Hudsonotes

Column of Mechanical Miscellany
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FULL STOP
(last in a series on brake care)

ROUTINE BRAKE INSPECTION, when drums are removed (as for greasing of front wheel bearings), should always include a look inside the rubber end caps of each wheel cylinder. In this way most minor leaks can be caught before fluid reaches the linings. Remedy for a leaking cylinder is of course to resurface it inside using a 2- or 3-stone rotary hone, and then to replace the two internal rubber piston cups. On a Hudson this can generally be done without removing the cylinder. Usually there are several choices regarding new parts, the most popular being a "kit" for wheel cylinder which includes the cups plus new rubber end caps and internal coil spring. But often the piston cups can also be had separately if preferred, and sometimes this is all that is needed. Clean and inspect the old end caps. Unless heat-damaged or very aged, they are often reusable. If not, be sure the kit contains a correct match for them.

Also inspect the two aluminum pistons. They should be smooth, although deposits can usually be removed with extra-fine steel wool. Check along the bottom of cylinder bore for rust pits. If they can still be felt after honing, cylinder probably needs to be replaced (unless rust is confined to extreme center area where piston cups do not travel).

As for the center internal spring, there is seldom real need for a new one unless plan is to install the replacement type which carries a metal "expander" ring at either end, designed to press against the rubber cups. Long available in the kits of certain brands, notably EIS, these expanders were first offered mainly as a correction for leaks caused by shrinking and hardening of early rubber piston cups in very cold weather. Today they are more often valuable in old brake cylinders which, though honed smooth, may be a trifle oversize. The expanders are not original Hudson equipment, but should be considered to help prevent future leaks when rebuilding.

Mechanics disagree as to whether all wheel cylinders, leaking or not, should be honed and rebuilt when new brake linings are installed. Some favor doing it to forestall the occasional comeback which does occur due to leaks developing very shortly after a straight relining job. Reason appears to be that the new, thicker linings will cause piston cups to move through a slightly different part of cylinder bore than before, possibly encountering some new irregularities. Often there is no problem, but it is well to check the cylinders several times for leaks during the first 2000 miles or so after relining, if they have not been rebuilt.

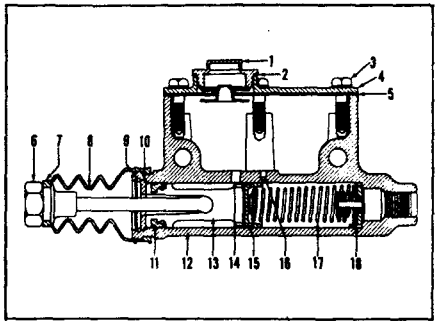
Sometimes commercially rebuilt brake cylinders are available, and are satisfactory; but if they (or even new ones) have been in long storage, it's occasionally necessary to do them over again before using.

THE NEXT TASK, after wheel cylinder repair, is bleeding of the brakes to remove air bubbles. Although Hudson brake bleeder screws mid-1949 and up are of the standard "nipple" type which permits attaching a hose so that bleeding can be done by a single person with the proper equipment, this job remains much simpler if a helper is available to step on brake pedal and hold it as requested. Before reinstalling rubber parts in wheel cylinder, however, it is wise to make sure that the bleeder screw can be loosened safely without distortion or breakage. When bleeder screws (and brake line flare nuts) are old, the best procedure is to apply penetrating oil well beforehand, and then to use only quality 6-point hexagon wrenches (not 12-point, and never plain open-end type!) on them.

Occasionally an obstinate screw can be loosened by impact, with a series of moderate hammer taps against the wrench, in preference to a hard steady pull which would only twist head off screw. Avoid vise-grips and similar tools unless the hex head is ruined and will be replaced.

If simpler methods fail, this is the time to use an acetylene torch on the cylinder (all rubber and aluminum parts removed), heating metal just around bleeder screw, not quite to redness, until the screw can be turned out. For first attempt, this is best done off car, but with practice it can be managed on the car, and also used (more gently) to free stubborn brake line nuts without damaging them or twisting off the steel line. Brake fluid will of course burn in open air, but it is not explosive unless trapped. If heat must be used on any brake line fitting, be sure that the line is open at another point for pressure relief.

The first automotive hydraulic brake fluid, c.1920, was plain water, but various other compounds, mostly alcohol-related, were soon tried out in order to eliminate freezing and reduce corrosion, without harming rubber parts. The most important additional improvement since that time has been the raising of the boiling point, and this in fact still marks the chief difference between a top-grade fluid and a barely passable one. Any vaporization of fluid due to heat when brakes are subjected to prolonged hard use (as on a long downgrade) will cause a severe loss of brake control. This is especially critical on disc brakes which have wheel cylinders placed quite close to the heated surfaces. A modern fluid compounded for disc-brake service thus is a good choice for older drum-brake cars as well, and offers an added margin of safety in this respect. Modern fluids, except for one or two far-out "synthetic" types, also will mix acceptably with older varieties, without purging of system, although any intermixing probably will lower the boiling point slightly.



1. Filler cap
2. Filler cap gasket
3. Reservoir cover screws
4. Reservoir cover
5. Reservoir cover gasket
6. Push rod
7. Push rod guard strap
8. Push rod guard
9. Piston stop plate lock wire
10. Piston stop plate
11. Piston cup secondary
12. Master cylinder body
13. Piston
14. Inlet port
15. Piston cup primary
16. Outlet port
17. Piston spring
18. Check valve

Brake fluids vary in their ability to absorb water. If unabsorbed, water eventually causes rust pitting inside cylinders and other brake parts; and if absorbed into fluid, it depresses the boiling point. In either case, the importance of keeping water out of system is obvious.

MASTER BRAKE CYLINDERS on some Hudsons, including 1948-50 stepdowns, were of aluminum, which eliminated rust but not wear. Later ones (with hex-head filler cap) were iron, as are the present-day replacements which can be adapted to fit. Unlike wheel cylinder repair kits, the kit for master cylinder normally includes a new aluminum piston along with the rubber parts. Cylinder diameter of the iron and aluminum versions on Hudson is the same, and one kit fits either type.

Check the brake-light switch occasionally. For safety on road, it should not require near-panic-stop pressure to operate, but should turn on as soon as pedal is lightly depressed in anticipation of a stop. The two terminals and their harness clips must be clean and shiny (and perhaps even given a drop of light oil), since corrosion here is a common cause of brake lights not working.

Most drivers are not aware of the extreme forces placed upon brake components during an all-out stop. Even the direct foot pressure at pedal can rise briefly to many hundreds of pounds . . . although this presupposes that another portion of the anatomy is solidly supported to accept the reactive force at the other end! And since the reactive force thus is transmitted to the front seat frame and its mountings, a check of those parts is sometimes in order, especially on any older car without power brakes. Remove front seat cushion and inspect car floor where the bolts holding front end of seat track on driver's side are attached. If crack is found, it can be repaired by welding or by adding steel

patch plate. Also inspect metal tray which supports seat cushion, around its front bolt holes and also at side edge, near seat adjustment lever.

Brake parts themselves seem well able to take the forces involved. If the master-cylinder push rod appears slightly bent after long severe use, it should be replaced (or very carefully straightened). This rod is threaded onto the heavy clevis at brake pedal lever to allow adjustment, and it should be set so that when pedal is released (and rubber seal washer on pedal stem under car floor is in place), the pedal will have just ¼ inch free play before tip of push rod moves the master piston.

Brake shoes should be inspected before relining, although in fact—despite the several tons' load on them—they rarely are found cracked, bent, twisted (or with broken welds) except on cars which use smaller brakes for vehicle weight than Hudson. Excessive wear at certain points—near anchor pin, for example—can interfere with the accurate fitting of new linings, but this too is unusual. Occasionally a defective shoe slips past even commercial reliners, or arrives with ill-set rivets, or with lining bonded out of position—or without enough bonding at one end. Check when installing.

Examine the brake lines and hoses under car. In many parts of the country, the rubber hoses—even those without steel wire reinforcement—will live to a healthy old age of 30 years or longer (except for possible corrosion at end fittings and ferrules), but the steel lines are quite vulnerable to rust damage. Any line which shows a rough flaky surface due to rust at any point should be promptly replaced. Lines with only smooth surface rust can be protected for several years at a time by rubbing them with thick wheel-bearing grease, especially at each retaining strap and clip. Conversely, in some hotter and drier climates, the steel lines usually outlast the car, but the hoses do not. Replace any hose which shows external cracks.

A mysterious case of uneven braking can occasionally be caused by a kinked or pinched spot in one brake line (or an obstructing bit of rubber or rust inside the line), although more often the cause is linings or other parts at one wheel which may be dirty, defective, stuck, or even assembled the wrong way. Tires, of course, need to be fairly uniform as to tread, pressure, and size; and if brake pull persists, the car's suspension parts—leaf and coil springs in particular, and their mountings—should also be checked.

WITH TWO OBVIOUS EXCEPTIONS—the 1935 Rotary Equalizer for mechanical brakes, and the famous 1936-57 cable-over-hydraulic reserve linkage at pedal (used on practically all except some power-brake models), Hudson brake design through the years tended to be relatively conventional. The company seems to have favored brake components bought from outside suppliers (Bendix, Wagner Lockheed, et al.), and fairly standard in design; but chosen with unusual care as to quality, size, and suitability. This combined with typical Hudson chassis stability gave brake performance which was above-average for its time and long afterward. Not for Hudson owners is the dilemma faced by restorers of certain celebrated Brand X's, between preserving correct originality on the one hand, and providing decent stopping capability for today's traffic on the other.

Were there any Hudson-built models which contradict the above, with brakes which were perhaps marginal in their time, and now are a problem on the road? I don't know of any, but—as noted in a previous column—would much like to hear from owners of earlier models on the subject.

For most of us the problem is otherwise: Hudson brakes are at least average even when not in top condition, so that it is all too easy to neglect frequent checking and adjustment. That's one reason this past series of four **Hudsonotes** columns has been written . . . not just to help keep 'em rolling, but also to help make sure they don't roll when they shouldn't.

"You have no idea how it boosts their morale"

Atkins in **Motor**, *June 1949*