

7
104
184
17

FRA RECORDS REQUIRED

<u>Period</u>	<u>Rule Number</u>
Daily	586 - Daily or Aftertrip
Mo.	382 - Switch Obstn.
	576 - Gage Ats. Ind.
3 Mo.	103 - Sw. Ckt. cont. & PD
	104 - Shunt Fouling
	107 - Ground
	383 - NON-C/o Valves
	386 - Restoring Feature
92 days	588 - Periodic Test - Loco.
6 Mo.	102 - SL & SEM Mech. Insp.
	384 - Cross Ptn.
1 Yr.	106 - AC Cnfgl & Vane Ry.
	108 - 500K or Less Cndrs.
	109 - Timing devices
	383 - cut-off type valves
	387 - Moveable Bridge lkg.
	577 - Test Ack. Cutin Ckt.
2 Yr.	102 - Sem & SL Mech.
	105 - Electric Lock
	106 - DC Polar and SIC Ry.
	376 - Mech. locking
	377 - Apr. locking
	378 - Time locking
	379 - Route locking
	380 - Indn. locking
	381 - Tfc. locking
	589 - Master Ry.-Torque Type
4 Yr.	106 - Relays
6 Yr.	589 - All Loco. Relays
10 Yr.	108 - Insulation Res.

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233

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- DEPARTMENT OF TRANSPORTATION
- FEDERAL RAILROAD ADMINISTRATION
- Part 233 – Signal System Reporting Requirements
- Part 235 – Instructions Governing Applications For Approval Of A Discontinuance Or Material Modification of A Signal System or Relief From The Requirements Of Part 236.
- Part 236 – Rules, Standards, And Instructions Governing The Installation, Inspection, Maintenance, And Repair Of Signal And Train Control Systems, Devices, And Appliances.
- Classification of Defect Codes

Effective February 27, 1984

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PART 233—SIGNAL SYSTEMS REPORTING REQUIREMENTS

Authority: Signal Inspection Act, as amended (49 U.S.C. 26); sec. 6(e)(6)(A) of the Department of Transportation Act (49 U.S.C. 1655(e)(6)(A)); secs. 202, 208 (a) and (d), and 209, Federal Railroad Safety Act of 1970, as amended (45 U.S.C. 431, 437 (a) and (d), and 438); sec. 1(b) Pub. L. 97-449, 96 Stat. 2413 (49 U.S.C. 501(b)(2), 504 and 522(a)); § 1.49 (f), (g), and (m) of the regulations of the Office of the Secretary of Transportation (49 CFR 1.49 (f), (g), and (m)).

§ 233.1 Scope.

This part prescribes reporting requirements with respect to methods of train operation, block signal systems, interlockings, traffic control systems, automatic train stop, train control, and cab signal systems, or other similar appliances, methods, and systems.

§ 233.3 Application.

(a) Except as provided in paragraph (b) of this section, this part applies to railroads that operate on standard gage track which is part of the general railroad system of transportation.

(b) This part does not apply to rail rapid transit operations conducted over track that is used exclusively for that purpose and that is not part of the general system of railroad transportation.

§ 233.5 Accidents resulting from signal failure.

Each carrier shall report within 24 hours to the Federal Railroad Administration by toll free telephone, number 800-424-0201, whenever it learns of the occurrence of an accident/incident arising from the failure of an

appliance device, method or system to function or indicate as required by Part 236 of this title that results in a more favorable aspect than intended or other condition hazardous to the movement of a train.

§ 233.7 Signal failure reports.

Each carrier shall report within 15 days each failure of an appliance, device, method, or system to function or indicate as required by Part 236 of this title that results in a more favorable aspect than intended or other condition hazardous to the movement of a train. Form FRA F6180-14, "Signal Failure Report," shall be used for this purpose and completed in accordance with instructions printed on the form.

§ 233.9 Annual reports.

Not later than April 1 of each year, each carrier shall file a report for the preceding calendar year on Form FRA F6180-47, "Signal Systems Annual Report," in accordance with instructions and definitions on the reverse side thereof.

§ 233.11 Civil penalty.

A carrier that fails or refuses to file reports as required by this Part is liable for the maximum civil penalty of \$2,500 for each offense as prescribed by the Signal Inspection Act, 49 U.S.C. 28, and the Federal Railroad Safety Act of 1970, as amended, 45 U.S.C. 438. Each day a failure or refusal continues is a separate offense.

§ 233.13 Criminal penalty.

Whoever knowingly and willfully—

(a) Makes, causes to be made, or participates in the making of a false entry in reports required to be filed by this part; or

(b) Files a false report or other document required to be filed by this part is subject to a \$5,000 fine and 2 years imprisonment as prescribed by 49 U.S.C. 522(a) and section 209(e) of the Federal Railroad Safety Act of 1970, as amended (45 U.S.C. 438(e)).

PART 235—INSTRUCTIONS GOVERNING APPLICATIONS FOR APPROVAL OF A DISCONTINUANCE OR MATERIAL MODIFICATION OF A SIGNAL SYSTEM OR RELIEF FROM THE REQUIREMENTS OF PART 236

Authority: Signal Inspection Act, as amended (49 U.S.C. 26); sec. 6(e)(6)(A) of the Department of Transportation Act (49 U.S.C. 1655(e)(6)(A)); secs. 202, 208 (a) and (d), and 209, Federal Railroad Safety Act of 1970, as amended (45 U.S.C. 431, 437 (a) and (d), and 438); § 1.49 (f), (g), and (m) of the regulations of the Office of the Secretary of Transportation (49 CFR 1.49 (f), (g), and (m)).

§ 235.1 Scope.

This part prescribes application for approval to discontinue or materially modify block signal systems, interlockings, traffic control systems, automatic train stop, train control, or cab signal systems, or other similar appliances, devices, methods, or systems, and provides for relief from Part 236 of this title.

§ 235.3 Application.

(a) Except as provided in paragraph (b) of this section, this part applies to railroads that operate on standard gage track which is part of the general railroad system of transportation.

(b) This part does not apply to rail rapid transit operations conducted over track that is used exclusively for that purpose and that is not part of the general system of railroad transportation.

§ 235.5 Changes requiring filing of application.

(a) Except as provided in § 235.7, applications shall be filed to cover the following:

(1) The discontinuance of a block signal system, interlocking, traffic control system, automatic train stop, train control, or cab signal system or other similar appliance or device;

(2) The decrease of the limits of a block signal system, interlocking, traffic control system, automatic train stop, train control, or cab signal system; or

(3) The modification of a block signal system, interlocking, traffic control system, automatic train stop, train control, or cab signal system.

§ 235.7 Changes not requiring filing of application.

(a) It is not necessary to file an application for approval of the following discontinuances:

(1) Removal of block signal system, interlocking, traffic control system, automatic train stop, train control, or cab signal system from track approved for abandonment by formal proceeding;

(2) Removal of devices and associated signals used to provide protection against unusual contingencies such as landslide, burned bridge, high water, high and wide load, or tunnel protection when the unusual contingency no longer exists;

(3) Removal of an interlocking where a drawbridge has been permanently closed by the formal approval of another government agency; or

(4) Removal from service not to exceed six months of block signal system, interlocking, or traffic control system necessitated by catastrophic occurrence such as derailment, flood, fire, or hurricane.

(b) When the resultant arrangement will comply with Part 236 of this title, it is not necessary to file for approval to decrease the limits of a system as follows:

(1) Decrease of the limits of an interlocking when interlocked switches, derails, or movable-point frogs are not involved;

(2) Removal of electric or mechanical lock from hand-operated switch in automatic block signal or traffic control territory where train speed over switch does not exceed 20 miles per hour; or

(3) Removal of electric or mechanical lock from hand-operated switch in automatic block signal or traffic control territory where trains are not permitted to clear the main track at such switch.

(c) When the resultant arrangement will comply with Part 236 of this title, it is not necessary to file an application for approval of the following modifications:

(1) A modification that is required to comply with an order of the Federal Railroad Administration or any section of Part 236 of this title;

(2) The installation of an automatic block signal or a traffic control system to replace manual block or non-signaled territory;

(3) The installation of a traffic control system to replace a roadway automatic block signal system (discontinuance of an automatic train stop, train control, or cab signal system is not permitted without FRA approval);

(4) The installation of an automatic train stop, train control, or cab signal system in an existing automatic block or traffic control system;

(5) The installation of a continuous inductive automatic train stop system to replace an existing intermittent inductive automatic train stop system;

(6) The installation of a continuous inductive automatic train stop system to supplement an existing automatic cab signal system;

(7) The installation of an automatic train control system to replace an existing automatic train stop system or to supplement an existing automatic cab signal system;

(8) The installation of an interlocking to replace existing stop signs, gates, or pipe-connected derails protecting a railroad crossing –at–grade;

(9) The installation of all relay type locking to replace existing mechanical or electromechanical locking of an interlocking;

(10) The installation of an additional controlled point in existing traffic control system;

(11) The installation of an interlocking in an existing block signal system;

(12) The conversion of a hand-operated switch, a hand-operated switch locked either electrically or mechanically, or a spring switch to a power-operated switch;

(13) The conversion of a spring switch to a hand-operated switch, or to a hand-operated switch locked either electrically or mechanically;

(14) The removal or relocation of signals associated with a spring switch converted to hand operation;

(15) The installation, relocation, or removal of signals to specifically provide adequate stopping distance;

(16) The change of aspects;

(17) The relocation of a signal to improve preview of signal aspect visibility;

(18) To replace a signal with a signal of another type;

(19) To change an approach signal to operative or inoperative signal, or remove an approach signal not required by § 238.310 of this title;

(20) The change in location of a machine from which an interlocking or traffic control system is controlled;

(21) The closing of a manual block station or the change in hours during which a manual block station is attended;

(22) The change in hours during which a manual interlocking is attended provided the interlocking operates for all routes over which train movements are permitted;

(23) The installation of devices used to provide protection against unusual contingencies such as landslide, burned bridges, high water, high and wide loads, or dragging equipment;

(24) The installation, relocation, or removal of signals, interlocked switches, derails, movable-point frogs, or electric locks in an existing system directly associated with:

- (i) The installation of new track;
 - (ii) The elimination of existing track other than a second main track;
 - (iii) The extension or shortening of a passing siding;
 - (iv) Elimination of second main track where signal system on retained main track is arranged to provide both opposing and following protection for train movements provided second main track is physically removed; or
 - (v) A line relocation; or
- (25) The temporary or permanent arrangement of existing systems necessitated by highway rail separation construction. Temporary arrangements shall be removed within six months following completion of construction.

§ 235.8 Relief from the requirements of Part 236 of this title.

Relief from the requirements of the Rules, Standards and Instructions contained in Part 236 of this title will be granted upon an adequate showing by an individual carrier. Relief heretofore granted to any carrier shall constitute relief to the same extent as relief granted under the requirements of this part.

§ 235.9 Civil penalty.

A carrier that fails or refuses to file an application required by this part is liable for the maximum civil penalty of \$2,500 for each offense as prescribed by the Signal Inspection Act, 49 U.S.C. 26, and the Federal Railroad Safety Act of 1970, as amended, 45 U.S.C. 438. Each day a failure or refusal continues is a separate offense.

§ 235.10 Contents of applications.

(a) The application may be submitted by letter and shall contain the following information:

(1) The corporate name of each applicant;

(2) The manner in which applicant is involved;

(3) The location of the project, giving name of operating division and nearest station;

(4) The track or tracks involved;

(5) A complete description of proposed changes as they would affect the existing facilities or of the section from which relief is sought;

(6) The reason for proposed changes or justification for relief from the requirements;

(7) The approximate dates of beginning and completion of project;

(8) Changes in operating practices, temporary or permanent;

(9) Whether safety of operation will be affected and if so, how; and

(10) Whether proposed changes will conform to the Federal Railroad Administration's Rules, Standards and Instructions (Part 236 of this title).

§ 235.12 Additional required information-prints.

(a) A print or prints, size 8 inches by 10½ inches, or 8½ inches by 11 inches, or folded to 8 inches by 10½ inches or to 8½ inches by 11 inches, shall be furnished with each application.

(b) The print or prints shall be to scale or by indicated dimensions, using Association of American Railroads graphic symbols.

(c) The following information shall be shown on the print or prints:

- (1) Present and proposed arrangement of tracks and signal facilities;
- (2) Name of carrier;
- (3) Operating division;
- (4) Place and State; and
- (5) Timetable directions of movements.

(d) If stopping distances are involved, the following information shall also be shown:

- (1) Curvature and grade;
- (2) Maximum authorized speeds of trains; and
- (3) Length of signal control circuits for each signal indication displayed.

(e) The following color scheme is suggested on prints:

- (1) Installations, relocations, and added signal aspects should be colored, preferably in yellow;
- (2) Removals, discontinuances, and abandonments should be colored, preferably in red; and
- (3) Existing facilities not pertinent to change proposed in application should be shown uncolored.

§ 235.13 Filing procedure.

(a) Applications or requests for reconsideration of an application shall be submitted by an authorized officer of the carrier.

(b) The original and two copies of each application with supporting papers should be filed.

(c) The application and correspondence in reference thereto should be addressed to the Associate Administrator for Safety, Federal Railroad Administration, Washington, D.C. 20590.

(d) A separate application shall be filed for each project.

(e) At a joint facility where changes are proposed in the automatic block signal system, interlocking, traffic control system, automatic train stop, train control, or cab signal system on the tracks of more than one carrier, or if more than one carrier will be affected by the proposed changes or relief sought, a joint application signed by all carriers affected shall be filed.

(f) Where only one carrier at a joint facility is affected by the discontinuance or modification of the installation or relief sought, it shall be responsible for filing the application. It shall also certify that the other joint carriers have been notified of the filing of its application.

§ 235.14 Notice.

The FRA will post public notice of the filing of an application or a request for reconsideration of an application in the FRA Office of Public Affairs and will mail copies to all interested parties.

§ 235.20 Protests.

(a) A protest against the granting of an application shall set forth specifically the grounds upon which it is made, and contain a concise statement of the interest of protestant in the proceeding.

(b) The original and two copies of any protest shall be filed with the Associate Administrator for Safety, Federal Railroad Administration, Washington, D.C. 20590, and one copy shall be furnished to each applicant.

(c) Protests should be filed within the time limit set forth in the public notice.

(d) The protestant shall certify that service of a copy of its protest was made upon each applicant.

(e) Request for hearing must be accompanied with a showing why the protestant is unable to properly present his or her position by written statements.

PART 236—RULES, STANDARDS, AND INSTRUCTIONS GOVERNING THE INSTALLATION, INSPECTION, MAINTENANCE, AND REPAIR OF SIGNAL AND TRAIN CONTROL SYSTEMS, DEVICES, AND APPLIANCES

Authority: Signal Inspection Act, as amended (49 U.S.C. 26); sec. 6(e)(6)(A) of the Department of Transportation Act (49 U.S.C. 1655(e)(6)(A)); secs. 202, 208 (a) and (d), and 209, Federal Railroad Safety Act of 1970, as amended (45 U.S.C. 431, 437 (a) and (d), and 438); § 1.49 (f), (g), and (m) of the regulations of the Office of the Secretary of Transportation (49) CFR 1.49 (f), (g), and (m))

§ 236.0 Applicability and minimum requirements.

(a) Except as provided in paragraph (b) of this section, this part applies to railroads that operate on standard gage track which is part of the general railroad system of transportation.

(b) This part does not apply to rail rapid transit operations conducted over track that is used exclusively for that purpose and that is not part of the general system of railroad transportation.

(c) Where a passenger train is operated at a speed of 60 or more miles per hour, or a freight train is operated at a speed of 50 or more miles per hour, a block signal system complying with the provisions of this Part shall be installed or a manual block system shall be placed permanently in effect which shall conform to the following conditions:

(1) A passenger train shall not be admitted to a block occupied by another train except under flag protection;

(2) No train shall be admitted to a block occupied by a passenger train except under flag protection;

(3) No train shall be admitted to a block occupied by an opposing train except under flag protection; and

(4) A freight train, including a work train, may be authorized to follow a freight train, including a work train, into a block but the following train must proceed prepared to stop within one-half the range of vision but not exceeding 20 miles per hour.

(d) Where any train is operated at a speed of 80 or more miles per hour, an automatic cab signal, automatic train stop or automatic train control system complying with the provisions of this Part shall be installed.

(e) Nothing in this section authorizes the discontinuance of a block signal system, interlocking, traffic control system, automatic train stop, train control, or cab signal system without approval of the Federal Railroad Administration.

§ 236.1 Plans, where kept.

As required for maintenance, plans shall be kept at all interlockings, automatic signals and controlled points. Plans shall be legible and correct.

§ 236.2 Grounds.

Each circuit, the functioning of which affects the safety of train operations, shall be kept free of any ground or combination of grounds which will permit a flow of current equal to or in excess of 75 percent of the release value of any relay or other

electromagnetic device in the circuit, except circuits which include any track rail and except the common return wires of single-wire, single-break, signal control circuits using a grounded common, and alternating current power distribution circuits which are grounded in the interest of safety.

§ 236.3 Locking of signal apparatus housings.

Signal apparatus housings shall be secured against unauthorized entry.

§ 236.4 Interference with normal functioning of device.

The normal functioning of any device shall not be interfered with in testing or otherwise without first taking measures to provide for safety of train operation which depends on normal functioning of such device.

§ 236.5 Design of control circuits on closed circuit principle.

All control circuits the functioning of which affects safety of train operation shall be designed on the closed circuit principle, except circuits for roadway equipment of intermittent automatic train stop system.

§ 236.6 Hand-operated switch equipped with switch circuit controller.

Hand-operated switch equipped with switch circuit controller connected to the point, or with facing-point lock and circuit controller, shall be so maintained that when point is open one-fourth inch or more on facing-point switch and three-eighths inch or

more on trailing-point switch, track or control circuits will be opened or shunted or both, and if equipped with facing-point lock with circuit controller, switch cannot be locked. On such hand-operated switch, switch circuit controllers, facing-point locks, switch-and-lock movements, and their connections shall be securely fastened in place, and contacts maintained with an opening of not less than one-sixteenth inch when open.

§ 236.7 Circuit controller operated by switch-and-lock movement.

Circuit controller operated by switch-and-lock movement shall be maintained so that normally open contacts will remain closed and normally closed contacts will remain open until the switch is locked.

§ 236.8 Operating characteristics of electromagnetic, electronic, or electrical apparatus.

Signal apparatus, the functioning of which affects the safety of train operation, shall be maintained in accordance with the limits within which the device is designed to operate.

§ 236.9 Selection of circuits through indicating or annunciating instruments.

Signal control and electric locking circuits shall not be selected through the contacts of instruments designed primarily for indicating or annunciating purposes in which an indicating element attached to the armature is arranged so that it can in itself cause improper operation of the armature.

§ 236.10 Electric locks, force drop type; where required.

Electric locks on new installations and new electric locks applied to existing installations shall be of the forced drop type.

§ 236.11 Adjustment, repair, or replacement of component.

When any component of a signal system, the proper functioning of which is essential to the safety of train operation, fails to perform its intended signaling function or is not in correspondence with known operating conditions, the cause shall be determined and the faulty component adjusted, repaired or replaced without undue delay.

§ 236.12 Spring switch signal protection; where required.

Signal protection shall be provided for facing and trailing movements through spring switch within interlocking limits and through spring switch installed in automatic block signal, train stop, train control or cab signal territory where train movements over the switch are made at a speed exceeding 20 miles per hour, except that signal protection shall be required only with the current of traffic on track signaled for movement in only one direction.

Note: Does not apply to spring switch installed prior to October 1, 1950 in automatic block signal, automatic train stop, or automatic train control territory.

§ 236.13 Spring switch; selection of signal control circuits through circuit controller.

The control circuits of signals governing facing movements over a main track spring switch shall be selected through the contacts of a switch circuit controller, or through the contacts of relay repeating the position of such circuit controller, which, when normally closed switch point is open one-fourth inch or more, will cause such signals to display their most re-

restrictive aspects, except that where a separate aspect is displayed for facing movements over the switch in the reverse position the signal shall display its most restrictive aspect when the switch points are open one-fourth inch or more from either the normal or reverse position.

§ 236.14 Spring switch signal protection: requirements.

(a) The indication of signal governing movements from siding to main track with the current of traffic on track signaled for movements in only one direction through a spring switch in automatic block signal territory shall be not less restrictive than "Proceed at Restricted Speed" when the block, into which movements are governed by the signal, is occupied, and shall be "Stop" when the main track is occupied by a train approaching the switch within at least 1,500 feet in approach of the approach signal located stopping distance from the main track signal governing trailing movements over switch, except that the indication may be caused to be less restrictive if approach or time locking is used.

(b) The indication of signal governing movements against the current of traffic from the reverse main of main tracks to a single track, or signal governing movements from a siding to a main track signaled for movements in either direction, through a spring switch, in automatic block signal territory, shall be not less restrictive than "Proceed at Restricted Speed" when the block, into which movements are governed by the signal, is occupied by a preceding train, and shall be "Stop" when the block on the single track into which the signal governs is occupied by an opposing train.

(c) The indication of signal govern-

ing movements against the current of traffic from the reverse main of main tracks to a single track or signal governing movements from a siding to a main track signaled for movements in either direction through a spring switch in automatic block signal territory shall be "Stop" when the normal direction main track of the double track or the single track signaled for movements in both directions is occupied by a train approaching the switch within at least 1,500 feet in approach of the approach signal located stopping distance from the main track signal governing trailing movements over switch, except that indication may be caused to be less restrictive if approach or time locking is used.

§ 236.15 Timetable instructions.

Automatic block, traffic control, train stop, train control and cab signal territory shall be designated in timetable instructions.

§ 236.16 Electric lock, main track releasing circuit.

When an electric lock releasing circuit is provided on the main track to permit a train or an engine to diverge from the main track without time delay, the circuit shall be of such length to permit occupancy of the circuit to be seen by a crew member stationed at the switch. When the releasing circuit extends into the fouling circuit, a train or engine on the siding shall be prevented from occupying the releasing circuit by a derail either pipe-connected to switch point or equipped with an independently operated electric lock.

§ 236.17 Pipe for operating connections, requirements.

(a) Steel or wrought-iron pipe one inch or larger, or members of equal strength,

shall be used for operating connections for switches, derails, movable-point frogs, facing-point locks, rail-locking devices of movable bridge protected by interlocking, and mechanically operated signals, except up-and-down rod which may be three-fourths inch pipe or solid rod. Pipe shall be fully screwed into coupling and both ends of each pipe shall be riveted to pipe plug with 2 rivets.

(b) Pipeline shall not be out of alignment sufficiently to interfere with proper operation, shall be properly compensated for temperature changes, and supported on carriers spaced not more than 8 feet apart on tangent and curve of less than 2° and not more than 7 feet apart on curve of 2° or more. With lever in any position, couplings in pipe line shall not foul carriers.

ROADWAY SIGNALS AND CAB SIGNALS

§ 236.21 Location of roadway signals.

Each roadway signal shall be positioned and aligned so that its aspects can be clearly associated with the track it governs.

§ 236.22 Semaphore signal arm; clearance to other objects.

At least one-half inch clearance shall be provided between semaphore signal arm, and any object that may interfere with its operation.

§ 236.23 Aspects and indications.

(a) Aspects shall be shown by the position of semaphore blades, color of lights, position of lights, flashing of lights, or any combination thereof. They may be qualified by marker plate, number plate, letter plate, marker light, shape and color of semaphore blades or any combination

thereof, subject to the following conditions:

(1) Night aspects of roadway signals, except qualifying appurtenances, shall be shown by lights; day aspects by lights or semaphore arms. A single white light shall not be used.

(2) Reflector lenses or buttons or other devices which depend for visibility upon reflected light from an external source shall not be used hereafter in night aspects, except qualifying appurtenances.

(b) The aspects of cab signals shall be shown by lights or by illuminated letters or numbers.

(c) Each aspect displayed by a signal shall be identified by a name and shall indicate action to be taken. Only one name and indication shall apply to those aspects indicating the same action to be taken; the same aspect shall not be used with any other name and indication.

(d) The fundamental indications of signal aspects shall conform to the following:

(1) A red light, a series of horizontal lights or a semaphore blade in a horizontal position shall be used to indicate stop.

(2) A yellow light, a lunar light, or a series of lights or a semaphore blade in the upper or lower quadrant at an angle of approximately 45 degrees to the vertical, shall be used to indicate that speed is to be restricted and stop may be required.

(3) A green light, a series of vertical lights, or a semaphore blade in a vertical position in the upper quadrant or 60° or 90° in the lower quadrant shall be used to indicate proceed at authorized speed.

(e) The names, indications, and aspects of roadway and cab signals

shall be defined in the carrier's Operating Rule Book or Special Instructions. Modifications shall be filed with the FRA within thirty days after such modifications become effective.

(f) The absence of a qualifying appurtenance, the failure of a lamp in a light signal, or a false restrictive position of an arm of a semaphore signal shall not cause the display of a less restrictive aspect than intended.

§ 236.24 Spacing of roadway signals.

Each roadway signal shall be located with respect to the next signal or signals in advance which govern train movements in the same direction so that the indication of a signal displaying a restrictive aspect can be complied with by means of a brake application, other than an emergency application, initiated at such signal, either by stopping at the signal where a stop is required, or by a reduction in speed to the rate prescribed by the next signal in advance where reduced speed is required.

§ 236.26 Buffing device, maintenance.

Buffing device shall be maintained so as not to cause the signal to display a less restrictive aspect than intended.

TRACK CIRCUITS

§ 236.51 Track circuit requirements.

Track relay controlling home signals shall be in deenergized position, or device that functions as a track relay controlling home signals shall be in its most restrictive state, and the track circuit of an automatic train stop, train control, or cab signal system shall be deenergized in the rear of the point where any of the following conditions exist:

(a) When a rail is broken or a rail or switch-frog is removed except when a rail is broken or removed in the shunt fouling circuit of a turnout or crossover, provided, however, that shunt fouling circuit may not be used in a turnout through which permissible speed is greater than 45 miles per hour. It shall not be a violation of this requirement if a track circuit is energized: (1) When a break occurs between the end of rail and track circuit connector; within the limits of rail-joint bond, appliance or other protective device, which provides a bypath for the electric current, or (2) As result of leakage current or foreign current in the rear of a point where a break occurs.

(b) When a train, locomotive, or car occupies any part of a track circuit, including fouling section of turnout except turnouts of hand-operated main track crossover. It shall not be a violation of this requirement where the presence of sand, rust, dirt, grease, or other foreign matter prevents effective shunting, except that where such conditions are known to exist adequate measures to safeguard train operation must be taken.

(c) Where switch shunting circuit is used:

(1) Switch point is not closed in normal position.

(2) A switch is not locked where facing-point lock with circuit controller is used.

(3) An independently operated fouling-point derail equipped with switch circuit controller is not in derailing position.

§ 236.52 Relayed cut-section.

Where relayed cut-section is used in territory where noncoded direct-cur-

rent track circuits are in use the energy circuit to the adjoining track shall be open and the track circuit shunted when the track relay at such cut-section is in deenergized position.

§ 236.53 Track circuit feed at grade crossing.

At grade crossing with an electric railroad where foreign current is present, the electric energy for noncoded direct current track circuit shall feed away from the crossing.

§ 236.54 Minimum length of track circuit.

When a track circuit shorter than maximum inner wheelbase of any locomotive or car operated over such track circuit is used for control of signaling facilities, other means shall be used to provide the equivalent of track circuit protection.

§ 236.55 Dead section; maximum length.

Where dead section exceeds 35 feet, a special circuit shall be installed. Where shortest outer wheelbase of a locomotive operating over such dead section is less than 35 feet, the maximum length of the dead section shall not exceed the length of the outer wheelbase of such locomotive unless special circuit is used.

§ 236.56 Shunting sensitivity.

Each track circuit controlling home signal or approach locking shall be so maintained that track relay is in deenergized position, or device that functions as a track relay shall be in its most restrictive state if, when track circuit is dry, a shunt of 0.06 ohm resistance is connected across the track rails of the circuit, including fouling sections of turnouts.

§ 236.57 Shunt and fouling wires.

(a) Except as provided in paragraph (b) of this section, shunt wires and fouling wires hereafter installed or replaced shall consist of at least two discrete conductors, and each shall be of sufficient conductivity and maintained in such condition that the track relay will be in deenergized position, or device that functions as a track relay will be in its most restrictive state, when the circuit is shunted.

(b) This rule does not apply to shunt wires where track or control circuit is opened by the switch circuit controller.

§ 236.58 Turnout, fouling section.

Rail joints within the fouling section shall be bonded, and fouling section shall extend at least to a point where sufficient trackcenters and allowance for maximum car overhang and width will prevent interference with train, locomotive, or car movement on the adjacent track.

§ 236.59 Insulated rail joints.

Insulated rail joints shall be maintained in condition to prevent sufficient track circuit current from flowing between the rails separated by the insulation to cause a failure of any track circuit involved.

§ 236.60 Switch shunting circuit; use restricted.

Switch shunting circuit shall not be hereafter installed, except where track or control circuit is opened by the circuit controller.

WIRES AND CABLES

§ 236.71 Signal wires on pole line and aerial cable.

Signal wire on pole line shall be

securely tied in on insulator properly fastened to crossarm or bracket supported by pole or other support. Signal wire shall not interfere with, or be interfered by, other wires on the pole line. Aerial cable shall be supported by messenger.

§ 236.73 Open-wire transmission line: clearance to other circuits.

Open-wire transmission line operating at voltage of 750 volts or more shall be placed not less than 4 feet above the nearest crossarm carrying signal or communication circuits.

§ 236.74 Protection of insulated wire: splice in underground wire.

Insulated wire shall be protected from mechanical injury. The insulation shall not be punctured for test purposes. Splice in underground wire shall have insulation resistance at least equal to the wire spliced.

§ 236.76 Tagging of wires and interference of wires or tags with signal apparatus.

Each wire shall be tagged or otherwise so marked that it can be identified at each terminal. Tags and other marks of identification shall be made of insulating material and so arranged that tags and wires do not interfere with moving parts of apparatus.

INSPECTIONS AND TESTS; ALL SYSTEMS

§ 236.101 Purpose of inspection and tests; removal from service of relay or device failing to meet test requirements.

The following inspections and tests shall be made in accordance with specifications of the carrier, subject to approval of the FRA, to determine if the apparatus and/or equipment is maintained in condition to perform its

intended function. Electronic device, relay, or other electromagnetic device which fails to meet the requirements of specified tests shall be removed from service, and shall not be restored to service until its operating characteristics are in accordance with the limits within which such device or relay is designed to operate.

§ 236.102 Semaphore or searchlight signal mechanism.

(a) Semaphore signal mechanism shall be inspected at least once every six months, and tests of the operating characteristics of all parts shall be made at least once every two years.

(b) Searchlight signal mechanism shall be inspected, and the mechanical movement shall be observed while operating the mechanism to all positions, at least once every six months. Tests of the operating characteristics shall be made at least once every two years.

§ 236.103 Switch circuit controller or point detector.

Switch circuit controller, circuit controller, or point detector operated by hand-operated switch or by power-operated or mechanically-operated switch-and-lock movement shall be inspected and tested at least once every three months.

§ 236.104 Shunt fouling circuit.

Shunt fouling circuit shall be inspected and tested at least once every three months.

§ 236.105 Electric lock.

Electric lock, except forced-drop type, shall be tested at least once every two years.

§ 236.106 Relays.

Each relay, the functioning of which

affects the safety of train operations, shall be tested at least once every four years except:

(a) Alternating current centrifugal type relay shall be tested at least once every 12 months;

(b) Alternating current vane type relay and direct current polar type relay shall be tested at least once every 2 years; and

(c) Relay with soft iron magnetic structure shall be tested at least once every 2 years.

§ 236.107 Ground tests.

(a) Except as provided in paragraph (b) of this section, a test for grounds on each energy bus furnishing power to circuits, the functioning of which affects the safety of train operation, shall be made when such energy bus is placed in service, and shall be made at least once every three months thereafter.

(b) The provisions of this rule shall not apply to track circuit wires, common return wires of grounded common single-break circuits, or alternating current power distribution circuits grounded in the interest of safety.

§ 236.108 Insulation resistance tests, wires in trunking and cables.

(a) Insulation resistance of wires and cables, except wires connected directly to track rails, shall be tested when wires, cables, and insulation are dry. Insulation resistance tests shall be made between all conductors and ground, and between conductors in each multiple conductor cable, and between conductors in trunking, when wires or cables are installed and at least once every ten years thereafter.

(b) When insulation resistance of wire or cable is found to be less than 500,000 ohms, prompt action shall be taken to

repair or replace the defective wire or cable and until such defective wire or cable is replaced, insulation resistance test shall be made annually.

(c) In no case shall a circuit be permitted to function on a conductor having an insulation resistance to ground or between conductors of less than 200,000 ohms during the period required for repair or replacement.

§ 236.109 Time releases, timing relays and timing devices.

Time releases, timing relays and timing devices shall be tested at least once every twelve months. The timing shall be maintained at not less than 90 percent of the predetermined time interval, which shall be shown on the plans or marked on the time release, timing relay, or timing device.

§ 236.110 Results of tests.

Results of tests made in compliance with §§ 236.102 to 236.109, inclusive; 236.376 to 236.387, inclusive; 236.576; 236.577; 236.586; 236.588; and 236.589 shall be recorded on preprinted or computerized forms provided by the railroad. Such forms shall show the name of the railroad, place and date, equipment tested, results of tests, repairs, replacements, adjustments made, and condition in which the apparatus was left. Each record shall be signed by the employee making the test and shall be filed in the office of a supervisory official having jurisdiction. Each record shall be retained until the next record is filed but in no case less than one year.

Subpart B—Automatic Block Signal Systems

STANDARDS

§ 236.201 Track-circuit control of signals.
The control circuits for home signal

aspects with indications more favorable than "proceed at restricted speed" shall be controlled automatically by track circuits extending through the entire block.

§ 236.202 Signal governing movements over hand-operated switch.

Signal governing movements over hand-operated switch in the facing direction shall display its most restrictive aspect when the points are open one-fourth inch or more and, in the trailing direction, three-eighths inch or more, except that where a separate aspect is displayed for facing movements over the switch in the normal and in the reverse position, the signal shall display its most restrictive aspect when the switch points are open one-fourth inch or more from either the normal or reverse position.

§ 236.203 Hand operated crossover between main tracks; protection.

At hand-operated crossover between main tracks, protection shall be provided by one of the following:

(a) An arrangement of one or more track circuits and switch circuit controllers,

(b) Facing point locks on both switches of the crossover, with both locks operated by a single lever, or

(c) Electric locking of the switches of the crossover. Signals governing movements over either switch shall display their most restrictive aspect when any of the following conditions exist:

(1) Where protection is provided by one or more track circuits and switch circuit controllers, and either switch is open or the crossover is occupied by a train, locomotive or car in such a manner as to foul the main track. It shall not be a violation of this require-

ment where the presence of sand, rust, dirt, grease or other foreign matter on the rail prevents effective shunting;

(2) Where facing point locks with a single lever are provided, and either switch is unlocked;

(3) Where the switches are electrically locked, before the electric locking releases.

§ 236.204 Track signaled for movements in both directions, requirements.

On track signaled for movements in both directions, a train shall cause one or more opposing signals immediately ahead of it to display the most restrictive aspect, the indication of which shall be not more favorable than "proceed at restricted speed." Signals shall be so arranged and controlled that if opposing trains can simultaneously pass signals displaying proceed aspects and the next signal in advance of each such signal then displays an aspect requiring a stop, or its most restrictive aspect, the distance between opposing signals displaying such aspects shall be not less than the aggregate of the stopping distances for movements in each direction. Where such opposing signals are spaced stopping distance apart for movements in one direction only, signals arranged to display restrictive aspects shall be provided in approach to at least one of the signals. Where such opposing signals are spaced less than stopping distance apart for movements in one direction, signals arranged to display restrictive aspects shall be provided in approach to both such signals. In absolute permissive block signaling, when a train passes a head block signal, it shall cause the opposing head block signal to display an aspect with an indication not more favorable than "stop."

§ 236.205 Signal control circuits; requirements.

The circuits shall be so installed that each signal governing train movements into a block will display its most restrictive aspect when any of the following conditions obtain within the block: (a) Occupancy by a train, locomotive, or car, (b) when points of a switch are not closed in proper position, (c) when an independently operated fouling point derail equipped with switch circuit controller is not in derailing position, (d) When a track relay is in de-energized position or a device which functions as a track relay is in its most restrictive state; or when signal control circuit is deenergized.

§ 236.206 Battery or power supply with respect to relay; location.

The battery or power supply for each signal control relay circuit, where an open-wire circuit or a common return circuit is used, shall be located at the end of the circuit farthest from the relay.

§ 236.207 Electric lock on hand-operated switch; control.

Electric lock on hand-operated switch shall be controlled so that it cannot be unlocked until control circuits of signals governing movements over such switch have been opened. Approach or time locking shall be provided.

Subpart C—Interlocking

STANDARDS

§ 236.301 Where signals shall be provided.

Signals shall be provided to govern train movements into and through interlocking limits, except that a signal shall not be required to govern movements over a hand-operated switch

into interlocking limits if the switch is provided with an electric lock and a derail at the clearance point, either pipe-connected to the switch or independently locked, electrically. Electric locks installed under this rule must conform to the time and approach locking requirements of Rule 314 (without reference to the 20-mph exceptions), and those of either Rule 760 or Rule 768, as may be appropriate.

§ 236.302 Track circuits and route locking.

Track circuits and route locking shall be provided and shall be effective when the first pair of wheels of a locomotive or a car passes a point not more than 13 feet in advance of the signal governing its movement, measured from the center of the mast, or if there is no mast, from the center of the signal.

§ 236.303 Control circuits for signals, selection through circuit controller operated by switch points or by switch locking mechanism.

The control circuit for each aspect with indication more favorable than "proceed at restricted speed" of power operated signal governing movements over switches, movable-point frogs and derails shall be selected through circuit controller operated directly by switch points or by switch locking mechanism, or through relay controlled by such circuit controller, for each switch, movable-point frog, and derail in the routes governed by such signal. Circuits shall be arranged so that such signal can display an aspect more favorable than "proceed at restricted speed," only when each switch, movable-point frog, and derail in the route is in proper position.

§ 236.304 Mechanical locking or same protection effected by circuits.

Mechanical locking, or the same pro-

tection effected by means of circuits, shall be provided.

§ 236.305 Approach or time locking.

Approach or time locking shall be provided in connection with signals displaying aspects with indications more favorable than "proceed at restricted speed."

§ 236.306 Facing point lock or switch-and-lock movement.

Facing point lock or switch-and-lock movement shall be provided for mechanically operated switch, movable-point frog, or split-point derail.

§ 236.307 Indication locking.

Indication locking shall be provided for operative approach signals of the semaphore type, power-operated home signals, power-operated switches, movable-point frogs and derails, and for all approach signals except light signals, all aspects of which are controlled by polar or coded track circuits or line circuits so arranged that a single fault will not permit a more favorable aspect than intended to be displayed.

§ 236.308 Mechanical or electric locking or electric circuits; requisites.

Mechanical or electric locking or electric circuits shall be installed to prevent signals from displaying aspects which permit conflicting movements except that opposing signals may display an aspect indicating proceed at restricted speed at the same time on a track used for switching movements only, by one train at a time. Manual interlocking in service as of the date of this part at which opposing signals on the same track are permitted simultaneously to display

aspects authorizing conflicting movements when interlocking is unattended, may be continued, provided that simultaneous train movements in opposite directions on the same track between stations on either side of the interlocking are not permitted.

NOTE: Relief from the requirement of this section will be granted upon an adequate showing by an individual carrier to allow opposing signals on the same track simultaneously to display aspects to proceed through an interlocking which is unattended, provided that train movements in opposite directions on the same track between stations on either side of the interlocking are not permitted at the same time.

§ 236.309 Loss of shunt protection; where required.

(a) A loss of shunt of 5 seconds or less shall not permit an established route to be changed at an automatic interlocking.

(b) A loss of shunt of 5 seconds or less shall not permit the release of the route locking circuit of each power-operated switch hereafter installed.

§ 236.310 Signal governing approach to home signal.

A signal shall be provided on main track to govern the approach with the current of traffic to any home signal except where the home signal is the first signal encountered when leaving yards or stations and authorized speed approaching such signal is not higher than slow speed. When authorized speed between home signals on route governed is 20 miles per hour or less, an inoperative signal displaying an aspect indicating "approach next signal prepared to stop" may be used to govern the approach to the home signal.

§ 236.311 Signal control circuits, selection through track relays or devices functioning

as track relays and through signal mechanism contacts and time releases at automatic interlocking.

(a) The control circuits for aspects with indications more favorable than "proceed at restricted speed" shall be selected through track relays, or through devices that function as track relays, for all track circuits in the route governed.

(b) At automatic interlocking, signal control circuits shall be selected (1) through track relays, or devices that function as track relays, for all track circuits in the route governed and in all conflicting routes within the interlocking; (2) through signal mechanism contacts or relay contacts closed when signals for such conflicting routes display "stop" aspects; and (3) through normal contacts of time releases, time element relays, or timing devices for such conflicting routes, or contacts of relays repeating the normal position or normal state of such time releases, time element relays, or timing devices.

§ 236.312 Movable bridge, interlocking of signal appliances with bridge devices.

When movable bridge is protected by interlocking the signal appliances shall be so interlocked with bridge devices that before a signal governing movements over the bridge can display an aspect to proceed the bridge must be locked and the track alined, with the bridge locking members within one inch of their proper positions and with the track rail on the movable span within three-eighths inch of correct surface and alinement with rail seating device on bridge abutment or fixed span **Emergency bypass switches and devices shall be locked or sealed.**

§ 236.314 Electric lock for hand-operated switch or derail.

Electric lock shall be provided for each hand-operated switch or derail within interlocking limits, except where train movements are made at not exceeding 20 miles per hour. At manually operated interlocking it shall be controlled by operator of the machine and shall be unlocked only after signals governing movements over such switch or derail display aspects indicating stop. Approach or time locking shall be provided.

RULES AND INSTRUCTIONS

§ 236.326 Mechanical locking removed or disarranged; requirement for permitting train movements through interlocking.

When mechanical locking of interlocking machine is being changed or is removed from the machine, or locking becomes disarranged or broken, unless protection equivalent to mechanical locking is provided by electric locking or electric circuits, train movements through the interlocking shall not be permitted until each switch, movable-point frog or derail in the route is spiked, clamped or blocked in proper position so that it cannot be moved by its controlling lever, and then train movements shall not exceed restricted speed until the interlocking is restored to normal operation. It will not be necessary to comply with this requirement at interlockings where protection is in service in accordance with section 303, provided that the signal controls are arranged so that the signals cannot display an aspect the indication of which is less restrictive than "proceed at restricted speed."

§ 236.327 Switch, movable-point frog or split-point derail.

Switch, movable-point frog, or split-point derail equipped with lock rod shall be maintained so that it can not be locked when the point is open three-eighths inch or more.

§ 236.328 Plunger of facing-point lock.

Plunger of lever operated facing-point lock shall have at least 8-inch stroke. When lock lever is in unlocked position the end of the plunger shall clear the lock rod not more than one inch.

§ 236.329 Bolt lock.

Bolt lock shall be so maintained that signal governing movements over switch or derail and displaying an aspect indicating stop cannot be operated to display a less restrictive aspect while derail is in derailing position, or when switch point is open one-half inch or more.

§ 236.330 Locking dog of switch-and-lock movement.

Locking dog of switch-and-lock movement shall extend through lock rod one-half inch or more in either normal or reverse position.

§ 236.334 Point detector.

Point detector shall be maintained so that when switch mechanism is locked in normal or reverse position, contacts cannot be opened by manually applying force at the closed switch point. Point detector circuit controller shall be maintained so that the contacts will not assume the position corresponding to switch point closure if the switch point is prevented by an obstruction, from closing to within one-fourth inch where latch-out device is

not used, and to within three-eighths inch where latch-out device is used.

§ 236.335 Dogs, stops and trunnions of mechanical locking.

Driving pieces, dogs, stops and trunnions shall be rigidly secured to locking bars. Swing dogs shall have full and free movement. Top plates shall be maintained securely in place.

§ 236.336 Locking bed.

The various parts of the locking bed, locking bed supports, and tappet stop rail shall be rigidly secured in place and alined to permit free operation of locking.

§ 236.337 Locking faces of mechanical locking; fit.

Locking faces shall fit squarely against each other with a minimum engagement when locked of at least one-half the designed locking face.

§ 236.338 Mechanical locking required in accordance with locking sheet and dog chart.

Mechanical locking shall be in accordance with locking sheet and dog chart currently in effect.

§ 236.339 Mechanical locking, maintenance requirements.

Locking and connections shall be maintained so that, when a lever or latch is mechanically locked the following will be prevented:

(a) *Mechanical machine.* (1) Latch-operated locking. Raising lever latch block so that bottom thereof is within three-eighths inch of top of quadrant.

(2) Lever-operated locking. Moving lever latch block more than three-eighths inch on top of quadrant.

(b) *Electromechanical machine.* (1) Lever moving in horizontal plane. Moving lever more than five-sixteenths inch when in normal position or more than nine-sixteenths inch when in reverse position.

(2) Lever moving in arc. Moving lever more than 5 degrees.

(c) *Power machine.* (1) Latch-operated locking. Raising lever latch block so that bottom thereof is within seven thirty-seconds inch of top of quadrant.

(2) Lever moving in horizontal plane. Moving lever more than five-sixteenths inch when in normal position or more than nine-sixteenths inch when in reverse position.

(3) Lever moving in arc. Moving lever more than 5 degrees.

§ 236.340 Electromechanical interlocking machine; locking between electrical and mechanical levers.

In electro-mechanical interlocking machine, locking between electric and mechanical levers shall be maintained so that mechanical lever cannot be operated except when released by electric lever.

§ 236.341 Latch shoes, rocker links, and quadrants.

Latch shoes, rocker links, and quadrants of Saxby and farmer machines shall be maintained so that locking will not release if a downward force not exceeding a man's weight is exerted on the rocker while the lever is in the mid-stroke position.

§ 236.342 Switch circuit controller.

Switch circuit controller connected at the point to switch, derail, or movable-point frog, shall be maintained so that its contacts will not be in position

corresponding to switch point closure when switch point is open one-fourth inch or more.

INSPECTION AND TESTS

§ 236.376 Mechanical locking.

Mechanical locking in interlocking machine shall be tested when new locking is installed; and thereafter when change in locking is made, or locking becomes disarranged, or tested at least once every two years, whichever shall occur first.

§ 236.377 Approach locking.

Approach locking shall be tested when placed in service and thereafter when modified, disarranged, or at least once every two years, whichever shall occur first.

§ 236.378 Time locking.

Time locking shall be tested when placed in service and thereafter when modified, disarranged, or at least once every two years, whichever shall occur first.

§ 236.379 Route locking.

Route locking or other type of switch locking shall be tested when placed in service and thereafter when modified, disarranged, or at least once every two years, whichever shall occur first.

§ 236.380 Indication locking.

Indication locking shall be tested when placed in service and thereafter when modified, disarranged, or at least once every two years, whichever shall occur first.

§ 236.381 Traffic locking.

Traffic locking shall be tested when placed in service and thereafter when modified, disarranged, or at least once

every two years, whichever shall occur first.

§ 236.382 Switch obstruction test.

Switch obstruction test of lock rod of each power-operated switch and lock rod of each hand-operated switch equipped with switch-and-lock-movement shall be made when lock rod is placed in service or changed out, but not less than once each month.

§ 236.383 Valve locks, valves, and valve magnets.

Valve locks on valves of the non-cut-off type shall be tested at least once every three months, and valves and valve magnets shall be tested at least once every year.

§ 236.384 Cross protection.

Cross protection shall be tested at least once every six months.

§ 236.386 Restoring feature on power switches.

Restoring feature on power switches shall be tested at least once every three months.

§ 236.387 Movable bridge locking.

Movable bridge locking shall be tested at least once a year.

Subpart D—Traffic Control Systems

STANDARDS

§ 236.401 Automatic block signal system and interlocking standards applicable to traffic control systems.

The standards prescribed in §§ 236.201, to 236.203, inclusive, §§ 236.205, 236.206, 236.303, 236.307 and 236.309 to 236.311, inclusive, shall apply to traffic control systems.

§ 236.402 Signals controlled by track circuits and control operator.

The control circuits for home signal aspects with indications more favorable than "proceed at restricted speed" shall be controlled by track circuits extending through entire block. Also in addition, at controlled point they may be controlled by control operator, and, at manually operated interlocking, they shall be controlled manually in cooperation with control operator.

§ 236.403 Signals at controlled point.

Signals at controlled point shall be so interconnected that aspects to proceed cannot be displayed simultaneously for conflicting movements, except that opposing signals may display an aspect indicating "proceed at restricted speed" at the same time on a track used for switching movements only, by one train at a time.

§ 236.404 Signals at adjacent control points.

Signals at adjacent controlled points shall be so interconnected that aspects to proceed on tracks signaled for movements at greater than restricted speed cannot be displayed simultaneously for conflicting movements.

§ 236.405 Track signaled for movements in both directions, change of direction of traffic.

On track signaled for movements in both directions, occupancy of the track between opposing signals at adjacent controlled points shall prevent changing the direction of traffic from that which obtained at the time the track became occupied, except that when a train having left one controlled point reaches a section of track immediately adjacent to the next con-

trolled point at which switching is to be performed, an aspect permitting movement at not exceeding restricted speed may be displayed into the occupied block.

§ 236.407 Approach or time locking; where required.

Approach or time locking shall be provided for all controlled signals where route or direction of traffic can be changed.

§ 236.408 Route locking.

Route locking shall be provided where switches are power-operated. Route locking shall be effective when the first pair of wheels of a locomotive or car passes a point not more than 13 feet in advance of the signal governing its movement, measured from the center of the signal mast or, if there is no mast, from the center of the signal.

§ 236.410 Locking, hand-operated switch; requirements.

(a) Each hand-operated switch in main track shall be locked either electrically or mechanically in normal position, except:

(1) Where train speeds over the switch do not exceed 20 miles per hour;

(2) Where trains are not permitted to clear the main track;

(3) Where a signal is provided to govern train movements from the auxiliary track to the signaled track; or

(4) On a signaled siding without intermediate signals where the maximum authorized speed on the siding does not exceed 30 miles per hour.

(b) Approach or time locking shall be provided and locking may be released either automatically, or by the control operator, but only after the

control circuits of signals governing movement in either direction over the switch and which display aspects with indications more favorable than "proceed at restricted speed" have been opened directly or by shunting of track circuit.

(c) Where a signal is used in lieu of electric or mechanical lock to govern movements from auxiliary track to signaled track, the signal shall not display an aspect to proceed until after the control circuits of signals governing movement on main track in either direction over the switch have been opened, and either the approach locking circuits to the switch are unoccupied or a predetermined time interval has expired.

Note.—Railroads shall bring all hand-operated switches that are not electrically or mechanically locked and that do not conform to the requirements of this section on the effective date of this Part into conformity with this section in accordance with the following schedule:

Not less than 33% during calendar year 1984.

Not less than 66% during calendar year 1985.

The remainder during calendar year 1986.

RULES AND INSTRUCTIONS

§ 236.126 Interlocking rules and instructions applicable to traffic control systems.

The rules and instructions prescribed in §§ 236.327 and 236.328, § 236.330 to § 236.334, inclusive, and § 236.342 shall apply to traffic control systems.

INSPECTION AND TESTS

§ 236.476 Interlocking inspections and tests applicable to traffic control systems.

The inspections and tests prescribed in §§ 236.377 to 236.380, inclusive, and §§ 236.382, 236.383, and 236.386 shall apply to traffic control systems.

Subpart E—Automatic Train Stop, Train Control and Cab Signal Systems

STANDARDS

§ 236.501 Forestalling device and speed control.

(a) An automatic train stop system may include a device by means of which the automatic application of the brakes can be forestalled.

(b) Automatic train control system shall include one or more of the following features:

(1) Low-speed restriction, requiring the train to proceed under slow speed after it has either been stopped by an automatic application of the brakes, or under control of the engineman, its speed has been reduced to slow speed, until the apparatus is automatically restored to normal because the condition which caused the restriction no longer affects the movement of the train.

(2) Medium-speed restriction, requiring the train to proceed under medium speed after passing a signal displaying an approach aspect or when approaching a signal requiring a stop, or a stop indication point, in order to prevent an automatic application of the brakes.

NOTE: Relief from the requirements of paragraphs (b) (1) and (2) of this section will be granted, insofar as speed limits fixed by definitions of Slow and Medium speeds

are concerned, upon an adequate showing by an individual carrier where automatic train control systems now in service enforce speed restrictions higher than those required by definitions in §§ 236.700 to 236.838 inclusive.

(3) Maximum-speed restriction, effecting an automatic brake application whenever the predetermined maximum speed limit is exceeded.

§ 236.502 Automatic brake application, initiation by restrictive block conditions stopping distance in advance.

An automatic train-stop or train-control system shall operate to initiate an automatic brake application at least stopping distance from the entrance to a block, wherein any condition described in § 236.205 obtains, and at each main track signal requiring a reduction in speed.

§ 236.503 Automatic brake application; initiation when predetermined rate of speed exceeded.

An automatic train control system shall operate to initiate an automatic brake application when the speed of the train exceeds the predetermined rate as required by the setting of the speed control mechanism.

§ 236.504 Operation interconnected with automatic block-signal system.

(a) A continuous inductive automatic train stop or train control system shall operate in connection with an automatic block signal system and shall be so interconnected with the signal system as to perform its intended function in event of failure of the engineer to acknowledge or obey a restrictive wayside signal or a more restrictive cab signal.

(b) An intermittent inductive automatic train stop system shall operate in connection with an automatic block signal system and shall be so interconnected with the signal system that the failure of the engineer to acknowledge a restrictive wayside signal will cause the intermittent inductive automatic train stop system to perform its intended function.

§ 236.505 Proper operative relation between parts along roadway and parts on locomotive.

Proper operative relation between the parts along the roadway and the parts on the locomotive shall obtain under all conditions of speed, weather, wear, oscillation, and shock.

§ 236.506 Release of brakes after automatic application.

The automatic train stop or train control apparatus shall prevent release of the brakes after automatic application until a reset device has been operated, or the speed of the train has been reduced to a predetermined rate, or the condition that caused the brake application no longer affects the movement of the train. If reset device is used it shall be arranged so that the brakes cannot be released until the train has been stopped, or it shall be located so that it cannot be operated by engineman without leaving his accustomed position in the cab.

§ 236.507 Brake application; full service.

The automatic train stop or train control apparatus shall, when operated, cause a full service application of the brakes.

§ 236.508 Interference with application of brakes by means of brake valve.

The automatic train stop, train control, or cab signal apparatus shall be so arranged as not to interfere with the application of the brakes by means of the brake valve and not to impair the efficiency of the brake system.

§ 236.509 Two or more locomotives coupled.

The automatic train stop, train control or cab signal apparatus shall be arranged so that when two or more locomotives are coupled, or a pushing or helping locomotive is used, it can be made operative only on the locomotive from which the brakes are controlled.

§ 236.511 Cab signals controlled in accordance with block conditions stopping distance in advance.

The automatic cab signal system shall be arranged so that cab signals will be continuously controlled in accordance with conditions described in § 236.205 that obtain at least stopping distance in advance.

§ 236.512 Cab signal indication when locomotive enters block where restrictive conditions obtain.

The automatic cab signal system shall be arranged so that when a locomotive enters or is within a block, wherein any condition described in § 236.205 obtains, the cab signals shall indicate "Proceed at Restricted Speed."

§ 236.513 Audible indicator.

(a) The automatic cab signal system shall be so arranged that when the cab signal changes to display a more restrictive aspect, an audible indicator will sound continuously until silenced by manual operation of an acknowledging device.

(b) The audible cab indicator of automatic cab signal, automatic train stop, or automatic train control system shall have a distinctive sound and be clearly audible throughout the cab under all operating conditions.

§ 236.514 Interconnection of cab signal system with roadway signal system.

The automatic cab signal system shall be interconnected with the roadway-signal system so that the cab signal indication will not authorize operation of the train at a speed higher than that authorized by the indication of the roadway signal that governed the movement of a train into a block except when conditions affecting movement of trains in the block change after the train passes the signal.

§ 236.515 Visibility of cab signals.

The cab signals shall be plainly visible to member or members of the locomotive crew from their stations in the cab.

§ 236.516 Power supply.

Automatic cab signal, train stop, or train control device hereafter installed shall operate from a separate or isolated power supply.

RULES AND INSTRUCTIONS; ROADWAY

§ 236.526 Roadway element not functioning properly.

When a roadway element except track circuit of automatic train stop, train control or cab signal system is not functioning as intended, the signal associated with such roadway element shall be caused manually to display its most restrictive aspect until such element has been restored to normal operative condition.

§ 236.527 Roadway element insulation resistance.

Insulation resistance between roadway inductor and ground shall be maintained at not less than 10,000 ohms.

§ 236.528 Restrictive condition resulting from open hand-operated switch; requirement.

When a facing point hand-operated switch is open one-fourth inch or more, a trailing point hand-operated switch three-eighths inch or more, or hand-operated switch is not locked where facing point lock with circuit controller is used, the resultant restrictive condition of an automatic train stop or train control device of the continuous type or the resultant restrictive cab signal indication of an automatic cab signal device on an approaching locomotive shall be maintained to within 300 feet of the points of the switch.

§ 236.529 Roadway element inductor; height and distance from rail.

Inductor of the inert roadway element type shall be maintained with the inductor pole faces at a height above the plane of the tops of the rails, and with its inner edge at a horizontal distance from the gage side of the nearest running rail, in accordance with specifications of the carrier.

§ 236.531 Trip arm; height and distance from rail.

Trip arm of automatic train stop device when in the stop position shall be maintained at a height above the plane of the tops of the rails, and at a horizontal distance from its center line to gage side of the nearest running rail, in accordance with specifications of the carrier.

§ 236.532 Strap iron inductor; use restricted.

No railroad shall use strap iron inductor or other roadway element with characteristics differing from its standard type on track where speed higher than restricted speed is permitted.

§ 236.531 Entrance to equipped territory; requirements.

Where trains are not required to stop at the entrance to equipped territory, except when leaving yards and stations and speed until entering equipped territory does not exceed restricted speed, the automatic train stop, train control, or cab signal device shall be operative at least stopping distance from the entrance to such territory except where the approach thereto is governed by automatic approach signal.

RULES AND INSTRUCTIONS; LOCOMOTIVES

§ 236.551 Power supply voltage; requirement.

The voltage of power supply shall be maintained within 10 percent of rated voltage.

§ 236.552 Insulation resistance; requirement.

When periodic test prescribed in § 236.588 is performed, insulation resistance between wiring and ground of continuous inductive automatic cab signal system, automatic train control system, or automatic train stop system shall be not less than one megohm, and that of an intermittent inductive automatic train stop system, not less than 250,000 ohms. Insulation resistance values between periodic tests shall be not less than 250,000 ohms for a

continuous inductive automatic cab signal system, automatic train control system, or automatic train stop system, and 20,000 ohms for an intermittent inductive automatic train stop system.

§ 236.553 Seal, where required.

Seal shall be maintained on any device other than brake-pipe cut-out cock (double-heading cock), by means of which the operation of the pneumatic portion of automatic train-stop or train-control apparatus can be cut out.

§ 236.554 Rate of pressure reduction; equalizing reservoir or brake pipe.

The equalizing-reservoir pressure or brake-pipe pressure reduction during an automatic brake application shall be at a rate not less than that which results from a manual service application.

§ 236.555 Repaired or rewound receiver coil.

Receiver coil which has been repaired or rewound shall have the same operating characteristics which it possessed originally or as currently specified for new equipment.

§ 236.556 Adjustment of relay.

Change in adjustment of relay shall be made only in a shop equipped for that purpose except when receiver coils, electro-pneumatic valve, or other essential part of the equipment is replaced. Irregularities in power-supply voltage or other variable factors in the circuit shall not be compensated for by adjustment of the relay.

§ 236.557 Receiver; location with respect to rail.

(a) Receiver of intermittent inductive automatic train stop device of the inert roadway element type shall be maintained with bottom of the receiver at a height above the plane of the tops of the rails, and with its outer edge at a horizontal distance from the gage side of the nearest rail, in accordance with specifications of the carrier.

(b) Receiver of continuous inductive automatic cab signal, train stop, or train control device of locomotive equipped with onboard test equipment, shall be maintained with the bottom of the receiver at a height above the plane of the tops of the rails, and with its outer edge at a horizontal distance from the gage side of the nearest rail, in accordance with specifications of the carrier.

§ 236.560 Contact element, mechanical trip type; location with respect to rail.

Contact element of automatic train stop device of the mechanical trip type shall be maintained at a height above the plane of the tops of the rails, and at a horizontal distance from the gage side of the rail, in accordance with specifications of the carrier.

§ 236.562 Minimum rail current required.

The minimum rail current required to restore the locomotive equipment of continuous inductive automatic train stop or train control device to normal condition or to obtain a proceed indication of automatic cab signal device (pick-up) shall be in accordance with specifications of the carrier.

§ 236.563 Delay time.

Delay time of automatic train stop or train control system shall not exceed 8 seconds and the spacing of signals to meet the requirements of

§ 236.24 shall take into consideration the delay time.

§ 236.564 Acknowledging time.

Acknowledging time of intermittent automatic train-stop device shall be not more than 30 seconds.

§ 236.565 Provision made for preventing operation of pneumatic brake-applying apparatus by double-heading cock; requirement.

Where provision is made for preventing the operation of the pneumatic brake-applying apparatus of an automatic train stop or train control device when the double-heading cock is placed in double-heading position, the automatic train stop or train control device shall not be cut out before communication is closed between the engineman's automatic brake valve and the brake pipe, when operating double-heading cock toward double-heading position.

§ 236.566 Locomotive of each train operating in train stop, train control or cab signal territory; equipped.

The locomotive from which brakes are controlled, of each train operating in automatic train stop, train control, or cab signal territory shall be equipped with apparatus responsive to the roadway equipment installed on all or any part of the route traversed, and such apparatus shall be in operative condition.

§ 236.567 Restrictions imposed when device fails and/or is cut out en route.

Where an automatic train stop, train control, or cab signal device fails and/or is cut out enroute, train may proceed at restricted speed or if an automatic block signal system is in operation according to signal indication

but not to exceed medium speed, to the next available point of communication where report must be made to a designated officer. Where no automatic block signal system is in use train shall be permitted to proceed at restricted speed or where automatic block signal system is in operation according to signal indication but not to exceed medium speed to a point where absolute block can be established. Where an absolute block is established in advance of the train on which the device is inoperative train may proceed at not to exceed 79 miles per hour.

§ 236.568 Difference between speeds authorized by roadway signal and cab signal, action required.

If for any reason a cab signal authorizes a speed different from that authorized by a roadway signal, when a train enters the block governed by such roadway signal, the lower speed shall not be exceeded.

INSPECTION AND TESTS; ROADWAY

§ 236.576 Roadway element.

Roadway elements, except track circuits, including those for test purposes, shall be gaged monthly for height and alinement, and shall be tested at least every 6 months.

§ 236.577 Test, acknowledgement, and cut-in circuits.

Test, acknowledgement, and cut-in circuits shall be tested at least once every twelve months.

INSPECTION AND TESTS; LOCOMOTIVE

§ 236.586 Daily or after trip test.

(a) Except where tests prescribed by § 236.588 are performed at intervals of

not more than 2 months, each locomotive equipped with an automatic cab signal or train stop or train control device operating in equipped territory shall be inspected for damage to the equipment and tested at least once each calendar day or within 24 hours before departure upon each trip.

(b) Each equipped locomotive shall be tested to determine the locomotive equipment is responsive to the wayside equipment and shall be cycled to determine the device functions as intended.

(c) Each locomotive equipped with intermittent inductive automatic train stop or non-coded continuous inductive automatic train stop or non-coded continuous inductive automatic train control device shall be tested to determine that the pickup of the device is within specified limits.

§ 236.587 Departure test.

(a) The automatic train stop, train control, or cab signal apparatus on each locomotive, except a locomotive or a multiple-unit car equipped with mechanical trip stop, shall be tested using one of the following methods:

- (1) operation over track elements;
- (2) operation over test circuit;
- (3) use of portable test equipment; or
- (4) use of onboard test device.

(b) The test shall be made on departure of the locomotive from its initial terminal unless that apparatus will be cut out between the initial terminal and the equipped territory. If the apparatus is cut out between the initial terminal and the equipped territory the test shall be made prior to entering equipped territory.

(c) If a locomotive makes more than

one trip in any 24-hour period, only one departure test is required in such 24-hour period.

(d) If a departure test is made by an employee, other than the engineer, the engineer shall be informed of the results of such test and a record kept thereof.

§ 236.588 Periodic test.

Except as provided in § 236.586, periodic test of the automatic train stop train control, or cab signal apparatus shall be made at least once every 92 days, and on multiple-unit cars as specified by the carrier, subject to approval by the FRA.

§ 236.589 Relays.

(a) Each relay shall be removed from service, subjected to thorough test, necessary repairs and adjustments made, and shall not be replaced in service unless its operating characteristics are in accordance with the limits within which such relay is designed to operate, as follows:

(1) Master or primary relays of torque type depending on spring tension to return contacts to deenergized position in noncoded continuous inductive automatic train stop or train control system, at least once every two years; and

(2) All other relays, at least once every six years.

§ 236.590 Pneumatic apparatus.

Automatic train stop, train control, or cab signal pneumatic apparatus shall be inspected and cleaned at least once every 736 days. The pneumatic apparatus shall be stenciled, tagged, or otherwise marked to indicate the last cleaning date of the apparatus.

Subpart F—Dragging Equipment and Slide Detectors and Other Similar Protective Devices

STANDARDS

§ 236.601 Signals controlled by devices; location.

Signals controlled by devices used to provide protection against unusual contingencies, such as landslides, dragging equipment, burned bridges or trestles and washouts shall be located so that stopping distance will be provided between the signal and the point where it is necessary to stop the train.

Subpart G—Definitions

§ 236.700 Definitions.

For the purpose of these rules, standards, and instructions, the following definitions will apply.

§ 236.701 Application, brake; full service.

An application of the brakes resulting from a continuous or a split reduction in brake pipe pressure at a service rate until maximum brake cylinder pressure is developed. As applied to an automatic or electro-pneumatic brake with speed governor control, an application other than emergency which develops the maximum brake cylinder pressure, as determined by the design of the brake equipment for the speed at which the train is operating.

§ 236.702 Arm, semaphore.

The part of a semaphore signal displaying an aspect. It consists of a blade fastened to a spectacle.

§ 236.703 Aspect.

The appearance of a roadway signal

conveying an indication as viewed from the direction of an approaching train; the appearance of a cab signal conveying an indication as viewed by an observer in the cab.

§ 236.704 Aspect, phantom signal.

An aspect displayed by a light signal, different from the aspect intended, caused by light from an external source being reflected by the optical system of the signal.

§ 236.705 Bar, locking.

A bar in an interlocking machine to which the locking dogs are attached.

§ 236.706 Bed, locking.

That part of an interlocking machine that contains or holds the tapets, locking bars, crosslocking, dogs and other apparatus used to interlock the levers.

§ 236.707 Blade, semaphore.

The extended part of a semaphore arm which shows the position of the arm.

§ 236.708 Block.

A length of track of defined limits, the use of which by trains is governed by block signals, cab signals, or both.

§ 236.709 Block, absolute.

A block in which no train is permitted to enter while it is occupied by another train.

§ 236.710 Block, latch.

The lower extremity of a latch rod which engages with a square shoulder of the segment or quadrant to hold the lever in position.

§ 236.711 Bond, rail joint.

A metallic connection attached to adjoining rails to insure electrical conductivity.

§ 236.712 Brake pipe.

A pipe running from the engineer's brake valve through the train, used for the transmission of air under pressure to charge and actuate the automatic brake equipment and charge the reservoirs of the electro-pneumatic brake equipment on each vehicle of the train.

§ 236.713 Bridge, movable.

That section of a structure bridging a navigable waterway so designed that it may be displaced to permit passage of traffic on the waterway.

§ 236.714 Cab.

The compartment of a locomotive from which the propelling power and power brakes of the train are manually controlled.

§ 236.715 Chain safety.

A chain provided for the purpose of preventing the receiver of a continuous inductive automatic train stop, train control or cab signal device from falling should it become detached from its normal support.

§ 236.716 Changer, pole.

A device by which the direction of current flow in an electrical circuit may be changed.

§ 236.717 Characteristics, operating.

The measure of electrical values at which electrical or electronic apparatus operate (e.g., drop-away, pick-up, maximum and minimum current, and working value).

§ 236.718 Chart, dog.

A diagrammatic representation of the mechanical locking of an interlocking machine, used as a working plan in making up, assembling and fitting the locking.

§ 236.719 Circuit, acknowledgment.

A circuit consisting of wire or other conducting material installed between the track rails at each signal in territory where an automatic train stop system or cab signal system of the continuous inductive type with 2-indication cab signals is in service, to enforce acknowledgement by the engineman at each signal displaying an aspect requiring a stop.

§ 236.720 Circuit, common return.

A term applied where one wire is used for the return of more than one electric circuit.

§ 236.721 Circuit, control.

An electrical circuit between a source of electric energy and a device which it operates.

§ 236.722 Circuit, cut-in.

A roadway circuit at the entrance to automatic train stop, train control or cab signal territory by means of which locomotive equipment of the continuous inductive type is actuated so as to be in operative condition.

§ 236.723 Circuit, double wire; line.

An electric circuit not employing a common return wire; a circuit formed by individual wires throughout.

§ 236.724 Circuit, shunt fouling.

The track circuit in the fouling sec-

tion of a turnout, connected in multiple with the track circuit in the main track.

§ 236.725 Circuit, switch shunting.

A shunting circuit which is closed through contacts of a switch circuit controller.

§ 236.726 Circuit, track.

An electrical circuit of which the rails of the track form a part.

§ 236.727 Circuit, track; coded.

A track circuit in which the energy is varied or interrupted periodically.

§ 236.728 Circuit, trap.

A term applied to a circuit used where it is desirable to provide a track circuit but where it is impracticable to maintain a track circuit.

§ 236.729 Cock, double heading.

A manually operated valve by means of which the control of brake operation is transferred to the leading locomotive.

§ 236.730 Coil, receiver.

Concentric layers of insulated wire wound around the core of a receiver of an automatic train stop, train control or cab signal device on a locomotive.

§ 236.731 Controller, circuit.

A device for opening and closing electric circuits.

§ 236.732 Controller, circuit; switch.

A device for opening and closing electric circuits, operated by a rod connected to a switch, derail or movable-point frog.

§ 236.733 Current, foreign.

A term applied to stray electric currents which may affect a signaling system, but which are not a part of the system.

§ 236.734 Current of traffic.

The movement of trains on a specified track in a designated direction.

§ 236.735 Current, leakage.

A stray electric current of relatively small value which flows through or across the surface of insulation when a voltage is impressed across the insulation.

§ 236.736 Cut-section.

A location other than a signal location where two adjoining track circuits end within a block.

§ 236.737 Cut-section, relayed.

A cut-section where the energy for one track circuit is supplied through front contacts or through front and polar contacts of the track relay for the adjoining track circuit.

§ 236.738 Detector, point.

A circuit controller which is part of the switch operating mechanism and operated by a rod connected to a switch, derail or movable point frog to indicate that the point is within a specified distance of the stock rail.

§ 236.739 Device, acknowledging.

A manually operated electric switch or pneumatic valve by means of which, on a locomotive equipped with an automatic train stop or train control device, an automatic brake application can be forestalled, or by means of

which, on a locomotive equipped with an automatic cab signal device, the sounding of the cab indicator can be silenced.

§ 236.740 Device, reset.

A device whereby the brakes may be released after an automatic train control brake application.

§ 236.741 Distance, stopping.

The maximum distance on any portion of any railroad which any train operating on such portion of railroad at its maximum authorized speed, will travel during a full service application of the brakes, between the point where such application is initiated and the point where the train comes to a stop.

§ 236.742 Dog, locking.

A steel block attached to a locking bar or tappet of an interlocking machine, by means of which locking between levers is accomplished.

§ 236.743 Dog, swing.

A locking dog mounted in such a manner that it is free to rotate on a trunnion which is riveted to a locking bar.

CROSS REFERENCE: Element, contact. See receiver, § 236.788.

§ 236.744 Element, roadway.

That portion of the roadway apparatus of automatic train stop, train control, or cab signal system, such as electric circuit, inductor, or trip arm to which the locomotive apparatus of such system is directly responsive.

§ 236.745 Face, locking.

The locking surface of a locking dog.

tappet or cross locking of an interlocking machine.

§ 236.746 Feature, restoring.

An arrangement on an electro-pneumatic switch by means of which power is applied to restore the switch movement to full normal or to full reverse position, before the driving bar creeps sufficiently to unlock the switch, with control level in normal or reverse position.

§ 236.747 Fore stall.

As applied to an automatic train stop or train control device, to prevent an automatic brake application by operation of an acknowledging device or by manual control of the speed of the train.

§ 236.748 Hanger, safety.

A rigid member provided for the purpose of preventing the receiver of a continuous inductive automatic train stop, train control or cab signal device from falling should it become detached from its normal support.

§ 236.749 Indication.

The information conveyed by the aspect of a signal.

§ 236.750 Interlocking, automatic.

An arrangement of signals, with or without other signal appliances, which functions through the exercise of inherent powers as distinguished from those whose functions are controlled manually, and which are so interconnected by means of electric circuits that their movements must succeed each other in proper sequence, train movements over all routes being governed by signal indication.

§ 236.751 Interlocking, manual.

An arrangement of signals and signal appliances operated from an interlocking machine and so interconnected by means of mechanical and/or electric locking that their movements must succeed each other in proper sequence, train movements over all routes being governed by signal indication.

§ 236.752 Joint, rail, insulated.

A joint in which electrical insulation is provided between adjoining rails.

§ 236.753 Limits, interlocking.

The tracks between the opposing home signals of an interlocking.

§ 236.754 Line, open wire.

An overhead wire line consisting of single conductors as opposed to multiple-conductor cables.

§ 236.755 Link, rocker.

That portion of an interlocking machine which transmits motion between the latch and the universal link.

§ 236.756 Lock, bolt.

A mechanical lock so arranged that if a switch, derail or movable-point frog is not in the proper position for a train movement, the signal governing that movement cannot display an aspect to proceed; and that will prevent a movement of the switch, derail or movable-point frog unless the signal displays its most restrictive aspect.

§ 236.757 Lock, electric.

A device to prevent or restrict the movement of a lever, a switch or a movable bridge, unless the locking member is withdrawn by an electrical

device, such as an electromagnet, solenoid or motor.

§ 236.758 Lock, electric, forced drop.

An electric lock in which the locking member is mechanically forced down to the locked position.

§ 236.759 Lock, facing point.

A mechanical lock for a switch, derail, or movable-point frog, comprising a plunger stand and a plunger which engages a lock rod attached to the switch point to lock the operated unit.

§ 236.760 Locking, approach.

Electric locking effective while a train is approaching, within a specified distance, a signal displaying an aspect to proceed, and which prevents, until after the expiration of a predetermined time interval after such signal has been caused to display its most restrictive aspect, the movement of any interlocked or electrically locked switch, movable-point frog, or derail in the route governed by the signal, and which prevents an aspect to proceed from being displayed for any conflicting route.

§ 236.761 Locking, electric.

The combination of one or more electric locks and controlling circuits by means of which levers of an interlocking machine, or switches or other units operated in connection with signaling and interlocking, are secured against operation under certain conditions.

§ 236.762 Locking, indication.

Electric locking which prevents manipulation of levers that would result

in an unsafe condition for a train movement if a signal, switch, or other operative unit fails to make a movement corresponding to that of its controlling lever, or which directly prevents the operation of a signal, switch, or other operative unit, in case another unit which should operate first fails to make the required movement.

§ 236.763 Locking, latch operated.

The mechanical locking of an interlocking machine which is actuated by means of the lever latch.

§ 236.761 Locking, lever operated.

The mechanical locking of an interlocking machine which is actuated by means of the lever.

§ 236.765 Locking, mechanical.

An arrangement of locking bars, dogs, tappets, cross locking and other apparatus by means of which interlocking is effected between the levers of an interlocking machine and so interconnected that their movements must succeed each other in a predetermined order.

§ 236.766 Locking, movable bridge.

The rail locks, bridge locks, bolt locks, circuit controllers, and electric locks used in providing interlocking protection at a movable bridge.

§ 236.767 Locking, route.

Electric locking, effective when a train passes a signal displaying an aspect for it to proceed, which prevents the movement of any switch, movable-point frog, or derail in advance of the train within the route entered. It may be so arranged that as a

train clears a track section of the route, the locking affecting that section is released.

§ 236.768 Locking, time.

A method of locking, either mechanical or electrical, which, after a signal has been caused to display an aspect to proceed, prevents, until after the expiration of a predetermined time interval after such signal has been caused to display its most restrictive aspect, the operation of any interlocked or electrically locked switch, movable-point frog, or derail in the route governed by that signal, and which prevents an aspect to proceed from being displayed for any conflicting route.

§ 236.769 Locking, traffic.

Electric locking which prevents the manipulation of levers or other devices for changing the direction of traffic on a section of track while that section is occupied or while a signal displays an aspect for a movement to proceed into that section.

§ 236.770 Locomotive.

A self-propelled unit of equipment which can be used in train service.

§ 236.771 Machine, control.

An assemblage of manually operated devices for controlling the functions of a traffic control system; it may include a track diagram with indication lights.

§ 236.772 Machine, interlocking.

An assemblage of manually operated levers or other devices for the control of signals, switches or other units.

CROSS REFERENCE: Magnet, track, see § 236.744.

§ 236.773 Movements, conflicting.

Movements over conflicting routes.

§ 236.774 Movement, facing.

The movement of a train over the points of a switch which face in a direction opposite to that in which the train is moving.

§ 236.775 Movement, switch-and-lock.

A device, the complete operation of which performs the three functions of unlocking, operating and locking a switch, movable-point frog or derail.

§ 236.776 Movement, trailing.

The movement of a train over the points of a switch which face in the direction in which the train is moving.

§ 236.777 Operator, control.

An employee assigned to operate the control machine of a traffic control system.

§ 236.778 Piece, driving.

A crank secured to a locking shaft by means of which horizontal movement is imparted to a longitudinal locking bar.

§ 236.779 Plate, top.

A metal plate secured to a locking bracket to prevent the cross locking from being forced out of the bracket.

§ 236.780 Plunger, facing point lock.

That part of a facing point lock which secures the lock rod to the plunger stand when the switch is locked.

§ 236.781 Point, clearance.

The location on a turnout at which the carrier's specified clearance is pro-

vided between tracks.

§ 236.782 Point, controlled.

A location where signals and/or other functions of a traffic control system are controlled from the control machine.

§ 236.783 Point, stop-indication.

As applied to an automatic train stop or train control system without the use of roadway signals, a point where a signal displaying an aspect requiring a stop would be located.

§ 236.784 Position, deenergized.

The position assumed by the moving member of an electromagnetic device when the device is deprived of its operating current.

§ 236.785 Position, false restrictive.

A position of a semaphore arm that is more restrictive than it should be.

§ 236.786 Principle, closed circuit.

The principle of circuit design where a normally energized electric circuit which, on being interrupted or deenergized, will cause the controlled function to assume its most restrictive condition.

§ 236.787 Protection, cross.

An arrangement to prevent the improper operation of a signal, switch, movable-point frog, or derail as the result of a cross in electrical circuits.

§ 236.788 Receiver.

A device on a locomotive, so placed that it is in position to be influenced inductively or actuated by an automatic train stop, train control or cab signal roadway element.

§ 236.789 Relay, timing.

A relay which will not close its front contacts or open its back contacts, or both, until the expiration of a definite time intervals after the relay has been energized.

§ 236.790 Release, time.

A device used to prevent the operation of an operative unit until after the expiration of a predetermined time interval after the device has been actuated.

§ 236.791 Release, value.

The electrical value at which the movable member of an electromagnetic device will move to its deenergized portion.

§ 236.792 Reservoir, equalizing.

An air reservoir connected with and adding volume to the top portion of the equalizing piston chamber of the automatic brake valve, to provide uniform service reductions in brake pipe pressure regardless of the length of the train.

CROSS REFERENCE: Rocker, see § 236.755.

§ 236.793 Rod, lock.

A rod, attached to the front rod or lug of a switch, movable-point frog or derail, through which a locking plunger may extend when the switch points or derail are in the normal or reverse position.

§ 236.794 Rod, up-and-down.

A rod used for connecting the semaphore arm to the operating mechanism of a signal.

§ 236.795 Route.

The course or way which is, or is to be, traveled.

§ 236.796 Routes, conflicting.

Two or more routes, opposing, converging or intersecting, over which movements cannot be made simultaneously without possibility of collision.

§ 236.797 Route, interlocked.

A route within interlocking limits.

§ 236.798 Section, dead.

A section of track, either within a track circuit or between two track circuits, the rails of which are not part of a track circuit.

§ 236.799 Section, fouling.

The section of track between the switch points and the clearance point in a turnout.

§ 236.800 Sheet, locking.

A description in tabular form of the locking operations in an interlocking machine.

CROSS REFERENCE: **Shoe**, see § 236.788.

§ 236.801 Shoe, latch.

The casting by means of which the latch rod and the latch block are held to a lever of a mechanical interlocking machine.

§ 236.802 Shunt.

A by-path in an electrical circuit.

§ 236.802a Siding.

An auxiliary track for meeting or passing trains.

§ 236.803 Signal, approach.

A roadway signal used to govern the approach to another signal and if operative so controlled that its indication furnishes advance information of the

indication of the next signal.

§ 236.804 Signal, block.

A roadway signal operated either automatically or manually at the entrance to a block.

§ 236.805 Signal, cab.

A signal located in engineman's compartment or cab, indicating a condition affecting the movement of a train and used in conjunction with interlocking signals and in conjunction with or in lieu of block signals.

§ 236.806 Signal, home.

A roadway signal at the entrance to a route or block to govern trains in entering and using that route or block.

§ 236.807 Signal, interlocking.

A roadway signal which governs movements into or within interlocking limits.

§ 236.808 Signals, opposing.

Roadway signals which govern movements in opposite directions on the same track.

§ 236.809 Signal, slotted mechanical.

A mechanically operated signal with an electromagnetic device inserted in its operating connection to provide a means of controlling the signal electrically, as well as mechanically.

§ 236.810 Spectacle, semaphore arm.

That part of a semaphore arm which holds the roundels and to which the blade is fastened.

§ 236.811 Speed, medium.

A speed not exceeding 40 miles per hour.

§ 236.812 Speed, restricted.

A speed that will permit stopping within one-half the range of vision, but not exceeding 20 miles per hour.

§ 236.813 Speed, slow.

A speed not exceeding 20 miles per hour.

§ 236.813a State, most restrictive.

The mode of an electric or electronic device that is equivalent to a track relay in its deenergized position.

§ 236.814 Station, control.

The place where the control machine of a traffic control system is located.

§ 236.815 Stop.

As applied to mechanical locking, a device secured to a locking bar to limit its movement.

§ 236.816 Superiority of trains.

The precedence conferred upon one train over other trains by train order or by reason of its class or the direction of its movement.

§ 236.817 Switch, electro-pneumatic.

A switch operated by an electro-pneumatic switch-and-lock movement.

§ 236.818 Switch, facing point.

A switch, the points of which face traffic approaching in the direction for which the track is signaled.

§ 236.819 Switch, hand operated.

A non-interlocked switch which can only be operated manually.

§ 236.820 Switch, interlocked.

A switch within the interlocking limits the control of which is interlocked with other functions of the interlocking.

§ 236.820a Switch, power-operated.

A switch operated by an electrically, hydraulically, or pneumatically driven switch-and-lock movement.

§ 236.821 Switch, sectionalizing.

A switch for disconnecting a section of a power line from the source of energy.

§ 236.822 Switch, spring.

A switch equipped with a spring device which forces the points to their original position after being trailed through and holds them under spring compression.

§ 236.823 Switch, trailing point.

A switch, the points of which face away from traffic approaching in the direction for which the track is signaled.

§ 236.824 System, automatic block signal.

A block signal system wherein the use of each block is governed by an automatic block signal, cab signal, or both.

§ 236.825 System, automatic train control.

A system so arranged that its operation will automatically result in the following:

(a) A full service application of the brakes which will continue either until the train is brought to a stop, or, under control of the engineman, its speed is reduced to a predetermined rate.

(b) When operating under a speed restriction, an application of the brakes when the speed of the train exceeds the predetermined rate and which will continue until the speed is reduced to that rate.

§ 236.826 System, automatic train stop.

A system so arranged that its operation will automatically result in the application of the brakes until the train has been brought to a stop.

§ 236.827 System, block signal.

A method of governing the movement of trains into or within one or more blocks by block signals or cab signals.

§ 236.828 System, traffic control.

A block signal system under which train movements are authorized by block signals whose indications supersede the superiority of trains for both opposing and following movements on the same track.

§ 236.829 Terminal, initial.

The starting point of a locomotive for a trip.

§ 236.830 Time, acknowledging.

As applied to an intermittent automatic train stop system, a predetermined time within which an automatic brake application may be forestalled by means of the acknowledging device.

§ 236.831 Time, delay.

As applied to an automatic train stop or train control system, the time which elapses after the onboard apparatus detects a more restrictive indication until the brakes start to apply.

§ 236.831a Track, main.

A track, other than auxiliary track,

extending through yards and between stations, upon which trains are operated by timetable or train orders, or both, or the use of which is governed by block signals.

§ 236.832 Train.

A locomotive or more than one locomotive coupled, with or without cars.

§ 236.833 Train, opposing.

A train, the movement of which is in a direction opposite to and toward another train on the same track.

§ 236.834 Trip.

A movement of a locomotive over all or any portion of automatic train stop, train control or cab signal territory between the terminals for that locomotive; a movement in one direction.

CROSS REFERENCE: Trip-arm, see § 236.744.

§ 236.835 Trunking.

A casing used to protect electrical conductors.

§ 236.836 Trunnion.

A cylindrical projection supporting a revolving part.

§ 236.837 Valve, electro-pneumatic.

A valve electrically operated which, when operated, will permit or prevent passage of air.

§ 236.838 Wire, shunt.

A wire forming part of a shunt circuit.

Appendix A—Civil Penalties

(a) A carrier that violates any provision of this Part is liable for a penalty of: (1) \$2,500 for each such

violation that results in death or serious injury or involves an immediate hazard of death or injury; (2) \$2,000 for each such violation that results from the knowing and willful failure of a carrier, its officers, or its agents to comply with such provision; (3) \$1,000 for each other violation of this Part.

(b) Each day that such violation continues is a separate offense.

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John H. Riley,
Administrator.

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**Department of Transportation
Federal Railroad Administration
Office of Safety**

**Classification of Defects of
Automatic Block Signal Systems
Interlocking
Traffic Control Systems
Automatic Train Stop, Train Control and
Cab Signal Systems
Dragging Equipment and Slide Detectors and
Other Similar Protective Devices**

**To Be Reported By
FRA Signal and Train Control Inspectors**

Part 233

- 5.01 Accident/incident resulting from or involving failure of appliance, device, method, or system to function or indicate as intended, not reported to FRA within 24 hours after accident/incident.
- 7.01 Report of failure of appliance, device, method, or system to indicate or function as intended not made on prescribed within fifteen (15) days.
- 9.01 Annual report for preceding year not filed prior to April 1.
- 9.02 Annual report for preceding year not correct.

Part 235

- 5.01 Discontinuance without FRA approval.
- 5.02 Decrease of the limits without FRA approval
- 5.03 Material modification without FRA approval.
- 5.04 Noncompliance with an order approving an application.
- 5.05 Noncompliance with an order of FRA.

Part 236

- 0.01 Block signal system not installed or manual block system not permanently in effect on line where freight train operates at 50 or more miles per hour.
- 0.02 Block signal system not installed or manual block system not permanently in effect on line where passenger train operates at 60 or more miles per hour.
- 0.03 Manual block system provided where freight train operates 50 or more miles per hour not permanently in effect.
- 0.04 Manual block system provided where passenger train operates 60 or more miles per hour not permanently in effect.
- 0.05 Manual block system permits a passenger train to be admitted without flag protection to a block occupied by another train.
- 0.06 Manual block system permits a train to be admitted without flag protection to a block occupied by a passenger train.

- 0.07 Manual block system permits a train to be admitted without flag protection to a block occupied by an opposing train.
- 0.08 Manual block system permits a freight train entering a block occupied by preceding freight train to exceed a speed that will permit stopping within one-half the range of vision.
- 0.09 Manual block system permits a freight train entering a block occupied by preceding freight train to exceed 20 miles per hour.
- 0.10 Automatic cab signal, train stop, or train control system not provided where train operates at 80 or more miles per hour.

Part 236

General

- 1.01 Track layout plan not kept at interlocking.
- 1.02 Circuit plan not kept at interlocking.
- 1.03 Locking sheet and dog chart not kept at interlocking where mechanical locking is used.
- 1.04 Circuit plan not kept at controlled point.
- 1.05 Circuit plan not kept at automatic signal.

- 1.06 Track layout plan for interlocking not correct.
- 1.07 Circuit plan for interlocking not correct.
- 1.08 Locking sheet and dog chart for interlocking where mechanical locking is used not correct.
- 1.09 Circuit plan for controlled point not correct.
- 1.10 Circuit plan for automatic signal not correct.
- 1.11 Profile plan not correct. (Includes plan not drawn to scale or not showing location of all signals, grades and alinement.)
- 1.12 Track layout plan for interlocking not legible.
- 1.13 Circuit plan for interlocking not legible.
- 1.14 Locking sheet and dog chart for interlocking not legible.
- 1.15 Circuit plan for controlled point not legible.
- 1.16 Circuit plan for automatic signal not legible.
- 1.17 Profile plan not legible.
- 1.18 Profile plan not available.
- 2.01 Circuit grounded sufficiently to permit flow of current equal to or in excess of 75% of release value of relay or other electromagnetic device in circuit.
- 3.01 Signal case not secured against unauthorized entry.

- 3.02 Instrument case not secured against unauthorized entry.
- 3.03 Power interlocking machine cabinet not secured against unauthorized entry.
- 3.04 Time release not secured against unauthorized entry.
- 3.05 Exposed electric lock not secured against unauthorized entry.
- 4.01 Interference with normal functioning of device without taking measures to provide safety of train operation.
- 5.01 Control circuit, the function of which affects safety of train operation, not designed on closed circuit principle.
- 6.01 Switch circuit controller on hand-operated facing-point switch not adjusted to shunt track circuit or open control circuits when switch point is open one-fourth inch or more.
- 6.02 Switch circuit controller on hand-operated trailing-point switch not adjusted to shunt track circuit or open control circuits when switch point is open three-eighths inch or more.

- 6.03 Hand-operated facing-point switch equipped with facing-point lock and circuit controller can be locked when switch point is open one-fourth inch or more.
- 6.04 Hand-operated trailing-point switch equipped with facing-point lock and circuit controller can be locked when switch point is open three-eighths inch or more.
- 6.05 Switch circuit controller not securely fastened in place.
- 6.06 Facing-point lock not securely fastened in place.
- 6.07 Switch-and-lock movement not securely fastened in place.
- 6.08 Contact opening of switch circuit controller contact less than one-sixteenth inch.
- 6.09 Switch circuit controller connections not securely fastened.
- 6.10 Switch and lock movement connections not securely fastened.
- 6.11 Facing-point lock connection not securely fastened.
- 6.12 Switch circuit controller not connected to normally closed switch point.

- 7.01 Contacts of circuit controller operated by switch-and-lock movement not adjusted so that normally open contacts remain closed until the switch is locked.
- 7.02 Contacts of circuit controller operated by switch-and-lock movement not adjusted so that normally closed contacts remain open until the switch is locked.
- 8.01 Pick-up value of electromagnetic device not in accordance with the limits within which it is designed to operate.
- 8.02 Drop-away value of electromagnetic device not in accordance with the limits within which it is designed to operate.
- 8.03 Working value of electronic or electrical apparatus not in accordance with the limits within which the apparatus is designed to operate.
- 9.01 Signal control circuit selected through contacts of indicator or annunciator in which the indicating element attached to the armature is arranged so that it can in itself cause improper operation of the armature.

- 9.02 Electric locking circuit selected through contacts of indicator or annunciator in which the indicating element attached to the armature is arranged so that it can in itself cause improper operation of the armature.
- 10.01 Electric lock not forced-drop type. (Applies only to electric lock installed after October 1, 1950.)
- 10.02 New electric lock applied to existing installation not forced-drop type.
- 11.01 Component, essential to the safety of train operation, failing to perform its intended function not adjusted without undue delay.
- 11.02 Component, essential to the safety of train operation, failing to perform its intended function not repaired without undue delay.
- 11.03 Component, essential to the safety of train operation, failing to perform its intended function not replaced without undue delay.
- 11.04 Cause not determined for signal component out of correspondence with known operating conditions.

- 12.01 Signal protection not provided for facing movements through spring switch within interlocking limits.
- 12.02 Signal protection not provided for trailing movements through spring switch within interlocking limits.
- 12.03 Signal protection not provided for trailing movements through spring switch in automatic block signal, train-stop, train control or cab signal territory where train movements over switch exceed 20 m.p.h. (Applies only to spring switch installed after October 1, 1950.)
- 12.04 Signal protection not provided for facing movements over spring switch in track signaled for movements in both directions within automatic block signal, train stop, train control or cab signal territory where train movements over switch exceed 20 m.p.h. (Applies only to spring switch installed after October 1, 1950.)
- 13.01 Control circuits of signal governing facing movements over main-track spring switch not selected through contacts of switch circuit controller or through contacts of relay repeating the position of switch circuit controller.

- 13.02 Signal governing facing movements over main-track spring switch does not display its most restrictive aspect when normally closed switch point is open one-fourth inch or more. (Does not apply where separate aspect is displayed for facing movement over the switch in the reverse position.)
- 13.03 Signal governing facing movements over main-track spring switch in both the normal and reverse positions does not display its most restrictive aspect when the switch points are open one-fourth inch or more from either the normal or reverse position.
- 14.01 Indication of signal governing movements from siding to main track with the current of traffic on track signaled for movements in only one direction through spring switch in automatic block signal territory, less restrictive than "Proceed at Restricted Speed" when the block, into which movements are governed by the signal, is occupied.
- 14.02 Indication of signal governing movements from siding to main track with the current of traffic on track signaled for movements in only one direction through spring switch in automatic block signal territory, not "Stop" when main track is occupied by a train approaching switch within at least

1500 feet in approach of the approach signal for the main track signal governing trailing movements over switch.

- 14.03 Indication of signal governing movements against the current of traffic from the reverse main of main tracks to single track through spring switch in automatic block signal territory, less restrictive than "Proceed at Restricted Speed" when the block, into which movements are governed by the signal, is occupied by a preceding train.
- 14.04 Indication of signal governing movements from siding to main track signaled for movements in either direction, through spring switch in automatic block signal territory, less restrictive than "Proceed at Restricted Speed" when the block, into which movements are governed by the signal, is occupied by a preceding train.
- 14.05 Indication of signal governing movements against the current of traffic from reverse main of main tracks to single track through spring switch in automatic block signal territory, not "Stop" when the block on the single track into which the signal governs is occupied by an opposing train.

- 14.06 Indication of signal governing movements from siding to main track signaled for movements in either direction through spring switch in automatic block signal territory, not "Stop" when the block on the single track into which the signal governs is occupied by an opposing train.
- 14.07 Indication of signal governing movements against the current of traffic from the reverse main of main tracks to single track through spring switch in automatic block signal territory, not "Stop" when the normal direction main track of the double track is occupied by a train approaching the switch within at least 1500 feet in approach of the approach signal for the main-track signal governing trailing movements over switch.
- 14.08 Indication of signal governing movements from siding to main track signaled from movements in either direction through spring switch in automatic block signal territory, not "Stop" when the single track signaled for movements in both directions is occupied by a train approaching the switch within at least 1500 feet in approach of the approach signal for the main-track signal governing trailing movements over the switch.

- 14.09 Indication of signal governing movements from siding to main track with the current of traffic on track signaled for movements in only one direction through spring switch in automatic block signal territory, less restrictive than "Proceed at Restricted Speed" when the block into which movements are governed by the signal is occupied and approach or time locking is ineffective.
- 14.10 Indication of signal governing movements from siding to main track, with the current of traffic, on track signaled for movements in only one direction through spring switch in automatic block signal territory, not "STOP" when main track is occupied by a train approaching switch within at least 1500 feet in approach of the approach signal for the main track signal governing trailing movements over the switch and approach or time locking is ineffective.
- 15.01 Automatic block signal territory not designated in timetable instructions.
- 15.02 Traffic control territory not designated in timetable instructions.

- 15.03 Automatic train stop territory not designated in timetable instructions.
- 15.04 Automatic train control territory not designated in timetable instructions.
- 15.05 Automatic cab signal territory not designated in timetable instructions.
- 16.01 Length of electric lock releasing circuit on main track too long to permit crew member standing at the switch to see a train or car occupying the releasing circuit.
- 16.02 Curvature of track on which electric lock releasing circuit is provided prevents crew member standing at the switch from seeing a train or car occupying the releasing circuit.
- 16.03 Electric lock releasing circuit on main track extends into fouling circuit where the turnout is not equipped with a derail at the clearance point either pipe-connected to the switch or independently locked, electrically.
- 17.01 Operating connection for switch, derail, movable-point frog, facing-point lock, rail-locking device of movable bridge protected by interlocking or mechanically operated signal not made of steel or wrought-iron pipe one inch or larger, or member

- of equal strength. (Does not apply to up-and-down rod of mechanically operated signal.)
- 17.02 Pipe not fully screwed into coupling.
 - 17.03 Pipe not riveted to pipe plug with 2 rivets.
 - 17.04 Pipe line out of alinement sufficiently to interfere with proper operation.
 - 17.05 Pipe line not properly compensated for temperature changes.
 - 17.06 Pipe line carriers spaced more than 8 feet apart on tangent or on curve of less than 2 degrees.
 - 17.07 Pipe line carriers spaced more than 7 feet apart on curve of 2 degrees or more.
 - 17.08 Coupling in pipe line fouls carrier.

Roadway Signals and Cab Signals.

- 21.01 Roadway signal not positioned and aligned so that the indication it displays can be clearly associated with the track it governs.
- 22.01 Semaphore arm clears object that may interfere with its operation less than one-half inch.
- 23.01 Aspects of roadway signal shown by means other than position of semaphore blade, color of lights, position of lights, flashing of lights or combination thereof.

- 23.02 Single white light used for aspect of roadway signal.
- 23.03 Reflector lenses, buttons, or other devices which depend for visibility upon reflected light from an external source used in night aspect of roadway signal.
- 23.04 Aspects of cab signals shown by means other than lights, illuminated letters, or illuminated numbers.
- 23.05 Signal aspect not identified by a name.
- 23.06 Signal aspect does not indicate action to be taken.
- 23.07 More than one name and indication applies to aspects indicating the same action to be taken.
- 23.08 Same aspect used with more than one name and indication.
- 23.09 Aspect other than a red light, a series of horizontal lights or a semaphore blade in the horizontal position, used to indicate stop.
- 23.10 Aspect other than a yellow light, a lunar light, series of lights, or a semaphore blade in the upper or lower quadrant at an angle of approximately 45 degrees to the vertical, used to indicate that speed is to be restricted and stop may be required.

- 23.11 Aspect other than a green light, a series of vertical lights, or a semaphore blade in a vertical position in the upper or 60° or 90° in the lower quadrant, used to indicate proceed at authorized speed.
- 23.12 Names, indications and aspects of roadway signals and/or cab signals not defined in carrier's block signal and interlocking rules currently in effect.
- 23.13 Copy of modification of carrier's block signal and interlocking rules not filed with the Federal Railroad Administration within thirty days after such modification became effective.
- 23.14 Night aspects of roadway signals not shown by lights.
- 23.15 Signal displays a less restrictive aspect than intended when arm of semaphore signal assumes a false restrictive position.
- 23.16 Signal displays a less restrictive aspect than intended when a lamp fails in a light signal.
- 23.17 Signal displays a less restrictive aspect than intended when a qualifying appurtenance is missing from its normal location on the signal mast.
- 24.01 Roadway signal not located with respect to the next signal or signals in advance which governs

train movements in the same direction, so that when it displays a restrictive aspect the indication of that aspect can be complied with by means of a brake application, other than an emergency application initiated at such signal, by stopping at the signal where a stop is required.

24.02 Roadway signal not located with respect to the next signal in advance governing movements in the same direction, so that when it displays a restrictive aspect the indication of that aspect can be complied with by means of a brake application, other than an emergency application, initiated at such signal, by a reduction in speed to the rate prescribed by the next signal in advance.

26.01 Buffing device causes signal to display a less restrictive aspect than intended.

Track Circuits.

51.01 Track relay not in deenergized position or device that functions as a track relay not in its most restrictive state in rear of broken rail.

51.02 Track relay not in deenergized position or device that functions as a track relay not in its most restrictive state when rail or switch frog is removed from track.

- 51.03 Shunt fouling circuit used where permissible speed through turnout is greater than 45 miles per hour.
- 51.04 Track relay not in deenergized position or device that functions as a track relay not in its most restrictive state when a train, locomotive, or car occupies any part of the track circuit, except fouling section of turnout of hand-operated main-track crossover. (Explain fully condition of rails with respect to presence of rust, dirt, grease or other foreign matter.)
- 51.05 Adequate measures to safeguard train operation not taken when it is known that a condition of sand, rust, dirt, grease or other foreign matter exists that has prevented effective shunting of a track circuit when occupied by a train, locomotive, or car.
- 51.06 Track relay not in deenergized position or device that functions as a track relay not in its most restrictive state when switch points are not closed in normal position, where switch shunting circuit is used.

- 51.07 Track relay not in deenergized position or device that functions as a track relay not in its most restrictive state when switch is not locked where switch is equipped with facing-point lock with switch circuit controller and where switch shunting circuit is used.
- 51.08 Track relay not in deenergized position or device functions as a track relay not in its most restrictive state when independently operated fouling-point derail equipped with switch circuit controller is not in derailing position, where switch shunting circuit is used.
- 51.09 Track circuit of an automatic train stop, train control, or cab signal system not deenergized in rear of broken rail.
- 51.10 Track circuit of an automatic train stop, train control, or cab signal system not deenergized when rail or switch frog is removed from track.
- 51.11 Track circuit of automatic train stop, train control, or cab signal system not deenergized in the rear of a train, locomotive, or car when such equipment occupies any part of a track circuit, except the fouling section of turnout of hand-operated main-track crossover. (Explain fully

- condition of rail with respect to presence of rust, dirt, grease, or other foreign matter.)
- 51.12 Adequate measures to safeguard train operation not taken when it is known that a condition of sand, rust, dirt, grease, or other foreign matter exists that has prevented effective deenergization of a track circuit of automatic train stop, train control, or cab signal system in the rear of a train, locomotive, or car when track circuit is occupied by such equipment.
- 51.13 Track circuit of automatic train stop, train control, or cab signal system not deenergized when switch points are not closed in normal position, where switch shunting circuit is used.
- 51.14 Track circuit of automatic train stop, train control, or cab signal system not deenergized when switch is not locked where switch is equipped with facing-point lock with circuit controller and where switch shunting circuit is used.
- 51.15 Track circuit of automatic train stop, train control, or cab signal system not deenergized when independently operated fouling-point derail equipped with switch circuit controller is not in derailing position, where switch shunting circuit is used.

- 52.01 Where relayed cut-section is used in territory where noncoded direct current track circuits are in use, the energy circuit to the adjoining track circuit not open when track relay at the cut-section is in deenergized position.
- 52.02 Where relayed cut-section is used in territory where noncoded direct current track circuits are in use, the adjoining track circuit not shunted when the track relay at the cut section is in deenergized position.
- 53.01 At grade crossing with electric railroad where foreign current is present, the electric energy for noncoded direct current track feeds toward the crossing.
- 54.01 Length of track circuit used for controlling signaling facilities that is less than maximum inner wheelbase of locomotive or car, not supplemented by special circuit or protective device that provides equivalent of full track circuit protection.
- 55.01 Dead section exceeds 35 feet and special circuit not installed.

- 55.02 Length of dead section exceeds length of outer wheel base of locomotive operating over such dead section and special circuit not installed. (Applies where length of outer wheel base of locomotive is less than 35 feet.)
- 56.01 Track relay not in deenergized position or device that functions as track relay not in its most restrictive state with a shunt of 0.06 ohm resistance connected across rails of track circuit, when track circuit is dry.
- 57.01 Shunt or fouling wires do not consist of at least two discrete conductors. (Does not apply to shunt wires to switch circuit controller through which signal control circuits are controlled and track circuits are shunted, or where track circuit is opened and relay side of track circuit is shunted.)
- 57.02 Shunt wires not of sufficient conductivity so that track relay is in deenergized position or device that functions as track relay is in its most restrictive state when circuit is shunted.
- 57.03 Shunt wires not maintained in such condition that track relay is in deenergized position or device that functions as track relay is in its

- most restrictive state when circuit is shunted.
- 57.04 Fouling wires not of sufficient conductivity so that track relay is in deenergized position or device that functions as track relay is in its most restrictive state when circuit is shunted.
- 57.05 Fouling wires not maintained in such condition that track relay is in deenergized position or device that functions as track relay is in its most restrictive state when circuit is shunted.
- 58.01 Fouling section of turnout does not extend to clearance point.
- 58.02 Rail joint in shunt fouling section not bonded.
- 59.01 Insulated rail joint not maintained in condition to prevent flow of sufficient track circuit current between rails separated by the insulation to cause failure of the track circuit.
- 59.02 Insulated rail joint not maintained in such a condition that the track circuit through the switch circuit controller can be opened when switch point is opened.
- 59.99 Insulation in insulated rail joint in bad condition.

60.01 Switch shunting circuit installed where track circuit or control circuit not opened by switch circuit controller. (Does not apply to installations made before February 27, 1984.)

Wires and Cables

- 71.01 Signal wire carried on pole line not securely tied in on insulator.
- 71.02 Signal wire not secured because of broken, missing, or burned pole or crossarm.
- 71.03 Signal wire not secured because of broken, burnt, or missing crossarm.
- 71.04 Signal wire interferes with or is interfered by another wire.
- 71.05 Cable used aerially not supported on insulators or by messenger.
- 73.01 Open-wire transmission line operating at voltage of 750 volts or more, less than 4 feet above nearest crossarm carrying signal or communication circuits.
- 74.01 Insulated wire not protected from mechanical injury.
- 74.02 Insulation of insulated wire punctured for test purposes.

- 74.03 Splice in underground wire does not have insulation resistance value at least equal to the wire spliced.
- 76.01 Wire not tagged or otherwise marked so it can be identified at terminal.
- 76.02 Nomenclature of tag or wire identification does not correspond to that of circuit plan.
- 76.03 Tag or other mark of identification in instrument case or apparatus housing not made of insulating material.
- 76.04 Tag interferes with moving parts of apparatus.
- 76.05 Wire interferes with operating part of mechanism.

Inspections and Tests - All Systems

- 101.01 Relay which failed to meet requirements of specified tests not removed from service.
- 101.02 Relay which failed to meet requirements of specified tests restored to service with operating characteristics not in accordance with the limits within which the relay is designed to operate.
- 101.03 Electromagnetic device other than relay, which failed to meet requirements of specified tests not removed from service.

- 101.04 Electromagnetic device other than relay, which failed to meet requirements of specified tests restored to service with operating characteristics not in accordance with the limits within which the electromagnetic device is designed to operate.
- 101.05 Electronic device which failed to meet requirements of specified tests not removed from service.
- 101.06 Electronic device which failed to meet requirements of specified test restored to service with operating characteristics not in accordance with the limits within which the electronic device is designed to operate.
- 102.01 Signal mechanism not inspected at least once every six months.
- 102.02 Tests of signal mechanism operating characteristics not made at least once every two years.
- 102.03 Mechanical movement to all positions of searchlight mechanism not observed at least once every six months.
- 103.01 Switch circuit controller not inspected at least once every three months.
- 103.02 Tests of switch circuit controller not made at least once every three months.

- 103.03 Point detector not inspected as least once every three months.
- 103.04 Tests of point detector not made at least once every three months.
- 104.01 Shunt fouling circuit not inspected at least once every three months.
- 104.02 Tests of shunt fouling circuit not made at least once every three months.
- 105.01 Tests of electric lock not made at least once every two years. (Does not apply to electric locks of forced-drop type.)
- 106.01 Tests of relay in service not made at least once every four years. (Does not apply to locomotive relay.)
- 106.02 Tests of centrifugal relay in service not tested least once every twelve months.
- 106.03 Tests of AC vane relay, D.C. polar relay, or relay with soft iron magnetic structure not tested at least once every two years.

- 107.01 Ground test on energy bus which furnishes power power to circuits, the functioning of which affects the safety of train operation, not made when installed or at least once every three months.
- 108.01 Tests of insulation resistance not made within specified period.
- 108.02 Action not taken to promptly repair or renew conductor when its insulation resistance is below 500,000 ohms.
- 108.03 Circuit permitted to function on a conductor having insulation resistance value less than 200,000 ohms.
- 109.01 Time release not tested at least once every twelve months.
- 109.02 Timing relay not tested at least once every twelve months.
- 109.03 Timing device not tested at least once every twelve months.
- 109.04 Timing of time release less than 90 percent of predetermined time interval.
- 109.05 Timing of timing relay less than 90 percent of predetermined time interval.

- 109.06 Timing of timing device less than 90 percent of predetermined time interval.
- 109.07 Predetermined time interval not shown on plans or marked on time release, timing relay, or timing device.
- 110.01 Record of tests not made.
- 110.02 Tests not recorded on form.
- 110.03 Record of tests not complete.
- 110.04 Record of tests not filed with supervisory official having jurisdiction.
- 110.05 Record of test form does not show name of railroad, place and date, equipment tested, repairs, replacements, adjustments made, condition in which apparatus was left, and signature of employee making the test.

AUTOMATIC BLOCK SIGNAL SYSTEMS

Standards.

- 201.01 The control circuits for home signal aspects more favorable than "proceed at restricted speed" not controlled automatically by track circuits extending through the entire block.

- 202.01 Signal does not display its most restrictive aspect when points of facing-point hand-operated switch over which it governs movements are open one-fourth inch or more.
- 202.02 Signal does not display its most restrictive aspect when points of trailing-point hand-operated switch over which it governs movements is open three-eighths inch or more.
- 202.03 Signal which displays a separate aspect for facing movements over hand-operated switch in the normal and in the reverse position does not display its most restrictive aspect when the switch points are open one-fourth inch or more from either the normal or reverse position.
- 203.01 At hand-operated crossover between main tracks protection not provided by one of the following:
(1) An arrangement of track circuits and switch circuit controllers, (2) facing-point locks on both switches of the crossover, with both locks operated by a single lever, or (3) electric locking of the switches of the crossover.
- 203.02 Signal governing movements over switch of hand-operated crossover between main tracks does not display its most restrictive aspect when

either switch of the crossover is open, where crossover protection is provided by track circuits and switch circuit controllers.

203.03 Signal governing movements over switch of hand-operated crossover between main tracks does not display its most restrictive aspect when crossover is occupied by a train, locomotive, or car in such manner as to foul the main track, where crossover protection is provided by track circuits and switch circuit controllers. (Explain fully condition of rail with respect to presence of sand, rust, dirt, grease or other foreign matter.)

203.04 Signal governing movements over switch of hand-operated crossover between main track does not display its most restrictive aspect when either switch of crossover is unlocked, where switches of crossover are provided with facing-point locks operated by a single lever.

203.05 Signal governing movements over switch of hand-operated crossover between main tracks does not display its most restrictive aspect before electric locking releases, where switches are electrically locked.

- 203.06 Electric locking releases before the expiration of predetermined time interval after signals display their most restrictive aspect. (Applies only to electric locking of switches of hand-operated crossover between main tracks.)
- 204.01 On track signaled for movements in both directions a train does not cause one or more opposing signals immediately ahead of it to display the most restrictive aspect the indication of which is not more favorable than "proceed at restricted speed."
- 204.02 On track signaled for movements in both directions where opposing signals are spaced stopping distance apart for movements in one direction only, signals not arranged so that a restrictive aspect will be displayed by at least one of the signals in approach of the opposing signals, when such approach signals are passed simultaneously by opposing trains.
- 204.03 On track signaled for movements in both directions where opposing signals are spaced less than stopping distance apart for movements in one direction, signals not arranged so that restrictive aspects will be displayed by both signals in approach

of the opposing signals for trains passing such approach signals simultaneously.

- 204.04 In APB signaling, train passing head block signal does not cause opposing head block signal to display an aspect not more favorable than "stop."
- 205.01 Circuits not so installed that signal will display its most restrictive aspect when the block into which it governs train movements is occupied by a train, locomotive, or car.
- 205.02 Circuits not so installed that signal will display its most restrictive aspect when points of a switch in the block into which it governs train movements are not closed in proper position.
- 205.03 Circuits not so installed that signal will display its most restrictive aspect when an independently operated fouling-point derail equipped with switch circuit controller in the block into which it governs train movements is not in derailing position.
- 205.04 Circuits not so installed that signal will display its most restrictive aspect when a track relay within the block into which it governs train movements is in deenergized position.

- 205.05 Circuits not so installed that signal will display its most restrictive aspect when a device that functions as a track relay within the block into which it governs train movements is in its most restrictive state.
- 205.06 Circuits not so installed that signal will display its most restrictive aspect when its control circuit is deenergized.
- 206.01 Battery or power supply for signal control relay circuit not located at the end of the circuit farthest from the relay. (Applies only to open-wire circuit or common return circuit.)
- 207.01 Electric lock on hand-operated switch can be unlocked before control circuits of signals governing movements over such switch have been opened.
- 207.02 Approach or time locking not provided for electric lock on hand-operated switch.
- 207.03 Electric lock on hand-operated switch can be unlocked before expiration of predetermined time interval where time locking is provided.
- 207.04 Electric lock on hand-operated switch can be unlocked before expiration of predetermined time interval with approach circuit occupied where approach locking is provided.

- 207.05 Approach locking not effective.
- 207.06 Time locking not effective.
- 207.07 Approach or time locking of electric lock on hand-operated switch can be defeated by the unauthorized use of emergency device which is not kept sealed in the non-release position.

INTERLOCKING

Standards.

- 301.01 Signal not provided to govern train movements into and through interlocking limits. (Note: This does not apply to a turnout over a hand-operated switch into interlocking limits if the switch is provided with an electric lock and a derail at the clearance point, either pipe-connected to the switch or independently locked, electrically. Electric locks installed under this rule must conform to the time and approach locking requirements of Section 236.314 (without reference to the 20-mile exceptions), and those of either Section 236.760 or Section 236.768, as may be appropriate.)
- 302.01 Track circuits not provided throughout interlocking limits.

- 302.02 Route locking not provided throughout interlocking limits. (Note: Route locking shall be effective when the first pair of wheels of a locomotive or car passes a point not more than 13 feet in advance of the signal governing the movement.)
- 302.03 Route locking not effective.
- 303.01 Control circuit for signal aspect with indication more favorable than "proceed at restricted speed" of power-operated signal governing movements over switches, movable-point frogs, and derails not selected through circuit controller operated directly by switch points or by switch locking mechanism, or through relay controlled by such switch circuit controller on each switch, movable point frog, and derail in the routes governed by the signal.
- 303.02 Control circuit for signal aspect with indication more favorable than "proceed at restricted speed" is not so arranged that such aspect can only be displayed by a signal when each switch, movable-point frog, and derail in the route governed is in proper position.
- 304.01 Mechanical locking, or the same protection effected by means of circuits not provided.

- 305.01 Approach or time locking not provided in connection with signal displaying aspects with indication more favorable than "proceed at restricted speed."
- 305.02 Approach locking not effective.
- 305.03 Time locking not effective.
- 306.01 Facing-point lock or switch-and-lock movement not provided for mechanically operated switch, movable-point frog, or split-point derail.
- 307.01 Indication locking not provided for semaphore type approach signal.
- 307.02 Indication locking not provided for power-operated home signal.
- 307.03 Indication locking not provided for power-operated switch, movable-point frog, or derail.
- 307.04 Indication locking not provided for approach signal of the light type. (Applies to each light signal except light signal all aspects of which are controlled by polar or coded track circuits or line circuits so arranged that a single fault will not permit a more favorable aspect than intended to be displayed.)
- 307.05 Single fault in line circuit controlling approach signal aspect, where indication locking is not provided, permits more favorable aspect than intended to be displayed.

- 307.06 Indication locking not effective.
- 308.01 Signals can display aspects which permit conflicting movements. (Does not apply to signals that may display restricting aspects at the same time on a track used for switching movements only, by one train at a time, or to opposing signals on the same track at manual interlocking which are permitted simultaneously to display aspects authorizing conflicting movements when interlocking is unattended, provided that simultaneous train movements in opposite directions on the same track between stations on either side of the interlocking are not permitted.)
- 309.01 Loss of shunt for five seconds or less permits established route at automatic interlocking to be changed.
- 309.02 Loss of shunt of five seconds or less permits the release of route locking of power-operated switch, movable point frog, or derail. (Does not apply to power-operated switch, movable-point frog, or derail installed prior to February 27, 1984).

- 310.01 Approach signal not provided for home signal on main track. (Does not apply where home signal is the first signal encountered when leaving yard or station where authorized speed approaching such signal is not higher than slow speed.)
- 310.02 Inoperative approach signal provided for home signal where authorized speed between home signals is greater than 20 miles per hour.
- 311.01 Control circuit for aspect with indication more favorable than "Proceed at restricted speed" not selected through relays or devices that function as track relays for all track circuits in the route governed or through repeating relays for such track circuits.
- 311.02 Signal control circuit at automatic interlocking not selected through relays or devices that function as track relays for all track circuits in the route governed or through repeating relays for such track circuits.
- 311.03 Signal control circuit at automatic interlocking not selected through relays or devices that function as track relays for track circuits in all conflicting routes within interlocking limits or through repeating relays for such track circuits.

- 311.04 Signal control circuit at automatic interlocking not selected through signal mechanism contacts for signals on all conflicting routes or through relay contacts closed when such signals display stop aspects.
- 311.05 Signal control circuit at automatic interlocking not selected through normal contacts of time releases or timing devices for all conflicting routes or through contacts of relays repeating the normal position of contacts of such time releases or timing devices.
- 312.01 Signal appliances at movable bridge protected by interlocking not so interlocked with bridge devices that before a signal governing movements over the bridge can display an aspect to proceed the bridge must be locked and the track properly alined.
- 312.02 Signal governing movements over movable bridge protected by interlocking can display aspect to proceed with bridge locking members displaced more than one inch from their proper position.
- 312.03 Signal governing movements over movable bridge protected by interlocking can display aspect to proceed with the track rail on the movable span more than three-eighths inch from correct surface with the rail seating device on the bridge abutment or fixed span.

- 312.04 Signal governing movements over movable bridge protected by interlocking can display aspect to proceed with the track rail on the movable span more than three-eighths inch from correct alinement with the rail seating device on the bridge abutment or fixed span.
- 312.05 Emergency bypass switch or device not locked or sealed.
- 314.01 Electric lock not provided for hand-operated switch or derail within interlocking limits.
(Does not apply where train movements are made at speeds not exceeding 20 m.p.h.)
- 314.02 Electric lock on hand-operated switch or derail at manually operated interlocking not controlled by operator of the machine.
- 314.03 Electric lock on hand-operated switch or derail within interlocking limits can be unlocked before signals governing movements over such switch or derail display aspects indicating stop.
- 314.04 Approach or time locking not provided for electric lock on hand-operated switch or derail within interlocking limits.

- 314.05 Electric lock on hand-operated switch or derail within interlocking limits can be unlocked before the expiration of the predetermined time interval, where time locking is provided.
- 314.06 Electric lock on hand-operated switch or derail within interlocking limits can be unlocked before the expiration of the predetermined time interval, with approach section occupied, where approach locking is provided.
- 314.07 Approach or time locking of electric lock at hand-operated switch or derail can be defeated by the unauthorized use of emergency device which is not kept sealed in the non-release position.
- 314.08 Approach locking not effective.
- 314.09 Time locking not effective.

Rules and Instructions.

- 326.01 Train movement permitted through interlocking while mechanical locking of interlocking machine is being changed or is removed, or when locking is disarranged or broken, without each switch, movable-point frog, and derail in route over which movement is made being spiked, clamped, or blocked

so that it can not be moved by its controlling lever. (Does not apply if protection equivalent to mechanical locking is provided by electric locking or electric circuits, or where protection is in service in accordance with section 303 of the Rules, Standards and Instructions for all signal aspects, and signal controls are arranged so that the signals can not display an aspect the indication of which is less restrictive than "Proceed at restricted speed.")

- 326.02 Train movement exceeds restricted speed through interlocking while mechanical locking of interlocking machine is being changed, is removed from the machine, or is disarranged or broken.
- 327.01 Switch, movable-point frog, or split-point derail can be locked when switch point is open three-eighths inch.
- 328.01 Stroke of plunger of facing-point lock less than 8 inches.
- 328.02 End of lock plunger clears lock rod more than one inch when lock lever is in unlocked position.
- 329.01 Bolt lock does not prevent signal from being operated to display an aspect less restrictive than "Stop" while derail is in derailing position.

- 329.02 Bolt lock does not prevent signal from being operated to display an aspect less restrictive than "Stop" when switch point is open one-half inch or more.
- 330.01 Locking dog of switch-and-lock movement extends through lock rod less than one-half inch in normal or reverse position.
- 334.01 Point detector contacts can be opened by manually applying force at the closed switch point when switch mechanism is locked in normal or reverse position.
- 334.02 Point detector circuit controller contacts assume the position corresponding to switch point closure when switch point is prevented by an obstruction from closing to within one-fourth inch. (Applies only to point detector where latch-out device is not used.)
- 334.03 Point detector circuit controller contacts assume position corresponding to switch point closure when switch point is prevented by an obstruction from closing to within three-eighths inch. (Applies only to point detector where a latch-out device is used.)

- 335.01 Driving piece not rigidly secured to locking bar.
- 335.02 Dog not rigidly secured to locking bar.
- 335.03 Stop not rigidly secured to locking bar.
- 335.04 Trunnion not rigidly secured to locking bar.
- 335.05 Swing dog does not have full or free movement.
- 335.06 Top plate not secured in place.
- 336.01 Locking bed parts or supports, or tappet stop rail not rigidly secured in place.
- 336.02 Locking bed parts or supports, or tappet stop rail not alined to permit free operation of locking.
- 337.01 Locking faces do not fit squarely against each other.
- 337.02 Locking faces fit with a minimum engagement when locked of less than one-half the designed locking face.
- 338.01 Mechanical locking not in accordance with locking sheet and dog chart currently in effect.
- 339.01 Lever latch block can be raised so that its bottom is within three-eighths inch of top of quadrant when latch is mechanically locked. (Applies only to mechanical interlocking machine with latch-operated locking.)

- 339.02 Lever latch block can be moved more than three-eighths inch on top of quadrant when lever is mechanically locked. (Applies only to mechanical interlocking machine with lever-operated locking.)
- 339.03 Lever which is mechanically locked in normal position can be moved more than five-sixteenths inch. (Applies only to electromechanical interlocking machine with levers moving in a horizontal plane.)
- 339.04 Lever which is mechanically locked in reverse position can be moved more than nine-sixteenths inch. (Applies only to electromechanical interlocking machine with levers moving in a horizontal plane.)
- 339.05 Lever which is mechanically locked can be moved more than 5 degrees. (Applies only to electromechanical machine with levers moving in an arc.)
- 339.06 Lever latch block can be raised so that its bottom is within seven thirty-seconds inch of top of quadrant, when latch is mechanically locked. (Applies only to power interlocking machine with latch-operated locking.)
- 339.07 Lever which is mechanically locked in normal position can be moved more than five-sixteenths inch. (Applies only to power interlocking machine with levers moving in a horizontal plane.)

- 339.08 Lever which is mechanically locked in reverse position can be moved more than nine-sixteenths inch. (Applies only to power interlocking machine with levers moving in a horizontal plane.)
- 339.09 Lever which is mechanically locked can be moved more than 5 degrees. (Applies only to power interlocking machines with levers moving in an arc.)
- 340.01 Locking between electric and mechanical levers of electromechanical interlocking machine not effective to prevent operation of mechanical lever without being released by electric lever.
- 341.01 Mechanical locking of Saxby and Farmer interlocking machine releases when a downward force not exceeding a man's weight is exerted on rocker while lever is in midstroke position.
- 342.01 Contacts of switch circuit controller connected at the point to switch, derail, or movable-point frog are in position corresponding to switch point closure when switch point is open one-fourth inch or more.

Inspections and Tests

- 376.01 Mechanical locking of interlocking machine not tested when new locking is placed in service.
- 376.02 Mechanical locking not tested when change in locking is made.
- 376.03 Mechanical locking not tested when restored after being disarranged.
- 376.04 Complete test of mechanical locking in interlocking machine not made at least once every two years.
- 377.01 Approach locking not tested when installed, modified, or after being disarranged.
- 377.02 Approach locking not tested at least once every two years.
- 378.01 Time locking not tested when installed, modified, or after being disarranged.
- 378.02 Time locking not tested at least once every two years.
- 379.01 Route or other type of switch locking not tested when installed, modified, or after being disarranged.
- 379.02 Route or other type of switch locking not tested at least once every two years.

- 380.01 Indication locking not tested when installed, modified, or after being disarranged.
- 380.02 Indication locking not tested at least once every two years.
- 381.01 Traffic locking not tested when installed, modified, or after being disarranged.
- 381.02 Traffic locking not tested at least once every two years.
- 382.01 Switch obstruction test not made when lock rod installed.
- 382.02 Switch obstruction test not made at least once each month.
- 383.01 Valve lock in electropneumatic interlocking not tested at least once every three months. (Applies only to valves of the non-cut-off-type.)
- 383.02 Valve in electropneumatic interlocking not tested at least once every year.
- 383.03 Valve magnet in electropneumatic interlocking not tested at least once every year.
- 384.01 Cross protection not tested at least once every six months.

- 386.01 Restoring feature on power switch not tested at least once every three months.
- 387.01 Movable bridge locking not tested at least once a year.

TRAFFIC-CONTROL SYSTEMS

Standards.

- 402.01 Signal control circuits for home signal aspects more favorable than "proceed at restricted speed" not controlled by track circuits extending through the entire block.
- 402.02 Signal at manually operated interlocking not controlled manually in cooperation with control operator.
- 403.01 Signals at controlled point simultaneously can display aspects to proceed for conflicting train movements. (Does not apply to signals on track used for switching movements only by one train at a time.)
- 403.02 Signals at controlled point on track used for switching movements only simultaneously can display aspect more favorable than "proceed at restricted speed" for conflicting train movements.

- 404.01 Signals at adjacent controlled points not so interconnected that aspects to proceed, on tracks signaled for movements at greater than restricted speed, cannot be displayed simultaneously for conflicting movements.
- 405.01 On track signaled for movements in both directions, occupancy of the track between opposing signals at adjacent controlled points does not prevent changing the direction of traffic from that which obtained at the time the track became occupied. (Note: Exception added 1/24/66 permits display of an aspect not less restrictive than that indicating "proceed at restricted speed" by a signal to permit a locomotive, with or without cars, to return to a standing portion of the train in the immediate approach to a controlled point during switching operations. Where a carrier provides the necessary arrangement to permit a locomotive to return to its train, as set forth in the exception, such an arrangement when actuated does not constitute a violation of Section 236.405 and should not be reported as such.)

- 407.01 Approach or time locking not provided for controlled signal where route or direction of traffic can be changed.
- 407.02 Approach locking not effective.
- 407.03 Time locking not effective.
- 408.01 Route locking not provided where switches are power-operated.
- 408.02 Route locking not effective.
- 408.03 Route locking not effective until first pair of wheels of locomotive or car passes a point more than 13 feet in advance of the signal governing the movement.
- 410.01 Hand-operated switch on main track not electrically or mechanically locked in normal position where signal is not provided to govern movement to main track and train movements are made at speeds in excess of 20 miles per hour and train or engine movements may clear the main track.
- 410.02 Hand-operated switch on signaled siding not electrically or mechanically locked in normal position where signal is not provided to govern movements to signaled

siding and train movements are made at speeds in excess of 30 miles per hour and train or engine movements may clear the signaled siding.

- 410.03 Approach or time locking not provided for electric lock on hand-operated switch.
- 410.04 Time locking not provided in connection with mechanical lock on hand-operated switch.
- 410.05 Approach or time locking not provided for signal used in lieu of electric or mechanical lock.
- 410.06 Electric or mechanical lock on hand-operated switch can be unlocked before control circuits of signals governing movements over the switch, which display aspects more favorable than "proceed at restricted speed," have been opened directly or track circuit has been shunted.
- 410.07 Signal provided in lieu of electric or mechanical lock can display an aspect to proceed before control circuits of signals governing movements over the switch have been opened.
- 410.08 Electric or mechanical lock on hand-operated switch can be unlocked before expiration of predetermined time interval where time locking is provided.

- 410.09 Signal provided in lieu of electric or mechanical lock can display an aspect to proceed before expiration of predetermined time interval where time locking is provided.
- 410.10 Electric lock on hand-operated switch can be unlocked before expiration of predetermined time interval, with approach section occupied, where approach locking is provided.
- 410.11 Signal provided in lieu of electric or mechanical lock can display an aspect to proceed before expiration of predetermined time interval, with approach section occupied, where approach locking is provided.
- 410.12 Approach or time locking of electric lock at hand-operated switch can be defeated by the unauthorized use of emergency release device of electric lock which is not kept sealed in the non-release position.

AUTOMATIC TRAIN-STOP, TRAIN-CONTROL AND CAB-SIGNAL SYSTEMS

Standards.

- 501.01 Automatic train control system with low-speed restriction does not enforce slow speed after train has been stopped by an automatic application of the brakes, until the apparatus is automatically

restored to normal because the condition which caused the restriction no longer affects the movement of the train.

501.02 Automatic train control system with low-speed restriction does not enforce slow speed after the speed of the train, under control of the engineman, has been reduced to slow speed, until the apparatus is automatically restored to normal because the condition which caused the restriction no longer affects the movement of the train.

501.03 Automatic train control system with medium-speed restriction does not require train to proceed under medium speed after passing a signal displaying an approach aspect in order to prevent an automatic application of the brakes.

501.04 Automatic train control system with medium-speed restriction does not require train to proceed under medium speed when approaching a signal requiring a stop, or a stop indication point, in order to prevent an automatic application of the brakes.

- 501.05 Automatic train control system with maximum-speed restriction does not require train to proceed at or under maximum authorized speed in order to prevent an automatic application of the brakes.
- 502.01 Automatic train stop or train control system does not operate to initiate an automatic brake application at least stopping distance from the entrance to a block occupied by a train, locomotive, or car.
- 502.02 Automatic train stop or train control system does not operate to initiate an automatic brake application at least stopping distance from the entrance to a block in which the points of a switch are not closed in proper position.
- 502.03 Automatic train stop or train control system does not operate to initiate an automatic brake application at least stopping distance from the entrance to a block in which an independently operated fouling-point derail equipped with switch circuit controller is not in derailing position.
- 502.04 Automatic train stop or train control system does not operate to initiate automatic brake application at least stopping distance from the entrance to a block in which a track relay is

- in deenergized position or device which functions as a track relay is in its most restrictive state.
- 502.05 Automatic train stop or train control system does not operate to initiate an automatic brake application at signal requiring a reduction in speed.
- 503.01 Automatic train control system does not operate to initiate an automatic brake application when the speed of the train exceeds the predetermined rate as required by the setting of the speed control mechanism.
- 504.01 Automatic train stop or train control system does not operate in connection with an automatic block signal system.
- 504.02 Automatic train stop or train control system not so interconnected with the signal system as to perform its intended function in the event of failure of the engineman to acknowledge or obey a signal requiring a reduction in speed.
- 505.01 Proper operative relation between the parts along the roadway and the parts on the locomotive does not obtain under all conditions of speed, weather, wear, oscillation, and shock.

- 506.01 Automatic train stop apparatus permits release of the brakes after automatic application before a reset device has been operated, while the condition that caused the brake application still affects the movement of the train.
- 506.02 Automatic train control apparatus permits release of the brakes after automatic application before the speed of the train has been reduced to a predetermined rate, while the condition that caused the brake application still affects the movement of the train.
- 506.03 Reset device so located that it can be operated by engineer without leaving his/her accustomed position in the cab and not so arranged as to prevent release of the brakes until the train has been stopped.
- 506.04 Brakes can be released following automatic brake application after reset device has been operated before train has been stopped, while the condition that caused the brake application still affects the movement of the train.

- 507.01 Automatic train stop or train control apparatus, when operated, does not cause a full service application of the brakes.
- 508.01 Automatic train stop, train control, or cab signal apparatus interferes with the application of the brakes by means of the brake valves.
- 508.02 Automatic train stop, train control, or cab signal apparatus impairs the efficiency of the brake system.
- 509.01 Automatic train stop, train control, or cab signal apparatus not arranged so that when two or more locomotives are coupled, or a pushing or helping locomotive is used, it can be made operative only on the locomotive from which the brakes are controlled.
- 511.01 Automatic cab signal system not so arranged that cab signals are continuously controlled in accordance with conditions that obtain at least stopping distance in advance. (Applies only to conditions described in parts (a), (b), (c), and (d), of Section 236.205 of the Rules, Standards and Instructions.)

- 512.01 Automatic cab signal does not indicate "Proceed at Restricted Speed" when locomotive enters or is within a block occupied by a train, locomotive, or car.
- 512.02 Automatic cab signal does not indicate "Proceed at Restricted Speed" when locomotive enters or is within a block in which the points of a switch are not closed in proper position.
- 512.03 Automatic cab signal does not indicate "Proceed at Restricted Speed" when locomotive enters or is within a block in which an independently operated fouling-point derail equipped with switch circuit controller is not in derailing position.
- 512.04 Automatic cab signal does not indicate "Proceed at Restricted Speed" when locomotive enters a block in which a track relay is in deenergized position or device that function as a track relay is in its most restrictive state. (Where there is more than one track circuit in the block.)
- 513.01 Audible cab indicator of automatic cab signal system does not sound continuously until silenced by manual operation of acknowledging device, when cab signal changes to a more restrictive aspect.

- 513.02 Cab indicator does not have a distinctive sound.
- 513.03 Cab indicator not clearly audible throughout cab under all operating conditions.
- 514.01 Cab signal indication authorizes operation of train at a speed higher than that authorized by indication of roadway signal that governed movement of train into block. (Does not apply when conditions affecting movement of train in the block change after train passes signal.)
- 515.01 Cab signal not plainly visible to member of locomotive crew from his/her station in the cab.
- 516.01 Automatic train stop, train control, or cab signal device not provided with an isolated or separate power supply. (Does not apply to devices installed prior to February 27, 1984 .)
- 516.02 Power supply used to operate equipment other than automatic train stop, train control, or cab signal device.

Rules and Instructions - Roadway.

- 526.01 Signal not caused manually to display its most restrictive aspect when roadway element associated with such signal is not functioning as intended. (Does not apply to track circuit.)

- 526.02 Signal which has been caused manually to display its most restrictive aspect when roadway element associated with the signal is not functioning as intended, caused to display a less restrictive aspect before such element has been restored to normal operative condition. (Does not apply to track circuit.)
- 527.01 Insulation resistance between roadway inductor winding and ground less than 10,000 ohms.
- 528.01 Restrictive condition of automatic train stop or train control device of the continuous type on an approaching locomotive not maintained to within 300 feet of the points of a facing-point hand-operated switch which is open one-fourth inch or more.
- 528.02 Restrictive condition of automatic train stop or train control device of the continuous type on an approaching locomotive not maintained to within 300 feet of the points of a trailing-point hand-operated switch which is open three-eighths inch or more.
- 528.03 Restrictive condition of automatic train stop or train control device of the continuous type

on an approaching locomotive not maintained to within 300 feet of the points of a hand-operated switch which is not locked, where such switch is equipped with facing-point lock with circuit controller.

- 528.04 Restrictive cab signal indication of automatic cab signal device on an approaching locomotive not maintained to within 300 feet of the points of a facing-point hand-operated switch which is open one-fourth inch or more.
- 528.05 Restrictive cab signal indication of automatic cab signal device on an approaching locomotive not maintained to within 300 feet of the points of a trailing-point hand-operated switch which is open three-eighths inch or more.
- 528.06 Restrictive cab signal indication of automatic cab signal device on an approaching locomotive not maintained to within 300 feet of the points of a switch which is not locked, where such switch is equipped with facing-point lock with circuit controller.
- 529.01 Inductor of the inert roadway element type too high.

- 529.02 Inductor of the inert roadway element type too low.
- 529.03 Inductor of the inert roadway element type too close to gage side of nearest running rail.
- 529.04 Inductor of the inert roadway element type too far from gage side of nearest running rail
- 531.01 Trip arm of automatic train stop device, in stop position, too high.
- 531.02 Trip arm of automatic train stop device, in stop position, too low.
- 531.03 Trip arm of automatic train stop device, in stop position, too close to gage side of running rail.
- 531.04 Trip arm of automatic train stop device, in stop position, too far from gage side of running rail.
- 532.01 Strap iron inductor or other roadway element with characteristics differing from standard type used on track where speed higher than restricted speed is permitted.
- 534.01 Automatic train stop, train control, or cab signal device not operative at least stopping distance from entrance to equipped territory. (Does not apply where trains are required to stop at entrance to equipped territory or where the approach thereto is governed by automatic approach signal.)

Rules and Instructions - Locomotive.

- 551.01 Voltage of power supply more than 10 percent above rated voltage.
- 551.02 Voltage of power supply more than 10 percent below rated voltage.
- 552.01 Insulation resistance between wiring and ground of continuous inductive type automatic train stop, train control, or cab signal device less than 1 megohm not corrected when periodic test is performed.
- 552.02 Insulation resistance between wiring and ground of continuous inductive type automatic train stop, train control, or cab signal device less than 250,000 ohms between periodic tests.
- 552.03 Insulation resistance between wiring and ground of intermittent inductive automatic train stop device less than 250,000 ohms not corrected when periodic test performed.
- 554.04 Insulation resistance between wiring and ground of intermittent inductive automatic train stop device less than 20,000 ohms between periodic tests.

- 553.01 Device by means of which operation of pneumatic portion of apparatus can be cut out, not sealed. (Does not apply to brake-pipe cut out cock, or double heading cock, of automatic train stop or train control equipped locomotive or to the cut out cock for the pneumatic whistle of an automatic cab signal system on an equipped locomotive.)
- 554.01 Equalizing reservoir or brake-pipe pressure during automatic brake application reduces at a rate less than that which obtains during a manual service application.
- 555.01 Receiver coil which has been repaired or rewound does not have same operating characteristics which it possessed originally or as currently specified for new equipment.
- 556.01 Change in adjustment of relay made elsewhere than in a shop equipped for that purpose. (Does not apply when receiver coils, electropneumatic valve, or other essential part of equipment is replaced.)
- 556.02 Relay adjusted to compensate for irregularities of power-supply voltage or other variable factors in circuit.

- 557.01 Receiver of intermittent inductive automatic train stop device of the inert roadway element type, or continuous inductive automatic train stop, train control, or cab signal device on locomotive equipped with onboard test device, too high.
- 557.02 Receiver of intermittent inductive automatic train stop device of the inert roadway element type, or continuous inductive automatic train stop, train control, or cab signal device on locomotive equipped with onboard test device, too low.
- 557.03 Receiver of intermittent inductive automatic train stop device of the inert roadway element type, or continuous inductive automatic train stop, train control, or cab signal device on locomotive equipped with onboard test device, too close to gage side of nearest rail.
- 557.04 Receiver of intermittent inductive automatic train stop device of the inert roadway element type, or continuous inductive automatic train stop, train control, or cab signal device on locomotive equipped with onboard test device, too far from gage side of nearest rail.

- 560.01 Contact element of automatic train stop device of the mechanical trip type too high
- 560.02 Contact element of automatic train stop device of the mechanical trip type too low.
- 560.03 Contact element of automatic train stop device of the mechanical trip type too close to gage side of rail.
- 560.04 Contact element of automatic train stop device of the mechanical trip type too far from gage side of rail.
- 562.01 Pick-up of locomotive equipment of continuous inductive automatic train stop, train control, or cab signal device too high.
- 562.02 Pick-up of locomotive equipment of continuous inductive automatic train stop, train control, or cab signal device too low.
- 563.01 Delay time of automatic train stop or train control system exceeds 8 seconds.
- 563.02 Spacing of signals to meet the requirements of section 236.24 of the Rules, Standards and Instructions not adequate in consideration of delay time during automatic train stop or train control brake application.
- 564.01 Acknowledging time of intermittent automatic train stop device exceeds 30 seconds.

- 565.01 Automatic train stop or train control device is cut out before communication is closed between engineer's automatic brake valve and the brake pipe, when operating double-heading cock toward double-heading position.
- 566.01 Locomotive from which brakes are controlled on train operating in automatic train stop, train control, or cab signal territory not equipped with apparatus responsive to roadway equipment installed on all or any part of route traversed.
- 566.02 Automatic train stop, train control, or cab signal apparatus on locomotive from which brakes are controlled of train operating in automatic train stop, train control, or cab signal territory not in operative condition.
- 567.01 Train permitted to proceed at higher than restricted speed to next available point of communication when automatic train stop, train control, or cab signal device fails and/or is cut out en route and no automatic block signal system is in operation.

- 567.02 Train permitted to proceed at higher than medium speed to next available point of communication when automatic train stop, train control, or cab signal device fails and/or is cut out en route and automatic block signal is in operation.
- 567.03 Report not made to designated officer at next available point of communication after automatic train stop, train control, or cab signal device fails and/or is cut out en route.
- 567.04 Train permitted to proceed at higher than restricted speed to point where absolute block can be established when automatic train stop, train control, or cab signal device fails and/or is cut out en route and no automatic block signal system is in use.
- 567.05 Train permitted to proceed at higher than medium speed to point where absolute block can be established when automatic train stop, train control, or cab signal device fails and/or is cut out en route and an automatic block signal system is in use.
- 567.06 Train permitted to proceed at a speed exceeding 79 m.p.h. where automatic train stop, train control,

or cab signal device fails and/or is cut out en route when an absolute block is established in advance of the train on which the device is inoperative.

- 568.01 Train operated at a speed higher than that authorized by the more restrictive indication when the speed authorized by the cab signal indication is different than that authorized by the indication of the roadway signal when train entered block governed by such signal.

Inspections and Tests - Roadway.

- 576.01 Roadway element not gaged monthly for height and alinement.
- 576.02 Roadway element not tested at least once every six months.
- 577.01 Test circuit not tested at least once every twelve months.
- 577.02 Acknowledgement circuit not tested at least once every twelve months.
- 577.03 Cut-in circuit not tested at least once every twelve months.

577.04 Onboard test equipment not tested at least once every twelve months.

Inspection and Tests - Locomotives.

586.01 Automatic train stop, train control, or cab signal apparatus on locomotive operating in equipped territory not tested either once every 24 hours or within 24 hours before departure on each trip. (Does not apply to locomotive on which periodic test is made at least once every two months.)

587.01 Test of automatic train stop, train control, or cab signal apparatus on locomotive not made on departure of locomotive from its initial terminal if equipment on locomotive is not cut out between its initial terminal and equipped territory. (Does not apply to locomotives and multiple-unit cars equipped with mechanical trip stop, or locomotives making more than one trip in each twenty-four hours where a departure test has been made on the locomotive equipment within the corresponding twenty-four hour period.)

- 587.02 Test of automatic train stop, train control, or cab signal apparatus on locomotive not made immediately prior to entering equipped territory, if equipment on locomotive is cut out between its initial terminal and equipped territory.
- 587.03 Automatic train stop, train control, or cab signal apparatus on locomotive making more than one trip within a twenty-four hour period not given a departure test within the corresponding twenty-four hour period.
- 587.04 Departure test of automatic train stop, train control, or cab signal equipment on locomotive made by employee other than engineer and engineer not informed of the results of such test.
- 587.05 Record of departure test of automatic train stop, train control, or cab signal equipment on locomotive not kept, when such test is made by employee other than engineer.
- 588.01 Periodic tests of automatic train stop, train control, or cab signal apparatus not made at least once every 92 days.

- 588.02 Periodic tests of automatic train stop, train control, or cab signal apparatus not made at least once every two months where daily or after trip test is not performed.
- 588.03 Periodic tests of automatic train stop, train control, or cab signal apparatus on multiple-unit car not made at periods specified by carrier.
- 589.01 Relay, other than a master or primary relay of torque type, not removed from service for test and necessary repairs and adjustment at least once every six years.
- 589.02 Master or primary relay of torque type depending on spring tension to return contacts to deenergized position of noncoded system not removed from service for test and necessary repairs and adjustment at least once every two years.
- 589.03 Relay replaced in service after test and repair with operating characteristics not in accordance with the limits within which such relay is designed to operate.

590.01 Automatic train stop, train control, or cab signal
pneumatic apparatus not inspected and cleaned
at least once every 736 days.

590.02 Automatic train stop, train control, or cab signal
pneumatic apparatus not stenciled, tagged, or
otherwise marked to indicate last cleaning date.

DRAGGING EQUIPMENT AND SLIDE DETECTORS AND

OTHER SIMILAR PROTECTIVE DEVICES

601.01 Signal controlled by device used to provide protection
against unusual contingencies, such as landslides,
dragging equipment, burned bridges or trestles,
and washouts not located so that stopping distance
is provided between the signal and the point
where it is necessary to stop the train.

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