E-Version – Does Not Contain General Notice Changes

Long Island Rail Road

TRANSPORTATION DEPARTMENT

TRAIN HANDLING AND EQUIPMENT MANUAL
T.H.E.M.

2012 EDITION

THIS BOOK IS THE PROPERTY OF
THE LONG ISLAND RAIL ROAD COMPANY

This electronic version does not include general notice revisions made during the present General Order. Employees must maintain a hard copy with those revisions.

Unless authorized by the proper authority, employees entrusted with this publication must not share, post on the internet nor divulge the contents thereof to anyone except authorized Company employees.

WE SERVE WITH PRIDE

BRAKE PIPE BRANCH PIPE CUTOUT COCK (BPBPCOC) - A device used to cut out the control valve on a locomotive or car.

BRAKE PIPE VENT VALVE (No. 8) - A device connected to the Brake Pipe, which propagates emergency Brake Pipe reductions by venting the Brake Pipe locally.

BRAKE SHOE - A replaceable friction element secured to the brake head for the purpose of producing retarding force to the wheel.

BRAKE SHOE KEY - A device by which a brake shoe is fastened to a brake head.

BRAKE SYSTEM - All apparatus such as air brake, electro-pneumatic brake, related piping, hand brakes, foundation brake rigging and dynamic brake, which act to retard, stop or prevent the movement of a train, locomotive or car.

CABOOSE - A car in a freight train intended to provide transportation for crewmembers; commonly referred to as a "Hack".

CABOOSE VALVE - A rotary type application valve in the caboose for the purpose of making either a service or emergency brake application.

CALENDAR DAY – A time period running from one midnight to the next midnight on a given date.

CHARGING AND RECHARGING - The term used to describe the flow of air into the air brake system to raise it to the desired pressure.

CHECK VALVE - A device so designed that it permits air to flow in one direction while preventing air from flowing in the opposite direction.

CLASP BRAKE - An arrangement of brakes in which two brake shoes are used on each wheel opposite to each other.

CLASS I (Brake Test) - A complete passenger train brake system test and inspection performed by a QMP to ensure that the air brake system is 100% effective.

CLASS IA (Brake Test) - A test and inspection performed by a QP of the air brake system on each car in a passenger train to ensure that the brakes apply and release on each car in the train in response to train line commands.

CLASS II (Brake Test) - A test and inspection performed by a QP of Brake Pipe integrity and continuity from the controlling locomotive to the rear unit of a passenger train.

CODE of FEDERAL REGULATIONS (CFR) - The Code of Federal Regulations is a codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government.

CONDENSATE - The undesirable accumulation of oil and water in the compressed air system which is continuously formed as compressed air cools.

- ✓ Check for proper fluid levels, temperatures and pressures in lubricating and cooling water systems.
- ✓ Check that walkways are clear of debris and/or oil to prevent personal injury.
- ✓ Check that safety appliances such as steps, ladders, handholds and handrails are secured and have the required clearance.
- ✓ Perform voice test of radio.
- ✓ Ensure that cab floors are free of tripping hazards.
- ✓ Cab seats must be secure.
- ✓ Provide flagging equipment (5 fusees and a red flag) and proper forms.
- ✓ Brake valves and air brake equipment at non-operating stations are cut-out and properly positioned.
- ✓ Doors and windows of unoccupied locomotives must be kept closed except when in use.

ENGINEER'S RESPONSIBILITY

Engineers when taking charge of their locomotive(s) must verify that there is a valid inspection form posted in the locomotive cab. They will be responsible for checking the proper application of seals, where those seals are accessible, on the locomotive lead unit controlling the movement of the train. If seal is found broken or missing at initial terminal, Engineer must notify Transportation or Mechanical Supervisor or the Movement Bureau.

Care of Equipment

A. Employees must not place their feet upon windshield, walls, control stand, any painted surface or otherwise damage the equipment in locomotive cabs.

B. Trash should be removed from locomotive cabs and placed in suitable trash receptacles.

C. Access doors to engine rooms and electrical cabinets must be kept closed, except when in use, to maintain cleanliness and pressurization.

D. Engine, train crews or other employees occupying locomotive cabs ensure that windows and doors are closed and cab lights extinguished when leaving cab.

PASSENGER EQUIPMENT SAFETY STANDARDS

CFR PART 238 – FRA REGULATION
FOR PASSENGER EQUIPMENT SAFETY STANDARDS

Purpose – To prevent collisions, derailments and other occurrences involving railroad passenger equipment that cause injury or death to railroad employees, railroad passengers or the general public.

Effective Operating Brakes

a. When dispatching trains from any terminal, PASSENGER TRAINS MUST have ALL brakes operative (100%).

b. At terminals, at no time, will the end car or locomotive be dispatched with the brakes cutout.

c. Cars with one truck brake cut out must be considered a no-brake car.

d. En route, if the air brakes on a rear passenger car become inoperative, refer to page 31.

e. Train dispatcher must be notified as soon as possible of any air brake defects occurring en route.

Handbrakes

Where required, trains must be secured by a minimum of two hand brakes on each end to prevent unintentional movement. During standing brake tests, Employee conducting the Class IA or Class II Brake test will apply handbrakes where applicable.

Piston Travel

Tread brake units on a locomotive or passenger car shall be adjusted to provide proper brake shoe clearance when brakes are released, approximately 1/4 inch.

Brake Tests performed on LIRR Passenger Trains:

- **Class I**
- **Class IA**
- **Class II**

Note: Only a Qualified Maintenance Person (QMP) may perform a CLASS I Brake Test. CLASS IA or CLASS II Brake tests may be performed by either a Qualified Maintenance Person (QMP) or a Qualified Person (QP).

CLASS I BRAKE TEST

A Class I Brake Test shall be performed once each calendar day. The qualified maintenance person (QMP) that performs the Class I Brake test will place in the cab of the controlling locomotives on both ends a written statement (Class I Brake test slip) that a Class I Brake test was performed. This slip will be retained in the cab until the next Class I Brake test is performed.

CLASS II (REAR END) BRAKE TEST

Class II Brake Test must be performed to determine that brakes apply and release on rear car or locomotive:

A. Prior to the departure of a passenger train from an initial station where a Class I or IA Brake Test remains valid.

B. Whenever the control stand used to control the train is changed (i.e. changing ends, operating from other than the head end, etc…)

C. When a solid block of cars that have previously received a Class I or IA Brake test are added to the train and/or cars are removed from the train.

D. When an Engineer first takes charge of the train, except for face-to-face relief.

Note 1: Switching movements may be made without conducting a Class II brake test. (Running Brake Test at 5 mph must be made)

Change of Crew

An Engineer, when taking charge of locomotive units coupled to trains with a direct change of engine crews, will ascertain from the previous Engineer:

A. Locomotive and train brakes are in operative condition.

B. The total amount of units in the consist.

C. Lead locomotive radio is in operative condition.

D. ASC properly certified.

E. All other pertinent information relating to the movement of the train.

Note: After departure, a Running Brake Test must be performed.

RUNNING BRAKE TEST

A Running Brake Test must be made by applying train air brakes with sufficient force to ascertain whether or not brakes are operating properly. When a train departs a yard, a running test of train brakes must be made at 5 mph. In addition, another running brake test must be made at 30 mph or as soon as conditions permit. All running brake tests must be performed by use of the ABV or master controller handle. Power should not be shut off unless required by circumstance, and if possible; the locomotive brake should not be permitted to apply.
Running test of brakes must be made as soon as conditions permit:
A. After a Class I, IA or II Brake Test is performed

B. Leaving any terminal.

C. Any point where motive power; engine crew, train crew or operating station has been changed.

D. When making yard switching moves

E. After troubleshooting brake problems.

F. After opening or closing an Angle/End/Cutout Cock, 3 way valve, making an air brake or airbrake component inoperative, plugging an EMV or where electrical jumper cables between MU cars have been disconnected.

G. When adverse conditions call into question the performance of the brakes.

Note: If train brakes do not operate properly, the train must be stopped. The cause of failure must be ascertained and if possible, corrected. If the brake problem is rectified, another running brake test must be performed.

Yard Movements and Switching Operations
A running test of the brakes must be performed whenever yard and switching movements are made, before the speed of the train exceeds 5 mph to determine that brakes are operative.
While engaging in switching operations crews must ensure the air brake system is fully charged. Engineers must utilize the automatic brake valve in lieu of the independent brake valve alone for train braking purposes when possible.

SPEED CONTROL SYSTEM

Tampering with Safety Control Equipment

Unauthorized annulment of or tampering with safety control equipment is prohibited. Any individual who willfully disables a safety device is subject to civil penalty and/or disqualification from performing safety sensitive functions on a railroad if found unfit for such duties under the procedures provided for in the CFR.

Primary Function of Speed Control Operation

The primary function of a speed control system is to ensure that train speed remains at or below the speed authorized by the signal system.

Principles of Speed Control Operation

Speed control equipment on board the train receives and constantly compares two basic input signals. The signals, which are received and compared, indicate TRACK SPEED, which is the maximum speed authorized for the train by the signal system, and TRAIN SPEED, which is the actual speed of the train.

Track Speed Signal - The track speed signal, usually referred to as the CODE, is a coded electrical signal indicating maximum speed allowed by the signal system for existing conditions on a specific section of track. The track speed signal is generated by wayside signal equipment and is transmitted through the running rails.

Train Speed Signal - The train speed signal tells the speed control apparatus and the train's Engineer the actual speed of the train. The train speed signal originates at an axle generator or speed sensor, which monitors revolutions per minute (RPM's) of the train's wheels.

Speed Comparison - The constant comparison of the actual train speed to the authorized track speed is the key to speed control operation. The on-board speed control equipment will respond to the track speed/train speed comparison in one of the following ways:

Compliance - If train speed is lower than track speed, the speed control system will continue to monitor operations. Engineer has full control of brakes and power.

Over speed - Train speed is higher than allowable track speed. The train has either accelerated above allowable speed or the track speed code has changed to a more restrictive indication:

a. An audible alarm (whistle or bell) alerts the Engineer to an overspeed condition.
b. Engineer must manually acknowledge the overspeed condition.
c. Time delay begins. The purpose of the time delay is to allow the Engineer to respond to the overspeed by applying the brakes to slow the train.

Penalty Brake Application - If the Engineer fails to respond to or correct the over speed condition within the time delay period, the speed control apparatus will:

a. Take control of the brake system and make a full service brake application and remove traction power from the train.

b. Since the Engineer failed to respond, a penalty application will remain in effect until the train has been brought to a stop.

c. A penalty brake application cannot be released until the Engineer follows a specific recovery procedure.

Operation in Cab Signal Territory (Diesel and MU Locomotives)

Locomotives equipped with Speed Control must have the equipment set up with the Speed Control cutout cock or switch sealed in the CUT-IN (OPEN) position

Note: When double-heading or with multiple unit operation of electric or diesel locomotives, these instructions apply only to leading locomotive units.

Entering Automatic Speed Controlled Territory - Trains entering automatic speed control territory pass over a Running Cut-In Section. The Running Cut-In Section activates on-board speed control equipment prior to the train's entry into speed-controlled territory. The test loop is installed at a location that allows sufficient stopping distance from the entrance to speed controlled territory. “BEGIN ASC” signs identify the test section.

Leaving Automatic Speed Controlled Territory - Trains leaving automatic speed controlled territory pass over a cutout loop. The loop contains a high-energy coded signal, which will cause an on-board cutout relay to operate if the Engineer has properly manipulated the controls and train speed is below MAS. When the cutout relay is activated, TRAIN SPEED signals will not affect the brake system and the automatic speed control system may be cutout.

Note: Failure to cutout on a loop does not constitute an ASC failure.

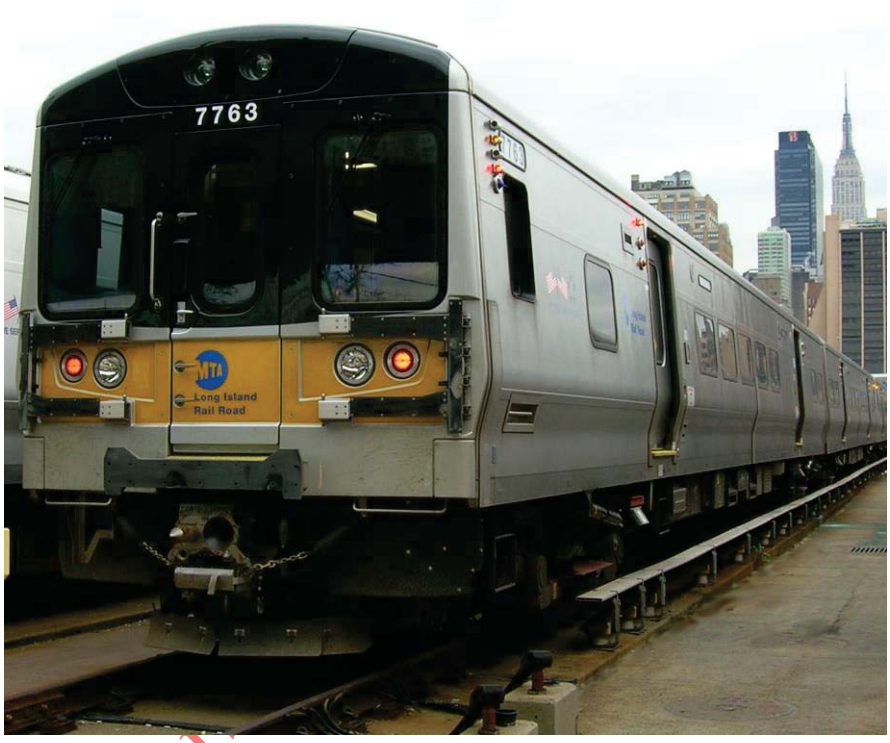
Automated Station Identification (ASI)

LIRR ASI systems are designed to comply with ADA regulations and (when functioning as intended) should not to be paused or turned off. This equipment has been modified to utilize GPS information provided from a train’s Automated Station Identification system to provide additional customer information through various LIRR computer systems. In order for the systems to interact properly, the passenger train identification number entered into a train’s ASI must be accurate. It is imperative that train crews must enter the exact train number of the train they are operating into the ASI. Utilizing a different train number, even if that train has the same station stops, will cause incorrect information to be generated to our customers.

Note: If you cannot enter your own train number, refer to the ASI section of that equipment’s pertinent THEM Appendix for instructions.

E-Version – Does Not Contain General Notice Changes

Long Island Rail Road



TRANSPORTATION DEPARTMENT
TRAIN HANDLING AND EQUIPMENT MANUAL

M7 APPENDIX

Car Number Series – 7002-7836
Built – 2002-2007

2012 EDITION

Automatic Train Control (ASC speed control)

ASPECT DISPLAY UNIT (ADU) - Aspect Code Change - When the ATC/cab signaling system receives a downward code change, an audible alert will sound. If the train speed is below the aspect displayed on the ASPECT DISPLAY UNIT (ADU), the Engineer will respond by moving the acknowledging device (wobble stick) to silence the alert.

Speed Sensing System (SSS) - A secondary component of the ATC system that monitors speed of the train, interprets data for tractive effort and spin slide control.

Overspeed - If the train speed exceeds the aspect displayed on the ASPECT DISPLAY UNIT (ADU), or if the ASPECT DISPLAY UNIT (ADU) changes to an aspect below the actual speed of the train, an OVERSPEED condition occurs.
An Overspeed condition is:

1. An audible alarm alerts the Engineer of an overspeed condition.
2. An automatic brake application occurs.
3. Traction power (propulsion) is removed.

The ATC system will apply train brakes to reduce the speed of the train. The M-7 will provide sufficient brake (BRAKE ASSURANCE RATE) to reduce the speed of the train below the aspect displayed on the ASPECT DISPLAY UNIT (ADU).

Penalty - If an overspeed condition is not acknowledged within 7 seconds, a penalty brake application will occur. A penalty brake application is an aggressive speed reduction provided by the ATC system to maintain the safety of the train.

Overspeed / Penalty Acknowledgment - When an overspeed or penalty occurs, the Engineer will respond as follows:

1. Acknowledge the audible alert by activating the acknowledging device (wobble stick).
2. Place the master controller to the COAST position, or ANY braking position.

The M-7 will maintain sufficient braking (BRAKE ASSURANCE RATE) to reduce the speed of the train below the aspect displayed on the Aspect Display Unit (ADU). When the train speed has reduced to the aspect displayed on the ASPECT DISPLAY UNIT (ADU), train control will be restored to the Engineer.

ATC, Speed Sensing System (SSS) and Alerter (ALE) bypass switches are located in the B car left hand electrical locker at the F-end.

- When ATC switch is in the bypass position the train should be treated as an ASC malfunction and the ADU (cab signal indicator) will be dark and inoperative
- When the SSS switch is in the bypass position the train should be treated as an ASC malfunction however the ADU (cab signal indicator) should remain illuminated and active.
- The ALE switch in bypass position does not affect the ATC (Automatic Speed Control) system and should not be treated as an ASC malfunction.

AUTOMATIC SPEED CONTROL DEPARTURE TEST (ASCDT)

Note: Both ATC and SSS must be sealed in the cut in position prior to ATC certification test and or departure. If one or both of the aforementioned switches is improperly sealed or the seal is absent, the ATC system is a malfunction except as provided by Rule 400 or 405.

1. Energize the operating stand and charge train.

2. Place Master controller in MIN BK.

3. Press ATC daily test button on Central Diagnostic Panel (CDP-left screen).

   ✓ 80 aspect will illuminate on ASPECT DISPLAY UNIT (ADU).

4. Hold acknowledging device (wobble stick) until 80 aspect is extinguished (5-7 seconds).

   ✓ Verify that ATC cutout is illuminated on TOD.

5. The ATC will cut-in at 80 and downward code aspects will individually illuminate to a 15 aspect necessitating the acknowledgement of each aspect within 7 seconds.

6. After acknowledging the 15 aspect the 15 aspect will again illuminate prompting the Engineer to observe the following:

   a. Speedometer on TOD (right screen) will display 17 mph, an overspeed alarm will sound and an overspeed indicator light on the TOD will illuminate. (Do Not acknowledge alarm at this time)

   b. Speed control brake will apply (approximately) 30+ psi brake cylinder pressure.

   c. Approximately 7 seconds later a penalty brake light will illuminate on TOD resulting in approximately 40+ psi of brake cylinder pressure.

   d. Approximately 7 seconds later the brake pipe will vent rapidly to 0 psi, the emergency brake light on TOD will illuminate with brake cylinder pressure at (approximately) 43+ psi or greater.

7. After confirming the above, the Engineer will now acknowledge alarm.

   ✓ ATC daily test button on CDP will display “passed”.

Note: although ATC daily test button on CDP displays “passed” the test must not be considered successful unless the Engineer has confirmed the three levels of brake application.

Parking Brake Operation

The M-7 car is equipped with a spring applied / air released parking brake for proper lay-up and other uses. The parking brake replaces the ratchet style hand brake found on M3 equipment. The parking brake is located in cabinet behind Engineer's seat. Both the CDP and the TOD screens indicate parking brake conditions.

- The parking brake indicator on the TOD will illuminate when 1 or more parking brakes are applied on the train.
- The parking brake indicator on the CDP will indicate "PB" in any car which has a parking brake applied

There are local interior and exterior indicator lights located on the M-7 cars that illuminate when parking brakes are applied on that car.

Note: It is essential that all unattended M7 equipment be secured with a minimum of 2 parking brakes on each end (except as provided by SI 1156-A).

Alerter (Deadman Protection)

The Alerter (ALE) monitors Engineer activity to ensure the Engineer is present and controlling train operation. The ALE has a sealed bypass switch and operates independently of the ATC and SSS. The ALE timer will count down 25 seconds of normal operation and monitor the following devices for activity:

1. ACKNOWLEDGING device.
2. Horn
3. Master Controller handle movement into or out of the COAST position.

    - If the train is stationary (not moving) and the master controller is in the Max BK position, the ALE countdown is suspended.
    - During operation, if Engineer activity is detected on any of the above three devices, the timer will automatically reset.
    - If no Engineer activity is detected for 25 seconds, an alarm will sound and the ALERTER light on the TOD will illuminate.

Initially, the alarm will begin at low volume and will increase in volume for 15 seconds. To silence the alarm and reset the ALE timer, activate one of the aforementioned devices.

If no activity is detected within the 15 seconds, a penalty brake application will take place. If an ALE penalty occurs, master controller must be moved into or out of COAST position to release brake application.

Note: If the ATC system bypassed, the ALE timer will continue to function properly, however failure to acknowledge the ALE alarm will result in an EMERGENCY application of the brakes.