

SECTION 1.

"SAFETY FIRST"

"SAFETY" is to be the first consideration of all members and workers....

"SAFETY for themselves"

"SAFETY for passengers"

"SAFETY for other road users"

"SAFETY for fellow members and workers"

The co-operation of all concerned is essential for the maintenance of precepts. REMEMBER! ACCIDENTS DON'T JUST HAPPEN. THEY ARE CAUSED!

(A)..."Safety on the road"

- (1) A tramcar being confined to movement along rails cannot turn or swerve, thus the action to be taken by drivers of tramcars to avoid traffic accidents is almost entirely confined to stopping the tram. It is therefore essential that a full appreciation of the factors which determine the distance in which a tram may be brought to a standstill must be always recognised. They are as follows:—

- (i) Time available
- (ii) Speed
- (iii) Weight (or load)
- (iv) Slope or gradient
- (v) Condition of rail surface

TIME:— The distance travelled in one second is roughly $1\frac{1}{2}$ times the speed in miles per hour. For example 10 mph = 15ft. per second, 30 mph = 45ft. per second. The extent to which the driver of a tram is alert is therefore reflected in the distance taken to stop the tram in emergency.

SPEED:— It is obvious that a greater distance is required in which to stop a tram (or any vehicle) as the speed increases.

WEIGHT:— The weight of a loaded tram is increased considerably. 40 passengers at average of 8 stones = 2 tons, so that a greater distance is required to stop a full tram than an empty tram.

SLOPE OR GRADIENT:— This is an important factor in affecting a stop with any vehicle. When on an upgrade the distance is reduced, but on a down grade the distance is increased and is proportionate to the steepness of the grade.

CONDITION OF RAILS:— To stop any moving vehicle depends to a very large extent upon the grip of tyres on the road in the case of motor vehicles, and wheels upon the rails in the case tramcars. Any slip or skid of the wheels increases the distance travelled before a stop is effected. It naturally follows that the amount of brake force that can safely be applied to any vehicle depends entirely upon the condition of the road or rail surface. If the surface is good and clean (the cleanest tram rail is when it is being washed with heavy rain) the maximum brake force may be used, but when it is greasy or slippery (misty rain after a dry spell of weather, autumn leaves or pine needles falling on the tracks) only a very gradual application of the brakes will avoid putting the tram into a skid.

COMBINED EFFECT:— All the factors of speed-weight-gradient and bad rail conditions may be present at the same time and it follows that the development of a true road sense requires that anyone driving a tram will always be conscious of them and drive accordingly.

- (2) Do not take a chance that a person or vehicle will get out of the way of your tram. Regard all persons on or near the track as children or deaf or blind. Be ready for every possibility. When in doubt always stop - take no risk.
- (3) Do not take it for granted that passengers will step on or off a tram quickly enough to avoid an accident. Stop the tram and ensure that they are safely on or off before starting the tram or giving a start signal to the driver.
- (4) When overtaking a vehicle in front, make sure that the other driver is aware of your approach and will keep clear of the tram track. Give ample warning of your approach and be ready to stop quickly if it should be necessary. Always remember that if you are overtaking another vehicle the law makes it your responsibility to do so safely.
- (5) The actions of children on the road or beside the track are unpredictable so when they are nearby, reduce speed and drive slowly past them. Sound foot-gong.
- (6) When the track is obstructed by a vehicle, by a crowd or by road or track maintenance works, do not run too close until the way is quite clear.
- (7) When passing horse-vehicles, remember that when startled, the horse is just as likely to back the vehicle toward the tram as to move away.
- (8) Remember that trams negotiating curves have the following characteristic. Single truck (4 wheel) trams project outwards at the front and rear ends of the tram. Bogie truck (8 wheel) trams - the body at the centre moves inward on the curve.
- (9) A life saved or an accident avoided is much more important than running to schedule or any other consideration.
- (10) **"SAFETY IN THE DEPOT OR ON THE ROAD"**
When taking over a tram car make sure that you can stop it before you apply power. See that the air pressure gauge shows a working pressure of at least 55 lbs. in the reservoirs if the compressor is operating or 65 lbs. if the compressor is not renewing the supply. Make sure that the brake valve handle is in position at the operating end. If you are relying upon the hand brake, wind up the slack chain and hold the brake wheel at starting position.

(B)..."Safe Working - Electrical Apparatus"

It is necessary that all employees associated with the operation and maintenance of tramcars are familiar with general principles as to electricity and the precautions to be taken in the operation, inspection or adjustment of apparatus.

Traffic employees are cautioned not to interfere with electrical equipment except as may be necessary in the case of fault or breakdown. This is to be confined to cutting out defective motors in the controllers, replacement of fuses in compressor or lighting circuits and replacement of burnt out lamps.

(1) Explanation of Tramway Electrical Circuit.

For an electrical current to flow and operate a motor, lamps, etc. a circuit must be completed i.e. two connections are necessary - one to bring electricity from the supply source and the other to return it to the supply source. Switches or circuit breakers are used to complete or to break the circuit. Applied to trams, the trolley wire is the positive or "live" connection from the supply, and the rail is the negative or "earth" side back to the supply source. To operate a tram therefore, the pole must be placed in contact with the trolley wire and the tram must be placed on the rails. The contact made in

each instance must be clean and both connections are equally important.

(2) Circuit on Tram (Trolley pole to Circuit Breakers and Switches)

Insulated cables connect from the trolley base to car apparatus. The circuit breaker (or line breaker on bogie trams) controls the supply of electricity to the traction motors, the lighting switch controls the supply to the lamps and the compressor switch the supply to the air compressor motor.

PRECAUTIONS—if the pole is in contact with the trolley wire the internal mechanism of circuit breakers and switches is "alive". The pole must therefore be removed and secured from the trolley wire before opening a circuit breaker or switch casing.

(3) Circuit on Tram (Switches and Fuses)

To provide for safety in the event of a fault or overload in electrical apparatus a "safety valve" in the form of a fuse is provided. This blows out and breaks the circuit in the event of a fault, etc. Cartridge type renewable fuses are provided for the lighting and air compressor circuits and are adjacent to the switches. Automatic switches or circuit breakers are provided for the traction motors by reason of the electrical current being subject to further regulation by the driving controller.

PRECAUTIONS—before attempting to replace a fuse cartridge, see that the switch for the circuit is open i.e. in the OFF position. Before attempting to open a controller case see that the circuit breaker is open i.e. in the OFF position.

(4) Line Breakers on Bogie Trams

The switch corresponding to the circuit breaker on small trams is located under the centre drop section of the tram and is remote controlled by a line breaker switch and fuse on the driving platform. On these trams the circuit breaker closes and opens automatically as the controller is moved in the ON and OFF directions.

PRECAUTIONS—since the line breaker is remote controlled and there is no certainty that it is safely opened, the trolley pole must always be removed and secured from the trolley wire before opening the controller case on this type of tram.

(5) Completion of Circuit from Tram to Rails

After the electric current has performed its work in the motors or lamps it is conveyed by cables to the truck of the tram and thence through the axles and wheels to the rails. It must be always realised that the steelwork of a tram is therefore an actual part of the electrical circuit and relies entirely upon the wheels being in contact with the rails for safe operations. If however, a tram becomes completely derailed or becomes stationary on dirty rails the circuit is broken and if the pole is in contact with the trolley wire a hazard exists in that the tram becomes what is known as "charged". This is by reason of the path for the electricity being complete from the trolley wire to the metal work of the tram, but the tram is incapacitated because the current cannot reach the rail. Any person touching the tram and standing on the rail or ground close to the rail would complete the circuit and receive a severe electric shock. This is a hazard to which all members and workers must be instantly alert.

PRECAUTIONS—first warn persons not to alight or attempt to board the tram, then remove the trolley pole from the overhead wire. To remove the pole, jump to the ground from the footboard, don't step down or touch handrails. Touching

only the trolley rope, pull the trolley pole clear. To make the necessity for these precautions quite clear it may be stated that a completely derailed or "earthed" tram having its pole still in contact with the trolley wire if touched by a person while standing on the ground, may present a similar hazard as to electric shock, as touching the trolley wire from the ground.

(6) Operating Trolley Pole from Roof of Tram in Traffic

It is occasionally necessary for employees to ascend to the roof of a tram to effect repairs to the trolley rope due to breakage by pole dewirement. To reach the roof the foot brackets provided on the side of the tram must be used and every care taken when ascending and descending.

PRECAUTIONS—when dry, the roof of a tram is a good insulation so long as care is taken to keep clear of metal work at the trolley base, but in wet weather a leakage path for electricity to earth is caused by water and a hazard may exist. To take no risk therefore, the trolley pole should not at any time be grasped by the hands but rope still attached to the pole if this can be safely reached, or by means of the length of rope still attached to the back of the tram. When the pole is pulled down and clear of the overhead wires it may be conveniently held between the legs while the rope is being repaired. If the pole is jammed and cannot be pulled down by means of the rope it is necessary to get a more positive grip on the pole; a dry bag or garment must be wrapped on the pole before grasping same.

(7) Broken Electric Light Globes

When the glass bulb of an electric light globe is broken do not overlook that the active elements for the electrical circuit are exposed.

PRECAUTIONS—in addition to taking the precaution of using a duster or handkerchief to avoid cutting the hand when removing the lamp cap from the socket, see that the lights are switched OFF or pull down the trolley pole.

(C)...Broken Trolley Wires Precautions and procedure to be adopted upon discovery of a broken wire.

(1) Trolley wire broken but held up by fittings and clear of the trams and road vehicles

- a. From the nearest telephone advise the traffic office or the station operator.
- b. If possible to coast tram under the broken wire, do so with the pole pulled down clear or transfer pole to the other wire on single track if the pole will not foul the break.
- c. If it is possible to proceed as above with safety, warn the motormen of trams met on the route and request that warning be passed on to succeeding trams.
- d. If it is not possible to proceed with safety, take no risk and wait until breakdown party arrives.

(2) Wire Broken and Hazardous to Vehicles or Pedestrians but no casualty or vehicle involved

- a. Warn all persons and vehicles to keep clear.
- b. If tram is two-man operated the conductor must go to the nearest telephone and advise the traffic office or station operator with the motorman standing by at the scene to prevent any person or vehicle from fouling the wire until an officer or breakdown party arrives.

- c. If the tram is one man operated, safety must be the first consideration. The motorman/conductor should arrange for information of the breakdown to be telephoned or conveyed by motorist to the traffic office, station operator or police station, and not leave the scene until an officer or breakdown party arrive to take charge.

(3) Wire Broken and Entangled with a Pedestrian or Vehicle or Wires fall on Tram containing Passengers

- a. The first essential is to get the casualty (pedestrian) clear of the wire. To enable this to be done quickly and safely use your jacket or overcoat if dry and throwing it over the wire at the nearest convenient spot, drag the wire into contact with the rail. This will cause a heavy flash if the wire is alive and open the circuit breaker at the power station. Leave the wire in contact with the rail so that it cannot be made alive.
- b. Remove the person from contact with the wire and apply artificial respiration. Arrange for the ambulance or nearest doctor to be called and then for advice to the traffic office or station operator.
- c. If there is no casualty but wire is entangled with a vehicle or upon a tram containing passengers, warn all persons to remain in safety until you have grounded the wire as detailed in paragraph a. Vehicles or trams must not be moved until an officer or breakdown party arrives to take charge.
- d. Take every precaution possible to keep moving traffic, pedestrians, etc. clear of the wire.

SECTION 2.

Instructions to be Observed by members and workers working on track maintenance

(A)...Safety.

1. Track maintenance workers must remember, at all times, that their safety is affected by both the tramway traffic and road traffic, and, conversely, that their operations can effect the safety of both tramway operations and road users.
2. All normally prescribed precautionary measures must, therefore, be strictly adhered to and special precautions taken when required.
3. Before commencing repairs to the permanent way, approved "Men at Work" signs must be placed in conspicuous positions facing on-coming traffic at each end of the section undergoing repairs.
4. If the permanent way under repair is left open after normal working hours, approved barricades and signs advising on-coming traffic must be erected in appropriate positions, red and green lamps being displayed in the correct positions on the barricades.

(B)...Operation of Equipment

1. All equipment including the road roller, air compressor, welding plant and motorised trolley must be only operated by authorised persons.
2. When operating the road roller, the driver must be observant of all employees and other road traffic.
3. All recognised safety precautions in the use of welding equipment must be observed at all times.