Hudsonotes

Column of Mechanical Miscellany
by George Schmidt
Mishicot, Wisc.

BETTER BRAKING
(part three of a series)

AUTOMOTIVE BRAKE LININGS for many years have been made by forming in molds a mixture which usually includes asbestos fibres and a thermosetting resin, sometimes with a soft metal wire mesh molded in for strength and better heat dissipation. Until the 1930's, however, most lining material was woven, generally of asbestos yarn, soft thin wire, etc. (often in several plies interlocked), and resin-impregnated. This woven construction permitted strength and excellent friction characteristics, and it is still offered for some truck and industrial applications, especially where flexibility is also needed (as on external contracting brake bands). Its main drawback has been high cost—roughly double that of a comparable molded material. Hudson was about the last U.S. carmaker to give up woven brake linings, specifying the "Ferodo" brand for front and rear secondary shoes as late as 1947.

Woven linings today are generally supplied in bulk rolls, in various widths, two standard thicknesses or more, and several qualities (all of them expensive). They can be cut, drilled, and countersunk about the same as molded linings. Bulk molded linings may come in similar rolls, or in wide "half-cylinder" shaped pieces.

Standard lining thickness on most passenger cars is 3/16 inch, with 1/4 inch usual for truck and industrial use. Hudson for years, however—1936-47, if not longer—used an intermediate 7/32 inch, and Ford's 1/5 inch at the time amounted to about the same thing (.2" *vs.* .21875"). If only 1/4-inch material can be found in the desired quality, and the drums do not actually need the 1/32 (.030 or .03125) inch oversize, it will have to be ground down to fit. Lining too thick for drum diameter is hazardous: it will not only drag but may suddenly lock the wheels. On the other hand, lining too thin will have to be ground even thinner to match curvature of drums (unless spacing material is used underneath); and mileage will thus be very limited.

Some clearance between drum and lining at the heel and toe (ends) of each shoe is desirable. Older manuals suggested checking this with a flat feeler gauge when adjustments were made, particularly to brand-new linings. A hole for inserting the gage is provided on most "centrifuse" type drums as used on many Hudsons, and the specification for most models was .010 inch at both shoes (or .015 at secondary alone, with primary pushed tight against drum). Such measurements can still be made if desired, but it should be pointed out that they are valid only if drum surface is in good condition, and perfectly round.

For most accurate adjustment of the rear shoes, some books suggest disconnecting the two brake cables at their clevises. This may not be really necessary unless the cables also require adjustment, but it offers a good opportunity to check that both are in good condition and free to slide in their sheaths. Oil them well (also brush or spray some on outside of sheaths to control rust); then do the same at front cable and all linkage parts underneath car. (See manuals, and also "Help for Handbrakes" in April 1975 *WTN.*) Cable failure due to use is rare, the real causes of trouble being disuse and neglect—and this seems to be even more the case on most late model Brand X's. Frequent lubrication is helpful on all, however (clean away gritty or sticky material first).

MUST BRAKE DRUMS be cut on a lathe when new linings are installed? With an old car, the answer nearly always is: yes, they should be—but without removing one bit more of thickness than absolutely necessary! Though this may resemble the classic parental admonition: "yes, you may go in to swim, but don't go near the water," it is sound advice for any collector car on which drums may already have been resurfaced several times, and for which replacements may be difficult to find in the future. The unworn ridge at mouth of drum should of course be removed—it interferes with reinstallation and correct adjustment. But if there is a similar ridge at inner edge of friction surface,

perhaps only a part of its width should be taken out, since this is where old drums are most easily weakened.

A bit of out-of-roundness commonly develops at the front drums with normal use. If a severe case of it is found at rear, one possibility is that someone in the past has used brakes hard enough to heat the drums thoroughly, and then applied the handbrake savagely tight, leaving it that way until the brakes cooled. In either case, the eccentric or elliptic shape must be corrected, since it causes erratic brake performance; sometimes even a perceptible throb at pedal. Any "bell-mouthed" tendency, or its opposite, must also be taken out; and scored surfaces, if any, cleaned up.

Here, however, I suggest . . . although this is heresy . . . that if scoring is reduced to merely two faint circles which remain from rivet damage, and if drum is already close to its maximum safe inner diameter (legally, the limit is .060 or about 1/16 inch radial oversize, though this makes no allowance for individual drum design), then the grooves are best simply left in place, up to a depth of a few thousandths. They are unlovely, but relatively harmless. Even a shallow spot of possibly a few square inches which may remain at one side after all other out-of-roundness has been removed is preferable to overcutting; and the new linings will soon polish out most of it.

While an old drum is on the lathe, and well lighted, it should also be inspected for any possibility of cracks starting to form, especially around the area where the steel disc and the cast-iron rim of a centrifuse-type drum are joined. In doubtful cases, even a check using one of the dye or magnetic processes (Zyglo; Magnaflux) may be wise.

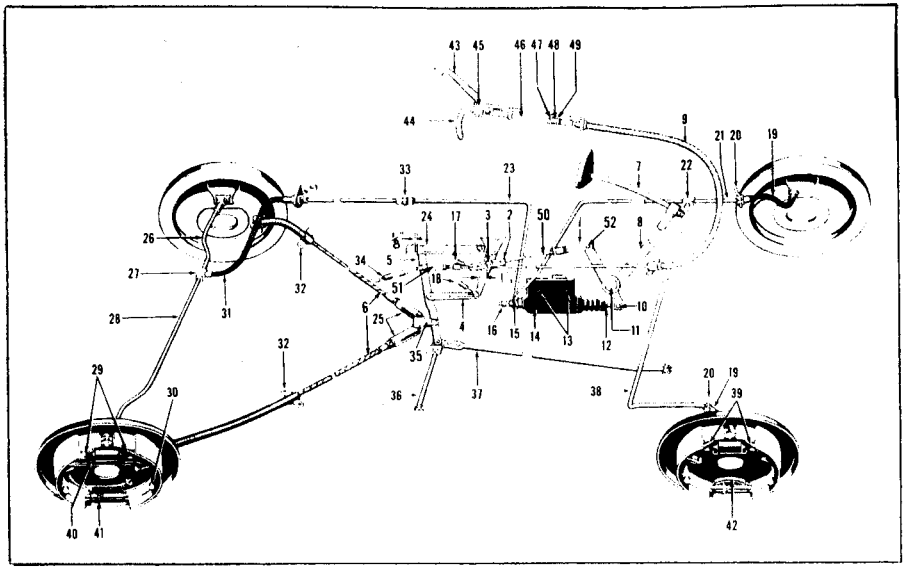
These centrifuse drums usually have a sheet-metal flange pressed over the outer rim, serving as a splash shield and to some extent as a heat sink and vibration dampener. Too often this flange deteriorates and comes loose on an otherwise usable drum. The metal ring is simply a tight press fit, but it does not seem ever to have been listed separately as a replacement part. Occasionally a good one can be salvaged by driving it carefully off a scrap drum, using hammer and block of wood. Ring is identical front and rear on most models.

DUST IN BRAKES from lining wear is normal, but should be cleaned out when drums are pulled for brake inspection. Quickest way is with an air hose and blowgun, but the asbestos-laden dust should not be inhaled. Alternative method is to use wire brush or medium-coarse steel wool, and non-oily rags or an old whisk broom. Cleanup is far more of a problem if leakage from brake cylinder or wheel bearing is mixed with the dust. Grease can be removed with the usual petroleum solvents, and brake fluid with alcohol (ordinary methanol non-permanent antifreeze will do). For slight remaining residue, wipe with a stronger non-selective solvent such as lacquer thinner, but do not get any on inner rubber piston parts.

Even linings with grease or brake fluid on them can often be salvaged if they have not been soaked and rubbed with the material for too long a time, and if they are not unusually absorbent (most U.S. linings today are not)—and if they are in good condition otherwise. Wash well in clean solvents as specified above, wipe as dry as possible, and finish drying in the air. Traces which remain can usually be removed with lacquer thinner and a rag (several applications)—or if they are deep, by heating the surface with a propane torch. Sandpaper the lining surface if glazed, and try on road. Unless uneven braking persists after a few more miles, or reappears later, linings need not be replaced.

GREASE ON BRAKES, in tiny amounts at the proper places, is needed to prevent squeaks, sticking, and excess wear on parts. Grease for this purpose is the familiar "white lubricant" (usual ingredients: high-quality oil plus a lithium soap), since it has very little tendency to spread, or to melt when hot. Best known brand is probably "Lubriplate," but there are others, including one from Wagner Lockheed (makers of many Hudson brake components for years). Some wheel-bearing greases which are especially heat- and moisture-resistant (but not ordinary chassis lube) may also be used here. When brakes are assembled at each wheel, the grease should be applied—very sparingly!—to the six points on backing plate against which shoe edges rub, to the anchor pin at top, to pivot of handbrake lever on rear secondary shoe, to the protruding end of brake cable and its spring, and possibly to other parts where there is a bit of movement. If any gets onto linings, remove immediately with clean solvent and rag. This light greasing usually eliminates having to hunt later for an elusive squeak or grunt heard at one wheel when pedal or hand lever is used. Also, to avoid future battles with stuck adjusters, be sure to grease well both ends of the adjuster screw.

Two special tools—bought or borrowed—for hooking and unhooking passenger-car brake springs will of course make brake work much easier on any Hudson 1936-57



BRAKE ARRANGEMENT — ALL EXCEPT JET AND POWER BRAKES

1. Brake pedal pull rod clevis
2. Brake pull rod slide link
3. Brake pull rod slide link retainer pin
4. Play link assembly
5. Hand brake cable lever
6. Rear brake cable
7. Brake pedal rod assembly
8. Brake pedal lever assembly
9. Hand brake cable assembly
10. Brake pedal to master cylinder clevis
11. Brake pedal lever shaft
12. Brake pedal to master cylinder push rod
13. Master cylinder attaching bolts
14. Master cylinder assembly
15. Master cylinder outlet fitting
16. Master cylinder stop light switch
17. Pedal pull rod to guide hanger return spring
18. Brake control lever to guide return spring
19. Front brake hose assembly
20. Front brake hose to frame assembly
21. Frame tee to left front hose tube assembly
22. Front frame tee
23. Master cylinder to frame connector tube
24. Hand brake cable lever guide plate assembly
25. Rear brake cable clevis
26. Rear axle tee to left rear wheel tube
27. Rear axle brake tee
28. Rear axle tee to right rear wheel tube
29. Brake shoe to anchor pin spring — rear
30. Brake shoe hold down spring and retainer
31. Rear brake hose assembly
32. Rear brake cable support bracket
33. Brake tube connector
34. Hand brake cable lever return spring
35. Hand brake cable lever toggle assembly
36. Cable lever pivot plate slide brace
37. Cable lever pivot plate and brace assembly
38. Frame tee to right front hose tube assembly
39. Brake shoe to anchor pin spring — front
40. Brake cable lever strut
41. Brake adjusting screw
42. Brake adjusting screw spring
43. Hand brake mounting bracket assembly
44. Hand brake lever grip
45. Hand brake ratchet rod housing
46. Hand brake ratchet rod
47. Hand brake inner ratchet rod stabilizer
48. Hand brake ratchet rod stabilizer spring
49. Hand brake outer ratchet rod stabilizer
50. Brake pedal lever pull rod
51. Hand brake cable clevis
52. Pedal link clevis

(and even earlier, since Hudson mechanical brakes of the Thirties used star-wheel adjusters, return springs, hold-down springs and pins, etc. fairly similar to those on hydraulic models). However, it will be found that, if necessary, the springs can also be handled using pliers—one standard and one vise-grip pair—along with some extra care, patience, and arm muscle. Be especially careful not to damage upper ends of the two return springs so that they will not stay hooked on anchor pin.

On the other hand, if springs at one or more wheels seem abnormally easy to handle, they have probably lost some of their strength due to heat damage, and should be replaced. Check by comparing each spring with a similar one known to be OK. Look for incorrect free length, or for a few turns near one end spaced unlike the rest; or perhaps for scorched paint (the return springs on most stepdowns were painted a bright aquamarine blue). Weak springs can cause uncertain brake release, side pull, added wear on linings, and even locking of wheels.

(THESE BRAKE comments will come to a stop in *Hudsonotes* next time. However, we'd also like to hear from readers who have favorite brake repair suggestions and corrections to offer, and we'd especially like to hear from members who have worked on the earlier, pre-hydraulic Hudson brakes, 1909-35. There is much they can tell us about the repair and adjustment problems peculiar to those years, the types of linings used, the differences found on early Hudson brakes as compared to most other cars of the era, and so on. We plan to devote some future *WTN* space to comments and tips from readers.)