



ELECTRIFIED TERRITORY RULES AND INSTRUCTIONS

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THE FOLLOWING RULES AND INSTRUCTIONS INCLUDED HEREIN ARE FOR THE GUIDANCE OF EMPLOYEES CONCERNED. SUCH EMPLOYEES MUST HAVE A COPY ACCESSIBLE WHILE ON DUTY. THEY SUPERSEDE PREVIOUS INSTRUCTIONS ISSUED IN THIS FORM.



Vice President
Operations & Maintenance

APPROVED BY
THE MINISTRY OF TRANSPORTATION AND HIGHWAYS OF BRITISH COLUMBIA
CERTIFICATE NO. 4967

ELECTRIFIED TERRITORY RULES AND INSTRUCTIONS

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1.0 GENERAL RULES

- A. Electrified Territory will be specified in the current Time Table. Boundaries will be identified by signs.
- B. These rules are issued for the protection of employees and property in Electrified Territory and must be observed by all employees whose duties are in any way affected thereby. Employees must be conversant with and obey these rules. Obedience to them is essential to safety. Constant care must be exercised to guard against personal injury, loss of life or damage to property. If in doubt as to their meaning, employees must apply to proper authority for an explanation.
- C. Before working in Electrified Territory employees must pass the required examinations. When employees are required to work in this Territory, they must alert each other to any danger.
- D. Occurrences or conditions which are likely to affect the safe operation in Electrified Territory must be reported immediately to the Train Dispatcher.
- E. The Train Dispatcher must be immediately notified by any employee(s) when an emergency exists and power is required to be switched off to prevent injury, damage or loss of life.
- F. Qualified employees are responsible for knowing that their men understand and comply with the rules for Electrified Territory. Employees must have a copy of these rules accessible while on duty.
- G. Tunnel Safety Instructions apply specifically to the Table and Wolverine tunnels at Mile 36.9 and Mile 45.5 respectively, on the Tumbler Subdivision.

2.0 ELECTRICAL OPERATING RULES

2.1 DEFINITIONS

Arc. A luminous flash or flame in or about wires or electric apparatus, caused by the passage of current through the air.

Capacitor. A device used to keep alternating current in step with voltage for most efficient transmission of energy, also used to drain off high frequency alternating currents.

Catenary System. A system of wires suspended over track between poles and portal bridges supporting overhead contact wires normally energized at 50,000 volts, 60 hertz, single phase alternating current.

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

Circuit Breaker/Interrupter. A device which normally operates automatically under conditions of overload, short circuit or to perform electrical switching.

Contact Wire. The solid overhead wire, sometimes referred to as trolley wire, with which the pantograph makes contact and collects current.

Control Jumper. A multi-circuit cable or jumper used between engines/units to transmit control.

Current. The quantity of electricity which flows through a cross section of an energized circuit during a unit of time.

De-Energized. An electric apparatus is de-energized when disconnected from the normal power source and proper grounding has been applied. All apparatus must be considered as "energized" and dangerous to life until the proper grounding is applied.

Disconnect Switch. A device which is closed to connect and opened to isolate electrical sections.

Dropper. A short piece of wire or strap used to suspend the contact wire from the messenger wire.

Electrical Barrier. A device approved by the proper authority which safely separates an employee from the catenary system and electrical apparatus.

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 substation where it is distributed at lower voltage to the overhead catenary system.

Electrical Protection Authorization. The form of authorization from the Power Coordinator to the E C A employee for protection to de-energize a section of the electrical system.

Electrified Territory. That portion of the railway equipped with a catenary system for electric train operation.

Energized. (Dangerous to Life). Electric apparatus, such as overhead wire, cable, transformers, circuit breakers, disconnect switches, motors, pantographs etc., are energized when connected to a power source. These devices may be considered to be de-energized only when the proper grounding is applied.

Feeder Wire. A wire strung on insulators to deliver current to the messenger and contact wires.

Ground Connection. Electric apparatus is grounded when metallicly connected to the rail, ground rods, or to mats buried in the earth.

Grounding Switch. A device which is closed to de-energize wire or electrical apparatus.

Messenger Wire. A cable attached to supporting structures and from which the contact wire is suspended.

Overhead Contact System. (OCS) See Catenary System.

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

Phase Break. A location in the catenary system where overhead wires are arranged to provide a dead section between different sources of power.

Qualified Employee. Employees required to operate or work in Electrified Territory are classified as follows:

E C A - An employee who has the responsibility for protecting other employees working within 10 ft of the 50,000 volt catenary system, transmission line or electrical apparatus.

E C B - Employees who operate machinery and/or have the responsibility for supervising other employees working in electrified territory.

E C C - Other employees including engine and train crews.

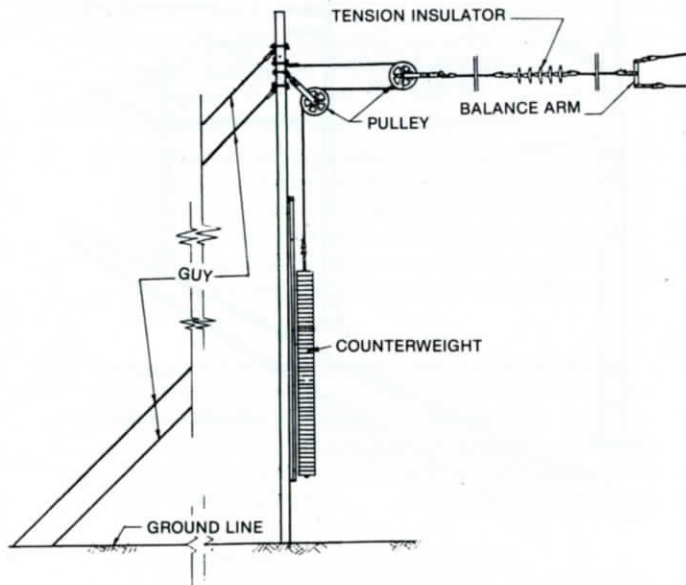
Reactor. A device used to limit current surges, also used in conjunction with capacitor to drain off high frequency current.

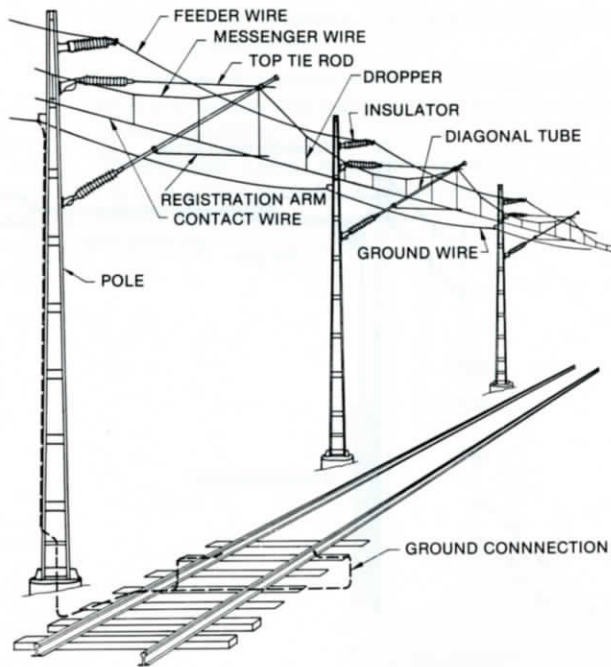
Substation. A location where power is received at high voltage and changed to required voltage and characteristics for distribution to the catenary system. It may contain transformers, capacitors, reactors, circuit breakers, disconnect switches and associated equipment.

Transformer. Apparatus which serves to increase or decrease voltage and transfer the energy from one circuit to another.

Transmission Lines. A system of wires used to transmit power at high voltage between generating station, substation and catenary.

WEIGHT TENSIONING





CATENARY SYSTEM

2.2 Energized Overhead Wires

- A. All overhead wires must be considered energized **AT ALL TIMES** except when it is **KNOWN** that they have been de-energized. The application of grounds must be visibly confirmed.
- B. Until the overhead wires are de-energized by an E C A employee, or unless an electrical barrier is in place, no persons except E C A employees may approach within ten (10) feet of energized overhead wires or apparatus.
- C. For the purpose of inspection only or when using approved tools, an E C A employee may approach no closer than three (3) feet to the energized overhead wires or electrical apparatus.
- D. Persons occupying Cabs or Cupolas of equipment must not allow any parts of their body, nor any held object, to project externally above the level of window and door openings. At no time shall the outward projection of person or objects from cabs or cupolas exceed that required for the discharge of normal duties.

2.3 Damaged Wires and Catenary System Components

- A. In describing such conditions the proper names and locations of the parts involved must be used. The following conditions which are likely to affect electric operation must be reported immediately to the Train Dispatcher:

- Broken or loose wires;
- Attachments or wires out of place;
- Broken overhead insulators, or anything that might snag the end of pantograph or prevent its smooth sliding over surface of contact wire.

- B. Employees must not touch broken wires or obstructions, including trees hanging from overhead wires, nor attempt to move them by any means but must report the location immediately to the Train Dispatcher and should, if necessary, leave someone to protect such wires or foreign objects until their removal. Other persons in or about the area must be warned of the location. A STOP signal must be given to approaching trains or equipment.

2.4 Working Under an Electrical Protection Authorization De-energizing Catenary Wires

- A. The E C A employee who is requesting an Electrical Protection Authorization must:

Obtain the necessary Authorization from the Power Coordinator for the work to be performed. This authorization must be recorded and repeated to the Power Coordinator. In addition, if required to protect against trains and/or track equipment, track protection must be obtained from the Train Dispatcher.

- B. The E C A employee in possession of an Electrical Protection Authorization must:
1. Ensure that the required grounding devices are applied. The E C A employee may direct another E C A employee to apply the grounding but must personally apply the first ground.
 2. Inform all persons working under this protection. A person required to work under this protection must first present himself to the E C A employee who has obtained the Electrical Protection Authorization.
 3. Explain to all persons involved the designations of the overhead wires de-energized and the extent of the authorization obtained. Each person must repeat the information received.

4. Not permit any person to work if, in his opinion, that person does not understand the instructions.
5. When the authorization is to be cancelled and prior to removing the grounds, inform all persons under this protection and ensure that all persons and equipment have moved to a safe distance.
6. Upon completion of work, ensure that all grounding devices are removed. The E C A employee may direct another E C A employee to remove the grounding.

C. When the grounds are removed the Electric Apparatus **MUST** be considered **ENERGIZED**.

D. The E C A employee must report to the Power Coordinator all irregularities in the execution of these instructions.

2.5 Working With Catenary Repair Unit

- A. The E C A employee who has obtained an Electrical Protection Authorization from the Power Coordinator must be the first person to ascend to the top of the equipment and upon completion of work, must be the last person to descend from the top of the equipment.
- B. The E C A employee must not assume that the person having been instructed by him will adhere strictly to such instructions and must remain alert to detect any potential violations of those instructions or changing conditions.

2.6 Work Adjacent to Energized Wires or Apparatus

Except as otherwise provided, when the ten (10) foot limit cannot be maintained, an Electrical Protection Authorization must be obtained and the wires or apparatus be de-energized as prescribed by Section 2.4.

Exception

When the wires or apparatus cannot be de-energized, no work shall commence until approval has been obtained from the Chief Inspecting Engineer of the Ministry of Transportation and Highways.

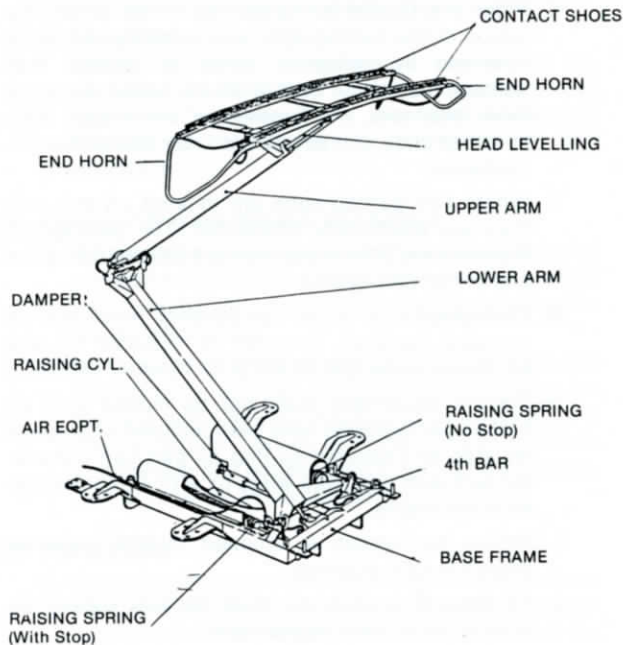
2.7 Electrical Engines Repairs and Service

- A. All electric engines under overhead wires must be considered energized except when it is known that pantographs are down and grounding switches are closed and locked.
- B. Units to be coupled or uncoupled must have the pantographs dropped before control jumpers for multiple unit operation are applied or removed, or if the pantograph cannot be lowered, open main circuit breaker and battery switch during time of insertion or removal of control jumpers.

2.8 Pantographs

- A. When conditions permit, employees should observe pantographs frequently. In case of a defective pantograph, the Train Dispatcher must be notified immediately.
- B. When units are coupled, only one of the pantographs at the coupled ends should be up.
- C. When there are visible defects or obstructions that may damage pantographs, the pantographs must be dropped.

- D. When pantograph arms, shoes, or end horns show indications of having been struck, pantographs must be dropped and conditions reported to the Train Dispatcher immediately.
- E. When practicable during periods of high winds, the action of the pantographs and catenary should be observed by employees. When it appears that damage may occur or that slower speed would be more desirable, the Engineman will reduce train speed at once and advise the Train Dispatcher immediately.
- F. Where two pantographs are located on one unit they are electrically connected. The pantograph that is in the DOWN position is ENERGIZED by the one in the UP position.
- G. Pantographs or other components must not be renewed, repaired, removed or replaced by any employee under ENERGIZED CATENARY WIRES.
- H. Electric equipment must not be moved until all broken pantographs have been removed or properly isolated and secured so that no part can come in contact with overhead wires or with equipment on adjacent tracks.
- I. Before pantograph is dropped throttle must be placed in OFF position.
- J. All grounding switches must be fully closed on electric units when hauled dead.
- K. Electric units must not be moved from electrified to non-electrified tracks or from non-electrified to electrified tracks unless pantographs are down.



PANTOGRAPH

2.9 Restrictions on Top of Equipment Under Energized Overhead Wires

- A. Employees must not climb, ride or do work upon the top of any car, engine, or other equipment when the ten (10) foot limit cannot be maintained under the energized catenary system **except** that employees may ascend to the brake platform on coal gondola or ballast hopper cars to apply or release hand brakes.
- B. Tank cars and/or open cars must not be loaded or unloaded under energized catenary wires.
- C. After the catenary system has been de-energized and grounded by an E C A employee, persons engaged in loading and unloading material must be warned not to allow their bodies or material of any kind to make contact with the catenary system. (See 2.4)

2.10 Operation of Electric Units

- A. When a stop is made as a result of an apparent derailment of units:
 1. Without leaving the unit, a visual check should be made of the pantographs and the extent of derailment. The Engineman must warn persons at the scene to stay ten (10) feet clear of derailed equipment.
 2. The Engineman should drop pantographs, close grounding switches and immediately advise the Train Dispatcher.
 3. When pantographs are dropped and grounding switches closed, persons may leave the unit(s).
 4. When pantographs cannot be dropped:
 - i. Persons on derailed unit must remain inside that unit unless it is KNOWN that at least one truck of the derailed unit is on the track. In that case persons may leave the unit.

- ii. If it is NOT KNOWN that at least one truck of the derailed unit is on the track, persons on derailed unit must remain inside the unit for personal safety and call the Train Dispatcher requesting de-energization of wires.
 - iii. If an imminent threat to personal safety is apparent inside the unit, persons may leave unit by jumping off. When jumping off, persons must avoid simultaneous contact with the unit and the ground. When on the ground, persons must not make contact with the unit.
- B. When a stop is made as a result of unexplained loss of current:
- 1. Without leaving the unit a visual check should be made of the pantographs. The Engineman must warn persons at the scene to stay ten (10) feet clear of stalled equipment.
 - 2. The Engineman should drop pantographs, close grounding switches and immediately advise the Train Dispatcher.
 - 3. When pantographs are dropped and grounding switches closed, persons may leave the unit.
 - 4. When the pantographs cannot be dropped:
 - i. Persons on stalled unit must remain inside the unit for personal safety and call the Train Dispatcher requesting de-energization of wires.
 - ii. If an imminent threat to personal safety is apparent inside the unit, person may leave unit by jumping off. When jumping off, persons must avoid simultaneous contact with the unit and the ground. When on the ground, persons must not make contact with the unit.



2.11 Phase Break Signs and Indicators

- A. The location of Phase Breaks will be specified in the current Time Table.
- B. Phase break signs are located on first catenary pole in advance of a phase break. Phase break indicators of a reflectorized type are located one mile in advance of the phase break sign.
- C. Trains equipped with electric units approaching a phase break sign on any track will place throttle in OFF position before entering the phase break, keeping it in that position until after the phase break is passed by all units in the consist.

2.12 Icing Conditions

- A. When contact wire is heavily coated with ice or when excessive arcing is apparent, speed must be reduced so as not to exceed 20 mph.
- B. When pantograph lowers due to ice or when ice load on a pantograph becomes excessive resulting in heavy arcing between shoe and wire, the engineman must place the throttle in the OFF position and may attempt to raise and lower the pantograph several times.

2.13 Operation of Cranes and Machines (except speeders)

- A. When cranes or machines equipped with booms are used in Electrified Territory the operator must know that the boom and supporting frame is properly grounded in accordance with Maintenance of Way specifications. (This includes non-Railway equipment.)

Machinery must be operated so that the following clearance restrictions are observed:

1. **WITH WIRES ENERGIZED**
Not closer than ten (10) feet to transmission lines or catenary system.
 2. **WIRES DISCONNECTED AND NOT GROUNDED**
Not closer than ten (10) feet to transmission lines or catenary system.
 3. **WITH WIRES DE-ENERGIZED**
Avoid contact with the wires.
- B. Location and working hours of all such machinery must be reported to the Train Dispatcher.

3.0 TUNNEL SAFETY INSTRUCTIONS

3.1 Definitions

Air Tester. An apparatus used to measure air contaminants.

Carbon Monoxide (CO). A colorless, odorless gas produced by combustion and gasoline powered engines. Exposure to low concentrations will produce headaches. Exposure to high concentrations will produce unconsciousness.

Contaminants. Materials in the air which can produce physical harm if present in large enough amounts (e.g. carbon monoxide, nitric oxide, nitrogen dioxide).

Detector Tubes. The small glass cylinders used as part of the air test apparatus.

Gas Mask. A device consisting of a face mask and a container filled with chemicals which remove air contaminants.

Maximum Acceptable Concentration (MAC). The maximum level of air contaminants to which an unprotected person can be exposed for extended periods of time.

Nitric Oxide. One of the gases given off in vehicle exhausts. Exposure to higher concentrations can cause irritation of eyes, nose and throat, and sleepiness.

Nitrogen Dioxide. One of the gases given off in vehicle exhausts. Exposure to concentrations 2-3 times the MAC will result in eye irritation, cough, chest and throat irritation.

Particulates. Dust, soot, smoke or other small particles suspended in the air.

Safety Monitor. Any person which has received instruction in the use of gas masks, SCBA, fire extinguishers, and air testing apparatus.

Scrubber. Any device which is fitted to an engine to remove air contaminants from the exhaust. Water bath and solid cartridge types are fitted to diesel equipment to remove particulates. Catalytic scrubbers are fitted to gasoline engines to remove carbon monoxide.

SCBA (Self Contained Breathing Apparatus) A face mask and compressed air tank which provides a limited supply of air for protection in contaminated areas.

3.2 Extended Period Work

These instructions apply to groups (e.g. track gang, surfacing gang) working continuously in the tunnels over several days:

- A. A vehicle capable of carrying a stretcher with clear access to a portal shall be available in the tunnel at all times for crews larger than 5 people.
- B. So far as practicable only diesel, propane or natural gas powered equipment shall be used.
- C. Diesel and gasoline powered equipment above twelve (12) horsepower shall be equipped with appropriate sized exhaust gas scrubbers.
- D. Scrubbers shall be maintained in good operating condition, inspected and cleaned in accordance with manufacturer's instructions.
- E. Exhausts shall be directed away from the workers' positions to obtain maximum exhaust dilution.
- F. Measurements for nitric oxide (NO), nitrogen dioxide (NO₂), carbon monoxide (CO), and air flows shall be made by a safety monitor at least hourly.
- G. When only gasoline, propane or natural gas powered equipment is in use, only carbon monoxide (CO) need be monitored.
- H. All air quality measurements and records of scrubber inspections and maintenance shall be recorded in a notebook as they are made and the record dated and initialled by the person performing the work. These records shall be retained with the gang at all times of inspection and filed with the project supervisor on project completion.

- I. When levels of any air contaminants reach the following, the safety monitor shall advise the work supervisor and commence testing every half hour:

nitrogen dioxide (NO₂) - 3 ppm
nitric oxide (NO) - 15 ppm
carbon monoxide (CO) - 50 ppm

- J. The work supervisor shall arrange for the evacuation of all unprotected personnel after being advised that any of the following levels are reached or exceeded:

nitrogen dioxide (NO₂) - 4 ppm
nitric oxide (NO) - 25 ppm
carbon monoxide (CO) - 200 ppm (2 successive readings, 15 minutes apart)

- K. An air quality test shall be made at the work site on commencement of work.

3.3 Short Term Work

These criteria apply to groups of less than 6 people, such as the OCS crews which will be in the tunnel for less than 4 hours per day or occasionally:

- A. Each of these crews shall be equipped with an air test kit containing a hand pump in good working order and an adequate supply of detector tubes for that pump.
- B. At least one member of the crew shall be a safety monitor.
- C. The crew shall use discretion in their work to ensure the crew members are not unduly exposed to air contaminants.
- D. The conditions specified in items H to K inclusive of 3.2 shall apply.

3.4 Passage Through Tunnels (other than trains)

- A. Where smoke which substantially restricts visibility is encountered, contaminant levels shall be checked.
- B. The limits specified in items I and J of 3.2 shall apply and unless dictated by emergency circumstances or where respiratory protection is available, there should be an immediate exit of the tunnel.
- C. Entering the tunnel on foot, without track vehicle and/or radio support shall be prohibited, except within (500 m) 1650 feet of the portals.

3.5 Problem Investigation

This applies to Communications, OCS and other M/W staff who may be investigating an in-tunnel problem:

- A. The crew shall be equipped with an air test kit in good working order and a supply of detector tubes.
- B. Respiratory protection shall be available for each crew member.
- C. A fire extinguisher suitable for class A, B, C fires shall be available.
- D. A least one member of the crew shall be a safety monitor.
- E. Air contaminant levels shall be checked when encountering smoke which substantially obstructs visibility.
- F. Respiratory protection shall be worn if contaminant levels exceed those specified in Item J of 3.2.
- G. SCBAs shall be worn to investigate or attempt to extinguish a fire in the Table or Wolverine tunnels.

3.6 Protective Equipment

- A. Vehicles shall be equipped with type ABC dry chemical extinguishers.
- B. Two SCBAs and a 10 Kg type ABC dry chemical extinguisher shall be available at Table tunnel south portal, Phase Break Mile 41.6, and Wolverine tunnel north portal.
- C. Fire extinguishers, SCBAs and gas masks shall be inspected monthly (as part of the OCS maintenance procedure for fixed plant installations) and maintained in good working order.
- D. Used gas mask canisters shall be replaced immediately and used SCBAs and fire extinguishers shall be promptly replaced or refilled. A report shall be filed as part of the incident report to the Train Dispatcher.

4.0 FIRST AID

4.1 Removing a Subject from Energized High Voltage Apparatus

No attempt should be made to remove a subject from Energized High Voltage Apparatus.

4.2 Management of Electrical Shock Injuries

Once the source of power has been removed, check the patient to see if he is breathing properly. Electric shock is not always fatal. It may only stun the subject and stop his breathing. SEND FOR MEDICAL AID IMMEDIATELY. However, as brain cells begin to die after 4 minutes without oxygen, mouth to mouth resuscitation must be started immediately.

Mouth to mouth resuscitation is usually required in electrical shock, severe smoke inhalation, or in cases in which breathing is temporarily stopped.

Prompt and continued efforts in restoring natural breathing are necessary for successful results. The failure of the patient to respond quickly to mouth to mouth resuscitation should not cause discouragement. This effort should be continued because:

The body depends upon a continuous exchange of air. We must breathe in and out between 12 to 20 times per minute.

Persons whose breathing has stopped, have been restored after mouth to mouth resuscitation has been continued for as long as three (3) hours or more.

4.3 First Aid

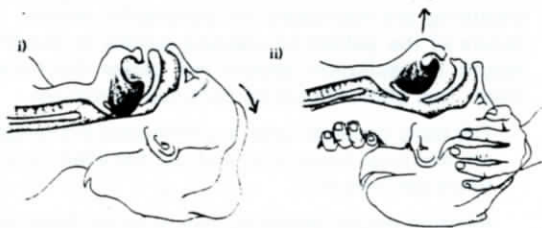
The following instructions are not meant to be a comprehensive first aid manual, but a guide for those who have had some first aid training.

If you have not had first aid training, you should follow the instructions using particular caution if required to administer Cardiopulmonary Resuscitation (C.P.R.).

SEND FOR MEDICAL AID IN ALL CASES.

4.4 Instruction for Mouth to Mouth Resuscitation

- A. Place the person lying on his back in a well ventilated area. (If in a closed area, open doors and windows.) Loosen any clothing about the neck.
- B. Tilt the head back.
- C. Raise the chin by lifting up the jaw.



- D. Pinch the patient's nostrils closed.
- E. Take a deep breath, make an airtight seal with your mouth and blow into the patient quickly four (4) times. Do not allow the patient's lungs to deflate

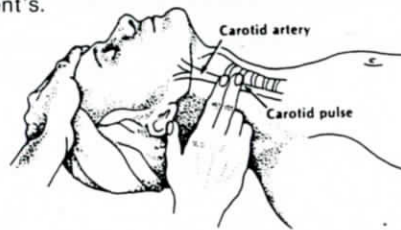
between each breath. (This is called "stacking".) This allows the patient's lungs to fill to their full capacity.



Rescue breathing should not be tiring.

You should notice the patient's chest rise. If the chest does not rise, check the mouth for any obvious obstructions (vomit, blood, loose dentures, etc.). Sweep out mouth with your finger. After any apparent obstruction has been removed, again attempt to blow into the patient's mouth, again "stacking" four breaths.

- F. After "stacking" four breaths, establish whether the patient has a heart beat. This can be done by feeling for the carotid pulse on either side of the neck. To find the pulse, place your fingers lightly on top of the patient's "Adam's Apple", pull your fingers towards you and down between the windpipe and strap muscle of the neck. It is important that the rescuer not use his thumb to locate a pulse as this will give the rescuer's pulse and not the patient's.



Spend at least seven (7) seconds but not more than ten (10) seconds to determine whether the patient has a pulse. If no pulse is detected after 7 - 10 seconds you will have to start Cardiopulmonary Resuscitation (C.P.R.) - See Section 4.5. If you find a pulse, and the patient is still not breathing:

- G. Pinch the patient's nostrils closed.
- H. Take a deep breath.
- I. Make an airtight seal with your mouth over the patient's mouth and blow gently into the patient once. (If you have trouble getting air into the patient, tilt his head back as far as possible and raise the chin by lifting up the jaw.)
- J. Wait five (5) seconds. During these 5 seconds, check to see if the patient's heart is still beating by checking the pulse (Step F).
- K. Pinch the patient's nose and blow directly into the mouth again.
- L. Repeat this rhythm (Steps G to K) and be prepared to continue for a long time. Mouth to mouth resuscitation should not be tiring. If you find yourself becoming dizzy, your breathing rate could be too fast.
- M. When the person begins to breathe, assist his first breaths with yours and continue if patient is having difficulty. When assisting a person with his breathing, it is important to blow into the patient at the same time he is trying to breath in (inhale).

4.5 Instructions for Cardiopulmonary Resuscitation (C.P.R.)

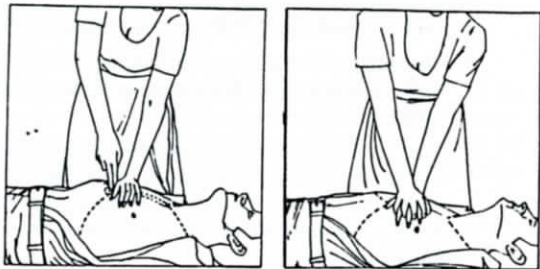
If you do not detect a pulse after "stacking" four breaths, you will have to start C.P.R. immediately. It is very important that an adequate assessment for a pulse be made. To perform C.P.R. on a heart that is beating slowly or is very weak would only endanger the patient. To perform C.P.R. do the following:

- A. The patient should be placed lying on his back on a FIRM surface with NO pillow or support under his neck.
- B. You should position yourself kneeling beside and as close to the patient as possible. Your legs should be slightly spread to allow yourself to move from the patient's head to his chest without changing your position.
- C. Slide the MIDDLE finger of your hand, closest to the patient's feet, along the patient's rib cage until you feel the notch where the ribs meet the chestbone (sternum).



- D. Place your index finger of the same hand beside the middle finger.

- E. Place the heel of your other hand (the hand closest to the patient's head) along the mid line of the chest ABOVE, not over, the measuring two fingers. It is important that the measuring fingers do not leave the chest until the heel of the hand is placed on the chest.



- F. The first hand is then removed from the notch and placed on top of the hand on the chest.
G. Straighten the arms by locking your elbows.
H. Position your shoulders directly over your hands.



- I. Using the weight of your body, gently push down (compress) the patient's chest about 1½" to 2" (38 - 51 mm).

- J. Release the pressure on the patient's chest so that your hands are resting lightly on the chest. Avoid moving the hands.
K. Compress and release the patient's chest fifteen (15) times. Proper rhythm can be maintained by counting "1 and 2 and 3 and 4 and five, and 1 and 2 and 3 and 4 and ten, and 1 and 2 and 3 and 4 and 15".
L. After the 15 chest compressions, shift to the patient's head.
M. Tilt the head back and raise the chin by lifting the jaw.
N. Take a deep breath.
O. Make a seal with your mouth over the patient's mouth and give two (2) quick breaths.
P. Shift back to the patient's chest.
Q. Repeat Steps C to P three more times.
R. After 4 cycles of 15 chest compressions and 2 quick breaths, take 7 - 10 seconds and check for a pulse.
S. If no pulse is still detected, repeat Steps C to P and check for pulse every 5 minutes.
T. If the patient has a pulse, continue mouth to mouth resuscitation and check the pulse between each breath.
C.P.R. and mouth the mouth resuscitation should be continued until one of the following occurs:

Spontaneous circulation and breathing are restored.

Another fully qualified person assists or takes over (Industrial First Aid Attendant, Ambulance Personnel).

4.6 Electrical Shock/Burns Treatment

If the electrical shock patient is breathing, reassure and keep the patient at absolute rest. (Any undue movement may cause the patient's breathing to stop.)

Treat burned areas:

If possible, ice wrapped in a wet cloth should be applied to the burn area for at least 30 minutes.

Do not pop blisters. Apply sterile gauze pad and a layer of drainage dressing. Ensure that the drainage dressing does not directly touch the burn. Hold the dressing in place with an appropriate bandage. The bandage must be snug enough to support the area, but not tight enough to break any blisters.

Similar coverings should be lightly bandaged over dry and charred burns. When checking a patient for injuries, be sure to remove boots and socks. In the case of high voltage shock, there are generally two wounds: an entrance wound, and an exit wound. The exit wound generally shows on the feet.

Transport the patient by STRETCHER to medical aid. Do not leave the patient unattended. Maintain a constant watch on the patient's breathing. All persons having received an electric shock MUST be treated by a doctor.

5.0 EXTINGUISHING FIRES

- A. Fire extinguishing apparatus should be ready for service at all times.
- B. Fires in proximity to overhead wires may interrupt power and must be reported immediately to the Train Dispatcher who will, when necessary, send an E C A employee to the scene of the fire. All activity must be done in strict compliance with Section 2.2 and 2.6.
- C. In case of fire on electric equipment or electrical apparatus, the equipment or apparatus power must be disconnected at once. The circuit should be grounded if possible, before using fire extinguishers. If the extent of the fire requires calling private or public fire departments, they must be advised whether the equipment or apparatus is energized or disconnected and not grounded, or de-energized.
- D. During a fire, all persons must keep as far as possible from energized high voltage wires which might fall. Arrangements must be made to have such wires de-energized and properly grounded.
- E. When using extinguishers, the user must consider all electrical apparatus and wires energized until it is known that proper grounds have been applied and must not approach within distances specified in these instructions. When discharging an extinguisher on a fire, the contents should be directed at the base of flames. After its use, the fire extinguisher shall be promptly replaced or refilled and a report made to the Train Dispatcher immediately.

- F. Use of extinguishers for fires around electrical circuits, **UNLESS APPROVED FOR THAT PURPOSE, IS PROHIBITED.** Follow instructions applying to the particular make of extinguishers, particularly in confined areas, care should be exercised to avoid being overcome by fumes and/or gases or oxygen deficiency. Extinguishers should never be used in such a way that the stream can strike the overhead wires until power has been disconnected and the wires properly grounded.
- G. Carbon Dioxide (CO₂) Extinguishers can be used on fires involving electrical apparatus, circuits, oil or grease. Carbon dioxide is in gaseous form and appears as a vapor when released from extinguisher. It is not a conductor of electricity and the "snow" sometimes discharged will not injure or corrode apparatus. As the discharge range of the gas from this extinguisher is approximately eight (8) to ten (10) feet and as the discharge rate is very rapid (10 to 20 seconds), the user of the extinguisher should endeavor to approach fire with any air current at his back and get as close as possible before operating control valve.
- H. Dry Chemical Type Extinguishers approved for that purpose, are effective on electrical apparatus, oil and grease fires. The dry chemical is a powder and appears as a vapor when discharged from the extinguisher. It is not a conductor of electricity. The range is approximately five (5) to twenty (20) feet and approximate time of discharge is ten (10) to twenty-five (25) seconds.

- I. On electric units the equipment room is equipped with an automatic fire extinguishing system. Excess temperature causes a release of halon gas throughout the equipment room and contactor cabinets. This gas is non toxic but will cause an oxygen deficiency and personnel must evacuate immediately upon release of halon gas.
- J. Oil Circuit Breaker and Transformer Fires may cause burning oil to be thrown on other electrical apparatus and to flow through indoor openings. Carbon dioxide or dry chemical should be used for first application, followed by the use of sand or earth to prevent fire spreading on the floor or ground.
- K. For air-cooled apparatus, including transformers and rotating machinery, stop all air-cooling appliances and close dampers before applying extinguisher to burning parts.