CONSOLIDATED RAIL CORPORATION

AIR BRAKE AND TRAIN HANDLING

RULES AND INSTRUCTIONS

EC-99

Rev. 7-86

NAME _____

OCCUPATION _____

EMPLOYEE NUMBER _____

The above employee attended an air brake instruction class.

DATE	LOCATION	INSTRUCTOR

N O T I C E

These rules and instructions govern the operation, testing and maintenance of air brake equipment. They must be obeyed by all employees whose duties are affected by them.

Employees whose duties are affected by these rules must attend an air brake instruction class at least once every two years or as required by proper authority.

Each affected employee must have a copy of this book (including all revisions) available while on duty and when attending instruction classes.

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1. STANDARD AIR PRESSURE

Pressure regulating devices for air brake equipment must be adjusted to the following pressures:

	Brake Pipe	Main Res.
a. Locomotives:		
Passenger service	110 -	130-140
Freight service - Road*	90 -	125-140
- Yard	80 -	125-140
- Light	90 -	125-140
		Misc.
b. Reducing Valves:		
Yard Air Supply		80
Locomotives:		
Independent Brake:		
Nos. 24 & 26 (Except SW class with No. 26 **(rev. 6-15-86)**		45
All others (Including SW class with No. 26 **(rev. 6-15-86)**		35
Control air pressure		90
c. Safety Valves		
Control & Distributing Valves		60
Main Reservoir		150
Compressor:		
Intercooler		60
Discharge pipe		185

* When freight locomotives are used to haul passenger trains, brake pipe pressure must be increased to standard for passenger locomotives before locomotive is coupled to train.

1.1 BRAKE PIPE EQUALIZATION PRESSURES

Brake Pipe Pressure	Equalization Pressure	Full Service Reduction
70	50	20
80	57	23
90	64	26
100	71	29
110	78	32

Equalization pressure is the highest braking pressure that can be obtained from a service brake application.

2. LOCOMOTIVE AIR BRAKES (MECHANICAL FORCES)

2.1 MAINTENANCE

2.1.1 — Brake equipment on locomotives must be inspected and maintained in accordance with current "Standard Maintenance Regulations — Locomotives" (S.M.R. - 1000).

2.2 RESPONSIBILITY

2.2.1 — Where mechanical forces are on duty, it will be their responsibility to know that the brakes are in a safe and suitable condition for service, that the locomotives have been inspected in accordance with the Standard Maintenance Regulations, and that all necessary repairs have been made before units are dispatched for service.

2.2.2 — The place, date and time of this inspection must be recorded on form MP-13 in the cab of each locomotive unit.

3. LOCOMOTIVE AIR BRAKES (ENGINEERS)

3.1 INSPECTIONS

3.1.1 — Each locomotive in use shall be inspected at least once during each calendar day. A written report (EL-106-A) of this inspection shall be made and a record (MP-13) maintained on each locomotive showing the place, date and time of the inspection.

3.2 RESPONSIBILITY

3.2.1 — Engineers, when taking charge of a locomotive, must determine that the inspection has been made by examining the cab record (MP-13).

3.2.2 — Where mechanical forces are on duty, the engineer will accept the inspection of the mechanical forces and will be only required to make the brake tests outlined in Section 3.4

3.2.3 — Where mechanical forces are not on duty and unit(s) are not within date, the engineer must make an inspection as specified in Section 3.3.

3.3 LOCOMOTIVE BRAKE INSPECTION

(1) Secure locomotive to prevent movement by applying hand brake on leading unit. Hand brakes should be released on all trailing units unless required to hold locomotive.

(2) Drain water and oil from main reservoir system.

(3) Blow condensate from end brake pipe and main reservoir equalizing hoses.

(4) Couple MU hoses properly between units. On leading and trailing ends of consist, place hoses in proper receptacles or couple to dummy couplings.

(5) Place all angle cocks, cut-out cocks and portions used to multiple the air brake equipment in their proper positions.

(6) Cut out (close) brake valve cut-out cocks at all stations except the station from which the brakes will be controlled.

(7) At the operating station from which the brakes will be controlled:

a. Insert independent brake handle and place in full application position.

b. Cut in (open) the independent brake cock.

c. Insert automatic brake handle and place in charging position.

d. Cut in (open) the automatic brake valve cut-out cock.

(8) Check that air pressure regulating devices are functioning properly and are adjusted to the standard pressures shown in Rule 1.

(9) Check that cut-out cock for deadman device is properly positioned and sealed.

(10) Test deadman device operation.

(11) Check that brake shoes are approximately in line with wheel tread and that brake cylinder piston travel does not exceed 1½ inches less than the total possible piston travel indicated on (Blue) cab form FRA F6180-49-A.

(12) Check that brake levers, rods, hangers and pins do not bind or foul; that pins are securely applied; and that no part of the rigging is less than 2½ inches above the rail.

(13) Test emergency brake valve.

(14) After inspection is completed, release all hand brakes.

3.4 LOCOMOTIVE BRAKE TESTS

The engineer, when taking charge of a locomotive, must know that the brakes are in operative condition by making the following tests:

3.4.1 BRAKE PIPE LEAKAGE TEST

(1) Make a ten (10) pound service brake pipe reduction.

(2) Cut out the pressure maintaining feature.

(3) Brake pipe leakage must not exceed three (3) pounds per minute.

3.4.2 STANDING LOCOMOTIVE BRAKE TEST

This test must be made:

(1) When initially taking charge of a light locomotive.

(2) After changing control stations on a light locomotive.

(3) Before making initial movement after cutting away from a train.

To determine effectiveness of brakes:

(1) Apply independent brake in Full Application position.

(2) Observe brake cylinder gauge for pressure.

(3) Momentarily apply power to insure that brakes are cut in and capable of holding locomotive.

(4) Shut off power before releasing brakes.

3.4.3 RUNNING LOCOMOTIVE BRAKE TEST

This test must be made as soon as operating conditions permit, and immediately after:

(1) Initial movement of light locomotive.

(2) A change has been made in consist of light locomotive.

(3) Changing control stations.

To determine effectiveness of brakes while the locomotive is moving:

(1) Apply independent brake sufficiently to develop noticeable brake cylinder pressure. Check appropriate retarding effort.

(2) Release independent brake and make a service application with automatic brake. Check brake cylinder pressure and retarding effort.

(3) Depress independent brake handle and hold down.
Check that brake cylinder pressure releases and locomotive rolls free.

3.5 CHANGE OF CREW

Engineers taking charge of locomotives will ascertain from incoming engineer either verbally or on prescribed form (EL-106-A) that locomotive brakes are in operative condition.

3.6 SECURING LOCOMOTIVES LEFT UNATTENDED

3.6.1 — When locomotive unit(s) in charge of the engineer are to be left unattended, it will be the responsibility of the engineer to know that units are properly secured.

3.6.2 — Hand brake must be tested when applied by releasing air brakes and determining that brake shoes remain secure against wheel.

3.6.3 — Independent brake must be Cut In and placed in Full Application position, automatic brake Cut In and placed in Full Service position and hand brake applied. Chocks must be applied to wheels where conditions require.

3.6.4 — Air brakes must not be relied on to hold unattended locomotives.

3.7 FAILURE OF LOCOMOTIVE AIR BRAKES

3.7.1 — All locomotives must leave terminal points with the air brakes in operative condition.

3.7.2 — If a failure of locomotive brakes occurs enroute, a report must be made at the first point of communication to the Train Dispatcher who will issue instructions.

3.7.3 — Engineers must report defects in locomotive air brakes at the end of each trip on prescribed form (EL-106-A).

3.7.4 — In the event that locomotive brakes become inoperative while locomotive is moving light, the procedure should be as follows:

(1) Locomotives with dynamic braking should be stopped by use of dynamic brake and hand brake.

(2) Locomotives without dynamic braking, rail cars and other equipment, must be stopped with the hand brake, if practicable.

(3) If not practicable to stop with hand brake, locomotives may be stopped by "plugging the motors".

CAUTION: THIS MUST ONLY BE USED AS A LAST RESORT. THE RETARDING FORCE WILL BE SEVERE WHEN POWER IS APPLIED IN REVERSE ON A MOVING LOCOMOTIVE, CREWS MUST ANTICIPATE THIS FORCE AND PROTECT THEMSELVES FROM INJURY.

To "plug the motors":

a. Place throttle lever in "idle" position.
b. Place reverse lever in position opposite to direction of movement.
c. Move throttle lever to first notch.
d. Locomotive must be secured with hand brakes immediately after movement is stopped, chocking the wheels if necessary.

3.8 LOCOMOTIVE AIR BRAKES — GENERAL

3.8.1 — Locomotive Brake Cylinder Gauge will indicate air pressure developed in the brake cylinders on only one truck, the truck nearest the guage.

3.8.2 — To assure a complete release of all locomotive brakes on a multiple consist when the automatic brake is applied, the independent brake valve handle must be depressed in Release for 4 seconds for each unit in the consist.

3.8.3 — An emergency brake application can be made by quickly opening the emergency brake valve, located in the cab and stenciled or marked, "Emergency Brake Valve."

3.8.4 — After an emergency brake application from any cause, the automatic brake valve handle must remain in Lap position (Emergency position with 26L) for one minute before attempting to release.

3.9 PRESSURE MAINTAINING FEATURE TEST

3.9.1 — Where a test of the maintaining feature is required, it shall be made in the following manner:

With the brake valve cut in (pressure maintaining cut in on 24RL) and the brake system charged:

(1) Make approximately a 10 pounds per minute brake pipe leak by slowly opening the cab emergency brake valve or brake pipe cock at end of locomotive until pressure begins to escape. **(revised 6-15-86)**

(2) Make a 10 pound brake pipe reduction with the automatic brake valve.

(3) Note that equalizing reservoir and brake pipe pressures do not increase or decrease during a test of 1 minute.

(4) Close the cab emergency brake valve or brake pipe cock at end of locomotive and recharge brake pipe. **(revised 6-15-86)**

(5) Note that main reservoir pressure is maintained during test.

4. POSITIONING LOCOMOTIVE AIR BRAKE EQUIPMENT

4.1 GENERAL INSTRUCTIONS

4.1.1 — When more than one locomotive unit is coupled to a train, all automatic brake valves must be cut out except the one from which the train brakes are operated.

4.1.2 — On all trailing units, brake valve handles must either be secured in the proper positions or removed.

4.1.3 — When changing operating stations, the change must be made without delay and precaution must be taken to insure that locomotive(s) do not move while change is being made.

4.1.4 — After positioning air brake equipment for single, multiple unit or double-heading service, the engineer must know that the locomotive air brakes will apply and release before proceeding.

4.1.5 — On cut-out cocks and valves: "OPEN" or "IN" will mean the same, and "CLOSED" or "OUT" will mean the same.

4.2 POSITIONING 26L EQUIPMENT

4.2.1 — To set up 26L brake equipment for "LEAD" position in multiple consist or for single unit, place handles and cocks in the following positions in the sequence listed:

(1) Insert the Independent Brake Valve Handle and place in FULL APPLICATION position.

(2) Place the MU-2-A Valve in LEAD OR DEAD position or the Dual-Ported Cut-Out Cock to IN or OPEN position. Brake Cylinder pressure will increase to Independent Brake Valve Setting.

(3) Insert the Automatic Brake Valve Handle and place in RELEASE position.

(4) Allow Equalizing Reservoir to charge to Regulating Valve setting, then depress and turn the Brake Valve Cut-Off valve to IN position. Brake Pipe will charge to Equalizing Reservoir pressure.

4.2.2 — To set up 26L brake equipment for "TRAIL", place handles and cocks in the following positions in the sequence listed:

(1) Place the Independent Brake Valve Handle in FULL APPLICATION position.

(2) Place the MU-2-A Valve in proper "Trail" position or Dual-Ported Cut-Out Cock in OUT or CLOSED position.

(3) Place Automatic Brake Valve Handle in SUPPRESSION and wait for the brake pipe exhaust to stop blowing.

(4) Depress and turn the Brake Valve Cut-Off Valve to OUT position.

(5) Return the Independent Brake Valve Handle to RELEASE position and remove handle.

(6) Place the Automatic Brake Valve Handle in HANDLE OFF and remove handle.

(7) Before leaving cab, check that Brake Cylinder pressure holds steady.

4.3 POSITIONING 24RL EQUIPMENT

4.3.1 — To set up 24RL brake equipment for "LEAD" position in multiple consist or for single unit, place handles and cocks in the following sequence:

(1) Insert the Independent Brake Valve Handle and place in FULL APPLICATION position.

(2) Turn Rotair Valve Handle to PASS position. Brake Cylinder pressure will increase to Independent Brake Valve setting.

(3) Insert the Automatic Brake Valve Handle in RUNNING position.

(4) Slowly move the Brake Valve Cut-Out Cock (Double-Heading Cock) to OPEN position pausing momentarily in mid position. Equalizing Reservoir and Brake Pipe will charge to Feed Valve Setting.

4.3.2 — To set up 24RL brake equipment for "TRAIL", place the handles and cocks in the following sequence:

(1) Place Independent Brake Valve Handle in FULL APPLICATION position.

(2) Turn the Rotair Valve Handle to PASS LAP position.

(3) Make a FULL SERVICE reduction with the Automatic Brake Valve.

(4) Close the Brake Valve Cut-Out Cock (Double Heading Cock).

(5) Automatic and Independent Brake Valve Handles must be removed in RUNNING and RELEASE respectively.

(6) Before leaving cab, check that Brake Cylinder pressure holds steady.

4.4 POSITIONING NO. 6 AND 14 EQUIPMENT

4.4.1 — To set up No. 6 or 14 brake equipment for "LEAD" in a multiple consist or for a single unit, position the handles and cocks in the following sequence:

(1) Place the Independent Brake Valve Handle in FULL APPLICATION position.

(2) Place Dual-Ported Cut-Out Cock in IN position, or if equipped with an MU-2-A Valve, in LEAD or DEAD position. Brake Cylinder pressure will increase to Independent Brake Valve setting.

(3) Insert Automatic Brake Valve Handle in LAP position.

(4) Place the 2-position or 3-position Cut-Out Cock in LEAD or IN position.

(5) Place the Automatic Brake Valve Handle in RUNNING position. Equalizing Reservoir and Brake Pipe will charge to Feed Valve setting.

4.4.2 — To set up No. 6 or 14 brake equipment for "TRAIL", the handles and cocks must be set in the following sequence:

(1) Place the Independent Brake Valve Handle in FULL APPLICATION position.

(2) Make a FULL SERVICE reduction with the Automatic Brake Valve and place handle in LAP position.

(3) If the unit is equipped with a 3-position Cut-Out Cock:

Place cock in TRAIL position. Remove or secure Automatic Brake Valve Handle in LAP position.

(4) if the unit is equipped with a 2-position Cut-Out Cock:

Place the cock in CLOSED position. Remove or secure Automatic Brake Valve Handle in LAP position.

(5) If the unit is equipped with an MU-2-A Valve, place the valve in TRAIL position or if equipped with a Dual-Ported Cut-Out Cock, place in OUT position.

(6) Independent Brake Valve Handle must be removed or secured in RELEASE position.

(7) Before leaving cab, check that Brake Cylinder pressure holds steady.

4.5 POSITIONING AIR BRAKE EQUIPMENT ON HELPER LOCOMOTIVE AT REAR OF TRAIN

4.5.1 — After coupling is made and **BEFORE** angle cocks are opened, a full service brake pipe reduction must be made on the helper locomotive.

4.5.2 — After exhaust stops blowing, air brake equipment must be set up as follows:

(1) 26L — Place Automatic Brake Valve handle in SUPPRESSION position and Brake Valve Cut-Off Valve in OUT position.

(2) Other types of equipment — Place Brake Valve Cut-Out Cock in OUT position and Automatic Brake Valve handle in RUNNING position.

4.5.3 — Hoses are to be coupled between rear car and helper locomotive and angle cocks opened SLOWLY.

4.5.4 — Independent Brake Valve must remain cut IN and handle placed in RELEASE.

4.5.5 — Brakes on helper locomotive will be controlled from leading locomotive.

4.6 POSITIONING AIR BRAKE EQUIPMENT ON HELPER OR DOUBLE—HEADING LOCOMOTIVE AT FRONT OF TRAIN

4.6.1 — Air brakes shall be controlled from the leading unit in the direction of movement.

4.6.2 — On the controlling unit of the locomotive next to the train, air brake equipment must be set up as follows:

(1) 26L — Place Automatic Brake Valve handle in SUPPRESSION position and Brake Valve Cut-Off Valve in OUT position.

(2) Other types of equipment — Place Brake Valve Cut-Out Cock in OUT position and Automatic Brake Valve handle in RUNNING position.

(3) Independent Brake Valve handle in RELEASE and Dual-Ported Cut-Out Cock in OPEN or IN position (MU-2-A Valve in LEAD or DEAD).

4.6.3 — After helper or doubleheader is coupled at front of train, a Road Test of the brakes must be made before proceeding.

4.7 COUPLING UNITS IN MULTIPLE

4.7.1 — When coupling MU air hoses, care must be exercised to insure that compatible hoses are connected, that independent Application and Release (A&R) hoses and Actuating (ACT) hoses are not crossed.

4.7.2 — Condensation should be blown from hoses before coupling.

4.7.3 — A visual inspection for hose defects and hose gaskets should be made prior to coupling.

4.7.4 — When coupling No. 6 equipment (not equipped with Actuating hose) to 26L or 24RL type:

(1) Brake Cylinder Equalizing hose must be connected to the A&R hose.

(2) Main Reservoir hose connected to Main Reservoir hose

(3) Actuating hose on 26L NOT connected and end cock closed.

4.7.5 — After coupling units in multiple, a test must be made to determine that brakes apply and release properly.**(revised 6-15-86)**

AIR BRAKE EQUIPMENT POSITIONS 26-L, 26-LA & 26-NL

MODE OF OPERATION	AUTOMATIC BRAKE VALVE		INDEPENDENT BRAKE VALVE		
	HANDLE	CUT-OUT COCK	HANDLE	MU-2-A VALVE (3-POSITION)	DUAL-PORTED COCK (2-POSITION)
LEAD OR SINGLE	RELEASE	IN (OPEN)	RELEASE	LEAD OR DEAD	IN (OPEN)
TRAILING	HANDLE OFF & REMOVED	OUT (CLOSED)	RELEASE & REMOVED	* TRAIL	OUT (CLOSED)
HELPER (Leading Unit)	SUPPRESSION	OUT (CLOSED)	RELEASE	LEAD OR DEAD	IN (OPEN)

* Must be in "Trail 24" when two (2) pipes are trainlined through to unit: the APPLICATION & RELEASE (or Brake Cylinder Equalizing) pipe and the ACTUATING pipe.

  Must be in "Trail 6" when only one (1) pipe, the BRAKE CYLINDER EQUALIZING is trainlined through to unit.

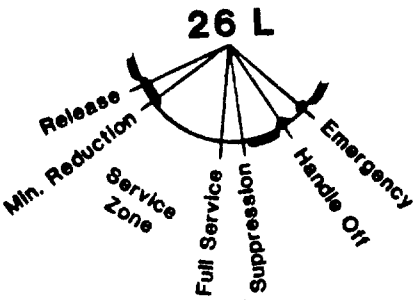
AIR BRAKE EQUIPMENT POSITIONS 24-RL

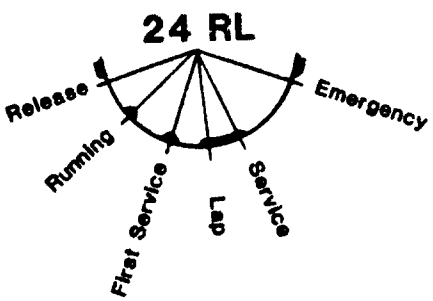
MODE OF OPERATION	AUTOMATIC BRAKE VALVE		INDEPENDENT BRAKE VALVE	
	HANDLE	CUT-OUT COCK	HANDLE	ROTAIR VALVE
LEAD OR SINGLE	RUNNING	OPEN	RELEASE	PASSENGER
TRAILING	RUNNING Handle Removed	CLOSED	RELEASE Handle Removed	PASSENGER LAP
HELPER (Leading Unit)	RUNNING	CLOSED	RELEASED	PASSENGER

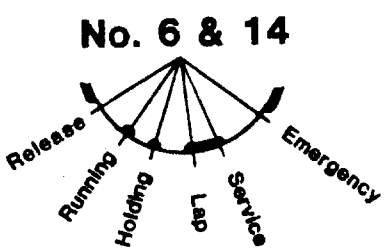
AIR BRAKE EQUIPMENT POSITIONS 6 BLC, 6 SL, 6BL & 14 EL

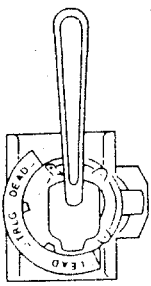
MODE OF OPERATION	AUTOMATIC BRAKE VALVE			INDEPENDENT BRAKE VALVE	
	HANDLE	2-POSITION CUT-OUT COCK	3-POSITION CUT-OUT COCK	HANDLE	2-POSITION MU-2-A OR DUAL-PORTED COCK (IF EQUIPPED)
LEAD OR SINGLE	RUNNING	OPEN	LEAD	RELEASE	IN
TRAILING WITH 2-POSITION CUT-OUT COCK	RUNNING Handle Secured	CLOSED		RELEASE	OUT
TRAILING WITH 3-POSITION CUT-OUT COCK	LAP Handle Removed		TRAIL	RELEASE	OUT
HELPER (Leading Unit)	RUNNING	CLOSED	DEAD	RELEASE	IN

HANDLE POSITIONS

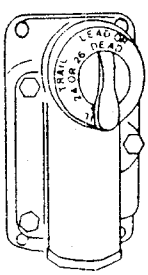




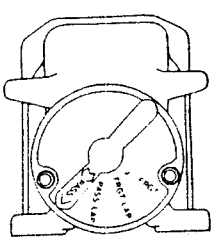




3-Position
Cut-Out Cock



M U 2-A Valve

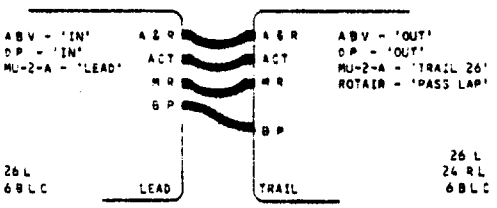


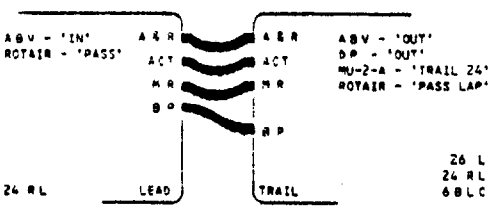
Rotair Valve

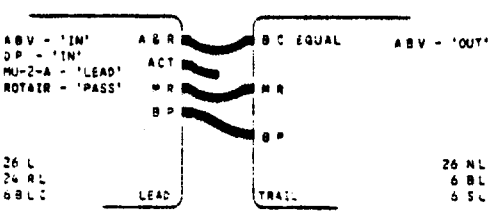
MULTIPLE UNIT AIR HOSE CONNECTIONS

LEGEND

A & R	INDEPENDENT APPLICATION & RELEASE
ACT	ACTUATING
M R	MAIN RESERVOIR
B P	BRAKE PIPE
A B V	AUTOMATIC BRAKE VALVE
D P	DUAL-PORTED CUT-OUT COCK





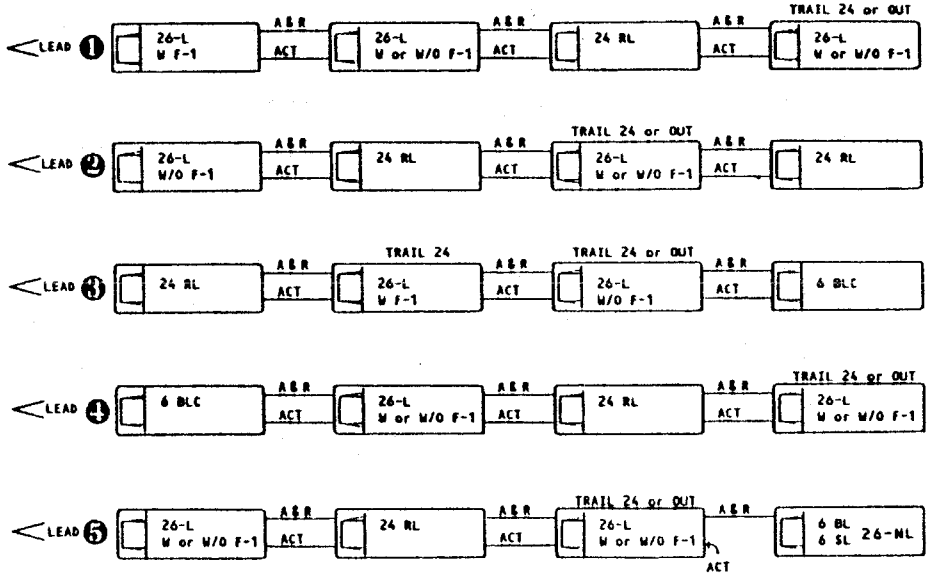


LEGEND

IN - OUT	Positions of DUAL-PORTED CUT-OUT COCK
TRAIL 24	MU-2-A VALVE Position
A & R	Independent APPLICATION & RELEASE pipe or BRAKE CYLINDER EQUALIZING pipe
A C T	ACTUATING pipe
W F-1	With F-1 SELECTOR valve
W/O F-1	Without F-1 SELECTOR valve

Note: Standard 6 BL or 6 SL Air Brake equipment should NOT be coupled in multiple ahead of 24 RL equipment.

In combination 5, with 6 BL, 6 SL or 26 NL equipment in the consist, when an Automatic brake application has been "bailed-off" and the Independent brake is reapplied, it may be necessary to again "bail-off" when releasing to insure release of the 6 BL, 6 SL or 26 NL brakes.



M U Combinations for Independent Brake Control

5. HAULING DEAD LOCOMOTIVES

5.1 CONDITIONS

5.1.1 — A "dead locomotive" is a locomotive that does not have any traction device supplying tractive effort. It does not cease to be a locomotive because its propelling motors are inoperative or because its control jumper cables are not connected.

5.1.2 — All locomotive units dispatched dead must have the air brakes operative.

5.1.3 — Dead units must not be coupled consecutively unless it is known that units are equipped with a vent valve.

5.1.4 — Refer to Rule 980, "Rules of the Transportation Department" for other conditions or restrictions.

5.2 DETERMINING SET UP

5.2.1 — The manner in which a dead locomotive unit is set up for TOW will be determined by the MU connections that can be made from the hauling locomotive and whether the air compressor is operating or not.

5.2.2 — This allows for three (3) methods of setting up units to be hauled dead:

(1) Dead-in-Consist

(2) Dead-in-Train (Main Reservoir pressure available)

(3) Dead-in-Train (Main Reservoir pressure NOT available)

5.2.3 — A unit set up "Dead-in-Consist" must, in addition to the Brake Pipe, have all three (3) MU hoses (Main Reservoir, Actuating, and Application & Release) connected to the hauling locomotive consist and the cocks open.

5.2.4 — A unit set up "Dead-in-Train (Main Res. Available)" must have the Brake Pipe connected and either the air compressor operating or the Main Reservoir hoses connected to the hauling locomotive consist.

5.2.5 — A unit must be set up "Dead-in-Train (Main Res. NOT available)" when only the Brake Pipe connection can be made and the air compressor is not operating.

5.3 SET UP "DEAD-IN-CONSIST"

5.3.1 — Brake Pipe hose coupled and cocks open.

5.3.2 — All MU hoses (3) properly coupled and cocks in proper position for trainlining.

5.3.3 — Automatic Brake Valve cut OUT.

5.3.4 — Independent Brake Valve cut OUT by placing Dual-Ported cut-out cock in "OUT" or "CLOSED" position, or by placing MU-2-A Valve in "Trail 24-26" position.

5.3.5 — Remove or secure Automatic and Independent brake valve handles. (Secure No. 6 Automatic brake valve handle in Running position.)

5.3.6 — Unit may be set up in this manner whether air compressor is operating or not.

5.4 SET UP "DEAD-IN-TRAIN (MAIN RESERVOIR AVAILABLE)"

5.4.1 — Brake Pipe hose coupled and cocks open.

5.4.2 — Air compressor must be operating or Main Reservoir hose must be coupled to hauling locomotive consist to provide Main Reservoir pressure for dead unit.

5.4.3 — Automatic Brake Valve cut OUT.

5.4.4 — Independent Brake Valve cut IN by placing Dual-Ported cut-out cock in "IN" or "OPEN" position or by placing MU-2-A Valve in "LEAD or DEAD" position.

5.4.5 — Dead Engine cock CLOSED.

5.4.6 — Remove or secure Automatic and Independent brake valve handles. (Secure No. 6 Automatic brake valve handle in Running position.)

5.4.7 — Except for 26L equipment, brake cylinder pressure must be limited to 30 pounds by adjustment of safety valve on distributing valve or control valve.

5.5 SET UP "DEAD-IN-TRAIN (MAIN RESERVOIR NOT AVAILABLE)"

5.5.1 — Brake Pipe hose coupled and cocks open.

5.5.2 — Automatic Brake Valve cut OUT.

5.5.3 — Independent Brake Valve cut IN.

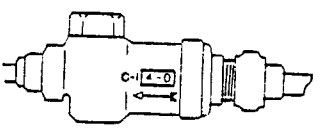
5.5.4 — Dead Engine Cock must be OPEN. (After Main Reservoir pressure has been reduced below 25 pounds.)

5.5.5 — All air operated devices except the brakes must be cut out.

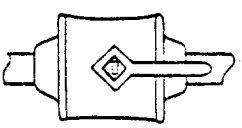
5.5.6 — Remove or secure Automatic and Independent brake valve handles. (Secure No. 6 Automatic brake valve handle in Running position.)

5.5.7 — Actuating and Application & Release pipe cocks at ends of unit must be open, preferably with hoses removed. Brake Cylinder Equalizing pipe (on single pipe system) must have cocks closed on both ends of unit.

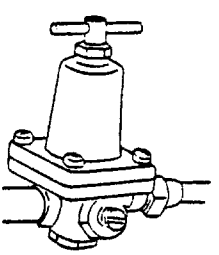
DEAD ENGINE FEATURES



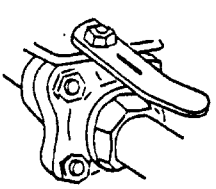
Spring-Loaded Check Valve



Dead Engine Cock



Pressure Regulator



Dead Engine Cock

6. MAKING UP TRAINS

6.1 GENERAL

6.1.1 — Before connecting yard air supply or locomotive, condensation must be blown from the pipe from which air pressure is supplied.

6.2 CONNECTING BRAKE PIPE

6.2.1 — Air hoses must be coupled properly between all cars.

6.2.2 — Angle cocks must be opened slowly and locked.

6.2.3 — Open angle cock nearest locomotive or yard air supply first.

6.3 COUPLING LOCOMOTIVE

6.3.1 — When cars that have been standing on charge are disconnected from the yard air supply, make a heavy service brake pipe reduction by **SLOWLY** opening the angle cock before coupling locomotive or other cars.

6.3.2 — When sufficient reduction is made, close the angle cock **SLOWLY** to avoid an unintentional release of brakes.

6.3.3 — After coupling locomotive to train, the couplers between locomotive and train should be stretched to see that coupling is made. Open angle cocks **SLOWLY**

6.3.4 — While the train is being made up and charged, locomotive brakes must remain applied.

6.4 CHARGING TRAIN FROM LOCOMOTIVE

6.4.1 — During initial charging, the output of the air compressor may be increased by moving the throttle to Run-3 or Run-4 position.

6.4.2 — Before opening the throttle, the generator field switch must be placed in "OFF" and the reverse lever in "NEUTRAL".

6.4.3 — When main reservoir pressure increases to 20 pounds above brake pipe pressure, throttle setting should be reduced.

6.4.4 — Throttle should be in idle when main reservoir pressure exceeds brake pipe pressure by 30 pounds.

6.5 CHARGING FROM YARD AIR SUPPLY

6.5.1 — When a yard air supply is available, it should be used to charge the train before the locomotive is attached.

6.5.2 — The yard air supply should be connected to the end which will be nearest to the hauling locomotive.

6.6 APPROXIMATE CHARGING TIME TO 90 PSI

6.6.1 — Single Car — 7 minutes
— 50 cars — 8-11 minutes
— 100 cars — 18-25 minutes
— 150 cars — 35-50 minutes

Times based on 50 ft. uncharged cars. Shorter times shown are for minimum brake pipe leakage, longer times are for maximum allowable brake pipe leakage.

6.6.2 — Pressure indicated at rear of train will determine state of charge.

6.7 ADDING CARS TO REAR OF TRAIN

6.7.1 — Where yard locomotives make up and add cars to rear of train, brake pipe pressure on cars to be added must not exceed 80 pounds. (At least 10 pounds below standard pressure for Road Freight.)

6.7.2 — After cars are coupled, stretch coupling.

6.7.3 — Before air hoses are coupled, make a full service reduction on added cars.

6.7.4 — After reduction is completed, **SLOWLY** close angle cocks between yard locomotive and added cars.

6.7.5 — Couple air hoses between added cars and road freight train and **SLOWLY** open angle cocks.

6.7.6 — Road engineer must make proper test of air brakes.

7. TRAIN AIR BRAKE INSPECTIONS

7.1 BRAKE PIPE AND CONNECTIONS

7.1.1 — Brake pipe hoses must be properly coupled and in condition for service.

7.1.2 — Angle cocks and cut-out cocks must be positioned properly.

7.1.3 — Reservoir drain valves must be closed.

7.1.4 — Air brake system must be charged to required pressure.

7.1.5 — Examination must be made for leaks and necessary repairs made to reduce leakage to a minimum.

7.1.6 — Employees must have with them, tools and materials necessary for changing defective air hoses, hose haskets, and tightening leaks.

7.2 RETAINING VALVES

7.2.1 — Retaining valves and pipes must be in condition for service.

7.2.2 — Handles must be positioned properly.

7.3 BRAKE RIGGING

7.3.1 — Brake rigging must not bind or foul.

7.3.2 — All parts of brake equipment must be properly secured and at least 2-3/4 inches above top of rail.

7.4 HAND BRAKES

7.4.1 — Hand brakes must be released unless needed to secure cars.

7.5 PISTON TRAVEL

7.5.1 — At Initial Terminal, piston travel of body mounted brake cylinders which is less than 7 inches or more than 9 inches must be adjusted to nominally 7 inches.

7.5.2 — Maximum piston travel of truck mounted brake cylinders must not exceed 6 inches. Minimum piston travel must be sufficient to provide proper brake shoe clearance when brakes are released.

7.5.3 — On cars equipped with other than standard single capacity brake, the piston travel must be adjusted as indicated on a badge plate or stenciling near brake cylinder on car.

7.5.4 — Before adjusting piston travel or working on brake rigging, the car brake must be cut out and released as described in 8.3.2; except when a side-vented cut-out cock is provided in brake cylinder pipe, this cock only may be closed and reservoirs need not be drained.

8. INOPERATIVE BRAKES ENROUTE

8.1 PERCENT OF OPERATIVE BRAKES

8.1.1 — Under no circumstances may the number of operative brakes in the train be less than 85% of all cars in the train.

8.1.2 — Each locomotive unit except the leading unit shall be counted as one car in determining percentage of operative brakes.

8.1.3 — When piston travel is more than 10-½ inches, the air brakes cannot be considered operative.

8.1.4 — In order to maintain 85% operative brakes, the maximum number of cars with inoperative brakes must not exceed the following ratio:

Inoperative Brakes	Total Cars In Train
1	7
2	14
3	20
4	27
5	34
6	40
7	47
8	54
9	60
10	67
11	74
12	80
13	87
14	94
15	100

8.2 PLACEMENT OF CARS WITH INOPERATIVE BRAKES

8.2.1 — Cars on which the air brakes become inoperative enroute may be hauled without change of position in the train, provided not more than two (2) cars with brakes cut out are in consecutive order.

8.2.2 — Cars picked up enroute with inoperative air brakes may be hauled to the next repair point. Defective air brake form (EC-100) must be attached to the brake pipe near angle cock at each end of car. Not more than two (2) cars with brakes cut out may be in consecutive order. **(revised 6-15-86)**

8.2.3 — A car having the hand brake inoperative must never be the rear car of a train.

8.2.4 — In case of emergency, such as movement of livestock or perishable freight, a freight car with an inoperative brake may be permitted to leave a terminal or pass a designated repair point under the following conditions:

(1) Movement must be authorized by the Superintendent.

(2) Car must be placed immediately ahead of caboose or rear car.

(3) Brake pipe hose must be connected and angle cocks open. If brake pipe is damaged, car must be coupled as described in 8.2.5.

8.2.5 — If brake pipe is damaged, car must be coupled at rear of train as follows:

(1) Brake pipe hoses connected.

(2) Angle cock closed on leading end of damaged car.

(3) Air pressure turned into hoses.

(4) Properly secured against separation.

(5) Train dispatcher must be notified before making movement.

8.2.6 — Any vehicle equipped with brake pipe only, must be placed immediately ahead of rear car and air brake must be operative on rear car. Not more than two (2) such vehicles are to be included in any train.

8.3 CUTTING OUT CAR BRAKES

8.3.1 — Air brakes must be cut out on a car when brakes do not release properly because of binding or fouling brake rigging or defective control valve. Brakes must also be cut out on a car being moved with an overheated journal.

8.3.2 — To cut out the brakes on a freight car:

(1) Close cut-out cock in branch pipe to control valve. (Place handle in-line with pipe.)

(2) Release air pressure from reservoirs by pulling reservoir release rod out to limit and holding until all pressure has exhausted.

(3) Check that piston rod has retracted to insure that cylinder pressure has released.

(4) Check that brake shoes are released from wheels.

8.3.3 — Defective air brake form (EC-100) must be attached to brake pipe near angle cock at each end of car.

8.3.4 — When an air brake defect is discovered enroute, the engineer must be notified of the nature of the defect and the location of the car in train. The Train Dispatcher must be notified at the first opportunity.

8.4 NULLIFYING NO. 8 VENT VALVE

8.4.1 — If a No. 8 vent valve should fail to reset enroute after an emergency brake application resulting in a continuous blow at the exhaust port, the valve must be plugged. **(revised 6-15-86)**

8.4.2 — This is accomplished by removing the vent protector and inserting the plug, which is an integral part of the vent protector, into the exhaust port.

8.4.3 — Defective air brake form (EC-100) must be attached to brake pipe near angle cock at each end of car.

8.5 FAILURE TO MAINTAIN ADEQUATE PRESSURE

8.5.1 — When the pressure required for the safe handling of train cannot be maintained, the train must be stopped and secured.

8.5.2 — If main reservoir pressure drops 5 pounds below the standard brake pipe pressure, the train must be stopped, a full service brake pipe reduction made and sufficient hand brakes applied to secure the train.

9. PASSENGER EQUIPMENT

9.1 MAKING UP PASSENGER TRAINS

9.1.1 — The release feature on all passenger carrying cars should be set for GRADUATED RELEASE.

9.1.2 — The release feature on all mail, baggage and express cars should be set for DIRECT RELEASE.

9.1.3 — When performing switching operations within a passenger terminal, air brake hose must be coupled between all cars and the brake system must be charged to at least 80 pounds.

9.2 MIXED CONSISTS

9.2.1 — The number of cars with passenger type brake equipment must not exceed 20 in any freight train.

9.2.2 — All such cars must be located forward of the 40th car unless authorized by the Superintendent.

9.2.3 — When moving passenger cars in a freight train, the release feature must be set for DIRECT RELEASE and the water raising system cut out.

9.2.4 — When moving business cars in a freight train, the release feature must be set for DIRECT RELEASE.

9.3 COMMUNICATING SIGNAL SYSTEM

9.3.1 — Communicating signal system must be tested before leaving initial terminal.

9.3.2 — If necessary for a train to proceed with communicating signal inoperative, train crew and engineer must be notified.

9.4 BRAKE TESTS (PASSENGER)

9.4.1 — The Initial Terminal Test must be made on a passenger train under the same conditions and in the same manner as a freight train, with the following exceptions:

(1) Passenger trains must be charged to not less than 90 pounds before starting test.

(2) If train is to be operated in electro-pneumatic brake operation, the system must be tested after testing the automatic air brake.

(3) Electro-pneumatic brake is tested by making a 20 pound E-P application, inspecting to see that all brakes have applied properly, then release properly.

9.4.2 — A Running Test (as described in Rule 15) must be made on all passenger trains after leaving:

(1) An initial terminal.

(2) Any point where locomotive, engine crew or train crew has been changed.

(3) Any point where a brake pipe angle cock has been turned or train consist changed.

(4) any point where electro-pneumatic brake circuit cables between locomotive units and/or cars have been disconnected.

(5) Where required by Timetable Special Instructions.

10. TRAIN AIR BRAKE TESTS — GENERAL

10.1 CONDITION OF BRAKES

10.1.1 — Each train must have the air brakes in effective operating condition, and at no time shall the number of operative brakes be less than 85% of the total number of cars in the train.

10.1.2 — Trains leaving initial terminal or 1,000 mile inspection point must have the air brakes on all equipped cars in effective operating condition. At all other times, cars on which the air brakes become inoperative may continue in train provided not less than 85% of the cars in the train have operative brakes.

10.2 RESPONSIBILITY

10.2.1 — Supervisors are jointly responsible with inspectors, engineers and trainmen for the proper testing of air brake equipment on locomotives and cars.

10.2.2 — They are responsible for detecting defects that can be disclosed by the required air brake tests.

10.2.3 — The required train air brake tests are:

INITIAL TERMINAL TEST — RULE 11
This test is made before the train is started to determine that brakes on each car are in suitable condition to make the trip.

TRANSFER TRAIN AND YARD TRAIN TEST — RULE 12
This test applies only to trains that are to be moved a short distance and require the use of air brakes.

ROAD TEST — RULE 13
This test determines that the brakes throughout the entire train can be controlled from the leading locomotive.

INTERMEDIATE BRAKE TESTS — RULE 14
These tests are to be made at intervals of 1,000 miles or less, or each time cars are added to the train.

RUNNING TEST — RULE 15
This test is made while the train is in motion to determine that the brakes are capable of slowing the train.

10.2.4 — While air brake tests are being made, trains are under the jurisdiction of employees making such tests and must not be moved until authorized to do so by them.

10.3 SIGNAL FOR BRAKE APPLICATION

10.3.1 — During standing tests, brakes must not be applied or released until the proper signal is given or understanding is obtained.

10.4 BRAKE PIPE LEAKAGE TEST

10.4.1 — Where a brake pipe leakage test is made from a locomotive, it shall be made in the following manner:

(1) Charge the brake pipe system to within 15 pounds of the feed or regulating valve setting.

(2) Reduce brake pipe pressure 20 pounds.

(3) Wait for exhaust to stop blowing.

(4) Cut out the pressure maintaining feature.

(5) Wait an additional 60 seconds for brake pipe pressure to settle throughout the train.

(6) Check brake pipe leakage for one minute as shown on the brake pipe gauge.

10.4.2 — Brake pipe leakage must not exceed 5 pounds per minute.

10.5 HAND BRAKES

10.5.1 — Hand brakes must be released on all cars and locomotive units before the train departs.

10.6 TEST OF END OF TRAIN DEVICE (Effective 6-15-86)

10.6.1 — When an end of train device is installed, it shall be determined that the identification code entered into the front unit is identical to the last 5 digits of the identification code on the rear unit.

10.6.2 — After charging the train, the pressure displayed on the front unit must be compared with the pressure displayed on the rear unit when the TEST button is pressed.

10.6.3 — The difference between the two readings shall not exceed three (3) pounds.

10.6.4 — If the end of train device fails enroute, subsequent brake tests must be performed by visual observation of rear car gauge or application and release of rear car brake.

11. INITIAL TERMINAL TEST AND INSPECTION

11.1 WHERE REQUIRED

11.1.1 — Where train is originally made up. (Initial Terminal)

11.1.2 — Where train consist is changed other than by adding or removing a solid block of cars and the train brake system remains charged.

11.1.3 — Where train is received in interchange if the train consist is changed other than by:

(1) Removing a solid block of cars from the head end or rear end,

(2) Changing locomotive,

(3) Removing or changing the caboose,

(4) Any combination of these changes.

11.2 TRAIN BRAKE INSPECTION

11.2.1 — An examination of the train air brake system must be made as prescribed in Rules 7.1 to 7.4 inc.

11.3 CHARGE REQUIRED FOR FREIGHT TRAIN

11.3.1 — Train air brake system must be charged to within 15 pounds of the setting of the feed or regulating valve on the locomotive.

11.3.2 — This pressure shall be indicated by an accurate gauge or E.O.T device at rear of train. **(revised 6-15-86)**

11.3.3 — Brakes must not be applied for test until signal is received.

11.4 APPLICATION OF BRAKES FOR TEST

11.4.1 — Reduce equalizing reservoir pressure 20 pounds.

11.4.2 — When brake pipe pressure has reduced to the level of equalizing reservoir and brake pipe exhaust stops blowing, cut out pressure maintaining feature (if equipped). On 26L, depress and turn the brake valve cut-off valve to "OUT".

11.4.3 — Wait 60 seconds for brake pipe presure to settle throughout the train.

11.4.4 — Then observe brake pipe leakage for the next minute on the brake pipe gauge. **(revised 6-15-86)**

11.5 BRAKE PIPE LEAKAGE

11.5.1 — Brake pipe leakage must not exceed five (5) pounds per minute.

11.6 INSPECTION OF BRAKE APPLICATION

11.6.1 — Train brakes must be inspected to determine that:

(1) Angle cocks are properly positioned,

(2) Brakes are applied on each car and locomotive unit,

(3) Piston travel complies with Rule 7.5.

(4) Brake rigging does not bind or foul,

(5) All parts of the brake equipment are properly secured.

11.7 INSPECTION OF BRAKE RELEASE

11.7.1 — After application inspection is completed, release signal must be given.

11.7.2 — Return brake valve handle to release or running position. On 26L, depress and turn the brake valve cut-off valve to "IN". On other than 26L, cut in the pressure maintaining feature if equipped.

11.7.3 — It must be seen that all brakes have released properly. Where conditions permit, a roll-by release inspection may be made.

11.8 TEST MADE FROM A YARD AIR SUPPLY

11.8.1 — When train air brake system is tested from a yard air supply, an engineer's brake valve or standard test device must be used.

11.8.2 — The test device should be connected to the end which will be nearest to the hauling locomotive. **(revised 6-15-86)**

11.8.3 — The train air brake system must be charged to not less than 65 pounds as indicated by an accurate gauge at the opposite end from the test device.

11.8.4 — When properly charged, make a 15 pound brake pipe service reduction.

11.8.5 — Wait 60 seconds for the brake pipe pressure to settle throughout the train.

11.8.6 — Then observe brake pipe leakage for one minute. Leakage must not exceed 5 pounds per minute.

11.8.7 — If brake pipe pressure has not reduced to 57 pounds, further reduce the pressure to this amount.

11.8.8 — Inspect the train brakes as specified in Rule 11.6

11.8.9 — After application inspection is completed, release brakes and make inspection as specified in Rule 11.7

11.8.10 — When practicable, train air brake system should be kept charged until the road locomotive is coupled to the train.

11.8.11 — If after testing the brakes, the train has been off charge for more than two (2) hours, an initial terminal test must again be performed.

11.8.12 — At the initial terminal, when a train has been given the initial terminal test and kept charged until the road locomotive is coupled, a brake pipe leakage test as prescribed in Rule 10.4 must be made by the engineer. It must be determined that:

(1) Brake pipe leakage does not exceed 5 pounds per minute.

(2) Brake pipe pressure at rear of train is reduced at least 5 pounds and then is increased at least 5 pounds as indicated by a gauge or E.O.T. device. (In the absence of a gauge or E.O.T. device, a visual observation must be made of the application and release of the rear car brakes.) **(revised 6-15-86)**

11.9 NOTIFICATION OF COMPLETION OF TEST

11.9.1 — When test of air brakes has been satisfactorily performed, the engineer must be notified that train is in proper condition to proceed. **(revised 6-15-86)**

11.9.2 — This notification must be made by a qualified person participating in the test or by one who has knowledge that it was made.

11.9.3 — When practicable, notification should be in writing on form MP-261-C.

11.9.4 — Notification must be in writing if:

(1) The employee making the test goes off duty before the road crew reports for duty, or

(2) The train is to be moved over 500 miles without being subjected to another test.

12. TRANSFER TRAIN AND YARD TRAIN TESTS

12.1 MOVEMENT NOT TO EXCEED 20 miles

12.1.1 — Couple air brake hose between all cars.

12.1.2 — Charge brake system to within 15 pounds of the setting of the feed or regulating valve.

12.1.3 — Make a 20 pound service brake pipe reduction.

12.1.4 — Determine that brakes are applied on each car.

12.1.5 — Observe that all brakes are released either prior to movement or while cars are passing.

12.2 MOVEMENT EXCEEDING 20 MILES

12.2.1 — Train must be given an Initial Terminal inspection and test. **(revised 6-15-86)**

13. ROAD TEST Set & Release

13.1 WHERE REQUIRED

13.1.1 — Where locomotive or caboose is changed. **(revised 6-15-86)**

13.1.2 — Where blocks of cars are cut-off from the rear and/or head end of train with consist otherwise remaining intact. **(effective 6-15-86)**

13.1.3 — After an angle cock is closed on a freight train for any reason and then reopened. **(effective 6-15-86)**

13.2 PROCEDURE

13.2.1 — After the train is reassembled, charge the brake pipe system to within 15 pounds of the feed or regulating valve setting as indicated at the rear of train by a rear car gauge or E.O.T. device. **(revised 6-15-86)**

13.2.2 — Test for brake pipe continuity must be made in the following manner:
(revised 6-15-86)

(1) Make a 20 pound brake pipe reduction

(2) Determine that brake pipe pressure is being reduced at least 5 pounds at rear of train as indicated by a rear car gauge or E.O.T. device.

(3) Release brakes.

(4) Determine that brake pipe pressure is being increased at least 5 pounds at rear of train as indicated by a rear car gauge or E.O.T. device.

(5) Before proceeding, it must be known that brake pipe pressure is being restored at rear of train.

13.2.3 — When brake pipe has been interrupted but not change is made in the train consist, including the locomotive and caboose, the requirements of a Road Test are fulfilled when it is known that brake pipe pressure is being restored at the rear of train as indicated by a rear car gauge or E.O.T. device. **(revised 6-15-86)**

13.2.4 — In the absence of a rear car gauge or E.O.T. device, a visual observation must be made of the application and release of the rear car brake. **(revised 6-15-86)**

14. INTERMEDIATE BRAKE TESTS

14.1 1,000 MILE INSPECTION

14.1.1 — Through trains must be given an inspection at intermediate points designated in the Timetable Special Instructions, to determine that:

(1) Brake pipe leakage does not exceed 5 pounds per minute.

(2) Brakes apply on each car from a 20 pound service brake pipe reduction.

(3) Brake rigging is properly secured and does not bind or foul.

(4) That piston travel does not exceed 10½ inches. **(effective 6-15-86)**

(5) All brakes release.

14.1.2 — The release inspection may be made either while standing or as train departs when speed is held suitable to allow inspection of entire train.

14.2 TEST OF CARS ADDED TO A TRAIN

14.2.1 — Where cars which have been previously given the Initial Terminal Test are added to a train, a Road Test as prescribed in Rule 13.2.2 must be made before proceeding. **(revised 6-15-86)**

14.2.2 — When cars which have not been previously charged and tested are added to a train, the initial terminal test may be made on these cars:

(1) When placed in the train, or

(2) At the next terminal where facilities are available for such attention.

14.2.3 — When cars are to be given the initial terminal inspection at the next terminal, the air brakes must be tested in the following manner before departure from the location where the cars are placed in the train.

(1) Charge train brake system to within 15 pounds of the feed or regulating valve setting as indicated at or from the rear of train.

(2) Test that brake pipe leakage does not exceed 5 pounds per minute.

(3) Determine that brakes on each of the added cars will apply from a 20 pound brake pipe reduction.

(4) Determine that air brakes and hand brakes on all added cars release.

(5) Road Test, as prescribed in Rule 13.2.2 shall be made at same time added cars are tested. **(revised 6-15-86)**

14.3 CHANGE OF CREW — NO CHANGE OF CONSIST

14.3.1 — The engineer taking charge of the train may ascertain from the incoming engineer, either personally or on prescribed form (MP-261-C) that the brakes are in operative condition.

14.3.2 — When the condition of the brakes cannot be ascertained from the incoming engineer and a prescribed form is not available, the engineer taking charge of the train will make a Road Test of the brakes before proceeding.

15. RUNNING TEST

15.1 WHERE REQUIRED

15.1.1 — A running test on freight trains is required only where specified in the Timetable Special Instructions.

15.2 PROCEDURE

15.2.1 — The running test is made by applying the train air brakes with sufficient force to ascertain whether or not the brakes are responding properly.

15.2.2 — Total brake pipe reduction must not be less than 10 pounds before releasing.

15.2.3 — If the air brakes do not respond properly, train must be stopped, cause of failure ascertained and corrected and the running test repeated.

16. BRAKE RULES — GENERAL

16.1 CUTTING OFF CARS OR LOCOMOTIVES FROM TRAIN

16.1.1 — Make a total brake pipe reduction of 20 pounds

16.1.2 — Thirty seconds later, move the brake valve handle to emergency position.

16.1.3 — After the brakes have applied in emergency at the location where cut is to be made, close the angle cock on side of cut closest to the locomotive.

16.1.4 — Leave the angle cock open on side of cut farthest from the locomotive.

16.1.5 — Disconnect the brake pipe hose coupling and all other connections before cars are uncoupled.

16.1.6 — Cars that will be left standing and unattended must be secured properly.

16.1.7 — Dependence must never be placed on the air brake to hold cars or locomotives left standing.

16.2 BRAKE APPLICATION FROM TRAIN

16.2.1 — Indications of a brake application from the train are:

(1) Drop in brake pipe pressure.

(2) Sound of excessive feed or regulating valve operation.

(3) Movement of brake pipe flow indicator hand to right, or warning light.

(4) Decrease in speed or increase in amperage without a known cause.

16.2.2 — If the train air brakes apply in emergency, place the brake valve handle in Handle Off or Lap position.

16.2.3 — If the train air brakes apply at a service rate, make a 6 to 8 pound brake pipe reduction, followed by further reductions as needed to stop safely.

16.2.4 — If power is being used, gradually close the throttle, avoiding any increase in amperage.

16.2.5 — When necessary, reduce locomotive brake cylinder pressure to prevent sliding wheels or harsh slack action.

16.2.6 — After the train has stopped, to assist in locating leakage, place the automatic brake valve handle in Release or Running position.

16.2.7 — If the train has broken in two:

(1) Close the angle cock on rear end of car immediately in front of the break.

(2) After releasing and recoupling, close angle cock on rear portion of train.

(3) Couple hoses and open the angle cock nearest to locomotive to test hoses before turning air pressure into the rear portion.

(4) After the brake system is properly charged, make a Road Test as prescribed in Rule 13.2.3. **(revised 6-15-86)**

16.3 EMERGENCY APPLICATION

16.3.1 — If necessary to make an emergency brake application, the brake valve handle must be moved quickly to "Emergency" position and remain there until the train stops.

16.3.2 — Locomotive brakes should be allowed to apply but brake cylinder pressure should be regulated to prevent sliding wheels or harsh slack action.

16.3.3 — After an emergency brake application from any cause, no attempt must be made to release the brakes until:

(1) Train has stopped

(2) Automatic Brake Valve Handle has been in LAP position for 60 seconds (26L EMERGENCY position for 60 seconds.)

16.3.4 — After an emergency application, regardless of cause, it must be known that brake pipe pressure is being restored at the rear of train before proceeding.

16.4 STICKING BRAKES

16.4.1 — Train and engine crews must keep a lookout for brakes sticking on their train and on trains being met or passed.

16.4.2 — They must advise one another as to location or portion of train on which indications are found of brakes sticking.

16.4.3 — Probable causes of brakes sticking are:

(1) Hand brake not fully released.

(2) Overcharged brake system.

(3) Retaining valve not in release position.

(4) Binding or fouled brake rigging.

(5) Excessive brake pipe leakage.

(6) Defective control valve.

(7) Improper handling of automatic brake valve, such as, failure to make at least a 10 pound reduction before releasing, or, by releasing before the brake pipe exhaust stops blowing.

16.4.4 — If brakes are stuck from improper handling of the automatic brake valve, after stopping train, a full service brake pipe reduction and release will usually correct the condition.

16.4.5 — Conditions that may cause an overcharged brake system are:

(1) Adding a block of cars which have been previously charged to a pressure higher than required.

(2) Attaching locomotive to opposite end of train.

(3) Combining two trains.

(4) Recoupling after a separation in train. **(effective 6-15-86)**

(5) Changing the hauling locomotive.

Note: In situations (1), (3) and (4) the overcharge may be eliminated by making a 20 pound brake pipe reduction before coupling air hoses. **(effective 6-15-86)**

16.4.6 — To reduce an overcharged brake system, while the train is standing:

(1) Adjust the feed or regulating valve to the desired brake pipe pressure setting.

(2) Place the automatic brake valve handle in Emergency position for one (1) minute.

(3) Place the brake valve handle in Release (Running) position until the brake pipe gauge shows 20 pounds.

(4) Place the brake valve handle in Handle Off (Lap) position and allow the brake pipe pressure to exhaust for one (1) minute.

(5) Place the automatic brake valve handle in Release (Running) and recharge the train.

This method can be used to reduce reservoir pressure 10 pounds below the initial pressure.

16.5 UNDESIRED RELEASE

16.5.1 — ABD and ABDW control valves have an accelerated release feature that is very sensitive to increases in brake pipe pressure. A slight increase in air pressure causes the valve to move to release and it will serially transmit the release rapidly through the train.

16.5.2 — The accelerated release feature, combined with a maintaining type automatic brake valve, can result in undesired brake releases if the following rules are not observed.

(1) In no case shall the INITIAL brake pipe reduction be less than six (6) pounds.

(2) If an application is required before the train brake system is fully recharged, the amount of reduction (at least 6 pounds) must be measured from the instant at which the brake pipe exhaust begins.

(3) The emergency brake valve on the locomotive is to be used only in an emergency situation. Under no circumstances should an attempt be made to make a brake application other than emergency with this valve as it may result in an undesired release of an automatic service application on the train.

(4) After moving the handle of the caboose valve to any application position, IT MUST NOT BE RETURNED TO THE CLOSED OR RELEASE POSITION UNTIL AFTER THE TRAIN HAS STOPPED. The handle must be moved to the extreme application position before moving it to closed or release position.

(5) If the 26-C brake valve is equipped with a three (3) position cut-off valve (FRT - PASS - OUT), it must never be placed in "PASS" position when hauling a freight train.

16.6 SECURING TRAINS ON GRADES

16.6.1 — When securing trains on a grade, hand brakes must be applied starting at the lowest level of the grade.

16.6.2 — When ready to proceed, hand brakes must remain applied until the air brake system is charged and the proper test has been made.

16.6.3 — Hand brakes are to be released starting from the highest level of the grade.

16.6.4 — Dependence must never be placed on air brakes to hold equipment left standing.

16.7 DOUBLE HEADING AND HELPING LOCOMOTIVES

16.7.1 — When more than one locomotive is attached to a train in double-heading or helper service, the engineer on the leading locomotive in direction of movement shall operate the train air brakes.

16.7.2 — On all locomotive units in the train except the leading unit, the brake valve cut-out cock must be closed, and all cocks and brake valve handles shall be positioned as specified in Rule 4.

16.7.3 — In case it becomes necessary for the leading locomotive to give up control of the train short of its destination, a road test of the brakes must be made to determine that train air brakes are operative from the automatic brake valve on the locomotive unit taking control of the train.

16.7.4 — After a helper locomotive is coupled to the train and the air brake system is charged, the engineer controlling the air brakes will make a 20 pound brake pipe reduction noting that the brake pipe exhaust stops blowing and that brakes apply on the rear of the train. Before proceeding, it must be known that brake pipe pressure is being restored at the rear of the train.

16.7.5 — When an emergency application of the air brakes occurs, engineers of helper locomotives must reduce throttle to Idle immediately.

16.7.6 — In case of emergency. the brakes can be applied from a locomotive having the brake valve cut-out cock closed, by moving the handle of the automatic brake valve to emergency position (except on No. 6 equipment) or by operating the emergency valve.

17. INBOUND BRAKE EQUIPMENT INSPECTION

17.1 INSPECTION OF TRAINS

17.1.1 — To be made at locations where inspectors are employed to make a general inspection of trains upon arrival at terminal.

17.1.2 — Visual inspection must be made of:

(1) Retaining valves

(2) Retaining valve pipes

(3) Release valves and rods

(4) Brake rigging and shoes **(revised 6-15-86)**

(5) Safety supports

(6) Hand brakes

(7) Brake hoses

(8) Position of angle cocks

17.1.3 — Necessary repairs should be made promptly where practicable.

17.1.4 — Any cars that cannot be repaired promptly must be marked for repair tracks.

18. FREIGHT TRAIN HANDLING

18.1 GENERAL INSTRUCTIONS

18.1.1 — The engineer must handle the train in a safe and fuel efficient manner, taking full advantage of throttle modulation and dynamic braking where conditions permit.

18.1.2 — Train braking must be handled in a manner that will prevent damage to cars and lading, keeping brake shoe and wheel wear to a minimum.

18.1.3 — The engineer must be familiar with the physical characteristics of the territory and plan ahead for the action to be taken.

18.1.4 — The following factors will affect the slowing and stopping ability of freight trains; speed, weight and length of train, grade, weather conditions, brake pipe leakage and gradient.

18.1.5 — Where conditions permit, slowdowns or stops should be made with not more than 15 pounds total brake pipe reduction. This reduces in-train forces and provides reserve braking effort should a shorter stop be required.

18.1.6 — The prolonged use of locomotive air brakes or excessive brake cylinder pressure, especially at high speeds is prohibited. Such action will cause burned and damaged brake shoes and overheated wheels.

18.1.7 — During switching operations, the throttle and independent brake must be handled in a manner that will permit slack to be adjusted smoothly.

18.2 STARTING FREIGHT TRAINS

18.2.1 — Power must not be applied until sufficient time has elapsed to insure the release of brakes.

18.2.2 — The approximate time required to release the brakes following a full service application is:

100 cars — 2 minutes
150 cars — 4 minutes
200 cars — 6 minutes

Add 2 minutes to these times if brake has been applied in emergency.

18.2.3 — A train must be started in the lowest throttle position possible.

18.2.4 — Do not advance the throttle while the load meter indicates increasing amperage.

18.2.5 — If the train does not start after applying reasonable power, the throttle must be returned to idle and the cause determined. Further advance of the throttle may cause train separation, damage to traction motors or rail burn.

18.2.6 — When necessary to take slack to start a train, the slack must be taken carefully to avoid harsh action and roll-back.

18.2.7 — While the train is being started, locomotive speed must be kept slow and uniform until entire train is moving.

18.2.8 — When starting a train on a curve, avoid high amperage that could cause stringlining.

18.3 USE OF SAND

18.3.1 — When necessary to use sand, the No. 1 truck (or Lead Axle) sand switch should be used to prevent slipping of locomotive wheels.

18.3.2 — Slipping of locomotive wheels causes severe stress to draft systems and damage to rails and should be avoided.

18.3.3 — Do not apply sand while wheels are slipping. Throttle must be reduced to stop wheel slip, then start sanding and advance throttle slowly.

18.3.4 — Where conditions require, sand should be used as the train is stopping to avoid slipping when starting.

18.4 ACCELERATING FREIGHT TRAINS

18.4.1 — Throttle must be advanced one position at a time.

18.4.2 — Ample time should be allowed between throttle movements. Throttle must not be advanced to the next higher position until the amperage has stabilized from the last throttle advance.

18.4.3 — Engineers of consists with more than 20 traction motors on line must not use full power in pulling below 12 MPH and must use care in applying power at speeds below 20 MPH.

18.5 BRAKING FREIGHT TRAINS

18.5.1 — Where conditions permit, the dynamic brake or throttle reductions must be used in lieu of power braking to reduce train speed.

18.5.2 — INITIAL REDUCTIONS OF LESS THAN SIX (6) POUNDS MUST NOT BE ATTEMPTED. (Reductions of less than 6 pounds may result in unintentional release of train brakes.)

18.5.3 — Braking should be started at a sufficient distance from the objective point to allow use of a split reduction.

18.5.4 — When conditions permit, Minimum Reduction position shall be used for the initial reduction.

18.5.5 — If conditions permit, wait 20 seconds after the brake pipe exhaust stops blowing from the initial reduction, then follow with additional reductions as required.

18.5.6 — When braking freight trains with power off:

(1) The throttle should be reduced slowly to idle allowing the slack to bunch gradually.

(2) If necessary, the dynamic brake (or independent brake if dynamic brake is not available) may be used to bunch slack prior to the initial reduction.

18.5.7 — When braking freight trains with power applied:

(1) The initial reduction should be made before reducing throttle.

(2) Locomotive brakes should not be permitted to apply.

(3) Engineer must observe amperage at time of initial reduction.

(4) As amperage increases from effect of brake application, throttle must be reduced.

(5) Only enough power should be maintained to control slack.

18.5.8 — When operating Mail or Trail-Van trains at speeds in excess of 59 MPH, and it is necessary to reduce speed in compliance with Approach Signal Indication (Rule 285) or Approach Sign, the following will apply:

(1) An initial reduction of not less than 26 pounds must be made.

(2) The throttle must be reduced gradually to Idle within 25 seconds.

(3) The locomotive brakes may be permitted to apply, limiting locomotive brake cylinder pressure if necessary to prevent wheel sliding.

18.5.9 — When braking freight trains that are authorized to operate at special speeds (above 50 MPH), the initial reduction should be not less than 15 pounds.

18.6 RELEASING BRAKES

18.6.1 — Brake applications must not be released while the brake pipe exhaust is blowing.

18.6.2 — After the desired braking has been accomplished, brakes may be released, providing:

(1) No less than a 10 pound brake pipe reduction has been made.

(2) Brakes on the entire train will be released before train speed is reduced to 10 MPH.

18.6.3 — If train slack is bunched when the brake valve is moved to release position, the dynamic brake (or independent brake) must be used to prevent run-out of slack until the train brakes are fully released.

18.6.4 — If power is applied when brake valve is moved to release position, the engineer should note the amperage reading and must handle the throttle so as not to exceed that reading until train brakes are completely released.

18.7 STOPPING FREIGHT TRAINS

18.7.1 — When conditions permit, the dynamic brake must be used to reduce train speed prior to stopping.

18.7.2 — At a sufficient distance to insure stopping at the desired point, make a minimum brake pipe reduction of 6 to 8 pounds following with additional brake pipe reductions as required.

18.7.3 — When train speed is reduced to the point where the dynamic brake is no longer effective, the independent brake should be applied lightly to prevent slack run-out and the dynamic brake released.

18.7.4 — The final reduction should be made when the train is within 40 to 50 feet of stopping. Brake pipe exhaust must be blowing as the train stops.

18.8 GRADE BRAKING — GENERAL

18.8.1 — When descending heavy grades, the "Pressure Maintaining Method" of braking shall be used to equalize braking force throughout the train. Locomotives must be equipped with operative Pressure Maintaining feature and Dynamic Brake.

18.8.2 — When locomotives are not equipped with Pressure Maintaining, train must be handled in accordance with "Non-Equipped Method" of braking unless specified in Timetable Special Instructions.

18.8.3 — When using the Pressure Maintaining Method of braking and this feature fails, stop must be made and train handled in accordance with Timetable Special Instructions.

18.8.4 — A partial release of the train brakes must never be attempted. Brakes must either be completely released or the train stopped.

18.8.5 — When stop is made on heavy descending grade, Instruction 16.6 must be complied with.

18.9 PRESSURE MAINTAINING METHOD

18.9.1 — When using this method of braking, the dynamic brake should be used to bunch slack prior to making the initial reduction.

18.9.2 — The amount of initial reduction will depend on the percent of grade. weight and speed of the train, but must not be less than 6 pounds.

18.9.3 — Further light reductions should be made when required to control speed of the train. These reductions should be made in small increments in order to avoid overbraking the train.

18.9.4 — The total brake pipe reduction should be sufficient to permit the value of the dynamic brake to be varied for control of slight speed changes due to physical characteristics of the railroad.

18.10 NON-EQUIPPED METHOD

18.10.1 — When using this method of braking, retaining valves must be set according to Timetable Special Instructions.

18.10.2 — The initial brake pipe reduction should be made as soon as practicable after passing the summit.

18.10.3 — The amount of this reduction will depend on the percent of grade, weight and speed of the train, but must not be less than 6 pounds.

18.10.4 — Further reductions may be made as required to properly control the speed of the train.

18.10.5 — When making brake applications, the brake valve should be moved promptly from Release to the desired Service position. Hold the reductions until speed is reduced below the desired speed to be maintained. At this point, the brakes may be released.

18.10.6 — Proper control of train speed involves frequent applications and releases. Retaining valves will act to hold the speed to a slow rate of increase to allow time for the brake system to recharge.

18.11 DEPLETED BRAKE PRESSURE

18.11.1 — During grade braking operation, should it become evident to the engineer that the brake is not controlling the train effectively, the train must be stopped and secured.

18.11.2 — If pressure cannot be restored, the conductor and engineer will be responsible for reporting to the Train Dispatcher who will issue instructions.

19. OPERATION OF EQUIPMENT

19.1 DYNAMIC BRAKE

19.1.1 — When available, the dynamic brake should be used to reduce speed, to bunch slack, and to hold the slack in while releasing train brakes on a moving train.

19.1.2 — Care must be exercised when applying and releasing the dynamic brake to prevent harsh run-in or run-out of the slack.

19.1.3 — Throttle must be in idle for 10 seconds before moving controls to set up the dynamic brake.

19.1.4 — The dynamic brake must be applied slowly and smoothly.

19.1.5 — When releasing the dynamic brake, the same precautions should be observed as specified for dynamic brake applications.

19.1.6 — Heavy dynamic braking must be avoided when negotiating turnouts, crossovers or sharp curves.

19.1.7 — The dynamic brake may be used independently or in conjunction with the train air brakes.

19.1.8 — When the dynamic brake is applied and it becomes necessary to stop the train, the automatic brake must be used.

(1) Make an initial reduction of not less than 6 pounds.

(2) Follow with additional brake pipe reductions as required.

(3) Gradually reduce dynamic brake until completely off.

19.1.9 — The independent brake must not be applied while the dynamic brake is applied on the locomotive, as this may cause the wheels to slide. **(revised 6-15-86)**

19.1.10 — The independent brake handle should be depressed frequently when the automatic brake is applied in conjunction with the dynamic brake to avoid wheels sliding. **(effective 6-15-86)**

19.1.11 — When dynamic braking force becomes ineffective, independent brake may be applied gradually while moving the dynamic brake control to OFF position.

19.1.12 — Trains other than solid loaded grain or mineral freight having 3 six-motor units equipped with extended range dynamic braking must reduce to ½ position on dynamic brake control at speeds below 15 miles per hour.

19.1.13 — Trains having 4 six-motor units equipped with extended range dynamic braking must reduce to ½ position on dynamic brake control below 20 miles per hour.

19.2 SELECT-A-POWER FUEL SAVER DEVICE

19.2.1 — The fuel saver device enables the engineer to subtract or add power on an individual trailing unit rather than reduce or increase power on all units in the consist.

19.2.2 — Each time the fuel saver "subtract" button is pressed, power is reduced to Run-1 position on an equipped trailing unit, starting from the rear of the consist. Power is restored to units in the reverse order when the "add power" button is pressed.

19.2.3 — The fuel saver device is nullified when the reverse lever is placed in neutral.

19.2.4 — The dynamic brake is operative on all units in the consist regardless of fuel saver mode. When returning to power, each unit will return to the previous fuel saver setting.

19.2.5 — The fuel saver device must be utilized to the fullest extent when full power is not required to maintain normal speed.

19.3 BACK-UP HOSE

19.3.1 — Back-up hoses of authorized design only are to be used and must be examined prior to each use to see that they are in fit and safe condition.

19.3.2 — Back-up hose must not be used as a substitute for hand signals or radio communication.

19.3.3 — The use of the back-up hose is permitted for car spotting operations providing that proper communication is maintained with the engineer to insure safety of the movement.

19.3.4 — Before starting any operation in which back-up hose is used to control the spotting of cars, the trainman and engineer must communicate to insure that both understand the moves to be made.

19.3.5 — After hose is attached, angle cock opened and brake system charged, brake test must be made before movement is started, as follows:

(1) Engineer must cut out brake valve on locomotive.

(2) Trainman will partially open the control valve by turning the handle slowly toward a position crosswise of the hose and observe that brakes apply on car.

(3) Engineer, after noting brake pipe reduction, will give trainman proper signal and will cut brake valve in.

19.3.6 — Engineer will control movement in accordance with signals from trainmen.

19.3.7 — Promptly after backup movement is started, trainman will make an application of the brakes to determine effective braking force.

19.3.8 — If such application is not observed, engineer must stop movement and ascertain reason.

19.3.9 — Service application of brakes is made by slowly opening the valve until desired braking effect is obtained.

19.3.10 — Valve should not be opened more than two-thirds unless emergency application is desired.

19.3.11 — If the desired braking is not obtained by service application, valve must be moved quickly to fully open position and movement stopped.

19.3.12 — Emergency application of brakes is made by opening valve quickly so that handle is crosswise of hose and left in this position until movement stops.

19.3.13 — Engineer must cut out brake valve on locomotive prior to approaching the vicinity where stop is to be made.

19.4 CABOOSE VALVES

19.4.1 — Brakes must not be applied from the train except in case of emergency, or in making Back Up and Switching movement.

19.4.2 — Whenever possible, trainmen must endeavor to attract the engineer's attention by radio or signals before applying the brakes from the train.

19.4.3 — To make a service application with the caboose valve:

(1) Move the handle clockwise to position 2.

(2) Leave handle in this position for AT LEAST 20 SECONDS.

(3) Move handle to position 3.

(4) Leave handle in this position until train stops.

19.4.4 — If speed of train is not being satisfactorily reduced with handle in position 3 after one minute, move handle quickly to the extreme application position and leave it there until train stops.

19.4.5 — To make an emergency application, move the handle quickly from release to the extreme application position and LEAVE IT THERE UNTIL TRAIN HAS STOPPED.

19.4.6 — After the handle has been moved to any application position, IT MUST NOT BE RETURNED TO THE CLOSED (OR LAP) POSITION UNTIL AFTER TRAIN HAS STOPPED.

19.4.7 — The handle must be moved to the extreme application position before moving it to closed (or lap) position.

19.5 BRAKE PIPE FLOW INDICATOR

19.5.1 — The brake pipe flow indicator can be used for determining the following information:

(1) When the brake system is charged.

(2) When brakes are released on rear of train.

(3) When brakes are being applied from the train.

(4) Heavy brake pipe or system leakage.

(5) Parted or burst air hose.

19.5.2 — The numerals on the flow indicator dial indicate the rate of air flow into the brake pipe. THE NUMERALS DO NOT INDICATE BRAKE PIPE LEAKAGE in pounds per minute.

19.5.3 — The position of the black hand should be noted at time of departure and the red hand set at one number greater than this point as a reference mark.

19.5.4 — Any movement of the black hand to the RIGHT of this reference mark indicates a greater air flow into the brake pipe which could be caused by a burst air hose, broken pipe, or brakes being applied from the train.

19.5.5 — When it is indicated that brakes are being applied from the train, the throttle and brake valves must be handled as described in Rule 16.2

19.6 RETAINING VALVES

19.6.1 — Retaining valves will be used where specified in the Timetable Special Instructions and at any time on a grade when in the judgment of the engineer or conductor their use is necessary to properly control the train.

19.6.2 — When retaining valves are not being used they must be placed in "Direct Exhaust" position, handle vertically downward.

19.6.3 — Trainmen will be responsible for the proper positioning of retaining valves on cars that are added to a train enroute.

19.6.4 — There are 2 types of retaining valves used on freight cars, the 3-position type and the 4-position type. The handle positions and functions are as follows:

EXHAUST: — Handle vertical downward.
Brake cylinder pressure exhausts normally and no pressure is retained.

HIGH PRESSURE — Handle 45^{0} below horizontal.
Brake cylinder pressure exhausts slowly to 20 pounds which is retained until handle is turned to exhaust.

LOW PRESSURE — Handle horizontal. (This position is only on 4-position type.)
Brake cylinder pressure exhausts slowly to 10 pounds which is retained until handle is turned to exhaust.

SLOW DIRECT EXHAUST — Handle 45^0 above horizontal.
Brake cylinder pressure exhausts slowly and no pressure is retained.

19.7 END OF TRAIN DEVICE (E.O.T.)

19.7.1 — When properly connected, the End of Train device will provide the following information in the locomotive cab:

(1) Continuous display of brake pipe pressure at rear of train.

(2) Brake application at rear of train (when brake pipe pressure is being reduced at least 5 pounds).

(3) Brake release at rear of train (when brake pipe pressure is being increased at least 5 pounds).

(4) A warning when pressure at the rear falls below 45 pounds.

(5) A warning when the telemetry signal is interrupted between the front unit and the rear units. **(revised 6-15-86)**

19.7.2 — The rear unit must be securely attached to the trailing coupler of the rear car, brake pipe hose connected to unit and angle cock opened slowly.

19.7.3 — Each rear unit is factory coded with a unique identification (I.D.) number which is included in each radio transmission. The front unit is provided with an I.D. selector to receive transmissions from only the specified rear unit.

19.7.4 — The last 5 digits of the I.D. number displayed on the rear unit must be selected (dialed) on the front unit. Once communication is assured between ends of the train, the I.D. selector on the front unit must not be changed.

19.7.5 — The rear unit is provided with a means of visually displaying the brake pipe pressure measurement. This display may be used to comply with the requirement that pressure be indicated by an accurate gauge at rear of train. **(effective 6-15-86)**

19.7.6 — After receiving a low pressure warning on the front unit display, and brake pipe pressure reading remains under 45 pounds or a no air warning is displayed, the train must be stopped promptly for inspection.
(effective 6-15-86)

19.7.7 — When any condition is indicated that will adversely affect operation of the E.O.T., the Train Dispatcher must be notified.

20. AIR BRAKE FORMS

20.1 FORM MP-261-C (INITIAL TERMINAL AIR BRAKE TEST)

20.1.1 — This form will be used, as specified in Rule 11.9, to notify the engineer that the Initial Terminal Air Brake Test has been satisfactorily performed.

20.1.2 — Where practicable and without delay to the train, this form will be issued to all trains at the completion of the Initial Terminal Air Brake Test.

20.1.3 — A form MP-261-C must be issued to trains that will be moved over 500 miles without being given another air brake test, or, if the inspector making the test goes off duty before the road crew reports.

20.1.4 — MP-261-C forms are to be made out in duplicate. One copy for the engineer and one copy to be kept on file for 30 days at the mechanical department office at the location where the test is made.

20.1.5 — When the End of Train Device (E.O.T.) is properly coupled to the rear of the train and communication (telemetry) is established with the locomotive, the last 5 digits of the I.D. number of End of Train device must be entered on form MP-261-C.

20.1.6 — If end of train device is changed enroute, the I.D. number must be changed on form MP-261-C to correspond to new rear unit I.D. number.

20.2 FORM EC-100 (DEFECTIVE AIR BRAKE)

20.2.1 — This form will be used to identify defective air brake equipment.

20.2.2 — The form must be properly filled out on both sides in duplicate. One form shall then be attached to the brake pipe near the angle cock at each end of the defective car.

20.2.3 — This form must be removed after repairs have been made to the air brake equipment, then turned in to the supervisor in charge at location where repairs were made.

20.3 FORM AD-1928 (RECORD OF REPAIRS — ENROUTE)

20.3.1 — This form must be filled out after replacing an air hose (or knuckle) on a freight car of foreign ownership.

20.3.2 — Heading must be filled out completely as instructed on back of form. Number of items, condition and reason (why made) must be circled.

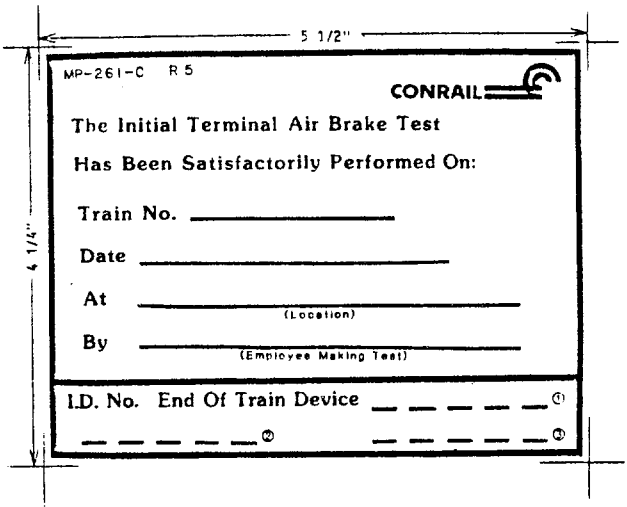
20.3.3 — Only new air hoses should be applied to foreign cars.

20.3.4 — Employee making repairs must sign in lower right corner.

20.3.5 — A separate form must be made out for each foreign car on which repairs are made.

20.3.6 — Form(s) are to be turned in with Time Return and Delay Report at completion of trip.

MP-261-C



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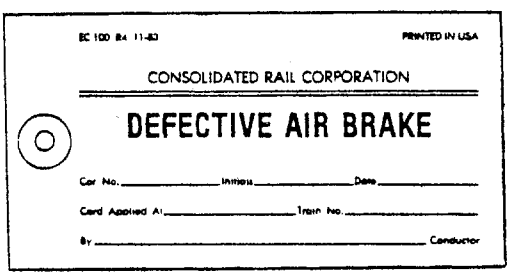

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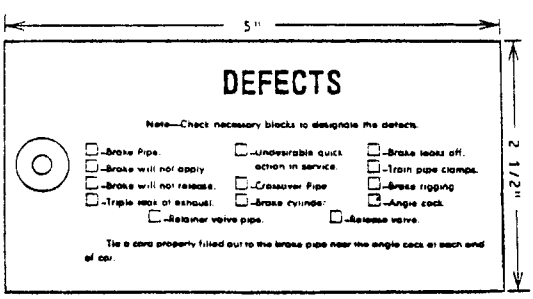
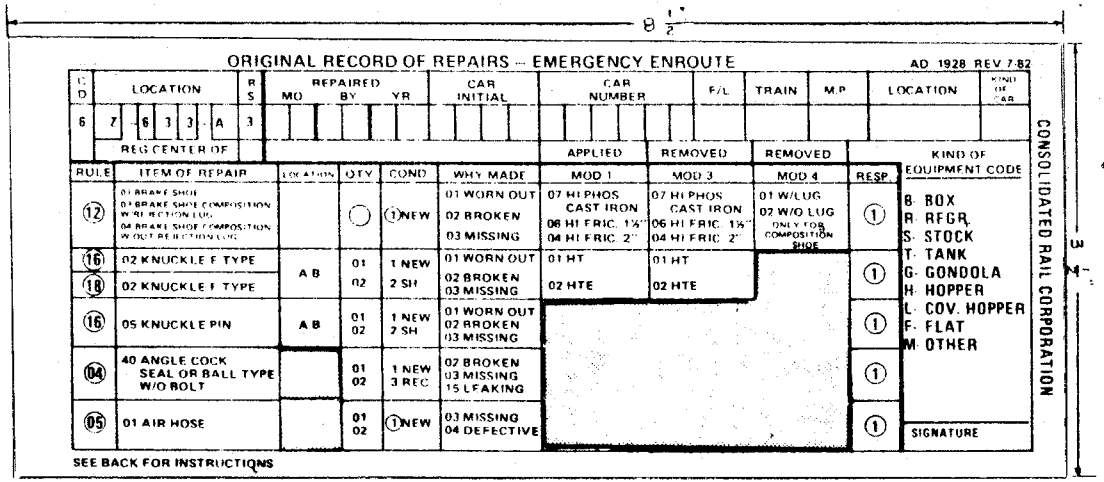


Back

AD-1928



8 1/2

ORIGINAL RECORD OF REPAIRS – EMERGENCY ENROUTE

AD 1928 REV 7-82

C D	LOCATION	R S	REPAIRED MO	REPAIRED BY	REPAIRED YR	CAR INITIAL	CAR NUMBER	F/L	TRAIN	M.P.	LOCATION	KIND OF CAR
6	7 6 3 3 A	3										
	REG CENTER OF											

RULE	ITEM OF REPAIR	LOCATION	QTY	COND	WHY MADE	APPLIED MOD 1	REMOVED MOD 3	REMOVED MOD 4	RESP	KIND OF EQUIPMENT CODE
(12)	01 BRAKE SHOE 01 BRAKE SHOE COMPOSITION W/REJECTION LUG 04 BRAKE SHOE COMPOSITION W/OUT REJECTION LUG		◯	(1) NEW	01 WORN OUT 02 BROKEN 03 MISSING	07 HI PHOS CAST IRON 06 HI FRIC 1½" 04 HI FRIC 2"	07 HI PHOS CAST IRON 06 HI FRIC 1½" 04 HI FRIC 2"	01 W/LUG 02 W/O LUG ONLY FOR COMPOSITION SHOE	(1)	B- BOX R- REFR. S- STOCK T- TANK G- GONDOLA H- HOPPER L- COV. HOPPER F- FLAT M- OTHER
(16)	02 KNUCKLE F TYPE	A B	01	1 NEW	01 WORN OUT	01 HT	01 HT		(1)	
(18)	02 KNUCKLE F TYPE		02	2 SH	02 BROKEN 03 MISSING	02 HTE	02 HTE			
(16)	05 KNUCKLE PIN	A B	01 02	1 NEW 2 SH	01 WORN OUT 02 BROKEN 03 MISSING				(1)	
(04)	40 ANGLE COCK SEAL OR BALL TYPE W/O BOLT		01 02	1 NEW 3 REC	02 BROKEN 03 MISSING 15 LEAKING				(1)	
(05)	01 AIR HOSE		01 02	(1) NEW	03 MISSING 04 DEFECTIVE				(1)	SIGNATURE

SEE BACK FOR INSTRUCTIONS

CONSOLIDATED RAIL CORPORATION

3 1/4

DEFINITIONS

ACCELERATED SERVICE RELEASE — A brake release feature of ABD and ABDW freight brake equipment which speeds up the release after a service application. Air pressure from the fully charged emergency reservoir is directed into the brake pipe at each car to increase brake pipe pressure and transmit release rapidly through the train.

AUTOMATIC AIR BRAKE — A brake system in which air pressure must be maintained in a brake pipe extending throughout the train to keep the brakes released. A reduction in brake pipe pressure will apply the brakes, an increase in brake pipe pressure will release the brakes.

AUTOMATIC BRAKE VALVE — A manually operated valve in the locomotive cab used to control the flow of air pressure into or out of the brake pipe for charging, applying and releasing brakes on locomotives and cars.

BACK-UP HOSE — A length of hose with a manually operated valve and warning whistle on one end and a standard brake pipe hose coupling on the other. Used for applying the brakes from the rear of a train when making a back-up movement.

BRAKE PIPE — A system of piping, including branch pipes, angle cocks, cut-out cocks, dirt collectors, hose and hose couplings, which conducts air pressure to the car reservoirs and is the sole means by which the engineer can control the car brakes.

BRAKE PIPE REDUCTION — A reduction of brake pipe pressure to cause a brake application or to increase a brake application. Brake pipe pressure may be reduced at a normal (service) rate or at a rapid (emergency) rate. A REDUCTION IS NOT COMPLETE UNTIL THE BRAKE PIPE EXHAUST HAS STOPPED COMPLETELY.

BRAKE VALVE CUT-OUT COCK (CUT-OFF VALVE or DOUBLE-HEADING COCK) — A manually operated valve used to cut out or cut in the automatic brake valve on a locomotive.

BRANCH PIPE CUT-OUT COCK — A device used to cut out the control valve on a locomotive unit or car. The handle is crosswise to the pipe when the cock is open.

CHARGING — The flow of air pressure into the brake pipe system to raise pressure in the reservoirs to the required amount.

CONSIST (LOCOMOTIVE) — Two or more locomotive units coupled in multiple control and operated from a single control stand.

CONTROLLING UNIT — The locomotive unit from which the engineer operates the locomotive consist or consists under his control.

CONTROL VALVE — An air operated valve on locomotives or cars which controls the charging of reservoirs and the application and release of brakes in response to reductions or increases in brake pipe pressure.

DEAD ENGINE FEATURE — A system found on all locomotive units through which main reservoirs can be charged from the brake pipe when the air compressor is not operating.

DEAD LOCOMOTIVE — A locomotive unit not providing tractive power.

DEADMAN DEVICE — A device which will cause an automatic brake application to be initiated when the engineer becomes incapacitated.

DIRECT RELEASE — The normal release of freight car brake equipment. Once the control valve is moved to release position by an increase in brake pipe pressure, all brake cylinder pressure is released.

DISTRIBUTING VALVE — A device which applies and releases the brakes on a locomotive from either the automatic or independent brake operation. Used with No. 6 equipment.

DOUBLE HEADER — Two locomotive consists coupled together and located on the head end of a train. Power and the independent brake are controlled separately by the engineer of each locomotive.

DUAL-PORTED CUT-OUT COCK — A manually operated cock in the locomotive cab used to cut out the independent brake valve when the unit is set up for trailing in a multiple consist.

DUMMY COUPLING — A device used to secure and protect unused hoses and couplings.

DYNAMIC BRAKING — A method of slowing the locomotive and train by changing the locomotive traction motors into generators.

EMERGENCY APPLICATIONS — A rapid, uncontrolled reduction of brake pipe pressure which causes control valves to move to emergency position and vent valves to open. An emergency application produces about 17% more braking effort than full service.

EMERGENCY BRAKE VALVE — A valve located in the locomotive cab, in addition to the automatic brake valve, which will cause an emergency brake application when opened quickly.

END OF TRAIN TELEMETRY DEVICE (E.O.T.) — A portable device attached to the rear coupler of a train that is capable of monitoring air pressure, motion and battery condition, then transmitting this information by telemetry (radio signals) to the locomotive cab where it is displayed.

ENGINE — An internal combustion power plant mounted under the long hood of a diesel-electric locomotive unit that drives the generators and auxiliary equipment on the unit.

EQUALIZATION PRESSURE — The pressure at which auxiliary reservoir and brake cylinder(s) are equal. This is the maximum braking effort that can be obtained in service applications.

EQUALIZING RESERVOIR — A small reservoir of air pressure controlled directly by the engineer when moving the automatic brake valve handle. Equalizing reservoir pressure is duplicated in the brake pipe.

EXTENDED RANGE (DYNAMIC BRAKE) — A supplement to the standard dynamic brake system which maintains maximum dynamic braking strength between the normal peak speed of about 25 MPH and 6 MPH.

F-1 SELECTOR VALVE — A device which automatically arranges the brake equipment on the locomotive to lead or trail other types of brake equipment as directed by the MU-2-A valve.

FEED VALVE — A manually adjusted valve that reduces main reservoir pressure for delivery to the equalizing reservoir and brake pipe.

FLOW INDICATOR (BRAKE PIPE) — An instrument which indicates the rate of flow of air pressure through the automatic brake valve to the brake pipe.

FINAL REDUCTION — A service reduction made as a train moving forward is nearing completion of stop. It provides a retarding force to the head portion of the train.

FULL SERVICE REDUCTION — A reduction of brake pipe pressure at a service rate, sufficient in amount to cause equalization.

GRADIENT — The difference in brake pipe pressure between the front and rear of the train.

GRADUATED RELEASE — A feature of passenger brake equipment whereby brake cylinder pressure may be reduced in steps proportional to increments of brake pipe pressure build-up. The feature may be nullified to direct release by positioning a release cap on the control valve.

HAND BRAKE — A mechanical arrangement, applied manually by wheel or lever, to force the brake shoes against the wheel tread to hold cars or locomotives at a state of rest.

HELPER LOCOMOTIVE — A manned locomotive other than the one controlling the train air brakes. It can be the second locomotive of a double header or a locomotive within the train or on the rear of a train.

INDEPENDENT BRAKE VALVE — A manually operated valve that provides control of the locomotive brakes regardless of the automatic brake valve handle position.

INDEPENDENT CUT-OUT COCK — see Dual-Ported Cut-Out Cock.

INITIAL REDUCTION — The first reduction of brake pipe pressure during a service brake application.

INITIAL TERMINAL — The location where a train is originally made up or classified. It is not necessarily the location where the crew goes on duty.

LIGHT LOCOMOTIVE — A locomotive operated without a train.

LOAD METER (AMMETER) — A meter located on the control stand that indicates amperage in one traction motor. The load meter indicates both pulling power and dynamic braking effort.

LOCOMOTIVE (CONSIST) — A self-propelled unit or units of equipment designed for moving other equipment operated from a single control stand.

MINIMUM REDUCTION — The first position to the right of release on the 26L automatic brake valve which produces a determined amount of brake pipe reduction. **(revised 6-15-86)**

MULTIPLE UNIT CONTROL (MU) — Two or more locomotive units coupled in such a manner that full control of power and braking can be obtained from a single control stand.

MU-2-A VALVE — A manually operated valve in the locomotive cab used for cutting in or cutting out the independent brake valve on some 26L equipped units.

NOMINALLY — Near or close to; within a reasonable tolerance of.

OVERCHARGE — A situation in which the brake equipment of cars or locomotives is charged to a higher pressure than the maximum brake pipe pressure that can normally be achieved in that part of the train.

OVER-REDUCTION — A service brake pipe reduction to a pressure lower than equalization.

PRESSURE MAINTAINING — A feature designed to maintain the brake pipe pressure at the desired level during service reductions initiated with the automatic brake valve. With this feature, a brake application of a desired amount can be held for long periods of time.

PSI (POUNDS PER SQUARE INCH) — A unit of measurement of air pressure. One PSI means that one pound of pressure is exerted on each square inch of area on the inner surface of the container, such as a cylinder or reservoir.

REDUCING VALVE — A valve which reduces main reservoir pressure for use in various air operated devices.

REGULATING VALVE — An integral part of an automatic brake valve which is manually adjusted to reduce main reservoir pressure for charging the equalizing reservoir. The regulating valve differs from a feed valve in that it does not deliver pressure to the brake pipe and that it can be used to reduce equalizing reservoir pressure as well as increase it.

RELEASE ROD — A rod extending to the side sill of a car which is operated to vent air pressure from brake cylinder(s), auxiliary and emergency reservoirs. Construction of the valve is such that by pulling out only partially on the release rod vents auxiliary reservoir; pulling out fully vents both auxiliary and emergency reservoirs, and a momentary pull vents brake cylinder pressure.

RETAINING VALVE — A device used on freight cars when descending heavy grades to retain a portion of the brake cylinder pressure while car reservoirs are being recharged.

ROTAIR VALVE — A device used with 24RL equipment to cut in or cut out the independent brake valve.

SERVICE APPLICATION — A brake application of one or more brake pipe reductions made at a service rate. A service brake application begins with the initial reduction and ends when the brake valve handle is placed in release position.

SPLIT REDUCTION — A brake application made by using a minimum reduction followed about 20 to 30 seconds later with additional reductions to the desired amount.

STANDARD SINGLE CAPACITY BRAKE — A brake system which provides constant braking force whether the car is empty or loaded.

STRINGLINING — A term used to describe the tendency of cars to pull off the inside of curves, trying to approach a straight line when the train is in draft.

SUPPRESSION — The preventing of a penalty brake application from occurring. Also, a position of the automatic brake valve handle on 26L equipment.

THROTTLE MODULATION — Varying the throttle position (power) to allow grade and rolling resistance to reduce train speed.

TONS PER OPERATIVE BRAKE — The result of dividing the gross tonnage of the train by the total number of cars with operative brakes.

TRAINLINE — The connection of similar air lines between units of a locomotive consist so that brake functions on each unit may be controlled from the leading unit.

UNDESIRED EMERGENCY — Any emergency application of the train brakes not made with a brake valve.

UNDESIRED QUICK ACTION (UQA) — An emergency application of the train brakes when a service application is intended.

UNIT — A single, self-propelled vehicle capable of moving other equipment. A locomotive may consist of one or more units, coupled in multiple so that all are controlled from one location.

VENT VALVE — An automatically operated valve or valvular portion of a car or locomotive brake system which responds to emergency brake applications to vent brake pipe pressure locally.

YARD AIR SUPPLY — A compressor and system of pipes and hoses located throughout a yard so that trains may be charged and tested before arrival of the road locomotive.

YARD LOCOMOTIVE — A locomotive assigned and operated in yard service. Class or horsepower does not affect this status. Pressure regulating devices must be adjusted as prescribed for yard service.