

THE PENNSYLVANIA RAILROAD

THE LONG ISLAND RAIL ROAD CO.

C. T. 290

SPECIAL INSTRUCTIONS

FOR

EMPLOYEES

IN

ELECTRIFIED TERRITORY

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No. **97181**.....

The Pennsylvania Railroad

The Long Island Rail Road Co.

SPECIAL INSTRUCTIONS

FOR

EMPLOYEES

IN

ELECTRIFIED TERRITORY

Effective May 1st, 1933

NOTICE

The instructions herein set forth are issued for the protection of employes and property in electrified territory. A copy must be issued to all employes working regularly or intermittently in such territory. A copy must also be furnished each new employe at the time of employment and before he is assigned to duty.

They are effective May 1st, 1933, and supersede all previous instructions inconsistent herewith.

Additional instructions may be issued by proper authority.

The receipt card C. T. 290A or G51 must be signed by the employe receiving the instructions and forwarded to the Superintendent.

W. C. HIGGINBOTTOM,
General Manager,
Eastern Region.

J. A. APPLETON,
General Manager,
New York Zone.

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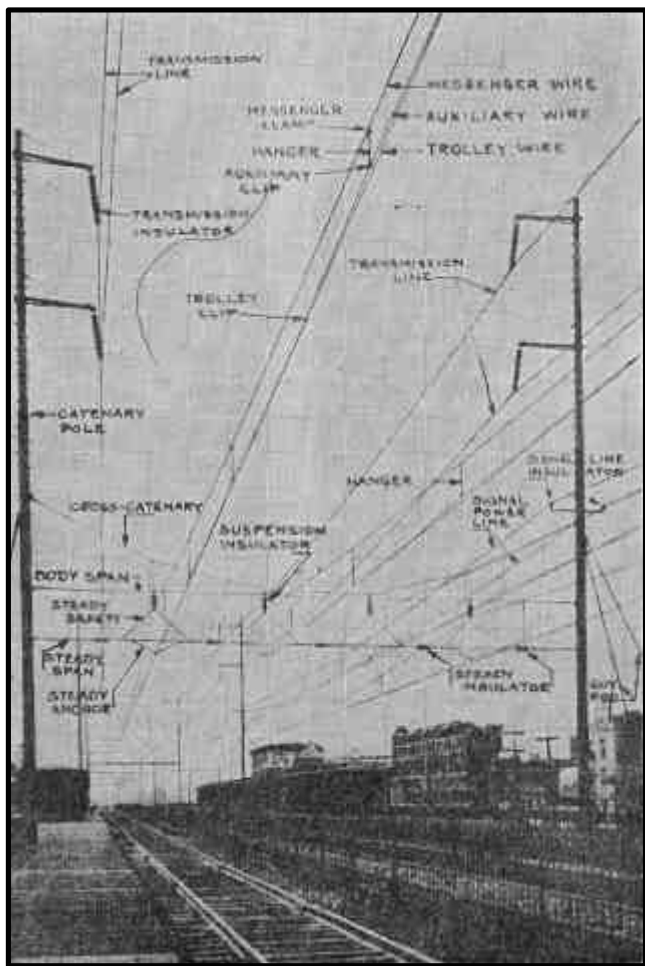


FIG. 1—OVERHEAD ELECTRIFICATION

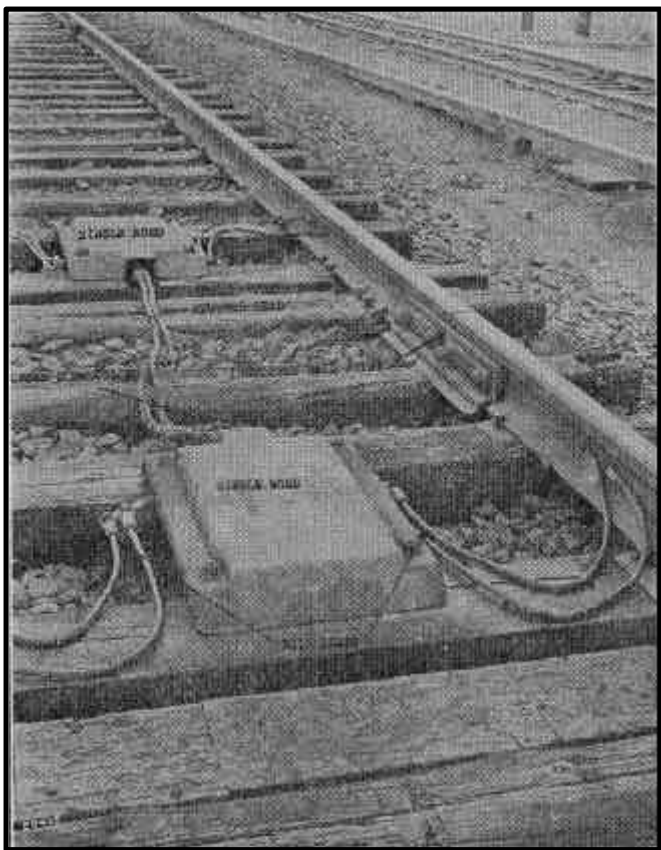


FIG. 3—IMPEDANCE BOND

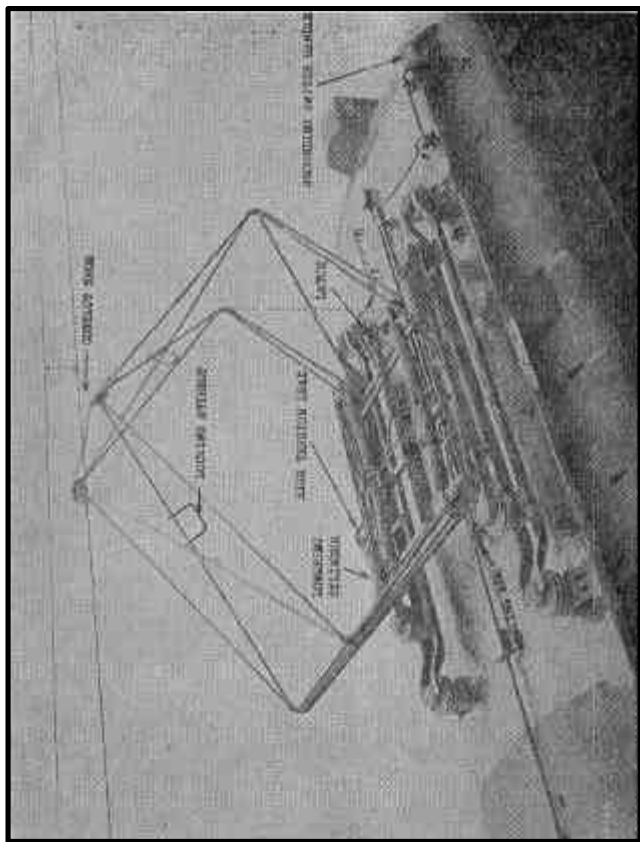


FIG. 4—PANTOGRAPH—MU CAR

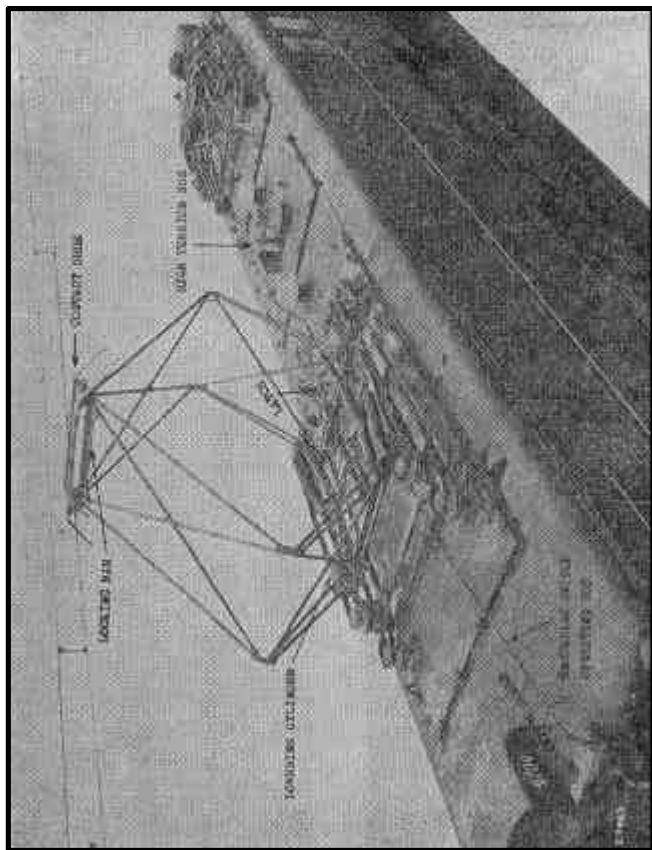


FIG. 5—PANTOGRAPH—ELECTRIC ENGINE

GENERAL INSTRUCTIONS

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

B. Employes must be conversant with and obey these instructions. Obedience to them is essential to safety. Constant care must be exercised to guard against injury, loss of life or damage to property. Employes must be familiar with the illustrations and instructions for resuscitation from electric shock. Employes must also be familiar with the Safety Rules. If in doubt as to their meaning, employes must apply to their superior officer for an explanation.

C. All occurrences or conditions which are likely to affect electric operation must be reported immediately to the Superintendent, as follows:

a. Attachments of the overhead wire system which are out of place or in such position that they can foul pantographs or the top of a steam engine or other high equipment.

b. Broken insulators, splintered cross arms, broken or loose wires or hanging foreign objects (such as kite strings);

broken third rail insulators, loose third rail joints, broken or loose protection hoards, end approaches out of place, splintered side approaches, defective anchors, buckled third rail, etc.

Note: In describing such conditions the proper names of the parts involved (Figs. 1 and 2) should be used.

D. Employes must not touch dangling wires nor attempt to move them by any means, but must report their location immediately to the Superintendent and should, if possible, leave someone to watch such wires until their removal. Other persons in danger should be warned of their location.

E. Loose or broken impedance bond connections in the tracks must be regarded as energized (live) and reported immediately to the Superintendent. See Fig. 3.

F. Tank cars, or open cars on which lumber, poles, pipe, structural iron, trees or other long material is to be loaded or unloaded, must, if possible, be placed on tracks where there are no overhead catenary wires or third rail, or on tracks where the overhead wires or third rail can be de-energized. Loading or unloading of inflammable liquids from tank cars must be done on

sidings especially equipped for this service and under special regulations therefor.

G. The Station Agent or his representative must forbid all persons to go on top of high lading or on roof of cars under the catenary system until the catenary system is de-energized and grounded. After the catenary system has been de-energized and grounded over cars on which persons are to engage in loading and unloading material, all such persons must be warned to regard all the overhead wires as energized and that they must not allow their bodies, material, or equipment of any kind, to come within eight (8) feet of transmission wires or within three (3) feet of catenary system and signal power wires.

H. Employes in electrified territory should be familiar with the location and operation of telephone equipment.

GENERAL DEFINITIONS

Electrified Territory. That portion of the railroad consisting of main tracks, sidings, yards and industrial tracks equipped for electric train operation by catenary system or by third rail, and necessary sub-stations,

transmission, and signal power lines located above or adjacent to the tracks.

Power. Electric energy, commonly referred to as "power", is produced at central generating stations or power plants and transmitted at high voltage by means of transmission lines to sub-stations where it is distributed to overhead catenary system, third rail, signal power lines, etc.

Energized—Live (Dangerous to Life). Electric apparatus, such as overhead wires, third rail, transformers, switches, motors, etc., is energized when connected to a power source.

De-energized—Apparently Dead. Electric apparatus, such as overhead wires, third rail, transformers, switches, motors, etc., is de-energized when disconnected from the normal power source, but such apparatus is dangerous to life until properly grounded.

Ground—Earth Connection. Electric apparatus, such as overhead wires, third rail, transformers, switches, motors, etc., is grounded when metallicly connected to the earth.

Circuit. The complete path over which electric current is transmitted from and returns to its source.

Transmission Lines. A system of wires or cables used to transmit power at high voltage between central generating stations and sub-stations.

Sub-Station. A place where power is received at high voltage and changed to required voltages and characteristics for distribution to the catenary system, third rail, and other electric apparatus. It contains transformers, rotating machinery, circuit breakers, sectionalizing switches, mercury arc rectifiers, etc.

Transformer. Apparatus which serves to increase or decrease voltage.

Catenary System. A system of wires suspended between poles and bridges supporting overhead contact wires normally energized at 11,000 volts.

Circuit Breaker. A device or switch which operates automatically or manually to protect, or to energize or de-energize transmission lines, signal power lines, catenary system, third rail, etc.

Sectionalizing Switch. A device or switch, closed to energize and opened to de-energize a section of the catenary system or a section of the third rail.

Electric Equipment. Electric equipment, as used herein, refers to engines and cars operated by power received from an overhead contact wire or a third rail.

Pantograph. A device located on top of electric equipment which collects power from the overhead contact wire by means of a sliding contact shoe.

Contact Wire (trolley). The overhead wire, sometimes referred to as trolley wire from which the pantograph or trolley collects current.

Third Rail. An electric conductor located alongside the running rail from which power is collected by means of a sliding contact shoe attached to the truck of electric equipment.

Grounding Switch. A device or switch, connecting wires or electric apparatus metallically to the earth.

Bus Coupler. A device located at the end of roof of electric equipment used to transmit high voltage power from one unit of electric equipment to another.

Bus Jumper. A cable or jumper located adjacent to draft gear used to transmit power the same as a "Bus Coupler".

Arc. A luminous and destructive flash or flame in or about the wires, third rail or electric apparatus.

Superintendent. As referred to in these instructions, the Superintendent will be represented by the Train Dispatcher.

Power Director. The Power Director is in charge of power distribution.

Qualified Employees. Employees who have passed the required examinations and have been approved by their superior officer, are classed as follows :

Class A.—Employees competent to erect, repair and maintain electric apparatus, or to supervise and protect other employees performing such work.

Class B. Employees, such as trainmen, enginemen, car inspectors and other approved employees in electric service, permitted to go on top of high equipment under the conditions hereafter authorized in these instructions.

Class C. Employees, such as supervisors, assistant supervisors, track foremen and approved employees permitted to operate ma-

chinery in Maintenance of Way service under the conditions hereafter authorized in these instructions.

OPERATION IN ELECTRIFIED TERRITORY ENERGIZED—(LIVE)—CIRCUITS

1. All overhead wires must be considered energized (live) at all times except when it is known they have been de-energized and properly grounded.

Until after wires are de-energized and properly grounded, and protection afforded by a Class A employe, all persons excepting Class A employes must not approach within the following distances :

Of transmission wires	8 feet
Of catenary system	3 feet
Of signal power wires	3 feet

For clearing pantograph troubles on multiple unit cars or locomotives, Section 14, pages 21 and 22, divisions (a) and (b) apply.

Class A employes in line of duty are governed by duly issued divisional instructions permitting them to work on certain energized (live) low voltage circuits and within closer clearances to high voltage circuits.

The third rail must be considered energized (live) at all times except when it is known to be de-energized.

Tools, clothing, or any part of the body must not be brought in contact with the energized third rail, except under the supervision of a Class A employee. Contact must never be made between the energized third rail and the track rails or ground. The protection board over the third rail must not be used as a walkway.

WORKING NEAR OVERHEAD WIRES

2. Work must not be done on any circuit until the part to be worked upon is de-energized and properly grounded by, or under the supervision of, a Class A employee. Insulation on wires and electric apparatus must not be depended upon for protection from personal injury.

3. Persons other than railroad employees must not be permitted to work near overhead wires or apparatus except when protected by a Class A employee who will take necessary precautions for their safety before starting and during the progress of the work.

4. Emergency repair work of any nature to clear up defects and permit equipment to be moved to an established point for mak-

ing repairs must not be done on the top or roof of any freight car, passenger car, cabin car, electric or steam engine, or other high equipment or high lading, while under overhead contact wire, except by Class A, B or C employees.

KEEP OFF TOP OF HIGH EQUIPMENT

5. Employees (except Class A, B or C employees in the discharge of their duties) are prohibited to get upon, ride upon, or work upon, the top, or roof of any freight car, passenger car, cabin car, electric or steam engine, or other high equipment or high lading or to go upon, or work upon the water tank, or above the coal load or any engine tender, used in either freight or passenger service, while said freight car, passenger car, cabin car, electric or steam engine, or tender is on main track, siding, yard track, or industrial track, under the energized catenary system.

6. Pilots must have each member of the crew promptly notified that (a) he is operating in electrified territory, (b) he must keep off top of equipment under overhead wires, and (c) he must not bring tools, equipment, clothing or any part of his body

in contact with the third rail. Pilots must also instruct engine crews in the manner of handling firing tools and the use of squirt hose. (See paragraphs Nos. 25 and 26.)

7. Station agents, yardmasters, conductors and car inspectors must notify caretakers of equipment or shipments that they must keep off top of equipment under overhead wires, and must not bring any part of their bodies, tools, material or clothing within specified clearance of overhead wires or in contact with third rail.

8. Bridge warnings ("tell-tales") have been removed and will not be used above tracks equipped with overhead wires.

OPERATION OF ELECTRIC EQUIPMENT

9. Overhead contact wires are divided into sections and the power supply controlled by circuit breakers and sectionalizing switches. Overhead contact wires on main tracks, sidings and yards, are normally energized at all times.

10. a. The overhead contact wire on all industrial tracks is normally de-energized.

b. Engineman must know that the sec-

tionalizing switch controlling industrial track is closed before entering, and opened after leaving and the electric equipment is clear. If it becomes necessary to de-energize the overhead contact wire while electric equipment is on industrial track, pantographs should be dropped before sectionalizing switch is opened and kept down until wire has again been energized.

c. Before the sectionalizing switch controlling track normally de-energized is closed, the catenary system must be clear of obstructions and material, and all persons near the track must be warned.

d. On tracks where inflammable liquids are handled, special switches are provided to simultaneously de-energize and ground the overhead contact wire.

11. a. When a section of the catenary system has been de-energized, electric equipment must not be run into or out of such section with pantographs up. Orders or instructions to drop pantographs will be issued by proper authority.

b. When electric equipment loses power, pantographs must be dropped at least 75 feet ahead of a section break and kept down

until an equal distance beyond the section break. If power is not restored by the time electric equipment has been stopped, pantographs must be dropped and the Superintendent notified. Stops should be made when possible near a telephone.

c. When there are visible defects or obstructions that may damage pantographs, pantographs must be dropped.

12. Engineman must shut off power before dropping pantographs. When a defect develops in the primary motor control system on electric equipment, pantographs must be dropped at once, if not automatically done. Pantographs must not be raised until it is safe to do so.

13. When electric equipment is derailed or the contact between electric equipment and the rail return circuit may be broken, pantographs must be dropped immediately and bus coupler circuit opened. Pantograph on the unit of electric equipment involved must not be raised, or the unit energized by means of the bus coupler, until wheel contact has again been made with the rail return circuit.

14. a. When pantographs are broken or

damaged, the train must be stopped immediately and arrangements made to de-energize wires over the train. If broken or damaged pantograph fouls the overhead wire, it must be disengaged with the pantograph pole. (See paragraph 15.)

Class A and B employees may go to the roof of electric equipment and remove or secure broken pantographs after : (I) overhead wire has been de-energized, (II) grounding switch on unit with damaged pantograph has been closed, and, (III) when other pantographs are available on adjacent units, additional protection should be provided by raising other pantograph or pantographs against the overhead wire and closing grounding switches on same.

b. On electric engines equipped with two (2) pantographs connected by a bus, damaged pantographs must be removed. On multiple unit cars equipped with bus couplers, bus must be de-energized or the damaged pantograph removed. While performing such work, employees must be governed by paragraph No. 1. The train must not be moved until all broken pantographs have been removed or properly secured so that no parts can come in contact with overhead wires or with trains on adjacent tracks.

15. When it is necessary to raise or drop pantographs from the outside of electric equipment by means other than compressed air, the pantograph pole (located on each unit of electric equipment) must be used as follows : (a) the pole must be clean and as dry as possible ; (b) rubber gloves must be worn; (c) hands must not be closer than six (6) feet from the hook.

16. The third rail is divided into sections and the power supply is controlled by circuit breakers and sectionalizing switches. Third rail on all main tracks, sidings and yards, is normally energized (live). Sectionalizing switches are located in boxes alongside the third rail.

17. Sectionalizing third rail switches for industrial tracks are in boxes located close to the track switch. Special switches are used on industrial tracks where inflammable liquids are handled, and on certain other tracks. Third rail on industrial tracks is normally de-energized. Engineman must know that the third rail sectionalizing switch controlling industrial track is closed before entering, and opened after leaving, and the electric equipment is clear. Employee operating sectionalizing switch must turn his face

away to guard against injury in case of a flash.

18. Before the sectionalizing switch controlling tracks normally de-energized is closed, the third rail must be clear of obstructions and material and all persons near the track must be warned. When the electric equipment has completed shifting and is clear, the sectionalizing switch must be opened and the switchbox closed and locked.

19. If a flash is observed on or near the third rail when sectionalizing switch is closed, the switch must be opened at once and third rail inspected. Any foreign object found in contact with the third rail must be removed ; then sectionalizing switch may again be closed. If a second flash occurs, the sectionalizing switch must be opened and the circumstances reported to the Superintendent.

20. When necessary to de-energize the third rail in an emergency to prevent personal injury or damage to property, the nearest substation, or the Power Director, must be notified immediately and the circumstances reported to the Superintendent.

21. Emergency jumpers are kept at places designated in the timetable, to supply power to electric equipment for short movements, where contact with the third rail is lost. Employee using jumper must guard against injury or burning by arc when contact is made or broken. Prompt report must be made to the Superintendent when (a) emergency jumpers are not at designated places, (b) difficulty is experienced in their use, (c) defective, and, (d) removed from and not returned to designated place.

22. Connecting or disconnecting bus jumpers without first opening the compressor, lighting and heating switches on de-energized units is prohibited unless all units in the train or draft are in contact with or all units are entirely disconnected from the third rail or overhead contact wire.

23. When a section of third rail has been de-energized, no multiple unit train, or electric locomotive, must be permitted to run into or out of such dead section. The Power Director, or person authorizing the de-energizing of the third rail, must confer with the Superintendent or Yardmaster, so that proper orders or instructions will be

issued to trains. It is permissible to make movements to or from de-energized third rail sections at crossovers and section gaps provided that the bus jumpers on the cars are first disconnected, and that a single car or electric locomotive will not bridge gap between energized and de-energized third rail sections.

OPERATION OF STEAM ENGINES

24. Before entering electrified territory, engineman must know that no part of the engine or engine equipment, such as cab ventilators, firing tools or coal on tender, will foul the overhead wires.

25. Firing tools must be used in such manner that they cannot come within three (3) feet of the overhead wires, and must be so placed on the tender that they cannot come in contact with overhead wires.

26. The squirt hose stream must not be allowed to strike the overhead wires.

27. All employes are prohibited from going on running boards or smoke-box steps without first securing permission from the engineman or person in charge, who will supervise the movements of such employes

while in such position. All employes required to go on running boards or smoke box steps of engines under overhead wires must not come within eight (8) feet of transmission wires or within three (3) feet of the catenary or signal power wires. Attention is called to the fact that wires may be low under or near bridges, in or near tunnels, or roofed or underground station tracks.

28. When possible, enginemen must avoid stopping with the stack of their engines under porcelain or wood stick insulators or under bridges.

OPERATION OF MAINTENANCE OF WAY MACHINERY

29. When Maintenance of Way machinery equipped with boom is used in electrified territory, the boom must be properly grounded. Such machinery must be operated so that the following clearance restrictions are observed :

a. With wires alive :

I. Without supervision of Class A or C employe.

—not closer than 8 feet to transmission wires.

- not closer than 3 feet to catenary system.
- not closer than 3 feet to signal power wires.
- II. Under supervision of Class A or C employe.
 - not closer than 8 feet to transmission wires.
 - not closer than 14 inches to catenary system.
 - not closer than 14 inches to signal power wires.
- b. With wires de-energized (not alive) and not grounded :
 - I. Without supervision of Class A or C employe.
 - not closer than 8 feet to transmission wires.
 - not closer than 3 feet to catenary system.
 - not closer than 3 feet to signal power wires.
 - II. Under supervision of Class A or C employe.
 - Avoid contact with the wires.
- c. With wires de-energized (not alive) and grounded :
 - I. Without supervision of Class A or C employe.

- Avoid contact with the wires.
- II. Under supervision of Class C employe.
 - light contact with the wires is permitted.
- III. Under supervision of Class A employe.
 - full contact with the wires is permitted, avoiding damage.

If, in the opinion of the foreman or the operator, any hazard is involved, he must request the protection of a Class A employe.

OPERATION OF WRECK DERRICKS

30. When a wreck derrick is necessary at a wreck or derailment, the Power Director will promptly dispatch a Class A employe to the wreck. The Class A employe shall report at once to the train master and wreck foreman. Should the wreck be of a serious nature, either a wire train or wire truck shall also be dispatched, so that major electrical work made necessary by the wreck will be properly performed.

31. a. Where it is necessary for the wreck derrick boom to come within eight (8) feet of transmission wires or three (3) feet of

the catenary system or signal power wires, the wires must be de-energized and properly grounded by a Class A employee.

b. If it becomes necessary for the wreck derrick boom to come in contact with de-energized and grounded wire resulting in either upward or lateral pressure on wire, such operation shall be under the direction of a Class A employee. Wreck derricks not equipped with a cowl (wire guard) on tip of boom must not be allowed to come in contact with de-energized overhead wires.

c. Should it become necessary when operating a wreck derrick to have the overhead wire drawn out of alignment or removed, the wire shall be de-energized and properly grounded, and the work done by or under the direct supervision of a Class A employee.

32. When wreck derrick is operating under overhead wires where it is unnecessary for boom to come within eight (8) feet of transmission wires or three (3) feet of the catenary system or signal power wires, such operation may be performed under the supervision of a Wreck Foreman, who is qualified to handle the boom under such conditions, without requiring the service of

a Class A employe and without de-energizing the overhead wires.

33. Employes, engaged in wrecking operations, must be protected from energized (live) third rail. Rubber mats or blankets used for such protection must be in a safe condition.

34. In the use of outriggers, unnecessary damage to third rail protection boards must be avoided.

FIRES

35. a. Fires in proximity to overhead wires may interrupt power and must be reported immediately to the Superintendent. The Superintendent will advise the Power Director, who will, when necessary, send a Class A employe to the scene of the fire. When power may be interrupted by fire, or when fire-fighting apparatus, hose streams, etc., may come in contact with overhead wires or third rail, power must be removed. If grounding of the overhead wires is necessary, it must be done by a Class A employe.

b. In case of fire in electrical apparatus, the power must be removed at once.

c. Use of hand extinguishers for fires

around electrical circuits, unless approved for that purpose, is prohibited. Follow instructions applying to the particular make of extinguishers. When using chemical extinguishers, use care to avoid being overcome by the fumes.

d. All persons must keep as far as possible, during a fire, from energized high voltage conductors which might fall. Arrangements must be made to have such wires de-energized and grounded.

e. When using extinguishers, the operator must be governed by paragraph No. 1.

RESUSCITATION FROM ELECTRIC SHOCK AND APPARENT DEATH

GENERAL

36. The general use of electricity about railroad property makes it desirable that all employes be trained to render intelligent assistance in electric accidents. Supervisory, Class A, B and C, and certain other employes must be given instructions and qualify in the methods to be followed and the precautions to be observed. In event of an accident, one employe should take charge

and select as assistants only those most likely to remain cool and dependable.

Artificial respiration, or forced breathing, is usually required in electric shock or asphyxiation .by gases in manholes or resulting from the use of fire extinguishers in confined spaces ; in other words, in all cases in which breathing is temporarily suspended.

It is highly important that some one, thoroughly familiar with the methods to be followed and the precautions to be observed, take charge and direct operations when an accident happens. The person in charge should select as assistants only those who are most likely to remain cool in such an emergency, and who may be depended upon to give the most intelligent assistance.

Prompt and intelligently directed and continued efforts in restoring natural respiration, are necessary for successful results. While promptness is essential, undue haste is to be condemned. The failure of the victim to respond quickly to resuscitation should not cause discouragement; the effort should be continued, because

The body depends upon a continuous

exchange of air, as shown by the fact that we must breathe in and out about fifteen times per minute.

If the body is not thus repeatedly supplied with air, suffocation occurs.

Persons whose breathing has been stopped have been restored after artificial respiration has been continued as long as three hours or more.

ELECTRIC SHOCK—Accidental electric shock does not always kill; it may only stun the victim and stop his breathing for a while. The shock is not likely to be immediately fatal.

Extreme care must be exercised in releasing the victim from contact with a live conductor, to avoid receiving a shock yourself. Many persons, by their carelessness in such matters, have been severely shocked or burned.

37. RELEASE OF VICTIM FROM CONTACT WITH LIVE CONDUCTORS IF KNOWN TO BE 750 VOLTS OR LESS:

(a) Do not touch the live conductor.

(b) Do not touch the victim on his

bare skin as long as he is in contact with the live conductor.

(c) Use a piece of DRY non-conducting material, such as a piece of wood, rope, a coat or rubber hose to push or pull the live conductor away from the victim. The live conductor may be handled safely with rubber gloves, or

(d) If the victim's clothing is dry, he should be dragged away from the live conductor by grasping his clothes, NOT HIS BARE SKIN. In doing this, the rescuer should stand on a dry board and use only one hand. Do not stand in a puddle of water or on damp or wet ground.

38. RELEASE OF VICTIM FROM CONTACT WITH LIVE CONDUCTORS OF UNKNOWN OR MORE THAN 750 VOLTS:

(a) Do not touch the live conductor.

(b) Do not touch ANY part of the victim as long as he is in contact with the live conductor.

(c) Use a treated wooden switch

pole to push the wire away from the victim. Keep the hands, at least six feet away from the victim and wire when doing this. Treated wooden poles may be found in all sub-stations, wire trains and at Telegraph and Signal Foreman's headquarters.

(d) If such a pole is not available, get current off line as promptly as possible by grounding the line, if rescuer knows how, or notify the power director, nearest signalman, or electrician before attempting to remove the victim, which should then be done by using a DRY piece of wood, rope, a coat or rubber hose.

(e) If the victim or the live wire is in a pool of water, do not step into the water. Remove the victim or the live wire with the pole.

When handling a live wire or other conductor, be careful to see that it does not come in contact with yourself or bystanders.

Send for a physician promptly, preferably a Company Physician, and put the case in his hands upon arrival.

METHOD OF ARTIFICIAL RESPIRATION

39. If the victim can be made to breathe and to continue to breathe, the major part of resuscitation has been accomplished, and recovery is practically assured. Having freed the victim from contact with the live conductor start artificial respiration immediately; do not wait for the physician. Resuscitation may be delayed or discontinued only long enough to carry the victim to a convenient spot where fresh air is abundant or to remove him to or from a train, and then only for the shortest possible time. Bystanders must not be permitted to collect closely about the victim ; this prevents his getting fresh air.

If the accident happens on the train, remove the victim to the baggage car, or if it happens on the right-of-way between stations, flag a train and place the victim in the baggage car. Open the doors and ventilators to admit fresh air. Upon the arrival of the train at the first station where a physician is at hand, turn the case over to him, together with whatever assistance he may require to continue artificial respiration.

Quickly feel with your fingers and remove from the victim's mouth and throat any foreign body, such as tobacco, false teeth, etc.

Do not stop to loosen the victim's clothing at this time; every moment of delay is serious.

Lay the victim on his belly, with arms extended forward as shown in Figure 6. The face should be turned to one side in such manner that the nose and mouth will be free for breathing. An assistant should draw the victim's tongue forward.

Kneel, straddling the victim's thighs, and facing his head. Put the palms of your hands on the muscles of his back over the lower ribs. Your thumbs should parallel his backbone, and your fingers should spread over the lower ribs as shown in Figure 6.

Hold your arms straight and swing your body forward slowly, bringing your weight to bear gradually upon the victim as shown in Figure No. 7. Pressure is thus applied over the lower ribs by the heels of your hands, compressing the lower part of the chest and the abdomen, and forcing the air out of the victim's lungs. This movement should take from two to three seconds, and

FIGURE 6 — INSPIRATION
Pressure Off

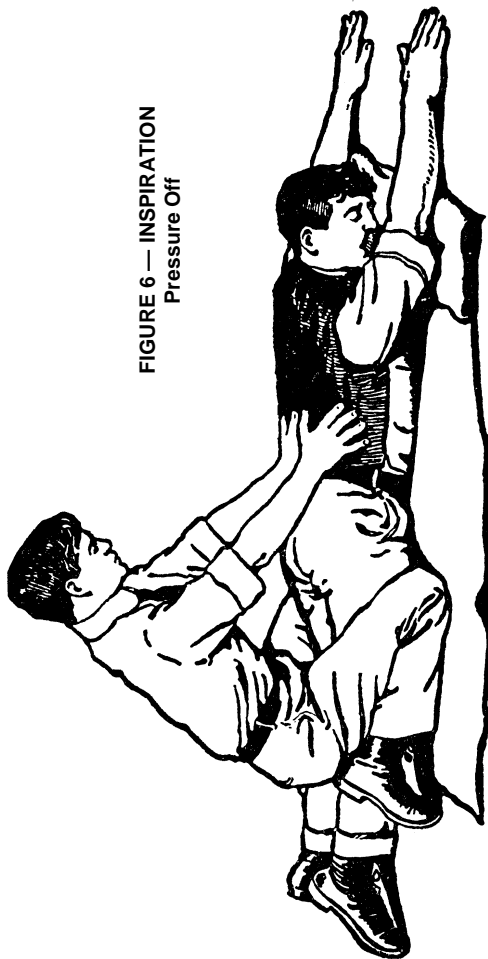
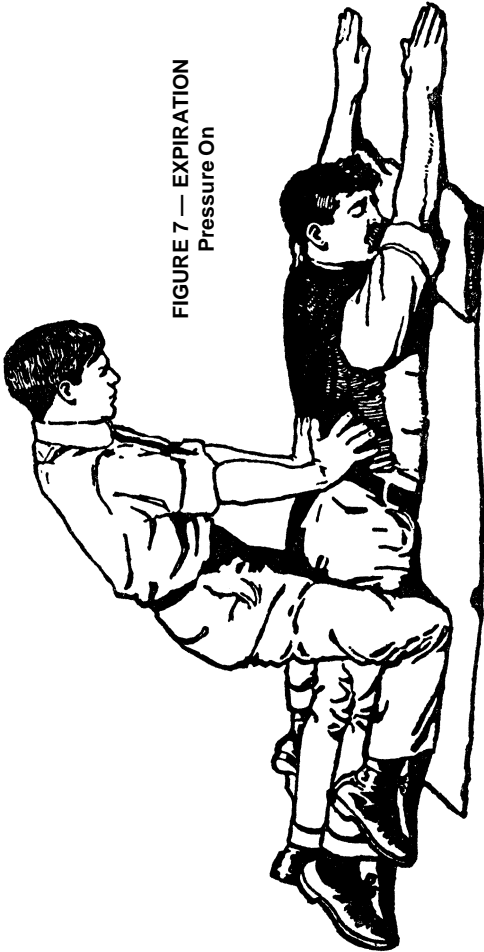


FIGURE 7 — EXPIRATION
Pressure On



pressure must be applied gradually and firmly — not violently. Excessive pressure may injure the internal organs and sudden thrusts do not resemble natural respiration.

Immediately swing backward to quickly remove the pressure. Keep your hands in place thus returning to the position shown in Figure No. 6. Through their elasticity the chest walls expand and draw fresh air into the lungs.

After two seconds repeat the double movement of compression and release; a complete respiration in four or five seconds or twelve to fifteen respirations per minute. If a watch or clock is not visible, follow the natural rate of your own deep breathing, swing your body forward with each exhalation, and backward with each inhalation. While doing this, an assistant should loosen any tight clothing about the victim's neck, chest or waist.

Continue artificial respiration, without interruption, for at least three hours, or until natural breathing is restored. Continue the movement for some time after natural breathing has begun. In continuing the movement be careful to keep your move-

ments in step with the natural breathing of the victim. In stopping the movement see that the victim continues to breathe; if he stops, start artificial respiration again.

Do not give any liquids by mouth until the victim is fully conscious. A physician only may administer stimulants; this should not be attempted by any other persons.

CARE OF THE VICTIM

40. In handling the victim, do not touch or irritate burned parts if possible, and during artificial respiration see that pressure is not brought to bear upon burns.

During the period of restoring natural respiration an assistant should keep the victim warm by applying a cover and by laying bottles or rubber bags filled with warm—not hot—water beside the body.

When natural respiration has been restored, burns, if serious, should be cared for until the physician arrives.

Do not open blisters.

A raw or blistered surface should be protected from the air. If the clothing sticks, cut around it ; do not peel it off. A dressing of soft material should be applied to the

burn, and this, or the cloth adhering to the wound, should be saturated with a solution of baking soda (one teaspoonful to a pint of water).

Cover the dressing with cotton, gauze, lint, clean waste, clean handkerchiefs or other soft cloth, and hold lightly in place by a bandage.

Similar coverings should be lightly bandaged over dry, charred burns, but without applying oil or other liquid dressing.

After regaining consciousness, the victim should be watched carefully to see that he does not exert himself except in moderation. Violent exertion is liable to cause a cessation of breathing, recovery from which is doubtful.

FIRST AID TREATMENT FOR BURNS AND SCALDS

41. A remedy has been provided for the treatment of burns and scalds, a supply of which is kept at all substations and block stations in the electrified territory.

Completely bandage the burn or scalds with contents of First Aid Packet; follow this by thoroughly wetting the bandages,

covering the injured part with the solution contained in the bottle, remembering that nothing is to be applied directly to the burn or scald except the bandage contained in the First Aid Packet.

It should be thoroughly understood that this preparation is not to be considered for healing purposes, but merely to save the person from pain until he can be treated by a physician.

SLEET INSTRUCTIONS for

A. C. ELECTRIFIED TERRITORY

The C.T. 290 Special Instructions must be strictly adhered to at all times.

It is the duty of the Train Dispatcher to obtain information at the first signs of sleet and promptly notify the Superintendent, who will proceed as outlined below:

1. Instructions shall immediately be issued for electric engines, operating as single units, to run with both pantographs up ; except at locations covered by timetable special instructions.

With the double pantograph order in effect, engines coupled shall run with two pantographs up on the leading unit (except at locations covered by timetable special instructions) and with rear pantograph up on each following unit.

Freight engines coupled not exceeding 50 M.P.H. may operate with two pantographs up on each of the two leading units (except at locations covered by timetable special instructions) and with rear pantograph up on each following unit.

2. Necessary patrol trains to remove sleet from the trolley wires, consisting of five (5) or more motor cars or two (2) electric engines, coupled, must be assigned to patrol affected area. In case of heavy sleet, it may be necessary to open the control switch on the leading motor car or open motor cutout switches on the leading engine, in order to reduce excessive arcing. A qualified lineman, instructed in renewal of pantograph shoes, should be assigned to accompany each patrol train. Patrol train should be equipped with one ground stick and five (5) pantograph shoes.

3. Electrified sidings, yard tracks and through freight tracks should be given required attention with patrol trains.

4. Electric engines and multiple unit cars lying in yards, sidings, or standing at any point, should have pantographs lowered and raised frequently, to prevent accumulation of sleet. In case pantographs operate sluggishly, the pantograph pole should be used to remove sleet and raise pantographs up and down.

5. Wire trains should be manned and held available at advantageous points for immediate call during sleet storms.

6. When running over the road, if excessive arcing occurs at pantograph shoe, engineman shall immediately raise second pantograph on engines, without waiting for instructions.

When pantographs lower due to sleet, or when sleet load on pantographs becomes excessive, resulting in heavy arcing between shoe and wire, master controller must be shut off, and an attempt made to raise and lower them several times. If this fails to free them, engineman must, if possible, stop the train under a trolley wire which is five (5) feet or more above the roof of the engine or multiple unit car, and attempt to raise and lower them several times with the pantograph pole.

If this fails to free them, the engineman on multiple unit cars, and engineman and helper on engines, should

remove the sleet, working under the energized trolley wire if it is five (5) feet or more above the roof of engine or multiple unit car, proceeding as follows:

Full control air pressure must obtain. The down button must be left in the "in" position, battery switches closed and all pantographs must be down. Engineman and helper must remove ice from step treads leading to the roof to insure safe footing, and must take extra precaution against slipping while on the roof. The engineman must close all ground switches and insert locking pins. The fireman or helper must assist engineman after pantographs have been grounded. Engineman and helper, before going on the roof or touching any part of the pantograph assemblies, must note position of all overhead wires above their engine or multiple unit car, that pantographs are held down by latches, that ground switches are making contact, and must at all times keep at least three (3) feet from all wires. Engineman and helper must stand astride the pantograph tubing so that it cannot raise, and must not work under the wire. With the wrench supplied as a standard tool, lightly tap the tubing, springs, rods, shoes and parts, removing the sleet, taking care not to bear excessive weight on the tubing which might throw it out of position. Upon completion of this work, and after all other persons have descended, engineman must know that pantographs are held down by latches, ground switches are in, move as far away as possible from normally energized parts on the roof, and open the ground switches. He should then prepare the engine or cars for service and proceed.

In case the engine or multiple unit cars are under a wire less than five (5) feet above the top of the roof, the engineman must advise the Superintendent, who shall arrange for the necessary protection.

7. At terminals, sufficient men shall be provided to remove sleet from pantograph assemblies. When this work must be done under an energized wire and is of sufficient magnitude to require a number of groups working on different engines or drafts of cars, the

supervisory employee shall designate one man in charge of each group to be responsible for the following procedure:

The man in charge shall see that all pantographs are down and the down button in the "in" position on each car or engine. He must know that all battery switches are "in" and that full control reservoir air pressure obtains unless equipment is in storage. He must call the attention of each person to the overhead wires. He must see that ice has been removed from step treads leading to the roof to insure safe footing, and then give permission to other employees to go on the roof. He must know that ground switches have been closed and locking pins inserted, before other employees come in proximity to normally energized parts.

Each employee must note the position of all overhead wires above the engine or multiple unit car before going on the roof and must at all times keep at least three (3) feet from all wires. Each employee must know the precautions outlined in the preceding paragraph obtain on his car or engine.

When arriving on the roof, employee must note that pantographs are held down by latches and ground switches are making contact before touching any part of the pantograph assemblies. He must stand astride the tubing so that it cannot raise and with a tool suitable for the purpose, lightly tap the tubing, springs, rods, shoes and parts, removing the sleet. Care must be taken not to bear weight on the tubing as it might be thrown out of position.

Upon completion of this work, and just before descending, each employee must know that pantographs are held down by latches, ground switches are in, then move as far as possible from normally energized parts on the roof, open ground switches and report to the man in charge of the group.

