

BRITISH RAILWAYS
(North Eastern Operating Area)

INSTRUCTIONS
IN CONNECTION WITH THE
WORKING OF
ELECTRIC TRAINS
ON THE TYNESIDE ELECTRIFIED LINES

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Each employee supplied with this book must make himself acquainted with, and will be held responsible for the observance of, the following instructions.

The Rules and Regulations of the Railway Executive also apply except as otherwise provided in these Instructions.

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GENERAL INSTRUCTIONS

Lines
equipped
for
electric
traction.

1.—These instructions apply to the North and South Tyneside Electrified lines of the British Railways, North Eastern Operating Area, viz.:—

The lines between Newcastle and Tynemouth via Wallsend and Benton.

The Riverside Branch.

The Main Lines between Newcastle and Benton Quarry Signal Box and from there to Benton Station Signal Box via the South West Curve and to Benton East Signal Box via the South East Curve.

The Newcastle and South Shields Branch.

The Quayside Branch,
and the several other curves, connections, sidings, and platform lines set out in detail in Instruction 40.

2.—Electrical energy is supplied from the power stations of the North Eastern Electricity Board by means of high tension cables, to the Railway Executive's sub-stations at

Supply
of
electrical
energy.

Wallsend	Percy Main
Pandon Dene	*Gateshead
*South Gosforth	*Pelaw
Benton	*Jarrow
*Earsdon Grange	*Tyne Dock
Cullercoats	
* Unattended	

from which the third rail conductor throughout the electrified lines and the overhead conductor in the Quayside sidings are fed by low tension cables known as feeder cables.

During the hours at which the sub-stations mentioned above are shut down the Gosforth Car Sheds and Sidings are fed from a sub-station at the Car Sheds.

The principal point of control is at Wallsend Sub-station where the Railway Executive's Electric Control is located. The Electric Control will issue instructions with regard to the switching for the whole system.

The third rail and connections are charged with electricity at a potential of approx. 630 volts.

Telephone communication is provided between the Control Room and all important points.

Third rail
and
connections.

3.—(a) Throughout the Electrified Area (except as described in Instruction 5), a third rail is laid for the purpose of conveying electrical energy to the trains. Usually it is placed in the 6 ft. way sometimes outside the track, but never in the 4 ft. way. Mounted on porcelain insulators it is elevated slightly above the track rails. Timber protection boards painted white are attached to the rail where necessary, while at the section ends the protection boards are painted red. At various points the rail is anchored to the sleepers by strain insulators, known as anchor insulators.

(b) The third rail is split up into various sections (as described in detail in Instruction 40). Electrical continuity to the various sections is established through cables connected to either a sub-station, signal box, chamber or pillar switchboard. These cables are known as feeder cables and are marked near the terminal with the section number.

(c) Electrical continuity is maintained over the gaps within the respective third rail sections by Continuity Cables, the ends of each individual cable being marked near the terminals with the section number and cable number. These cables are separately numbered on each section; those on even numbered sections have even numbers and those on odd numbered sections have odd numbers.

A Section can be sub-divided by disconnecting the continuity cables. **Both terminals of the cable must be disconnected.** In the case of the dolly type terminal the set screws must be taken out and the

3 (c)—Continued.

bond lifted up clear of the metal cap and prevented, by some insulating material, from restoring contact. The bonds should not be allowed to make contact with ballast. In the case of the Callender connectors the cable terminal nut must be unscrewed from the large bolt and the cable taken off. The cable socket must be prevented from coming in contact with the third rail, track rail or ballast.

Disconnection whenever possible should only be done when the rail is "dead", but in any case both ends of the cable must be disconnected as stipulated above.

4.—When a section of line, or part of it, is made dead because of derailment, failure or other mishap particular care must be taken to ensure that none of the gaps between the dead section and the adjacent live sections or between the live part and the dead part of a section is bridged by an electric train. Death or serious injury to men working on the dead section might result from failure to observe this instruction.

Trains
bridging
section
gaps.

5.—The sidings at the top and bottom of the Quayside Tunnel are equipped with overhead wires for the purpose of conveying electrical energy through collectors known as pantographs to the electric locomotives using these lines. These wires derive current supply from the same source as does the third rail and the safety precautions apply equally to both.

Overhead
conductor.

Normal
path of
current.

6.—(a) Current is taken from the third rail by the collector shoes of the trains. It passes through the electrical equipment and the motors to the wheels, whence it is led back to the sub-stations by the track rails, which are suitably bonded for the purpose. In addition, a negative rail laid in the centre of the four-foot way, and bonded to the track rails to assist in carrying the current back to the sub-stations, is provided at various places. After leaving the apparatus on the trains, and reaching the track rails, the current is not dangerous.

(b) Where the normal path of the current is disturbed, a short circuit may be set up, which has harmful effects, and needs to be quickly remedied. A disturbance may be caused by conductive substances connecting the third rail with the ballast, track rails, or other track metal work. Ballast (especially coke and cinder ballast), wet materials, and all metals are good conductive substances.

Caution
against
electric
shock.

7.—It must always be assumed that the third rail and its connections are alive. Even if it be known that the current is cut off because of its not being required for traffic purposes, it may be switched on at varying times according to circumstances.

All employees of the Railway Executive are warned against crossing the third rail more than is absolutely necessary in the discharge of their duties.

All employees are also warned that when one shoe of a train is in contact with the third rail all the other shoes of the train are alive. Care should

7—Continued.

be taken not to touch or step on a shoe when stepping from an electric train on to the permanent way and when stepping up to an electric train from the permanent way.

8.—Trespass must not be permitted, and any unauthorised person observed walking on or in the vicinity of the electrified lines must be requested to leave and warned not to trespass again. The name and address of any such persons must be taken and handed to the nearest Station Master or other superior officer with a report of the circumstances.

Trespassing.

9.—In order to avoid risk of interference with the current in the third rail, it is important that all yards, sidings and track be kept clean and clear of dirt, refuse and spare material. Proper receptacles are provided at each station for dirt and refuse.

Disturbance
to current
supply.

10.—(a) Every employee of the Executive knowing of fire or sparking on the third rail or overhead wires (otherwise than when a train is passing) or on the cables and connections, or of accident on the line, must report it, or ensure its being reported at once to the nearest signal box, and wait and perform such services as the Signaller or the occasion shall require.

Reporting
accidents,
&c., and
acting
promptly.

(b) In reporting fire, sparking or accident, care must be taken to state the exact locality, and whether the Up or Down line or both are affected.

Means of
ensuring
safety.

11.—(a) In performing any service in connection with the third rail, persons must protect themselves from electrical contact by means of the nonconductive articles supplied.

(b) A pair of rubber gloves and two bags of dry sand must always be available in each signal box and at each station.

Each motor coach carries a rubber mat and bag of sand.

A damaged glove is dangerous, as also is a wet glove when the moisture extends as far back as the wrist. All damaged gloves must be replaced at once.

(c) In default of rubber gloves or mat, a nonconducting medium must be improvised in cases of emergency. Dry wood, or dry woollen, cotton or paper material of several thicknesses may be used.

Extinguishing
fire.

12.—Fire extinguishers supplied for use in electric stock fall into two categories, viz.:—

(a) Soda-acid type, two of which are provided in each luggage compartment. These must not be used on, or adjacent to, any electrical equipment which may be alive.

(b) Special extinguishers, one of which is provided in each Motorman's compartment. These are distinguished by a broad yellow band and are safe to use on live electrical equipment.

Care must be taken, particularly in confined

12 (b)—Continued.

spaces, to guard against the fumes given off by the special extinguishers.

Staff must make themselves familiar with the method of operating both types of extinguisher. Instructions are printed in bold letters on the cases of all extinguishers.

WATER MUST NOT BE USED UNDER ANY CIRCUMSTANCES WHILST THE CURRENT IS STILL ON. Hose pipes must be kept clear of live rails and live conductors.

In all cases except where machinery and instruments are involved, DRY sand may be used.

13.—Electric head and tail signals are carried by electric passenger trains, particulars of which are given in the Sectional Appendix to the Rules and Regulations and Working Time Table.

Train
signals.

Electric parcels trains must carry an oil tail lamp by day and by night.

Block Regulation 19 is not applicable during daylight to electric trains (except in the case of electric parcels vans).

14.—A line leakage test of all sections of third rail will be made each Wednesday night (Thursday morning) after the cessation of electrically operated trains, and the line will be alive during these tests.

Line
leakage.
test.

INSTRUCTIONS TO CIVIL AND SIGNAL & TELECOMMUNICATIONS ENGINEERS' STAFF

Electric
Track
Equipment—
general
description
of third
rail.

15.—The third rail is supported upon insulators fastened by coach screws to the sleepers of the permanent way. The rails are normally of 60 feet lengths, and are jointed with fish plates. Copper bonds provide continuity at the joints.

The centre of the third rail is at a distance of 1 foot 4 inches from the gauge line, and the top is 3 inches above the level of the track rails. A section of track is shown below.



The rail ends on either side of gaps and inter-sections are suitably shaped to allow the collector shoes to mount the rail easily.

In order to ensure sufficient clearance at junctions and crossings between the shoes of a train travelling on one track and the third rail of the converging track, a clear distance of 1 foot 8 inches

15—Continued.

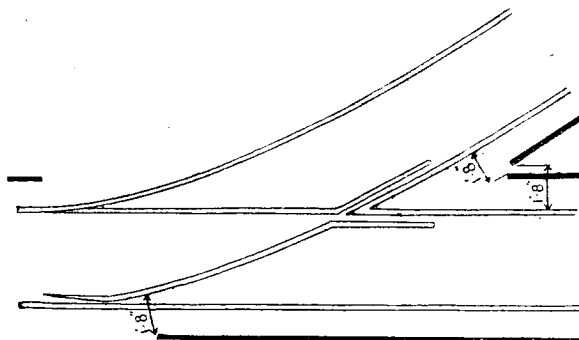
must be left between the track rail and the third rail, as shown below.

Note.

Track Rail shown thus



Third



In special cases side run-on pieces are fixed to the side of the third rail to allow the collector shoe to mount the rail where it cannot be broken near points.

A space of at least 3 feet is left between the ends of third rails and the sides of all level crossings.

The insulators are generally fixed on the longitudinal centre line of the sleepers, and are not usually fixed upon the track rail joint sleepers. The distance between insulators should never exceed 14 feet from centre to centre.

Bonding.

16.—Both the third rail and the track rails are respectively connected by means of copper bonds so as to ensure electrical continuity. At crossings and junctions long bonds are used to bridge across interruptions to the track rail.

The track rails are generally cross-bonded between the two rails of each track at intervals of 300 feet, and between the two inner rails of adjacent tracks at the same space interval. The bonds in the 6-foot way are midway between those in the 4-foot way. Where track circuits are installed cross-bonding is altered to suit.

All bonds are made of flexible copper strands in order to prevent breakage by vibration.

**Main
Cables.**

17.—Main cables (i.e., high tension, telephone, pilot and lighting cables), run alongside the track in several places on the North Tyneside Area; they are generally buried in the ground, and their route is indicated by cast-iron pillars marked "Cables." At bridges, viaducts, in tunnels and in cuttings where they cannot be laid underground, the cables are carried on brackets, and either armoured or enclosed in iron troughs.

**Third Rail
and Negative
Return
Cables.**

18.—(a) Third rail feeder cables pass from the sub-stations, signal boxes with section switch boards and switch chambers or pillars to section gap terminals. Third rail continuity cables pass from terminal to terminal where the third rail is interrupted.

18—Continued.

(b) Negative return cables pass from the track rails or negative return rail (where installed) to the sub-station. Where the negative return rail is interrupted electrical continuity is established either by cables or bonding.

Cables are generally laid on or near the surface and are either covered by tiles marked "Electric Cable" or encased in wooden trunking. Where laid underground they are placed at a depth of 1 to 3 feet.

19.—(a) When trains are approaching, employees working on the permanent way must at once move clear to the outside of the line, and on no account stand in the six-foot way.

Observances
for safety
of employees.

(b) The Ganger or man in charge must not allow his men to work singly more than is necessary.

(c) All Permanent Way, Signal and Telecommunications and Shops staff working on the electrified lines must be provided with a pair of rubber gloves and each Civil Engineer's gang and each Civil Engineer's train with a rubber mat or other insulating equipment. The Inspector, Ganger or man in charge must advise his men of the danger of allowing themselves or any bare metal tools to make contact with either the third rail and the track rail or chairs, ballast, water mains, or other conductive material, and he must see that his men when working in close proximity to the third rail

19 (c)—Continued.

use the insulated tools and insulating equipment to avoid such contact being made.

Unloading
material.

20.—(a) Care must be taken not to allow ballast or any other material to come in contact with the third rail, insulators, anchors or terminals.

(b) Ballast or other material must be unloaded in the four-foot way or clear of tracks used by electric trains. Only wagon doors furthest from the live rail must be let down.

(c) The man who has charge of the unloading must see that materials are not left any nearer than 2 feet 3 inches from the outside of the track rails or higher than the top thereof.

Scrap
material.

21.—The Permanent Way and S. and T. Engineer's Staff must see that all scrap material (such as broken chairs, fish-plates, bolts, old rails and wires) is kept clear of the third rail and taken to the scrap bins provided for this purpose.

All spare material must be returned to the proper store.

Trolleys.

22.—Great care must be taken when placing trolleys on the line and removing them, so that they do not come in contact with the third rail.

Fixing
signal
wires.

23.—(a) The S. and T. Engineer's staff when fixing and repairing signal wires must attach a cord to

23 (a)—Continued.

the wire when reeving it under the rails, and also place a piece of wood under the third rail to prevent accidental contact.

(b) The S. and T. Engineer's staff or other workmen, are strictly forbidden to leave any wire or other metallic material by the side of the line unless it is secured in such a way as to prevent anyone tampering with it or placing it in contact with the third rail.

24.—Each Ganger or man in charge must carefully examine the drains on his length, and keep them in proper order. On account must he allow the water to accumulate so as to interfere with the third rail or insulators, and in cases where this is likely to occur he must at once report the matter to the nearest Signaller and, by telegraph, to the Permanent Way Inspector.

Drains.

25.—All boxing over point rods, signal wires, water and gas pipes, etc., and all timbers at level crossings and bridges, must not be above the level of the track rails for a distance of 1 foot 9 inches from the outside thereof so as to be clear of the collector shoes of electric coaches. The shoes drop to a lower level when free from contact with the third rail.

Clearances
for collector
shoes.

26.—(a) Gangers or men in charge, and others when excavating ground or sleepers must, if they

Protection
of cables.

26 (a)—Continued.

come across any hard substance, investigate the matter carefully before proceeding further with the work.

(b) They must on no account allow anyone to drive posts, crowbars or picks into ground near those places where cables are known to be laid without first having received permission from the Civil Engineer, the Mechanical and Electrical Engineer and the S. and T. Engineer.

Tools and
stores.

27.—Tools, bonds, etc., for repairs to the electrified lines must be kept dry and clean.

Sand for
putting
out fire.

28.—Permanent Way Inspectors will be responsible for seeing that a supply of sand is kept at each station. **Water Must Not** be thrown on the third rail and must only be used for extinguishing burning sleepers or timber work which is clear of the third rail and fittings.

Defective
fencing.

29.—Fencing protecting the Railway Executive's property along the electrified lines must be kept under careful observation and if at any time it is found to be defective, steps must be taken to repair it immediately and a report sent to the Permanent Way Inspector.

Examining
lengths.

30.—(a) When examining lengths, the Ganger or other authorised person must have with him a

30 (a)—Continued.

pair of rubber gloves in addition to the articles mentioned in Rule 220. He must examine the insulators, rail joints, anchors and cable terminals, and any breakage or defect must at once be reported to the Permanent Way Inspector.

(b) The Ganger or other authorised person when walking a length must attend to any matter reported by the Signalmen.

31.—Spanners which may be required in connection with low tension cable terminal nuts and bolts are kept at each signal box.

Special tools.

32.—(a) In lifting the permanent way no lift must be greater than one inch at a time, and must be carried out in a length of at least 20 yards. All sleepers to which insulators are fastened must be properly packed before trains are allowed to pass over them, so as not to cause breakage of the insulators.

Lifting and ballasting permanent way.

(b) Each gang is provided with a track jack, which must be used in place of the ordinary bars; and on no account must it be placed under the third rail. In slewing the line or in packing the road, great care must be taken that the bars or tools do not come in contact with the third rail, insulators, anchors, terminals or cables.

Lifting
cross-over
roads.

33.—When lifting and packing the lines at cross-over roads and junctions, care must be taken to see that both rails are raised equally up to a point where the rails are 2 feet 6 inches apart, so as to prevent the collector shoes of the trains from catching the cross rails.

Broken
rails.

34.—A broken rail must be replaced as early as possible, but in cases of emergency the broken part may be drilled, fished and bonded until proper arrangements can be made to remove it. All cases of broken rails must be reported to the Permanent Way Inspector by telegraph.

Alterations
to
permanent
way—
re-bonding.

35.—When any alterations involving the breaking of the track rails are made they must be re-bonded as speedily as possible. All materials and tools necessary for this purpose must be on hand previous to breaking the road.

Broken
insulators.

36.—All cases of broken insulators must be reported to the Permanent Way Inspector and be replaced as soon as possible. Care must be taken to use rubber gloves when carrying out this work.

Accidents
or
obstruction.

37.—In all cases of accident, or of obstruction due to the presence of snow and ice, an advice must be immediately sent by telephone or telegraph to the Permanent Way Inspector, informing him of the nature of the accident or obstruction.

38.—When it is found necessary to clear the third rail of snow or ice before the service begins in the morning, the Permanent Way Inspectors or men in charge will be called out and held responsible for clearing the third rail. In the event of further assistance being required with scrapers, the Permanent Way Inspectors will communicate with the Superintendent of the Car Sheds, who will place vehicles with scrapers at their disposal. (See also Instructions 54 and 80).

Clearing
third rail
of snow
or ice.

39.—(a) Should it be necessary to make a section of the third rail dead for repair purposes, the Ganger or man in charge must communicate with the nearest Signaller, who will then arrange for current to be cut off in accordance with Instructions 40 and 46.

Making the
third rail
dead for
repair
purposes.

An entry must then be made in the signal box Occurrence Book giving particulars of the work about to be done on the dead section of third rail. The Signaller, also the man requesting the line to be made dead, must sign the book, such signed entry being an assurance to the Ganger or man in charge that the section of the third rail has been made dead.

(b) When repairs have been completed and the section of line can be made alive again, an entry in the Occurrence Book must be made stating that all men and materials are clear. This entry must be signed both by the Signaller and the person who requested the section to be made dead, after which

39 (b)—Continued.

arrangements may be made to make the section alive.

(c) When it is necessary to disconnect the cable terminals at each side of a derailed vehicle or obstruction, this work may be done by the permanent way staff, if available, under the instructions of the Station Master, Signaller or other authorised person. The Electric Control must be advised immediately of any such cable disconnection.

INSTRUCTIONS TO SIGNALMEN

40.—The Mechanical and Electrical Engineer is responsible for controlling the supply of Electrical Energy to the third rail and overhead conductors. An Electric Control Operator is stationed continuously in a Control Room situated adjacent to Wallsend Sub-Station and he will control all switching operations. Contact can be established on the following telephone circuits:—

Sectioning
of
third rail.

North Tyneside	South Tyneside
Direct Line	Special Circuit
Various Omnibus circuits	Emergency circuit via Newcastle Telegraph Office
P.O. Wallsend 63471	P.O. Wallsend 63471

A diagram of the whole system showing the switching connections is posted in each signal box on the Tyneside Electrified Lines. A diagram is also posted in signal boxes responsible for switching operations showing in greater detail all the local switch connections, and feeder and continuity cable connections in the immediate neighbourhood.

When not in use or in case of accident individual sections of third rail can be made dead by having all the section feed point switches opened. The ends of these sections are indicated by the protection boards being painted red for a length of 12 feet. Up and Down lines can be made dead separately.

40—Continued.

The term "Switch open" means that the switch contacts are apart thereby breaking the path of the electric current. The term "Switch closed" means that the switch contacts are closed together, thereby completing the path for the flow of electric current.

The following is a list of Third Rail Sections, giving the situation of the controlling switches; each section is known by a number, and all switches and circuit breakers are suitably indicated on the various switchboards:—

PASSENGER LINES

No.	Situation of Switch.	Section. From To	Line.	Situation of Switch.
P. 1.		Buffer ends No. 1 Platform.	End of No. 1 Platform.	Platform. Platform Switch Chamber at end of Central Sta- tion Fish Dock.
P. 2.		Buffer Ends No. 2 Platform.	End of No. 2 Platform.	do. do.
P. 3.		Buffer Ends No. 3 Platform.	End of No. 3 Platform.	do. do.
P. 4.		Buffer Ends No. 4 Platform.	End of No. 4 Platform.	do. do.
P. 5.		Buffer Ends No. 5 Platform.	End of No. 5 Platform.	do. do.
P. 6.		Buffer Ends No. 6 Platform.	Diamond Crossing.	do. do.

Sections Nos. P. 1 to P. 6 refer to Platform Lines in Newcastle Central Station.

40—Continued.

No.	Situation of Switch	From	Section. To	Line	Situation of Switch
7.	Central Third Rail Sectioning Cabin East of Central Station	Central Station	Manors Station	Down Main	Manors Third Rail Sectioning Cabin.
8.	do.	do.	do.	Up Main.	do.
9.	do.	do.	do.	Down Tynemouth	do.
10.	do.	do.	do.	Up Tynemouth	do.

Hook Switches are mounted on Third Rail Sections Nos. 7, 8, 9 and 10 at Dean Street Viaduct whereby the portions of these Sections to the East and West of this point may be disconnected from one another.

11.	Manors Third Rail Sectioning Cabin.	Manors Station	Riverside Signal Box.	Down Main	Riverside Signal Box.
12.	do.	do.	do.	Up Main	do.
13.	do.	do.	do.	Down Tynemouth	do.
14.	do.	do.	do.	Up Tynemouth	do.
15.	Riverside Signal Box.	Riverside Signal Box	Heaton South Signal Box	Down Main	Heaton South Signal Box.
16.	do.	do.	do.	Up Main	do.
17.	do.	do.	do.	Down Tynemouth	do.
18.	do.	do.	do.	Up Tynemouth	do.
19.	Heaton South Signal Box	Heaton South Signal Box	Point on Benton S.W. Curve	Down Main	Benton Sub-station.
20.	do.	do.	do.	Up Main	do.
21.	do.	do.	Point East of Wallsend Station	Down Tynemouth	Wallsend Sub-station.
22.	do.	do.	do.	Up Tynemouth	do.

40—Continued.

No.	Situation of Switch	From	Section. To	Line	Situation of Switch
23.	Riverside Signal Box.	Riverside Signal Box.	Walker Signal Box.	Down Riverside	Walker Signal Box.
24.	do.	do.	do.	Up Riverside	do.
25.	Walker Signal Box.	Walker Signal Box.	Point East of Carville Station.	Down Riverside	Wallsend Sub-station.
26.	do.	do.	do.	Up Riverside	do.
27.	Wallsend Sub-Station.	Point East of Wallsend Station.	Percy Main	Down Tynemouth	Percy Main Signal Box.
28.	do.	do.	do.	Up Tynemouth	do.
29.	do.	Point East of Carville Station.	do.	Down Riverside	do.
30.	do.	do.	do.	Up Riverside	do.
31.	Percy Main Signal Box.	Percy Main	Tynemouth	Down Tynemouth	Tynemouth South Signal Box.
32.	do.	do.	do.	Up Tynemouth	do.
33.	Tynemouth South Signal Box.	Tynemouth	Point North of Cullercoats Station.	Down Tynemouth	Cullercoats Sub-station.
34.	do.	do.	do.	Up Tynemouth	do.

Sections 33 and 34 are continued through the Platform Lines.

On leaving Tynemouth Station the **Up** line becomes the **Down** line, and the **Down** line becomes the **Up** line.

35.	Cullercoats Sub-Station	Point North of Cullercoats Station.	Backworth Station Signal Box.	Down	Backworth Station Signal Box and Earsdon Grange Sub-Station.
36.	do.	do.	do.	Up	do.
37.	Backworth Station Signal Box.	Backworth Station Signal Box.	Point E. of Benton Station.	Down	Benton Sub-Station.
38.	do.	do.	do.	Up	do.

40—Continued.

No.	Situation of Switch	Section. From	To	Line	Situation of Switch
39.	Benton Sub- Station.	Point East of Benton Station.	South Gosforth East Signal Box.	Down	South Gosforth East Signal Box.
40.	do.	do.	do.	Up	do.
41.	South Gosforth East Signal Box.	South Gosforth East Signal Box.	Point North of Manors North Station.	Down	Pandon Dene Sub-Station.
42.	do.	do.	do.	Up	do.
43.	Pandon Dene Sub-Station	Point North of Manors North Station.	West End of Manors North Station.	Down	Manors Third Rail Sectioning Cabin.
44.	do.	do.	do.	Up.	do.
45.	South Gosforth East Signal Box and Hook Switch on Third Rail.	South Gosforth East Signal Box.	South Gosforth West Signal Box.	Down	South Gosforth West Signal Box.
46.	do.	do.	do.	Up	do.
47.	South Gosforth West Signal Box.	South Gosforth West Signal Box.	South Gosforth	Down	South Gosforth emergency switch pillar
48.	do.	do.	do.	Up	do.
49.*	Chamber at Heaton East Signal Box.	Heaton East Signal Box.	Benton Bank Signal Box.	Down Goods.	
50.*	do.	do.	do.	Up	Goods.
* Goods Lines used by Passenger Trains in emergency only.					
52.		East end of Nos. 4, 5 and 6 Platforms, Central Station.	Diamond Crossing.	Up and Down	Platform Switch Chamber at end of Central Station Fish Dock.
53.	Central Third rail Sectioning Cabin East of Central Station.	North End of High Level Bridge.	Point West of St. James' Bridge Signal Box.	Down	Gateshead Sub-Station.

40—Continued.

No.	Situation of Switch	Section. From	To	Line	Situation of Switch
53A.	Hook Switch mounted on Section 53 at North End of High Level Bridge.	North End of High Level Bridge.	South End of High Level Bridge.	Down Slow	Switch Pillar at North End of Gateshead East Station.
54.	Central Third Rail Sectioning Cabin East of Central Station.	North End of High Level Bridge.	Point West of St. James' Bridge Signal Box.	Up	Gateshead Sub-Station.
55.	Gateshead Sub-Station	Point West of St. James' Bridge Signal Box.	Pelaw Signal Box.	Down	Pelaw Sub-Station.
56.	do.	do.	do.	Up	do.

On leaving Pelaw the **Up** line becomes the **Down** line and the **Down** line becomes the **Up** line.

57.	Pelaw Sub-Station	Pelaw Signal Box.	Point East of Pontop Signal Box.	Down	Jarrow Sub-Station.
58.	do.	do.	do.	Up	do.
59.	Jarrow Sub-Station	Point East of Pontop Signal Box.	Harton Signal Box.	Down	Tyne Dock Sub-Station.
60.	do.	do.	do.	Up	do.
61.	Tyne Dock Sub-Station	Harton Signal Box.	South Shields Signal Box.	Down	Switch Chamber adjacent to South Shields Signal Box.
62.	do.	do.	do.	Up	do.

40—Continued.

The following crossovers on the Main Line between Newcastle and South Shields must not be used by electric trains because of the arrangement of the third rail:—

1. Pontop No. 1 Crossover (West End).
2. Jarrow Crossover near entrance to Shell Mex Branch.
3. Jarrow Crossover at West End of Station.

All other crossovers on this branch can be used by electric trains including the two following which, although not electrified, can be used in emergency by coasting the train through:—

1. Pontop Crossover No. 2 (East Crossover near Bridge No. 7.)
2. Hilda Signal Box.

GOODS LINES, DOCK LINES AND SIDINGS

CENTRAL STATION—Fish Dock, Horse Dock and Siding Lines. Supply is derived from the lines between Central Station and Manors Station, and between Central Station and Gateshead Station. The switch is situated in the Platform Switch Chamber at the end of Fish Dock.

MANORS NORTH STATION—Dock Platform Lines and Down Goods line. Supply is derived from Section 43 or 44. The switch for selecting supply from 43 or 44 is situated in Manors North Signal Box. The switches for individual control of the respective lines are situated in a Switch Chamber between Nos. 4 and 5 Platform Lines.

MANORS STATION AND NEWCASTLE QUAYSIDE—Trafalgar Yard and Quayside Lines. Supply is normally

40—Continued.

taken direct from Pandon Dene Sub-station but can be taken from Section 14. The switch for selecting supply from Pandon Sub-station or Section 14 is situated in a Switch Chamber near the mouth of Quayside Tunnel. To obtain supply from Pandon Sub-station the switches at the following points must be closed:—

Pandon Dene Sub-station.

Switch Pillar at North end of Manors North No. 1 Platform.

Switch Pillar under Argyle Street Bridge.

Switch Pillar outside Argyle Street Signal Box.

The switches for individual control of the Quayside Tunnel third rail and Trafalgar Yard overhead lines are situated in the switch chamber near the mouth of the Quayside Tunnel. The supply for the Trafalgar Yard Grain Dock overhead lines is derived from Trafalgar Yard overhead lines and the switch is situated in a switch box on a pole at the East end of the Grain Dock.

The supply for the Quayside overhead lines is derived from the Quayside Tunnel third rail and the switch is situated in a switch chamber at the lower end of the Quayside Tunnel.

HEATON EAST (WALKER GATE)—Down Goods Line. Supply is obtained from Section 21 by means of a switch situated in the switch chamber adjacent to Heaton East Signal Box.

WALLSEND STATION — Station Siding. Supply is obtained from Section 22 by means of a switch situated in a switch pillar opposite Wallsend Signal Box.

HOWDON-on-TYNE STATION—Station Siding. Supply is obtained from Section 28 by means of a switch situated in a switch pillar opposite Howdon-on-Tyne Signal Box.

40—Continued.

NORTH SHIELDS STATION—Siding and Carriage Dock. Supply is obtained from Section 32 by means of a switch situated in a switch pillar at the West end of the Up Platform.

TYNEMOUTH STATION—Down Main Line, Platform lines 4 & 5, and Platform line 6 & Fish Dock. Supply is obtained from Section 31 or 33 by means of a switch situated in a switch pillar between Nos. 5 & 6 Platform Lines, which also houses the three switches for the individual control of the above lines.

TYNEMOUTH STATION—Up Main Line and Platform Lines, 1, 2 and 3. Supply is obtained from Section 33 or 34 by means of a switch situated in a switch pillar at the North end of the Up Platform which also houses the two switches for the individual control of the above lines.

CULLERCOATS STATION—Sidings. Supply is obtained from Section 33 by means of a switch situated in a switch pillar on the Down side, North of Cullercoats Station.

MONKSEATON STATION—Shunting Neck, No. 1 Standage Siding, No. 2 Standage Siding, Cattle Dock Siding, and Horse & Carriage Siding. Supply for the Shunting Neck, No. 1 Standage Siding and No. 2 Standage Siding can be taken from Section 35 or 36 by means of a switch situated in a switch chamber at the East end of the Up Platform, which also houses the three switches for the individual control of these siding lines. Supply to the Cattle Dock Siding is obtained from No. 1 Standage Siding by means of a switch in a switch pillar adjacent to Monks-eaton East Signal Box. Supply to the Horse & Carriage Siding is obtained from Section 35 by means of a switch situated in a switch pillar at the East end of the Down Platform.

SOUTH GOSFORTH EAST—East Car Shed Lines and Approach Roads. Supply can be taken from Sections 39, 40, 41 and 42 and Gosforth East Sub-station via the switch-board in South Gosforth East Signal Box, or from the Car

40—Continued.

Sheds Sub-station when the third rails serving the running lines outside the Car Shed area are dead. On the switchboard at South Gosforth East Signal Box two switches are provided for the above lines, one of which controls East Car Shed Lines 1 to 8 and associated Approach Road, and the other East Car Shed lines 9 to 12 and associated Approach Road. The feeder cables from these two switches terminate at hook switches mounted on the third rails whereby the cables may be isolated from the third rails. Only East Car Shed Lines 1 to 8 and associated Approach Road can be made alive directly from the Car Shed Sub-station, where a switch is provided for the purpose. To obtain supply to East Car Shed Lines 9 to 12 and associated Approach Road from this source both the above-mentioned switches in South Gosforth East Signal Box must also be closed.

SOUTH GOSFORTH WEST—West Car Shed Lines and Approach Roads. Supply can be taken from Sections 45, 46, 47 and 48 via the switchboard in South Gosforth West Signal Box or from the Car Sheds Sub-station when the third rails serving the running lines outside the Car Shed area are dead. Supply to Sections 47 and 48 may be obtained in emergency from Sections 41 and 42, respectively, by means of switches in a switch pillar adjacent to the Down Branch line at the North end of South Gosforth Station. On the switchboard at South Gosforth West Signal Box two switches are provided for the above lines, one of which controls West Car Shed lines 3 to 8 and associated Approach Road, and the other West Car Shed lines 9 to 12 and associated Approach Road. Only West Car Shed lines 3 to 8 and associated Approach Road can be made alive directly from the Car Sheds Sub-station, where a switch is provided for the purpose. To obtain supply to West Car Shed lines 9 to 12 and associated Approach Road from this source both the above-mentioned switches in South Gosforth West Signal Box must also be closed.

40—Continued.

SOUTH GOSFORTH CAR SHEDS—East Car Shed Lines 1 to 8 may be coupled to West Car Shed Lines 3 to 8 by closing the two switches in the Car Sheds Sub-station irrespective of whether the Sub-station is supplying power or not. East Car Shed lines 9 to 12 may be coupled to West Car Shed lines 9 to 12 by closing the hook switch mounted on the third rail at the South-West corner of the Car Sheds.

PELAW STATION—Station Siding. Supply is obtained from Section 55 by means of a switch situated in a switch pillar at the East end of the Island Platform.

HEBBURN STATION—Up Goods Line. Supply is obtained from Section 58 by means of a switch situated in a switch pillar West of Hebburn Station on the Up side.

JARROW STATION—Down Siding. Supply is obtained from Section 59 by means of a switch situated in a switch pillar West of Jarrow Station on the Down side.

GARDEN LANE (SOUTH SHIELDS)—Nos. 1 & 2 Carriage Sidings. Supply is obtained from Section 62 by means of two switches situated in a switch pillar adjacent to Garden Lane Signal Box.

SOUTH SHIELDS—Middle Road, Sidings 1 & 2, Sidings 3 & 4, and Sidings 5 & 6. Supply can be obtained from either Section 61 or 62 by means of a switch situated in a switch chamber adjacent to South Shields Signal Box which also houses the four switches for the individual control of the above lines.

41.—The signalmen at the undermentioned boxes will be responsible for reporting to the Electric Control all matters pertaining to the working of the third rail sections enumerated below and for

Responsi-
bility for
Third Rail
Sections.

41—Continued.

the execution of instructions from the Electric Control concerning such sections:—

Signal Box		Section Numbers :	
Newcastle No. 1	...	P. 1, P. 2, P. 3, P. 4, P. 5, P. 6, and 52	
Manors ...	...	7, 8, 9, 10, 43 and 44	
Riverside ...	...	11, 12, 13, 14, 23 and 24	
Heaton South ...	...	15, 16, 17, 18, 19, 20, 21, 22, 49 and 50	
Walker Station	...	25 and 26	
Percy Main Station	...	27, 28, 29, 30, 31 and 32	
Tynemouth South	...	33 and 34	
Backworth Station	...	35, 36, 37 and 38	
South Gosforth East	...	39, 40, 41, 42, 45, 46, 47 and 48	
Gateshead High Street		53, 54 and 53a	
Pelaw ...	...	55, 56, 57 and 58	
Harton ...	...	59, 60, 61 and 62	

During the time Riverside Signal Box is closed, third rail sections 11 & 15, 12 & 16, 13 & 17 and 14 & 18 will each become one third rail section under the charge of Heaton South Signal Box.

During the time Percy Main Station Signal Box is closed third rail sections Nos. 27 & 31, and 28 & 32 will each become one third rail section under the charge of Tynemouth South Signal Box.

During the time Walker Station Signal Box is closed when the Riverside lines are alive third rail sections 23 & 25, and 24 & 26 will become one third rail section under the charge of Riverside Signal Box.

41—Continued.

During the time Harton Signal Box is closed third rail sections 57, 59 & 61 and 58, 60 & 62 will be under the charge of Pelaw Signal Box.

When a Signaller closes or opens any of the above mentioned signal boxes he must report to and take instructions from the Electric Control.

42.—(a) Signallers shall only be allowed to operate the switches and circuit breakers on the sectioning switchboards under the instructions of the Electric Control, Wallsend, except as otherwise laid down in local printed instructions. In emergency Station Masters or Inspectors in charge will be allowed to execute switching operations on receipt of instructions from the Electric Control, Wallsend.

Operation
of
switches.

(b) One Signaller only should undertake the arrangements for making the third rail alive or dead. A Signaller engaged on this duty must not be relieved until such arrangements are completed and the entries recorded in the book provided for the purpose.

(c) A diagram showing the arrangement of the switches has been placed in every signal box in which there is a switchboard. The switches are of two kinds, section switches and interconnector switches. The handles of the interconnector switches are painted white and like the section switches must only be operated on receipt of instructions from the Electric Control, Wallsend.

42—Continued.

(d) During the times the lines are normally open to traffic, all section switches will be kept closed, except in the case of siding switches which must be closed only at such times as is necessary for traffic purposes.

(e) A section of third rail is not disconnected and dead until all the feed point switches connected to the section are opened. The Signaller in charge of the section is responsible for ensuring that all such switches are open before advising other signal boxes or workmen that the third rail is dead in accordance with Instruction 47(a).

Operation of
Siding switch
pillars and
chambers.

43.—(a) The switch pillars and chambers must be kept locked and the keys left at the nearest signal box. Special instructions are posted in each pillar and chamber, in regard to the operation of the switches. These switches may be operated in accordance with Instruction 50 without first having the current cut off or communicating with the Electric Control, provided there is not a train in motion or electrical trouble in the siding. The Electric Control must be immediately advised of such operations as soon as complete through the Signaller in charge of the Section. When electrical trouble is being experienced on the third rail system, siding switches must only be operated on the instructions of the Electric Control.

(b) The Signaller in charge of the switch pillar and the Signaller in charge of the third rail section must record full particulars of every switch opera-

43 (b)—Continued.

tion in the book provided for this purpose. (See also Instruction 57).

44.—(a) When Power is required for electric traction the Electric Control will advise the Signaller in charge of the section concerned that the third rail is about to be made alive.

Commence-
ment of
traffic.

(b) As soon as the running of electric traffic has ceased on each section the Signaller in charge of the section must report the fact to the Electric Control, Wallsend, giving the number of the section. The Electric Control will then arrange to make the necessary section or sections dead, advising the Signaller in charge of the section or sections accordingly.

Cessation
of traffic.

(c) Line leakage test of all sections of third rail except the Car Shed Lines, Sections P1, P2, P3, P4, P5, P6, 52 and the Fish Dock Lines will be made each Thursday morning. After cessation of traffic on Wednesday all section switches will remain closed until instructions to open them are received from the Electric Control.

Line leakage
test.

45.—(a) In all cases of emergency especially where there is danger to human life or risk of serious fire, Signallers must tell the Electric Control what has happened and which section or sections of the third rail should be made dead. The Electric Control will make the necessary arrangements and afterwards inform:—

Operation
of switches
in cases of
emergency.

(1) The Signaller in charge of the third rail section concerned, who will in turn inform:—

45 (a)—Continued.

(i) The nearest signal box open on the adjoining section so as to ensure that no electric train bridges the gap between sections, and

(ii) Other signal boxes on the section.

(2) The Signaller who has reported the occurrence.

Restoration
of current
after
emergency.

(b) When the current has been cut off because of an emergency it must be restored only on the application of the Signaller at the signal box where the request was originally made for the third rail section concerned to be made dead. This request must be made by him to the Signaller in charge of the third rail section or sections concerned and that Signaller will ask the Electric Control for the current to be restored and will advise the other signal boxes on the section or sections concerned.

(c) Care must always be taken to state correctly the number of the section as given in Instruction No. 40.

(d) As soon as the section has been made dead, the Signaller at whose request it has been made dead must report to the Signaller in charge of the section.

Safeguarding
men during
Track
repairs—
Procedure.

46.—(a) Should it be necessary to make a section of third rail dead for repair purposes or should men be engaged on the permanent way during the

46 (a)—Continued.

period the section of third rail is normally dead, the person in charge of the work must communicate with the nearest Signaller, who, if not in charge of the section concerned, will in turn communicate with the Signaller who is.

The following procedure must then be carried out:

- (i) The Signaller in charge of the third rail section concerned must inform the nearest signal box on the adjoining section in the rear so as to ensure that no electric train bridges the gap between sections.
- (ii) He must then tell the Electric Control what is required.
- (iii) He must record details in the occurrence book to show the section affected and the time of communication.
- (iv) After receiving an assurance from the Electric Control that the section of the third rail concerned has been made dead he must record this information also in his occurrence book.
- (v) He must tell the Signaller who has made the request and the other Signallers on the section concerned of the arrangements for making the third rail dead.

46 (a)—Continued.

The Electric Control will make special arrangements for safeguarding the men and will issue the necessary instructions to the Signaller in charge of the section. Before giving this Signaller an assurance that the section concerned is dead the Electric Control will obtain from such responsible third rail section boxes in which indication is installed confirmation that the respective Neon Indicators have ceased to glow.

The Signaller at the signal box where the request has been made for the third rail to be made dead will make an entry in his occurrence book showing the time the request is received from the person in charge of the work, the particulars of the work to be done, the section of the third rail affected and the time the third rail is made dead. This entry will be signed by the Signaller and by the person in charge of each part of the work. Should the Signaller change duty during the time that work is in progress the man going off duty will be responsible for seeing that the man coming on duty countersigns the entry in the occurrence book.

Caution
blocks.

(b) The signal boxes, switch pillars and chambers in which switchboards are fixed are provided with wooden caution blocks painted red and lettered "Men working on line", which are to be placed on the switch contacts in order to prevent the switch being closed while men are working on the third rail or its connections. Whenever the line is made dead for men to effect repairs, or

46 (b)—Continued.

when men are engaged on the third rail during the period it is normally dead, the Signaller in charge of the section switch must place or have placed one of the wooden caution blocks on the switch contact for the section on which the men are working. Where there are signal boxes at each end of the section both Signallers must make use of the red caution blocks.

The caution blocks must not be removed from the switch contacts until definite instructions have been received from the person in charge of the men that all the men are clear of the rail and then only after permission has been granted by the Electric Control. In cases where there are Signallers at each end of the section the Signaller who received the information must transmit it to the Signaller at the other end of the section, but the reports to and the instructions from the Electric Control must be transmitted through the Signaller in charge of the section.

(c) When the work has been completed and all men and materials are clear so that the section of third rail concerned can be made alive again an entry must first be made in the occurrence book at the signal box originally receiving the request from the person in charge for the line to be made dead stating the time that the third rail has been restored to normal and that all men and materials are clear. This entry must be signed by the Signaller and by the person in charge of each part of the

Restoration
of current
after track
repairs.

46 (c)—Continued.

work, or his authorised deputy. If the person in charge of the work should be withdrawn before the work is complete his relief must deputise.

After this has been done the Signaller will advise the Signaller in charge of the third rail section. This Signaller will then advise the other signal boxes concerned that the third rail section may be made alive as soon as it is required for traffic purposes, and he will then ask the Electric Control to make the necessary arrangements. An entry in the occurrence book will be made by the Signaller in charge of the section and by the other Signallers affected.

Restoration
of current
on account of
repair work
after
accident or
derailment.

(d) When a section of third rail has been made dead on account of accident or other emergency which is followed by repair work to the third rail and its connections or to the permanent way and which continues to require the third rail section concerned to be dead, the Signaller at the box concerned must not ask for the section to be made alive again until he has received an assurance from the person in charge of the repair work that all men are clear of the line and that the current may be restored. He must make an entry in his occurrence book and advise the Signaller in charge of the third rail section who, after informing all Signallers on the section concerned, will pass the information on to the Electric Control and will ask for the section to be made alive again.

46—Continued.

(e) A third rail section must NEVER be assumed dead even if the respective Neon Indicator fails to glow. All changes of indications should be immediately reported to the Electric Control.

Neon
Indicators.

47.—(a) If a section is made dead during the period the third rail is normally alive the Signalman in charge of the section must inform by telephone all signal boxes on the section and the nearest signal boxes on the adjoining sections in accordance with Instruction 45 or 46.

Protection of
dead Section—
advising.

(b) Electric trains must not be allowed to pass on to a dead section.

Trains not to
bridge gap.

A Signalman having been informed that a section is to be made dead must ascertain from the motorman or guard whether any train at his box is standing over the section gaps or is in contact with the section of third rail to be made dead, and if so, the train must be moved clear before the section is made dead, unless owing to an emergency the arrangements set out in Instruction 45 have been applied.

(c) If a section of third rail has to be made dead during the hours that electric trains are running, all electric trains must be stopped at the signal box in the rear of the dead section.

Trains to be
stopped at
Signal Box
in rear.

48.—When a section is made dead on account of continuing fault or obstruction, it is essential to locate the fault and it may be necessary to limit

Limiting
defective
section.

48—Continued.

the effects by disconnecting cables. If it is proposed to disconnect cables, the Electric Control must be advised by the Station Master or Signaller nearest to the point where the disconnection is to be made, or by the person in charge of the work. Disconnections can then be made in accordance with Instruction 3(c).

When the terminals have been disconnected the Station Master or Signaller must advise the Electric Control who will then arrange for the switches to be placed as necessary. The dead section will then be limited to the third rail between the points of disconnection and Instruction 47 applied. As stated in Instruction 4, great care must be taken to ensure that the instructions to prevent the bridging of the gap are applied in the case of the new gap created by this cable disconnection.

The person making the disconnection must use the rubber gloves (Instruction 11(b)) and the spanner (Instruction 31) provided for the purpose.

49.—At each signal box on the Electrified Lines there should be on hand:—

- (i) Two bags of sand and one pair of rubber gloves (Instruction 11(b)).
- (ii) Two Whitworth single-ended spanners ($\frac{5}{8}$ in. and 1 in.).
- (iii) One 6 in. second-cut file where necessary (Instruction 50(e)).
- (iv) One Shunter's pole (Instruction 52(c)).

Equipment
in Signal
Boxes.

50.—(a) The special instructions posted up in the signal box must be strictly observed.

Handling of
switch gear.

(b) In following out the special instructions posted in the signal box, a subsequent step must not be taken until assurance has been received that the previous step has actually been completed.

(c) The person opening or closing switches must always stand clear. On opening, the switch must be pulled out sharply with the strap provided, and on no account must a switch be left partially open. Not more than one switch must be operated at the same time.

(d) In the event of a flare continuing after a switch has been opened, it should be extinguished by means of dry sand.

(e) After a flare on the switch board, the switch blades and forks should be examined, and if any beads of metal or roughness caused by burns are found, the switches and forks concerned must be made dead, and the beads or roughness filed off before the switches are again operated so as to ensure an even contact. A six-inch second-cut file which must not be used for any other purpose is supplied to each signal box, where necessary. Rubber gloves must be worn while this is being done.

Automatic
switch
gear and
circuit
breakers.

51.—Prior to making any circuit breaker alteration or adjustments, the Electric Traction Engineer's representative must advise the Electric Control, Wallsend of his intention, and enter the details of the alteration in the book provided in the signal box for the purpose.

Fire,
sparking
or accident.

52.—(a) Signalmen must keep a constant look out, and must pay careful attention to reports made to them of fire, sparking, accident or other emergency. They must immediately advise the Electric Control, Wallsend of such occurrences through the Signaller in charge of the third rail section, and must draw the attention of the Lengthmen or other employees of the Executive within call to the fire, sparking, accident or other emergency so that it may be remedied, or the cause ascertained.

(b) Every effort must be made to keep the lines clear of obstruction and to remove the cause of any short circuit without making the section dead.

(c) A shunter's pole must be kept at each signal box for the purpose of removing any obstruction from the rails. Dry wood may be used for the same purpose.

(d) If the Signaller considers it desirable he must arrange for the section of third rail affected to be made dead,

52 (d)—Continued.

- (i) When a fire or accident which cannot be dealt with under Clause (a) occurs on the line.
- (ii) When there is need of urgent repairs, as provided for in Instruction 39.

(e) A record of the time, nature, and consequences so far as can be ascertained, must be made and a report sent immediately to the Station Master, who will at once report fully to the District Operating Superintendent.

53.—(a) When fire, sparking, accident or other emergency affects or is likely to affect the working of traffic, an advice must be sent by telephone to the Train Control at Newcastle or Sunderland, as the case may be, the Electric Control, the Station Master's Office, Newcastle and Gosforth Car Sheds.

Reporting
of
accidents.

(b) When the sparking, fire, accident or other emergency is due to or causes any defect or disturbance of the track or third rail and associated apparatus, the Permanent Way Inspector and Electric Control, Wallsend, must be immediately notified. The latter will advise the third rail electricians or the cable electricians, or both, depending upon the apparatus involved.

(c) When the accident affects or relates to the coaches or equipment, or in case of interruption of current, the Gosforth Car Shed must be at once advised by telephone.

53—Continued.

(d) The Signaller in charge of the section must report to the Electric Control, Wallsend, full particulars of sparking, fire, accident or other emergency. The Electric Control will issue such instructions as may be necessary and record them for future reference.

(e) Should any Signaller have reason to believe that there is an interruption of electrical energy, he must at once report the fact to the Signaller in charge of the third rail section, who will in turn report to the Electric Control, Wallsend.

Snow or ice.

54. Whenever snow or ice is likely to accumulate on the third rail when the Permanent Way staff are not on duty, arrangements must be made to clear the third rail in accordance with the local instructions issued from time to time.

(See also Instructions 38 and 80.)

Repeating
telephone
message.

55. When a telephone message is sent relating to the restoring or interrupting of the current it must be repeated by the person receiving it in order to confirm that it is correctly understood. Great care must be taken to ensure that the correct number of the section is given.

56.—Defects in telephones must be reported at once. Inattention to calls must also be reported to the District Operating Superintendent. It is important that information be transmitted quickly and measures taken promptly.

Defects and
inattention
to
telephones.

INSTRUCTIONS TO STATION MASTERS, GUARDS, SHUNTERS, STATION STAFF AND OTHERS

Operation
of switch
pillars.

57.—The station staff will act when necessary for the Signaller in the operation of the switch pillars and chambers. (See also Instruction 43.)

Non-
conductive
material to be
available.

58.—A pair of rubber gloves and two bags of dry sand must be kept in each signal box (see Instruction 49(i)) and at each station. Station Masters will be held responsible for seeing that these are always on hand.

Protection
of men
working
under
coaches.

59.—Before proceeding to work underneath the coaches the instructions in the General Appendix to the Rules and Regulations and Working Time Table for the protection of Carriage Cleaners and others, when working on Coaching Stock must be observed.

Instructions
for working
Cowhead
couplings,
Rules 12
and 145.

60.—(a) The electric stock is fitted with a non-automatic centre coupling of the "Cowhead" type. The coupling heads act both as a coupling and a buffer—there being no side buffers on the vehicles other than the Electric Parcels Vans and Luggage Motor Driving Thirds.

(b). In coupling Electric Parcels Vans or Luggage Motor Driving Thirds to ordinary vehicles the

60 (b)—Continued.

Shunter must not stand between the vehicles until they come to rest.

(c) TO COUPLE OTHER THAN ELECTRIC PARCELS VANS AND LUGGAGE MOTOR DRIVING THIRDS.—A screw coupling must be in one only of the two heads about to be joined together, and the pin must be out of the other head. The Shunter, taking up a position in the gangway of the carriage, must hold up the end of the screw coupling until the vehicles are pushed together. The end must then be dropped and the remaining pin pushed through the head and the link, care being taken to see that both pins are far enough through to ensure that the drop-end falls down to prevent the pin from working out. The coupling must then be screwed up tightly, by means of the bar provided for that purpose. When tight, the screw must be in such a position that the bar drops down through a hole in the centre of the plain portion of the screw and through a hole in the coupling head, thus preventing the coupling from becoming slack.

The brake pipes may then be connected in the usual way, and the electrical connections as provided for in Instruction 61.

(d) TO UNCOUPLE OTHER THAN ELECTRIC PARCELS VANS AND LUGGAGE MOTOR DRIVING THIRDS.—The brake pipes and electrical connections must be disconnected and the screw sufficiently slackened to allow the pin to be with-

60 (d)—Continued.

drawn. After taking out one pin the coaches may be drawn apart.

(e) Spare screw couplings must be placed on the hooks provided in the driving compartment and must not be left lying on the floor.

(f) Care must be exercised in shunting vehicles fitted with "Cowhead" couplings. They must not be shunted against ordinary vehicles or against buffer stops if the latter are not provided with a centre buffing block.

(g) TO COUPLE ELECTRIC PARCELS VANS OR LUGGAGE MOTOR DRIVING THIRDS to ordinary vehicles, a special screw coupling which is secured to the cowhead coupler by a pin is provided on the electric vehicle. The pin must be pushed through the head and link far enough to ensure that the drop end falls down to prevent the pin from working out.

The side buffers on these vehicles must be placed in the "Long" position.

The screw coupling link must be placed on the hook of the ordinary vehicle and the coupling screwed up tightly.

The brake pipes may then be connected in the usual way.

(h) TO UNCOUPLE ELECTRIC PARCELS VANS OR LUGGAGE MOTOR DRIVING THIRDS

60 (h)—Continued.

from ordinary vehicles. The brake pipes must be disconnected, the screw coupling slackened and the coupling link lifted over the hook of the ordinary vehicle.

61.—(a) Except at Car Sheds, the station staff are responsible for attaching and detaching of coaches and for all connections being properly made. In assembling trains or coupling two trains together, after the screw couplings have been placed in position, a set of jumper cables must be inserted in their respective sockets.

Use of
Jumper Cable.

(b) Care must be taken not to touch the terminals of the jumpers, or let them come in contact with the rails, ballast or the metal work of the coach.

(c) If a coach fitted with collector gear is being coupled or uncoupled, or two trains each containing one or more coaches fitted with collector gear are being coupled or uncoupled, the jumpers must not be inserted or pulled out unless **one or more of the shoes** on each portion are making contact with the third rail. If none of the shoes on one portion is making contact, **all the main switches** on that portion must be placed in the "off" position before coupling or uncoupling.

In all cases when disconnecting Motor Coaches, the pump switches on them must be opened before the jumper cables are withdrawn.

Barrow
crossings to
be used for
Luggage.

62.—Luggage, etc., must only be conveyed across the line at stations via the barrow crossings.

Wagon
doors to be
secured.

63.—When shunting in sidings and yards on the electrified lines, care must be taken to see that the doors of all wagons are pinned up or shut, so that nothing can come in contact with the third rail and nothing can fall out of the wagons on to the rail.

Brake pin
chains.

64.—Brake pin chains must be fastened in a secure manner to prevent them coming in contact with the third rail. In all cases of brake pins or other metallic substances coming in contact with the third rail or its connection, the Guard, Shunter or other person concerned must arrange for the pins to be immediately fastened up or the metallic substance removed, even if this necessitates the stopping of the train. The Guard, Shunter or other person concerned must report such occurrences.

Shunting
operations.

65.—When pinning or unpinning brakes, coupling or uncoupling wagons, Guards, Shunters and others concerned, must, as far as practicable, work on the side of the wagons at which there is no third rail.

INSTRUCTIONS TO ELECTRIC TRAINMEN

66.—(a) The **1937** stock comprises 64 Articulated Twin-Coach Units, each unit being made up of two coaches carried on three bogies one of which is a motor bogie. The units are coupled together by means of centre cowhead couplers and short screw couplings. Buffers are not provided. The coaches are fitted with the Westinghouse Electro Pneumatic Brake.

Electric
Rolling
Stock.

(b) There are also two Luggage Motor Driving Third Passenger Coaches (non-articulated). Each coach is carried on two motor bogies. These coaches have side buffers as well as the centre cowhead coupler and can be attached to other **1937** electric stock or to non-electric stock. These two coaches are chiefly run with the six trailer coaches to form the Control Set. The coaches are fitted with the Westinghouse E.P. Brake only.

(c) In addition, there are two Motor Driving Parcels Vans for the conveyance of luggage, etc. Each van is carried on two motor bogies and is provided with buffers as well as the centre cowhead coupler. The vans can be attached to other **1937** electric stock or to non-electric stock. The vans are fitted with the Westinghouse E.P. Brake and with the Vacuum Brake.

(d) The **1920** converted stock comprises 18 single driving Motor Coaches each with one motor

66 (d)—Continued.

bogie and 18 single driving Trailer Coaches. These coaches are fitted with centre cowhead couplers but no buffers. The coaches are fitted with the Westinghouse E.P. Brake.

(e) In addition there is a Parcels Van which is fitted with centre cowhead coupler and side buffers. The Van is fitted with Westinghouse E.P. and Vacuum Brakes. The van can be attached to other **1920** electric stock or to non-electric stock.

(f) Trains can be made up of two, four, six or eight coaches. All motor coaches and certain of the trailer coaches are fitted with apparatus by means of which the motors on one or more of the motor coaches can be operated together from any one Motorman's compartment, whether at the front, rear or middle of the train.

(g) Coaches of various building dates must not be coupled together, except in case of emergency, and only the cowhead screw coupler must be used. On no account must an attempt be made to couple the electrical or brake connection.

(h) The maximum load to be hauled behind a Parcels Van must not exceed 100 tons. A parcels van which is running light or hauling vehicles, the weight of which does not exceed 30 tons, must have the motors of the trailing bogie cut out.

67.—The electric stock is fitted with passenger communication apparatus, and the Regulations for

67—Continued.

Communication between Passenger, Guard and Driver by means of the Automatic Brake as shown in the General Appendix to the Rules and Regulations and Working Time Table must be observed as far as they are applicable.

68.—When running between Newcastle and Manors and between Newcastle and Gateshead in either direction, Motormen must not move the Controller beyond the series position. Running.

69.—The power must be switched off as soon as possible after attaining full speed, and as long an interval allowed before applying the brakes, as is consistent with smooth stopping and the keeping of proper time during each run. In other words, Motormen must endeavour to "coast" their trains as much as possible. For their guidance diamond-shaped boards have been placed by the side of the track marking the point at which the power should be switched off. Coasting.

70.—The following stores will be carried in the Motorman's compartment of each motor coach: Equipment in motor coaches.

- 1 Screw coupling (Cowhead type).
- 1 Ice-scraper handle.
- 1 Shoe stick.
- 3 enclosed fuses of each type.
- 3 Motor fuses.
- 3 Shoe fuses.

70—Continued.

- 1 Rubber mat.
- 1 Fire extinguisher (marked with yellow band) (Instruction 12(b)).

In addition:—

- 1 30-ft. Train line coupler in each double-ended motor coach (Instruction 73).
- 1 Fire extinguisher in every luggage compartment (Instruction 12(a)).
- 1 Bag sand (Instruction 78(b)).

Train signals

71.—(a) Head and route signals must be carried by each train in accordance with Instruction 13. The Motorman will be responsible for the correct setting of the destination indicator and the marker lights at the leading end.

The Guard is responsible for the correct setting of the destination indicator at the rear end and the tail light.

(b) When trains pass through North Shields Tunnel the destination indicators must always be lighted as a warning to any person who may be working in the tunnel.

Lighting
and
heating.

72.—(a) Guards must regulate the lighting and ventilation of the coaches, and must also regulate the heating of coaches in accordance with the detailed instructions exhibited in the Car Sheds and at the terminal stations, and immediately inform the Motorman of any defect in the lighting

72 (a)—Continued.

or heating. The roof lamps must be extinguished when trains are resting.

(b) In the case of **1937** stock, the main heating and lighting switch and fuse are mounted on a panel which is enclosed and suspended from the under-frame. The lighting of the entire train can be controlled by trip and set switches which are mounted in each driving compartment. Circuit switches to control the lighting of each coach are mounted in the gangway. Two heating switches (main and half-heat) are mounted in the gangway of each coach. Full heat is obtained by turning to the ON position both switches. Half-heat is obtained by turning to the ON position the main switch only. A thermostat which is fixed to a partition towards the centre of each coach will then control the heating. Until the heat of the coach reaches the predetermined temperature, a small lamp fixed in the switch box will be illuminated.

In the case of the **1920** stock the main lighting switch, and in the Winter the main heating switch, on each coach, must be put to the ON position by the Motorman at the beginning of the day's working. All regulating of lights and heaters must be done by means of the small lighting and two-way heating switches on the gangways and vans.

73.—(a) Where gaps occur in the third rail Motormen must exercise great care so as to avoid stopping in such a position that the shoes of the train are not in contact with the third rail,

Trains
stopping
out of
contact
with third
rail.

73 (a)—Continued.

especially when working a single coach or a train with the shoes on only one coach in use.

(b) A single motor coach must carry the loose train line coupler 30 feet in length, fitted with slipper attachment.

(c) If a train or coach should stop over a gap, so that no shoe is in contact with the third rail, the Guard must take the loose train line coupler, if it is available, and insert the plug in the train line socket, and then hold the slipper down on the third rail at the nearest point to the train or coach. By this means the Motorman will be able to move the train until the shoes are again in contact with the third rail. The Motorman will be responsible for seeing that the temporary connection is properly made in the train line socket.

(d) On no account must the ends of the loose coupler be allowed to come in contact with the track, ballast, or any metal work.

Power cut off
from Third rail.

74.—Should the power be cut off from the third rail, the Motorman must, if he is applying power, move his controller handle to the OFF position, then see that the lighting switches are turned on, and wait till the lights indicate that the power has come on again. After the lamps have become fully lit up, he must, if on the up line, wait half a minute, and on the down line, one minute before starting

74—Continued.

the train, so that all trains will not commence to use current at the same time.

Should the power be cut off the third rail for more than three minutes, the Motorman must send the Guard to the nearest signal box to give information.

All power failures must be reported by the Motorman before signing off duty.

75.—Motormen must not allow any unauthorised person in the Motorman's compartment or to handle any of the apparatus in or about the trains, and must enter the names of any persons travelling in the Motorman's compartment on their daily voucher giving the Motorman's compartment pass number.

Unauthorised
persons in
Motorman's
Compartment.

Only two persons are permitted to ride in the Motorman's compartment, in addition to the Motorman, at any one time.

76.—The Motorman must always remain in the leading Motorman's Compartment when the train is in motion, except as provided for in Instruction 77. If it is necessary for the Motorman to leave the leading Motorman's Compartment he must always take the controller reversing handle with him.

Motorman
leaving
leading
Motorman's
Compartment.

Driving
train from
any other
than leading
Motorman's
Compartment.

77.—(a) In the event of any apparatus in the leading Motorman's Compartment proving defective, the train should be driven from the Motorman's Compartment nearest to the leading end of the train. A Guard or other person who knows the road must be stationed in the leading Motorman's Compartment to pass the necessary hand signals to the Motorman. The train should then proceed at Caution either to destination or the nearest point at which the defective vehicle can be uncoupled or the train left. The Motorman must at once send information through the nearest Signal Box to the Car Sheds if the train or coach has to be left in a siding.

(b) When setting back from one line to another or into a siding, the Motorman need not change ends.

(c) When a movement is made in the backward direction the Motorman must have his train well under control, and the Guard or Shunter must ride in the leading vehicle to keep a sharp lookout, warn anyone on the lines and give the necessary hand signals to the Motorman.

Fire on
Coaches.

78.—(a) Guards noticing any fire or smell of burning must at once draw the attention of the Motorman to it, assist him in ascertaining the cause, and render any assistance necessary. The Motorman should immediately open all the switches on the coach affected. If this does not

78 (a)—Continued.

remove the trouble, he must proceed to isolate the coach or unit by

- (i) Taking out the shoe fuses on the defective coach or twin unit.
- (ii) Withdrawing the train line jumpers on either side of the defective coach or twin unit.

(b) If arcing or flame is being maintained as the result of a short circuit and during the time the Motorman is isolating the coach as instructed above, the Guard must endeavour to extinguish it by means of the fire extinguisher marked with a yellow band, or by the use of dry sand. A bag of dry sand is carried under the long seat in the passenger compartment immediately behind the Motorman's Compartment.

(c) After making sure that all burning has ceased, the train may proceed to its destination to be dealt with as may be necessary.

(d) The responsibility for removing burning matter rests with the Motorman in cases where his train is stopped owing to this cause.

79.—Motormen observing any burning matter in close proximity to the third rail must stop, and if possible remove same, failing which they must report to the nearest signal box or station.

Burning
matter on
the track.

Where a train stops owing to burning matter, and

79—Continued.

the train comes to rest near a signal box which is open, the Guard should proceed to the box, and arrange with the Signaller for the current to be cut off until the fire is extinguished or the burning matter is removed. After this has been done the Guard must return to his train.

Snow or Ice
on
third rails.

80.—(a) In the case of snow or ice on the third rail the ice scrapers must be screwed down so as to avoid any delay to traffic. If necessary assistance must be given at terminal stations to shunt trains in order to deal with the scrapers which are on the platform side of the coaches.

(See also Instructions 38 and 54).

(b) Ice scraper gauges are kept at Gosforth Car Sheds, Newcastle Central, Manors North and South Shields.

(c) In screwing down the ice scrapers at other places than a terminal station where gauges are kept, the scraper must be screwed down until it touches the third rail and then two full turns given to the screw. **Rubber gloves must be worn when doing this.**

Attention
to luggage
compartment.

81.—(a) Guards are responsible for the opening and closing of inter-communication doors as necessary.

81—Continued

(b) In cases where there is more than one luggage compartment on a train the Guard must ride in the one nearest the rear of the train.

82.—The Guard must do all in his power to assist the Motorman in cases of difficulty (consistent with the first duty of caring for the safety of the passengers), particularly as required in Instructions 77 and 78.

Guards to assist Motorman.

83.—(a) Should an accident to an electric train accompanied by only one Guard cause an obstruction of any line or lines used by trains running in the opposite direction, the Motorman must immediately go forward on foot and protect the opposite line or lines in accordance with Rule 180(a).

Protection of train in case of accident.

Under these circumstances, when a Guard is not available for protection, the Motorman must act in accordance with Rule 180(c).

(b) If an accident results in a fire breaking out and there is also an obstruction of any line or lines used by trains running in the opposite direction, the Motorman must take the necessary action to extinguish the flames and the Guard must act in accordance with Rule 180(d).

Passengers
leaving
train in
case of
accident.

84.—In case of accident, passengers should be advised not to leave the coaches except at station platforms so long as the current is on the third rail. If it should become necessary to call upon the passengers to alight otherwise than at a station, care must be taken that they alight at the side which is clear of the third rail, and from the doors of coaches remote from collector shoe gear. The passengers must walk in the four foot way and must leave the railway at the nearest available place. The Guard or other competent person must accompany the passengers, and be responsible for their safe guidance.

Complaints
with regard
to running.

85.—Should any complaint be made by the Motorman with regard to the running of any of the coaches, or should the Guard notice anything amiss with the train, the Station Master or person in charge at the next station at which the train stops must be advised to wire the terminal station to have a spare set ready to put into traffic to take the place of the set of which complaint is made.

Guards to
assist
Station
staff.

86.—Guards must assist the station staff in coupling and uncoupling vehicles which it may be necessary to attach or detach.

Spare Oil
Lamps.

87.—A spare oil tail lamp must be carried and lighted in case of failure of the electric light.

Westinghouse
Brake
Regulations.

88.—The Regulations for working the Westinghouse Brake on steam trains must be observed so far as they are applicable.

HAULING OR PROPELLING OF ELECTRIC TRAINS IN EMERGENCY

89.—There are three means of removing an electric set which cannot be moved under its own power whether due to a defect in the set or in the third rail. Assistance may be provided by:—

- | | |
|---|-----------------------------------|
| (a) An additional electric set. | } In case of
defect in
set. |
| (b) A double driving parcels
motor van | |
| (c) A steam engine—in case of
defect in set or third rail. | |

Hauling or propelling of an electric set should be carried out only on the authority of the District Control, a Station Master or other responsible official.

If the set is defective it should be removed to the nearest convenient Siding—with a third rail shoe approach if possible—and the passengers detrained at the most suitable station short of the siding.

If there is a defect in the third rail, method “c” must be adopted and the set should be moved only as far as is absolutely necessary to clear the line and meet traffic requirements.

89—Continued.

(a) Assistance by an Additional Set

An additional set of not less than two motor coaches and two trailer coaches may be used to draw or propel the disabled train. It must be coupled to the train by cowhead couplers only.

(b) Assistance by a Parcels Motor Van

If a double driving parcels motor van is more readily available it may be used to haul or propel the disabled train. Side buffers at the end of the van nearest the train must be closed up and only the cowhead couplers engaged.

(c) Assistance by a Steam Engine

If assistance cannot be obtained with electric vehicles a steam engine may be used. Emergency rigid couplings are available to enable a steam engine which has no cowhead coupler to be coupled to electric passenger stock which has no side buffers. They are on hand at all stations in the Electrified Area and at the following signal boxes on the South Tyneside Lines:—

Park Lane	Pontop	Hilda
St. Bede's	St. James' Bridge	Garden Lane

The rigid coupling can be used only with a drawbar hook incorporating the gedge slot. Most modern passenger and goods engines and all wagons are fitted with this type of drawbar hook,

89—Continued.

but many of the mineral and smaller goods engines are not so fitted.

When a suitable engine has been obtained, the footplating of which does not protrude beyond the buffer beam, the three link or screw coupling should be removed and the doorway flap above the cowhead on the electric vehicle lifted up. The engine should then be brought in to stand about three feet from the cowhead. From the doorway of the electric vehicle the flattened section of the rigid coupling should be inserted in the gedge slot with the bar vertical, after which the bar should be dropped into the coupling pin holder incorporated in the cowhead. The engine should then close in towards the disabled set to bring the hole of the rigid coupling in line with the coupling pin holder, after which the coupling pin may be inserted and secured (when the rigid coupling has been pressed home the holes should be in alignment). There must be no one between the engine and the set during the closing-up movement. See detailed sketch, page 72.

If an engine fitted with a gedge slot is not available one or other of the following alternatives must be adopted according to circumstances:—

- (i) A wagon may be utilised between the set and an engine not so fitted, and the rigid coupling inserted in the gedge slot of the wagon drawbar hook.

89—Continued.

- (ii) The emergency hook for loose coupling where available must be used subject to the following conditions:
 - (a) Under no circumstances must the vehicles be propelled.
 - (b) It is essential to keep the coupling tight at all times and the handbrake in the Motorman's and Guard's compartments must be used as necessary.
 - (c) A speed of not more than 10 m.p.h. must be observed and the Motorman must be prepared for any signals from the Driver indicating that he is about to stop.
- (iii) An electric vehicle fitted with side buffers in addition to the centre cowhead coupler may be placed between the engine and the electric set, and so avoid the use of either the rigid coupling or the emergency hook for loose coupling.

In connection with method "a", "b" or "c" the following instructions must be carefully observed:—

1.—Control of Train

- (a) The Motorman of the set being assisted must apply the hand brake as required. If being hauled he must be prepared to observe hand signals from the Motorman of the assisting set or the Driver of the assisting engine. If being propelled, he and his

89—Continued.

Guard must ride in the leading Motorman's compartment and be prepared to exchange signals with the Motorman of the assisting set or the Driver of the assisting engine.

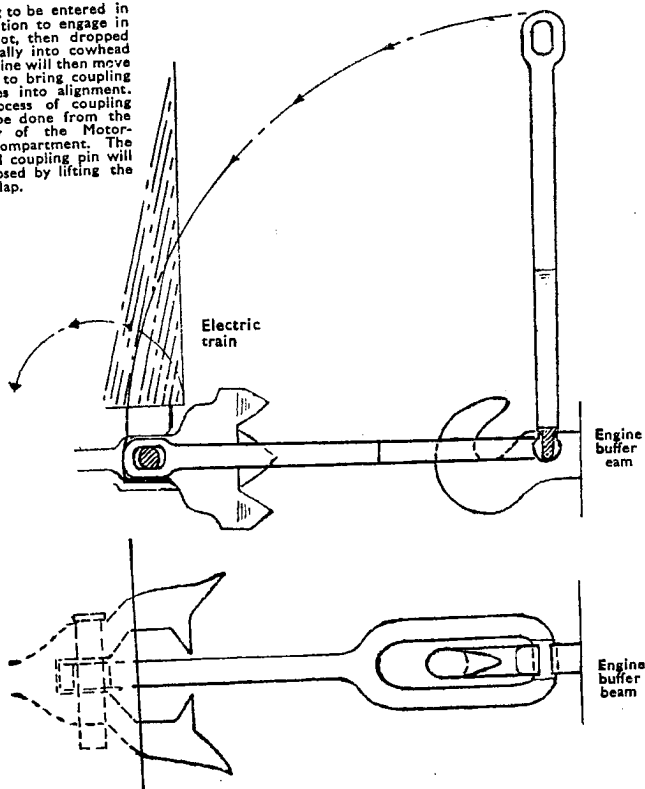
- (b) The Motorman of an assisting set must not operate the controller handle beyond the series position.
- (c) The Driver of an assisting engine must proceed with caution and not make a sudden stop except in emergency.

2.—If a section of the third rail is dead owing to defect, derailment or other cause.

- (a) All sections of third rail over which it is necessary for a train to be moved by an engine, must be made dead whilst the set is being moved over them.
- (b) To reduce as much as possible the distance over which the sets have to be moved by an engine, third rail cables should be disconnected by a qualified person (Instruction 39(c)) at the nearest point on either side of the defect, derailment or other cause where an engine can be attached or detached and the electric set run under its own power. Gaps so created at either end of the defective portion of the third rail must not be bridged until the third rail is dead on both sides of the gap.
- (c) If the defect is likely to continue for any length of time a steam service should be substituted for the electric.

Proposed rigid coupling for removing electric train by steam engine in the event of breakdown

Coupling to be entered in this position to engage in gedge slot, then dropped horizontally into cowhead slot. Engine will then move forward to bring coupling pin holes into alignment. The process of coupling should be done from the doorway of the Motor-man's compartment. The cowhead coupling pin will be exposed by lifting the hinged flap.



CLEARING THIRD RAIL OF SNOW AND ICE

GENERAL INSTRUCTIONS

90.—Reference is made in the body of these instructions to the arrangements to be introduced for clearing the third rail of snow and ice. Instructions 37 and 38 refer to the calling out of Permanent Way Inspectors etc., and the turning out of the de-icing van. Instruction 54 is a general reference to the instructions issued locally and Instruction 80 deals with the screwing down of ice scrapers on vehicles in traffic.

LOCAL INSTRUCTIONS

91.—In addition instructions are issued locally from time to time. The details will vary but the general principles are that when Permanent Way staff are not on duty the Signaller concerned must call out the nearest Permanent Way man and advise the District Control Staff who will arrange to call out the appropriate third rail Electrician or Ganger and the latter decides whether the Permanent Way Inspector should be called out.

Calling Out
of Staff.

92.—Thermometers are fixed outside various signal boxes strategically placed and at South Gosforth Car Sheds, and the Signaller at each place

De-icing Van.

92—Continued.

must advise the District Control of the thermometer readings as follows:—

Newcastle District

10.30 p.m. and 2.0 a.m. each night (on Sunday night only by those Signalmen on duty).

Sunderland District

At 11.0 p.m. and 1.0 a.m. and every hour afterwards until traffic starts.

If the reading is 32°F. or less, or the Foreman at Gosforth Car Sheds considers it necessary, the District Control calls out the District Engineer's Staff for the de-icing van and arranges the special opening of Signal Boxes as required. The Route to be followed in the Newcastle District is set out in a special circular.

Ice Scrapers
on vehicles in
traffic.

93.—(a) When it is frosty the Station Staff at Newcastle Central, Manors, Tynemouth and Monkseaton should confer with the Newcastle District Control, and at South Shields with the Sunderland District Control, on the desirability of screwing down the ice scrapers on the trains, and each District Control will advise Gosforth Car Sheds accordingly.

(b) Particular regard should be paid to the first service daily over each line. If the de-icing van has treated the third rail within the previous 24 hours the scrapers should not normally be required

93 (b)—Continued.

for dealing with frost; in this connection unnecessary use of the scrapers should be avoided as it will tend to remove the special de-icing fluid from the third rail. If, however, there has been a heavy fall of snow, the scrapers will probably be required.

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THE "ELECTRICAL REVIEW'S" SUGGESTIONS FOR DEALING WITH APPARENT DEATH FROM ELECTRIC SHOCK

Death only Apparent

In many cases where persons receive electric shocks, death is only apparent and animation may be restored if efforts at resuscitation are not too long delayed.

Method of Resuscitation

The method of resuscitation resorted to should be that known as artificial respiration.

The Necessity of Steady Persistent Effort

Steady persistent effort is one of the essential conditions of successful attempts to restore animation. Disappointing though the results may be it is better to prolong the operation rather than discontinue it at too early a stage, unless a medical man pronounces life to be extinct. In cases of severe shock, respiration is seldom established under one hour, while three hours may be necessary to restore normal breathing.

Break Circuit

Break the electric circuit at once if there be an interrupter close at hand; if not, lose no time, but proceed to remove the body from contact with the live conductor.

Danger of Touching the Body of the Injured Person

Do not touch the man's body with bare hands, but if india-rubber gloves are not at hand pull him off the live conductor by his coat tail, if his clothes are not wet; or fold your coat, or some dry articles, such as a newspaper, into two or three thicknesses, and using this as a pad, take hold of the body and pull it away from the circuit; or a broom handle may be used to raise the body or to detach the wires from it. A good plan is to stand on a dry board, or on a thick newspaper or bundle of sacking, or charge the body with the shoulder.

Send for a Medical Man at Once

No time should be lost in sending for a qualified medical man, but in the meantime the following efforts should be made to restore animation:—



Figure 1



Figure II

How to Place the Body

Having pulled the body away from the live conductor, free the neck from clothing, and treat the case as one of drowning, as follows:—The body should be placed face downwards, preferably on a dry mattress, on a dry floor, or on dry straw.

Means of Resuscitation

Then promote artificial breathing by leaning forward over the patient, and, without violence, produce a firm, steady, downward pressure (see Figure I). Next release all pressure by swinging your body backwards without lifting your hands from the patient (see Figure II).

Repeat this pressure and relaxation of pressure as directed, without any marked pause between the movements, about fifteen times a minute, until natural breathing is established.

The efforts to restore breathing must be carried out with perseverance, as in some cases it has been restored after a long period of apparent death.

Circulation may be aided by rubbing the body, or striking it with a wet towel.

The Use of Oxygen

Where it is possible to procure a cylinder of oxygen, inhalation may be attempted; but this should be done only under medical advice. Under no circumstances whatever should the gas be taken directly from the cylinder to the patient; the safest plan is to allow it to bubble through water, to enable its rate of flow to be observed. Efforts at artificial respiration should be kept up while the gas is being administered, in order to aid its entrance into the lungs.

Stimulants to be Avoided

Stimulants should not be administered, unless recommended by a medical man.

The Necessity of Deliberation

It should be borne in mind that to be successful the foregoing operations should be carried out deliberately and methodically. There should be no haste, but the operations should be executed vigorously.

Instructing the Staff

The only way of carrying out these suggestions is to know them thoroughly. Members of the electrical staff should carefully instruct themselves beforehand, and much good might result if they occasionally practised the methods here prescribed.

Addresses and Telephone Numbers of Nearest Medical Men and Hospitals.

(To be filled in at the Works.)

(By permission of the Proprietors
of the "Electrical Review," London).

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