

Your Car's Air Brakes, Part II

By Martin McDonough

This is the second of a two-part series on air brakes. Every private car owner should have some basic knowledge of how air brakes work. It will aid you in better understanding your own car's air brake equipment and broaden your understanding of what the engineer is doing at the head end of your train.

The automatic quick-acting air brake is the cornerstone of American railroads. Air brakes determine how fast a train is allowed to travel, how far apart signals are placed and how many trains can safely operate during a given time over a given distance.

The Federal Government's active involvement with air brakes can be traced to 1893 when Congress first acted to adopt the Safety Appliance Act forcing the railroads to use air brakes, giving the engineer control of the train.

In 1958, the government took a major step when Congress required issuance of regulations for maintenance and testing of air brakes. Today, the Federal Railroad Administration is mandated to carry out this order.

In the event the FRA finds air brake tests to be unsatisfactory, it levies fines. If they find air brakes have been tampered with, the FRA is empowered to initiate criminal action.

It is not enough for your car's brakes to simply function. High-speed passenger train operation makes it essential the brakes be able to function right up to the limit of their design capabilities.

The Power Brake Law requires air brake equipment on your private car to be cleaned,

repaired, lubricated, inspected and tested (known as COT&S) as often as required depending on the type of brake equipment. For Universal (UC) equipment the interval is 15 months, 24 months for D-22, 36 months for cars equipped with 26-C and 16 years for the new ABDW freight brake now in use by Amtrak on equipment assigned to the Auto Train pool. For all other types of brake equipment, the interval is twelve months.

When your car's air brake equipment comes due for COT&S (clean, oil, test and stencil) servicing, make absolutely sure you get what you're paying for. Here are some of the steps taken by the repairman that you as car owner will need to become familiar with and will want to follow up on to ensure the job has been done correctly.

- All air brake valves including control, relay, quick service, conductor's (inside your car) and E-3 application valves if your car has them, must be removed from the car, completely serviced, repaired or replaced if necessary and tested before being reinstalled on the car,

The E-3 application valve is one valve you should check out personally when the job is finished, satisfying yourself completely that the valve has, in fact, been removed from the car and serviced. Not all cars have E-3 valves, but if your car is equipped with one or more B-3-B conductor's valves, you'll have an E-3 for each one. The E-3 is tied into the conductor's valve. When the conductor's valve is activated, it also activates the E-3, resulting in an emergency brake application.

Now here's the important part. Because the E-3 valve is often up against the underside of the car floor and over a truck, it is not unknown for this valve to be skipped completely simply because just getting to it is often a very dirty job if the car is not up in the air with the trucks rolled out.

Martin McDonough is a former Amtrak Car Inspector whose roots go all the way back to the New Haven Railroad. He resides in Hyde Park, Massachusetts.

If the E-3 application valve is ignored over a period of time, two things are possible. It may not activate at all or if it does, it may not reseal properly or reseal at all.

- Directly behind the control valve on your car (or on the branch pipe leading from the train line brake pipe to the control valve in the case of the UV valve) is a small device called a dirt collector. Frequent removal of the dirt chamber portion of this device (and I suggest before and at the end of every trip your private car makes) should become a habit so accumulated moisture, pipe scale and just plain dirt can be removed. Keep in mind that once the dirt chamber is filled, condensate and foreign substances have nowhere else to go except your control valve.
- If your car has truck-mounted brake cylinders, the piston should have new packing cups applied. If your car is disc brake equipped, be sure the disc brake air cylinders have been completely reconditioned or replaced if necessary.
- Apply your hand brake. Then take a complete walk around the car checking to see all brake shoes have applied, making 100 percent contact with the wheel tread. Use a small pinch bar to determine all brake shoes are tight against the wheels. Release the hand brake. Walk around one more time observing to see all brake shoes have retracted properly from the wheels.
- The entire length of your car's brake pipe should be well secured to the carbody frame. Check to see all air brake components, reservoirs and brake cylinders are securely fastened with bolts drawn up tight.
- Be sure there's a dummy coupling for each air hose at both ends of your car. These couplings do more than just keep your hoses off the ground. They prevent unnecessary damage to the glad hands and gaskets, keeping dirt out of the hoses and brake pipe. Remember, dirt in the brake pipe can eventually wind up in your control valve (see dirt collector above).
- Though not required to be changed, it's a good idea to request all new pipe gaskets. A dried out or brittle gasket represents another

potential problem that can be avoided well ahead of time.

- Because it is not an air brake valve, the A-1-A valve is one of those valves not required to be removed from the car and serviced during a COT&S inspection. I would suggest, however, you add this one to the list of valves to be serviced. It controls your water raising system — a very important item to you — and is an item often overlooked unless you request it.

When all air brake work has been completed, make your own inspection of work performed, paying close attention to all air brake valves and brake cylinders. Do components look newly serviced or replaced or merely painted over? Are cotter keys shiny and new and the correct size? Do nuts and bolts look like they've been removed? Look close and take an interest — it's your money.

Here are some additional general thoughts on air brakes to keep in mind.

All railroads, including Amtrak, require you to set your hand brake when your private car is left standing alone. Setting a car with air alone is not allowed for any reason. Be sure the hand brake is released when the car is to be moved. Failure to do so is to invite the possibility of slid-flat wheels.

In the event your brakes become inoperative en route, Amtrak will carry you only as far as the nearest repair point where you'll be set out. Repairs will have to be made and proof of satisfactory inspection and a single car air brake test made before you'll be allowed to continue — one more reason to get to know your car's complete air brake system.

Most private cars out there have a brake pressure retaining valve piped to the control valve exhaust. Its purpose is to release brake cylinder pressure at a slower rate during the time required for recharging the car's air brake system on descending grades. When your brakes release, air exhausts into the atmosphere through this retaining valve. Don't let anyone fool with this valve by moving the handle to the horizontal (slow direct exhaust) position in an attempt to stop what might easily be perceived as a slow air leak. The net result could be some flat wheelsets since what's been done in changing the position

of the retaining valve handle is to set up the valve to retain air brake cylinder air longer, thus slowing its release from the air brake cylinders.

There is a way to avoid this potential air brake problem altogether and that is to remove it entirely and replace it with a wasp protector, designed so air can still exhaust into the atmosphere but provided with a screened metal material to keep insects out.

It seems a majority of private cars operating today are equipped with Universal or D-22 type air brake control valves. Working parts inside these valves are usually brass and subject to wear. Reworking or replacing them is not inexpensive.

The inner workings of the 26-C control valve, however, are equipped with rubber diaphragms and "O" rings. As a result, repairs are less expensive. The 26-C functions more efficiently too and has less downtime at servicing time than older types of air brake valves.

Looking ahead into the not-too-distant future, Amtrak is now using the ABDW air brake control valve on passenger equipment assigned to Auto Train operation. To make a long story short, the ABDW is a very fascinating valve. It's also extremely efficient and does not need to be replaced for 16 years.

AAPRCO should keep an eye on Amtrak's accumulated results with the ABDW. In coming years, it could be the ideal valve from both a service and price standpoint. But for now, Amtrak limits ABDW-equipped private cars to just one car per train.

Each truck-mounted brake cylinder has its own slack adjuster. As your brake shoes wear down from service use, some compensation must be made as the piston travel becomes longer and therefore less efficient. The automatic slack adjuster senses this brake shoe wear and automatically adjusts brake cylinder piston travel at a predetermined rate. Slack adjusters can be operated manually too and you will have to do so when changing brake shoes.

Watch it! The air brake cylinder slack adjuster is one of the items most often skipped entirely during a COT&S. It is not unknown for the slack adjuster to be simply painted over leaving the impression it has been removed from

the truck, serviced and tested as required. Looks nice though With the new paint job.

Time to sum up.

- Make sure you've gotten everything you're paying for in a COT&S inspection procedure. When COT&S and the date is stenciled on your car it means all air brake components on your car have been taken off the car, dismantled, serviced, reassembled, tested, replaced if necessary, and your car has new brake pipe air hoses and hose gaskets.
- Make sure the often overlooked conductor's and E-3 application valves have received proper attention.
- Always carry a couple extra brake hoses aboard. It's an excellent practice. You may be able to help Amtrak too in the event of a broken hose somewhere in the train's consist. Completing your trip is a team effort. Don't forget cast iron brake shoes if your car uses them. You're not going to find any in an Amtrak yard.
- If your car still has an air brake cylinder retaining valve, you may want to consider removing it. You don't need it on your private car. Amtrak doesn't use them anymore either.
- Incidentally, here's a related thought while we're on the subject of things you don't need on your car. Sometimes items (decelostat valves and decelostats are good examples) no longer required on passenger cars are disconnected but left on the car for appearances. Be aware the law states all air brake components on your car are subject to the COT&S procedure even if they are not in use. Could be a good time to take those unneeded items off the car for good.
- If you are not already storing some spare parts on your own, now is a good time to begin doing so. It's not getting any easier to obtain air brake replacement parts for 30- and 40-year-old cars.

So there you have it and now your car is on the train and just about set to go. Just enough time to make one final check to see that:

1. all air hoses are coupled and in suitable condition for good service.

2. angle cocks, cut out cocks and retaining valve handles are in their proper operating positions.
3. if HEP equipped, all cables appear visually to be properly connected.
4. all reservoir cocks are closed in the horizontal position.
5. all necessary repairs have been made to reduce any air leakage to an acceptable minimum.
6. all air brake equipment components are properly secured.
7. brake rigging is not binding or fouling anywhere.
8. hand brakes are released.

Have a safe trip!