What You Should Know About

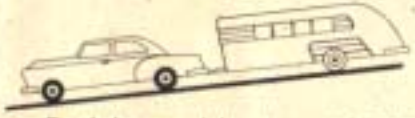
Trailer BRAKES

WHY YOU NEED TRAILER BRAKES

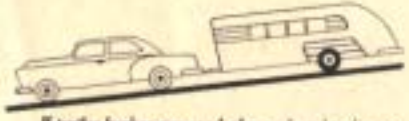
Hand Control — on left-hand side of steering column operates both electric trailer brakes. A rheostat, varies current going through brakes.

On a 4,000 lb. car, four 2" x 11" brakes give working drum area of 276 sq. in. and drum loading of 14½ lb. per sq. in.

On a 3,500 lb trailer with two 1¾" x 12" brakes, drum area is 170 sq. in. and drum loading is about 20½ lbs. per sq. in.



If car brakes are used alone, they must stop 7500 lbs. total. This makes drum loading 27 lbs. per sq. in. At 20 m.p.h. a driver cannot stop in less than 35.7 feet.



If trailer brakes are used alone, drum loading on them jumps to 57 lbs. per sq. in. Shortest distance in which driver is going 20 m.p.h. can stop is 41.6 ft.

If all six brakes are used, the drum loading evens out at 18 lbs. per sq. in. The stopping distance at 20 m.p.h. then drops to 19.2 ft. Hence, towing trailer is safer.

Electric brakes in house trailers pose new questions. Before setting out it will pay you to know the answers.

When trailerites get together — and the "tribe" is increasing — you can usually count on one thing: sooner or later they will start "chewing the fat" about electric trailer brakes. This story tells you what you need to know to become the "life of the party". Nearly all the big trailer coaches now have electric brakes. A few drivers understand them — and the fact that a mechanic is a good man on car brakes is no guarantee that he can also service trailer brakes. These brakes differ in just one big respect from your hydraulic car brakes. In hydraulic systems, cylinders force the bands against the drums. In electric brake systems, bands still do the braking, but armatures and electro-magnets move them against the drums. Current comes from the car's 6-volt system.

ARMATURE AND MAGNET FACES always touch — whether the brakes are on or off. The armature revolves with the drum. The magnet is attached to the backing plate, but can turn with the wheel a fraction of an inch in either direction, depending on whether the trailer is going forward or backward.

Springs keep the armature against the magnet. This means the armature must slide against the magnet even when the brakes are off. The two poles of the magnet wear concentric rings in the face of the armature. This is normal.

HOW THE BRAKES WORK. When you move the brake controller, the magnet becomes energized, attracting the armature with increasing force as you shove the control towards Full On position. The magnet finally locks up with the armature and is forced to revolve with it. But, as soon as the magnet begins to turn, a lug attached to it forces out a brake band against the drum. When the band begins to press against the drum, the magnet stops, turning the band, and remaining there as long as current is reaching the magnet.

But something has to give. Since the magnet cannot revolve farther, it and the armature become in effect a slip clutch. The armature slips around the magnet. (However, you can slide trailer tires by abruptly slamming the control to "Full".) Brakes are rated according to drum loading. This is the relationship of the vehicles' weight to square inches of brake drum surface. If the average car drum loading is about 15 lbs. per sq. in.

Your four car brakes were designed to handle this much weight, with good margin to spare. But, piling on a 3500 lb. trailer produces a dangerous overload. You can expect slower stops, overheating, fading and short lining life.

ELECTRIC BRAKES MUST BE BROKEN IN carefully to mate the magnets to the armatures. The firm that makes the trailer coach brakes, Warner Electric Brake & Clutch Company, recommends this procedure:

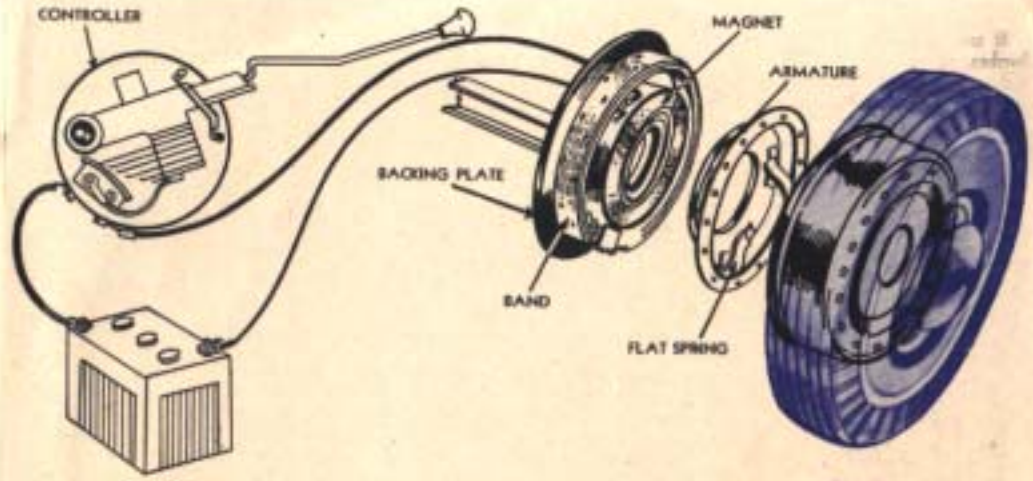
1. Speed up to at least 30 m.p.h., apply the trailer brakes only until speed is reduced to 15 m.p.h., then let the train regain speed. Do not lock the wheels.

2. Drive for a half a mile without using the brakes. Then repeat step 1.

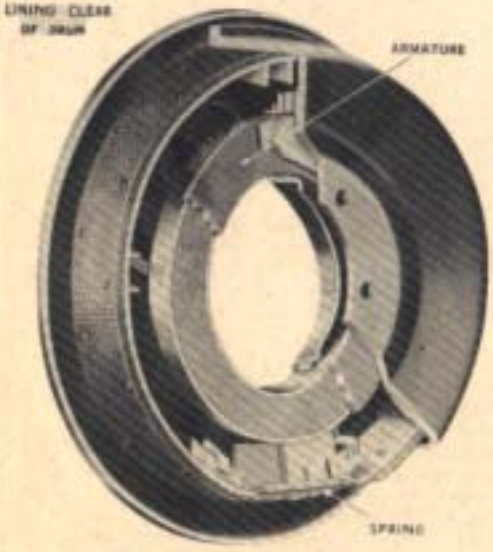
3. Repeat steps 1 and 2 several times — until you have travelled about six miles.

4. Let the brakes run free for about four miles, then apply them again to check their efficiency.

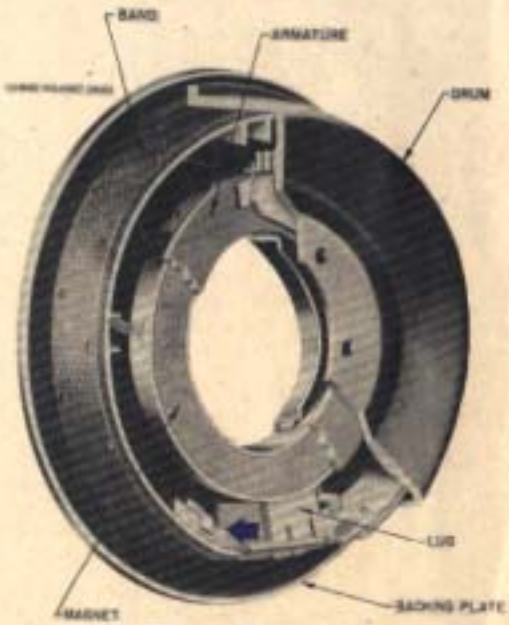
SERVICE PROCEDURES to apply to hydraulic brakes also apply to electric brakes. Replace greasy or worn lining with new. Avoid out-of-round or oversize drums. Keep wheel bearings tight. In addition, the magnets must draw the required amperage, and the magnet and armatures must be in contact and in correct relationship with each other.



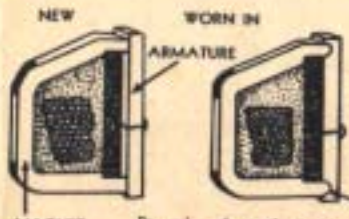
Here are parts. The hand controller, an 8-step rheostat, delivers current from car battery to electro-magnet mounted inside brake shoe. The more current, the greater braking effort. The magnet is free to move slightly 'round trailer axle. The armature is attached to the drum and revolves with it. Flat steel springs keep armature always in contact with magnet.



When brake is "Off", the coil spring at the bottom keeps brake shoe contracted and lining away from drum. Armature slides against magnet.



When brake is applied, magnet locks to armature and revolves a bit, forcing lug to throw lining out against drum. Armature then slips.



The magnet poles wear grooves into armature face, at left. The brakes may be noisy while "wearing in".

Rivet heads can't score drum. As lining wears, lug moves farther up each time. But, at point where heads become exposed, lug hits stops and brake

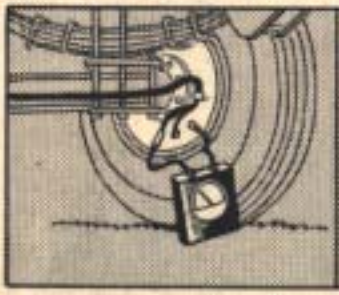
If trouble develops in electric brakes, check the electrical circuit first. Experience has shown wiring causes most complaints.

A low reading DC ammeter is essential. For two-brake systems, use one with maximum scale of 10 to 15 amps. Current draw is so low that a meter of high capacity is less accurate.

Make amperage tests with a controller lever at "Full On" position. Be sure also that engine is running to get full current from generator.

Connect all connections first. Loose wires or corrosion on terminals will always give trouble. In making ammeter tests, be sure trailer and car circuits are connected.

Amperage at the controller should be between 5.4 and 8 amps. for a 2-brake trailer system with lever "Full On". To test, remove one wire and connect ammeter in series.



Current draw at brake should be between 2.7 and 4 amps. Remove one wire from brake and connect meter as above. Check for broken or loose wires if amperage is low.

Test controller by connecting in series with 6-volt battery and a 21-candle power, 6-volt bulb. Lamp should light a little more at each successive step as you move handle.

Amperage capacity of magnet can be tested like this. A variation of 10% from rated amperage on the nameplate is O.K. Rated amperage is for 70° temperature.

A grooved armature need not be replaced until it is almost worn through. If you replace a magnet, you must also replace the armature — a new magnet would not mate with the old armature. However, you can install a new armature alone.

The brakes are connected to a hot terminal on the starter, and operating current comes from the generator. The return wire goes to the battery ground strap. You may find some body-grounded returns, but they are not recommended. Wire not smaller than No. 12 should be used for the 1¾" x 12" brakes that are now standard on all coach trailers.

HERE ARE OTHER TIPS for getting the most out of electric brakes: Use the car and trailer brakes simultaneously. If you wish you can buy a controller that does this automatically. With it installed in the car hydraulic lines, all you do is press the foot pedal. For driving on hills, apply the brakes intermittently rather than keeping them on steadily. Never wire the brakes into the stop light circuit. This would give "On" and "Off" brake operation without any graduation of power. The brakes would grab.

If you have parked the trailer for a long period, especially at the seashore, check the brakes before using. Because of rust, you may not have any.

One brake per wheel has been the rule in cars for years. It is a good rule for trailers too. If your trailer is heavy enough to need four wheels, it needs four brakes.

WARNER ELECTRIC BRAKE & CLUTCH COMPANY
BELOIT, WISCONSIN, U.S.A.

This article reprinted from "POPULAR SCIENCE" magazine, July, 1951.