THE PENNSYLVANIA RAILROAD

LOCOMOTIVE MAINTENANCE INSTRUCTIONS NO. L-50-B
Superseding Locomotive Maintenance Instructions No. L-50-A, dated October 15, 1940
ISSUED PHILADELPHIA, PA.
OCTOBER 20, 1947

# INTERMITTENT INDUCTIVE SYSTEM AUTOMATIC TRAIN STOP
# OPERATION - TESTS - MAINTENANCE

## General

1. This train stop device is known as the Union Switch & Signal Company Intermittent Inductive Automatic Train Stop. No speed control is provided, but a brake application will be initiated at each signal displaying indication other than "proceed" or "proceed at restricted speed," unless the engineman, aware and alert, "Forestalls" the application by means provided for that purpose.

2. The following Rules and Instructions for the operation, care and maintenance shall be carefully read by all employes whose duties require them to operate locomotives so equipped, or to maintain this equipment. In case any of these instructions are not thoroughly understood by an employee, he shall request information from his Supervisor, in order that all points may be clearly understood by him.

## Description

1. Engine Equipment

A receiver is rigidly, but adjustably, mounted on each tender on the trailing journal box of the forward tender truck on the right hand side and so positioned as to pass over the track inductor with a minimum clearance of 1-1/2" and maximum clearance of 2", as shown on tracing D-413899.

It is essentially of the same magnetic structure as the track inductor, but has two windings. The receiver is associated with a train control relay which is carried on the tender, and which, when de-energized, initiates a full service brake application. Both the inductor and receiver coils are waterproof and are installed in substantial housings to protect them from mechanical injury and against the weather.

All of the automatic controlling valves, except the magnet valve, acknowledging valve and re-set cock are included in the automatic brake valve.

The train stop relay (Type E) is enclosed in a weatherproof iron box supported underneath the tender frame on the right side, as shown on tracing D-413899.

## Description of Locomotive Circuits

Standard tracing No. C-81248 shows diagram of the locomotive circuits and apparatus, all being shown in normal running position.

Electric energy is obtained from the headlight generator, through main switch located in cab of the locomotive.

Normally, current for one circuit flows from B-32 to bottom contact point of the stick relay, contact arm, to wire A, primary of receiver, wire NA and magnet valve to common. This is a low resistance circuit and energizes the engine receiver.

Another circuit is through the upper contact of the stick relay to wire S, thence operating coils of the stick relay to common via wire NS, receiver secondary, part of receiver primary, wire NA, and the magnet valve to wire C. This circuit holds the stick relay in the normal energized position as shown.

The magnetic flux caused by the primary winding is normally constant, but when a receiver passes over an inductor at signal displaying indication other than "proceed" or "proceed at restricted speed" - that is, an open circuit inductor, the receiver flux is offered a path of considerably lower reluctance through the iron inductor core, and the flux rapidly increases as the receiver approaches, and decreases as it recedes from the inductor. This induces a complete cycle of two alternations of voltage in the receiver secondary through the following circuit, the first half cycle operating in the direction traced; wire NS, operating coil of stick relay, wire S, contact of stick relay, wire A, part of the primary receiver coil and all of the secondary winding. This voltage is high enough to reverse the current through the stick relay, causing it to open its contacts. The opening of these contacts de-energizes the receiver primary and the magnet valve, and also opens the operating circuit of the stick relay itself. This relay can only be re-energized by operating the acknowledging valve, which temporarily connects energy (by means of the acknowledging relay) to the operating coil of the relay via wire S.

As has already been explained, de-energization of the stick relay is effected by the movement of the receiver over an open circuit inductor. The greater the rate of train movement, the greater will be the rate of change in flux density, and the greater will be the voltage induced in the receiver for de-energizing the stick relay. Conversely, at extremely low rates of speed, the induced voltage will be insufficient for this function. This system has been designed so that the stick relay will be de-energized at speed of 1.5 or more miles per hour.

Receiver passing over an inductor at signals displaying indication other than "proceed" or "proceed at restricted speed," unacknowledged, the stick relay is opened as above described, magnet valve is de-energized, resulting in an automatic brake application.

Receiver passing over an inductor at signals displaying indication other than "proceed" or "proceed at restricted speed," acknowledged, the stick relay is opened when passing inductor, but relay is immediately picked up again through the following circuits B-32 to A-1, through resistor to wire A, through primary of receiver to wire NA, through magnet valve to wire C. Stick relay will pick up through the following circuits, B-32 through contacts of acknowledging relay to S, through stick relay to wire NS, through all of the secondary winding and part of primary winding, of receiver to wire NA, through magnet valve to wire C, energizing stick relay, with no brake application resulting.

The brake application was not initiated as the magnet valve was held energized, even though the stick contact of the stick relay opened when passing over the inductor, because the acknowledging relay was picked up while the receiver was passing over the inductor. The acknowledging relay being picked up, held the magnet valve energized over the following circuit:

B-32, lower contact of closed acknowledging relay, resistor, wire "A", receiver primary, wire "NA", magnet valve, to C.

When receiver passes over a clear inductor, the magnetic action is similar, except that current induced in the now short circuited inductor winding opposes a change of flux in the magnetic circuit, consisting of the inductor and the receiver, to such an extent that the voltage induced in the receiver secondary winding is too small to open the stick relay.

The track inductors are located about 70 feet in the rear of the signals so that the engine receiver will pass the inductor before the front engine wheels enter the next track circuit, thus avoiding opening the coil of the associated inductor until the receiver has passed it.

To prevent arcing and burning of the stick relay contact which opens the circuit including the receiver primary and the magnet valve, a spark arrester is connected between wires A and C. This arrester consists of an unidirectional current device, offering a low resistance to current flowing from wire C to wire A, but a high resistance to currents in the opposite direction. The arc producing current induced by the collapse of the magnetic fields in the magnet and receiver, when the stick relay contacts open, flows from left to right in both coils, its circuits being from the A terminal of the receiver, the primary winding, wire NA, winding of the magnet valve, wire C, spark arrester, wire A, back to the receiver primary. This energy is therefore allowed to dissipate itself within the circuit just traced, and the stick relay contact, which would otherwise be subjected to destructive arcing, is

effectively protected, resulting in reducing failures due to burned contacts, and increasing contact life. No spark arrester is needed for the upper stick relay contact since the current must have been reduced to a very low value to effect the opening of the contact.

Flexible coupling cables with substantial electric couplings are provided between engine and tender and between tender and the receiver. These cables allow for difference in distance between the respective units and also provide for a convenient means for electrical uncoupling during tests and repairs.

Forestalling Automatic Brake Application

Acknowledging valve is provided in the locomotive cab, which, when in acknowledging position, will prevent automatic brake application when passing over inductor at signal in more restrictive indication than "proceed" or "proceed at restricted speed," and is accompanied by an audible indication located in the cab.

Automatic Application of the Brakes

The automatic brake application resulting from failure to acknowledge is a straight service application.

Release

After an automatic brake application, the release of the brake can be accomplished only after the train has been stopped and the re-set cock operated, restoring equipment to normal position, as explained under release of automatic brake application.

Double-Heading

When locomotives are double-headed, the automatic train stop equipment is cut out on the second locomotive by the customary use of the double-heading cock.

Wayside Equipment

Track inductors are located outside the right hand rail and approximately seventy feet from each signal (not including dwarf signals) governing entrance to a block in the direction from which trains normally approach such signals. It is a fixed structure, parallel to the track. Its inside edge is 17-1/4 inches outside the gauge of the rail, the flat top being 2-1/2 inches above the top of the rail. It is supported on long ties and is insulated from the running rails. This construction maintains an accurate vertical and horizontal alignment of the inductor with respect to the running rails. The track inductor consists essentially of an iron U-shaped core, with a winding thereon, which is controlled from the signal circuits. The functioning of the inductor is controlled by traffic conditions in advance. The breaking

or removal of any of the wiring leading to the inductor will cause an automatic brake application on the locomotive passing the inductor.

## Manual Service Application

The engineman may, in this system, apply the brakes at any time to any degree permissible in usual air brake practice. The application of the train brakes is effected by reducing the air pressure in the brake pipe, accomplished as usual, through the medium of the engineer's brake valve by moving the brake valve handle to the service or emergency position.

The manual service application of the brakes will be first described. Main reservoir pressure supplies air via pipe 6 to the chamber of the rotary valve of the engineer's valve. In running position (see standard tracing C-81248) it passes through the feed valve, a port in the rotary valve seat, Port 18, brake pipe cut-off valve, Pipe 13, to the lower chamber 13 of the equalizing piston, and through the double-heading cock to the brake pipe. A branch through the rotary valve seat connects pipe 18 and, therefore, the brake pipe, through pipes 21 and 8 to the equalizing reservoir, and to the upper chamber 8 of the equalizing piston. Since these connections are the same, except in physical arrangement, as in the existing engineer's brake valve, manual brake application can be made exactly as before. Another branch of pipe 18 passes through a port in the application valve and pipe 11 to the operating chamber of the brake pipe cut-off valve, holding this latter valve to the left. The check valve with restricted by-pass in pipe 8 prevents an overcharge of the equalizing reservoir when releasing brakes.

When the engineer's brake valve is moved to the service position, pipe 18 and the feed valve pressure are disconnected from the upper chamber of the equalizing piston and from the equalizing reservoir, and the latter volumes are vented to atmosphere through pipes 8 and 21 and the usual preliminary exhaust until a desired pressure reduction is accomplished, after which the engineer's brake valve is moved to lap, stopping further reduction but maintaining the reduced equalizing reservoir pressure. The brake pipe pressure in chamber 13 below the equalizing piston then raises the equalizing discharge valve, connecting the brake pipe through pipe 16 to atmosphere. When the pressure in the brake pipe and the lower chamber of the equalizing piston is reduced to slightly below that of the equalizing reservoir and the upper chamber of the piston, the piston is forced downward, closing the equalizing discharge valve and preventing further brake pipe reduction.

## Manual Emergency Application

The manual emergency brake pipe reduction is not made entirely through the

automatic brake valve, but a relay brake pipe vent valve is included in the brake valve and operated via the sand pipe port by the automatic brake valve in the emergency position. By this valve a larger brake pipe vent is made than through the present H-6 automatic brake valve so that emergency brake applications are always effective even on long freight trains after a manual or automatic service brake application has been started, or if made immediately following release. Furthermore, its connection below the double-heading cock permits helper engines to make emergency brake application if the need arises.

## Automatic Brake Application

When the train control stick relay is opened at the inductor in the rear of a signal giving an indication other than "proceed" or "proceed at restricted speed," magnet valve becomes de-energized, connecting chamber 10 of the application valve to atmosphere. Normally, the main reservoir pressure on both sides of the application valve piston is in equilibrium by virtue of the restricted feed port through the piston of the valve, and it assumes the normal position because of the spring in chamber 10. The venting of chamber 10 to atmosphere reduces the pressure faster than it can be replenished through the feed port, and when sufficient reduction has been made, the air pressure in chamber 6 is able to overcome the combined spring and air pressures in chamber 10, and move the piston and valve downward. By this movement, chamber 10 is also connected directly to atmosphere through the brake application valve via pipe 5 through the reset cock.

The brake application valve, as its name indicates, is the direct means of controlling the functions involved in automatically applying the train brakes.

## Forestalling Automatic Brake Application

The functioning of the system is to automatically initiate a brake application at an inductor at signals giving indication other than "proceed" or "proceed at restricted speed," if the engine crew is incapacitated, but may be forestalled by them if on the alert. This is accomplished by operating the acknowledging valve in the cab. When the handle of the valve is moved forward, pressure from the acknowledging reservoir, which had been previously charged from main reservoir, operates the acknowledging relay and blows the whistle. The air from the acknowledging reservoir exhausts through the whistle and allows the relay to return to the normal position in from fifteen to twenty-five seconds. During this acknowledgment period, the magnet valve would not be de-energized when passing a signal giving indication other than "proceed" or "proceed at restricted speed."

## Preventing Release

When the brake application valve functions in response to the opening of the stick relay due to passing a stop inductor unacknowledged, it cuts off the feed valve pressure, via pipes 18 and 11 from chamber 11 of the brake pipe cut-off valve, and vents chamber 11 to atmosphere. The cut-off valve therefore operates to the left, closing the passage between charging pipe 18 and brake pipe 13 so that the engineman is unable to release the brakes until train is stopped.

## Release After Automatic Brake Application

Acknowledgment must first be made which re-energizes the stick relay, and, in turn, energizes the controlmagnet valve and closes one atmospheric vent of pipe 10. The automatic brake valve must be placed in lap position to close the atmospheric vent of pipes 10 and 5 through port 5 in the brake valve. Pipe 10, however, is still connected to atmosphere via pipe 5 and the re-set cock. When the train comes to a stop, the engineman having lapped his automatic brake valve and acknowledged, descends to the ground and throws the re-set cock to release position and returns it to running position after the brake application valve restores. The location of the re-set cock as described is to provide access from the engine in case the stop is made in a tunnel or on a bridge or similar structure where it is impossible to dismount. The operation of the re-set cock closes the final vent of pipe 10 to atmosphere. Pipes 5 and 10 will then become charged through the restricted port in the piston of the brake application valve, the spring back of this piston returning to the normal position when the pressure in pipe 10 approaches that in chamber 6. This movement of the application piston disconnects pipes 10 and 5 and will be followed by the restoration of the cut-off valve connecting pipes 13 and 18. The re-set cock may then be returned to normal, brakes then can be released in the usual way.

Should the engineman fail to return the re-set cock to running position to release the brakes, pipe 10 will again be vented to atmosphere via the re-set cock and pipe 5, resulting in further brake pressure as soon as the engineman moves the automatic brake valve handle away from the lap position. The engineman must again return brake valve handle to lap position and after 5 seconds return re-set cock to normal position, then release brakes in usual way.

## Pneumatic Cut Out

A pneumatic cut-out is provided for use in case of train stop failure. The engineman may cut out the train stoppneumatically by breaking a seal which releases a small lever. This lever, when reversed, prevents the venting of chamber 10 when pipe 10 is vented, and therefore, the brake application valve will be inoperative. When the pneumatic lever has been reversed and the condition which required it is rectified, the lever may be returned to the cut-in position and the train stop will thereafter be effective. The seal being broken constitutes evidence that the pneumatic cut-out has been used, and must be reported to the proper authority. It can only be replaced by authorized persons possessing the proper seal.

## Instructions for Daily Inspection and Maintenance

All brake apparatus, unless otherwise specified and used for standard air brake control, is to be maintained in accordance with existing Locomotive Maintenance Instructions.

The automatic Train Stop apparatus must be inspected and tested after each trip or day's work.

1. Inspection of all Train Stop equipment must be made and a record of all defects found must be recorded on Form M.P. 93-A and filed with M.P. 62 form.

2. It shall be noted and recorded whether or not the locomotive arrived with the pneumatic equipment cut in and sealed.

(a) All cases of broken or missing seals on locomotives arriving from Automatic Train Stop territory shall be investigated.

(b) When locomotives equipped with Automatic Train Stop are operated in non-train stop territory, and arrive with the seal broken or missing, no investigation is necessary. However, the Form M.P. 93-A shall be marked "Locomotive not used in Automatic Train Stop territory."

3. Test headlight generator voltage at the generator terminals. Boiler pressure must be within 40 pounds of the rated working pressure. Voltage shall be taken for two load conditions.

(a) Daylight load: train stop equipment and those locomotive lights which cannot be turned off.

(b) Headlight load (250 watts) added to (a): both voltages must be within the limits - 31.0 and 34.0 volts.

4. Examine for loose or damaged parts. All apparatus, including receiver, conduits, conduit fittings, piping and pipe clamps.

5. Receiver height above the top of rail must be measured from the bottom and ends of receiver pole faces. Standard gauge, as shown on tracing D-407318 must be used.

(a) Height between bottom of pole faces and top of rail, minimum 4", maximum 4-1/2." (Bottom of pole faces to top of inductor, minimum 1-1/2", maximum 2") and the variation between the height of the two pole pieces shall not exceed 1/4". All gauging shall be done on good track.

(b) The distance from gauge side of near rail to outside of receiver must be 22" (plus or minus 1").

(c) Receiver must be inspected for marks which indicate that it has struck an object along the roadway - if marks are found, report must be made to the proper authority so that obstruction along roadway may be located and corrected.

6. Portable inductor, as shown on tracing F-81866, shall be used to make the following tests:

(a) Polarity Check

Close double throw switch S-1 in either direction. Close S-2 towards R-2, then close S-3. This will give full voltage on portable inductor. If engine relay is not energized, acknowledge, which will close relay. If, upon opening S-3, the engine relay opens, S-1 is in its correct position; if not, reverse S-1 and again close and then open S-3.

(b) Stop Inductor Test Acknowledged

With portable inductor in place, polarity checked, relay de-energized, switch S-3 open, switch S-2 closed in stop position, acknowledge, reset, release brakes and restore acknowledging valve to charging position. Acknowledge and in 15 seconds open switch S-2. No automatic brake application should be received.

(c) Stop Inductor Test Unacknowledged

With switch S-2 restored to stop position, lap brake valve and open switch S-2. An automatic brake application should be received.

(d) Note the brake pipe reduction, which should be 22 to 24 pounds with 70 pounds brake pipe pressure, or 36 to 38 pounds with 110 pounds brake pipe pressure.

With automatic brake valve in service position, the time required to reduce equalizing reservoir pressure 20 pounds should be 9 to 11 seconds with 70 pounds brake pipe pressure, and 5-1/2 to 7 seconds with 110 pounds brake pipe pressure. (The equalizing reservoir or brake pipe reduction during an automatic brake application shall be at a rate not less than that which results from a manual service application).

(e) Move brake valve handle to running position and brake pipe reduction should continue, but should not be allowed to reduce more than 10 pounds.

(f) Move brake valve handle to emergency position, the vent valve should operate and an emergency application should be obtained.

(g) Move brake valve handle to running position, operate acknowledging valve and move reset cock to release position, then place brake valve handle in lap position. Brake application valve should release and return to normal position in from 3 to 5 seconds. Reset cock shall be returned to running position and brakes released in the usual manner.

(h) Low Speed or Clear Inductor Test

With switch S-2 closed in clear position, relay energized, open switch S-2. Engine relay should not release and no automatic brake application should be received.

## Monthly Inspection and Test

In addition to Daily Inspection and Tests, the following shall be done:

1. Examine entire automatic train stop apparatus for general condition, such as conduits, junction boxes, receiver coils, relay adjustment, etc.. See that all drain holes in junction boxes are open.

2. All terminals shall be examined to see that all wires have tags and eyelets, and that they are secured with double nuts; replace any missing eyelets or tags. Examine all wires at terminals for abrasion of insulation and loose strands of wire which might cause a short circuit or ground.

3. A record of all relay adjustments, megger readings and defects found shall be recorded on form M.P. 93-B, and filed with M. P. 62 forms.

4. Examine contacts on acknowledging and stick relays for signs of burning or pitting.

5. The pick-up and release values of the stick relay shall be accurately measured by the following method, which does not require the use of the portable inductor to adjust for relay release:

(a) (1) Have the equipment energized long enough to permit coils to come to their normal operating temperature. About one-half (1/2) hour is sufficient.

(2) See that headlight generator voltage is 32 volts at the main switch.

(3) With relay in the engine circuit, remove N.S. wire from N.S. terminal on top of relay, and connect this wire and terminal to lower terminal posts marked (Receiver) on relay test box. This places the milliammeter in series with relay holding coils and secondary winding of receiver. Acknowledge, which will energize the relay and with current flow in right direction read the current value, which should be between 52 and 66 milliamperes. If this current is abnormally low investigate for high resistance contacts, such as might be found at any of the various terminals. If abnormally high, check relay and receiver windings for shorted out turns by "Resonant test method" described below:

After current value has been read, reconnect N.S. wire to terminal, remove relay from engine circuit and connect S and N.S. wires to terminal posts marked (Relay) on test set. By means of the rheostat charge relay to 150 m.a., then slowly lower current until relay releases. Note the release value and if it is not exactly 38 m.a. <u>less</u> than the current value when relay was in the engine circuit, relay must then be adjusted to release at that value.

(b) In order to provide for adjustment of relay, a suitable arrangement is included in the relay, whereby proper operations may be obtained. The arrangement consists of an adjusting screw which determines the tension of a spring attached to the armature of the relay. This screw may be reached by breaking the seal of an outside protecting cover, after which the screw may be adjusted with a screw-driver. The screw and cover is on the right side of the relay, on left side of the armature. No other part of the relay need be disturbed to make the adjustment.

To increase relay release value, spring tension against arm is increased by screwing in, and to lower the release value by backing out, the adjusting screw.

(c) Make record on form 93-B of the engine relay current, the pick-up and release current values. The relay should release on not less than 12 milliamperes and should pick up on not more than 125 milli-amperes.

(d) Resonant Test of Relay and Receiver

By use of the Resonant Test Set, as shown on tracing F-81866, connect relay or receiver to terminals on set and adjust condenser values until the highest milli-ampere reading is obtained on meter. Then check the combined microfarad capacity of the condensers used to obtain this reading. These values should not exceed the following:

| Unit | Voltage | Capacity |
|---|---|---|
| Relay (S and NS Term.) | 12 v. | not more than 3.1 m. f. |
| Rec. Sec. (A and NS Term.) | 12 v. | not more than 1.9 m.f. |
| Rec. Prim. (A & NA Term.) | 12 v. | not more than 3.0 m. f. |

If the condenser capacity for any unit is greater than shown above, it is an indication that turns are shorted out and relay or receiver should be replaced.

(e) If the relay cannot be adjusted within the limits specified, or is otherwise defective, it should be forwarded to the repair shop for overhauling.

(f) Relays shall be forwarded to the shop for general overhauling at a period not exceeding three years.

6. Make the following megger test of automatic train stop and engine lighting circuits. These tests to be made at the main switch located in the cab. All readings shall be not less than one megohm.

(a) Train Stop Circuits With main switch open, megger B-32 and C to ground.

(b) Engine Lighting Circuits With main switch open and all other engine switches closed, megger C to ground.

(c) Caution Do not attempt to megger any of the circuits while they are energized. The headlight generator must be stationary.

(d) When meggering engine lighting circuits, it is imperative that all lamps are in the sockets and filaments intact.

7. Magnet Valve. The voltage across the magnet valve (MA to C) should not be more than 11 volts. However, the magnet valve is so designed to pick up against 110 pounds of air pressure with not more than 7.7 volts across magnet terminals (MA to C). Magnet valve shall be thoroughly cleaned and air line blown out.

8. Pneumatic. With 800 cubic inch acknowledging reservoir and #45 drill size choke in pneumatic whistle, the acknowledging time should be not less than 15 seconds nor more than 25 seconds for either 100 lb. or 130 lb. main reservoir pressure, with diaphragm release spring adjusted to open the contacts of acknowledging relay when pressure is reduced to 45 pounds. This adjustment can be plus or minus 5 pounds.

9. Spark Arrester. When it becomes necessary to replace a spark arrester, the polarity of the headlight generator must be properly connected. If the polarity is reversed, the spark arrester will be damaged.

10. Examine all pipes and connections for air leaks.

11. Six Months Periodic Inspection and Maintenance

In addition to the inspection and maintenance mentioned under monthly inspection, the following shall be done:

(a) Clean and lubricate Brake Application Valve, Cut-off Valve, Vent Valve, and Brake Valve, as per Locomotive Maintenance Instructions L-4-E.

(b) Examine and clean ball check and choke in No. 8 line in brake valve.

12. Class Repairs.

In addition to inspection and maintenance under six months periodic inspection, the following shall be done:

(a) Remove all wiring from conduits and renew any that is found to be defective. Inspect particularly for insulation where the flexibility has been destroyed by heating.

Instruction to Enginemen, Covering Departure Test

Enginemen, when taking charge of train-stop-equipped locomotives, shall proceed as follows:

1. Note that cut-out cock is cut "in" and sealed on locomotives that are being dispatched in Automatic Train Stop territory. Start generator. Generator must be kept running continuously with its throttle wide open when automatic train stop is cut in.

2. The handle of main switch to Train Stop equipment must be in "on" position.

3. Start air compressor. As the main reservoir pressure builds up, the brakes will automatically apply on locomotive and tender.

4. Lap brake valve.

5. Move acknowledging valve to charging position. After the main reservoir pressure builds up to 75 pounds or over, move the acknowledging valve to the acknowledging position.

6. Move reset cock to release position, where it must remain until application valve moves to normal position, requiring from 3 to 5 seconds, then restore the reset cock to running position. Move acknowledging valve to running position. Release brakes in the usual manner.

7. Make usual air brake tests.

8. Two test inductors are located on the departure tracks of all engine terminals and must be used to make the following tests:

9. Stop Inductor Test - Acknowledged.

Proceed over first inductor at a minimum speed of two (2) miles per hour and not over five (5) miles per hour. Acknowledge within fifteen (15) seconds before the receiver passes over the inductor, to determine that the whistle sounds and that no automatic brake application has taken place. After receiver has passed the inductor move acknowledging valve to charging position.

10. Stop Inductor Test - Unacknowledged.

(a) Proceed over second test inductor at a minimum speed of two (2) miles per hour and not over five (5) miles per hour, and with the acknowledging valve in the charging position, a full service automatic brake application should occur.

(b) Before receiver passes over inductor, move brake valve handle to lap position. After automatic brake application has been completed, acknowledge, reset and release brakes in the usual manner.

(c) If the equipment fails to operate, engineman must report to proper authority, who will correct the defects.

11. Road Failures:

Enginemen must report removal of seals, automatic train stop failures, and interruptions on form (N.Y.C. Form SC-1) at first available point of communication.

If the train stop equipment fails enroute, the engineman must report on M.P. 62 report, giving location where failure occurred, and any other information that would be helpful in correcting the defects.

12. On locomotives that are being dispatched into other than Automatic Train Stop territory, the main switch must be opened and cut-out cock closed before leaving the terminal.

## General Information to Enginemen

1. Automatic brake applications will occur when receiver is passing over inductors at signals giving indications other than "proceed" or "proceed at restricted speed," unless the acknowledging valve is held in the acknowledging position. Acknowledging valve must not be in "acknowledging position" more than fifteen (15) seconds before passing over inductor and must then be immediately returned to charging position.

2. When passing over inductors at signals displaying "proceed" or "proceed at restricted speed," it is not necessary to acknowledge.

3. To prevent automatic brake applications, engineman must acknowledge when passing over inductors as follows:

(a) When running forward with current of traffic at signals displaying other than "proceed" or "proceed at restricted speed."

(b) When making back-up movements against the current of traffic.

(c) When making forward movements and pushing cars.

(d) In an emergency when double-heading and automatic brakes are being operated from the second engine.

4. When an automatic brake application occurs, move brake valve handle to lap position. After train has stopped, move acknowledging valve handle to acknowledging position and the move reset cock to release position for about five (5) seconds, then return to running position. Train brake may then be released in the usual manner. Acknowledging valve handle should be returned to charging position.

In case it becomes necessary to cut out Automatic Train Stop on account of improper operation, broken pipes or other causes, break the seal on the cutout cock located on the brake application portion of the brake valve, and turn handle to the down position.

All improper operations and defects in the Automatic Train Stop equipment must be reported on M.P. 62 work report.

H. T. Cover
Chief of Motive Power