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# **SOUTHERN PACIFIC COMPANY**

(PACIFIC LINES)

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## **RULES AND REGULATIONS OF THE TRANSPORTATION DEPARTMENT**

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Effective December 1, 1951

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The rules herein set forth govern the railroads operated by the Southern Pacific Company (Pacific Lines). They supersede all previous rules and instructions inconsistent therewith.

Special instructions may be issued by proper authority.

**W. D. LAMPRECHT,**  
General Manager.

Approved:

**J. W. CORBETT,**  
Vice President  
System Operations.

SOUTHERN PACIFIC COMPANY  
PACIFIC LINES  
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## GENERAL NOTICE

Safety is of the first importance in the discharge of duty.

Obedience to the rules is essential to safety and is required.

To enter or remain in the service is an assurance of willingness to obey the rules.

The service demands the faithful, intelligent and courteous discharge of duty. Courtesy is the outward expression of an inward consideration for others.

To obtain promotion, ability must be shown for greater responsibility. One of the best recommendations for promotion is that an employe has so performed his duties as to win the good will and friendship of patrons for the railroad and for himself.

Suggestions from employes intended to promote safety, economy, or service, are solicited and will receive consideration.

The public judges a railroad by the appearance and conduct of its employes, quality of service, and condition of the property. Courteous, considerate treatment of patrons is of first importance in retaining and increasing the volume of business, and affects the extent of security and opportunity for employes in the Company's service.

## GENERAL RULES

**A.** Employes whose duties are prescribed by these rules must be provided with a copy.

Employes whose duties are in any way affected by the timetable must have a copy of the current timetable, and supplements if any, with them while on duty.

**B.** Employes must be conversant with and obey the rules and instructions. If in doubt as to their meaning, they must apply to proper authority for an explanation.

**C.** Employes must pass the required examinations.

**D.** Persons employed in any service on trains are subject to the rules and instructions.

**E.** Employes must render every assistance in their power in carrying out the rules and instructions and must report promptly to the proper official any violation thereof.

**F.** Accidents, failure in the supply of water or fuel, defects in track, bridges or signals, or any unusual condition which may affect the movement of trains, must be promptly reported to the chief train dispatcher from first available point of communication, and if first reported orally, confirmed by telegram, and also by mail on the prescribed form when required, to the Superintendent.

**G.** The use of intoxicants or narcotics by employes subject to duty is forbidden. Being under the influence of intoxicants or narcotics while on duty, or their use or possession while on duty, is sufficient cause for dismissal.

**H.** The use of tobacco by employes in uniform while on duty, or by those serving patrons in or about stations or on passenger trains, is forbidden.

**J.** Employes on duty must wear the prescribed badge and uniform and be neat in appearance.

**K.** To avoid annoyance to the public, employes and others authorized to transact business at stations and on or about trains, must be courteous, orderly and quiet.

**M.** Employes must exercise care to avoid injury to themselves or others. They must observe the condition of equipment and the tools which they use in performing their duties, and when found defective will, if practicable, put them in safe condition, reporting defects to the proper authority.

They must inform themselves as to the location of structures or obstructions where clearances are impaired.

They must expect the movement of trains, engines or cars at any time, on any track, in either direction.

They must not stand on the track in front of an approaching engine or car for the purpose of boarding it.

Carelessness by employes of the safety of themselves or others will not be condoned.

Each personal injury suffered by an employe, no matter how trivial; and any injury to another employe, or other person, of which an employe has personal knowledge, must be reported without delay to his immediate superior; and written report completely and correctly made must thereafter be promptly mailed to Superintendent.

Conductors, engineers, foremen, and other supervisors must make report without delay, by wire, of any personal injury to employes under their jurisdiction, or to other persons reported to them or of which they have knowledge; with written report in full on prescribed form promptly forwarded thereafter.



## DEFINITIONS

**Absolute-Permissive Block.** A block within which the movement of trains on a designated section of track or tracks is directed by signals automatically controlled and without train-order authority and without superiority of trains.

**A-PB.** Abbreviation for Absolute-Permissive Block.

**Absolute Signal.** A home signal, the indications of which authorize and govern the movement of trains and engines and supersede the superiority of trains.

**Approach Signal.** A fixed signal used in connection with a home signal to govern the approach thereto. (For example, see Rule 285).

**Automatic Block Signal System.** A series of consecutive blocks governed by block signals actuated by a train, or by certain conditions affecting the use of a block.

**ABS.** Abbreviation for Automatic Block Signal System.

**ATS.** Abbreviation for Automatic Train Stop.

**Block.** A length of track between consecutive home signals governing in one direction; or from a home signal to sign reading "End of Block", or "Block System Limit"; the use of which by trains is governed by block signals.

**Block Signal.** A fixed signal at the entrance of a block, or within a block, to govern trains entering and using that block.

**Block System.** A series of consecutive blocks within A-PB, ABS, CTC and interlockings.

**Centralized Traffic Control.** A method of operation by means of which the movement of trains over routes and through blocks on a designated section of track or tracks is directed by signals and controlled from a designated point without requiring the use of train orders and without superiority of trains.

**CTC.** Abbreviation for Centralized Traffic Control.



**Controlled Siding.** A siding within CTC which may, or may not, have block signal control between fouling points on siding.

**Crossover.** A connection between two adjacent parallel tracks.

**Current of Traffic.** The movement of trains on a main track, in one direction, specified by the rules.

**Distant Signal.** A fixed signal used in connection with a home signal to govern the approach thereto. (For example, see Rule 286).

**Division.** That portion of a railroad assigned to the supervision of a Superintendent.

**Double Track.** Two main tracks, on one of which the current of traffic is in a specified direction, and on the other in the opposite direction.

**Dual Control Switch.** A power operated switch which is also equipped for hand-throw operation.

**Dummy Mast.** A short mast placed on top of a bracket post or bracketed to the side of a signal mast, to indicate another track between the bracket post or signal mast and the track or tracks for which signals are provided.

**Engine.** A unit propelled by any form of energy, or a combination of such units operated from a single control, used in train or yard service.

**Extra Train.** A train not authorized by a timetable schedule. It may be designated:

Extra: For any extra train except work extra.

Work Extra: For work train extra.

**Fixed Signal.** A signal of fixed location indicating a condition affecting the movement of a train, such as train-order, interlocking, absolute or automatic block signal; switch; stop signs; yard limit signs or speed signs.

**Grade Signal.** An automatic home signal distinguished by a disk bearing the letter "G" on signal mast.

**Holidays.** When this term is used in timetables, timetable bulletins and train orders, it will apply to the following days:

New Years Day, January 1st,  
Washington's Birthday, February  
22nd,  
Decoration Day, May 30th,  
Independence Day, July 4th,  
Labor Day, first Monday in September,  
Thanksgiving Day, fourth Thursday  
in November,  
Christmas Day, December 25th.

**Home Signal.** A fixed signal at the entrance of a route or block to govern trains entering and using that route or block.

**Interlocking.** An arrangement of signal appliances so interconnected that their movements must succeed each other in a predetermined order. It may be operated manually or automatically.

**Interlocking Limits.** The tracks between the opposing home signals of an interlocking.

**Interlocking Signal.** A home signal of an interlocking.

**Main Track.** A track extending through yards and between stations, upon which trains are operated by timetable or train order, or both, or the use of which is governed by signal indication.

**Overlap Post.** A post installed when necessary to mark the limit of control of a block signal.

**Pilot.** An employe assigned to a train when the engineer or conductor is not acquainted with the rules or portion of the railroad over which the train is to be moved.

**Regular Train.** A train authorized by a timetable schedule.

**Schedule.** That part of a timetable which prescribes class, direction, number and movement for a regular train.

**Section.** One of two or more trains running on the same schedule displaying signals or for which signals are displayed.

**Siding.** A track auxiliary to the main track for meeting or passing trains.

**Signal Aspect.** The appearance of a fixed signal conveying an indication as viewed from the direction of an approaching train.

**Signal Indication.** The information conveyed by the aspect of a signal.

**Single Track.** A main track on which trains are operated in both directions.

**Speeds:**

**Medium Speed.** A speed not exceeding forty miles per hour.

**Restricted Speed.** Proceed prepared to stop short of train, obstruction, or switch not properly lined and to look out for broken rail, not exceeding twenty miles per hour.

**Slow Speed.** A speed not exceeding twenty miles per hour.

**With Caution.** To run at reduced speed, according to conditions, prepared to stop short of a train, engine, car, misplaced switch, derail, or other obstruction, or before reaching a stop signal. Where circumstances require, train must be preceded by a flagman.

**Spring Switch.** A switch equipped with a spring mechanism arranged to restore the switch points to normal position after having been trailed through.

**Station.** A place designated in the timetable by name.

**Subdivision.** A portion of a division designated by timetable.

**Superior Train.** A train having precedence over another train.

**Timetable.** The authority governing the movement of trains subject to the rules. It contains the classified schedules of regular trains, and special instructions.



**Train.** An engine, or more than one engine coupled, with or without cars, displaying markers.

**Train of Superior Class.** A train given precedence by timetable.

**Train of Superior Direction.** A regular train given precedence in the direction specified by timetable as between opposing trains of the same class.

**Train of Superior Right.** A train given precedence by train order.

**Train Register.** A book or form used at designated stations for registering signals displayed, the time of arrival and departure of trains and such other information as may be prescribed.

**Yard.** A system of tracks within defined limits, other than main track and siding, provided for the making up of trains, storing of cars and other purposes, over which movements may be made without train-order authority, but subject to direction of a yardmaster, if on duty, and such rules, instructions and signals as may be prescribed.

**Yard Engine.** An engine assigned to yard service.

**Yard Limits.** The territory between signs placed adjacent to main tracks to designate the points between which engines may operate on main track without train-order or timetable authority, and within which limits engines and certain trains are restricted in their movement on all tracks.

**Note.** Where, in these rules, special instructions, timetable bulletins, or in train orders, the following terms appear, they will apply as follows:

**Train or Trains:** In connection with speed restrictions or the observance of signals (except train-order signals), also applies to engines.

**Conductor:** To conductor or yard-engine foreman.

**Trainmen:** To conductors and brakemen; yard-engine foremen and yardmen.

**Engineman or Enginemen:** To engineers, firemen, hostlers and hostler helpers.

**Outside of Block System Limits:** Also applies to movement on any track which is provided with block signals for movement in one direction only, when movement is being made in the direction for which block signals are not provided.



# RULES FOR SINGLE AND DOUBLE TRACK

Rules will apply as follows:

Without prefix: To both single and double track,

Prefix "S": To single track only.

Prefix "D": To double track only.

## STANDARD TIME

1. Standard time, obtained from an authorized observatory, will be transmitted by telegraph daily except Sundays and holidays. Clocks bearing the prescribed sign "Standard Clock" will be maintained at designated places, as shown in timetable, and employes charged with the duty of receiving time signal must set standard clock to agree with time signal, and make record on prescribed form of any variation.

At enginehouses and other locations of standard clocks where time signal is not received, employe in charge of standard clock must obtain correct time from nearest train-order operator by telephone, during, or after, transmittal of time signal, and set the clock.

2. Each of the following employes, and such other employes as may be designated, must carry, while on duty, a reliable railroad grade watch, and must carry a watch certificate, Form 2821, both of which must be presented to an authorized watch inspector for examination during the month of October of each year:

\*Train-order operators,

\*Signal operators,

\*Except when assigned in offices where a standard clock is located.

Conductors,

Brakemen,

Engineers,

Firemen,

Outside hostlers,

Outside hostler helpers,

General yardmasters,

Assistant general yardmasters,

Yardmasters,

Assistant yardmasters,

Yard-engine foremen,

Yardmen,

Switchtenders,

Herders.

Employes must show their watches and certificates to division officers, authorized watch inspectors and traveling watch inspectors upon request.

3. Conductors, yard-engine foremen, engineers and outside hostlers must compare their watches with a standard clock, and conductors and yard-engine foremen must compare time with their engineers, when commencing each day's work; and conductors must compare time with their brakemen, yard-engine foremen with their yardmen, and engineers with their firemen, as soon thereafter as practicable.

The time when watch is compared with standard clock, and any variation of such watch must be recorded on prescribed form. If watch is set to correct time the word "set" must also be recorded.

When an additional engine is added to a train en route, engineer of that engine must compare time with the conductor or an engineer of the train.

When conductors and engineers tie up at a point where there is no standard clock, time must be compared with train-order operator on duty when commencing each day's work. If this cannot be done, time must be compared with conductor or engineer of first available train.

At train-order offices and interlockings where there is no standard clock, train-order operators and signal operators must, during each tour of duty, compare time with time signal if possible, otherwise with a train-order operator where standard clock is maintained, or time signal is received.

Watches must be set to correct time if they reflect a variation of more than twenty seconds from correct time when comparison is made as prescribed in this rule.

## TIMETABLES

4. Each timetable, from the moment it takes effect, supersedes the preceding timetable, and its schedules take effect on any subdivision at the leaving time at their initial stations on such subdivision. But when a schedule of the preceding timetable corresponds in number, class, day of leaving, direction, route, and initial and terminal stations with a schedule of the new timetable, and is in effect as prescribed by Rule 82, a train authorized by the preceding timetable will retain its train orders and assume the schedule of the corresponding number of the new timetable.

Schedules on each subdivision date from their initial station on such subdivision.

Not more than one schedule of the same number and date may be in effect on any subdivision.

**4-A.** Notice of new timetable, or a supplement, must be issued by timetable bulletin and posted at least twenty-four hours prior to its effective time. During a period commencing twenty-four hours before and continuing until six days after it becomes effective, notice by train order, Form Q, must be given to conductors and engineers of trains.

Yardmasters must know that yard-engine foremen, yardmen, yard enginemen, hostlers and hostler helpers, have in their possession new timetable, and supplements if any, before becoming effective.

Before commencing a trip on any subdivision upon which they have not been working, or after an absence of six days or over, trainmen and enginemen must inquire for and know that they have the current timetable, and supplements if any.

**4-B.** Special instructions in a timetable supersede any rule or regulation of the book of rules with which they conflict.

Special instructions appearing on a schedule page of a timetable apply only to the page on which they appear, unless otherwise provided.

Bulletin boards and/or bulletin books will be provided at stations designated by timetable. Timetable bulletins will contain only information or instructions relating to the rules, or movement of trains; supersede special instructions in the timetable, or any rule or regulation of the book of rules with which they conflict, and expire with the current timetable. Instructions affecting the superiority of trains must not be issued by timetable bulletin.



Trainmen, enginemen and others concerned in the movement of trains must review timetable bulletins when commencing each day's work, and review other instructions relating to their duties as often as practicable.

Timetable bulletins will be issued by authority and over the name of the Superintendent, and will be numbered consecutively during the effectiveness of each timetable, and bear the name of the division and the number of the current timetable.

5. Not more than two times are given for a train at any station; where one is given, except at terminating stations, it is the leaving time; where two, they are the arriving and leaving times.

Unless otherwise provided, time applies at the clearance point of the switch of the siding where an inferior train must be clear of main track; where there is no siding, it applies at the place from which train-order signal is operated; where there is neither siding nor train-order signal, it applies at the location of the station sign.

Schedule meeting or passing times are indicated by figures in full-faced type.

Both the arriving and leaving times of a train are in full-faced type when both are meeting or passing times, or when one or more trains are to meet or pass it between those times.

When there are one or more trains to meet or pass a train between the two times, or more than one train to meet or pass a train at any station, it will be indicated by a heavy dash under figures, thus:

5:45 or 7:10

7:30

6. The following symbols when placed before the figures of a schedule indicate:

s—regular stop,

f—flag stop to receive or discharge traffic,

c—conditional flag stop as prescribed by special instructions.

6-A. The following symbols when placed at left of station name indicate:

TO—train-order office,

R—train-register station.



The following symbols when placed at left of page indicate:

- B—bulletin station,
- K—standard clock,
- W—water station,
- D—diesel fuel station,
- O—fuel oil station,
- I—interlocking,
- T—turntable,
- Y—wye or turning track,
- P—telephone.

Double track or CTC limits will be indicated within brackets at the right of station column.

ABS, A-PB or ATS limits will be indicated within brackets at the left of station column.

The following abbreviations may be used in conjunction with brackets opposite station column in the timetable:

- DT—double track,
- CTC—centralized traffic control,
- ABS—automatic block signal system,
- A-PB—Absolute-permissive block,
- ATS—automatic train stop.

## SIGNALS AND THEIR USE

7. Employes whose duties may require them to give signals must provide themselves with the proper appliances, keep them in good order and ready for immediate use.

7-A. Yellow signals and unattended red flags and red lights must be placed to the right of track in direction of approach. Other flag and lamp signals, fusees and torpedoes must also be placed on that side, but they must be respected when received from, or displayed on, either side. When practicable all signals by hand must be given on the engineer's side.

7-B. Signals must be given and acted upon strictly in accordance with the rules. Trainmen, enginemen, and others must keep vigilant lookout for signals. Those giving signals must locate themselves so as to be plainly seen. Signals must be given in such a manner that they cannot be misunderstood.

Precaution must be exercised by trainmen and enginemen to avoid acting upon signals that are not understood, or that may be intended for other trains or engines. In case of doubt, movements must not be made until oral understanding has been reached.

In backing engine or cars, or shoving cars ahead of engine, the disappearance from view of trainmen or lights by which signals controlling the movement are being given must be construed as a stop signal.

While switching, enginemen must remain on the engine, exercising care in handling engine while trainmen or others are making couplings, and must give close attention to signals.

Hand, flag and lamp signals to proceed on main track or siding do not supersede the superiority of trains, nor dispense with the observance of fixed signals, unless otherwise provided.

8. Flags of the prescribed color must be used by day, and lights of the prescribed color by night.

Electric lamps may be used for displaying white light only, except that yardmen may use electric lamp with green light in giving signals to trains entering or leaving yard tracks during night hours.

9. Day signals must be displayed from sunrise to sunset, but when day signals cannot be plainly seen, night signals must be used in addition.

Night signals must be displayed from sunset to sunrise.

## 10. COLOR SIGNALS

COLOR	INDICATION
(a) Red	Stop.
(b) Yellow	Proceed at reduced speed, and for other uses prescribed by the rules.
(c) Green	Proceed, and for other uses prescribed by the rules.
(d) Green and white	Flag stop. See Rule 28.
(e) Blue	See Rules 26 and 297.

**10-G.** When an unattended red flag or red light is displayed to the right of main track in direction of approach, train, after stopping, must be preceded for a distance of three-fourths mile from point where signal is displayed, by a flagman who must carefully examine track and structures.

A signal so displayed will not apply to the track on which train is running if displayed beyond the first rail of an adjoining track.

An unattended red flag or red light placed between the rails of any track other than main track requires that train or engine stop and not proceed until flag or light has been removed by an employe of the class that placed it there.

**10-H.** When a yellow signal is required it will be displayed to the right of track in direction of approach, one mile from structure or track over which speed of trains must be restricted. Where two or more main tracks are affected the signal will be displayed for each track the same as if it were a single track.

Trains must not exceed the speed specified by train order, or timetable bulletin, or fifteen miles per hour if no different speed is specified, while passing over the structure or track affected, until the rear of train clears the restricted limit.

Where yellow signals are displayed within limits of a length of track over which a maximum speed is designated in train order or timetable bulletin and no maximum speed is otherwise specified for the particular section of track protected by these yellow signals, trains must not exceed fifteen miles per hour there-over.

A green metal signal by day, and in addition a green light by night, will be displayed to the right of each track at the limit of restriction, and trainmen will give signal 12(c) after rear of train has passed it.

A yellow flag by day and a yellow light by night may be displayed on speed sign post to direct attention to figures on speed sign, and will not be considered a yellow signal as prescribed by this rule.

**10-J.** Speed signs will be located to the right of track in direction of approach where practicable. On double track where trains keep to the left, they will be located to the left if proximity of adjoining main track prevents location to the right.



Speed signs that prescribe reduction in speed will be located three-fourths mile from initial point of restriction, and where used to authorize an increase in speed will be located at the point where higher permissible speed commences, and speed may be increased accordingly as soon as rear of train has passed the speed sign. Where such signs are not used to authorize an increase in speed, limit of restriction will be shown in timetable.



Fig. 1



Fig. 2



Fig. 3

The higher number on speed sign indicates the maximum speed for trains consisting entirely of passenger equipment, and the lower number indicates the maximum speed for all other trains. Where but one number is shown, it indicates the maximum speed for all trains.

Round yellow speed signs indicate by black figures the maximum speed for certain passenger trains designated by special instructions in the timetable. Speed indicated by oval white speed signs applies to those trains unless a round yellow speed sign is displayed on same post below the oval speed sign.

Certain speed signs have the word "SIGNAL" above the figures. Such speed signs in approach to a distant signal indicate the speed that must not be exceeded while engine is passing the distant signal three-fourths mile beyond the speed sign, unless distant signal can plainly be seen to be displaying green aspect. Such speed signs in approach to a home signal indicate the speed that must not be exceeded while approaching the home signal three-fourths mile beyond the speed sign until indication of home signal can plainly be seen. The word "SIGNAL" on an oval speed sign also applies to a round yellow speed sign if displayed on the same post.



11. When an unattended fusee is burning on, or near, a track within block system limits, train may proceed without stopping, but must not exceed restricted speed for one-half mile from point where fusee is displayed.



When an unattended fusee is burning on, or near, a track outside of block system limits, train must stop and not proceed until fusee has burned out.

An unattended fusee burning beyond the first rail of an adjoining main track will not apply to the track on which train is running.

11-A. Fusees must not be placed in timber-lined tunnels, nor on bridges, road crossings, signs; nor at places where damage from fire may result, and must not be placed between rails of a track when practicable to avoid it.

## 12. HAND, FLAG AND LAMP SIGNALS

**Note.** The hand, or a flag, moved the same as the lamp, as illustrated in the following diagrams, gives the same indication.

MANNER OF USING	INDICATION
(a) Swung at right angle to track.	Stop. 
(b) Slight horizontal movement at arm's length at right angle to track.	Reduce speed. 

MANNER OF USING	INDICATION
(c) Raised and lowered vertically.	Proceed, also trainmen's answer to signal 14(k).
(d) Swung vertically in a circle at right angle to track.	Back.
(f) Swung horizontally above the head at right angle to track when standing.	Apply air brakes.
(g) Held at arm's length above the head, when standing.	Release air brakes.



**12-H.** Any object waved violently by anyone on or near the track is a signal to stop.

## 14. ENGINE WHISTLE SIGNALS

**Note.** The signals prescribed are illustrated by "o" for short sounds, "—" for longer sounds. The sound of the whistle should be distinct, with intensity and duration proportionate to the distance signal is to be conveyed.

In case of whistle failure, speed of train must be reduced and the bell rung continuously when approaching and passing through stations, yard limits, over public crossings, and on curves.

Signs bearing the letter "X", located one-fourth mile in advance of certain public crossings at grade, and signs bearing the letter "W", located one-fourth mile in advance of certain tunnels and obscure curves, require engine whistle signal as prescribed by Rule 14(1). Absence of these signs, in advance of public crossings at grade, tunnels or obscure curves, does not relieve engineers from complying with Rule 14(1).



SOUND	INDICATION
(a) o	Apply brakes. Stop.
(b) ---	Train ready to proceed. Must also be given after stopping at a railroad crossing not protected by an interlocking.
(c) -ooo	Flagman protect rear of train.
(c-a) ooo-	Flagman protect front of train.
(d) ----	Flagman may return from west.
(e) ----	Flagman may return from east.
(f) ---	Train parted.
(g) oo	Answer to 14(k) or any signal not otherwise provided for.
(h) ooo	When standing, back. Answer to 12(d) and 16(c).
(j) ooooo	When running, answer to 16(d). Call for signals.
(k) -oo	(Single track) To call attention of engine crews and train crews of trains of the same class, inferior trains and yard engines, and of trains at train-order meeting or waiting points, to signals displayed for a following section, unless otherwise provided by special instructions. Failure to receive acknowledgment by signal 14(g) and 12(c) must be reported.
	Signal 14(k) also to be sounded when passing rear of freight trains.
	(Double track) To call the attention of engine crews and train crews of trains of the same class and of inferior trains moving in the same direction, and of yard engines, to signals displayed for a following section.
(l) --o-	Approaching public crossings at grade, tunnels and obscure curves; to be commenced sufficiently in advance to afford ample warning, but not less than one-fourth mile before reaching a crossing, and prolonged or repeated until engine has passed over the crossing.

SOUND	INDICATION
(m) ———	One mile before reaching stations, junctions, drawbridges, railroad crossings at grade, and mail cranes located between stations. When standing, apply air from rear of train, such application to be answered by 14(g).
(n) ——o	Approaching meeting or waiting points. (See Rule S-90-A).
(o) o—	Inspect brake pipe for leaks or for brakes sticking.
(p) Succession of short sounds.	Alarm for persons or live stock on the track.
(r) oo—	Engineer of second engine take control of air brakes. When second engineer has taken control, he must repeat the signal.
(s) oo oo	Engineer of second engine assist in recharging brake pipe.
(t) —o	When running against the current of traffic: (1) Approaching stations, curves, or other points where view may be obscured. (2) Approaching passenger or freight trains and when passing freight trains.
(u) —o —ooo	Flagman protect rear of train on both tracks.
(v) —o ooo—	Flagman protect front of train on opposite track.
(w) —o ———	Flagman discontinue protection of rear on eastward track but continue protection on westward track.
(x) —o ———	Flagman discontinue protection of rear on westward track but continue protection on eastward track.

**Note.** The prefix signal “—o” in Rules 14(u), (v), (w) and (x) should be followed by an interval of five seconds before remainder of signal is sounded.

15. The explosion of two torpedoes is a signal to proceed with caution for one mile. The explosion of one torpedo will indicate the same as two, but the use of two is required.

Torpedoes must not be placed near station buildings, nor on public crossings, nor on other than main track.

Torpedoes are explosive, and must not be affixed to end gates or railings, or left lying on platforms of cars or elsewhere, where children or unauthorized persons may pick them up.

## 16. COMMUNICATING SIGNALS

**Note.** The signals prescribed are illustrated by "o" for short sounds; "—" for longer sounds.

SOUND	INDICATION
(a) o o	When standing, start.
(b) o o	When running, stop.
(c) o o o	When standing, back.
(d) o o o	When running, stop at next station.
(e) o o o o	When standing, apply or release air brakes.
(f) o o o o	When running, reduce speed.
(g) o o o o o	When standing, recall flagman.
(j) o o o o o o	Increase train heat.
(k) —————	Running test completed; elsewhere when running: look back for hand signals.
(l) o	Approaching meeting or waiting points.
(m) ————— o	Shut off train heat.

When train order is received indicating that main track is out of service and that trains are to be detoured through a siding or other track, or over a shoofly, necessitating a reduction in normal train speed, signal 16(f) must be sounded on passenger trains one mile before reaching point where train must reduce speed, which must be acknowledged by whistle signal 14(g).



17. The headlight must be displayed to the front of every train day and night but will be extinguished when meeting trains under the following conditions:

Outside of CTC limits, if train is clear of main track, and has stopped;

When standing at end of double track, or at a junction;

When standing on main track, if switch, and derail if any, have been lined for the opposing train, but not until headlight has been blinked as assurance to the opposing train that route is properly lined, and opposing train has also blinked its headlight as acknowledgment.

17-A. When an engine is running by day, headlight must be displayed to the front in direction of movement, when such movement involves crossing of streets, roads or highways at grade.

When an engine is standing or running by night, headlight or white light if no headlight, must be displayed to the front and rear. When coupled to a car, headlight next to car must be extinguished.

17-B. If headlight fails, a white light must be substituted. Headlight failures must be reported by wire to the chief train dispatcher.

17-C. When the rules require headlights to be displayed, electric headlights will be dimmed to the front, except when nearing street or highway crossings, as follows:

When standing or running on yard tracks.

When approaching stations where other trains are standing.

On double track, when approaching stations, momentary blink, followed by dimming of headlight, as a signal to an opposing train that speed will be reduced, or stop made if necessary, to permit opposing train to receive or discharge traffic.

When passing head end and rear end of trains on adjoining track.

At other points to permit passing of signals, delivery of train orders, or when the safety of employes requires.

**17-D.** Oscillating white light on engines so equipped must be operated during stormy weather day and night, foggy weather during daylight hours only, and must be operated approaching road crossings at grade both day and night under all conditions.

Oscillating red light on engines so equipped shall be operated by day or night, only when the train is proceeding under the provisions of Rule 510(b) or when a train has stopped, or is stopping, under circumstances that may cause an adjacent track to be fouled, and will not in any way relieve trainmen or enginemen from compliance with Rules 99, 102, and other rules. A train or engine on the same or adjacent track must stop at once, and may proceed only after ascertaining that track is safe for passage of trains.

**S-17.** Except in CTC, until the headlight of a train turned out to meet another is extinguished, it is an indication that the main track is obstructed. The opposing train must approach with caution, and if the head end of train is clear of main track, it may proceed with caution to the point where the main track may be obstructed.

**19.** Markers must be displayed while train is authorized and must be removed when train arrives at destination and has stopped clear of main track, except when markers are permanently installed on equipment, in which case lights must be extinguished.

Night indication must be displayed through tunnels and sheds.

When the rear unit of a train or engine is equipped with built-in electric markers, or electric signal lamps, they must be lighted by day as well as by night to be considered as markers, and the provision that markers will display green to the front or sides will not apply.

Markers must be displayed to indicate the rear of every train as follows:

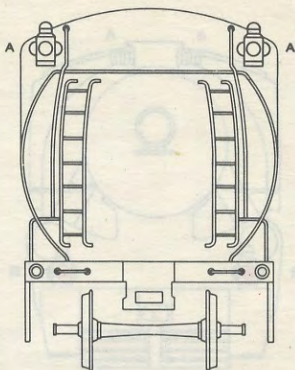


Fig. 1.

Running Forward by Day, Without Cars or at the Rear  
of a Train Pushing Cars.

Marker lamps not lighted at AA as markers.

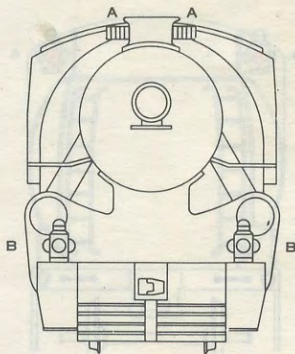


Fig. 2.

Running Backward by Day, Without Cars or at the Rear  
of a Train Pushing Cars.

Indicators illuminated at AA.

Marker lamps not lighted at BB as markers.



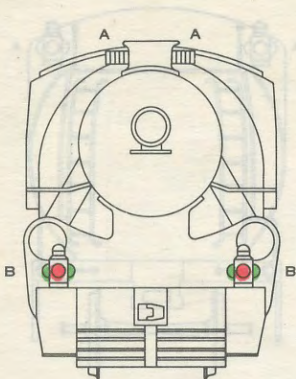


Fig. 3.

**Running Backward by Night Without Cars or at the Rear of a Train Pushing Cars.**

Indicators illuminated at AA.

Lights at BB as markers, showing green to side and in direction engine is moving and red in opposite direction.

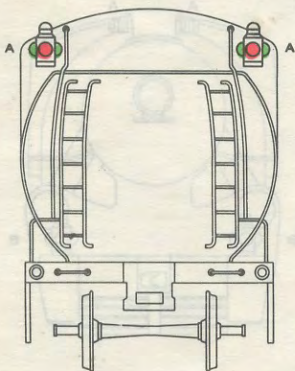


Fig. 4.

**Running Forward by Night, Without Cars or at the Rear of a Train Pushing Cars on Single Track, and With the Current of Traffic on Double Track.**

Lights at AA as markers, showing green to the front and side and red to the rear.

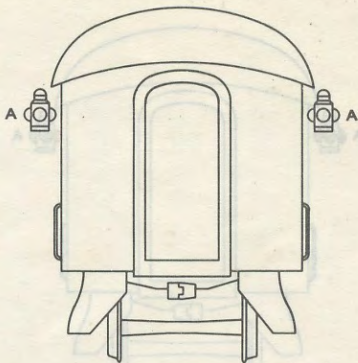


Fig. 5.

**Rear of Train by Day.**

Marker lamps not lighted at AA as markers.

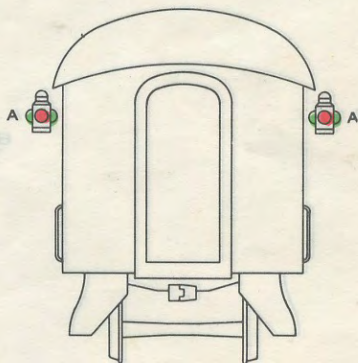


Fig. 6.

**Rear of Train by Night While Running on Single Track,  
and With the Current of Traffic on Double Track.**

Lights at AA as markers, showing green to the front and side and red to the rear.

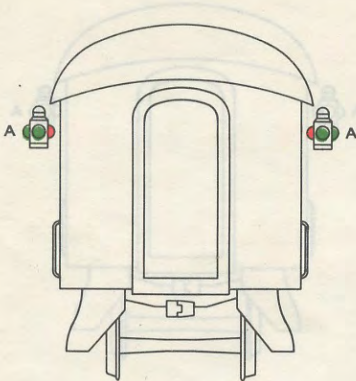


Fig. 7.

**Rear of Train by Night When on Siding to Be Passed by Another Train, except Within CTC Limits.**

Lights at AA as markers, showing green toward engine, side and to rear.

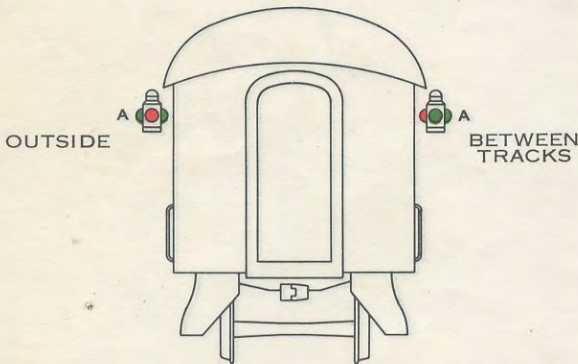


Fig. 8.

**Rear of Train by Night, Turned Out or Running Against the Current of Traffic, on Double Track.**

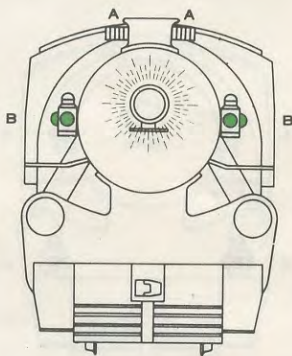
Lights at AA as markers, showing green to front and side and green to the rear on the side next to the main track on which the current of traffic is in the direction the train is moving and red to the rear on the opposite side.



**19-A.** Except in CTC, when markers display red lights to the rear at night, it is an indication that the main track is obstructed. A following train must approach with caution, and if the rear of train is clear of main track it may proceed with caution to the point where the main track may be obstructed.

**19-B.** Oscillating red light on rear of trains so equipped must be operated continuously day and night while train is on main track except may be extinguished when a train is between siding or yard track switches to permit passing of signals. Light must be extinguished when train is clear of main track. Red light shall be turned on and turned off by trainmen; or by enginemen on light engines. Display of red light does not relieve conductors or engineers from providing proper flag protection, or from complying with other rules.

**20.** All sections except the last will display signals as follows:



**Fig. 1.**

**Running Forward by Day or Night Displaying Signals  
for a Following Section.**

Indicators illuminated at AA.

Green lights at BB.

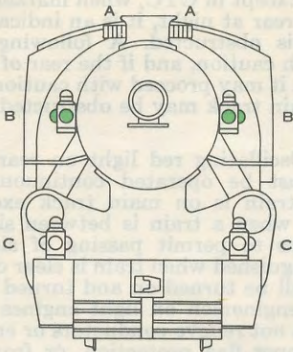


Fig. 2.

**Running Backward by Day, Without Cars or at the Rear of a Train Pushing Cars, and Displaying Signals for a Following Section.**

Indicators illuminated at AA.

Green lights at BB.

Marker lamps not lighted at CC as markers.

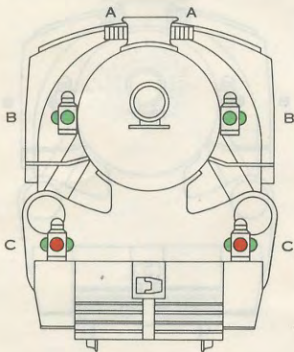


Fig. 3.

**Running Backward by Night, Without Cars or at the Rear of a Train Pushing Cars, and Displaying Signals for a Following Section.**

Indicators illuminated at AA.

Green lights at BB.

Lights at CC as markers, showing green to side and in direction engine is moving and red in opposite direction.

21. Trains must be identified by train indicators displayed on the engine when so equipped; if an engine on a regular train is not so equipped, all other trains to be met or passed must be given train order advice of the engine number.

Identification of opposing trains in CTC or on double track is required only as prescribed by special instructions in timetable.

21-A. Extra trains with engines equipped with train indicators must display identification as follows, unless otherwise provided:

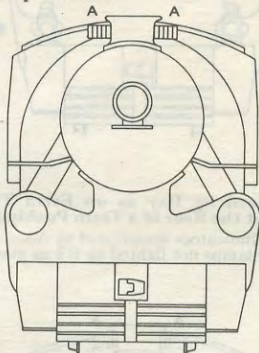


Fig. 1.

**Running Forward by Day as an Extra Train.**  
Indicators illuminated at AA.

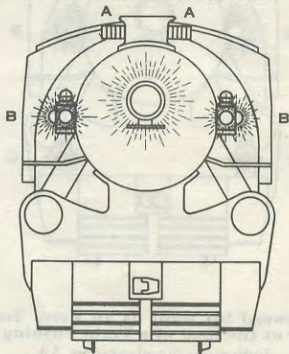


Fig. 2.

**Running Forward by Night as an Extra Train.**  
Indicators illuminated at AA.  
White lights at BB.



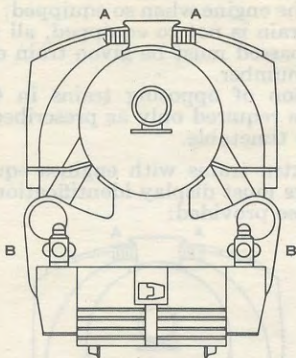


Fig. 3.

**Running Backward by Day as an Extra Train, Without Cars or at the Rear of a Train Pushing Cars.**

Indicators illuminated at AA.  
 Marker lamps not lighted at BB as markers.

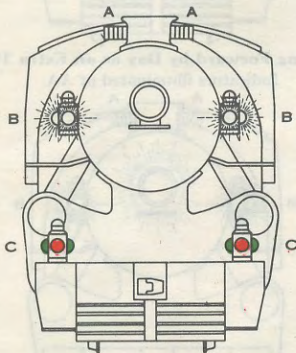


Fig. 4.

**Running Backward by Night as an Extra Train, Without Cars or at the Rear of a Train Pushing Cars.**

Indicators illuminated at AA.  
 White lights at BB.  
 Lights at CC as markers, showing green to side and in direction engine is moving and red in opposite direction.

**21-B.** Extra trains with engines not equipped with train indicators will display identification as follows:

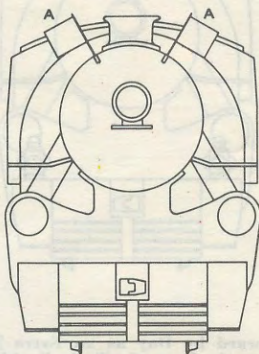


Fig. 1.

**Running Forward by Day as an Extra Train.**  
White flags at AA.

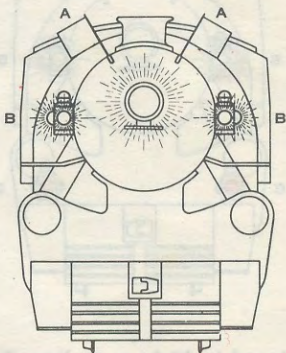


Fig. 2.

**Running Forward by Night as an Extra Train.**  
White flags at AA and white lights at BB.

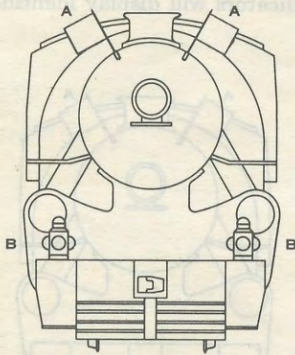


Fig. 3.

**Running Backward by Day as an Extra Train, Without Cars or at the Rear of a Train Pushing Cars.**

White flags at AA. Marker lamps not lighted at BB as markers.

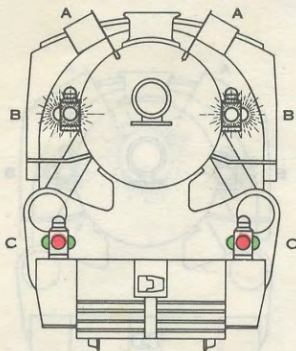


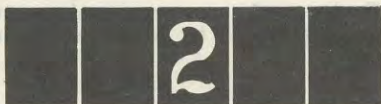
Fig. 4.

**Running Backward by Night as an Extra Train, Without Cars or at the Rear of a Train Pushing Cars.**

White flags at AA. White lights at BB. Lights at CC as markers, showing green to side and in direction engine is moving and red in opposite direction.



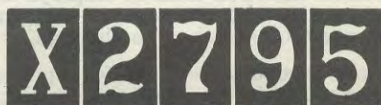
**21-C.** A train with engine equipped with train indicators must not leave its initial station until identification is displayed. Unused spaces must be filled in with black blanks. Train indicators must be displayed as follows:



No. 2, or Last section No. 2



First 4



Extra 2795, or Work Extra 2795

Before making change in train indicators, such action as may be necessary must be taken to protect other trains.

The section of a schedule not required to display signals must display the schedule number only.

Enginemen must not put up, take down, nor change indicators while engine is in motion.

Train indication must be removed on arrival at destination, unless otherwise provided.

**22.** When two or more engines in service are coupled at the head of a train, the leading engine only will display signals and train indication; except that when road engine is coupled behind a helper engine over part of a subdivision, the road engine may display signals and train indication the same as displayed on helper engine.

23. One marker, flag, light, or train indicator, where in the rules two are prescribed, will indicate the same as two; but the proper display of all train signals is required.

25. Each car of a passenger train must be connected with the engine by a communicating signal appliance.

26. When necessary to work under or about an engine, train, car or cut of cars for inspection, repairing or servicing of any of them a blue sign reading "Men at Work" must be displayed at each end unless standing on a spur track, in which event the sign will be displayed only on the end to which coupling can be made. If engine is attached to train, car or cars, sign on engine end must be displayed on engineer's side of cab of engine.

When more than one class of employe is engaged in the work, a disk with the name of each employe or each class, must be attached to the sign.

On tracks regularly assigned for repairing or servicing of cars, a similar sign, or a sign reading "Stop—Men at Work" (white lettering on red background) must be placed on the track or between the rails of the track, or switches leading to the track may be locked with special lock.

At night a blue light must be attached to each such sign as prescribed herein.

An engine, train, car or cut of cars when so protected must not be moved nor coupled to, nor other equipment placed so as to obstruct the view of the signs or lights.

A disk may be removed only by the employe attaching it or by an employe authorized by him to remove it, and signs or lights must not be removed by any person other than an employe of the class that placed it, and not until all disks, if any applied, have been removed.

Before engaging in the work of inspecting, repairing or servicing of any engine, train, car or cut of cars, each employe must see that he is protected as provided herein.

When repair work is to be done under or about an engine or car in a train where movement would endanger employes engaged in such work and blue signs are not available, the engineer and fireman must be orally notified by the employe in immediate charge of the work and complete understanding had to prevent movement while work is being done. The same employe is required to notify the engineer and fireman orally when the work has been completed.

**27.** A signal imperfectly displayed, or the absence of a fixed signal at a place where a signal is usually shown, must be regarded as the most restrictive indication that can be given by that signal, except that when the day indication is plainly seen, it will govern.

Engine crews and train crews using a switch where the switch light is imperfectly displayed or absent, must, if practicable, correct or replace the light. Reflector type switch lamps, when used, will indicate the same as lighted switch lamps.

Imperfectly displayed signals, or the absence of fixed signals, must be promptly reported to chief train dispatcher.

**28.** A green and white signal must be used to stop a train at authorized flag stops.

**29.** When a signal is given by hand, flag or lamp to stop a train, it must be acknowledged by signal 14(g), and unless proceed signal is received reason for stopping the train must be made known to engineer before train proceeds.

**29-A.** When the cause for a flagman's signal is fully explained to the engineer, and circumstances do not require the train to stop, it may proceed, being governed by the instructions of the flagman.

**30.** The engine bell must be rung when an engine is about to be moved; while passing through tunnels; while approaching public crossings at grade, beginning sufficiently in advance to afford ample warning, but not less than one-fourth mile before reaching such crossing and continuing until the engine has passed over the crossing; and elsewhere when necessary as a warning signal.



**31.** The whistle must be sounded at all places where required by rule or law, and elsewhere when necessary as a warning signal. When visibility is impaired by fog, storm, or otherwise, the whistle must be sounded frequently as a warning to trackmen and other employes who may be working on or about the track. Except in emergency, or in compliance with Rule 14(l), the whistle must not be sounded while opposite a passenger train.

**32.** The unnecessary use of either whistle or bell is forbidden. Whistle signals must be sounded, and bell rung, by the leading engine.

**33.** Watchmen stationed at highway crossings must use stop signals when necessary to stop trains. When no special signal device is authorized, they must use a red signal to stop highway traffic. They must not give proceed signals to highway traffic.

**34.** Each member of engine crew must, and each member of train crew must when practicable, identify by name each signal affecting the movement of his train as soon as it becomes visible or audible to him and, in addition, communicate the aspect of each automatic block, interlocking, absolute and train-order signal. Other members of the crew within hearing distance must acknowledge at once and repeat the name and aspect of the signal as soon as it can be verified.

**35.** The following signals must be used by flagmen:

Day signals: A red flag, torpedoes and fusees.

Night signals: A white light, torpedoes and fusees.

The following signals must be kept ready for use by train-order operators:

Day signals: A red flag, a green and white flag.

Night signals: A white light, a green light and fusees.

Note: Red flag and fusees will be provided at train-order offices located beyond the fouling point, or where leaving time applies; and at such other stations as are authorized by Superintendent.

Green and white flag, and green light will be used only at train-order offices where first-class trains are scheduled to stop on flag.

## SUPERIORITY OF TRAINS

**70.** Within limits in which Rule D-251 is applicable, and within interlocking, A-PB and CTC, signal indications will supersede the superiority of trains.

Illuminated letters in letter type indicators will also supersede the superiority of trains within the limits defined by special instructions in timetable.

**S-71.** A train is superior to another train by right, class or direction.

Right is conferred by train order; class and direction by timetable.

Right is superior to class or direction.

Direction is superior as between trains of the same class.

**D-71.** A train is superior to another train by right or class.

Right is conferred by train order; class by timetable.

Right is superior to class.

**72.** Trains of the first class are superior to those of the second class; trains of the second class are superior to those of the third class, and so on.

**S-72.** Regular trains in the direction specified by timetable are superior to trains of the same class in the opposite direction.

**73.** Extra trains are inferior to regular trains. Second and following sections of a schedule are inferior to preceding sections of the same schedule.

## MOVEMENT OF TRAINS

**81.** A main track must not be occupied without authority and it must not be fouled until, by observation, signal indication, block indicator indication, normal operation of electric or mechanical switch lock, or protection by flagman, the engineer or conductor, as the case may be, is assured it is safe to do so.

In yards where yardman's proceed signal is required for trains to enter main track, such signal is also an indication that protection has been provided and yardman giving the signal must know that such protection has been provided.

**82.** Timetable schedules, unless fulfilled, are in effect for twelve hours after their time at each station.

Regular trains more than twelve hours late on either their schedule arriving time or leaving time at any station lose both schedule and train-order authority, and may proceed only as authorized by train order.

**82-A.** Unless otherwise provided, regular trains will be authorized at their initial stations by clearance, which must bear the OK, time and initials of the chief train dispatcher. At an intermediate station, the following form of train order must be used:

“ENG. \_\_\_\_\_ RUN AS NO. \_\_\_\_\_ FROM \_\_\_\_\_”

When its initial station is an open train-order office, unless otherwise provided, an extra train must not leave without a clearance, which must bear the OK, time and initials of the chief train dispatcher.

**83.** A train must not leave its initial station, or a junction, or an intermediate station where schedules originate or terminate, or pass from double track to single track, or from CTC to other track, until it has been ascertained that all superior trains due have arrived or left, or that it has authority to proceed.

Visual identification, register check, or train-order check of a section, will be evidence that all preceding sections of the same schedule have also arrived or left.

Stations at which train registers are located will be designated in timetable.



**83-A.** The information called for by a train register must be inscribed therein and the register checked by the conductor, or by the engineer if there is no conductor, except as hereinafter provided.

Regular trains will register their arrival on the page of register dated for the day on which such regular train is due to arrive; and register their departure on the page dated for the day on which the train is due to depart.

An extra train will register only at a register station where it originates or terminates, unless otherwise directed.

**83-B.** A train may leave a register ticket of prescribed form with the train-order operator at a train-register station when authorized by special instructions or by train order, or when a train-order check of trains is received. When so authorized, the operator must enter on the register information contained on the ticket, then report the train from the register.

When a train-order check of a schedule or section is received, or a schedule or section is identified or checked on a register at the initial or terminal station, or at the end of double track or CTC, or after having been met on single track or passed on either double or single track by a regular train, it will not be necessary to check an intermediate register against the same train.

**83-C.** Before leaving a train-register station at which it is necessary for the conductor to check the register, he must deliver, or have delivered to his engineer, or engineers if more than one, a check of the register on Form S-2529, a copy of which conductor must place with his copy of clearance and any train orders received.

Enginemen must check Form S-2529 for the information needed as to superior trains or trains of the same class that have arrived or left.

If no conductor, engineer must check the register, and place Form S-2529 with his train orders.

**83-D.** When a train is restricted for an extra train, the restricted train must not leave until the extra train has been identified by the conductor or engineer or member of the crew authorized to do so, or a train order is received superseding or annulling the restriction, or a train order, Form V, Example (4) is received.

A train may check the register against an extra only when authorized by train order, Form W, Example (4).

**84.** A train must not start until the proper signal is given.

**85.** When a train of one schedule is on the time of another schedule of the same class in the same direction, it will proceed on its own schedule.

Trains of one schedule may pass trains of another schedule of the same class. Second and inferior class and extra trains may pass and run ahead of second and inferior class and extra trains.

Except as hereinafter provided, a section must not pass and run ahead of another section of the same schedule without first exchanging train orders with the section to be passed, each section to change indicators, and display signals if necessary, responsibility resting with the conductor and engineer of each section. The change in sections must be reported from the first open train-order office unless otherwise instructed. Within CTC, or territory where Rule D-251 applies, a section may pass and run ahead of another section of the same schedule without exchanging train orders, or changing indicators or signals, but must not leave those limits until the change in sections has been authorized by train order.

**86. Within block system limits, other than CTC and territory where Rule D-251 applies:**

(a) A train must be clear of main track and insulated joints before the leaving time of an opposing superior train.

(b) A train must be clear of main track and insulated joints sufficiently in advance of the leaving time of a following first-class train or train of superior right to avoid delaying such train by block signal indication.

**87. Outside of block system limits:**

(a) A regular train must be clear of main track before the leaving time of an opposing train of superior direction.

(b) A train must be clear of main track not less than five minutes before the leaving time of an opposing train of superior right or class.

(c) A train must be clear of main track before a superior first-class train or a train of superior right in the same direction is due to leave the next station in the rear where time is shown, but not less than ten minutes if schedule provides less than ten minutes time between the two stations.

**88.** Firemen must remind engineers, and when practicable brakemen must remind conductors or engineers, of the time of a superior train which must be cleared.

**S-88.** Extra trains will be governed by train orders with respect to opposing extra trains.

At a train-order meeting point between extras the train in the inferior timetable direction must take the siding, unless train order otherwise provides.

**89.** When an inferior train fails to clear a superior train by the time required by rule, it must be protected at that time as prescribed by Rule 99.

Trains required to take siding must head in, when practicable. If necessary to pull by and back in, or enter siding at other than the initial switch, train must be protected by flagman before movement is made beyond the initial switch, unless authority for occupancy of main track is otherwise provided.

**S-90.** At train-order meeting points trains must stop short of fouling point of switch to be used by the train entering the siding, and will provide such additional fouling point clearance as is consistent with operating conditions.

Outside of block system limits, trains must stop at schedule meeting points, if the train to be met is of the same class, unless the switch is properly lined and the track clear. When the expected train of the same class is not found at the schedule meeting point, the superior train must approach all sidings prepared to stop until the expected train is met.



**S-90-A.** Approaching a schedule meeting point with a train of the same or superior class, or a train-order meeting or waiting point, the engineer of a freight train or of an engine running light, must sound signal 14(n) immediately after sounding signal 14(m) and on a train of passenger equipment conductor must sound signal 16(l) at least one mile before reaching the station, and engineer must immediately acknowledge by sounding signal 14(n).

Should engineer fail to sound signal 14(n), fireman must immediately remind him of the requirement. Should engineer fail to reduce speed preparatory to stopping short of fouling point, when required, the conductor must take immediate action to stop the train.

Should a stop be made after signal 14(n) has been sounded and before the expected train is met, signal 12(c) or 16(a) must not be given for movement beyond point of restriction until such train has been met, or authority is held to proceed against it.

**91.** Outside of block system limits, trains in the same direction must keep not less than ten minutes apart. Lighted fuseses must be thrown off for this purpose when necessary.

**91-A.** Outside of block system limits, when the view is obscured, trains must approach stations at a rate of speed that will enable them to stop should an emergency arise.

**92.** A train carrying passengers or mail must not leave the place where traffic is received or discharged at a station in advance of its schedule leaving time.

**93.** Within yard limits engines, after complying with provisions of Rule 81 or Rule 513, may use main track without train-order authority, clearing or protecting against first-class trains, and without flag protection against second- and inferior-class trains, extra trains and engines.

Second- and inferior-class trains, extra trains and engines must move with caution on main track within yard limits, except where movements are governed by block signal indication.

Trains and engines must not move against the current of traffic within yard limits until provision has been made for protection of the movement, except where movement is within interlocking limits and interlocking signals are provided to protect the movement on such track.

**95.** Two or more sections may be run on the same schedule. Each section has equal timetable authority.

A train must not display signals for a following section without train-order authority, except as prescribed by Rule 85, or upon receipt of clearance at its initial station with the words "Green Signals" following the section number.

**96.** Clearance or train order requiring display of signals authorizes such signals to be displayed to the terminal on the subdivision. A train order must not be issued creating a section to an intermediate point of the schedule, nor to take down signals at an intermediate point of a schedule. When it is desired to discontinue the last section from initial station or any intermediate point, train order, Form K, must be used.

When a following section is created at an intermediate point of a schedule, a copy of the order must be given to inferior trains and to trains of the same class in both directions, at or before reaching such point, until the following section has left.

**97.** Unless otherwise provided, extra trains must not be run without train-order authority.

**D-97.** Work extras must move with the current of traffic, unless otherwise directed.

**D-97-A.** When authorized by special instructions in the timetable, trains moving with the current of traffic may run extra or work extra without train-order authority, except when a train order, Form D-S, is in effect, but must obtain a clearance before commencement of trip if at an open train-order office.

**98.** Trains and engines must approach the end of double track, junctions, railroad crossings at grade, and drawbridges, prepared to stop, unless the switches are properly lined, signals display proceed indication, and track is clear.

Except where otherwise provided, trains and engines must stop before crossing a railroad at grade, or a drawbridge, unless protected by interlocking.

**99.** When a train is moving under circumstances in which it may be overtaken by another train, the flagman must drop lighted fuses at proper intervals and take such other action as may be necessary to insure full protection.

Except as prescribed in Rule 99-A, when a train stops under circumstances in which it may be overtaken by another train, the flagman must go back immediately with flagman's signals a sufficient distance to insure full protection, placing two torpedoes and, when necessary, in addition, displaying lighted fuses. When recalled and safety to train will permit, he may return, and he will leave the two torpedoes, and if conditions warrant also leave a lighted fusee.

When a train stops under circumstances in which it may be overtaken by another train, the engineer will immediately signal the flagman to protect the rear. When ready to proceed he will recall the flagman.

The front of the train must be protected in the same way when necessary by the brakeman, or by the fireman if brakeman not available.

Conductors and engineers are responsible for the protection of their trains or engines.

The train must be protected in the same manner before fouling main track when protection by flagman is required as prescribed by Rules 81 and 513. Engineer or conductor at the fouling point must know that such protection has been provided.

**99-A.** When rear of train is standing within yard limits, flag protection to the rear is not required against second- and inferior-class trains, extra trains and engines.

When a train stops within block system limits, with protection of at least two block signals to the rear, flagman must go back immediately with flagman's signals a sufficient distance to insure full protection against following trains moving at restricted speed, except when rear of train is standing between opposing absolute signals at a station, or is within interlocking limits, flag protection to the rear is not required.

During station stops flagman of a train carrying passengers must take position not less than thirty feet behind rear car, except when necessary to go farther to afford protection.

When protection is to be afforded for other than a train or engine and where conditions may interfere with the safe passage of trains or engines at normal speed, flagman must provide protection in accordance with second paragraph of Rule 99.



**S-99-B.** When a flagman is sent with specific instructions affecting the superiority of an opposing train such instructions must be in writing on the prescribed form. When sent by train, he must ride on the engine and show the flagging order to the engineer who must let him off at the point at which opposing train is to be restricted.

Flagging instructions must be written in duplicate, one copy given to the flagman and the other retained by the conductor, or engineer if no conductor, until movement is completed, and then mailed to the Superintendent. Flagging orders issued by conductor must be shown to his engineer.

An engineer must not carry a flagman flagging against an opposing train, unless he presents his flagging instructions written on prescribed form. After reading the flagman's hold order, engineer must return it to the flagman and flagging order must be delivered to engineer of the restricted train.

**99-C.** When a regular train, in territory designated by Superintendent, receives a train order, Form I, Example (1), protection against extra trains in the direction specified is not required until the time named. Extra trains in the direction specified must not follow the regular train until the time named.

When an extra, in territory designated by Superintendent, receives a train order, Form I, Example (2), protection against extra trains in the direction specified is not required until the time named. Other extra trains in the direction specified must not enter the territory named until the time named.

**100.** When the flagman goes back to protect the rear of the train and is left behind, another trainman must take his place on the train.

**101.** Trains and engines must be protected against any known condition which interferes with their safe passage at normal speed.

When conditions are found which may interfere with the safe passage of trains or engines at normal speed and no protection has been provided, such action must be taken as will insure safety.

**101-A.** Instructions respecting the movement of trains or the condition of track or structures must be in writing, except within yard limits where movements are subject to yardmaster's instructions, and within CTC where instructions may be issued by telephone by train dispatcher.

**102.** If a train should part while in motion, trainmen must take necessary precaution to prevent damage to the detached portions.

Should there be a sudden application of brakes, which may cause damage to train or obstruct an adjacent track, train-parted signal 14(f) must be given, and enginemen and trainmen must immediately display stop signals to trains on the other track. Trains receiving these signals must stop and not proceed until it is known that the track is not obstructed.

**102-A.** When part of a train is left on main track by night, or by day where the view is obscured, two torpedoes must be placed on the rail two rail-lengths apart, one-fourth mile in advance of the rear part of the train, to warn enginemen, and by night a white light must be placed on the front of the rear part of the train. When circumstances require, a flagman must protect engine when returning.

**103.** When cars are pushed by an engine, except when switching either within or outside of yard limits, or when making up trains in yards, and even in above exceptions when conditions require, a member of the crew must take a conspicuous position on the leading car. By night he must display a white light.

**103-A.** Before kicking or dropping cars over a public crossing not protected by a watchman, or by gates, a member of the crew must take position at the crossing to afford protection to traffic while movement is being made.

Switches must not be left open nor cars left standing longer than necessary, on main or other tracks, within operating limits of wigwags, crossing bells, or other automatic warning devices.

In general, highway crossing signals are so designed that they will not operate for trains or engines making a reverse movement after having passed over the crossing. Before such reverse movement is made, a member of the crew must take position at the crossing to afford protection to traffic while movement is being made, unless it is known that signals are operating.

**103-B.** Passenger trains normally required to make back-up movement, and trains moving with caboose as leading car, must be equipped with back-up hose or pipe with whistle attached.

**104.** Except where yardmen are in charge of switches, trainmen (enginemen if no trainmen) are responsible for the proper setting of hand-operated switches and derails to be used by their train or engine, and for their return to proper position after use. Enginemen must see that the switches and derails immediately ahead of engine in direction of movement are properly set.

A switch must not be left open for another train or engine unless in charge of a member of the crew of such train or engine.

When spring switches or dual control switches are operated by hand, they are considered hand-operated switches within the meaning of this-rule.

**104-A.** Main track switches, and other switches equipped with switch locks, must be left locked and unless otherwise provided must not be left unattended if lined for other than normal movement. Switches not equipped with locks must be left hooked. When a switch cannot be properly locked or hooked, as the case may be, it must be secured and immediately reported to proper authority.

**104-B.** If a rigid switch is run through, it is thereafter unsafe. If an engine or car is run partly through a rigid switch, the movement must be continued.

Switches damaged in this way must be reported by wire to the proper authority and, when practicable, section foreman notified. They must be spiked unless section foreman takes charge.

**104-C.** When a train or engine is clear of main track, to be met or passed by a train, employes must not unlock derails or switches, nor be between the fouling point and main track switch. They must not be within 150 feet of any main track switch until the approaching train has passed.



Conductor or engineer nearest the switch must see that other members of their crew comply with this rule.

When necessary to go beyond the switch in flagging, flagman must remain at least 150 feet away from the switch while the approaching train is passing over it.

When a train or engine is on main track to be met or passed by a train and a switch is to be set for the approaching train to enter siding, employe, after securing the switch must take position at least 150 feet away from the switch while approaching train is passing over it.

When a switch is thrown, the employe setting it must see that both points have moved to the proper position. A switch must be fastened as soon as thrown either way; and when locked, the chain pulled to insure that lock is securely fastened.

Neither switch of a crossover may be opened when there is a train, engine or car closely approaching either switch. When crossover movement is to be made by a train or engine both switches must first be opened before the movement is commenced, and within block system limits the movement must be completed before either switch is restored to normal position.

An employe alighting from a moving train to change position of a switch behind such train, must get off rear of rear car when practicable, or, when not practicable, on opposite side of track from switch stand, unless it is unsafe to do so. While a train is moving over a switch any member of the crew in the vicinity of such switch must take position on opposite side of track from switch stand when practicable, and when not practicable to do so, must take position not less than twenty feet from the switch stand.

**104-D.** Before making a running switch, stop must be made, brakes tested, and switch tried. The engine must be kept on straight track, when practicable.

Running switches must not be made with scale test cars, or work equipment such as pile-drivers, locomotive cranes, power shovels, ditchers, spreaders and steam derricks.

**104-E.** A switch stand with plate bearing letter "V" identifies a stand which automatically varies the position of the switch points in trailing movements only and which automatically keeps the points in the position to which forced by the trailing movement. Switch target moves with the movement of switch points, but switch lever moves only when hand thrown. A switch equipped with this automatic stand does not function like a spring switch. The use of the automatic stand is restricted to tracks other than main track. Trailing movement may be made over the switch from either track, regardless of position of switch points. When facing point movement is to be made and switch points are not lined for such movement, the switch must be lined by hand.

**105.** Before entering a siding or other track, it must be known that switch, and derail if any, is properly lined, and when practicable, stop must not again be made until train is clear of main track and movements must be made with caution.

Where trains are to meet or pass, train taking siding will, after clearing main track, provide such additional clearance to fouling points as is consistent with operating conditions.

A siding assigned for use by trains of a specified direction must not be used by a train in the opposite direction unless authorized by train order; or in an emergency by taking the necessary precaution to insure safety, providing protection by flagman where visibility is obscured.

**106.** The conductor and the engineer, and the pilot if any, are responsible for the safety of the train and the observance of the rules, and, under conditions not provided for by the rules, must take every precaution for protection.

This does not relieve other employes of their responsibility under the rules.

**107.** When a passenger train is receiving or discharging traffic at a station, a train or engine must not pass between it and the station platform unless proper safeguards are provided, and movement made with caution.

**108.** In case of doubt or uncertainty, the safe course must be taken.

**D-151.** Trains and engines must keep to the right, unless otherwise provided.

**D-152.** Before a train or engine crosses over to or obstructs another track it must first be protected on that track.

## **RULES FOR MOVEMENT BY TRAIN ORDERS**

**201.** For movements not provided for by timetable, unless otherwise provided, train orders will be issued by authority and over the initials of the chief train dispatcher and only contain information or instructions essential to such movements.

They must be brief and clear; in the prescribed forms when applicable; and without erasure, alteration or interlineation.

Figures in train orders must not be surrounded by brackets, circles or other characters.

**202.** Each train order must be given in the same words to all employes or trains addressed.

**203.** Train orders must be numbered consecutively each day, beginning at midnight. Duplicate numbers of the same date must not be used over the initials of the same chief train dispatcher.

**204.** Train orders must be addressed to those who are to execute them, naming the place at which each is to receive his copy. Those for a train must be addressed to the conductor and engineer, and also to the pilot if any. A copy for each employe addressed must be supplied by the operator.

**204-A.** A copy of each train order affecting movement of a train having helper engines must be given to engineer of each helper engine.

If helper engine is not in train when orders are to be delivered, operator must be instructed to make an additional copy and to deliver it to road engineer or to conductor for delivery to helper engineer when helper engine is added. Comparison to be made by helper engineer with road engineer or conductor, when practicable, to insure that he has a copy of each order that affects the movement of the train.



**205.** Each train order must be written in full in a book provided for the purpose in the office of the train dispatcher; and with it recorded the time and the signals which show when, and from what office the order was repeated and the responses transmitted. The date, and the train dispatcher's initials must be placed at the top of each page. These records must be made at once, and never from memory or memoranda.

Additions to train orders must not be made after they have been repeated.

If an error is made in transmitting a train order it must be immediately destroyed, and the same order number must not be again used on the same day.

**206.** In train orders and clearances regular trains will be designated by number, thus: NO 10, and sections, thus: SECOND 10. Extras will be designated by engine number and the direction, thus: EXTRA 798 EAST. Work extras will be designated by engine number, thus: WORK EXTRA 798.

When an engine of another railroad is used, the initials of that road must precede the engine number, thus: EXTRA GN 5002 EAST.

Even hours must not be used in stating time of day in train orders.

**206-A.** In transmitting and repeating train orders and clearances by telephone, the names of stations, sections, and direction of extras, must be plainly pronounced, and then spelled, letter by letter, thus: Aurora, A-u-r-o-r-a; Second, S-e-c-o-n-d; East, E-a-s-t. Order numbers, train, engine and other numbers, and time, must first be pronounced and then followed by pronouncing each figure, thus: One hundred five, 1-0-5; Twenty-seven fifty-six, 2-7-5-6; Nine fifty, 9-5-0. Where the number is but one figure it must first be pronounced, thus: One, figure 1, then spelled, thus: o-n-e.

The letters duplicating names of stations, numerals and time, will not be used when transmitting by telegraph, and will not be written in the train-order book nor in train orders, whether transmitted by telephone or telegraph.

The names of stations, sections, direction of extras, order numbers, train, engine, and other numbers, and time, must be written in train orders and in train-order book thus: AURORA; SECOND; EAST; 105; 2756; 950; 1.

**206-B.** When transmitting by telephone, the dispatcher must write the train order in the train-order book as he transmits it and underscore each word and number as repeated by each office. When transmitted by telegraph, the order must be written in train-order book as repeated by the first office and each word and number must be underscored as repeated by each succeeding office.

**206-C.** To relay a train order, it must be transmitted in the usual manner to the relaying office. The operator at relaying office must transmit the order to destination. The operator receiving the order at destination must repeat the order to the operator at relaying office, who must underscore on his copy each word and number as repeated. He must then repeat the order to the train dispatcher, by whom "complete" will be given to the relaying operator, who will transmit it to destination.

If the order is also addressed to a superior train at the relaying office, the "X" response must be given before it is transmitted to the inferior train.

**206-D.** Before transmitting an order to a conductor or engineer over a telephone circuit, the person who is about to receive the order must give his name, train identification, and location.

The "X" response must not be used when handling train orders direct with conductor or engineer.

A copy of the train order, bearing the name of the person who receives and repeats it, must be promptly mailed by him to the Superintendent.

Each telephone booth must be supplied with necessary blanks and carbon sheets.

Telephone receivers and switches must be left in proper position to avoid interference with circuit.

Booths must be kept locked when not in use.

**207.** To transmit a train order, the direction must be given to each office addressed, and the number of copies stated.

**208.** A train order to be sent to two or more offices must be transmitted simultaneously to as many of them as practicable. When not sent simultaneously to all, the order must be sent first to the superior train.

The several addresses must be in the order of superiority of trains, each office taking its proper address.

A train order restricting the movement of a train must not be issued for it at the station where such movement is restricted if it can be avoided. If necessary to place such an order at a train-order office located beyond the fouling point, or where leaving time applies, operator must give additional stop signals with red flag or fusee to the restricted train. When so sent to a point other than its initial station or a station within interlocking limits, the following must be added to the order:

“ORDER TO \_\_\_\_\_ AT \_\_\_\_\_”

Train dispatcher must not give OK to the clearance until assured by operator that the train has stopped. Opposing trains that have received the order must take siding if the restricted train is met at the station named, unless the order otherwise provides.

**208-A.** Under the following conditions, a train order restricting the superiority of a train must not be repeated, nor the “X” response sent, until the engineer, or engineer of the leading engine if more than one engine, is in the train-order office and has assured the operator that he understands that the train is to be restricted:

- (a) When a train has received a clearance, or the engine of which has passed the train-order signal displaying proceed indication.
- (b) To annul the authority of a work extra, unless the movement is otherwise safeguarded.
- (c) When it is necessary for train dispatcher to know that an order has been delivered to the conductor and engineer of a train before such order addressed to another train may be completed.



If clearance has been received at that station, all copies of such clearance held by engineers and the conductor must be returned to the operator and be destroyed before new clearance and the restricting order are delivered to either engineers or conductor. Previously delivered train orders addressed to the train at that station must not be returned to the operator.

**208-B.** When a train order restricting the superiority of a train is to be transmitted by telephone direct to a train, the train dispatcher must have a personal understanding with the conductor and engineer, or with the engineer if there is no conductor, that the train is to be restricted before transmitting the order.

**209.** Operators receiving train orders must write or typewrite them in manifold during transmission.

When necessary to make additional copies of a train order, operator, after repeating the new copy to train dispatcher, must sign his own name on new copies. Operator must file the copy from which he made copies, together with one of the new copies, showing thereon date and time made. Train dispatchers must record the time and date, and name of office repeating each recopied train order.

**210.** When a train order has been transmitted, unless otherwise directed, operators must repeat it in the succession in which the several offices have been addressed. Each operator receiving the order must observe whether the others repeat correctly, unless relieved of this duty by train dispatcher. After each order has been repeated correctly, the response "Complete", the time, and initials of chief train dispatcher will be given by the train dispatcher. The operator will then write or type, in the space provided, the time and his last name, and when OK to clearance received, deliver, or place on delivery post, a copy for each employe addressed. When delivery to an engineer cannot be made in the vicinity of the office, the order will be delivered by a member of the crew.

**210-A.** When a train order is delivered to any member of train or engine crew, the employe making delivery must not orally inform the person to whom delivered, the contents thereof, nor read the order to him.

**210-B.** Train orders, clearances, and check of train register must be shown by conductor to at least one brakeman, and to others when practicable. They must be shown by engineer to fireman, and when practicable, to forward brakeman. Brakemen and firemen must read and return them, comparing their understanding of the orders with conductor or engineer, call their attention to errors or omissions, and should there be occasion to do so, remind conductor or engineer of their contents.

**211.** To enable train dispatcher to advance a train beyond a station where it is restricted for an opposing or a following train, the necessary train order must first be issued, and then an order, Form N, may be issued to the operator, which will authorize operator to illuminate letter "M" in letter type indicator, if one is located at or near the siding switch, as a calling-on signal, which engineer must acknowledge by sounding signal 14(b). Train may then proceed on main track to receive orders.

Form N train order may be issued to authorize lowering of train-order signal arm several times and its return to stop position as a calling-on signal, at stations where letter type indicator for display of letter "M" is not installed, and such operation of the signal will be an indication to an approaching train that orders are to be delivered which will authorize movement to the next station at least, against and ahead of all superior trains. Engineer must acknowledge this calling-on signal by sounding signal 14(b), and will proceed on main track to receive orders.

Operation of the signal in above manner is prohibited unless operator has received Form N train order, and provided time limit named in the order has not expired.

If train is delayed between the time of acknowledging the calling-on signal and receipt of train orders, protection by flagman against any superior train must be provided.

**212.** When directed by the train dispatcher, a train order, having been transmitted, may be acknowledged by operator as a holding order until repeated, by responding: "\_\_\_\_\_(Order number)\_\_\_\_\_to \_\_\_\_\_(Train number)\_\_\_\_\_X", with the operator's initials and office name. The operator must then write or type on the order his initials and the time.

**213.** "Complete" must not be given to a train order for delivery to an inferior train until the order has been repeated or the "X" response sent by the operator who receives the order for the superior train.

**214.** When a train order has been repeated, it must be completed at once, but when the "X" response is sent, and until it has been completed, the order must be treated as a holding order for the train or trains addressed, and must not be otherwise acted on until "complete" has been given.

If the means of communication fails before an office has repeated an order or has sent the "X" response, the order is of no effect, and must be there treated as if it had not been sent.

**216.** When an order is to be issued and delivered to a train by the train dispatcher, a carbon impression must be made in the train-order book at the time the order is written. If later the order is to be sent to another office, it will be transmitted from the copy in the book. The requirements for delivery are the same as at other offices.

**217.** A train order to be delivered to a train at a point not a train-order office, or at one at which the office is closed, must be addressed to "C&E \_\_\_\_\_ AT \_\_\_\_\_ CARE OF \_\_\_\_\_", and forwarded and delivered by the employe in whose care it is addressed. When sent in care of the conductor or engineer of a train, the number of the order must be shown in the usual manner on clearance for the train making delivery the same as if addressed to it. Copies of the order must be provided for conductor and engineer of the train making delivery and copies for conductor and engineer of the train addressed.

Orders must not be sent, in the manner herein prescribed, to a train, the superiority of which is thereby restricted.

**218.** When a schedule is designated in a train order by its number alone, all trains operating as sections of that schedule are included, and each must have copies delivered to it.

This does not apply to addresses on clearances.



**220.** Train orders once in effect continue so until fulfilled, superseded, or annulled. Any part of an order specifying a particular movement may be either superseded or annulled.

Orders, held by, or issued for, or any part of an order relating to, a regular train, become void when such train loses both right and schedule as prescribed by Rules 4 and 82, or its schedule is annulled.

When a conductor or engineer, or both, are relieved before the completion of a trip, all train orders and instructions held must be personally delivered to the relieving conductor or engineer, with necessary information regarding trains met or that have passed. Relieving conductor or engineer must compare such orders and instructions with his engineer or conductor before proceeding.

**220-A.** Train orders relating to track conditions, unless annulled, must be respected by conductor and engineer on all trips made during the tour of duty on which such orders are received.

A train order received by a train may be made applicable to an additional trip by issuance of an order reading "RESPECT ORDER NO. \_\_\_\_\_", or adding these words to the order creating the train for the additional trip.

**221.** A train-order signal will be provided at each train-order office, except at those where all trains are required to obtain clearance.

The arm of a train-order signal to the right, as seen from an approaching train, is the one which governs. When the arm is extended horizontally, or in addition a red light is displayed, it indicates "stop", and when inclined downward at an angle of 60 degrees, or in addition a green light is displayed, it indicates "proceed". The arms will be fastened to indicate "proceed" when a train-order office is closed.

The train-order signal must be kept in stop position for both directions while operator is on duty, except signal will be cleared for an approaching train when no orders are held for any train in the same direction other than for trains originating.

Signal must be restored to stop position as soon as practicable after rear of train has passed, and operator must not OS the train, nor "X" or repeat

an order for a following train until signal has been restored. If signal is restored to stop position before rear of train has passed the signal, train must stop and obtain clearance.

When signal remains in stop position for an approaching train, a clearance must be obtained, and engine must not pass the fouling point of the switch at which an opposing train may enter the siding, or the place where time applies if there is no siding, until engineer has ascertained that he is not to receive train orders which restrict his train at that point.

When orders are to be delivered by operator, speed of train must not exceed thirty miles per hour passing the office. Delivery of orders by operator while train is moving, or from delivery post will indicate that the orders do not restrict the train at that station.

Outside of block system limits and for movements into territory outside of block system limits, operators must space trains ten minutes apart. When clearance is delivered before the expiration of the ten minutes, operator must show on clearance the time following train may leave.

When light is not displayed in train-order signal at night, report must be made from next open train-order office, unless special instructions provide that light will not be displayed.

**221-A.** Before clearing a train for which there are orders, operator must carefully read the address of each order held, fill out the clearance, showing thereon without erasure or alteration, the number of each train order addressed to the train or in care of an employe on the train, then transmit the address and order numbers from clearance to the train dispatcher, who must check the correctness thereof against his record in train-order book, and if correct give the OK, time and initials of chief train dispatcher, and make proper record thereof; and the operator, after entering this information on clearance, may make delivery.

When necessary to issue clearance to a train for which there are no orders, the word "No" must be written in the space provided for number of orders and the time issued will be inserted following operator's name. Such clearance will not bear dispatcher's OK, except when used to authorize a train at its initial station as prescribed by Rule 82-A.

If all orders held for a train have been completed, and communication fails before clearance has been OK'd by train dispatcher, operator may deliver such orders accompanied by clearance bearing notation "wire failure" in the space provided for dispatcher's OK. Time of issuance must follow operator's name. If no orders for delivery, and OK'd clearance is required by the rules, the operator may clear the train as prescribed in this paragraph. Such clearance must be accepted and acted upon as though OK had been given in the usual manner. When communication has been restored, operator will notify train dispatcher the time and order numbers for each train so cleared, for dispatcher's record.

Clearances and train orders must be carefully checked by conductors and engineers and if errors or omissions found, train must not proceed until correction has been made.

Clearances may be handwritten or typewritten, and must bear the date of issuance, with time in the proper space.

If, after a clearance is delivered to conductor or engineer, or both, orders are issued for a train which do not restrict its superiority, the train dispatcher, without requiring the operator to destroy the clearance first issued, may authorize issuance of a second clearance which must be endorsed "Second" preceding the word "clearance" on top margin. All orders for delivery to the train at that station must be shown on second clearance.

**222.** Operators must promptly record, and report to the train dispatcher, the arrival and departure of all trains, reporting "no signals", or "green signals", as the case may be. If report of signals displayed is incorrect, the train dispatcher must immediately notify all trains affected until he has ascertained that the signals are properly displayed, and should "no signals" be registered when "green signals" should have been registered, he must require immediate correction in train register.

**222-A.** Operators in relieving each other must make a transfer on prescribed form, of undelivered train orders and undelivered messages addressed to, or in care of, trains; also show on the transfer, except at train-register stations where all trains register, the



numbers of all overdue trains and whether trains then in the yard or at stations have or have not been cleared. The operator assuming duty must not handle train-order signal, nor deliver train orders, until transfer has been made and signed.

If an operator is permitted to close his office leaving track orders, annulments of schedules, or undelivered messages addressed to, or in care of, trains, for another operator coming on duty at a later time, he must list them in transfer book and operator coming on duty later will sign it.

**223.** The following signals and abbreviations may be used:

Initials for name of the chief train dispatcher,

Such office and other signals as are arranged for by the Superintendent,

C&E.....conductor and engineer,

X.....train will be held until train order is made "complete",

Com.....complete,

OK.....correct,

OS.....train report,

No.....number,

Eng.....engine,

Psgr.....passenger,

Frt.....freight,

Mins.....minutes,

Jct.....junction,

Div.....division,

Subdiv.....subdivision,

MP.....mile post,

MPH.....miles per hour,

Dispr.....dispatcher,

Opr.....operator,

The usual abbreviations for the names of the months.

# CLEARANCE

C.S. 2643

To C. & E. \_\_\_\_\_ Station \_\_\_\_\_ 19 \_\_\_\_\_

Display "No" or "Green" for each regular  
(Insert "No" or "Green" for each regular  
train at initial station.) Signals.

I have \_\_\_\_\_ orders for your train as follows:  
(If no orders, insert "No".)

{ No. \_\_\_\_\_ No. \_\_\_\_\_ No. \_\_\_\_\_ No. \_\_\_\_\_

Orders { No. \_\_\_\_\_ No. \_\_\_\_\_ No. \_\_\_\_\_ No. \_\_\_\_\_

{ No. \_\_\_\_\_ No. \_\_\_\_\_ No. \_\_\_\_\_ No. \_\_\_\_\_

O.K. at \_\_\_\_\_ M, \_\_\_\_\_ Chief Train Dispatcher.

Do not leave before \_\_\_\_\_ M.

(Fill in this line only when necessary to comply with Rule 221)

Operator. \*Time \_\_\_\_\_ M.

Conductor and each engineer must have a copy and see that their train is correctly designated above, also that the number of orders, and the numbers of all orders received correspond with the numbers inserted above.

Operators must retain a carbon copy.

\*To be filled in only when clearance is not OK'd.

## FORMS OF TRAIN ORDERS

**Note.** Forms with the prefix "S" are for single track; those with the prefix "D" are for double track; those without prefix are for single or double track.

Examples given herein are typical.

### S-A

#### Fixing Meeting Points for Opposing Trains

- (1) NO 1 MEET NO 2 AT AFTON
- (2) NO 3 MEET SECOND 4 AT BERTRAM
- (3) NO 5 MEET EXTRA 95 EAST AT  
MARFA
- (4) EXTRA 562 EAST MEET  
EXTRA 231 WEST AT LANGTRY
- (5) NO 2 AND SECOND 4 MEET  
NO 1 AND NO 3 AT GLAMIS AND  
EXTRA 95 WEST AT OGILBY
- (6) NO 2 MEET NO 3 NO 5 AND  
NO 7 AT PATTERSON
- (7) NO 1 MEET FIRST 2 AND SECOND 2  
AT POMONA THIRD 4 AND FOURTH  
4 AT WALNUT AND EXTRA 95  
EAST AT PUENTE  
NO 1 TAKE SIDING AT POMONA  
AND WALNUT
- (8) FIRST 5 SECOND 5 AND THIRD 5  
MEET NO 6 AT MECCA
- (9) SECOND 573 HOLD MAIN TRACK  
MEET NO 26 AT FENELON
- (10) SECOND 7 MEET NO 256 AT  
FLOWING WELL AND NO 258  
AT AMOS  
NO 256 HOLD MAIN TRACK AT  
FLOWING WELL

When there is more than one meeting point made in a train order, and it is desired that the superior train take siding, or that the inferior train hold main track, at either, or all, of the meeting points, such instructions must be in a separate paragraph in the order.



Trains receiving Form S-A train orders will run with respect to each other to the designated points and there meet in the manner prescribed by the rules, and unless the designated train is met, will not proceed until further authority to move is given by train order.

Work extras must not be given meeting points with each other, nor with other trains.

## B

### Directing a Train to Pass or Run Ahead of Another Train

- (1) NO 171 PASS NO 3 AT JEFFERSON  
NO 3 TAKE SIDING

Both trains will run according to rule to the designated point and there arrange for the rear train to pass promptly. The order must state which train is to take siding.

When an inferior train receives an order to pass a superior train, authority is conferred to run ahead of the train passed, from the designated point. If, after leaving the station named, the first-named train is delayed, it may allow the second-named train to pass and the authority to run ahead will then become void.

- 
- (2) EXTRA 594 EAST RUN AHEAD  
OF NO 6 MOJAVE TO LANG

The first-named train will run ahead of the second-named train between the points designated.

If a train be delayed after receiving an order to run ahead of a superior train, the first-named train may allow the second-named train to pass, and the authority to run ahead will then become void.

## S-C

### Giving Right Over an Opposing Train

- (1) NO 172 HAS RIGHT OVER NO 3  
MOOR TO VALLEY PASS

If the second-named train reaches the point last named before the other arrives, it may proceed, clearing the time of the opposing train as required by rule. If the first-named train is met between the designated points, and engine of the second-named train is not on siding with train indicators displayed, the first-named train must be informed of the arrival of the second-named train.

- (2) EXTRA 37 EAST HAS RIGHT OVER  
No 3 KLAMATH FALLS TO CHILOQUIN

The regular train must not go beyond the point last named until the extra train has arrived, unless authorized by train order.

Examples (1) and (2) give right to the train first named over the regular train between the points named. If the trains meet at either of the designated points, the first-named train must take the siding, unless the order otherwise prescribes.

- 
- (3) EXTRA 172 WEST HAS RIGHT OVER  
EXTRA 2391 EAST FRESNO TO  
LOS BANOS AND WAIT AT  
MENDOTA UNTIL 320 PM  
FIREBAUGH 350 PM  
DOS PALOS 420 PM  
FOR EXTRA 2391 EAST

This order gives right to the first-named extra over the other extra named between the points designated, but not at either of those points, and does not restrict the first-named train beyond the initial switch of siding at the last-named station.

If the second-named extra exists beyond the second-named point at the time the order is issued, the following must be added to the order:

AND TAKE SIDING NOT LEAVE  
LOS BANOS UNLESS  
EXTRA 2391 EAST HAS ARRIVED

## D

### Giving Right Over Another Train in the Same Direction

- (1) NO 101 HAS RIGHT OVER NO 25  
SACRAMENTO TO OAKLAND PIER

The second-named train must clear the time of the first-named train as prescribed by Rule 86 or 87.

- (2) EXTRA 95 WEST HAS RIGHT OVER  
NO 59 BURBANK JCT TO SAUGUS  
AND WAIT AT  
BURBANK JCT UNTIL 850 PM  
SAN FERNANDO 920 PM  
NEWHALL 940 PM
- (3) EXTRA 57 WEST HAS RIGHT OVER  
EXTRA 61 WEST  
KING CITY TO WATSONVILLE JCT

Examples (2) and (3) give right to the first-named train over the other train between the points named. If train-order time is given, the first-named train must not pass the designated stations before the time shown, and the second-named train must clear such time as prescribed by Rule 86 or 87. If no time is given, the second-named train must not leave the first-named point ahead of the first-named train.

## E

### Time Orders

- (1) NO 1 RUN 50 MINS LATE  
CRESCENT LAKE TO KLAMATH FALLS
- (2) NO 1 RUN 50 MINS LATE  
CRESCENT LAKE TO CHEMULT AND  
20 MINS LATE CHEMULT TO  
KLAMATH FALLS

This makes the schedule time of the train named, between the stations named, as much later as stated in the order, and any other train receiving the order is required to run with respect to this later time, as before required to run with respect to the schedule time. The time in the order should be such as can easily be added to the schedule time, as 10, 20, etc.

- (3) NO 16 WAIT AT  
CARTER UNTIL 950 AM  
PENGRA 1030 AM  
HILLS 1055 AM



The train, or trains, named must not pass the designated points before the time given. Other trains receiving the order are required to run with respect to the time specified at the designated points or any intermediate station where schedule time is earlier than the time specified in the order, as before required to run with respect to the schedule time of the train, or trains, named.

The station names must be written in column formation.

(4) NO 16 RUN 20 MINS LATE ON  
ORDER NO 17

This makes the time mentioned at each station in an order issued under example (3) as much later as specified and trains receiving this order are required to run with respect to this later time, as before required to run with respect to the time specified in the order under example (3).

(5) NO 16 RUN 20 MINS LATE ON  
ORDER NO 17 FROM PENGRA

If it is desired that an order to run late on a wait order shall not apply to the time given at all of the stations, example (5) may be used, and will have the same meaning except that it applies only to the station named in example (5) and succeeding stations.

Examples (4) and (5) may be used in connection with a wait order of an extra when issued in the form of example (3).

Examples (1), (2), (3), (4) and (5) may be used in connection with an extra created by example (3) Form G, and the times at each point stated in that example have the same meaning as schedule times in the foregoing examples.

## S-E

### Time Orders

(1) NO 1 WAIT AT  
SALIDA UNTIL 950 AM  
FOR NO 272

The train first named must not pass the designated point before the time given, unless the other train has arrived. The train last named is required to run with respect to the time specified, at the designated point or any intermediate station where schedule time is earlier than the time specified in the order, as before required to run with respect to the schedule time of the train first named.

## F

### For Sections

Sections will be created at their initial stations by clearance bearing the words "green signals", or "no signals". Sections may be created, withdrawn, or reversed at an intermediate station by use of one of the following examples:

- (1) NO 9 DISPLAY SIGNALS  
DAVIS TO OAKLAND PIER  
FOR ENG 6005
- (2) SECOND 42 DISPLAY SIGNALS  
PERSHING TO HEMPSTEAD  
FOR ENG MK&T 422

The engine named in example (1) will become Second 9, and the engine named in example (2) will become Third 42, from the stations named.

- (3) ENG 85 DISPLAY SIGNALS AND  
RUN AS SECOND 2 DAYTON TO ECHO  
FOLLOWING SECTIONS CHANGE  
NUMBERS ACCORDINGLY

This example may be used to add any section other than the last section at an intermediate station.

The engine named will display signals and run as directed, and following sections will take the next higher number.

To drop any section other than the last, when there are more than two sections, example (4) will be used:

- (4) ENG 85 IS WITHDRAWN AS  
SECOND 2 AT NOME  
FOLLOWING SECTIONS CHANGE  
NUMBERS ACCORDINGLY

The engine named will drop out at the station named, and following sections will take the next lower number, the last section authorized will not display signals.

Under examples (3) and (4) it is the duty of the train dispatcher to know that each conductor and engineer has in his possession all train orders affecting his train in its new position.

To pass one section by another, example (5) will be used:

(5) ENGS 99 AND 25 REVERSE  
POSITION AS SECOND AND  
THIRD 2 ALPINE TO SANDERSON

Conductors and engineers of the trains addressed must personally exchange orders, and arrange for display of signals and train indicators accordingly. Following sections, if any, need not be addressed. Engine 99 will then become Second 2 displaying signals, and Engine 25 will become Third 2 displaying signals if Third 2 displaying signals into the first-named station.

Each section affected by these orders must have copies and must arrange signals and train indicators accordingly.



## G

### Extras

- (1) ENG 99 RUN EXTRA  
LATHROP TO FRESNO
- (2) ENG 2599 RUN EXTRA  
ROSEVILLE TO MARYSVILLE  
AND RETURN TO LINCOLN

When example (2) is used the extra must go to the station second named before returning to the station last named, unless the order is annulled. If the second-named station is an open train-order office, a clearance ok'd by train dispatcher must be obtained. This form of order does not relieve the train of providing protection by flagman to the rear in either direction, when required by the rules.

- (3) ENG 2351 RUN EXTRA LEAVING  
CALEXICO THURSDAY FEB 17TH  
AS FOLLOWS WITH RIGHT OVER  
ALL TRAINS  
LEAVE    CALEXICO    1110 PM  
          HEBER        1120 PM  
          EL CENTRO    1140 PM  
ARRIVE  IMPERIAL    1150 PM

This order may be varied by specifying the kind of extra and the particular trains over which the extra shall, or shall not, have right. Trains over which the extra is given right must clear the time of the extra as prescribed by Rule 86 or 87. Work extras, whether required to protect or not to protect against extras, must clear the time of this extra in the same manner.

This order must not be issued while an order, example (8) Form S-H, or example (3) Form D-H is in effect, and must not be combined with any other form of order.

- (4) AFTER 210 PM ENG 2175 RUN  
EXTRA BLACK BUTTE TO WEED

The extra must not leave the station first named before the time stated. This example must not be used in lieu of other forms of orders which provide protection against opposing extra trains.

When an order, Form G, is fulfilled or annulled, other forms of orders held by the extra so created, except Forms K and V, are also made void.

## H

### Work Extras

- (1) ENG 292 WORKS EXTRA  
645 AM UNTIL 1130 AM  
BETWEEN COYOTE AND GILROY  
AND ON BOTH TRACKS  
BETWEEN GILROY AND CORPORAL

The work extra, whether standing or moving, must protect in both directions on single track against extra trains within the work limits, and on double track against extra trains moving with the current of traffic.

The time of regular trains must be cleared.

## S-H

### Work Extras

- (1) ENG 292 WORKS EXTRA 645 PM  
SEP 12TH UNTIL 601 AM SEP 13TH  
BETWEEN EUGENE YARD  
AND SWISSHOME

The work extra, whether standing or moving, must protect itself against extra trains within the work limits in both directions.

The time of regular trains must be cleared.

The month and date will not be used when the time limits do not extend into a second day.

This may be modified by adding:

- (a) NOT PROTECTING AGAINST  
EASTWARD EXTRA TRAINS

When the above is added the work extra will protect only against westward extra trains.

- (b) NOT PROTECTING AGAINST  
EXTRA TRAINS

When the above is added protection against extra trains is not required.

- (c) NOT PROTECTING AGAINST  
EXTRA TRAINS UNTIL 240 AM

When the above is added protection against extra trains is not required until the time named, and extra trains must not enter the work limits before that time.

When a work extra has been authorized by train order not to protect against extra trains, and later it is desired that after a certain time it clear the track for an extra, or to protect against a designated extra in either direction, the appropriate example of the following may be used:

- (2) WORK EXTRA 2560 CLEARS EXTRA  
705 EAST BETWEEN DRAGOON AND  
BENSON AFTER 210 PM
- (3) WORK EXTRA 2560 PROTECTS  
AGAINST EXTRA 705 EAST  
BETWEEN DRAGOON AND BENSON  
AFTER 210 PM

To enable a work extra to follow an extra into work limits when it is not practicable to furnish the extra a copy of the work order, the following example may be used:

- (4) WORK EXTRA 2560 MUST NOT PASS  
EXTRA 4302 WEST BETWEEN  
DRAGOON AND BENSON
- (5) WORK EXTRA 292 PROTECTS  
AGAINST EXTRA 5100 EAST  
BETWEEN VENETA AND  
SWISSHOME AFTER 1001 PM  
INSTEAD OF 901 PM

This example will be used when necessary to set back, or advance, the time at which the work extra must begin protection against the extra or extras named, and must include the station limits within which the change is effective. The train against which protection is to be provided may enter the limits named after the time first named.

When necessary to authorize two or more work extras within the same limits or portions of the limits, the following example may be used, and responsibility for thorough understanding as to movements of the two work extras, and the protection that is to be provided will rest with conductors and engineers of the work extras named:

- (6) ENGS 2548 AND 2765 WORK EXTRA  
1001 AM UNTIL 501 PM BETWEEN  
FENELON AND VALLEY PASS  
NOT PROTECTING AGAINST EXTRA  
TRAINS EXCEPT PROTECT AGAINST  
EACH OTHER



To enable a work extra to work on the time of a regular train, the following example will be used:

- (7) WORK EXTRA 3254 PROTECTS  
AGAINST NO 55 BETWEEN  
KINGSBURG AND GOSHEN JCT

The work extra may work on the time of the regular train mentioned in the order, and must protect against that train.

---

When a work extra is to be given exclusive right over all trains, the following example will be used:

- (8) WORK EXTRA 4196 HAS RIGHT  
OVER ALL TRAINS BETWEEN  
MERCED AND MADERA  
715 PM JUNE 29TH UNTIL  
115 AM JUNE 30TH

This gives the work extra exclusive right to the track between the points designated, between the times named, and other trains must not enter the limits unless permission is obtained from conductor and engineer of the work extra.

This order must not be modified or amplified, and must not be issued while an order, example (3), Form G, is in effect.

---

The work limits should be as short as practicable, to be changed as the progress of the work may require.

Work extras must give way to all trains as promptly as practicable.

Whenever extra trains are run into limits of a work extra they must be given a copy of the order sent to the work extra. Should the work order instruct a work extra not to protect against extra trains in one or both directions, extra trains must protect against the work extra; if the order indicates that the work extra is protecting itself against other trains, such trains must run expecting to find the work extra protecting itself.

**D-H**  
**Work Extras**

- (1) ENG 3219 WORKS EXTRA  
ON EASTWARD TRACK  
645 AM UNTIL 545 PM BETWEEN  
MONTELLO AND VALLEY PASS

The work extra, whether standing or moving must protect itself within the work limits against extra trains moving with the current of traffic on the track or tracks named.

The time of regular trains must be cleared.

This form may be modified by adding:

- (a) NOT PROTECTING AGAINST  
EASTWARD EXTRA TRAINS

Protection against eastward extra trains is not required.

To enable a work extra to work on the time of a regular train, the following example may be used:

- (2) WORK EXTRA 1765 PROTECTS  
AGAINST NO 56 BETWEEN  
SELBY AND MARTINEZ

The work extra may work on the time of the train or trains named in the order and must protect against such train or trains.

When it is desired to move a train against the current of traffic into limits of a work extra, provision must be made for the protection of such movement.

When a work extra is to be given exclusive right over all trains, the following example will be used:

- (3) WORK EXTRA 3219 HAS RIGHT  
OVER ALL TRAINS ON EASTWARD  
AND WESTWARD TRACKS  
BETWEEN MOOR AND WELLS  
701 PM NOV 2ND UNTIL  
101 AM NOV 3RD

This gives the work extra exclusive right to the track or tracks named, between the points designated, between the times named, and other trains must not enter the limits unless permission is obtained from conductor and engineer of the work extra.

This order must not be modified or amplified, and must not be issued while an order, example (3), Form G, is in effect.

The work limits should be as short as practicable, to be changed as the progress of the work may require.

Work extras must give way to all trains as promptly as practicable.

Where extra trains are authorized to move with the current of traffic without running orders, a work extra must not be given an order under examples (1a) or (3), Form D-H, nor an order that all extra trains in a specified direction will wait at a designated point.

## I

### Relief of Protection by Flagman

- (1) NO 697 NOT PROTECTING AGAINST WESTWARD EXTRA TRAINS UNTIL 130 PM BETWEEN CORVALLIS AND CHESHIRE
- (2) EXTRA 2345 EAST NOT PROTECTING AGAINST EASTWARD EXTRA TRAINS UNTIL 330 PM BETWEEN ALTURAS AND CANBY

This form must not be used to relieve a train of protection by flagman to the rear against a regular train, and must not be used when a work extra in the territory named has been instructed not to protect against extra trains.

This form must not be combined with other forms, and must not be used in territory where, by special instructions in timetable, trains moving with the current of traffic may run extra or work extra without train-order authority, as prescribed by Rule D-97-A.

## J

### Holding Order

- (1) HOLD NO 2
- (2) HOLD ALL TRAINS

When a train has been so held it must not be permitted to proceed until the order to hold is annulled, or an order is addressed to the operator in the following form:

- (3) NO 2 MAY GO

These orders will be addressed to the operator and acknowledged in the usual manner.

Form J will be used only when necessary to hold trains until other orders can be given, or in case of emergency.



## K

### Annuling a Schedule or Section

- (1) NO 1 OF FEB 29TH IS ANNULLED  
TUCSON TO PHOENIX
- (2) SECOND 5 OF FEB 29TH IS  
ANNULLED BEAUMONT TO  
HOUSTON
- (3) NO 52 OF FEB 29TH HAS ARRIVED  
MERCED AND IS ANNULLED  
MERCED TO FRESNO

The date named in the order must be the date on which the schedule is due to leave its initial station on the subdivision.

The schedule or section annulled becomes void between the points named and cannot be restored.

When a section is annulled from an intermediate point, opposing inferior trains must not leave that point until it is ascertained that the schedule has been fulfilled to that point, or an order example (3) is received, or an order is received authorizing train to proceed.

It will be necessary to obtain the annulment of a schedule or section but once, provided conductor and engineer have a copy in their possession on each trip.

## L

### Annuling an Order

- (1) ORDER NO 10 IS ANNULLED

If an order which is to be annulled has been delivered to a train, the annulling order must be addressed to that train. If it has not been delivered, the annulling order may be addressed to the operator, who must then destroy all copies of the order annulled but his office copy, on which he must write the number of the annulling order.

The operator or train addressed must have a copy of the order annulled.

When an order is annulled on other than the date of issue, the date as well as the number of the order annulled must be designated in the annulling order.

- (2) THIS ORDER ANNULLED AT 210 PM

The above addition may be made to any order which is to be annulled at a predetermined time.

An order which has been annulled must not be re-issued under its original number.

## M

### Anulling Part of an Order

- (1) THAT PART OF ORDER NO 10  
READING NO 1 MEET NO 2  
AT HALSEY IS ANNULLED
- (2) THAT PART OF ORDER NO 12  
READING NO 13 WAIT AT  
MARTINEZ UNTIL 1050 AM  
IS ANNULLED

Form M must be used when a particular movement or portion of movement in an order is to be annulled, and does not affect other movements in the order.

## N

### Calling-On Order

- (1) ADVANCE EXTRA 6153 EAST ON  
MAIN TRACK UNTIL 1101 AM

This form, addressed to the operator may be used only after orders have been issued to an approaching train which provide authority and time necessary for the train to hold main track and advance at least to the next station, ahead of, and against, all superior trains, provided calling-on signal is acknowledged before the time limit shown. The train dispatcher must specify a time limit in this form which will safely allow the approaching train to move on main track to the next station at normal speed.

---

Operator receiving this form will then illuminate the letter "M" in letter type indicator if one is located at or near the siding switch; or will lower the train-order signal arm several times and return it to stop position where no letter type indicator is installed; as a calling-on signal provided time limit has not expired. Engineer must acknowledge by sounding signal 14(b) as prescribed by Rule 211, as indication to his conductor that authority has been received to hold main track.

At points where letter type indicators are provided which may display either letter "M" or "S", special instructions in timetable may authorize and require movement otherwise, and must be respected.

## P

### Superseding an Order or a Part of an Order

- (1) NO 1 MEET NO 2 AT PARRAN  
INSTEAD OF TOY
- (2) NO 273 PASS NO 1 AT DEVERS  
INSTEAD OF FELICIA  
NO 1 TAKE SIDING
- (3) NO 172 HAS RIGHT OVER NO 3  
FAIRBANK TO HEREFORD  
INSTEAD OF BISBEE JCT
- (4) NO 172 HAS RIGHT OVER NO 3  
FAIRBANK TO BISBEE JCT  
INSTEAD OF HEREFORD

The train addressed must have a copy of the order containing the movement that is superseded.

This form must be used whenever the limits in an order Form S-C, are shortened or lengthened.

An order which has been superseded must not be reissued under its original number.

When a train is directed by train order to take siding or to hold main track for another train, such instructions apply only to the point named in the order, and do not apply to the superseding order unless so specified.

## Q

### Issuance of New Timetable or Supplement

- (1) TIMETABLE NO 73 IS EFFECTIVE  
1201 AM JAN 1ST
- (2) SUPPLEMENT NO 1 TO TIMETABLE  
NO 3 IS EFFECTIVE 1201 AM  
FEB 15TH



## D-R

### Providing for a Movement Against the Current of Traffic

- (1) NO 1 HAS RIGHT OVER OPPOSING  
TRAINS ON NO 2 TRACK  
EDER TO NORDEN

The designated train must use the track specified between the points named and has right over opposing trains on that track between those points. Opposing trains must not leave the point last named, nor any intermediate point where the order is received, until the designated train arrives.

All trains between the points named moving with the current of traffic in the same direction as the designated train must, when practicable, be given a copy of the order, and they may then proceed on their own schedules, or authority.

---

This order may be modified as follows:

- (2) AFTER NO 4 ARRIVES AT EDER  
NO 1 HAS RIGHT OVER OPPOSING  
TRAINS ON NO 2 TRACK  
EDER TO NORDEN

The train to be moved against the current of traffic must not leave the first-named point until the arrival of the first-named train.

---

A train must not be moved against the current of traffic until the track on which it is to run has been cleared of opposing trains, or until those trains have in their possession a copy of the order authorizing the movement.

Where trains moving with the current of traffic are authorized to run extra or work extra without train-order authority, Form D-R must not be used until all trains and engines which may use either track, have received a copy of the order.

## D-S

### Providing for the Use of a Section of Double Track as Single Track

- (1) WESTWARD TRACK WILL BE USED AS SINGLE TRACK BETWEEN WELLS AND MOOR

If it is desired to limit the time for such use, the following may be added:

FROM 101 PM UNTIL 301 PM

All trains must use the track specified between the stations named and must be governed by rules for single track.

Trains running against the current of traffic on the track named must be clear of the track at the expiration of the time specified, or protected by flagman, as prescribed by Rule 99.

Where trains moving with the current of traffic are authorized to run extra or work extra without train-order authority, Form D-S must not be used until all trains and engines which may use either track, have received a copy of the order.

## V

### Check of Trains

- (1) REGULAR TRAINS DUE SALINAS  
BEFORE 930 AM JUNE 4TH  
HAVE ARRIVED AND LEFT  
EXCEPT FIFTH 766

"Due" refers to schedule arriving or leaving time, and not to run late or wait order time.

- (2) NO 76 OF JUNE 4TH HAS ARRIVED  
KING CITY
- (3) THIRD 43 OF JUNE 4TH HAS LEFT  
DEMING WITH GREEN SIGNALS

A check of a section will indicate that all preceding sections of the same schedule have also arrived or left, and must state "with no signals" or "with green signals", as the case may be.

- (4) EXTRA 1744 WEST HAS ARRIVED  
ALVARADO ON ORDER NO 425

When necessary to make an exception of a train or trains, such exception will be added. The train addressed is not to be included in the exceptions.

Where not required, the word "arrived" or "left" will be omitted.

When this form is received train may register by ticket, provided it is not necessary to check the register against other schedules.

## W

### Change in Clearance or Register Requirements

- (1) NO 74 DO NOT OBTAIN CLEARANCE  
AT NEWARK

When example (1) is used, the station named is not a train-order office for the train named, regardless of the indication displayed by train-order signal, if any, at that station.

- (2) NO 12 DO NOT REGISTER  
AT EUGENE
- (3) EXTRA 2376 WEST REGISTER  
AT INGLE ON ORDER NO 76

When example (3) is used, number and date of the order specified will be inserted in column of train register captioned "Signals".

- (4) EXTRA 105 EAST MAY CHECK  
REGISTER AT INGLE AGAINST  
EXTRA 2376 WEST ON ORDER NO 76

Examples (3) and (4) may be combined with other orders.



### Signals Taken Out of Service or Restored

- (1) AUTOMATIC BLOCK SIGNALS TEMPORARILY OUT OF SERVICE BETWEEN SIGNAL\_\_\_\_ AND SIGNAL\_\_\_\_ EXCEPT\_\_\_\_ AND ARMS HAVE BEEN REMOVED AND LIGHTS EXTINGUISHED IN SEMAPHORE SIGNALS OR LIGHTS COVERED IN LIGHT SIGNALS. SPEED OF PASSENGER TRAINS MUST NOT EXCEED 59 MPH AND OTHER TRAINS 49 MPH AND RULES 11, 87, 91, 93, 304 AND OTHER RULES GOVERNING MOVEMENT OUTSIDE OF BLOCK SYSTEM LIMITS WILL APPLY. WHEN ARMS ARE REPLACED ON SEMAPHORE SIGNALS OR COVERING REMOVED FROM LIGHT SIGNALS THEY MUST BE REGARDED AS AGAIN IN SERVICE.
- (2) AUTOMATIC BLOCK SIGNALS AGAIN IN SERVICE BETWEEN SIGNAL\_\_\_\_ AND SIGNAL\_\_\_\_.

Example (1) may be issued on receipt of advice from Signal Supervisor that signals are to be taken out of service, and may be prefaced by the words "Effective\_\_\_\_M, \_\_\_\_\_195\_" when necessary.

These examples must not be used when number plates are reversed, showing yellow.

## BLOCK SIGNAL AND INTERLOCKING RULES

### RULES GOVERNING THE MOVEMENT OF TRAINS AND ENGINES IN THE SAME DIRECTION BY BLOCK SIGNALS

**D-251.** On portions of the railroad on designated tracks as specified in the timetable, trains will run with reference to other trains in the same direction by block signals whose indications will supersede the superiority of trains.

**D-253.** The train dispatcher must be informed in advance of any known condition that will delay the train or prevent it from making usual speed.

**D-254.** Except as affected by Rule D-251 all block signal rules and other rules remain in force.

### FIXED SIGNALS

Automatic block signals will bear number plates attached to signal masts. The number plate on a distant light signal will bear the prefix "D".

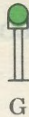
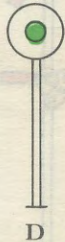
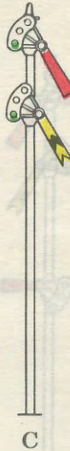
Interlocking signals will not bear number plates, but may have plates bearing the letters "SA".

Absolute signals will not bear number plates, but will have plates bearing the letters "A" or "SA".

Aspects as illustrated or referred to in these rules are shown by the position of semaphore arms or color of lights, or both, as seen from an approaching train. Other combinations may be used.

**RULE 281.**

RULE 282.

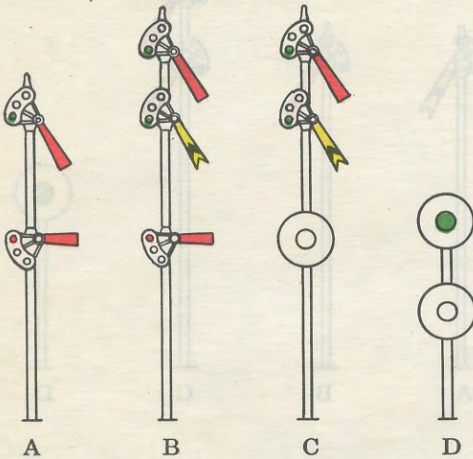


**Indication:** PROCEED

**Name and Aspect:** BLOCK SIGNAL GREEN

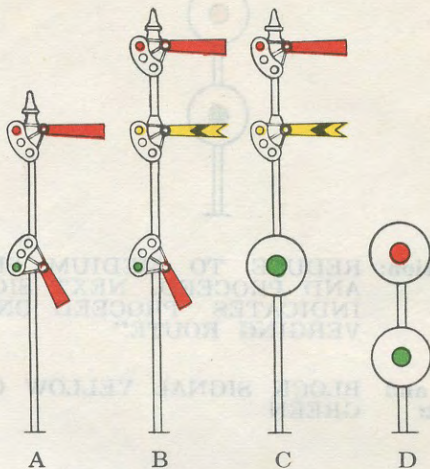


**RULE 282.**



**Indication:** PROCEED EXCEPT ON DIVERGING ROUTE

**Name and Aspect:** BLOCK SIGNAL GREEN



**Indication:** PROCEED ON DIVERGING ROUTE

**Name and Aspect:** BLOCK SIGNAL GREEN FOR DIVERGING ROUTE



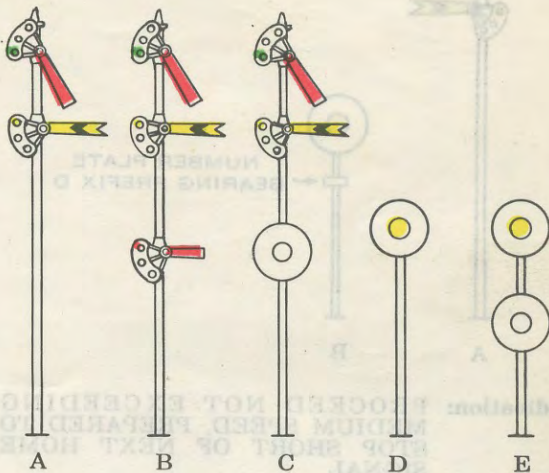
**Indication:** REDUCE TO MEDIUM SPEED AND PROCEED. NEXT SIGNAL INDICATES "PROCEED ON DIVERGING ROUTE."

**Name and Aspect:** BLOCK SIGNAL YELLOW OVER GREEN



**RULE 285.**

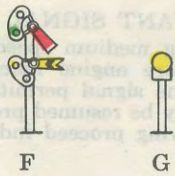
RULE 285



INDICATION: PROCEED NOT EXCEEDING MEDIUM SPEED, PREPARED TO STOP SHORT OF NEXT HOME SIGNAL

NAME AND ASPECT: APPROACH SIGNAL YELLOW

Trains exceeding medium speed must reduce to medium speed before engine reaches the signal if advance view of the signal permits. After entering the block speed may be resumed provided next signal can be seen displaying proceed indication (green aspect).



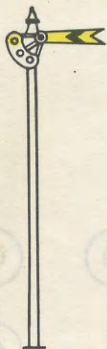
**Indication:** PROCEED NOT EXCEEDING MEDIUM SPEED, PREPARED TO STOP SHORT OF NEXT HOME SIGNAL

**Name and Aspect:** APPROACH SIGNAL YELLOW

Trains exceeding medium speed must reduce to medium speed before engine reaches the signal if advance view of the signal permits. After entering the block speed may be resumed provided next signal can be seen displaying proceed indication (green aspect).

**RULE 286.**

RULE 286



A



B

NUMBER PLATE  
← BEARING PREFIX D

**Indication:** PROCEED NOT EXCEEDING MEDIUM SPEED, PREPARED TO STOP SHORT OF NEXT HOME SIGNAL

**Name and Aspect:** DISTANT SIGNAL YELLOW

Trains exceeding medium speed must reduce to medium speed before engine reaches the signal if advance view of the signal permits. After entering the block speed may be resumed provided next signal can be seen displaying proceed indication (green aspect).

RULE 287.

RULE 287



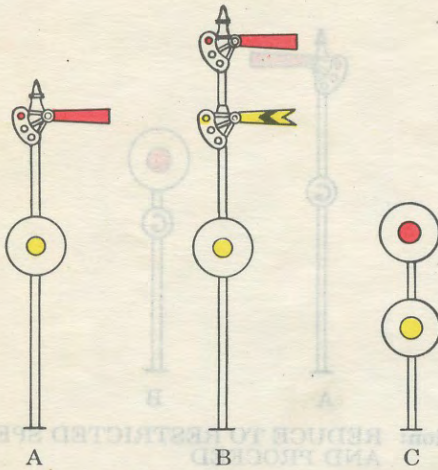
**Indication:** REDUCE TO RESTRICTED SPEED  
AND PROCEED

**Name and Aspect:** GRADE SIGNAL RED



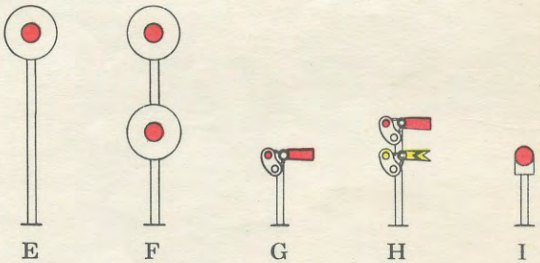
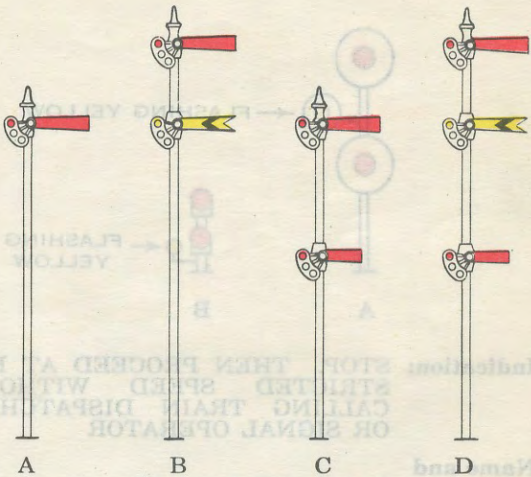
RULE 288.

RULE 288.



**Indication:** PROCEED ON DIVERGING ROUTE AT RESTRICTED SPEED

**Name and Aspect:** HOME SIGNAL YELLOW FOR DIVERGING ROUTE

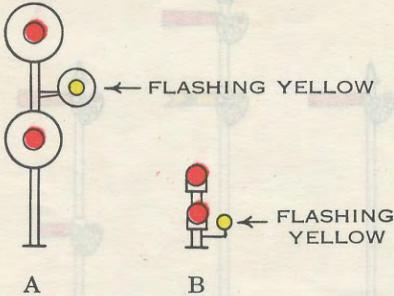


**Indication:** STOP

**Name and Aspect:** HOME SIGNAL RED

**RULE 291.**

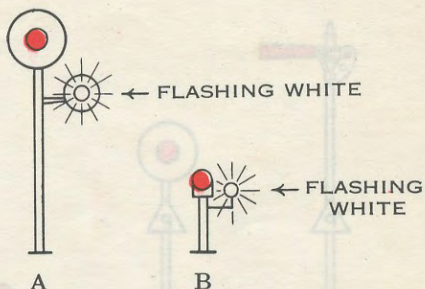
RULE 291



**Indication:** STOP. THEN PROCEED AT RESTRICTED SPEED WITHOUT CALLING TRAIN DISPATCHER OR SIGNAL OPERATOR

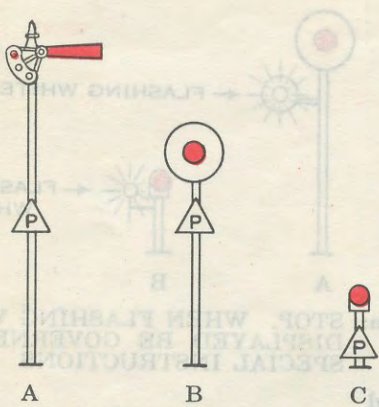
**Name and Aspect:** FLASHING YELLOW





**Indication:** STOP. WHEN FLASHING WHITE DISPLAYED BE GOVERNED BY SPECIAL INSTRUCTIONS

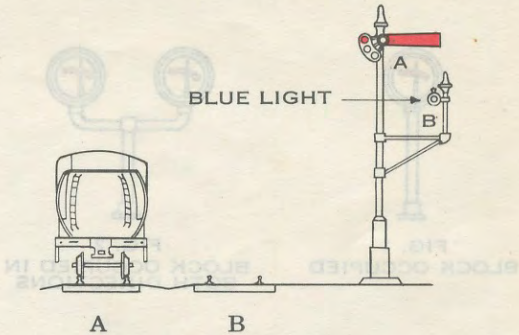
**Name and Aspect:** FLASHING WHITE



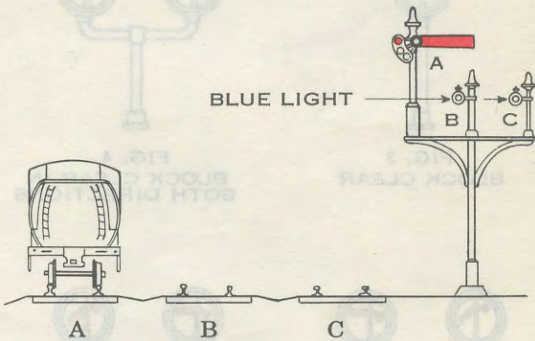
**Indication:** STOP. INSPECT TRAIN, TRACK OR STRUCTURE AS PROVIDED IN SPECIAL INSTRUCTIONS, AND PROCEED THROUGH REMAINDER OF THE BLOCK IN ACCORDANCE WITH PROVISIONS OF RULE 507, 509, 510, 663, 744, OR 776, AS THE CASE MAY BE.

**Name and Aspect:** HOME SIGNAL RED, WITH TRIANGULAR PLATE

# RULE 297. DUMMY MASTS



SIGNAL A GOVERNS TRAIN ON TRACK A  
DUMMY MAST B REFERS TO TRACK B



SIGNAL A GOVERNS TRAIN ON TRACK A  
DUMMY MAST B REFERS TO TRACK B  
DUMMY MAST C REFERS TO TRACK C



# RULE 298. BLOCK INDICATORS



FIG. 1  
BLOCK OCCUPIED



FIG. 2  
BLOCK OCCUPIED IN  
BOTH DIRECTIONS



FIG. 3  
BLOCK CLEAR

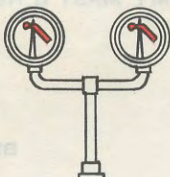


FIG. 4  
BLOCK CLEAR IN  
BOTH DIRECTIONS



FIG. 5  
BLOCK OCCUPIED  
TO THE RIGHT  
CLEAR TO THE LEFT



FIG. 6  
BLOCK OCCUPIED  
TO THE LEFT  
CLEAR TO THE RIGHT

**301.** A signal improperly displayed, or the absence of a signal at a place where a signal is usually shown, must be regarded as the most restrictive indication that can be given by that signal.

The absence of a light, or a white light displayed where a colored light should be, in a block signal, must be regarded as the most restrictive indication that can be given by that signal, except that when day indication is plainly seen it will govern.

When a block signal is out of order and not so indicated, or is improperly displayed, or working improperly, or light is out at night, report must be made to the chief train dispatcher from the next open train-order office.

**303.** Interlocking or absolute signals may govern movements into the ABS adjoining interlocking or CTC limits. When so arranged they will be designated "semi-automatic" and distinguished by a plate bearing the letters "SA". Trains stopped by such signals must observe interlocking or CTC rules within the interlocking or CTC limits, and ABS rules within the automatic portion of the block beyond interlocking or CTC limits.

**304.** When automatic block signals are to be taken out of service for an extended period of time, train order, Form Z Example (1) and timetable bulletin must be issued, and arms removed and lights extinguished in semaphore signals, or lights covered in light signals. Train order and timetable bulletin must remain in effect until signals are restored to service.

When signals are to be again restored to service, train order Form Z Example (2), and timetable bulletin must be issued.

As soon as arms are placed on semaphore signals, or covering removed from light signals, they must be regarded as in service.

**305.** After passing a signal indicating "proceed", the indication of the next signal may change to "stop", and enginemen and trainmen must be on the alert to observe it.

A train, if delayed in the block, must proceed with caution to the next signal.

**306.** A home signal with triangular plate bearing the letter "P" is also actuated by some special protective device, and when signal displays stop indication, Rule 507, 509, 510, 663, 744 or 776, as the case may be, will govern; and in addition, careful examination must be made of train, track or structure for which protection is provided to assure that it is safe for the passage of trains. Number or location of such signals will be shown in timetable, with description of the special protection afforded.

When a signal with triangular plate protecting a spring switch displays stop indication, except when the switch is lined by hand for the movement, member of crew must open and close spring switch by hand, removing any obstruction.



## AUTOMATIC BLOCK SIGNAL SYSTEM

**505.** Automatic block signals govern the use of the blocks, but unless otherwise provided, do not supersede the authority of trains; nor dispense with the use or the observance of other signals whenever and wherever they may be required.

**D-506.** Unless otherwise provided, block signals for a track apply only to trains moving with the current of traffic on that track.

**507.** When an automatic block signal displays stop indication, train, without stopping, may proceed at restricted speed, under the following conditions:

- (a) To enter a siding where the switch is not more than one thousand feet beyond the signal and it can be seen that no opposing train has passed the home signal governing such opposing train at the opposite end of siding, or that an opposing or preceding train has stopped, or is moving prepared to stop clear of the route to be used.
- (b) To enter a yard track when the switch is lined for the receiving track and the route is clear to the fouling point of the switch.
- (c) To continue on the main track when meeting or passing a train when the view of track is clear to the point where fouled by the train which is taking siding, or when the engineer is informed by a member of the crew of the train to be met or passed that the stop indication of the signal is caused by the train to be met or passed being partly in the siding and not clear of main track.
- (d) To continue within the limit of a grade signal.
- (e) To permit an engine with, or without cars, to couple to its train.

**508.** When an automatic block signal number plate is reversed, showing yellow, and signal displays stop indication, train, without stopping, may proceed at restricted speed through the block.

**509.** When an automatic block signal displays stop indication, train, after stopping, may proceed at restricted speed, under the following conditions:

(a) On single track, when a preceding train is seen in the block, and the intervening track is seen to be clear.

(b) On single track, when view of track is clear to the end of block, or view of track is clear to a distant signal displaying green aspect.

(c) On single track within Centralized Traffic Control limits.

(d) On double track.

**510.** Except as provided in Rule 507, 508 or 509, when an automatic block signal displays stop indication, train must stop and the following will govern:

(a) If means of communication available and train dispatcher knows there is no opposing train between the signal and the next open train-order office, he may authorize train to proceed at restricted speed to the next signal.

(b) If no means of communication available, or if train dispatcher does not know whether there is an opposing train between the signal and the next open train-order office or not, train must wait five minutes and may then proceed at restricted speed, except that when view of track ahead is not clear for at least one-fourth mile at any location within the block, movement must be stopped and then be protected by being preceded by a flagman. Engines so equipped must display oscillating red light to the front.

Flagman must watch for broken rails or other defects in track while preceding his train.

Except as provided in Rule 508, when a train is proceeding after finding an automatic block signal displaying stop indication, enginemen must watch for broken rails or other defects in track.

When proceeding under provisions of Rule 507, 509 or 510, restricted speed must not be exceeded until rear of train has passed out of the block, or has passed a distant signal displaying green aspect.

**512.** Block indicators for one track at a cross-over will be located at the switch stand for the switch in the other track; at other switches they may be placed at the switch stand or at the derail.

The member of crew required to handle the switch must observe and respect block indicator indication, and may signal his engineer to pass the fouling point only after such indication permits switch to be thrown and switch has been properly lined.

Where an automatic signal is located at the fouling point, and block indicator is located at the switch, the switch may be thrown if indicator indicates block clear. When switch is lined, the signal at fouling point should display proceed indication, and movement may then be made; but if signal displays stop indication after switch is properly lined, movement to main track may be made only after the applicable portion of Rule 509 or 510 has been complied with.

Where there is no automatic signal at the fouling point, if indicator indicates block clear in both directions for the track which is to be fouled, switch may be lined immediately; but when single indicator indicates block occupied, or when double indicator indicates block occupied in the direction in which movement is to be made, switch must not be unlocked, nor the track fouled, until the approaching train or engine has passed, or protection by flagman has been provided in the direction or directions necessary, to protect the move.

**513.** Before a train or engine fouls a main track and before the main track switch is thrown it must be known by normal operation of electric or mechanical switch lock, observance of signal, block indicator, or by view of track for entire length of the block that there is no train or engine, either within or closely approaching the block to be occupied, moving toward the switch; otherwise protection by flagman must be provided in the direction or directions necessary to safeguard the movement. The engineer or conductor, as the case may be, at the fouling point must know that such protection by flagman has been provided, except in yards where yardman's proceed signal is required for trains to enter main track, such signal is also an indication that necessary protection has been provided. Yardman giving the signal must know that such protection has been provided.

**515.** A train having passed out of a block must not back into that block except under protection by flagman.

Reverse movement within a block must not be made except under protection by flagman.

When making a reverse movement on main track after moving out of a siding or other track, train will,



unless movement be completed beyond the governing signal, proceed only as prescribed by the applicable portion of Rule 507, 509 or 510.

**516.** Overlaps may be indicated by overlap posts, locations of which will be shown in timetable. A train holding main track at a meeting point must not pass the overlap post, nor open a switch within the overlap, until the opposing train has entered the block. A preceding train must clear the overlap as soon as practicable to avoid delay to a following train.

**517.** Insulated joints are placed near the fouling point. Engines or cars must not be left standing between these joints and the track protected.

### SPRING SWITCHES

**535.** A spring switch will be distinguished by a target bearing the letters "SS". After trailing through a spring switch a reverse movement must not be made until it is known that both points have moved to proper position. When a stop is made before the entire movement is completed, a reverse movement must not be made, nor slack taken, until the switch has been lined by hand.

Maximum speed for trailing movement when the spring is to be actuated, and maximum speed for facing movements with switch points in normal position, as indicated in Speed Restrictions tables must not be exceeded.

**536.** When a trailing movement is to be made over a spring switch equipped with a facing point lock and the initial movement of the switch points is not to be actuated by the engine, switch must be lined for the movement. Employe so lining the switch must again line it for normal position after movement has been completed, unless he has arranged for another employe to do so.

A spring switch must not be trailed through unless switch target displays the letters "SS" in normal position, or switch has been lined for the movement.

**538.** Location and normal position of spring switches on main tracks, and designation of such spring switches equipped with facing point locks, will be listed in timetable.

**D-539.** Trains and engines moving against the current of traffic must not exceed 35 miles per hour over a spring switch in facing point direction. Unless the movement is protected by a block signal displaying proceed indication, or by a switch-point indicator displaying green aspect, stop must be made before reaching the spring switch and member of crew must examine switch and know that points are in proper position for the movement and switch locked, before proceeding.



## INTERLOCKING

**605.** Interlocking signals govern the use of the routes of an interlocking, and as to movements within interlocking limits, their indications supersede the superiority of trains, but do not dispense with the use or the observance of other signals whenever and wherever they may be required.

Rule D-152 will not apply within interlocking limits.

**606.** Interlocking limits on main tracks will be designated in the timetable, except at railroad crossings, junctions and drawbridges where the limits are clearly defined by the interlocking home signals. Where necessary, limits on other than main tracks will be indicated by signs.

**607.** Automatic signals located within interlocking limits will be observed in accordance with Rule 507, 509 or 510, as applied to single track.

**611.** Unless otherwise provided, signals must be kept in the position displaying the most restrictive indication, except when displayed for an immediate movement.

**612.** Appliances must be operated carefully, and only by those charged with that duty. If any irregularity affecting their operation is detected the signals must be displayed to give their most restrictive indication until repairs are made.

**613.** When the route is lined, the signals must be operated sufficiently in advance of approaching trains to avoid delay.

**615.** When necessary to change any route for which the signals have been cleared for an approaching train, switches, movable point frogs or derails must not be changed, nor signals cleared for any conflicting route, until the train for which the signals were first cleared has stopped.

**616.** The lever operating a switch, movable point frog, derail, or lock must not be moved when any portion of a train is standing on or closely approaching the switch, movable point frog or derail.

**617.** Operating levers must be blocked, or marked, and should not be used, when a track, switch or signal is undergoing repairs, or when a track is obstructed.

**619.** If the force, whose duty it is to keep switches clear when snow or sand is drifting, is not on hand when required, the fact must be reported to the chief train dispatcher. During storms, high water, drifting snow or sand, special care must be used.

**620.** If a signal fails to work properly its operation must be discontinued, and, until repaired, the lever secured so signal will display its most restrictive indication.

**621.** Signal operator must observe, as far as practicable, whether the indications of the signals and the position of the derails and switches correspond with the position of the levers.

**622.** Signal operator must not make, nor permit to be made, any unauthorized repairs, alterations or additions to the interlocking. Any defects in the interlocking must be reported promptly to the signal supervisor; also to the chief train dispatcher if trains may be delayed.



**623.** If there is a derailment, or if a rigid switch, movable point frog or derail is run through, or if any damage occurs to the track or interlocking, the signals must be restored so as to display their most restrictive indication, and no movement permitted until all parts of the interlocking and track subject to consequent damage have been examined and are known to be in safe condition.

**624.** When necessary to disconnect a switch, movable point frog, derail, lock, or electric locking circuit, all switches, movable point frogs and derails affected must be securely spiked or fastened in the required position and the levers blocked, or marked, in such manner that they cannot be operated, before any train is permitted to pass over them.

**625.** When any part of an interlocking is to be repaired, the signal operator must have an understanding of the scope of the work and what route or routes may be affected by such repairs.

When any part of an interlocking is undergoing repairs, signals must not be displayed for any movements which may be affected by such repairs until it has been ascertained from the repairman that the switches are properly set for such movements.

When repairs or changes necessitate the removal of any part of the machine locking, the signal operator must ascertain what routes are affected, and must not clear the signals over any such affected routes. Trains must be moved over such routes as prescribed by Rule 628, until the locking has been restored.

**626.** Signal operator must observe, as far as practicable, each passing train, and note whether it is complete and in order. Should he note any indication of conditions endangering that train, or any other train, the signal operator must take such measures for the protection of trains as may be practicable.

**627.** When an interlocking signal displays stop indication because of track occupancy by train or engine, signal operator may authorize another train or engine to enter block if necessary, provided he has assured himself that the following train or engine is fully acquainted with the intended move.

**628.** Hand signals must not be used when the proper indication can be displayed by the interlocking signals. When hand signals are necessary, the signal operator must assure himself that the switches are properly set and that the route is clear. Signals must be given by signal operator on the ground unless otherwise provided, and must be given in such a way that there can be no misunderstanding on the part of enginemen or trainmen as to the signals, or as to the train or engine for which they are given.

A yellow flag must be used by day, a yellow light by night, in giving hand signals.

**629.** Before granting permission in accordance with Rule 663 for trains or engines to pass an inoperative signal, a red tag or wedge must be applied to the signal lever, and it must not be removed until it is known that the train or engine has completed the authorized movement.

When a switch or signal must not be operated, because of track obstruction or other condition, signal operator must apply a red tag or wedge to control lever governing the switch or signal, and it must not be removed until the switch or signal is reported ready for use.

**630.** Signal operators must see that lamps and appliances for hand signaling, and, unless otherwise provided, tools and fire apparatus are ready for immediate use.

**633.** If a train overruns a signal displaying stop indication or fails to obey a hand signal, the fact must be reported to the Superintendent.

**634.** Signal operators must not permit unauthorized persons to enter the interlocking station.

**635.** When signal operators relieve each other they must make a transfer of all unexecuted orders and instructions, and information as to train movements, overdue trains, and the conditions of the interlocking.

**636.** A train-order signal within the limits of an interlocking must not be cleared for an approaching train until the preceding interlocking signals governing the movement of the train have been cleared.

**637.** Ordinarily, passenger trains must be given precedence over freight trains, but when a signal displays proceed indication for an approaching train, it must not be changed, except as provided in Rule 615.

**638.** In case of failure of a lever indication, the signal operator must ascertain that all requirements affecting the safety of train movements are fulfilled before releasing the indication.

**639.** Instructions as may be required, governing the operation and manipulation of each interlocking will be placed at that interlocking station, and signal operators must familiarize themselves therewith.

**661.** If a signal indication permitting a train to proceed has been accepted, and is changed to display stop indication before it is reached, stop must be made at once. Such occurrences must be reported to the Superintendent by engineer.

**662.** Interlocking limits must not be entered or fouled on any track unless properly authorized by signal indication, or by permission of signal operator.

**663.** When an interlocking signal displays stop indication, train or engine, after stopping, may proceed through the interlocking limits of such signal at restricted speed, under the following conditions:

- (a) Upon receiving hand signal as prescribed by Rule 628.
- (b) Upon receiving authority by telephone or otherwise orally from signal operator, and after a member of the crew has made careful examination of facing point switches.
- (c) If no signal operator on duty, by flagman preceding the train, if interlocking cannot be operated by a member of the train crew. At railroad crossings and junctions flag protection must be provided on the intersecting tracks unless interlocking signals, or derails, thereon be known to be in position to protect the movement.



Flagman must watch for broken rails or other defects in track while preceding his train; and when not required to send a flagman in advance under these conditions, enginemen must watch for such defects.

**669.** Trains stopped by the signal operator in making a movement through an interlocking, must not move in either direction until they have received the proper signal from him.

**670.** A reverse movement within interlocking limits, or a forward movement after making a reverse movement, must not be made without the proper interlocking signal indication or permission from the signal operator.

### **AUTOMATIC INTERLOCKING**

**680.** Signals will normally display stop indication, and on approach of a train or engine will display proceed indication if no movement approaching on the intersecting track.

**681.** If home signal does not display proceed indication, and no movement approaching on intersecting track, member of crew must be sent to the crossing to operate time-release.

After time-release has functioned, if home signal then does not display proceed indication, train may proceed through interlocking limits as prescribed by Rule 663(c).

**682.** Instructions for operating time-release, and length of time that must be allowed for the release to function, will be posted inside the time-release box.

### **LETTER TYPE INDICATORS**

**705.** Letter type indicators may display indications by illuminated letters, and when so displayed require movement as shown in special instructions in timetable, and supersede the superiority of trains to the extent shown in such special instructions. Restrictions that may be imposed by automatic block signals or other signals must be complied with.

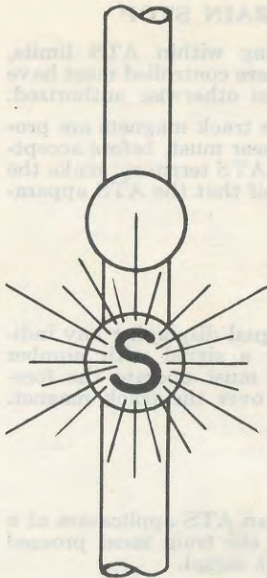


Fig. 1

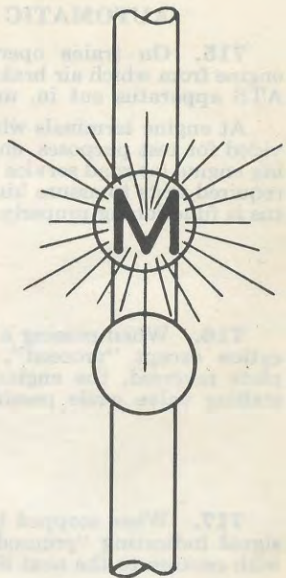


Fig. 2

The following letters may be used in these indicators;

M  
S  
SS  
NS  
W  
T

Other letters or combination of letters, or words may be used.

**706.** At point where the authority granted by letter type indicator terminates, or when no letter is illuminated in an indicator, timetable and train-order requirements will govern.

**707.** At stations where the indicator is operated by a train-order operator, the operator must not illuminate the indicator without authority from train dispatcher, except those governing movements for which yardmaster's authority must be obtained.

## AUTOMATIC TRAIN STOP

**715.** On trains operating within ATS limits, engine from which air brakes are controlled must have ATS apparatus cut in, unless otherwise authorized.

At engine terminals where track magnets are provided for test purposes, engineer must, before accepting engine for road service in ATS territory, make the required tests to assure himself that the ATS apparatus is functioning properly.

**716.** When passing a signal displaying any indication except "proceed", or a signal with number plate reversed, the engineer must operate the fore-stalling valve while passing over the track magnet.

**717.** When stopped by an ATS application at a signal indicating "proceed", the train must proceed with caution to the next block signal.

**718.** When an ATS application occurs in train service, either inside or outside of ATS limits, report must be made on the prescribed form from the next open train-order office.

**719.** When the ATS apparatus on the engine fails and cannot immediately be repaired, it must be cut out of service, and the train may then proceed, not exceeding medium speed to the first available point of communication, where report must be made to train dispatcher, after which normal speed may be resumed, but must not pass an engine terminal, if entering or continuing in ATS limits, without permission from the chief train dispatcher.



## ABSOLUTE-PERMISSIVE BLOCK

**740.** On portions of the railroad within limits specified in the timetable and designated as absolute-permissive block (A-PB), trains will be governed by block signals whose indications will supersede the superiority of trains for both opposing and following movements on the same track.

**741.** Absolute signals govern the use of the routes within A-PB limits, and confer authority to the limit of the A-PB; but do not dispense with the use or the observance of other signals whenever and wherever they may be required.

**742.** The train dispatcher must be informed of any known condition that will delay the train, or prevent it from making usual speed through A-PB limits.

Within such limits, second and inferior class trains, extra trains and engines must not occupy a block, or overlap in connection therewith, when it is known that a first-class train will be delayed thereby.

**744.** When an absolute signal displays stop indication, train must stop, and if after waiting ten minutes no train is seen or heard approaching, flagman must be sent ahead and train may follow, keeping at least one-half mile behind flagman until he reaches next signal displaying proceed indication, or when he has reached opposite end of A-PB.

## CENTRALIZED TRAFFIC CONTROL

**Note.**—Where, in these rules the term “train dispatcher” is used, it has reference to the train dispatcher or signal operator, or some employe acting upon authority of the train dispatcher.

**760.** On portions of the railroad within block system limits specified in the timetable and designated as centralized traffic control (CTC) trains will be governed by block signals whose indications will supersede the superiority of trains, unless otherwise provided.

**761.** Absolute signals govern the use of the routes within CTC limits; and confer authority to the next absolute signal, except that the last absolute signal confers such authority only to the CTC limit; but do not dispense with the use or the observance of other signals whenever and wherever they may be required.

**762.** Within CTC limits, Rule 93 will not apply.

**763.** Unless otherwise provided, train indicators, signals and markers must be displayed through CTC limits.

**764.** Initial and terminal points of CTC will not affect the initial and terminal stations of schedules, nor of extra trains created by train order. Rule 96 must be observed in creating sections.

**765.** When necessary to perform switching at a station, or to work between stations, when the track between stations is unoccupied, train dispatcher must designate the work limits and clock time limit that must not be exceeded and must immediately actuate levers on control machine to display stop indication in an absolute signal at the entrance to each end of work limits and place red tags on the levers controlling such absolute signals. The tags must not be removed or attempt made to change the position of dual control switches within the limits until train or engine has reported work completed or the track cleared.

Trains or engines granted work limits and clock time limit may occupy the main track and move in either direction within such limits without protection by flagman, passing automatic block signals displaying stop indication without stopping but all movements must be made with caution.

To hold work limits for time authorized, main track must be occupied continuously, or main track switch left open. If track is cleared and switches restored to normal position, new authorization must be obtained before re-entering main track.

Unless granted an extension of time, a train or engine must be clear and reported clear of the work limits before clock time limit given. If impossible to clear it by the time specified, protection by flagman, in both directions, as prescribed by Rule 99, must be afforded at that time.

Train dispatcher must be notified by member of crew when train or engine is clear of work limits, except that when train dispatcher authorizes by signal indication, a train or engine to move out of work limits in the same direction in which it entered, it will be considered reported clear when such train or engine has passed out of the work limits by signal indication.

When a train or engine requests work and clock time limits or reports clear of work limits, employe will state his name, occupation, location, and train or

engine number. Work and time limits granted must be repeated to train dispatcher, and if correct, response "OK" will be given.

**766.** The lever controlling a dual control switch must not be actuated while an engine, car, or any portion of a train is standing on, or moving over the switch.

**767.** If a switch or signal is not to be operated because of track obstruction, repairs, or other condition, a red tag must be applied to the lever controlling the switch or signal, and the tag must not be removed until the switch or signal is reported ready for use.

**768.** Levers controlling the signals and route must be set sufficiently in advance of approaching trains to avoid unnecessary delay.

**769.** The main track or a controlled siding must not be fouled unless authorized by absolute signal indication or by permission from train dispatcher.

Before granting authority to enter main track at a hand-operated switch train dispatcher must protect the movement by placing absolute signals in stop indication.

All movements on controlled sidings must be made with caution.

**770.** When two or more trains or engines are to be granted work and clock time limits within the same or overlapping territory the train dispatcher must inform the conductor of each train or engine of the fact and conductors must arrange for the necessary protection.

Train dispatchers must not authorize a train or engine to pass an absolute signal displaying stop indication for a following move until he has assured himself that conductor of any train already within the block is fully acquainted with intended move so that proper protection will be provided.

**771.** Train dispatcher must not operate a dual control switch for switching moves requiring more than one reverse and one normal movement of the switch.

When switching is to be done over dual control switch work and clock time limits must be obtained from the train dispatcher. Selector lever must then be placed in hand position or crank removed from crank holder whether switch is to be thrown or not and must not be again placed in motor position until switching has been completed.



When selector lever is placed in hand position or crank removed from crank holder all signals governing movement over the switch will display stop indication and the train or engine granted work and clock time limits may consider the indication of such signals suspended and make movements over the switch on hand signals from trainmen.

Before making movements over the switch, trainmen must notify engineer when selector lever is placed in hand position or crank removed from crank holder so that engineer will be governed by hand signals.

When selector lever is to be restored to motor position or crank returned to crank holder engineer must be immediately notified so he will be governed by signal indication.

**772.** When necessary to hand-operate a dual control switch permission from train dispatcher must be first obtained; then proceed as follows:

(a) When dual control switch is equipped with selector lever and hand-throw lever:

(1) Unlock switch lock.

(2) Move selector lever from position marked "Motor" to position marked "Hand".

(3) Operate hand-throw lever back and forth until switch points are seen to move with movement of lever, then line switch for route to be used and check points to see that they are in proper position for movement.

(4) After movements over switch have been completed, switch must be restored to position in which originally found, then restore selector lever to position marked "Motor" and secure with lock. Selector and switch levers must not be forced. They will move easily when properly in mesh, although some manipulation of first one and then the other may be necessary to get them in proper mesh.

(b) When dual control switch is equipped with crank instead of selector lever, permission from train dispatcher must first be obtained and then:

(1) Unlock crank holder and remove crank.

(2) Unlock hasp on small round cover on top of switch machine, insert crank on shaft and turn until switch is in desired position and as far as crank will turn. Inspect switch and see that points are in proper position for movement and remove crank from switch machine. Do not restore crank

to crank holder until entire movement has passed over switch.

(3) Further instructions posted at the switch must also be observed.

(4) After movements over switch have been completed, crank switch to same position in which originally found, remove crank, lock crank hasp on switch machine, replace crank in crank holder and lock.

When selector lever has been returned to motor position and locked, or crank returned to crank holder and locked, train dispatcher must be immediately notified.

**773.** Trainmen must notify engineer when the selector lever is to be placed in hand position, and must notify him when it is to be returned to motor position, so that he may know when to be governed by the indication displayed by signals.

**774.** To enter main track at hand-operated switches where absolute signal is provided to govern movement, permission for the movement must first be obtained from the train dispatcher, then line switch and be governed by absolute signal indication.

**775.** If a change in direction of movement is to be made while any portion of train is occupying, or which will cause any portion of train to occupy, the short section of track between opposing absolute signals at a dual control switch while selector lever is in motor position, train dispatcher's permission must first be obtained, and it must be known that switch points for either facing or trailing movement are in proper position for the movement.

**776.** When an absolute signal displays stop indication, unless stop indication is known to be caused by the approach of a train, train dispatcher must be consulted as quickly as possible by the member of the crew closest to telephone and the following will govern:

- (a) If signal cannot be cleared and there is no opposing or preceding train causing signal to display stop indication and light on control machine is illuminated (indicating that dual control switch is locked), and provided time-release feature is not operating and movement does not require position of switch to be changed, train dispatcher, after placing opposing absolute signals in stop indication, may authorize train to proceed on main track or siding at restricted speed to next absolute signal and trains may pass automatic block signals displaying stop

indication without stopping. Member of crew must examine switch to see that points are in proper position for movement, selector lever in motor position and locked, or, at crankover switch, that crank is locked in crank holder.

(b) If desired movement requires that position of switch be changed or if light on control machine is not illuminated (which would indicate dual control switch is not locked) train dispatcher must not authorize movement until dual control switch has been opened and closed by hand as prescribed by Rule 772. If signal cannot then be cleared, selector lever must be placed in hand position or crank removed from crank holder until movement over the switch has been completed. Member of crew must notify train dispatcher when selector lever has been returned to motor position or crank returned to crank holder.

**777.** If for any reason proceed indication of an absolute signal cannot be acted upon at once, train dispatcher must immediately be notified.

**778.** Except as prescribed in Rules 765 and 776, when an automatic block signal displays stop indication, Rules 507, 508, or 509, as the case may be, as applied to single track, will govern. If the signal governs entrance to main track, permission from train dispatcher must first be obtained.

**780.** Trains carrying passengers or United States mail must not leave a station where passengers or mail are received or discharged, in advance of their time as shown in timetable.

**781.** Instructions relating to track conditions will be issued by train order before train enters CTC when practicable, but when not practicable, may be issued orally to engineer within CTC for such conditions as apply within CTC limits. Conductor of a train, or engineer if train is a light engine, entering CTC at an intermediate point, must ascertain from train dispatcher what instructions are in effect as to track conditions on that portion of CTC over which movement is to be made.



## GENERAL REGULATIONS

**801.** Employees who are insubordinate, dishonest, immoral, quarrelsome, or otherwise vicious, will not be retained in the service.

**802.** Indifference in the performance of duties will not be condoned. Civil, gentlemanly deportment is required of all employees in their dealings with patrons, the public, their subordinates, and each other. Boisterous, profane, or vulgar language is forbidden. Employees must not enter into an altercation, but will report the facts to their immediate superior.

**803.** Continued failure by an employe to meet his just obligations shall be sufficient cause for dismissal.

Employees must not contract for deductions from wages without the consent of the Company.

Any act of hostility, or wilful disregard of the Company's interests will not be condoned.

**804.** Misconduct or negligence affecting the interests of the Company will not be condoned and must be reported. Withholding such information will be considered proof of negligence or indifference, and treated accordingly.

**805.** Employees are forbidden to offer presents to their superiors, either directly or indirectly, and those in authority will not accept such presents. The acceptance of gratuities or rewards from passengers or other patrons of the Company is forbidden.

**806.** Unless specially authorized, employees must not use the Company's credit and must neither receive nor pay out money on the Company's account. Property of the Company must not be sold nor in any way disposed of except by proper authority.

**807.** The affairs of the Company must not be divulged nor access to the Company's records permitted, without proper authorization.

**808.** Information concerning accidents or personal injuries to other than employees must be communicated or given only to authorized representatives of the Company, and then only when known to be authentic. Information as to accidents or personal injuries to employes shall be given only to a person in interest. Information concerning accidents or personal injuries of any character contained in the files of the Company is confidential and must not be divulged without proper authority from the Company.

**809.** The Company's telegraph or telephone lines must not be used unnecessarily; messages relating to personal affairs of employes must not be transmitted over them, except in case of illness or accident.

Mail not pertaining to the affairs of the Company must not be sent by train mail; to do so is forbidden by United States postal laws.

**810.** Employes must not engage in other business without permission of the proper officer. They must not absent themselves from their employment without proper authority. They must report for duty at the prescribed time and place, remain at their post of duty, and devote themselves exclusively to their duties during their tour of duty.

An employe subject to call for duty must not absent himself from his usual calling place without notice to those required to call him.

**811.** Employes whose duties connect them with the movement of trains or engines must not absent themselves from their places, substitute others, or exchange duties without proper authority. Trains must not be delayed for trainmen and enginemen to eat, without permission of chief train dispatcher.

**812.** Employes required to perform service on more than one division, also employes of other railroads while operating trains or engines on this Company's tracks, are under the jurisdiction of the division on which the service is being performed. Employes of this Company, while performing service or operating trains or engines on the tracks of another railroad, are under the jurisdiction of the railroad on whose tracks the service is being performed.

**814.** When leaving the service, or on demand by proper authority, Company property entrusted to employes must be returned.

**816.** Protection of the Company's property and property in its custody from fire is a duty of employes under all circumstances. The employe having direct supervision over the buildings, premises, or cars will be held responsible for the observance of safe practices and fire prevention rules and regulations.

Buildings, docks, and wharves must be kept free from accumulation of dirt, rubbish, and flammable material; special attention being given to closets, lockers, fuel bins, attics, stationery cabinets, etc. Gasoline and oil must be kept in prescribed places and only authorized containers used. Stoves in buildings, outfit cars, and cabooses must conform to prescribed stan-

dards, and must be kept free from accumulation of rubbish. Oils, fusees, torpedoes, and matches must be kept in containers provided for that purpose. Fire extinguishers must be kept properly charged and must be located in accessible places ready for immediate use. Fire hose and nozzles must be kept in places provided therefor and in serviceable condition. Water barrels must be kept filled, and the necessary supply of buckets ready for use.

**817.** Employes must keep a sufficient distance from passing trains to avoid possibility of being struck by anything projecting or that may fall or be thrown therefrom. On double track, they should keep outside of and clear of both tracks while train is passing. They must not depend on others to notify them of approaching trains, engines or cars.

**818.** Billboards must not be erected, nor material placed, on Company property which will obstruct the view of approaching trains.

**819.** In emergencies, or in case of obstruction by accident or other cause, suggestions based on observation of the actual situation are useful and required, and frequent report of progress must be made. Prompt action is imperative, and in the absence of an officer the employe on whom the responsibility most naturally falls will assume authority.

**820.** In case of damage to trains, engines, cars or structures involving the security of freight or other Company property, it is the duty of all employes to see that arrangements are promptly made for its protection against loss through pilferage or other causes.

**821.** In case of extraordinary rain storm or high water, trains and engines must be stopped, and bridges, trestles, culverts, and other points subject to damage, examined by conductor and engineer, or engineer if there is no conductor, before proceeding.

Speed of equipment over inundated tracks must not exceed 3 MPH, and movement must not be made if the depth of water above top of rail exceeds the following:

Diesel engines . . . . .	3 inches
Passenger cars and steam engines equipped with roller bearings . . . .	6 inches
Other passenger cars and steam engines . . . . .	12 inches



Careful inquiry must be made at all stopping places, extra stops being made if thought advisable, to ascertain the extent and severity of storms, and no risk must be taken. In case of doubt as to the wisdom of proceeding, train must be moved to the safest available place and there held until it can proceed with safety, chief train dispatcher to be kept informed of conditions from nearest available point of communication.

Trains and engines must run with caution over portions of the track which may have been damaged, and if a defect which may cause an accident is discovered, the telegraph or telephone must not be wholly relied on to notify trains and engines.

**822.** Employees are cautioned not to get on or off an engine or car which is in rapid motion.

Employees must face the equipment in descending ladders on engines and cars, whether standing or moving.

Employees are forbidden to ride on pilots of engines; are forbidden to take position, either seated or standing, on handrails of engines; and are forbidden to go between moving cars or engines. When movement is being made they must not go between engine and car or ride on leading footboards of engine in direction of movement, except for the purpose of uncoupling car from engine.

If uncoupling lever on one side fails to work, that on the other side must be used. When necessary to change the alignment of couplers, cars must be stopped, and under no circumstances must attempt be made to adjust couplers with foot or hand, or raise lock pin by hand, while cars are moving.

If necessary to make change or repairs to couplers, the circumstances must be understood by all employees who may, through misunderstanding, move or cause cars to be moved; the cars should be separated not less than one car-length to reduce possibility of injury, should they be moved by mistake. Employees should, when possible, avoid standing directly in line with couplers while making repairs.

Trainmen and enginemen must forbid employees whose duties do not connect them with the movement to get on or off trains, engines, or cars, while in motion.

Employes must not remain in bay window of caboose on the side next to a track on which a train, engine or car is passing, or being passed.

**823.** Electric light and power wires must be considered alive at all times. Employes must not depend for their safety on the insulation of wires. Employes noticing dangling wires or wires sagging over track, must avoid coming in contact with them. They must provide, if possible, such protection as will insure the safety of themselves and others, and promptly notify the proper authority.

**824.** On grades, before engine is cut off at stations to do work, or at any stop of unusual length, a sufficient number of hand brakes must be set to hold the train and the air released. Both conductor and engineer will be held responsible for compliance with this rule.

**825.** Cars must not be left on sidings without permission of chief train dispatcher, except in emergency, in which case the conductor must promptly inform chief train dispatcher. Crews are not relieved of compliance with rules requiring that trains using a siding must proceed with caution, even though they may not have been notified that there are cars on the siding.

Cars must be kept clear of any street or public crossing, and at least one hundred feet from the crossing when practicable.

A sufficient number of hand brakes must be set to hold cars; if brakes are inoperative, cars must be secured otherwise. When cars are set out on a grade they must be coupled, if practicable, and in addition to brakes being set, wheels must be blocked.

Cars should not be stored on tracks not protected with derails, facing-point switches, or by ascending grades toward main track, except in emergency or on instructions of chief train dispatcher or other proper authority and in such cases, cars must be properly secured. Wheels must be blocked where necessary.

When empty cars are stored on tracks adjacent to buildings an opening of at least forty feet must be made every five car-lengths.

Outfit cars must not be left adjacent to oil or gasoline loading or unloading locations, lumber yards, storehouses, warehouses or other buildings. When placed on tracks without fire protection, an opening of at least forty feet must be made every five car-lengths. Diner should not be separated from kitchen car.

Engines must not be operated over live rail of any track scale having both live rail and dead rail. Where there is no dead rail, engine may use live rail at speed not exceeding five miles per hour.

**826.** Only on certain tracks designated by Special Notice, a sign reading "EMPLOYEES WORKING" (white lettering on red background) must be placed on the car, track, or between the rails of the track, in approach to cars which are being loaded, or unloaded, and when sign is displayed cars must not be coupled to, nor moved, nor other cars placed so as to obstruct the view of the sign. White light must be attached to the sign by night.

The sign will be placed and removed only by authorized employes. The sign must be displayed to protect employes loading, unloading or working in or about cars, and must not be removed until it is known that employes and others are clear, and that aprons have been removed, and trucks and other vehicles are clear.

On other tracks, when necessary to disturb cars that are being loaded or unloaded, or serviced, notice must first be given to all persons in or about the cars to be moved, and it must be known that trucks and other vehicles are clear.

When a sign reading "STOP—TANK CAR CONNECTED" (white lettering on blue background) is displayed on a track or car, the car or cars must not be coupled to, nor moved, until it is known that connections have been detached.

When a sign reading "SERVICE CONNECTIONS" (black lettering on white background) is displayed on a car or engine, the car or engine must not be coupled to, nor moved, until it is known that connections have been detached.



When a sign reading "OCCUPIED OUTFIT CARS" is attached to switch lock, the outfit cars must not be coupled to, nor moved, until occupants have been notified, and permission given by foreman or his representative.

Any cars not to be removed must be returned to the location at which found.

**827.** Speed of freight trains must not exceed eight miles per hour when starting from initial stations and intermediate stops, for the length of train, or until proceed signal is received from trainman.

Rolling inspection of running gear and brakes of as much of the train as is practicable must be made when starting from initial station and intermediate stops; and if necessary, stop signal must be given if wheels are found sliding. Conductors must promptly mail to Superintendent report of flat wheels found under cars in their trains.

Trainmen must be in position to observe their trains while running, particularly while rounding curves and approaching or leaving stations. Enginemen and forward brakemen must frequently look back for, and comply with, signals that may be given by other employes while train is running.

Unless otherwise provided, when conditions are favorable and in the judgment of conductor it is safe, freight trains need not stop for train inspection. Where stops are made for other reasons, inspection of trains must be made as often as practicable. When weather conditions restrict visibility, or other conditions require, conductor will designate stops for inspection which in his judgment are necessary.

Inspection should include running gear, bearings, brake and draft rigging. If defects are discovered they should be corrected if possible, and cars unsafe to run must be set out and chief train dispatcher notified. Special attention must be given to hot bearings.

Cars bearing placards denoting contents are explosive, flammable, poisonous, or otherwise dangerous, must be given careful inspection at all points where train inspection is made.

Trains, including military trains, made up in part of freight cars or caboose equipped with cast iron wheels are required to comply with rules and instructions applying to freight trains.

**829.** When a train stops to be met or passed by another train, a trainman on head end of train must take position and make rolling inspection of passing train from side opposite to his train; trainmen at rear of standing train must make rolling inspection on side adjacent to their train.

At meeting or passing points when neither train stops and in double track territory, a trainman must be stationed on rear platform of rear car or caboose and make rolling inspection of passing train and be in position to observe signals that may be given by crew of either train, except when rear car is a private or official car or has observation end, trainman will take position in first accessible vestibule and with vestibule door open make rolling inspection and be in position to observe signals that may be given.

Trainmen, stationmen, train-order and signal operators, linemen, signal maintainers, bridge and track foremen, track walkers, pumpers and watchmen must observe passing trains closely and if hot bearing, brakes sticking, wheel sliding, dragging equipment, insecure lading or any other dangerous condition is detected, they must give stop signals to trainmen and enginemen on passing train. If nothing irregular is noted, they will give proceed signal as rear of train passes, as an indication that they have observed the train and noted nothing dangerous.

Trainmen and enginemen must be on the lookout for signals from such employes and take such action as may be necessary to insure safety.

**830.** Trains and engines when standing or switching must not block traffic on street or public road crossings longer than necessary.

Trains must not stand on railroad crossings at grade, on drawbridges, or within the limits of an interlocking, when practicable to avoid it.

**831.** Pile drivers, locomotive cranes, and any other work equipment having butt couplers (no draft gear), scale test cars, and all wooden underframe cars must be handled near rear of train ahead of caboose and behind any helper engine. When practicable all

other work equipment, including steel underframe outfit cars, power shovels, derricks, spreaders, ditchers, pile drivers and locomotive cranes should be similarly handled in train. It will not be necessary to keep wooden underframe cars in one block when so handled.

Women and children must not be permitted to ride in outfit cars when moved by freight or mixed train. Other occupants of outfit cars must remain inside and not ride on top, sides or between these and other cars during course of road or yard movements.

**833.** Power shovels, pile drivers, derricks, ditchers, cranes and the like must not be handled in trains without A frames, leads and booms having been lowered and secured. Unless booms are disconnected they must be placed in trains in trailing position when possible.

When spreaders are shipped they should be handled with nose ahead, and with center plow and side wings into clear and properly chained and bolted.

When such roadway machines are operated on double track, or on track next to a main track, or on ground adjacent to a main track, boom or other parts of machine must not be operated to foul main track without proper protection. Such equipment must be at rest and clear of main track when a train is passing.

When ballast or other material is being loaded or unloaded on track adjacent to main track, proper flag protection must be provided on main track, and loading or unloading must be stopped while a train is passing.

Rail, pipe, poles, tanks, structural steel or similar lading must not be handled on or off open top car on track adjacent to main track when other track is available.

**834.** Open top cars loaded with rail, pipe, logs, lumber, structural steel, poles, or mounted wheels, when lading projects above sides or end walls of the car, must not be placed in trains next to engines, cabooses, occupied outfit cars, nor cars placarded "Explosives", "Dangerous", or "Poison Gas". This does not apply to trains consisting entirely of logs. ICC regulations must be observed in handling placarded cars in proper location in train.

**835.** Yardmaster must inform conductor and conductor must inform engineer and chief train dispatcher when there is equipment in train requiring reduced speed.



When handled in trains, S and SE class engines must be placed, when practicable, with the tender ahead.

**836.** Outside of yard limits, cars must not be shoved ahead of engine between stations when it can be avoided. When necessary to so handle, slow speed must not be exceeded.

**837.** Switching must be carefully done, and trains and engines must be carefully handled, to avoid shocks from abrupt starting or stopping; from impact in making coupling, and to prevent personal injuries, and damage to cars or contents, or engines.

Before fouling any track it must be known that engines or cars on adjacent tracks are clear. Cars must not be shoved to foul leads or adjacent tracks until it is known that it is safe to do so. Cars must not be left foul of an adjacent track if possible to avoid it.

Except at points where by special instructions a specified number of hand brakes must be set, cars standing on grade must not be coupled to in descending direction until it is known that sufficient hand brakes are set to prevent uncontrolled movement of cars should coupling fail or cars not be securely coupled.

When passenger cars are coupled, and before beginning to shove passenger cars or freight cars, slack between cars must be stretched to insure that all cars are properly coupled.

Movements into spur tracks must be so controlled as to prevent damage at end of spur. Before coupling to cars on spur tracks it must be known that such cars are secured by hand brakes, if necessary, to prevent damage should coupling fail.

Cars occupied by passengers, and occupied outfit cars must not be switched unless air brakes are in service on all cars, and must not be detached while in motion. When making coupling to such cars, air brakes must be cut in and operative on all cars being handled, and they must not be kicked nor dropped against other cars, and other cars must not be kicked nor dropped against them.

**837-A.** Open top cars on which load is liable to shift; cars containing livestock; or cabooses (at points where cabooses layover), must not be kicked nor dropped against other cars or cabooses, and other cars and cabooses must not be kicked nor dropped against them.

A car placarded "Explosives" or "Poison Gas" shall not be cut off while in motion. No car moving under its own momentum shall be allowed to strike any car placarded "Explosives", or "Poison Gas." No freight car placarded "Explosives" or "Poison Gas" shall be coupled to with more force than is necessary to complete the coupling.

Loaded tank cars placarded "Inflammable" or "Dangerous" must not be cut off in motion until hand brake has been tried and found in proper working condition, and not until previously cut off cars have cleared ladder track or lead, if any, and such placarded cars must be into clear of ladder track or lead before another car is allowed to follow them.

Any other car placarded "Inflammable" or "Dangerous" must not be cut off in motion until hand brake has been tried and found in proper working condition.

**838.** Employes must avoid making unnecessary noise in or about sleeping cars. Employes should pass through them only when necessary, and in a quiet manner. Careless coupling or switching of cars, or the disturbance of occupants of sleeping cars in any manner, must be avoided.

Uniform caps must be removed while passing through dining cars when occupied by passengers, except when engaged in collecting transportation.

**839.** Careless throwing of articles from engines and cars is dangerous and is forbidden.

**840.** The display of advertisements or banners upon freight or passenger cars must not be permitted, except upon authority of the Superintendent.

**842.** Yardmasters are responsible for conditions within yards. Trains and engines will be under the control of the yardmaster, and all employes in train, engine and yard service will be subject to his direction as to movements within yard limits. Road crews of trains will be responsible for their respective trains and engines until the yardmaster or his representative takes charge.

Yardmasters will keep informed of important trains, such as stock, fruit and manifest, and make every effort to get them through the yard with the least possible delay. They must see that ICC regulations are observed in placing placarded cars in proper location in trains.

**843.** The general direction and government of a train is vested in the conductor, and all other persons employed on the train must obey his instructions. Should there be any doubt as to authority or safety of proceeding, he will consult with the engineer, who will be responsible with him for the safety and the proper handling of the train and such use of signals and other precautions as circumstances may require. Conductor must obey the instructions of yardmasters within yard limits and be governed by the direction of agents in doing work at stations, and conform to the instructions issued by the Traffic and Accounting Departments.

**844.** Before leaving initial station, the conductor must be assured that all crew members are on hand, and hand brakes are released, and that train is provided with the proper tools, supplies and flagging equipment.

**845.** Conductors must assure themselves that their subordinates are competent and instruct them if necessary in the proper performance of their duties. Incompetence and disobedience must be reported.

**846.** The protection of trains is of the first importance, and conductors must not allow other duties to interfere therewith. Conductors must require their flagmen to act with the utmost promptness and in strict accordance with the rules. A trainman must be stationed, when practicable, on the rear of every train while in motion.



**847.** When the rear car is a private or official car, or an occupied observation car, trainmen, except in emergency, must not get on or off the observation platform to the inconvenience of passengers.

Train employes must not use space in observation end of occupied observation cars, or occupy space in rooms of sleeping cars if other space available. Permission to use such space must be obtained from conductor. They must not occupy seats with passengers or enter into conversation with them, or with other employes, further than is required in the discharge of their duty; but, so far as possible, they will contribute, without being officious, to the safety, convenience, and comfort of passengers.

Trainmen while on duty must not stroll or lounge about station platforms, read newspapers or any kind of literature, nor solicit for any other transportation company or for any hotel.

**848.** When private or official cars are to be handled on rear of train during night, occupants must courteously be requested to leave doors unlocked or provide rear brakeman with keys, which will be returned following morning. When crews change, or cars are set out, conductor must arrange with relieving conductor or with stationmaster, agent or yardmaster for prompt return of keys. Trainmen will use keys only when necessary to go through the car to flag when train has stopped with rear on bridge or trestle without sidewalks. Doors must be locked when rear brakeman is out flagging.

Unoccupied private or official cars will not be handled on rear of train unless keys are available.

**849.** Particular attention must be given to heating, lighting and ventilation of cars occupied by passengers, or being made ready for use.

On a passenger train when approaching a station where engines are to be changed, or train-heat line is to be parted, trainman will open train-heat valve on rear of train, one mile or more before reaching station, and sound signal 16(m), and engineman will shut off train heat at least one-half mile from station. Care must be taken to select location for this operation where there is the least probability of injury to persons or damage to property.

**850.** End gates must be in position to protect all open vestibules of occupied equipment. When making backward movement of trains or cars, passengers must not be permitted on rear platform.

**851.** When a passenger train is standing to meet or be passed by another train, at a point where no passengers are to be received or discharged, the vestibule doors must be kept closed on the side on which the approaching train is to pass, unless a member of the crew is in position to prevent passengers from alighting.

**852.** Gunpowder, dynamite, nitro-glycerine, or other explosives, must not be transported in any car attached to a passenger train. Flammable moving picture films, and firearms unless knocked down and in cases, must not be carried in cars occupied by passengers; except that firearms may be carried by police, military, or naval officers whose duties require it.

Home moving picture film (8 mm. and 16 mm.) are not considered flammable.

**853.** Passengers must not be allowed to carry bulky packages or other articles into coaches which may obstruct the aisles, seats, or the space between the seats, to the inconvenience of other passengers, nor to place heavy or bulky hand baggage or packages in overhead racks.

Passengers may be allowed to take canaries or other small birds in cages into passenger cars. Guide dogs, when accompanying blind persons, may be allowed in Pullman rooms; and if muzzled in coaches.

Dogs, cats or other small animals may be taken into private room accommodations in Pullman cars, but not into other passenger carrying cars. Not more than two animals may be taken into any one room. The animals must be in suitable containers when taken to and from the room, but dogs may be on leash and muzzled in lieu of in container.

**854.** Disorderly persons must not be allowed to board trains, nor may offensive language or other misconduct be permitted in or about cars.

**855.** If necessary to eject a passenger from the train, discretion must be used. Local rules, state laws, and the proprieties shall govern. Conductors will call upon duly constituted peace officers or upon railroad police for assistance when necessary.

If a passenger is ejected from a train, the name and address of such passenger, as well as names and addresses of all witnesses and their statements in writing if possible, should be obtained. Passengers must not be ejected from trains except at a station where shelter and food may be obtained.

If there is doubt as to the right of a passenger to continue on transportation presented, or as to the proper course to be pursued, the facts in the case must be reported by wire to the Superintendent.

**856.** So far as possible, conductors must see that passengers are provided with seats, and that no one is allowed to occupy more than a single seat to the exclusion of others. Employes traveling on passes should not occupy seats to the exclusion of revenue passengers. When seats are not available in the coaches and there are vacant seats in any parlor or sleeping car (except chartered cars), passengers may be seated therein and train conductors will arrange with sleeping car conductors accordingly. Such seats must be surrendered as soon as there is room in the coaches or whenever required for regular use. Seats in the sleeping cars must not be so assigned or occupied at night after the passengers have retired.

**858.** Approaching a station at which the train is to stop, a member of crew must pass through each coach occupied by passengers and twice distinctly announce the name of the station; and approaching junctions, names of principal stations on connecting line, names of other stations when it is known there are passengers on the train for those stations, location of connecting trains, and any other helpful information, must be announced; except, at night when passengers are sleeping in coaches, each passenger must be individually notified when train is approaching his destination, to avoid disturbing other passengers.

Conductors must require employes of parlor, lounge, and sleeping cars to inform their occupants when train is approaching their destination.

Should a stop be made before the station announced is reached, trap doors must not be opened without leaving a member of crew in charge.



**859.** Trainmen must be on the alert for gamblers and swindlers, have them watched, personally warn passengers and if any attempt is made to defraud, prevent it and report by wire to the Superintendent. Beggars and other unauthorized persons must not be permitted to solicit or otherwise annoy passengers. Unauthorized advertising matter must not be distributed on trains.

**860.** Telegrams entrusted to the care of conductors must be promptly delivered, if possible. Receipts may be taken for commercial telegrams. If telegram cannot be delivered, that information must be endorsed on the envelope and the telegram left at the next open office where train stops.

**861.** Articles found on trains must be delivered to the person authorized to receive them at terminal stations or division headquarters.

**862.** Except as otherwise provided, passenger trainmen must remain by their train at terminals to answer inquiries and assist passengers, until the train is vacated or until they are relieved.

**863.** In case of personal injury, loss of life or damage to property, conductors must furnish wire reports of facts, with the name and address, and written statement when possible to obtain it, of each person who witnessed or has information concerning the accident. In case of death from accident or other cause on their train, or of fatal injury to a person by their train, they must see that the proprieties are observed and that the body receives appropriate care and is removed as soon as possible to a proper place and left in charge of a public officer or an agent of the Company; and in case of serious injury they must see that suitable arrangements are made to care for the injured person before train proceeds.

**864.** Persons, other than employes in the discharge of their duties and holders of properly endorsed transportation, must not be permitted to ride on an engine, or in a baggage, mail, or express car without a written order from the proper officer, except that conductors may permit passengers to enter baggage car to gain access to their checked baggage, to inspect corpse, or to care for pets. Unless entrance and exit are made during station stop, passenger must be accompanied by a member of the crew.

**865.** Unless authorized, passengers must not be carried on freight trains. Upon presentation of proper transportation employes traveling on Company business may be carried between points at which trains stop. Trainmen must caution persons carried on freight trains to remain seated while trains are moving and guard against possibility of injury on or around such trains.

**866.** Freight conductors are responsible for the security of freight while in their charge. Seals and fastenings of cars must be examined and record made of imperfect or missing seals, also of seals that may be applied by them. Doors of empty cars in trains must be closed and fastened. Doors of loaded cars must be closed and sealed properly unless left open for ventilation.

**867.** All freight handled in trains must be covered by waybill. A car must not be taken from a station if it is unsafely loaded.

**868.** When necessary to set out cars which are bad order, wire report must be made to the chief train dispatcher, stating nature of defect, giving initials and number of car, and if loaded, contents, destination, and waybill reference. Cars containing livestock, perishable or manifest, or cars placarded "Inflammable" or "Dangerous" must not be set out without permission of chief train dispatcher.

Prompt notice must be sent to the chief train dispatcher of the completion of repairs to disabled cars.

**869.** When practicable, a trainman must ride rear platform or in rear car of all trains when passing through wooden-lined tunnels and over long open-deck trestles, in position to observe fire that might be set from moving train and to take such action as may be necessary.

**870.** Conductors must see that their cabooses are kept in a clean and tidy condition.

**871.** Firemen are subordinate to engineers. Engineers must assure themselves that their firemen are competent and instruct them if necessary in the performance of their duties. Incompetence and disobedience must be reported.

872. Enginemen must know before starting each trip or day's work that their engine is equipped with prescribed signals, tools, supplies, and flagging equipment in serviceable condition. They must know that they have an ample supply of water, fuel and sand. They must also know that a proper level of water is maintained in the boiler of steam engines at all times to prevent damage.

873. Care must be exercised to prevent water being thrown from smokestack when starting. At places where personal injury or damage may result, blow-off cocks and cylinder cocks must not be opened, injectors permitted to overflow, nor steam blown from train-heat line.

Blow-off cocks must not be open, and boosters and injectors must not be started while an engine is standing on, or passing over a spring switch, power-operated switch, movable part of an interlocking, or at location of rail lubricator. Sanders must not be operated within 150 feet of these installations. Blow-off cocks must not be open while passing over steel or wooden structures.

Steam engines must be fired in such manner as to avoid dense smoke.

874. Enginemen must be alert in all matters pertaining to safety and while running must keep a vigilant lookout, carefully note all signals, observe position of switches and derails affecting their movement, and watch for obstructions and defects in track. They must frequently look back for signals and indications of defects in train, especially while rounding curves and approaching or leaving stations.

Enginemen must make inspection of engines in their charge at each stop where time will permit. They must watch for indication of hot bearings and other defects while engine is in motion and give necessary attention to prevent failures.

In moving into a track to set out or pick up cars, engine must approach with caution to avoid injury to persons or damage to property when coupling is made.



**875.** So far as practicable enginemen must observe all wigwag and other crossing warning devices, and must report from the first available point of communication any that are out of order, stopping for that purpose if necessary.

**877.** When stock is found inside of right-of-way fence, sectionmen must be notified, when practicable, and report made by wire to the chief train dispatcher. Should stock be killed or injured, report on prescribed form must be made.

**878.** Enginemen must use every precaution to avoid setting fires along the line.

**879.** If a train makes an improper stop at a station or elsewhere, and it becomes necessary to move the train, it must not be done without the proper signal being given, nor while passengers are leaving or entering the train.

**880.** Unless otherwise instructed, engineers shall not permit anyone to handle the engine, except the fireman when competent, and then only by consent of the proper authority and in the presence of and under the direction of the engineer; the responsibility remaining with the engineer. Only a fireman who has had the prescribed experience as an engineer may be permitted thus to handle the engine of a passenger train.

The leading engine of a passenger train must be handled by an engineer and fireman who have had the prescribed experience.

**881.** Enginemen must never interfere with the safety valves or allow the boiler pressure of steam engines to be above the limit at which valves are set. Steam pressure must be regulated to avoid the escape of steam from safety valves.

**883.** Engines must not be stored, nor left unattended on tracks that are not protected by derails against entry to main track. When engines are left without an employe in charge, hand brakes must be applied and when blocking or chains are available, wheels must be secured. On diesel engine, reverse lever must be removed from the control stand and cab doors locked when so equipped.

Trains, engines or cars must not be left on main track without protection, nor left on any track blocking movements on adjoining tracks.

Engines coupled to passenger trains must not be left without an employe in charge.

**884.** When possible to avoid it, engines must not be left standing within one hundred feet of a street or highway crossing; nor under any overhead structure; nor in the vicinity of waiting rooms, telegraph or telephone offices; nor near cars occupied by passengers, when the noise or smoke may disturb the occupants.

**885.** Agents and subordinates must acquaint themselves with the business interests of the people with whom they come in contact, use proper means to secure traffic and act with the view of accommodating the public and promoting the best interests of the Company. Agents must notify the Superintendent and heads of departments, of anything affecting their departments either prejudicial thereto, or conducive to their good, present or prospective.

**886.** Notices to the public must be neatly posted in the station. Other advertising matter must not be posted on premises, except when properly authorized, and then only at places designated for the purpose. When train bulletin boards are provided, proper entries must be made thereon.

**887.** Agents must not be absent from their stations, grant leave of absence to their subordinates, or make any change in their forces without permission.

**888.** Frequent inspection of station grounds, platforms, offices and buildings is required, and agents must keep stations clean and orderly.

Agents must see that stockyards are kept in good condition, and that the gates of the pens and chutes are closed and securely fastened when not in use.

Before loading stock, cars must be examined to see that they are in good order. After loading, doors must be closed and all fastenings well secured.

**889.** Agents must promptly report by wire to the Superintendent all cases of attempted robbery, theft of property belonging to or in charge of the Company, damage to property by fire or storm, personal injury and other extraordinary occurrences, at or in the vicinity of stations.

**890.** Waiting rooms and other apartments for the accommodation of passengers must be adequately heated, ventilated and lighted when stations are open for the transaction of business. During the hours of darkness, platforms must be adequately lighted, when practicable. Waiting rooms, ticket offices and baggage rooms must be open such period of time as may be required before and after the departure of trains that are scheduled to stop.

**891.** Order must be preserved in and about stations; disorderly persons, or loungers, and persons engaged in unauthorized occupations must be excluded from stations and station platforms.

**892.** Places where automobiles and other vehicles may stand at stations, and where persons in charge thereof, hotel and other solicitors may remain while engaged in their duties on the Company's premises, will be designated by agents. Bicycle riding and the driving of automobiles or other vehicles on station platform must not be permitted.

**893.** Current timetables must be studied to avoid the sale of tickets to stations where trains do not stop, or for trains which do not carry passengers.

**894.** Prompt attention must be given to correspondence; books and accounts must be promptly and neatly written, in the manner prescribed by the departments to which they relate, and must be submitted to authorized officials for examination as may be required.

**895.** Every effort must be made to obtain cars for shippers at the time desired, but promise must not be given to furnish cars within a specified time, unless authorized. Cars must be ordered from the chief train dispatcher as required, and the commodity, destination, and route when for points off the line, shall be given. When possible, cars of proper capacity must be furnished. Cars must be loaded to capacity when practicable. Cars furnished for loading must be in proper condition for the class of freight to be loaded.



Report should be made to the chief train dispatcher when cars received are unfit for the purpose required. When the demand for cars exceeds the supply, the available cars must be distributed in proportion to the actual requirements of shippers, their ability to promptly load, and with due regard to the sequence of orders. Agents must see that cars are promptly loaded, unloaded and forwarded, and that demurrage and storage rules are enforced.

**896.** Freight must be loaded safely and stowed properly, and, when necessary, fastened securely by brackets, cleats, stakes, chains, or other means, as the nature of the freight may require, to prevent loss or damage by falling, shifting, chafing, breaking or by contact with any contaminating substance. In loading merchandise cars, freight must be stowed in station order.

The loading of lumber, timber, scrap metal, and other freight on open top cars must be in conformity with Rules Governing the Loading of Commodities on Open Top Cars as published by the Association of American Railroads, printed copies of which will be furnished for use of shippers upon application to the Superintendent.

Loading must conform to the prescribed weight and clearance restrictions applicable to the entire route over which shipment is to move.

**897.** Before cars are forwarded, the required cards must be applied as indicated by the special instructions relating thereto, and old cards removed, except the AAR defect or repair cards.

**898.** Effort must be made to have consignees remove from cars and station grounds all accumulation of dunnage, decayed fruit, or vegetables for which they are responsible.

**899.** When the unloading of cars is unreasonably delayed, the circumstances must be reported to the proper official.

Immediately upon arrival of cars containing Company material, the person in whose care the shipment is consigned must be notified; and if satisfactory disposition is not given within twenty-four hours, the attention of the Superintendent must be called to the fact.

**900.** Unless otherwise directed, separate cars must not be used or ordered for partial loads of freight that can be loaded into cars of local freight trains.

**902.** Local freight to be loaded or unloaded at stations must be checked and any irregularities found must be noted on the waybills.

**903.** Less than carload shipments of freight must be marked plainly, showing consignee and destination, and all old marks must be erased.

**904.** Freight which requires shelter must be promptly placed in freight house or in cars.

**905.** Freight houses and closed cars containing freight must be locked, except when agent or other authorized person is in immediate charge thereof.

**906.** Freight, baggage, mail or express matter, trucks or carts, must not be left between tracks, nor within six feet of any track, and must be secured with appliances provided. Handles on four-wheel trucks must be turned under, or secured in raised position.

**907.** Skids, trucks, carts and scales, when not in use, should be placed in baggage room or warehouse. If necessary to leave on platform, they must be arranged at end or rear of station building if possible, and secured so they cannot roll out of position. Tongues of trucks not in use must be fastened in position to prevent accidents.

**908.** Station employes must not handle switches for trainmen, except where, by special instructions, it is made their duty.

**909.** When there are indications of windstorms, cloudbursts, or abnormal weather conditions, agents must take precaution to prevent cars from moving and obstructing the main track.

Agents must inform the Superintendent promptly by wire regarding the severity of storms and extent of damage that may result.

**910.** Agents must know the boundaries of the Company's property at their stations and be familiar with leases thereon.

Unless provided for by lease, the use of Company property for storage purposes must not be permitted without authority from the Superintendent.

**911.** When agents are authorized to act as agents of Express or other Companies, preference must be given to the business of the Railroad Company.

**912.** Agents and operators must not permit unauthorized persons inside their offices. Business with the public or trainmen must be transacted over the counter or through window provided for that purpose.

**913.** Agents and operators must see that their stations are supplied with the necessary signal appliances.

Should anything endanger the safety of trains, proper signals must immediately be displayed.

**914.** The chief train dispatcher has supervision over operators. He must be kept informed of the movements and whereabouts of telegraph and telephone linemen.

**915.** Unless otherwise provided, operators are subordinate to agents and will devote themselves first to the telegraph and telephone service, giving train orders preferred attention. Those who have additional duties must be within hearing of their instruments when possible, and arrange their work so it will not conflict with the proper handling of telegraph and telephone business. They must not absent themselves nor close office without permission from the train dispatcher, except when means of communication fail.

**916.** When trains are passing, unless other duties prevent, operator must be on platform prepared to receive communications from trainmen.

**917.** Contents of telegrams must be held strictly confidential and in no manner made known to any person, except the one addressed. Violations are punishable under state laws.

Telegrams addressed to officers of the Company must be enclosed in envelopes and sealed.



**918.** A copy of all train orders issued must be filed in station records; each month's business must be labeled and tied in a package showing month and year.

**919.** Operators will be held responsible for the prompt delivery of telegrams. When answers are required, they must make every reasonable effort to obtain them. In case the person to whom a telegram is addressed cannot be found, originating office must be notified without delay.

**920.** Office hours at train-order offices are fixed by the Superintendent. Operators at stations where offices are not open continuously, must post notice showing location of their place of residence, so they may be called in an emergency.

# RAILROAD RADIO GENERAL AND OPERATING RULES

## GENERAL

**950.** The following rules and requirements cover use of railroad radio systems and govern employes using such systems:

**950-A.** Definition: A Railroad Communication System is one employing radio for the transmission of intelligence between moving equipment, between moving equipment and a fixed point, or between fixed points.

**950-B.** Radio communication systems are under the jurisdiction of the Federal Communications Commission. The railroad company and its employes are governed by the Commission's operating rules. Violation is a Federal offense for which severe penalties are provided.

**950-C.** Employes required to operate railroad radio transmitting sets at fixed stations must be conversant with Railroad Radio General and Operating Rules and pass examination thereon.

## OPERATING RULES

**951.** All employes, except those specifically authorized to do so, are prohibited from making any adjustments to a railroad radio set. Employes so authorized must carry their FCC operator license or verification card when on duty. If it appears that a radio transmitter is not operating properly its use shall be discontinued and the designated official\* notified as soon as possible.

\*The designated railroad official will be named in notice posted in the cab of engine, in the caboose or in the base station.

**952.** No employe shall knowingly transmit any false distress communication, any unnecessary, irrelevant or unidentified communication, nor utter any obscene, indecent, or profane language via radio.

**953.** No employe shall divulge or publish the existence, contents, purport, effect or meaning of any communication (distress communications excluded) except to the person for whom the communication is intended or to another employe of the railroad whose duties may require knowledge of the communication. The above applies either to communications received direct or to any that may be intercepted.

**954.** Before transmitting, any employe operating a radio transmitting set shall listen a sufficient interval to be sure that the circuit is not already in use, particularly for distress traffic.

**955.** A distress call will be preceded by the word "Emergency" repeated three times. Such calls shall be used only to cover initial reports of derailment, storms, washouts, fires, obstruction to tracks, or other matters which would cause serious delay to traffic, damage to property, injury to employes or the traveling public, and shall contain as complete information thereon as possible. All employes shall give absolute priority to communications from another station in distress, and except in answering or aiding a station in distress shall refrain from sending any communications until there is assurance that no interference will result to the station in distress.



**956.** The railroad company is required to answer an official notice of violation of the terms of the Communications Act of 1934, as amended, within three days from receipt of notice and any employe receiving inquiry concerning any violation shall answer such inquiry within 24 hours after receipt of notice.

**957.** Any employe shall permit inspection of the radio equipment in his charge and all FCC documents pertaining thereto, by a duly accredited representative of the Federal Communications Commission at any reasonable time.

**958.** Employes, except in yard operation, shall identify the radio station from which they are calling by prefacing their call with the railroad name, for example: "SP Caboose Train Second 802 calling SP Engine Second 802, over" and to answer a call, announce, for example: "This is SP Caboose, Train Second 802, over."

**959.** In certain cases at crossings, junctions or paralleling tracks some interference may develop with another railroad. In such cases special care in making identification shall be used and the employes concerned shall cooperate in handling their business by alternating calls and being as brief as possible.

**960.** If any communication from a station other than another railroad radio station interferes with railroad radio service the railroad employe will endeavor to ascertain the identity of such station and report the occurrence as soon as possible through authorized channels to the designated railroad official,\* giving the exact time, nature of the communication and identity of the station, if possible.

Internationally, the word "Mayday" indicates a distress message, the word "Pan", an urgent message and the word "Security", a safety message. Railroad employes may hear such messages sent by aircraft or, in coastal areas, by boats. Railroad employes hearing such messages must report them immediately through authorized channels to the designated railroad official\* in addition to taking such appropriate action to relieve the distress as may be possible.

\*The designated railroad official will be named in notice posted in the cab of engine, in the caboose or in the base station.

RULES GOVERNING OPERATION AND  
TESTS OF AIR AND DYNAMIC  
BRAKES AND AIR SIGNAL  
APPARATUS

FREIGHT AND PASSENGER  
TRAIN OPERATION

Starting and Operating Compressors

1. Employees in charge of steam locomotives must start compressors slowly with drain cocks open to allow condensation to escape gradually and to prevent piston heads from striking cylinder heads. If not equipped with mechanical lubricator, start the hydraulic lubricator and feed the steam end of compressor of two drops per minute for each compressor, more may be necessary depending on character of service. Open throttle to full extent after 30 pounds or more pressure has accumulated in the main reservoir. Compressors must be operated only when necessary, and when shut off, compressors and reservoir drain cocks kept open to drain water.

Governing

Before starting each trip or shift, and at every opportunity thereafter, condensation must be drained from reservoir, moisture and dirt collector. Condensation in the reservoir causes unsatisfactory operation of compressors and air signal apparatus.

Train Handling, Operation and

Tests of Air and Dynamic Brakes

and Air Signal Apparatus

When locomotives are coupled each engineer must know that all brake cylinders are out in and brakes are operative before starting. The test with selective feature control cocks must be in correct position, when so equipped. When locomotives are coupled each engineer must observe pressure indicated by air gages, note if running test is made and if brakes are operative on locomotive in his charge. Air brakes must be operated from the lead locomotive; on all other locomotives the double-heading cock must be closed, rotary valves in correct position, brake valve handles kept in running position and compressor operating. When direction of movement is reversed with light locomotives, automatic brakes must be applied and double-heading cock closed on lead locomotive before reverse movement is started.

# **RULES GOVERNING OPERATION AND TESTS OF AIR AND DYNAMIC BRAKES AND AIR SIGNAL APPARATUS**

## **FREIGHT AND PASSENGER TRAIN OPERATION**

### **Starting and Operating Compressors**

1. Employes in charge of steam locomotives must start compressors slowly with drain cocks open to allow condensation to escape gradually and to prevent piston heads from striking cylinder heads. If not equipped with mechanical lubricator, start the hydrostatic lubricator and feed the steam end of compressor 15 drops of oil, then set lubricator to feed a minimum of two drops per minute for each compressor, more may be necessary depending on character of service. Open throttle to full extent after 30 pounds or more pressure has accumulated in the main reservoir. Compressors must be operated only when necessary, and when shut off, compressor and reservoir drain cocks kept open to drain water from system.

Before starting each trip or shift, and at every opportunity thereafter, condensation must be drained from reservoirs, moisture and dirt collectors. Condensation in the reservoirs causes unsatisfactory operation of control air and brakes; in freezing temperatures it may cause frozen pipes and connections.

### **Enginemen and Hostlers**

2. When taking charge of locomotives they must know that all brake cylinders are cut in and brakes are operative. Immediately after starting, a running test with automatic brake valve must be made. The selective feature control cocks must be in correct position, when so equipped.

When locomotives are coupled each engineer must observe pressures indicated by air gages, note if running test is made and if brakes are operative on locomotive in his charge. Air brakes must be operated from the lead locomotive; on all other locomotives the double-heading cock must be closed, rotair valves in correct position, brake valve handles kept in running position and compressors operating. When direction of movement is reversed with light locomotives, automatic brakes must be applied and double-heading cock closed on lead locomotive before reverse movement is started.



The communicating signal must be known to be operating properly before leaving departure track.

Locomotive brake must be cut in at all times and operated in such a manner as to avoid overheating and loosening of tires or sliding of drivers, and locomotive operated to prevent wheels sliding. When taking charge of locomotive, engineer will direct attention of roundhouse foreman to slipped tires or flat driving wheels developed by inspection, and in the absence of the roundhouse foreman will report such condition in writing before departure. If flat spots or loose tires are discovered after leaving departure track, report must be made from first available point of communication. When wheels are slid flat or tires are loosened en route, engineer must wire Superintendent and Master Mechanic from the first available telegraph office, and make report on prescribed forms on arrival at terminal.

When independent or dynamic brake is used, care must be exercised to avoid harsh slack action.

Independent brake valve handle must not be fastened in release position.

Locomotives in motion must not be reversed while driver brakes are applied.

When air brake system is equipped with safety control feature and train is in motion, the foot valve pedal, or brake valve handle, must not be fastened in position by any means, or safety control feature cut out, except in emergency or as otherwise provided.

On steam locomotives equipped with electro-pneumatic brake, the mountain cock located above the cab deck must have handle in brake cylinder pressure position (parallel with pipe) except when necessary to release driver brake cylinder pressure in electro-pneumatic brake operation. On diesel locomotives so equipped, the lock-out position of the independent brake valve may be used if necessary to release driver brake cylinder pressure when using the electro-pneumatic brake.

Steam locomotives with 8-ET equipment must have controlled emergency and retarded charging cock handle in "P" position at all times except in freight service with 40 or more cars, all locomotives at head end of train must have controlled emergency and retarded charging cock handles in "F" position.

Diesel locomotives must have rotair valve in leading control unit and retarded charging cock in all units in "P" position and rotair valve in trailing control unit in lap position at all times except when in freight service with 40 or more cars, all diesel locomotives at head end must have rotair valve in leading control unit and retarded charging cock in all units in "F" position and rotair valve in trailing control unit in lap position.

When steam or diesel locomotive is standing, either detached or coupled to a train, the independent brake must be fully applied. On diesel locomotives the reverse lever must be moved to off position.

### Standard Pressures

3. Pressure for the air brake system must be kept as near possible to standard as follows:

Standard brake pipe pressure for passenger trains is 110 pounds.

Standard brake pipe pressure for freight and mixed trains is 80 pounds.

Yard locomotives when handling passenger equipment must carry 110 pounds brake pipe pressure.

Should the proper control of a freight train make it necessary, the use of 90 pounds brake pipe pressure is permissible.

### STANDARD AIR BRAKE PRESSURES ON LOCOMOTIVES—POUNDS

	MAIN RESERVOIR				
	High Pressure Governor	Low Pressure Governor	Brake Pipe	Reducing Valve	Safety Valve
<b>Diesel</b>					
Freight.....	140	130	80	40	45
Passenger.....	140	130	110	*30	55
Switching					
General.....	140	130	80	40	45
Passenger.....	140	130	110	40	45
<b>Steam</b>					
Freight.....	140	125	80	45	50
Passenger.....	140	125	110	45	50
Switching					
General.....	140	125	80	45	50
Passenger.....	140	125	110	45	50

(\*On locomotives equipped with 24-RL brake equipment and speed governor control, the reducing valve will be set so brake cylinder gage will indicate 30 pounds when a full independent application has been made on a standing locomotive.)

On diesel locomotives the safety valve in the discharge pipe must be set at 175 pounds and the safety valve connected to the main reservoir at 150 pounds pressure.

With 6-BL, 6-DS, 6-SL and 24-RL equipment the reducing valve is built into the self-lapping unit of the independent brake valve.

### STANDARD PISTON TRAVEL

Steam Locomotives—Driving, Engine and

Trailing Truck Brakes.....	4" to 6"
Tender Brakes.....	5" to 7"
Diesel Locomotives.....	2½" to 5"
Except DF-100 to 112 class.....	4½" to 6"

### Observing Equipment

4. Enginemen and trainmen must inspect air brake equipment in their charge at every opportunity, and correct defects when practicable. Air gages must be frequently observed. Main reservoir pressure must be maintained at least 15 pounds above adjustment of feed valve to insure release of brake and to furnish sufficient air for auxiliary air-using devices.

If any hazard to safe operation develops while running, needed precautions must be taken promptly by the use of signals, conductor's valve or the setting of hand brakes, as circumstances warrant, without awaiting a call from the engineer for assistance.

Before working on the brake rigging of a car coupled in a train, Transportation Department Rule 26 must be complied with, brakes cut out by closing cut-out cock in the branch pipe, all reservoirs drained, and necessary precautions taken to avoid personal injury if car moves due to slack action. When side-vented cut-out cock is closed in brake cylinder pipe, it is unnecessary to drain reservoirs.

### Surprise Stop Only

5. In making a stop with a train where circumstances make it desirable to work power to the stopping point, or when time will not permit the adjusting of slack, apply the automatic brakes in service or emergency, as conditions require, while keeping the locomotive brake released, gradually closing throttle and developing driving brake cylinder pressure as the speed reduces so that the throttle will be closed, the locomotive brake fully applied and sanders open as locomotive comes to a stop.



## Total Application Before Releasing

6. When stop is made with a light application, make an additional reduction of brake pipe pressure totaling 20 pounds before releasing. Do not attempt to start a freight train until the following time has elapsed after initially placing the automatic brake valve handle in release position:

Two minutes	with	train	of	50	to	75	cars.
Three	"	"	"	"	"	75	to 100 "
Four	"	"	"	"	"	100	to 150 "

## Standard Method of Releasing Brakes

7. On freight trains place the automatic brake valve handle in release position until such time as brake system is fully recharged, slowly return it to running position, then wait until brake pipe pressure has settled, and make two short releases, 6 seconds for the first and 3 seconds for the second.

On passenger trains, place the automatic brake valve handle in release position until the brake system is charged to not less than 5 pounds below standard pressure, slowly return it to running position, then wait until the brake pipe pressure has settled, and make a short release by moving the brake valve handle momentarily to release and back to running position. On diesel locomotives equipped with 24-RL equipment this kick-off is not necessary when feed valve side of the selector cock is used.

When the locomotive is equipped with feed valve selector cock, and it is in feed valve position, the automatic brake valve handle may be kept in release position as long as desired in recharging brake pipe without danger of overcharge. In this position, although the brake pipe pressure will not build up above the setting of the feed valve, 30% more air can flow to the brake pipe than is possible with the brake valve handle in running position.

## Tail Hose Test

8. When tail hose is used for back-up movement, the engineer must charge brake system to not less than 5 pounds below standard pressure, make a reduction of 10 pounds, place automatic brake valve handle in lap position and give one sound of locomotive whistle. An additional service reduction must then be made with tail hose cock. When the engineer notes brake pipe pressure falling he will signal with two sounds of the locomotive whistle. When brake pipe pressure hand stops falling, release brakes in accordance with Rule 7. Brake valve handles must be kept in running position, except when brakes are being applied or released or in accordance with the second paragraph of Rule 10.

## Adding Cars to Train

9. When one or more cars are added to a train between terminals, trainmen must see that hand brakes are released before the cars are moved, and when in position in the train the air brakes thereon must be tested to see that they apply and release. If the brake system is depleted, brakes will not operate until sufficient time has elapsed for reservoirs to charge. Due to the volume of AB, LN, UC and D-22 control equipment, a longer time is required to charge the brake system to a point where the brakes will operate.

When cars with LN equipment are placed in freight trains of more than 30 cars, the cut-out cock in the pipe between the supplementary reservoir and the brake cylinder head must be closed and drain cock left open on the supplementary reservoir.

When cars with UC or D-22 equipment are placed in freight trains of more than 30 cars, close the cut-out cock in the branch pipe, drain all reservoirs, set direct and graduated release cap in direct release position, then open cut-out cock and close drain cocks. To set cap in required position, remove cap screws and turn cap until the letters cast on cap and body of flange indicate required position.

## **Emergency Application**

10. When the automatic brake valve handle is placed in emergency position, it must be left there until the train stops.

If the train brakes should become applied other than by the engineer, automatic brake valve handle must immediately be placed in lap position and left there until train stops. If working power, be governed by provisions of Rule 5. When stop is completed, (and PC switch recovered on a diesel locomotive), allow sufficient air to pass through the brake pipe to enable the trainmen to locate the cause. If brake pipe has been ruptured, or the train parted, angle cock must be closed on both sides of defect and sufficient hand brakes set to hold train before attempting to make repairs. Hand brakes must not be released until brake pipe pressure has been restored.

## **Brake Sticking**

11. If brakes on a freight train apply while in motion and they cannot be released manually, train must be stopped and the cause ascertained and corrected.

If brakes on a passenger train apply while in motion, the engineer must make not less than two reductions totaling at least 15 pounds, then release brakes. If brakes cannot be released, train must be stopped and the cause ascertained and corrected.

The following method will be used when necessary to release air brakes manually:

With AB or D-22 equipment, open the release valve partly until the brake begins to release, then close it. If fully open, the emergency reservoir will also be drained, which is not desirable.

With PM equipment, open the drain cock until the brake begins to release, then close it.

With LN equipment, open the drain cock on the auxiliary and supplementary reservoirs, leaving them open until the brake is released.

With UC equipment, open the drain cocks on the auxiliary and emergency reservoirs, leaving them open until the brake is released.

With UC and D-22 control valves, a side-vented cut-out cock which vents brake cylinder pressure when closed is installed in the brake cylinder pipe to each truck, and can be used to cut out brakes in cases of



failure of foundation brake rigging. If necessary to cut out the brake on a car, close the branch pipe cut-out cock (which is combined with the dirt collector) and drain both the auxiliary and the emergency reservoirs, by pulling the duplex release valve handle its full travel and holding until pressure is depleted. If brakes fail to release under above rules, cut-out cock in branch to 21 magnet valves should be opened.

When necessary to release air brakes manually and there is no pressure in the brake pipe, completely drain all reservoirs.

### **Setting Out Cars**

12. Sufficient hand brakes must be set on cars switched out of train, and reservoirs drained with hand brakes set. To drain air from brake system with AB or D-22 equipment, open release valve fully. If hand brakes are inoperative, cars must be otherwise secured. When cars are set out on a grade they must be coupled, if practicable, and in addition to hand brakes being set, wheels must be blocked.

On passenger cars, make a reduction of 10 pounds before setting the hand brakes.

### **Brake Failure**

13. If train cannot be satisfactorily controlled with the air brakes, it must be stopped. If on a grade, it must be secured by hand brakes before beginning an inspection to determine the cause.

In case the trouble cannot be corrected or complete air failure occurs from any cause, train must not be moved unless it can be done with safety and then only to the first available point of communication with chief train dispatcher, where authority must be received before proceeding.

Except when due to compressor failure, the following data must be developed at the next terminal and forwarded to the Superintendent and Master Mechanic:

Number of locomotive and name of engineer.

Initial, number, and tonnage of cars.

Number of operative brakes.

Piston travel of each car.

Brake leverage of each car.

Brake pipe leakage.

Brake cylinder leakage of each car.

Condition of retaining valves.

If automatic brake equipment on lead locomotive fails, on trains being handled by more than one locomotive, train must be stopped, automatic brakes left applied, and control of brakes transferred as follows:

(a) When second locomotive is immediately behind lead locomotive, lead engineer must signal second engineer by two short and one long sounds of locomotive whistle to take control of the brakes, then close double-heading cock. When the second engineer has secured control of the brakes, he must repeat the signal.

(b) When second locomotive is not immediately behind the lead locomotive, sufficient hand brakes must be set to hold the train and an oral understanding must be had between the conductor and engineers before the train is moved. When descending a grade, sufficient hand brakes must be set on head end of train to control slack and insure safety while train is being moved.

Should the compressor on the lead locomotive fail, the train must be stopped, automatic brakes left applied, dead locomotive feature cut in, and control of the brakes transferred to the second locomotive.

Should the main reservoir supply on the lead locomotive fail, the train must be stopped, automatic brakes left applied, steam applied to the power reverse gear on steam locomotives, and the control of the brakes transferred to the second locomotive.

In case of compressor or main reservoir supply failure, the train must not be moved beyond the next point where a locomotive with suitable air equipment can be placed in the lead.

If dynamic brake fails in retainer territory, stop must be made immediately, and after brake pipe pressure has been restored, train may proceed being governed by steam locomotive retainer rule. In the event tonnage per operative retainer exceeds the maximum prescribed for steam locomotive, speed will be reduced to insure safety but will not exceed 15 MPH.

## Double Heading

14. Before an additional locomotive is coupled to the head end of a train, the incoming engineer must apply the train brakes with an application of not less than 15 pounds on passenger train or 20 pounds on freight train, and close double-heading cock. After the additional locomotive is coupled to the train, the lead engineer must release the brakes. This procedure must be followed in reverse order when the lead locomotive is detached. In each instance trainmen must note that the rear brakes have applied and released.

In starting trains with two or more locomotives on the head end, the lead engineer will, if possible, start the train. If unable to start he will signal the other engineers either by the locomotive whistle or by hand to assist in starting. If necessary to take slack, engineers will close throttles, open cylinder cocks and allow the lead locomotive to take the slack.

With one or more helper locomotives back in train, steam helper engineers will first use power in starting. The lead engineer must be prepared to start promptly and carefully before helper locomotives stall.

When starting trains powered in whole, or in part, by diesel locomotives, power must be applied in such manner as will cause train to move promptly. If the train cannot be so started, the lead engineer, unless otherwise provided, should take slack back to lead helper. When taking slack care must be used to avoid damage to equipment.

Helper engineers back in train must not, unless otherwise provided, take the slack without an oral understanding with leading engineer. When double-heading engineers of both locomotives must agree on the procedure to be followed in handling the train at various points en route.

When double-heading on descending grades, engineer on second locomotive must keep throttle in drifting position, allowing only enough steam to prevent vacuum in cylinders, (on diesel locomotives throttle must be kept in throttle position one). The lead engineer will handle the train brakes, the engineer on the second locomotive controlling the driving brake cylinder pressure on that locomotive to avoid tires becoming overheated or wheels sliding. Engineers must allow driving brakes to apply when completing stop, open sanders and close throttle.



## Dummy Couplings

15. Whenever the brake pipe, communicating signal, straight air, or any other air hose on locomotives, cars or cabooses is not coupled to mating hose, it must be coupled to the dummy coupling, when so equipped, to prevent accumulation of dirt in or injury to hose couplings.

## Conductor's Valve

16. Should there be immediate danger to life or property, the valve must be opened suddenly to full extent and left in that position until train stops, then closed.

When imperative that the train be stopped within a reasonable distance, for example, when a hot box is noted and a stop signal cannot be transmitted to the enginemen, the valve must be opened gradually and with care to avoid emergency action until it is known that the brakes are reducing the speed of the train and opening maintained until train stops, then closed.

## Retaining Valves

17. Retaining valves are ordinarily located near the hand brake on freight, baggage, express and mail cars and in the vestibule of passenger cars.

Pressure retaining valves in service retain a predetermined pressure in brake cylinders while triple valves are in release position and auxiliary reservoirs are being recharged. The amount of pressure retained in brake cylinders depends on the type of retaining valve used. This valve performs no function when in cut-out position (handle perpendicular or down) as it then allows brake cylinder pressure to be discharged freely.

The 10 and 15-pound types have two positions of the control handle, viz.: perpendicular or down position when not in use, and horizontal or up position when in use. The 10-20 or 15-30 pound type has three positions of the control handle, viz.: perpendicular or down position when not in use, midway or high pressure position at an angle of 45 degrees when retaining 20 or 30 pounds pressure in the brake cylinder, and horizontal or up position when retaining 10 or 15 pounds. High pressure position must not be used on empty cars.

The four position release control retaining valve requires the same operation as the three position type,

with the exception that in slow direct exhaust position the handle is turned to the position marked "SD" (45° above horizontal).

Placing retaining valve control in any other position is forbidden.

Where retaining valves are used, Superintendent will prescribe the number and points between which they are to be used; additional valves must be turned up if requested by engineer.

### **Grade Braking**

18. When descending grades, particularly when retaining valves are not required, build up brake cylinder pressure by making light brake pipe reductions consistent with grade, speed and weight of train, spacing the reductions so as to have the brake application as heavy as possible without exceeding a full service by the time a release of the brake is necessary or desirable. This method may be used in conjunction with dynamic brakes.

When dynamic brake is not in use, locomotive brake must be allowed to apply with train brakes when drifting with throttle in run one or idle position.

### **Grade Braking (Using Retaining Valves)**

19. The one-application method must be employed while descending grades when using retaining valves. The brake system must be charged to standard pressure before leaving the summit of the grade, and after leaving, one or more brake pipe reductions made and train permitted to attain the desired speed which must not exceed the prescribed maximum speed. After this has been accomplished, brake pipe pressure on the gage must be observed and the brakes released. The brake valve handle must be left in release position until the brake pipe pressure is restored before returning it to running position, followed by two short releases, if time permits. Just before the train begins to gain speed, one reduction must be made, bringing brake pipe pressure to where it was immediately before releasing. After brake valve exhaust closes and train is about to slow down again, release must be made as before. This operation must be continued while descending the grade, the speed being kept sufficiently low to permit restoring the amount of air used on the previous application.

## Safety Appliance Act

21. The Safety Appliance Act requires that on any train operated with power or train brakes, not less than 85 per cent of the cars of such train shall have brakes capable of being operated by the engineer of the locomotive hauling such train. The proportion of air brakes in operation must at no time be less than 85 per cent of all the cars in a train.

## FREIGHT TRAIN OPERATION

### Terminal Test

22. Trains arriving at terminals where facilities are available and special instructions provide for immediate brake test and repairs, must be left with air brakes fully applied.

Condensation must be blown from the pipe from which air is taken before connecting yard air line or locomotive to train.

After train has been made up and yard test plant or locomotive is attached, an inspector will observe gage in caboose or one attached to brake pipe hose at the rear of train and when the brake system has been charged to not less than 5 pounds below standard pressure as indicated by this gage he will signal to apply the brakes. The inspector or engineer must make a reduction of 15 pounds and, as soon as the brake valve exhaust closes, note the brake pipe leakage, which must not exceed 3 pounds in 30 seconds, then increase the reduction to a total of 20 pounds. The amount of leakage must be reported to the inspector.

The inspectors must then determine if the brake is applied on each car, that the piston travel is between 7 and 9 inches and that the brake rigging does not bind or foul. Release signal must then be given and each brake examined to see that it has released.

When train is tested from a yard test plant, the test plant should, if practical, be connected to the head end. Before test plant is detached, a reduction of 20 pounds will be made with valve of test plant. After coupling locomotive to train and opening angle cock, engineer on signal from inspector will recharge brake system, and inspector will note that rear brakes release.



If test is made from the locomotive and one or more helper locomotives are in the train, the brake valve on the lead locomotive must be used.

Defects discovered must be corrected before cars are allowed to leave the yard.

### **Make-up of Trains**

**23.** Before leaving a terminal, or at points where cars are added to the train, trainmen must report to engineers how the train is made up, advising the number of loaded and empty cars in the train and their approximate location. They must also advise the number and location of passenger cars and dead locomotives that may be in the train.

When passenger train cars are handled in freight trains, it must be known that all brakes are released on such cars before proceed signal is given after each stop.

### **Road Test**

**24.** When motive power, engine crew and/or train crew is changed, the outgoing engineer must charge the brake system to not less than 5 pounds below standard pressure, make a reduction of 15 pounds on proper request or signal and as soon as the brake valve exhaust closes, note the brake pipe leakage, which must not exceed 3 pounds in 30 seconds, then increase the reduction to a total of 20 pounds. Trainmen must determine that brake is applied on each car. Cars found with inoperative brakes must be reported on Form S-2809, Defective Equipment. When one or more cars are added to a train at any point subsequent to a terminal test, the cars added, when in the position where they are to be hauled in the train, must be tested as prescribed above.

After test has been made and brakes released, trainmen must note that the brake pipe pressure is restored to at least 60 pounds as indicated by caboose gage before authorizing train to proceed, then observe by running inspection that each brake has released.

## Rear End Test

**25.** At any point, except as provided in Rule 32, after angle cock is closed and locomotive detached or train uncoupled, then recoupled and angle cock opened, rear end test must be made in the following manner:

(a) When visibility permits or other means of communication are available for transmission of signals between the lead locomotive and rear of train, the engineer must place brake valve handle in lap position while couplings are being made and angle cocks opened, after which he must note brake pipe pressure as indicated by gage, and if it has not been reduced at least 20 pounds he must reduce it to that amount and release brakes. While release is being made trainmen must observe caboose gage and must not authorize train to proceed until it is known that the pressure is restored to at least 60 pounds and the rear brakes have released.

(b) When visibility does not permit and other means of communication are not available for transmission of signals between the lead locomotive and rear of train, or at any point that the Superintendent may designate, the engineer must charge the brake system to not less than 10 pounds below standard pressure, make a reduction of 10 pounds, and as soon as the brake valve exhaust closes, signal by one sound of the locomotive whistle. The angle cock at the rear of train must then be opened gradually and with care to avoid emergency action, allowing only enough air to escape to cause the brake pipe gage hand on the locomotive to fall. When the engineer notes the brake pipe pressure falling, he must signal by two sounds of the locomotive whistle and the angle cock must then be closed. When the brake pipe pressure has stopped falling, the engineer must release the brakes.

(c) When coupling or detaching one or more locomotives ahead of road locomotive, or immediately ahead of, or at rear of caboose, or when caboose only is added or detached, the brakes must be applied with not less than a 20-pound reduction before the angle cock is opened or closed. After coupling and opening the angle cock, and while release is being made, trainmen must observe caboose gage and must not authorize train to proceed until it is known that the pressure is restored to at least 60 pounds and rear brakes have released.

## Release after Emergency with AB Valves

26. After an emergency application of the brakes on cars equipped with AB valves, release must not be attempted until after 70 seconds have elapsed with brake valve handle in lap position. There may be a slight blow at the main exhaust port of the emergency portion for a least one minute, but brakes should not be considered defective unless the blow continues longer than two minutes.

## Undesired Emergency Test

27. When an undesired emergency has occurred the second time on any district, the following tests will be made: Charge brake system fully, then make a 6 pound reduction, engineer noting the brake pipe leakage. If no undesired emergency results, trainmen must check brakes starting from each end of train. The brakes on any car, on which the brake cylinder piston has not moved, should be cut out. If cutting out brake on any car does not correct the condition, brake or brakes that have been cut out, must be cut in. Retaining valves must be inoperative when making this test.

If test is made on grade, sufficient hand brakes must be set to hold the train and must not be released until test has been completed and brake pipe pressure restored.

## Service Stop

28. In making a service stop while working power an initial reduction of brake pipe pressure of not more than 6 pounds will be made, keeping the driver brakes released. As speed is reduced and if further reductions are made in brake pipe pressure, driver brakes must be permitted to apply, and if working power, throttle must be gradually reduced to run one or drifting position. If stop is to be made with slack bunched, throttle must be closed and independent brake applied gradually to prevent harsh change in slack, completing stop with light applications of train brakes if necessary. **With either method approximately 40 feet from where train would stop a final service reduction must be started, throttle closed and sanders opened.** Driver brake pressure must be regulated by means of the independent brake valve if necessary.

Short movements with heavy trains should be avoided if possible.



## **Release While Running**

**29.** Where a light application of brakes is made, (not in excess of 8 pounds) it should be increased, consistent with conditions, before attempting to release.

When dynamic brakes and/or retaining valves are used on trains of any length, air brakes may be released at speeds of 8 miles per hour or over if descending grades favor this release. This rule not to govern on level or rolling territory.

When retaining valves or dynamic brakes are not used, no attempt should be made to release brakes unless the slack can be, and is, properly controlled. To control slack action, the following conditions and rules govern:

- (1) Main reservoir pressure must be at maximum.
- (2) Slack in train must be in favorable position.
- (3) Sufficient time must have elapsed since last brake pipe reduction to permit slack adjustment.
- (4) Proper allowance must be made for grade conditions, viz., sags, humps, and curves.

Unless the above conditions are favorable do not attempt to release the brakes, but follow the safe course and bring the train to a stop.

After brakes are released while running, additional power must not be used until the slack has had time to adjust itself, and it must thereafter be gradually increased.

## **Stop with Helper Locomotive Back in Train**

**30.** When a stop is made on level track or ascending grade, lead engineer must gradually move throttle to run one or drifting position at the proper time to allow the slack to move in gently before making a brake application to stop. The engineer of each helper locomotive back in train must continue working power, keeping driver brakes released and gradually closing throttle until stalled. When a stop is made on descending grade or just over summit of a grade, helper engineers must use only enough power to keep slack bunched until train stops.

## **Stop While Backing**

**31.** When stopping a train while backing on level track or descending grade, with one or more locomotives ahead, lead engineer will adjust slack by making light application of locomotive or train brakes, and if necessary light brake pipe reductions will be made to complete stop. When ascending a grade, he will gradually close throttle allowing train to stall, and if necessary make a light brake pipe reduction to complete stop, keeping driver brakes released until stop is completed.

With one or more helper locomotives back in train, lead engineer must prevent locomotive brake from applying, and helper engineers must hold the slack in by use of dynamic or locomotive brakes. If necessary, make light brake pipe reductions but avoid having brake valve exhausting at completion of stop.

## **Standing on Grade**

**32.** When stop is made on a grade for an indefinite period, brakes on all locomotives must be fully applied and sufficient hand brakes set, when necessary, to hold the train, and air brakes on cars released. When on an ascending grade, hand brakes must be set on rear and on a descending grade, set on head end of train.

When stop is for a short period and retaining valves are in use, the air brakes when necessary, may be applied and released once every two minutes to assist locomotive brakes to hold the train.

When one or more helper locomotives are back in train the lead engineer, before his locomotive is detached, must make a brake pipe reduction of 20 pounds, then signal lead helper engineer by two short and one long sound of the locomotive whistle to take control of the brakes. Lead helper engineer must then release the train brakes and repeat the signal. After lead engineer notes the brake pipe pressure is being restored, the locomotive may be detached. When the lead locomotive is again attached, the engineer will signal with one sound of the locomotive whistle. Lead helper engineer must then make a reduction of 20 pounds and close double-heading cock, after which the lead engineer will release the brakes. Trainmen must observe caboose gage and must not authorize train to proceed until it is known that the pressure is restored to at least 60 pounds and the rear brakes have released.

When, from any cause, locomotive whistle signals cannot be distinctly heard, lead helper engineer must orally be instructed to take control of train brakes before the lead locomotive is detached.

### **Tonnage Per Operative Brake**

**33.** The tonnage per operative brake to be handled while descending grades of 1.8 per cent or over will be prescribed by the Superintendent.

### **Retaining Valves**

**34.** At points where necessary to make road or yard retaining valve test, the brake system must be charged to not less than 5 pounds below standard pressure and a 15 pound reduction of brake pipe pressure made. Retaining valve handles must be turned to horizontal position on the number of valves to be used on the run, after which the brakes must be released. After waiting one minute, retaining valve handles must be turned to perpendicular position, and where there is a restricted or no discharge of air at the exhaust port, the cause must be ascertained and corrected. It must be known that the small vent port is open.

Before a train is operated on a descending grade requiring the use of retaining valves, it must be known that a sufficient number of them are placed in service to enable the engineer to control train speed properly.

The required number of retaining valve handles must be turned up solid on the head end of the train before beginning the descent and left in that position until the train has descended the grade, except that retaining valve handles must be turned down on cars developing excessive wheel heat, and an equal number turned up on other cars.

In turning down retaining valve handles to allow trains to start, trainmen must commence at the rear.

When retaining valves are used, unless otherwise provided, the speed for any one mile in the first 5 miles must not exceed 20 miles per hour, after which speed must not exceed 25 miles per hour. This does not constitute authority to exceed specific speed restrictions. The first stop to permit wheel heat radiation and train inspection must not be less than 4 nor more than 10 miles from the point where braking commenced. Trains must remain at such stop at least 10 minutes.



Overheated wheels must be reported on Form S-2809, Defective Equipment, for information of inspectors at the next terminal.

### **Overcharge**

**35.** If the brake system has been overcharged 10 pounds or more, while running, brake valve handle can be placed in a position or feed valve adjusted to maintain such overcharge until correction can be made.

In reducing an overcharge, the automatic brake valve may be used, making the necessary number of reductions to overcome any overcharge.

With AB equipment, for every 10 pounds overcharge two full service brake applications and releases must be made, or auxiliary and emergency reservoirs drained.

## **PASSENGER TRAIN OPERATION**

### **Terminal Test by Car Inspectors**

**36.** Condensation must be blown from the pipe from which air is taken before connecting yard air line or locomotive to train.

Inspectors must see that supplementary reservoirs on all cars with LN equipment are cut in, and that direct and graduated release cap on UC and D-22 control valve equipment is set in graduated release position.

After train has been made up and locomotive or yard test plant is attached, an inspector will attach a gage to brake pipe and communicating signal hose at rear of train and when the brake system has been charged to not less than 5 pounds below standard pressure as indicated by this gage he will signal to apply the brakes. The inspector or engineer must make a reduction of 15 pounds and, as soon as the brake valve exhaust closes, note the brake pipe leakage, which must not exceed  $2\frac{1}{2}$  pounds in 30 seconds, then increase the reduction to a total of 20 pounds. The amount of leakage must be reported to the inspector. Inspectors must then determine if the brake is applied on each car; that the piston travel is between  $2\frac{1}{2}$  and  $4\frac{1}{2}$  inches on cars equipped with D-22 control valves; between 7 and 9 inches on other cars, and that the brake rigging does not bind or foul. Release signal must then be given by four sounds of the communi-

cating signal, (using cord of rear car). When this signal has been properly received, engineer will release the brakes and inspectors will examine each brake to see that it has released. The inspector must report to conductor and engineer the number and type of brake equipment in train.

When train is tested from a yard test plant, it must be connected to the head end. After coupling locomotive on and opening angle cock, and before proceeding, an application and release test must be made from the locomotive. The inspector must note that the rear brakes apply and then signal for a release as prescribed herein, noting that rear brakes release.

If after testing from a yard test plant the train is not kept charged until locomotive is coupled on, a terminal test must be made, with the exception of noting piston travel and whether the brake rigging binds or fouls.

In addition to test of automatic brakes, on trains operating with electro-pneumatic brakes, car inspectors will signal engineer, using communicating signal on rear car, to apply brakes. Engineer will make brake application, developing not less than 60 pounds pressure as indicated on straight air gage, after which car inspectors will determine if brakes have applied on each car in train. Release signal will then be given and car inspectors will observe that brakes are released on all cars. The engineer must observe the action of the electro-pneumatic brake gage.

Defects discovered must be corrected before cars are allowed to leave the yard.

### **Terminal Test By Trainmen**

37. At lay-over points, the outgoing engineer must charge the brake system to not less than 5 pounds below standard pressure, make a reduction of 15 pounds and, as soon as the brake valve exhaust closes, note the brake pipe leakage, which must not exceed  $2\frac{1}{2}$  pounds in 30 seconds, then increase the reduction to a total of 20 pounds. The trainmen must determine if the brake is applied on each car. Release signal must then be given by four sounds of the communicating signal, (using cord of rear car). When this signal has been properly received the engineer will release the brakes and trainmen will see that brake is released on each car.

## Road Test By Trainmen

**38.** At points where motive power, engine crew and/or train crew is changed or where continuity of brake pipe has been disturbed, rear end air test must be made before proceeding, as follows:

NOTE—Rear end test will not be made when coupling or detaching one or more helper locomotives ahead of road locomotive.

After the brake pipe has been charged to standard pressure, the outgoing engineer will apply the brakes with a 10 pound reduction, then signal by one sound of the locomotive whistle. The angle cock on the rear of the train will then be opened gently, allowing only enough air to escape to cause brake pipe gage hand in cab to fall without making an emergency application, then closed. When the engineer notes the brake pipe gage hand falling he will signal the trainman by two sounds of the locomotive whistle. The trainman will immediately give four sounds with the communicating signal (using cord on rear car). When this signal has been properly received, engineer will release the brakes. Trainman will see that brakes apply and release on rear car.

On trains equipped with electro-pneumatic brakes, application and release test is to be made from locomotive. Trainmen will note that rear brakes apply, then signal for release, noting that rear brakes release.

This test to be followed by running test.

### Running Test

**39.** As soon as speed permits, after motive power and/or engine crew has been changed, helper locomotive added or detached, or an angle cock closed, except for detaching cars from rear, train brakes must be applied with sufficient force to determine whether they operate properly. Automatic brake only will be used for this purpose unless otherwise provided. Power must not be shut off unless conditions require. This test will also be made not more than 3 miles before reaching railroad crossings at grade outside block system limits or descending grades of 1.8 per cent or over, and at such other points as may be designated by the Superintendent.

During test, a trainman must station himself near the retaining valve of the last car so equipped, and if air escapes from it while brakes are being released, must signal the engineer to increase speed. In case retaining valves are not accessible, trainman will



ascertain that brakes apply and release on rear car before giving a proceed signal. Communicating signal should be used when possible, in which case one long sound must be given. If air does not escape or engineer does not receive the required signal, train must be stopped and rear end test made.

### **Communicating Signal**

40. Communicating signal must be tested by use of cord on rear car before leaving a terminal, lay-over point, or when the cut-out cock in the signal pipe has been closed.

To use the communicating signal, pull cord one second for each intended sound of the whistle and allow at least five seconds between each operation.

When one or more cars have been added to or detached from rear of train, trainmen must know before starting that discharge valve on the rear car is cut in.

When double-heading, the locomotive coupled next to the train must supply air for the communicating signal system; other locomotives must have communicating signal supply valve closed.

### **Reduction of Speed**

41. When it is desired to make a reduction of speed with a passenger train of 25 cars or less, apply the brakes with an initial reduction of 6 pounds. This should be followed by an additional reduction, or reductions as needed. When the speed has been reduced sufficiently, the brakes should be released.

### **Service Stop**

42. Service stop with 16 cars or less with 75% or more graduated release equipment.

The brakes should be applied by making an initial reduction of 6 to 8 pounds. After the slack has become adjusted, an additional brake pipe reduction of sufficient amount should be made to stop short of objective; if held fully applied. When speed has been reduced sufficiently start a graduated release of the brake cylinder pressure by moving the brake valve handle to release, then back to lap position when handling trains of 10 cars or more, or running position then back to lap with less than 10 cars. This procedure should be continued, completing the stop holding light brake cylinder pressure applied, throttle closed. Necessity for making further brake pipe reductions to complete the stop should be avoided.

## **Two-Application Stop**

**42-A.** When a station or other ordinary stop with a passenger train (25 cars or less) is made, except as provided by Rule 42, an initial brake pipe reduction of approximately 6 pounds should be made, closing locomotive throttle to run one or drifting position, then make additional brake pipe reductions. When speed has been reduced sufficiently so train brakes can be fully released and brake system recharged, close throttle, maintain 10 or 15 pounds driving brake cylinder pressure, place automatic brake handle in release position (for an example 6 seconds for 15 cars, 10 seconds for 20 cars or more) and recharge the system, then return the brake valve handle to running position. Complete the stop with moderate brake pipe reductions, totaling not more than 8 or 10 pounds, allowing locomotive brakes to apply with train brakes, and hold all brakes applied until train stops.

For spot stops, as for fuel or water, proceed as outlined in the first sentence of this rule. When the speed has been reduced to approximately 10 miles per hour, close the locomotive throttle, place the automatic brake valve handle in release position and recharge the brake system. Return the automatic brake valve handle to running position, retaining not to exceed 10 pounds of driver brake cylinder pressure. Complete the stop with the independent brake valve, using the required locomotive brake cylinder pressure and avoiding slack action due to rapid increase or decrease of locomotive brake cylinder pressure.

On ascending grades the train may be pulled to a stop without the use of brakes.

Passenger trains of more than 25 cars must be handled under freight train rules.

## **Stop With Electro-Pneumatic Brake**

**42-B.** When a stop is made with electro-pneumatic brake, a full service application of the automatic brake must be made before locomotive or cars are detached.

## **Stopping on Grades**

**42-C.** Passenger trains must be stopped on grade in such manner as to prevent slack from running in or out when train brakes are released.

## Overcharge

43. If the brake system becomes overcharged while running, the automatic brake valve handle must be placed in such position as to maintain the overcharge until correction is made.

When necessary to change to a lower brake pipe pressure, it must be reduced to 60 pounds with automatic brake valve and the supplementary reservoir on LN and emergency reservoir on UC and D-22 equipments drained. Drain cock must be left open for approximately 10 seconds, then brakes released. This must be done with the train standing, and the brakes examined to see that they all release.

## Defects in Air Brake Equipment

44. When defects in the air brake equipment develop between repair points and cannot be corrected without serious delay, cut out the brake and report on Form S-2809.

When necessary to cut out the air brake on rear car, a trainman must station himself on such car and know that the hand brake is operative. The car must be switched ahead of other cars with operative air brakes at the first available point.

Should the brake pipe on the tender or any car in a train break, the communicating signal pipe may be used as a brake pipe by coupling the brake pipe hose, on cars ahead of and behind the break, to the communicating signal pipe hose, and draining reservoirs on cars with the broken pipe. Communicating signal on these cars and others to the rear will be inoperative. When necessary to cut out a brake, the engineer must be advised.

## Undesired Emergency Test

45. When making this test, the following method will be used. Charge brake system fully and then make a 6 pound reduction. If undesired emergency does not occur, trainmen should check brakes, starting from head end. The brake on any car, **except the last car**, on which the brake cylinder piston has not moved, should be cut out and reported at the first terminal where repairs can be effected.

## Retaining Valves

46. When turning valve handles down while running, start from the rear and work forward.



## Failure of Electro-Pneumatic Brake

47. The electro-pneumatic brake is applied and released simultaneously throughout the train by means of an electric circuit as contrasted with the automatic brake which is dependent upon changes in brake pipe pressure for operation. Failure of the electric circuit does not cause the brake to apply and ordinarily this failure would not be detected until an attempt was made to use the electro-pneumatic brake.

In case electro-pneumatic brake fails to release, electro-pneumatic brake switch must be placed in OFF position and automatic brake used as above.

In case of failure of electro-pneumatic brake on steam locomotives, use automatic brake valve. Emergency brake application is available at any time with either electro-pneumatic or automatic brake valve.

In case of failure of electro-pneumatic brake on diesel passenger locomotives, the following shall govern:

First, place brake valve handle in running position.

Second, change shifter lever from straight air (SA) to automatic (AU) position. This provides automatic brake application in the normal manner.

In event of insufficient time to make this change:

First, take foot off of safety control.

Second, make certain that brake valve handle is not in the depressed position.

This will initiate a full service application of the brakes after 5 seconds.

Emergency brake application is available at any time with either electro-pneumatic or automatic brake valve operation, or by opening the conductor's valve in cab.

To detect electro-pneumatic brake failure, diesel passenger locomotives are equipped with circuit checking equipment. When the electro-pneumatic brake equipment is intact it will show a white light; in case of failure a red light will be displayed. When this red indication develops, the shifter lever should be changed at once to automatic (AU) position, and train handled with automatic brake until electro-pneumatic brake failure has been corrected.

With the circuit checker operating, if an electro-pneumatic brake application is attempted and a red indication appears either before or during the attempt, a full service automatic brake application will occur.

Under these circumstances and in order to release this application, procedure should be as follows:

First, return brake valve to running position.

Second, move the shifter lever to automatic (AU) position.

Third, place the automatic brake valve in lap position to recover the PC switch.

Fourth, after switch is recovered, place brake valve in normal position.

Train will then be handled with the automatic brake.

In order to extinguish the circuit checker red light after electro-pneumatic brake failure, move switch on the circuit panel to the "Off" position.

Engineers departing initial terminal will set up the the circuit checker in accordance with instructions on the circuit panel.

**48.** When necessary to change operating ends on diesel locomotives, the following will govern:

- (a) Make full service reduction with automatic brake valve.
- (b) Move independent brake valve handle to release position and observe that brakes remain applied.
- (c) Close brake pipe cut out cock.
- (d) Place rotair valve in correct position.
- (d) Move automatic brake valve handle to running position and remove both brake valve handles.
- (f) Place reverse lever on "Off" position and remove.
- (g) Place control switches in "Open" position and when provided lock in "Off" position.
- (h) Proceed to opposite end. Check PC switch and reset if necessary. Close control and fuel pump switches and such other switches as may be necessary.
- (i) Insert reverse lever, automatic and independent brake valve handles and move independent brake valve handle to "Full" application position and rotair valve to correct operating position.
- (j) Open brake pipe cut out cock slowly pausing from 5 to 10 seconds in midway position; then make a full service reduction.

- (k) When ready to move locomotive, depress safety control foot pedal or automatic brake valve handle and release in normal manner.

NOTE—1. On Alco diesel locomotives fuel pump switch on non-operating end must remain closed until fuel pump switch on operating end has been closed.

2. When changing ends on locomotives equipped with automatic train stop, release valve must be placed in proper position.

**49.** The dynamic brake must be used whenever practicable in reducing and controlling train speed, and with its use care must be exercised to prevent harsh slack action.

In using dynamic brake, ten seconds should elapse after throttle is placed in idle position before making any move to initiate dynamic braking. When speed of train and dynamic braking characteristics of diesel units comprising the locomotive are such that harsh slack action would result from dynamic braking, it is permissible to use the independent brake in lieu of the dynamic brake to gather the slack gently. Automatic service brake applications while the dynamic brake controlling lever is in the "Off" position should be avoided.

The independent brake must not be used when using the dynamic brake. When conditions necessitate change-over from dynamic brake to independent air brake or vice versa, such change-over must be accomplished without undesired train slack action and without excessive braking force that would cause wheels to slide.

The results of placing the dynamic brake controlling lever in the braking range will be indicated by movement of the loadmeter pointer. Failure of the pointer to respond is an indication of circuit trouble, in which case the dynamic brake controlling lever should be moved to a motoring position, and the throttle opened to the first notch momentarily before again attempting to use the dynamic brake. The dynamic brake controlling lever must not be moved farther into the braking range when circuit trouble is indicated.

Automatic service brake applications will not apply the air brake on the locomotive when the dynamic brake controlling lever is in the braking range. A brake-valve-initiated emergency brake application, an Automatic Train Stop brake application, and on Alco passenger locomotives, a safety control brake application, will nullify the dynamic brake and allow the air brake to apply on the locomotive.

Dynamic brake effort increases in proportion to the loadmeter indication up to the point of maximum allowable current and then decreases as locomotive speed increases. Care must be exercised to prevent excessive current through dynamic brake grids as indicated on the loadmeter and/or by the lighting of the brake warning light and/or the lighting of the wheel slip light when using dynamic brake. Regardless of the locomotive consist, these warning lights must not be permitted to stay lighted when using dynamic brake.



## GENERAL REGULATIONS

### Train Handling

59. To control train properly, the brake system must be fully recharged when releasing after each brake application. Speed must be controlled to allow sufficient time for recharging.

60. Smooth train handling depends on the ability to control slack and an understanding of how to prevent it from running in or out harshly. Severe slack action can be prevented by exercising care in the use of power, dynamic brakes, train and locomotive brakes, and sand. The heavier the locomotive and the longer the train, the greater the care that is required. Rough handling or break-in-two can only occur as the result of a harsh change in slack. The severity of the shock depends on the difference in speed of portions of train that must be made uniform instantly, which change must be controlled by engineer.

61. Excess pressure is the amount of air pressure in pounds per square inch in the main reservoir over that in the brake pipe and auxiliary reservoirs, and is required to charge the brake system and release brakes. It is indicated by the difference between the brake pipe hand and the main reservoir hand on the air gage.

62. When releasing the brakes or charging the system, the brake valve handle must be in release position and left in that position until brake pipe pressure will remain within 5 pounds of pressure carried when brake valve handle is returned to running position. This method of recharging may result in a reapplication of the brakes which must be released by waiting a sufficient length of time before making the required short releases. If releasing the brakes is the only object the brake valve handle must be left in release position not to exceed 25 seconds, except when using feed valve side of selector cock on 24-RL equipment there is no limit on time release position can be used, as there is no possibility of overcharging and 30% more air can flow to the brake pipe in this position than in running position.

63. When the make-up of trains or grade conditions are such that they have a tendency to bunch the slack, slack should be gathered easily and brakes operated with slack bunched. When such tendency is to stretch the slack, train should be operated with

slack stretched. A number of factors determine at how low a speed brakes can be released without likelihood of damage; these factors include: how heavily brakes are applied, the time interval since last brake pipe reduction, the amount of main reservoir pressure, the length of train, whether slack is in or out, and on whether track conditions (sags, humps, and curves) favor releasing. Engineer must exercise good judgment in this, but if in doubt, bring train to a stop.

**64.** Most of the break-in-twos occur while starting or stopping; therefore, engineers should apply their knowledge and skill of train handling at those times. In a service stop with a freight train using automatic and/or dynamic brake when making the final reduction, engineers must assure themselves that such reduction is not made too soon or too late; either action will defeat the purpose. The object of this rule is to apply the brakes heavier on the head end of train, and at a time when the reduction will not have a chance to reach the rear before the train has stopped. Locomotive brakes must be kept applied until stop is completed.

**65.** To obtain the shortest service stop, good practice dictates but one application divided into several reductions, allowing 7 to 10 seconds between reductions, all of which are to be made in normal service position of the brake valve. The first reduction should be an amount that will apply the brakes only to a degree that will prevent harsh slack action. Following the first light reduction, time should be allowed for the slack to become adjusted, after which further reductions can be made. These reductions should not be of sufficient amount to stop at the objective point. A final reduction to complete the stop must be made.

The amount of initial reduction should be approximately 6 pounds, but should suit speed and grade. The objective is to have all slack action take place at low brake cylinder pressure to insure gradual adjustment.

**66.** Some of the fundamentals relating to braking are summed up as follows:

- (a) On level track the entire braking power is available for stopping.

- (b) On descending grade a certain portion of the braking power is required to prevent an increase in speed. The braking power available for stopping is that which is in excess of what is necessary to prevent an increase in speed.
- (c) The braking power obtained from brake shoe pressure increases as the speed reduces.
- (d) Brake cylinder leakage increases the distance required for a stop.

**67.** The ability to obtain the maximum braking power possible is dependent on the brake system being charged to standard pressure, and the proper use of same. Steam compressors must be operated with throttle fully opened.

The locomotive brake operated automatically with the train brakes when a short stop is desired adds greatly to the braking power of the train, and the brakes can be applied alike to all wheels for ordinary stops; in emergency the greatest possible braking power is at once obtained by one movement of the brake valve handle.

**68.** Although a standing brake test with knowledge of tons per operative brake and number of cars is necessary before starting, the ability to control or stop a train must be confirmed by the first running application after passing the summit. Speed should be kept low until this is determined. Where conditions are not favorable, speed should be reduced or, if necessary, train stopped.

Following is summary of important features in the foregoing:

- (a) The relation between the number of operative brakes and tonnage, with number of cars in the train, should be known before beginning the descent.
- (b) The indicated ability to control train should be tested by the first running application and the average speed down the grade should be determined by the result of this test.
- (c) The speed should be held as near the average as practicable.
- (d) Brake system should be kept as near the standard pressure as possible, recharging whenever the grade, curvature, and main reservoir pressure offer an opportunity.



**69.** Slipping of drivers must be avoided through proper use of throttle, reverse lever and sand. It seriously damages rails and causes rapid wear of driving wheels. It is wasteful of fuel and water. Harmful stresses are set up throughout the machinery which could cause failure of those parts. Rough handling also results from slipping of drivers.

Engineer will be held responsible for unnecessary slipping of drivers.

Engineer must know that the sanders are operating properly when he takes charge of a locomotive and must inspect the sanders at every opportunity while the locomotive is in his charge.

When stopping (unless instructions prohibit), sand must be used for the last two car lengths at least, regardless of the condition of the rail. In emergency application of brakes, sand should be started as soon as possible. Sand once started should be continued until the train stops.

When starting, sand should be used until sufficient speed is attained so that slipping will not occur.

When slipping occurs, do not apply sand until throttle has been reduced and the drivers have stopped spinning.

Any defects in sanders, piping, or any other condition which prevents the proper operation of sanders should be reported promptly on prescribed form.

## **DESCRIPTION OF AIR BRAKE EQUIPMENT**

### **8-ET Equipment**

**80.** The following features incorporated in the 8-ET and 24-RL equipment are not in the 6-ET equipment:

(a) **First Service.** A cut-out cock with horizontally operated handle is built into the brake valve housing for cutting this feature in or out. Suitable markings on the housing underneath the handle indicate whether this feature is cut in or out.

(b) **Synchronization of Locomotive with Train Brakes, Both in Service and Emergency.** In service this feature automatically provides for the uniform application of locomotive and train brakes on both a time and pressure basis. Initial locomotive brake cylinder pressure development is delayed to coincide with that on the cars, after which both train and locomotive brake cylinder pressures build up uniformly.

(c) **Emergency Applications.** Are adjustable to provide slack control according to the service. This feature provides a rapid development of locomotive brake cylinder pressure for passenger and short freight trains; or a controlled build-up for long freight trains. A cut-out cock located in the vertical support of the independent brake valve cuts the above feature in or out according to its handle location over suitable markings: "P" for passenger trains, short freight trains, and light locomotives; "F" for freight trains or more than 40 cars. The rotair valve on diesel locomotives with 24-RL equipment serves the same purpose.

(d) **Pressure Chamber Retarded Charging Feature.** Makes provision to guard against pressure chamber overcharge during release. This feature is adjustable to the service and may be cut out on short trains where overcharge is not probable and where fast recharge is desirable.

This feature is controlled by a small cut-out cock located on the control or distributing valve. With the cock handle over the letter "F" (freight) the slow pressure chamber recharge rate is effective. With the handle over the letter "P" (passenger) the rapid recharge rate is effective. When two or more light locomotives are coupled descending a grade, the handle on this cock must be placed over the letter "P" on all locomotives.

(e) **An Automatic Emergency Application.** Is available at all times from a helper locomotive having No. 8-ET or 24-RL equipment without opening the double-heading cock, whenever the automatic brake valve handle is moved to emergency position.

## M-36-B and DE-24 Brake Valve for Electro-Pneumatic Equipment

81. The M-36-B brake valve is used only on some steam locomotives and is operated independently of the automatic brake valve. The DE-24 type brake valve on diesel locomotives is combined with the automatic brake valve operating air brakes electrically or automatically by a shifter lever which is placed in (SA) position for electro-pneumatic brake operation and (AU) position for automatic brake operation. In electro-pneumatic brake operation, both the M-36-B and DE-24 brake valves develop pressure from 0 to 75 pounds and are self-lapping. Emergency brake application is available at all times with either of these brake valves when placed in emergency position. The M-36-B brake valve when not in use will be secured in an inoperative position.

82. To recover PC switch after safety control application:

- (a) Place automatic brake valve in lap position.
- (b) Close throttle to idle.
- (c) Place foot on safety control foot pedal.
- (d) Wait until PC switch light goes out or application pipe gage hand builds up to main reservoir pressure (if PC switch will not reset with brake valve handle in lap after an emergency application of the brakes, place brake valve handle in release position).
- (e) Reset train control, if used.
- (f) Check PC switch.
- (g) Release brakes.

## Steam Air Compressors

90. If compressor stops, it should be ascertained that lubricator is feeding oil to steam end; second, shut off compressor steam throttle, tap the compressor head lightly, then turn steam on quickly.

(a) If compressor then fails to start, open drain cock in steam passage to ascertain if governor or throttle allows steam to reach the compressor.

(b) If the drain cock test indicates the trouble to be in the compressor, remove the plug in the lower air cylinder head and examine the piston and rod for failures.

(c) If compressor pounds badly, remove air inlet strainers as they may be partially clogged.



(d) The boiler pressure must be not less than 40 pounds higher than main reservoir pressure for compressor to operate properly. If it runs slowly and does not start promptly after the governor has stopped it, the cause is generally a sluggish governor. Some of the other causes are: lack of lubrication; compressor throttle not open enough to permit a sufficient flow of steam; or discharge valves leaking.

(e) If necessary to cut out a defective one, close the throttle valve in branch steam pipe and open drain cocks on the defective compressor. Both compressors should be operated on locomotives so equipped.

### **Air Compressor Governors**

Main reservoir pressure is controlled by a governor top connected to the brake valve and identified as the low pressure top when brake valve handle is in release, running or holding position with H-6, and release or running with G-6 and H-8. The pressure is controlled by a governor top connected direct to the main reservoir identified as the high pressure top when brake valve handle is in lap, service, or emergency position.

To adjust low pressure top, the brake valve handle must be placed in running position.

To adjust the high pressure top, the brake valve handle must be placed in lap position.

When the governor does not allow the compressor to run and air is escaping at the vent port, the diaphragm or pin valve leaks. If air is not escaping, the piston is stuck in closed position.

When the governor stops the compressor at the proper pressure but does not start it promptly when the pressure is reduced, the vent port is stopped up. If the vent port is open and a considerable variation of pressure is required to stop and start the compressor, the diaphragm is buckled, or the pin valve is leaking. To remedy, cut out the low pressure governor; if compressor does not start, cut out the high pressure governor and throttle the compressor.

## Diesel Air Compressors

92. Diesel air compressors are connected directly to the diesel engine and compressor speed will correspond with engine speed. Oil level in compressor crank case can be checked with bayonet gage when compressor is stopped. When necessary to provide more air than is available with engine at idle, open generator field switch, place reverse lever in "Off" position and open throttle not to exceed 4th notch.

If difficulty develops in compressor that will permit the compressor to run without pumping air, open the unloader valve; if the compressor cannot be operated without damage, it will be necessary to stop the diesel engine.

## Brake Valves and Feed Valves

93. The brake pipe pressure is supplied from the main reservoir through the automatic brake valve and is controlled by a feed valve.

The feed valve can be adjusted to carry any desired brake pipe pressure.

To adjust feed valves, the brake valve handle must be placed in running position.

94. The function of release position is to release brakes, charge the brake system quickly and hold the locomotive brake applied while the train brakes are being released, except that the G-6 does not hold locomotive brake applied.

95. The function of running position is to supply the brake pipe through the feed valve and release the locomotive brake.

96. The function of holding position is to supply the brake pipe through the feed valve and hold the locomotive brake applied.

97. The function of lap position is to close all ports leading to the brake pipe.

98. The function of service position is to make service reductions in brake pipe pressure.

99. The function of emergency position is to make emergency reductions in brake pipe pressure.

100. A brake application is the total amount the brakes are applied, and may consist of one or more reductions.

## Safety Valves

**101.** It is desirable to keep the braking power of a locomotive below the standard when there is no water in the boiler, as on a dead locomotive. This is done by adjusting the safety valve to the maximum brake cylinder pressure desired, which is 25 to 30 pounds.

## Pipe Connections

**102.** The pipe connections to the double chamber reservoir of the distributing valve can be identified by letters and figures on the reservoir near the pipe connections.

These connections are marked on the 6-ET equipment as follows:

Branch from brake pipe is BP.

Brake cylinder pipe is CYLS or BC.

Main reservoir supply pipe is MR.

Release pipe is 4.

Application cylinder pipe is 2.

There are three  $\frac{3}{4}$ -inch pipe connections, namely, a branch from the brake pipe, a brake cylinder pipe and a supply pipe from the main reservoir.

There are two  $\frac{1}{2}$ -inch copper pipe connections, namely, a release pipe and an application cylinder pipe.

**103.** Connections are marked on 8-ET equipment as follows:

Branch brake pipe is 1.

Release pipe is 6.

Main reservoir supply pipe is 7.

Brake cylinder pipe is 9.

Application cylinder pipe is 12.

Controlled emergency pipe is 17.

There are two one-inch pipe connections, a brake cylinder pipe and a supply pipe from the main reservoir; one  $\frac{3}{4}$ -inch pipe connection, a branch from the brake pipe; and three  $\frac{1}{2}$ -inch copper pipe connections as follows: a release pipe, an application cylinder pipe, and a controlled emergency pipe.



## BROKEN PIPES

### 8-ET EQUIPMENT

#### Brake Pipe

**104.** If the brake pipe branch to the distributing valve breaks off, close the cut-out cock. The automatic brake on the locomotive will be inoperative. Use the independent brake instead.

If the brake pipe breaks off under the automatic brake valve and cannot be repaired, block the broken pipe and use the independent brake valve to operate the train brakes by cutting out the locomotive brake and crossing the brake cylinder hose between the locomotive and tender with the brake pipe hose. Then adjust the independent reducing valve to 80 pounds on a freight train and 110 pounds on a passenger train, and set the safety valve on distributing valve to correspond. Then manipulate the brakes with independent brake valve by placing handle in application position to release and charge the brakes and in release position to apply brakes. In this case locomotive brake would be inoperative.

#### Brake Cylinder Pipe Failure

**105.** Locomotive brake cylinders are grouped together under control of a vent cut-out cock for each group. In event of pipe failure, cylinders involved may be cut out by use of proper cut-out cock. This is to be located by tracing the brake cylinder pipe.

#### Broken Main Reservoir Pipe

**106.** If main reservoir pipe breaks between the reservoir and the branch pipe to the distributing valve, or between the brake valve and the branch pipe leading to the distributing valve, in such a way that it cannot be repaired, the locomotive brake cannot be applied by either brake valve.

If the branch pipe from the main reservoir pipe to the distributing valve, breaks between the main reservoir pipe and the cut-out cock, plug the main reservoir side of the break and close the branch pipe cut-out cock (on dirt collector). The locomotive brakes are then inoperative. The train brake can be operated in the usual manner. This procedure should be followed in event of a feed valve sticking open or failure to properly control brake pipe pressure.

### **Main Reservoir Pressure Falling Rapidly**

107. A broken brake cylinder pipe or blown out brake cylinder gasket will cause main reservoir pressure to fall rapidly when an application of brakes is made.

Temporary repairs can be made if locomotive brake is required by use of two communicating signal hoses. If no extra hose is available, cut out the tender brake and use the two hoses between locomotive and tender.

### **Broken Feed Valve Pipe**

108. If feed valve pipe breaks, block the broken pipe at the break, back off the adjusting handle on feed valve, and set low pressure top of governor to stop compressor at 80 pounds on a freight train, and at 110 pounds on a passenger train; then charge the train and carry the automatic brake valve handle in release position.

### **Broken Release Pipe**

109. If release pipe breaks between automatic and independent brake valves, proceed. The holding feature of the automatic brake valves will be inoperative, and operation of independent brake valve will not be interfered with, except that a broken independent release pipe destroys the quick release function of the independent brake valve and ability to make an independent release following an automatic application.

### **Leaking or Broken Application Cylinder Pipes**

110. If application cylinder pipe leaks, it is not necessary to stop. While automatic brake application on locomotive will leak off, pressure can be maintained by using independent brake valve.

If application cylinder pipe breaks off, block opening from the distributing valve. Brake cannot be operated with the independent brake valve but it must be carried in running position. The pressure maintaining feature of the automatic brake is lost.

### **Equalizing Reservoir Pressure Falling**

111. With automatic brake valve on lap, if equalizing reservoir hand of air gage continues to fall and service exhaust continues to blow, there is a broken equalizing reservoir or gage pipe, or other leak from equalizing reservoir pressure.

To handle train in the above event, block the broken pipe. Before making application of brakes, close double-heading cock, place brake valve handle in service position and open double-heading cock until required reduction is made, then close slowly. To release brakes, place brake valve handle in release, open double-heading cock, then return handle to running position.

## **24-RL EQUIPMENT**

### **AUTOMATIC BRAKE VALVE**

(Note: Pipes are identified by number on control valve)

#### **Equalizing Reservoir Pipe 5**

**112.** (a) Close pipe to brake valve by plug or short close bend.

(b) Close brake pipe Exhaust ( $\frac{1}{2}$ " pipe opening on rear of rotary valve seat) using  $\frac{1}{2}$ " pipe plug or well fitted hardwood plug.

(c) To apply the brake move the brake valve handle into the emergency position zone, gradually opening the pilot emergency valve only. Functions of the service position are lost.

#### **Application Pipe 10**

**113.** (a) When service application portion is used close the safety control cut-out cock on front of the brake valve. This cuts out the safety control and overspeed operation.

(b) When emergency application portion is used, close the cut-out cock if available or close the pipe by plugging or close bend. The function of the emergency portion is lost.

#### **Brake Pipe 1**

**114.** Must be repaired or locomotive and train automatic brakes are inoperative. The locomotive independent brake is operative but the automatic brake valve handle should be placed in lap position.

#### **Control Pipe 11**

**115.** Cut out the electro-pneumatic brake and proceed using the automatic brake.



### **Safety Control Pipe 3**

117. If broken between the brake valve and the foot valve, proceed with safety control using diaphragm foot valve only. If between foot valve and relay air valve unit close the cut-out cock on the service or emergency application portion or make a close tight bend to stop the leak from application portion. All functions of the application portion are lost.

### **Suppression Reservoir Pipe 23**

119. Stop leak on brake valve side of the break, by plugging or close tight bend. Proceed, functions are the same as with Rotair valve in PASS.

### **Reduction Limiting Reservoir Pipe 24**

120. Close first service cut-out cock and proceed using service position for automatic brake operation.

### **Power Cut-off Pipe 25**

121. Power cut-off for any application portion operation is lost. Stop leak from the brake valve.

### **Main Reservoir Pipe 30**

122. Must be repaired to have an automatic brake. If the independent brake valve is not mounted on the automatic brake valve pedestal, the independent brake valve can be used if the main reservoir loss of air is cut off.

### **Second Reduction Reservoir Pipe 18**

124. Proceed without any repairs. Safety and overspeed brake pipe reductions are unlimited.

### **Suppression Reservoir Pipe 19**

125. Repair leak on brake valve side by close tight bend on the pipe. Proceed with the loss of permanent suppression feature.

### **Suppression Pipes 26 and 17**

126. Repair leak on brake valve side by close tight bend in the pipes. Proceed with the loss of partial suppression.

### **Broken Gage Pipes**

127. Repair the leak with close tight bend and proceed without the use of gage.

## INDEPENDENT BRAKE VALVE AND ROTAIR VALVE

### Main Reservoir Pipe 30

128. If broken at any point repair must be made to have the use of the independent brake valve. If the break occurs in the branch leading to the independent brake valve, stop the loss of main reservoir air, and the controlled emergency feature is still available. The automatic brake is not affected.

### Actuating Pipe 13

129. Proceed without any repairs with the loss of the independent quick release feature. The brake valve handle must *not* be placed in lock down position.

### Application and Release Pipe 20

130. Proceed with the independent Brake Valve Handle in *release position* (not locked down) with the loss of the independent brake.

### Controlled Emergency Pipe 35

131. Place rotair valve in PASS and proceed without the controlled emergency feature and other freight functions (split reductions, etc.).

## BRAKE CYLINDER RELAY VALVES

### Main Reservoir Pipe 6

132. It must be repaired to have a locomotive brake. If repair cannot be made, stop loss of main reservoir air and follow instructions.

### Brake Cylinder Pipe 30

133. Same as for main reservoir pipe 6 unless break in cylinder pipe is beyond the cylinder cut-out cock in which case close the cock and proceed with these cylinders cut-out.

### Control Pipe 16

134. Must be repaired to have a locomotive brake. Otherwise follow the instructions.

## **MASTER CONTROLLER AND 21-B MAGNETS AND BRACKET**

### **Control Pipe 11 to Master Controller**

135. It must be repaired to have an electro-pneumatic brake, or move brake valve shifter to, "AU" position and proceed with the automatic brake.

### **Straight Air Pipe 4**

136. It must be repaired to have electro-pneumatic brake. If repairs cannot be made move automatic brake valve shifter lever to "AU" position, and proceed with the automatic brake.

### **Auxiliary Reservoir Pipe 6**

137. It must be repaired to have an electro-pneumatic brake. To have an automatic locomotive brake the auxiliary reservoir leak must be stopped. The automatic locomotive brake can be cut-out by closing brake pipe branch pipe cock and use the independent brake.

## **D-24 CONTROL VALVE**

### **Displacement Reservoir Pipe 3**

### **Auxiliary Reservoir Pipe 5**

### **Emergency Reservoir Pipe 2**

138. In case of breakage of any of these pipes close the brake pipe branch pipe cut-out cock. The automatic locomotive brake is inoperative but the independent brake can be used.

### **Main Reservoir Pipe 6**

139. The main reservoir leak must be stopped by close tight bend in the pipe. The independent application and release portion slide valve will be blown from its seat with either an electro-pneumatic or independent brake application. The amount of pressure to blow the slide valve from its seat will vary depending upon the tension of the slide valve spring.

### **Independent Application and Release Pipe 20**

140. The independent application is lost but the quick release is still available. No repairs need be made, proceed and carry independent brake valve handle in running position.



### Actuating Pipe 13

141. The independent quick release and electro-pneumatic locomotive brake cut-out features are lost. No repairs need be made, proceed but do *not* use "lock down" position of the independent brake valve handle since this will cause a blow at broken 13 pipe.

### Straight Air Pipe 8

142. The use of the electro-pneumatic brake is lost on the locomotive if repairs cannot be made. The electro-pneumatic brake can be operated on all other units if the break is repaired on the straight air pipe side, but do not close the pipe on the D-24 control valve side.

### Controlled Emergency Pipe 35

143. The controlled emergency feature is lost. Proceed with the rotair valve in PASS position.

### Control Pipe 16

144. If the break is between the D-24 Control Valve and the brake cylinder relay valve repairs must be made to have a locomotive brake. If repairs cannot be made follow the instructions for moving a locomotive without an operating brake. If the break occurs beyond the branch leading to the brake cylinder relay valve repair the leak with a short close bend on the control valve side. Proceed with the loss of the relayair valve unit cut-off valve function.

NOTE 1—A close tight bend refers to tubing which can be doubled over and hammered tight enough to prevent serious leakage. Where the pipe breaks at the flange fitting a well fitted hardwood plug may be driven into the fitting to prevent serious leakage. Blank gaskets or discs under flange fittings or in iron pipe unions are methods that can be used to advantage.

NOTE 2—In case the brake pipe branch pipe is closed, to move the locomotive to a terminal, the auxiliary and emergency reservoirs should be drained and open to the atmosphere to guard against the possibility of cock key leakage resulting in a stuck brake. This may be obtained by disconnecting one of the pipes 2, 3 or 5.

## **Dead Locomotive Feature**

145. The purpose of the dead locomotive feature is to enable the main reservoir on that locomotive to be charged from the train brake pipe when the air compressors are inoperative. It must be cut in and brake valves carried in running position when brakes on dead locomotive are to be used. This feature is cut in or out on the 6-ET by a  $\frac{3}{8}$ -inch cock located between brake pipe and main reservoir and by a cap incorporated in the distributing valve on 8-ET and change-over cock on control valve on 24-RL. The brake cylinder pressure on dead locomotive can be controlled with independent valve if main reservoir is charged.

## **6-ET EQUIPMENT**

### **Broken Brake Pipe Branch to Distributing Valve**

146. Close cut-out cock or plug pipe from brake pipe. Automatic brakes on locomotive will be inoperative. If independent brake application is made, the independent brake valve handle must be placed in release position to release locomotive brakes.

### **Broken Brake Pipe Near Hose Connection on Back End of Locomotive**

147. Plug the broken pipe on the locomotive. Couple brake pipe hose on front end of tender to signal hose on back end of locomotive. Couple the brake pipe hose at pilot of locomotive to signal hose. Close cut-out cock to signal system near reducing valve. Communicating signal system will be inoperative.

### **Broken Brake Pipe on Tender**

148. Couple the signal hose on back end of tender to brake pipe hose on car, and signal hose on front end of tender to brake pipe hose on locomotive. Close cut-out cock to signal system near reducing valve. Communicating signal system will be inoperative.

### **Broken Brake Cylinder Pipe**

149. If pipe is broken between either the locomotive or tender brake cylinders and cut-out cock, cut out the defective brakes. If pipe is broken between the cut-out cocks and "T" near the distributing valve, plug the pipe from distributing valve and use the remaining brakes. If pipe is broken between the "T" and distributing valve, close the cut-out cock in the main reservoir supply pipe to distributing valve, in which event locomotive brakes will be inoperative.

### **Broken Dead-Engine Feature Pipe**

150. Close cut-out cock or plug end of pipe from which air flows.

### **Broken Distributing Valve Main Reservoir Supply Pipe**

151. Close cut-out cock or plug pipe from main reservoir. Locomotive brakes will be inoperative.

### **Broken Main Reservoir Pipe Leading to Feed and Reducing Valves**

152. Plug both sides of broken pipe. Independent brake, signal system, and running and holding positions of automatic brake valve will be inoperative. Use release position of automatic brake valve to release train brakes, and release position of independent brake valve to release locomotive brakes. If the locomotive brakes are required, before making an automatic brake application, move the independent brake valve to slow application position, as no pressure is available to hold the independent brake valve rotary on its seat. Adjust high pressure governor top to brake pipe pressure to prevent overcharging.

### **Broken Application Cylinder Pipe**

153. Plug the opening from the distributing valve. The locomotive brakes cannot be operated with the independent brake valve, but it must be carried in running position, and pressure maintaining feature of automatic brake is lost.

### **Broken Distributing Valve Release Pipe**

154. Proceed; the holding feature of automatic brake valve is lost, and it will be impossible to keep locomotive brakes fully applied with independent brake valve, however, full application of locomotive brakes can be made with automatic brake valve.



### **Broken Feed Valve Pipe**

155. With B and M type feed valves, slack off on the adjusting nut, and with F type feed valves, slack off on the adjusting nut and plug the pipe from the feed valve to avoid loss of air. Plug the pipe from the brake valve if time will permit. Set the high pressure governor top to stop the compressor at 80 pounds on a freight, and 110 on a passenger train, then charge the brake pipe and carry the automatic brake valve handle in release position.

### **Broken Independent Brake Valve Supply Pipe**

156. If equipped with M type reducing valve, slack off on adjusting nut to shut off air. If equipped with F type reducing valve, slack off on adjusting nut and plug the pipe from the reducing valve to shut off air. Locomotive brake and signal system will be inoperative. If locomotive brakes are required, plug the broken pipe from the independent brake valve and place the independent brake valve handle in slow application position while brakes are applied with automatic brake valve. When brakes are released, place independent brake valve handle in running position.

### **Broken Remote Control Pipe from F-3 Feed Valve**

157. Shut off pressure to feed valve by closing cock at main reservoir, remove brass nut from front of F-3 feed valve and remove rubber seated check valve from spring. Replace nut, plug pipe and open cock.

### **Broken Main Reservoir Pipe Under H-6 Brake Valve**

158. Plug both ends of broken pipe, close cut-out cock to low pressure governor top at brake valve. Release position of automatic brake valve is then inoperative and release must be made in running position.

### **Broken Brake Pipe Under Automatic Brake Valve**

159. Block the broken pipe, and use independent brake valve to operate train brakes by cutting out locomotive brakes and crossing the brake cylinder hose between locomotive and tender with the brake pipe hose. Then adjust the independent reducing valve to 80 pounds on a freight, and 110 pounds on a passenger train, and set the safety valve on the distributing valve to correspond. Then manipulate the brakes with the independent brake valve by placing the handle in application position to release and charge the brakes, and in release position to apply the brakes. In this case locomotive brakes will be inoperative.

### **Broken Equalizing Reservoir Pipe**

160. Block the broken pipe from brake valve. Before making an application of brakes, close the double-heading cock, place automatic brake valve handle in service position and open the double-heading cock until the required reduction is made. To release brakes, place automatic brake valve handle in release, open double-heading cock, then return handle to running position.

### **Broken Release Pipe Between Automatic and Independent Brake Valves**

161. Proceed; holding feature of automatic brake valve is lost; independent brake valve operation is not interfered with.

### **Broken Low Pressure Operating Governor Pipe**

162. Close cut-out cock at brake valve.

### **Broken Equalizing Reservoir Gage Pipe**

163. Plug the broken pipe.

### **Broken High Pressure Operating Governor Pipe**

164. Plug broken pipe from main reservoir, control the compressor with steam throttle when automatic brake valve handle is in lap, service, or emergency position, to prevent carrying main reservoir pressure in excess of 140 pounds. With automatic brake valve in release, running, or holding position, low pressure governor top will control the pressure.

## COMMUNICATING SIGNAL

165. The amount of pressure in communicating signal pipe on a locomotive with ET equipment can be ascertained by applying brake fully with the independent brake valve. The pressure will be 3 pounds less than that shown in the brake cylinders.

If communicating signal whistle sounds when automatic brake valve is placed in release position or independent brake valve is placed in application position, the check valve of the combined strainer and check valve unit has failed.

If whistle fails to sound when it should, and communicating signal pipe is charged, look for the defect in signal valve, car discharge valve, or signal whistle. Before reporting a defect, inspect all connections for leaks and see if signal whistle needs adjusting or cleaning.

The communicating signal is operated by a reduction in signal pipe pressure made by opening the car discharge valve.

If communicating signal gives a weak sound, the reducing valve may not be maintaining pressure at 42 pounds, whistle is filled with dirt or not properly adjusted, or the port under the end of signal valve is partly closed by dirt.

When more than one locomotive is used on the head end, the locomotive next to train must supply air for the communicating signal system, except that when diesel locomotive is used, the air will be supplied by operating end.

If any defects develop in communicating signal system while on the road that cannot be corrected, trainmen must be so advised and arrangements made for hand signals.



## CARS

170. The conductor will report on Form S-2809 all known defects on cars in his train on arrival at terminals.

171. In coupling or uncoupling the hose, if there is ice in the couplings it must first be thawed to prevent damage to the rubber gaskets and insure tight joints.

172. With 80 pounds brake pipe pressure, a service reduction of approximately 22 pounds will fully apply the brakes; with 90 pounds brake pipe pressure, a service reduction of approximately 26 pounds will fully apply the brakes; and with 110 pounds brake pipe pressure, a service reduction of approximately 32 pounds will fully apply the brakes.

173. When the brake pipe pressure is reduced 10 pounds there will be approximately 25 pounds in the brake cylinder.

174. A service rate of reduction must be made from brake pipe pressure to produce a service application of brakes.

175. A rapid rate of reduction must be made from brake pipe pressure to produce an emergency application of brakes.

Emergency application produces approximately 20% greater brake cylinder pressure than a full service application.

176. It is important to keep the air brake apparatus free from leaks in order to obtain the full benefit of the brakes and prevent waste of air.

177. A train must not leave its initial station without first testing the air brakes.

178. If the locomotive is coupled to the train with the brake system charged and any brake does not release, the retaining valve handle may be in horizontal position; if not, the retaining valve or pipe may be stopped up, or the hand brake set. If the brake cannot be released by turning retaining valve handle down, disconnecting retaining valve pipe, or releasing hand brake, cut out brakes on car.

179. If a brake repeatedly fails to release from the locomotive, cut out the brake and report on Form S-2809.

180. If a brake with the system charged fails to remain applied when a brake pipe reduction is made, the cause is leaky brake cylinder packing. The brake should not be cut out, but reported on Form S-2809.

181. Not more than two consecutive brakes in a train may be cut out and maintain emergency action throughout the train.

### Cutting Out Brakes

182. The following method will be used when necessary to cut out brakes:

**Car with K triple valve:** Close cut-out cock in the brake pipe branch pipe and bleed the auxiliary reservoir.

**Car with AB brake equipment:** Close the branch pipe cut-out cock and drain both auxiliary and emergency reservoirs by fully opening release valve.

**Car with PM brake equipment:** Close cut-out cock and drain auxiliary reservoir.

**Car with LN brake equipment:** Close cut-out cock and drain both auxiliary and supplementary reservoirs.

**Car with UC brake equipment:** With double equipment having independent brake rigging for each truck, the brakes can be cut out individually by opening brake cylinder side vented cut-out cock on each end of car. If this is not practicable close branch pipe cut-out cock and bleed all reservoirs.

**Car with D-22 control valve:** This equipment has side vented cut-out cocks for each brake cylinder which should be used as required. If this is not practicable close the branch pipe cut-out cock (which is combined with the dirt collector) and drain both the auxiliary and the emergency reservoirs by pulling the duplex valve handle its full travel and holding until the pressure is depleted.