Why Won't it Stop?

By Dick Ray

In the spring, 1991, *Setoff*, the "Track Inspector Sez" said, A THOUGHTFUL MOTORCAR MEET PARTICIPANT ALWAYS CHECKS THE BRAKES OF THE CAR BEHIND, AND THE FUEL LEVEL OF THE CAR AHEAD.

This was supposed to be humorous. After all, who would appear at a meet without enough gas or without properly adjusted brakes? It seems a few still do!

Running out of gas causes, at most, a slight delay in the tour; but bad brakes are a safety hazard. At those meets where I have assisted with safety inspection, I have always paid particular attention to the brake adjustment of each car. When improper adjustment was discovered, the owner was usually not aware of it. If the car had stopped properly before, the owner assumed it would stop properly again. In all cases so far, we were able to properly adjust the brakes before starting out.

The NARCOA Rulebook has "Brakes" as the first item under "Mechanical Standards," and says: "*The brake lever must not be against the stop when brakes are fully applied. Brake end arms shall not be in danger of going over center with full application.*" The Rulebook has always contained this statement, and the MOW Rulebook says substantially the same thing. This seems clear to me, to the Rulebook authors, and to the vast majority of owners who maintain their brakes properly.

Perhaps the few whose brakes are out of adjustment do not know how to do it correctly. This article is intended to educate owners and safety inspectors on the adjustment process, and is specific for Fairmont M or MT series cars. However, the principles apply to other models and makes, since they have similar systems.

The first goal is to have the brakes hold the car so it cannot be moved when the brake-operating lever is in the first notch. This is about half the total available travel. The second notch is provided so wear occurring on a long run does not use up the available range of brake lever effectiveness. The lever travel space beyond the second notch is for another purpose, covered later.

The second goal is to avoid any possibility of the brake shoe operating rods descending below horizontal, because this removes all braking action. When the brakes are properly adjusted, and the lever will hold the car firmly in the first notch, this second goal will be satisfied, unless the car has some other type of wear which affects the brakes.

Note: Please refer to the accompanying illustration, from Fairmont, Page 39A – Bulletin 415.

First, drop the rods (M33222, M28351, and F7106) from the vertical links (M18456), loosen the lock nuts (F2702), and unscrew everything for cleaning and lubrication. Measure the length of threads available on each of the threaded pieces (2 on each side of the car) (7106 and M28351), and write it down, referenced to the location (front, rear, left, right). You will use these dimensions later, to make sure there are enough threads inside the tubes (M33222) to allow for future adjustments, as the brake shoes wear. Coat all threads with grease or anti-sieze, so that you can easily adjust the linkage in the future. Inspect the rest of the parts for excessive wear, and reassemble everything into approximate adjustment.

Now note where the brake lever is, relative to the first notch criterion. (You won't want it so tight you have difficulty getting it into that first notch.) With the lever effectively in the first notch, look carefully at each pair of vertical links (M18456) connecting the brake operating arms (M30124) to the brake shoe operating rods on each side.

The ideal position for the vertical links is vertical when the lever is in the first notch and the shoes are firmly against the wheels. This gives each brake shoe the same mechanical ad-vantage, and therefore the same force on each wheel when the brakes are applied. To achieve this ideal, remove the lower pin (M28761) and adjust the length of the rods on each side until the links are approximately vertical when as-sembled, as shown in the illustration.

If this cannot be achieved, there are several possible causes: 1) Wrong operating rods; 2) Someone modified the rods before you got the car; 3) Wrong brake shoe assemblies; 4) Unequal wear on front and rear brake shoes.

In any case, the cause must be found before the proper cure can be applied. There is no use going further with the process, until the above adjustment is accomplished. In the end, you will need at least a half-inch of the threads screwed inside the rods (which are actually tubes with a nut welded to one end). An additional half-inch is necessary, to allow for wear when you are starting with new wheels and brake shoes. You can measure the length of threads outside the tubes, and subtract it from your previously measured total length figures.

Once you have the links approximately vertical, you can now adjust the brake shoe clearance on each side. It needs to be equal. This will equalize the braking force on each side of the car. With the brakes fully released, slide a flat-bladed screwdriver between one shoe and its wheel, to take up the clearance on both front and rear shoes. Make a mark on the screwdriver blade at the edge of the brake shoe. Repeat the procedure and make the measurement on the other side of the car. The distance the tapered blade of the screwdriver goes in be-

tween the shoe and the wheel should be equal for both sides of the car.

Before adjusting the rods on one side tighter, or the other side looser, make note of the position of the brake lever when the brakes are applied, and decide whether you need the overall system tighter or looser. To avoid moving the links away from vertical, adjust the front and rear rods (on the side you are changing) an equal amount. The threads are either 3/8-18 or ½-12, so a half-turn each on the front and rear rods moves the shoes 55 to 83 thousandths of an inch. If any operating rod must be lengthened by more than several turns, you will need to measure the exposed thread length again, to make sure sufficient threads extend inside the rod.

When everything is properly adjusted, tighten all four lock nuts (F2702), wipe excess grease off everything, and install new cotter pins, preferably of stainless steel. They don't rust and fall out. This adjustment should last for several years. If not, maybe you are using the brakes too much by approaching grade crossings, switches, and similar hazards too fast!

Normal stops require only minor pressure on the brake lever. However, it is necessary to have a lot of extra braking capability available for an unplanned sudden stop. Shiny wheels on dry shiny rail have a lot of traction, and it takes a lot of pressure on the brake shoes to make use of that traction in an emergency.

Every part in the brake system has some flexibility. The brake lever bends, the cross shaft twists, and the axles bend. All these require the brake lever to move beyond its normal braking position, which is why we want the first notch to be the normal braking position. If you find that, despite the static adjustment described above, you often need to go beyond the first notch when braking, the car may have other problems.

Worn wheel bearings may be detected by applying the brake at rest while someone is watching to see if any wheel moves slightly as the brake shoe presses on it. With enough force, you can bend the axle slightly, so care must be used to tell the difference between bearing wear and normal deflection of the axle. It is also conceivable that bearing assemblies could become loose in the frame, from the drive belt or chain pulling on the axle and the brakes pushing on it. When problems are identified, a proper cure must be achieved.

The wood blocks on the brake shoes are also important, because they determine the point at which the operating rods push on the brake shoes, and they therefore affect the length of the operating rods. If the blocks become rotten, they may compress during application of the brakes. Also, if someone installed replacements consisting of "improvements" over the factory design, or used an otherwise inadequate material, the adjustments may not insure proper braking.

Note: The foregoing is the opinion of the author only, who claims no expert knowledge, and it does not represent any official position of NARCOA or other organization.