

HYDRAULIC BRAKE SYSTEM MAINTENANCE

We continue to stress the importance of proper hydraulic brake system inspection and maintenance. This bulletin will inform your personnel on proper service procedures and explain the service characteristics of brake system components.

BRAKE FLUID

Inspection of brake fluid level in the master cylinder reservoir should be made every 1000 miles. The master cylinder cover should be level, when removed, and fluid level should be checked without changing the position of the master cylinder. If fluid level is below the cover gasket surface or below the cap threads, fluid should be added. (A small air space is acceptable.) If D.O.T. -3 Brake Fluid is used, the brake system should be drained, flushed, and refilled with new brake fluid every year to eliminate any contamination such as sludge. This yearly service can be eliminated when D.O.T.-5 silicone fluid is used. We recommend you use D.O.T.-5 silicone fluid for improved performance. As announced previously in Service Letter M-28, this change was made in production motorcycles in September 1976.

Silicone brake fluid reduces corrosion, will not degrade the "rubber" components, and sludge will not form in the system. It will not absorb water, does not attack painted parts, and has a higher boiling point than conventional brake fluid. When stored under normal conditions it has unlimited shelf life. It is somewhat harder to bleed brakes with D.O.T.-5 because of its viscosity. For this reason, a lower viscosity silicone fluid will be available in the near future. Bleeding procedures given in the service manual should be followed.

REPLACING BRAKE FLUID

When changing from D.O.T.-3 to D.O.T.-5 fluid or when flushing the brake system, it is important that D.O.T.-3 fluid be removed completely. Old fluid could be contaminated with water and if mixed with the new D.O.T.-5 fluid, it would detract from its effectiveness. The old fluid could also cause varnish deposits if the system is operated above the boiling point of D.O.T.-3. Caution should be used when bleeding because any brake fluid on the pad will contaminate the pad material and reduce brake effectiveness. The fluid absorbed by the pads cannot be removed satisfactorily with any solvent nor by operating the brakes.

Procedure:

1. Disconnect the brake lines from the master cylinder and wheel calipers (wheel cylinders if drum brakes). Catch old fluid in container and discard.
2. Remove master cylinder and brake calipers from motorcycle.
3. Disconnect brake hoses from the metal brake lines (if applicable).
4. Flush the metal brake lines several times with silicone brake fluid (D.O.T.-5) fluid to remove all the old fluid. Solvent flushing is not recommended.

5. Replace the brake hoses with new ones.
6. Disassemble the master cylinder and wheel calipers or cylinders.
7. Drain and remove any residual D.O.T.-3 brake fluid with a dry, clean cloth that will not leave lint or grit on the master cylinder or caliper parts.
8. Replace master cylinder and wheel caliper rubber seals, piston cups and O-rings with new parts.
9. Coat pistons, piston bores and rubber parts with silicone brake fluid and reassemble.
10. Install master cylinder and calipers on motorcycle.
11. Reassemble brake lines to master cylinder and calipers.
12. Fill brake system with D.O.T.-5 silicone brake fluid and bleed air from system following procedure in Service Manual. Fluid leakage from the rear master cylinder boot after bleeding is often caused by excessive piston travel due to air in the system. The boot should be wiped clean of any brake fluid to avoid contaminating the cylinder with road dust.

MASTER CYLINDERS

In addition to the master cylinder inspections listed under Brake Fluid, proper operation can be verified by gently activating the brake with the master cylinder cover removed and observing a squirt or geyser of the fluid in the reservoir through the small bleed hole. No disturbance or squirt would indicate that the master cylinder cup was not uncovering the small bleed back hole in the reservoir. This would result in a dragging brake, decreased pad life and gradual brake energization due to heat buildup. To verify proper cup position with a fully assembled master cylinder, a thin wire (.020" tag wire) can be carefully inserted through the small hole in the reservoir into the cylinder bore. An interference with the wire would indicate that the cup was covering the hole and inspection of the cause should be made.

Rubber components should be examined for swelling or unusual softness or hardness and replaced if necessary. The piston should be free to slide in the bore of the master cylinder when assembled. The bore itself should be inspected for signs of wear or scuffing and master cylinder replaced if necessary.

BRAKE CALIPERS

The caliper is a self adjusting unit. The FL front and rear caliper and the FX rear caliper pistons incorporate a press ring which allows the piston to readjust automatically under brake fluid pressure as normal brake pad wear occurs. The caliper on the rear of the FL, FX models now incorporate a wave washer to retract the piston .032"-.038" when the brake pedal is released. The FL, FX front, XL front and XLCR front and rear calipers rely on deformation of the O-ring in the caliper to retract the piston and brake pads.

Clearance between brake calipers and accessories such as saddlebag supports is mandatory. When installing accessories, or adjusting the position of the rear wheel, clearance must be maintained through the entire range of front and rear suspension travel.

Brake calipers should be free to move in their mounts (bushings on pins) to properly align with the disc and to prevent abnormal drag. Light drag is acceptable. Every 1000 miles the caliper should be checked for this freedom. An anti-rattle clip has been used on the Electra-Glide front caliper and an anti-rattle spring, part No. 43302-77 is now available for any FX or XL calipers that are loose and rattling.

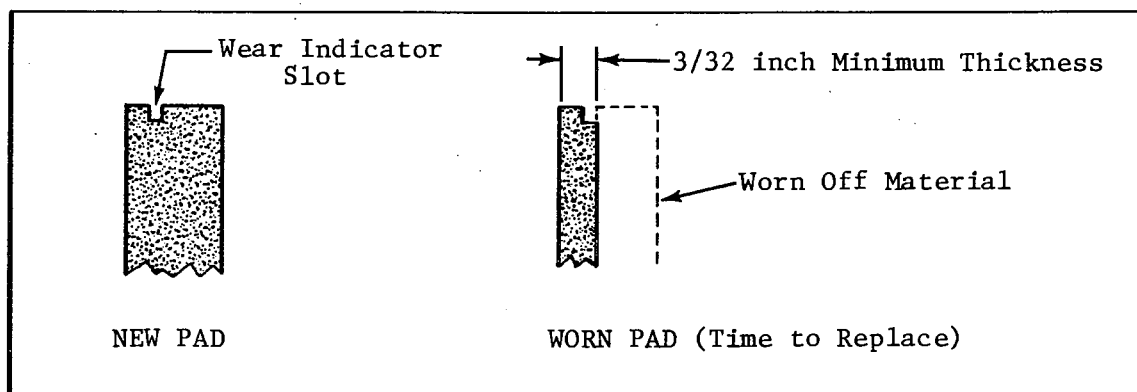
BRAKE PADS

Disc brake friction material can be classified as organic, semi-metallic, or metallic. Organic material will outwear an equal section of metallic material under normal operating conditions. An organic pad will also reduce heat transfer between the brake disc and brake fluid in the caliper. It is also less harsh on the disc and usually leaves the disc with a polished look. This material has two disadvantages. The organic material will fade when high pad temperatures are developed, and wet stopping power is very poor when the material is thoroughly wet.

Metallic friction material increases its efficiency as temperatures increase, and water has little effect on stopping performance. Currently available metallic linings, in normal service, have a shorter wear life than organic. Semi-metallics have characteristics in between the organic and metallic.

Replace pads when the thickness of the friction material has worn down to 1/16 inch or less on all models except those specified in the following paragraph. We suggest that you use only the recommended Harley-Davidson pads.

1974 thru 1977 XL, XLCH, XLT, FX, FXE, FXS models have a wear indicator slot in the front brake pad friction material. Replace pads when the friction material has worn down to 3/32 inch thickness as shown in the illustration.



FRONT BRAKE PADS - 1974 thru 1977 XL/FX MODELS ONLY (EXCEPT XLCR)

Brake squeal, common with disc brakes, is caused by the brake pad vibrating against the caliper piston or caliper backing plate. This condition can be aggravated by disc runout, caliper misalignment, or glazed pads.

BRAKE DISCS

Motorcycle brakes operate under high temperatures and can absorb far more horsepower than the engine produces. The discs do not need a polished appearance to maintain efficiency. A disc with a slight amount of grooving similar to a phonograph record is normal with metallic brake pads and is acceptable if the surface is smooth. The newer stainless brake discs may appear grooved, but if you run your fingernail over the surface you find there are no grooves. Disc runout, on the motorcycle, should not exceed .015". If the disc becomes warped or dished beyond this specification it should be replaced.

Brake pedal travel is increased with the wave washer type of piston retraction. Caution must be used when adjusting brake pedal travel. If the required freeplay in the plunger is adjusted away, the expanding brake fluid cannot return to the reservoir and gradual energization of the brake may occur. If there is any doubt concerning this freeplay or other proper operation of the master cylinder, the master cylinder cap should be removed and the pedal depressed several times. A squirt of fluid each time will verify proper operation.

LEAKAGE

Any fluid leakage in the brake system should be a signal for replacement of the particular component causing leakage. On an older system, pay special attention to hoses, looking for cracked or cut surfaces which could develop leakage.

HARLEY-DAVIDSON MOTOR CO., INC.

ROUTING	SERVICE	PARTS	CHIEF	MECHANIC	MECHANIC	MECHANIC	MECHANIC	RETURN
	MANAGER	MANAGER	MECHANIC	NO. 1	NO. 2	NO. 3	NO. 4	THIS TO:
INITIAL HERE →								