FAIL TO HOLD)

Fade is caused by loss of friction from excess heat. Improperly compounded linings will fade to a greater degree than quality linings. Very few linings are entirely free of fade. If drums are turned too thin, even the best lining will fade because thin drums expand more when hot, which reduces lining contact excessively. Fade may also be caused by lining soaked with fluid or oil. Inferior fluid will boil in the wheel cylinders, causing fade. Driver abuse, such as riding the brake pedal, or holding the brakes on for long periods on a downhill run, will cause fade.

## TROUBLE SHOOTING DISC BRAKES

### LOW PEDAL OR EXCESSIVE TRAVEL

Fluid low. Inferior brake fluid (low boiling point). Air in system. Hoses weak enough to expand under pressure. Disc runout excessive. Wheel bearings or steering parts loose. Shoe and lining knockback after violent cornering or rough road travel (pump pedal to restore normal pedal height). Rear brake adjustment needed. Warped or excessively tapered shoe and lining assembly. Damaged caliper piston seal. Master cylinder or power unit malfunction. Metering valve (in line to front brakes) not working. Piston and shoe assembly not seated or properly positioned. Caliper seals soft or swollen.

### NO BRAKING ACTION WHEN PEDAL PUSHED

Out of fluid. Pistons pushed back into bores during servicing. Air in system. Hydraulic leak. Rear brakes out of adjustment.

### HARD PEDAL

Power unit or master cylinder malfunctioning. Linings soiled with brake fluid, oil, or grease. Lines, hoses, or connections dented, kinked, collapsed, or clogged. Master cylinder cups swollen. Shoes and linings worn. Incorrect lining. Frozen or seized pistons. Metering valve (in line to front brakes) not working. Master cylinder bore corroded or rough. Caliper cylinder bores corroded or rough. Pedal pushrod and linkage binding.

### PULLING OR GRABBING

Lining soiled with brake fluid, oil or grease. Caliper loose or out of alignment. Lines, hoses, or connections dented, kinked, collapsed, or clogged. Master cylinder bore corroded or rough. Caliper pistons frozen or seized. Caliper cylinder seals soft or swollen. Caliper cylinder bores corroded or rough. Pedal linkage binding. Metering valve (in line to front brakes) not working. Lining surface contaminated or slightly charred from fast brake in. Scores or corrosion on surface of piston. Unbalanced tire pressure between right and left wheels. Unmatched linings. Front end out of line. Power unit malfunction. Rear brake pistons sticking. Broken rear spring. Rear drums out-of-round. Rear brakes out of adjustment. Distorted brake shoes, or lining sticking out beyond end of shoe.

### PEDAL GOES SLOWLY TO FLOOR

Inferior brake fluid (low boiling point). Hydraulic leak. Worn primary cup or scored bore causing internal leak in master cylinder. Air in system. Bleeder screw open.

### NOISE AND CHATTER OR PEDAL PULSATING

Disc has excessive lateral runout. Disc thickness varies (sides out of parallel). Shoe and lining knockback after violent cornering (pump pedal to correct). Groan or chatter with car creeping slightly (increase or decrease pedal pressure slightly to correct). Excessive clearance between shoe and caliper. Anti-rattle retainer missing or out of position. Brake disc rubbing caliper housing. Rear drums out-of-round. Wheel bearings loose. Rear drum distorted by improper nut tightening. Caliper mounting bolts too long.

### DRAGGING BRAKES

Lines, hoses or connections dented, kinked, collapsed or clogged. Master cylinder compensating port clogged or restricted by swollen primary cup. Residual pressure valve installed by mistake in master cylinder (no valve used with disc brakes). Caliper pistons frozen or seized. Caliper cylinder seals swollen. Caliper cylinder bores corroded or rough. Power unit pushrod out of adjustment. Sticking pedal linkage. Metering valve (in line to front brakes) not working. Driver riding pedal. Power booster check valve faulty.