

B M T

L I N E S

RAPID TRANSIT DIVISION

INSTRUCTIONS

FOR

TOWERMEN

New York Rapid Transit Corporation

GENERAL INFORMATION

1 Q. To whom do Towermen report?

A. To the Division Superintendents.

2 Q. Who, in addition to the Division Superintendent may issue orders which must be obeyed by the Towerman?

A. Supervisor of Towermen, Train Masters and Dispatchers.

3 Q. What are the duties of Towermen?

R A. To set up the proper routes and display the proper signals for train movements and to keep the tower in a neat and orderly condition and in case of failure of the signal or interlocking apparatus, to take such steps as are specified herein to relieve the failure and facilitate traffic.

R **4** Q. What work, in addition to that specified in question three, (3), is a towerman permitted or required to do?

A. Nothing, except keeping of records and performing such other duties as may be assigned by proper authority or required by the rules.

5 Q. How may the towerman determine which levers of the interlocking machine to operate in order to set up a route and clear the proper signals therefor?

A. From the manipulation chart.

6 Q. How may a Towerman determine when it is safe to pull a switch lever to set up a different route?

A. By watching the lights of the illuminated indicator.

7 Q. How long in advance of the arrival of a train should the signals be cleared?

A. Long enough to allow the train to enter and proceed thru the interlocking plant without delay.

8 Q. How may a towerman determine the class and destination of an approaching train?

A. By marker lights, flags and destination signs displayed by the train.

9 Q. What must be done when an extra or special train arrives at the tower?

A. Unless previously notified the towerman must ask the Chief Train Despatcher (Extension 758) for information and instructions as to its movement and destination and then set up the route and display signals accordingly.

10 Q. Who, in addition to the towerman is permitted to operate the levers of an interlocking machine or other appliances in the signal tower?

A. No one except such persons as may be specifically authorized to do so by proper authority.

11 Q. What persons are *not* permitted to enter signal towers?

A. All persons, except officials of the road, or those employed in the maintenance or operation of the apparatus, or properly identified representatives of supervisory authorities.

12 Q. Should a towerman make any inspection upon relieving another towerman?

A. Yes. He should examine all seals and see if any have been broken.

13 Q. When may a seal on any part of the signal apparatus be broken?

A. Only when necessary to permit the operation of trains, due to failure of the ordinary means of providing for such operation.

14 Q. What must be done when a seal is broken?

A. The fact and the reason therefor must be reported immediately to the Signal Division and the Division Superintendent and a record made in the book located in tower for that purpose.

15 Q. Is a towerman permitted to make changes in signal equipment?

A. No.

16 Q. In case of any improper or unusual condition affecting the operation of the switch or signal appliances, what should the towerman do?

A. Report such condition immediately to the Signal Maintainer, and notify Signal Division and Division Superintendent and if such condition affects train movements he shall also notify the Chief Train Dispatcher Extension No. 758.

17 Q. When may signal levers be allowed to remain in the reverse position?

A. When the towerman *knows* that the next following train will take the same route as the preceding train.

18 Q. In all other cases, when should a signal lever be returned to its normal position?

A. Immediately after the train has passed the signal which it controls.

19 Q. When may a proceed signal be taken away from a train?

A. When anything is discovered that might endanger the train, or when for any reason it becomes necessary to set up a different route for the train.

20 Q. What precautions must be used in case it becomes necessary to change a route for which signals have been cleared?

A. The towerman must not change the position of any switch in the route or clear any conflicting signals until the train for which the signals were first cleared has come to a stop.

21 Q. When is it not permissible to change a switch or switch lock?

A. When a train is on or closely approaching the switch or switch locking devices.

22 Q. What must be done when any irregularity is noticed in the operation of a lever?

A. Lever must be returned to its normal position and kept there until repairs have been made.

23 Q. When must signal lights be kept lighted?

A. At all times in light signals and from sunset to sunrise in semaphore signals.

24 Q. What must the towerman do if a train overruns a stop signal?

A. He must report the fact with full information immediately to the Division Superintendent and Chief Train Dispatcher.

25 Q. What must be done in case of a signal light out or broken red glass?

A. The signal lever must be kept in the normal position and a red flag or lantern substituted for the signal.

26 Q. How may a train stopped by such a signal be authorized to proceed?

A. It must be flagged by.

27 Q. What must the towerman do before flagging a train through an interlocking plant?

A. He must make sure that the switches in the route to be traversed are all properly set and that all other conditions affecting the safety of the train are proper.

28 Q. What must the towerman do in case of any defect in the interlocking apparatus which makes it possible to clear a signal with a switch, derail or lock in the wrong position or a conflicting signal clear?

A. He must cause the signals to display their stop indications and when necessary for trains to pass such signals, he must flag them by.

29 Q. If any part of the interlocking apparatus or track is damaged, as in the case of a derailment or switch run thru, what must the towerman do?

A. He must place the levers affected in their normal position if possible, and see that no trains or switching movement is made over the affected parts un-

til a thorough examination has been made by the Signal Division and all parts liable to be affected found to be in safe condition for such train movement.

30 Q. In case it is necessary to disconnect a switch from the interlocking apparatus, what precautions must be taken?

A. The switch must be securely fastened with spike, wedges or clamps.

31 Q. What precautions must be taken when switches or signals are undergoing repair?

A. The towerman must not clear signals for any movement which may be affected by such repairs until he has ascertained that the switches are properly set and locked for such movement.

32 Q. What appliances for hand signalling must the towerman have ready for service?

A. Red, yellow, green and white lanterns and red, yellow, and green flags.

33 Q. When may hand signals be used?

A. Only when proper indications cannot be given by fixed signals.

34 Q. What precautions must be taken in giving hand signals?

A. They must be given from such a point and in such a way that there can be no misunderstanding on the part of the motormen or trainmen as to the meaning of the signals, or as to the train for which they are given.

35 Q. Who must be notified in case it is necessary to use hand signals instead of fixed signals?

A. Signal Division, Chief Train Despatcher and Division Superintendents.

36 Q. If necessary to leave the tower when on duty what must the towerman do?

A. He must take all necessary precautions to insure the safety of operation during his absence.

37 Q. What must the towerman do when he is succeeded by another towerman?

A. He must advise the succeeding towerman of any special orders or instructions, or any defects observed in the interlocking apparatus, or any changes which have been made therein.

38 Q. What must a towerman do before leaving a tower where there is no succeeding towerman?

A. After setting up all routes required for regular operation he must not leave the tower until a train has passed over each route.

39 Q. During cold or stormy weather, what extra precautions must the towerman take?

A. He must use extra vigilance in order to detect defects in switches and signals and their connections, and will as frequently as the condition of the weather may require, operate the levers in order to prevent switches, signals and connections from freezing.

40 Q. Where call-on signals are in use what must be done before the call-on lever is reversed?

A. The route must be set up and the home signal lever reversed.

SPECIFIC INSTRUCTIONS

As to Procedure in Case of Failure of Various Types of Interlocking.

In all cases of trouble with signal equipment advise the maintainer promptly and the Chief Train Despatcher (Extension 758). If unable to locate the maintainer advise the Signal Division Office.

41 Q. What precautions must a towerman use when he finds a train passing a tower with the rear of train not protected with red lights at night, during foggy weather or in subways?

A. He must notify the following train, the next tower and the Chief Train Despatcher, Extension 758.

42 Q. What precautions must a towerman use when fog order has been put in effect?

A. He must not permit any reverse movements while fog order is in effect without permission from the proper authority.

43 Q. Should a towerman make any report when power is turned off the third rail or the lights go out?

A. Yes. He should report such conditions immediately to the Chief Train Despatcher, Extension 758, and to office of Division Superintendent.

44 Q. What action must a towerman take when a motorman reports that there is smoke in the subway?

A. He must report the facts to the Chief Train Despatcher, Extension 758, at once and request permission to start the fans if control switches are located in tower under his charge.

45 Q. What precaution must a towerman use when cranking a switch?

A. He must place a red flag or lantern in the center of the track opposite the signal governing switches.

GENERAL RAILWAY SIGNAL COMPANY'S ELECTRIC INTERLOCKING.

Signals.

46 Q. When signal lever cannot be pulled out, what must the towerman do?

A. Check combination and make certain that signal levers governing movements to the same track are back and that the levers required for the combination have been moved to the extreme position.

47 Q. If still unable to pull out lever, what must the towerman do?

A. Hook down automatic stop arm or arms, (if in use), and flag trains according to the rules.

48 Q. Must the towerman make any observations at the signal at the time of hooking down stop arm?

A. Yes. He must make sure that the signal indicates stop.

49 Q. What further precaution must the towerman take before flagging train?

A. He must make sure that the route is properly lined up.

50 Q. If after the signal lever has been pulled out the lever light remains dark, what is indicated?

A. The lever lamp may be burnt out or the signal may not have responded to the movement of the lever.

51 Q. What observation must the towerman make if the signal still does not clear when the lever is pulled out?

A. Make sure that the preceding train has cleared the block and that all screw releases and call-on levers are in the normal position.

52 Q. What must the towerman do if the signal does not clear when lever is pulled out?

A. Change the fuse and try lever again.

53 Q. If the signal still fails to clear, what must the towerman do?

A. Leave the signal lever pulled out and pull out call-on lever.

54 Q. If the call-on signal fails to clear when call-on lever is pulled out, what must the towerman do?

A. Flag trains according to the rules.

55 Q. How may the towerman ascertain if the preceding train has cleared the block?

A. By observing the illuminated diagram.

56 Q. What is the normal position of the screw release?

A. When the handle cannot be turned further in a counter-clockwise direction.

57 Q. If the signal lever fails to indicate when it is put back, what must the towerman do?

A. Make sure that the call-on lever is all the way back.

58 Q. If the signal lever still fails to indicate, what must the towerman do?

A. Operate screw release to reverse position, put back signal lever and then restore screw release to normal position.

59 Q. If signal lever still fails to indicate, what must the towerman do?

A. Set up route by hand and flag trains according to the rules.

60 Q. In case of failure of A. C. power supply, what must the towerman do?

A. Put signal levers back to indicating positions, set up route by hand and flag trains according to the rules.

Switches.

61 Q. What does the blue lamp on the operating board indicate when out?

A. The lamp may be burned out or circuit breaker open.

62 Q. What must the towerman do when circuit breaker opens?

A. Try to reset it.

63 Q. What must the towerman do before attempting to close circuit breaker?

A. Close all polarized relays at the back of the machine and on the operating board.

64 Q. When is a polarized relay closed?

A. When the handle is down.

65 Q. What must the towerman do to close the circuit breaker?

A. Lift handle of circuit breaker all the way up and then press all the way down.

66 Q. If one or more of the polarized relays opens when the circuit breaker is reset, what must the towerman do?

A. Make sure that the switch machines controlled by those levers correspond with their levers and remove both motor brushes before making any further effort to reset the circuit breaker.

67 Q. If switch lever cannot be moved from either extreme position, what must the towerman do?

A. Check combination. See that other levers affecting the route are all the way in or all the way out and again try lever. See that no train is standing on the track circuit, then use "emergency release".

68 Q. Is it necessary to hold the "emergency release" button in during the time the switch lever is being operated?

A. Yes.

69 Q. If lever cannot then be moved, what must the towerman do?

A. Set up route by hand and flag trains according to the rules.

70 Q. If lever can be moved to the indicating position but no indication is received, what must the towerman do?

A. Move lever back to opposite indicating position, watch ammeter and pull lever again. If ammeter needle does not move the circuit breaker may be open.

71 Q. If circuit breaker is not open what must the towerman do?

A. Renew fuse or fuses for that lever and try lever again.

72 Q. If fuses are O. K., what must the towerman do?

A. Crank switch or switches and flag trains according to the rules.

73 Q. How would you crank a switch?

A. Remove *both* brushes from the motor, place crank in socket and turn until switch has moved to the position desired.

74 Q. When may the switch be considered to have been cranked over and locked?

A. When the crank has been turned freely eight (8) times after the point is up to the rail.

75 Q. If either or both switches controlled by a lever which has failed is in the proper position for the route required, what must the towerman do before flagging trains over them?

A. Remove both brushes from each switch motor and make sure that switches are locked.

76 Q. What precautions must the towerman take before replacing the brushes?

A. He must make sure that there is no train on or closely approaching the switches involved. Towerman will only replace brushes when signal maintainer is not available.

77 Q. Must switches be thrown from the tower, after the brushes have been put back, before a train is permitted to pass over the switches?

A. Yes. They must be thrown at least twice.

78 Q. If the ammeter needle hangs for several seconds above the rated current for operating a switch, what must the towerman do?

A. Operate lever back and forth several times.

79 Q. If the ammeter needle continues to hang above the rated current, what must the towerman do?

A. Return switch lever to original position and investigate to determine if there is any obstruction in the switch.

80 Q. If no obstruction is found, what must the towerman do?

A. Remove *both* brushes from switch motor and try cranking the switch.

81 Q. If switch cannot be locked by cranking, what must the towerman do?

A. Make sure that switch points are set up to stock rail and secured, and flag trains according to the rules.

Traffic Levers.

82 Q. What is the purpose of the traffic lever?

A. To enforce co-operation between towermen in the towers at the ends of a section of track in which traffic may be operated in either direction.

83 Q. In order to change the direction of traffic, is it necessary that the section be unoccupied?

A. Yes.

84 Q. What means are provided to permit operation of the traffic lever in case of a track circuit failure?

A. An emergency screw release.

85 Q. What must the towerman do before using the emergency screw release?

A. Obtain permission from the proper authority.

86 Q. In changing the direction of traffic, which traffic lever must be moved first?

A. The lever which was moved last in changing the direction of traffic.

NOTE—See page 53 for list giving location of General Railway Signal Company's Interlocking Plants.

FEDERAL SIGNAL COMPANY'S ELECTRIC INTERLOCKING

In all cases of trouble with signal equipment advise the maintainer promptly and the Chief Train Despatcher (Extension 758). If unable to locate maintainer advise the Signal Division Office.

Signals.

See questions 46 to 60, inclusive, General Railway Signal Co.'s section, which also apply to Federal Signals.

Switches.

87 Q. What does the blue lamp on the operating board indicate when out?

A. The lamp may be burned out or circuit breaker open.

88 Q. What must the towerman do when circuit breaker opens?

A. Try to reset it.

89 Q. What must the towerman do to reset the circuit breaker?

A. Press the middle push button on the operating board.

90 Q. If the circuit breaker will not remain reset, what must the towerman do?

A. Change over double throw switch at the bottom of power board and reset circuit breaker.

91 Q. If the circuit breaker still fails to reset, what must the towerman do?

A. At Chambers St. and at Essex St., make sure that all of the walking beam relay contacts are making on the bottom springs and reset the circuit breaker. At Jamaica, make sure that all cross protection contacts in the front of the machine are closed.

92 Q. If the circuit breaker again drops out, what must the towerman do?

A. At Chambers St. and Essex St. Look at all the disc contacts on cross protection coils in back of the machine, replace any that may have jumped out and reset circuit breaker.

93 Q. If one or more of the disc contacts on the cross-protection coils in the back of the machine at Chambers St. or Essex St. jump out or, if one or more

of the cross-protection contacts in the front of the machine at Jamaica open after the circuit breaker is reset, what must the towerman do?

A. Make sure that the switch machines controlled by those levers correspond with their levers and remove motor brushes before making any further effort to reset circuit breaker.

94 Q. If the switch lever can not be unlatched, with the lever in the extreme position, what must the towerman do?

A. Check combination, see that the latches on other levers affecting the route are all the way down and again try lever. See that no train is standing on the track circuit, then use emergency release.

95 Q. If lever cannot then be unlatched, what must the towerman do?

A. Set up route by hand and flag trains according to the rules.

96 Q. If lever can be moved to the indicating position but no indication is received, what must the towerman do?

A. Move lever back to opposite indicating position, watch ammeter and

pull lever again. If ammeter needle does not move the circuit breaker may be open.

97 Q. If circuit breaker is not open, what must the towerman do?

A. Renew fuse or fuses for that lever and try lever again.

98 Q. If fuses are O. K., what must the towerman do?

A. Crank switch or switches and flag trains according to the rules.

99 Q. How would you crank a switch?

A. Remove *both* brushes from the motor, place crank in socket and turn until switch has moved to position desired.

100 Q. When may the switch be considered to have been cranked over and locked?

A. When the crank has been turned freely thirteen (13) times after the point is up to the rail.

101 Q. If either or both switches controlled by a lever which has failed is in the proper position for the route required, what must the towerman do before flagging trains over them?

A. Remove both brushes from

each switch motor and make sure that switches are locked.

102 Q. When should towerman replace brushes in switch machine and what precautions must be taken?

A. Only when signal maintainer is not available and he must make sure that there is no train on or closely approaching the switches involved.

103 Q. Must switches be thrown from the tower, after the brushes have been put back, before a train is permitted to pass over the switches?

A. Yes, they must be thrown at least twice.

104 Q. If the ammeter needle hangs for several seconds above the rated current for operating a switch, what must the towerman do?

A. Operate lever back and forth several times.

105 Q. If the ammeter needle continues to hang above the rated current, what must the towerman do?

A. Return switch lever to original position and investigate to determine if there is any obstruction in the switch.

106 Q. If no obstruction is found, what must the towerman do?

A. Remove *both* brushes from switch motor and try cranking the switch.

107 Q. If switch cannot be locked by cranking, what must the towerman do?

A. Make sure that switch points are set up to stock rail and secured and flag trains according to the rules.

NOTE—See page 54 for list giving location of Federal Signal Company's Electric Interlocking Plants.

HALL ELECTRIC INTERLOCKING

In all cases of trouble with signal equipment advise the maintainer promptly and the Chief Train Despatcher (Extension 758). If unable to locate the maintainer advise the Signal Division Office.

Signals.

See questions 46 to 60, inclusive, General Railway Signal Co.'s section which also apply to Hall Signals.

Switches.

108 Q. What does the blue lamp on the operating board indicate when out?

A. The lamp may be burned out or circuit breaker open.

109 Q. What must the towerman do when circuit breaker opens?

A. Try to reset it.

110 Q. What must the towerman do to close the circuit breaker?

A. Lift handle of circuit breaker all the way up and then press all the way down.

111 Q. If the circuit breaker will not remain reset, what must the towerman do?

A. Remove the fuses for the lever that was being operated when the circuit breaker dropped out.

112 Q. What must be done with the switches from which the fuses were removed?

A. Make sure that the switch machines controlled by those levers are locked in the required position and remove *both* motor brushes.

113 Q. If the switch lever cannot be removed from either extreme position, what must the towerman do?

A. Check combination. See that other levers affecting the route are all the way in or all the way out and try lever again. See that no train is standing on the track circuit then use "Emergency Release".

114 Q. If lever cannot then be moved, what must the towerman do?

A. Set up route by hand and flag trains according to the rules.

115 Q. If lever can be moved to the indicating position but no indication is received, what must the towerman do?

A. Move lever back to opposite indicating position, watch ammeter and pull lever again. If ammeter needle does not move the circuit breaker may be open.

116 Q. If circuit breaker is not open, what must the towerman do?

A. Renew fuse or fuses for that lever and try lever again.

117 Q. If fuses are O. K., what must the towerman do?

A. Crank switch or switches and flag trains according to the rules.

118 Q. How would you crank a switch?

A. Remove *both* brushes from the motor, place crank in socket and turn until switch has moved to the position desired.

119 Q. When may the switch be considered to have been cranked over and locked?

A. When the crank has been turned freely, eight (8) times after the point is up to the rail.

120 Q. If either or both switches controlled by a lever which has failed is in the proper position for the route required, what must the towerman do before flagging trains over them?

A. Remove both brushes from each switch motor and make sure that switches are locked.

121 Q. What precautions must the towerman take before replacing the brushes?

A. He must make sure that there is no train on or closely approaching the switches involved. Towerman will only replace brushes when signal maintainer is not available.

122 Q. Must switches be thrown from the tower, after the brushes have been put back, before a train is permitted to pass over the switches?

A. Yes, they must be thrown at least twice.

123 Q. If the ammeter needle hangs for several seconds above the rated cur-

rent for operating, what must the towerman do?

A. Operate lever back and forth several times.

124 Q. If the ammeter needle continues to hang above the rated current, what must the towerman do?

A. Return switch lever to original position and investigate to determine if there is any obstruction in the switch.

125 Q. If no obstruction is found, what must the towerman do?

A. Drop out the circuit breaker, by pulling main switch on switchboard, remove both brushes from switch motors and try cranking the switches.

126 Q. If switch cannot be locked by cranking, what must the towerman do?

A. Make sure that switch points are set up to stock rail and secured, and flag trains according to the rules.

Traffic Levers.

127 Q. What is the purpose of the traffic lever?

A. To enforce co-operation between towerman in the towers at the ends

of a section of track in which traffic may be operated in either direction.

128 Q. In order to change the direction of traffic is it necessary that the section be unoccupied?

A. Yes.

129 Q. What means are provided to permit operation of the traffic lever in case of a track circuit failure?

A. An emergency screw release.

130 Q. What must the towerman do before using the emergency screw release?

A. Obtain permission from the proper authority.

131 Q. In changing the direction of traffic, which traffic lever must be moved first?

A. The lever which was moved last in changing the direction of traffic.

NOTE—See page 54 for list giving location of Hall Electric Interlocking Plants.

UNION SWITCH AND SIGNAL CO.'S ELECTRIC INTER- LOCKING.

Signals.

In all cases of trouble with signal equipment advise the maintainer promptly and the Chief Train Dispatcher (Extension 758). If unable to locate the maintainer advise the Signal Division Office.

132 Q. When signal lever cannot be moved to the right or left as required, what must the towerman do?

A. Check combination and make certain that signal levers governing movements to the same track are on centre and that the switch levers required for the combination have been moved to their extreme positions.

133 Q. If still unable to operate lever, what must the towerman do?

A. Flag trains according to the rules.

134 Q. Must the towerman make any observations at the signal before flagging trains?

A. Yes. He must make sure that all of the signals controlled by that lever indicate stop.

135 Q. What further precaution must the towerman take before flagging train?

A. He must make sure that the route is properly lined up.

136 Q. What must the towerman do if the signal does not clear when the lever is moved to the right or left?

A. Change the fuse on terminal board in back of machine and try lever again.

137 Q. If the signal still does not clear when the lever is moved to the right or left what should the towerman do?

A. If a train is on the adjacent track he must make sure that it is clear of the fouling point, and flag trains according to the rules.

138 Q. If the signal still fails to clear, what must the towerman do?

A. Leave signal lever in the right or left position as may be and flag trains according to the rules.

139 Q. If the signal lever fails to indicate when it is put back, what must the towerman do?

A. Make sure that the signal has resumed the stop position and if not push it back by hand.

140 Q. If signal lever fails to indicate, what must the towerman do?

A. Set up route by hand and flag trains according to the rules.

SWITCHES

141 Q. If the lever cannot be moved from either extreme position, what must the towerman do?

A. Check combination and make sure that all other switch levers affecting the route are in their extreme positions and that all signal levers affecting the route are on center.

142 Q. If lever cannot then be moved, what must the towerman do?

A. Set up route by hand and flag trains according to the rules.

143 Q. If lever can be moved to the indicating position but no indication is received, what must the towerman do?

A. Put lever back to the opposite indicating position, watch ammeter and throw lever again.

144 Q. If the needle on ammeter fails to move indicating that no current is going to the switch, what must the towerman do?

A. Put the lever on center and change the short fuse on back of machine, operate the lever again and watch ammeter.

145 Q. If ammeter still fails to indicate current flow, what must the towerman do?

A. See if the safety circuit controller (turtle) is kicked out and if a crossover or switch and derail are controlled by the same lever, look at the safety circuit controllers (turtles) on both ends. If one or both safety circuit controllers (turtles) are found kicked out, reset them and try the lever again.

146 Q. If the ammeter still fails to indicate current flow, what must the towerman do?

A. Set up route by hand and flag trains according to the rules.

147 Q. If the ammeter needle hangs considerably above 10 amperes, what must the towerman do?

A. Throw lever back quickly to the opposite indicating position, then put lever on center and investigate to determine if there is any obstruction in the switch.

148 Q. If no obstruction is found, what must the towerman do?

A. Kick out the safety circuit controller (turtle) and operate switch with wrench. If unable to raise the detector bar disconnect it at the switch machine. If switch can then be cranked freely, reset safety circuit controller (turtle) and resume operation from the machine, keeping in mind that the detector bar is disconnected and its protective features removed.

149 Q. If the switch fails to lock, what must the towerman do?

A. Kick out the safety circuit controller (turtle), disconnect the switch from the switch machine and connect it to hand-throw. Set up route by hand and flag trains according to the rules.

150 Q. If the ammeter indicates that current is flowing to the switch and hangs at about 10 amperes for several seconds, what must the towerman do?

A. Change the two indication (long fuses) in back of the machine.

151 Q. If the lever still fails to indicate, what must the towerman do?

A. Put lever on center, remove short fuse from the back of the machine, operate switches and derails in route by hand and flag trains according to the rules.

All Apparatus.

152 Q. If all the switches and signals should fail, what must the towerman do?

A. Put all switch levers which are not in the extreme position on center. Remove the fuses from all the signal levers which are not in the normal or center position. Change the main fuses. Replace the switch and signal fuses and operate the levers one at a time until the desired combinations are set up.

153 Q. If changing the main fuses fails to remedy the trouble, what then must the towerman do?

A. Remove the main fuses, set up route by hand and flag trains according to rules.

NOTE—See page 54 for list giving location of Union Switch and Signal Co.'s Electric Interlocking Plant.

UNION SWITCH AND SIGNAL CO.'S ELECTRO-PNEUMATIC INTERLOCKING.

Signals.

In all cases of trouble with signal equipment advise the maintainer promptly and the Chief Train Dispatcher (Extension 758). If unable to locate the maintainer advise the Signal Division Office.

154 Q. When signal lever cannot be moved to the right or left as required, what must the towerman do?

A. Check combination and make certain that signal levers governing movements to the same track are on center and that the switch levers required for the combination have been moved to their extreme position.

155 Q. If still unable to operate lever, what must the towerman do?

A. Hook down automatic stop arm if in use and flag trains according to the rules.

156 Q. Must the towerman make any observations at the signal at the time of hooking down stop arm?

A. Yes. He must make sure that all of the signals controlled by that lever indicate stop.

157 Q. What further precaution must the towerman take before flagging train?

A. He must make sure that the route is properly lined up.

158 Q. What must the towerman do if the signal does not clear when the lever is moved to the right or left?

A. If air pressure is O. K., change over batteries.

159 Q. If the signal still fails to clear, what must the towerman do?

A. Leave signal lever in the right or left position as may be and flag trains according to the rules.

160 Q. What observation must the towerman make before flagging trains?

A. If the train is on the adjacent track he must make sure that it is clear of the fouling point.

161 Q. If the signal lever fails to indicate when it is put back, what must the towerman do?

A. Make sure that the signal has resumed the stop position and if not push it back by hand.

162 Q. If the signal lever still fails to indicate, what must the towerman do?

A. Use emergency release where provided.

163 Q. If signal lever still fails to indicate, what must the towerman do?

A. Set up route by hand and flag trains according to the rules.

Switches.

164 Q. If the lever cannot be moved from either extreme position, what must the towerman do?

A. Check combination and make sure that all other switch levers affecting the route are in their extreme positions, and that all the signal levers affecting the route are on center. Make sure that no train is on the track circuit, then use emergency release.

165 Q. If lever cannot then be moved, what must the towerman do?

A. Set up route by hand and flag trains according to the rules.

166 Q. How would you put a switch on hand throw?

A. Shut off air from cylinder, bleed cylinder and connect hand throw lever to switch and lock movement.

167 Q. If lever can be moved to the indicating position but no indication is received, what must the towerman do?

A. If air pressure is O. K., change over the batteries.

168 Q. If the lever still fails to indicate, what must the towerman do?

A. Set up route by hand and flag trains according to the rules.

169 Q. If switch cannot be locked with hand-throw, what must the towerman do?

A. Return switch to original position and investigate to determine if there is any obstruction in the switch.

170 Q. If no obstruction is found, what must the towerman do?

A. Make sure that switch point sets up to stock rail, clamp switch point

securely and flag trains according to the rules.

Air Compressing Plant

171 Q. What indicates low air pressure?

A. The alarm bell which is controlled by the air gauge will ring.

172 Q. What must the towerman do when the alarm bell rings?

A. Change the switch on the compressor switch-board to the other source of power.

173 Q. If compressors do not start up, what must the towerman do?

A. Open main-switch, change the compressor fuses and close the main-switch.

174 Q. If the compressors still fail to start, what must the towerman do?

A. Close governor cut around switch.

175 Q. If the compressors then start up, what must the towerman do?

A. Open main switch when pressure reaches 90 lbs. Compressor will then have to be operated by closing

the main switch when the pressure drops to 75 lbs., and by opening the main switch when the pressure reaches 90 lbs., until the arrival of the maintainer.

176 Q. If the compressor does not start after closing governor cut around switch, what must the towerman do?

A. Set up route by hand and flag trains according to the rules.

177 Q. In case of a bad leak in the pipe line, what must the towerman do?

A. Shut off the air by closing the cock nearest to the leak on the side next to the tower. Switches affected will have to be operated by hand and trains flagged according to the rules.

NOTE—See page 55 for list giving location of Union Switch and Signal Co.'s Electro-Pneumatic Interlocking Plants.

Mechanical Interlocking

In all cases of trouble with signal equipment advise the maintainer promptly. If unable to locate the maintainer advise the Signal Division Office.

General.

178 Q. When lever cannot be unlatched, what must the towerman do?

A. Check combination and make certain that all levers affecting the combination are properly latched.

179 Q. If still unable to unlatch the lever, what must the towerman do?

A. Examine the connection between the lever and the locking. If broken move the locking bar into place by hand.

180 Q. If locking connection is found to be O. K., what must the towerman do?

A. Flag trains according to the rules.

Signals.

181 Q. If signal lever cannot be pulled all the way out after being unlatched, what must the towerman do?

A. Flag trains according to the rules.

182 Q. Must the towerman make any observation before flagging trains?

A. Yes. He must make sure that the signal indicates stop.

183 Q. What further precaution must the towerman take before flagging train?

A. He must make sure that the route is properly lined up.

Switches.

184 Q. If unable to move the switch lever to the extreme position either way, what must the towerman do?

A. Return lever to original position and investigate to determine if there is any obstruction in the switch or if there is something fouling a crank or compensator in the pipe line for that switch.

Locks.

185 Q. If unable to pull the lock lever all the way out, what must the towerman do?

A. Throw the switch or switches locked by the lever, which failed, easy, and try to pull out lock lever again.

186 Q. If still unable to pull lock lever all the way out, what must the towerman do?

A. Throw the switch or switches locked by the lever, hard, and try lock lever again.

187 Q. If still unable to pull the lock lever all the way out, what must the towerman do?

A. Return lever to original position and investigate to determine if there is any obstruction in the switch or if there is something fouling a crank or compensator in the pipe line, and also check adjustment of switch points.

188 Q. If switch point is out of adjustment, what must the towerman do?

A. Adjust it with the tools provided on the emergency tool board.

189 Q. If switch point is found setting up properly to the stock rail, what must the towerman do?

A. See if the detector bar is obstructed, and if so and the obstruction cannot be removed, disconnect the detector bar by removing the pin at the rocker or crank arm.

190 Q. If still unable to pull lock lever all the way out, what must the towerman do?

A. Make sure that the point of switch is up to stock rail and in the case of facing switches secured, make sure that the route is properly lined up and flag trains according to rules. If a trailing switch, make sure that the switch sets up to stock rail and flag trains according to the rules.

191 Q. What precaution must the towerman take before operating a switch or lock with detector bar disconnected?

A. He must be sure that there is no train on or closely approaching the switch.

NOTE—See page 55 for list giving location of Mechanical Interlocking Plants.

Automatic Interlocking.

192 Q. What is meant by the term automatic interlocking?

A. Any interlocking plant in which one or more of the switches and signals are arranged for automatic control independent of the interlocking machine levers.

193 Q. Are such switches and signals also arranged so as to be controlled by corresponding levers?

A. Yes.

194 Q. How is the change from automatic control to lever control and vice versa made?

A. By means of a master lever located in the interlocking machine.

195 Q. In what position should the master lever be to permit lever control of switches and signals?

A. The normal position.

196 Q. Is it necessary that the levers of the interlocking machine be in any particular position in order to operate the master lever?

A. Yes.

197 Q. How is that position to be determined?

A. By observation of the manipulation chart.

198 Q. Can levers, which are not concerned with automatic operation, be operated when the automatic interlocking is in effect?

A. Yes, unless a conflicting route would be set up by doing so.

199 Q. In the event of a failure of any sort at an automatic interlocking, what must the towerman do?

A. Proceed in accordance with the appropriate rule for the type of interlocking involved.

200 Q. In what position should the towerman place the master lever when leaving the tower?

A. In the reverse position.

NOTE—See page 56 for list giving location of Automatic Interlocking Plants.

Location of Interlocking Plants

GEN. RY. SIG. CO.—Electric Interlocking Plants.

Queens Plaza East
Queens Plaza West
Lexington Ave. and 60th St.
57th St. and 7th Ave.
Times Square
34th St.
Union Square
Canal St. and Bway.
City Hall
Whitehall St.
Gold St. (Myrtle Ave.)
Lawrence St.
DeKalb Ave.
Pacific St.
36th St. and 4th Ave.
59th St. and 4th Ave.
86th St. and 4th Ave.
Prospect Park
Brighton Beach
Ocean Parkway
Kings Highway (Culver)
West 8th St.
Stillwell Ave.

5th Ave. (38th St. Cut)
8th Ave. (38th St. Cut)
Bay Parkway
6th Ave. (Sea Beach)
Kings Highway (Sea Beach)
Coney Island Creek
Canal St. (Center St.)
Gates Ave.
Tower 1, E. N. Y.
Tower 2, E. N. Y.
Tower 3, E. N. Y.
Greenwood Ave.
Lefferts Ave.

FEDERAL SIGNAL CO.—Electric Interlocking Plants

Chambers St.
Jamaica (168th St.)
Essex St. 2 E

**HALL SWITCH & SIGNAL CO.—
Electric Interlocking Plant**

Broadway and Myrtle Ave.

UNION SWITCH CO.—Electric Interlocking Plant

36th St. and 5th Ave.

**UNION SWITCH & SIGNAL CO.—
Electro - Pneumatic Interlocking
Plants**

Park Row
Bridge Yard
Kings Highway (Brighton)
Wyckoff Ave.
Navy St.
Sands St.
Franklin and Fulton
Marcy Ave. and Bway.
Fresh Pond Road
Grand and Myrtle

Mechanical Interlocking Plants

Hubbards Creek (Sea Beach)
Fulton Ferry
Tillary St.
Adams St. Cut
Crescent St. 2 E
Nostrand and Fulton
A. Y. Yard—E. 105th St.
65th St. and 3rd Ave.
Kings County Terminal
High St. Loop
Broadway Ferry
60th St., Jamaica
Grant Ave. 2 E
Rockaway Parkway

INTERLOCKING PLANTS

Arranged for Automatic Control

Franklin Ave. and Fulton St.

65th St. and 3rd Ave.

Grand and Myrtle Aves.

Park Row.

Montrose Ave.

OAK PRINTING & PUBLISHING CO.
NEW YORK