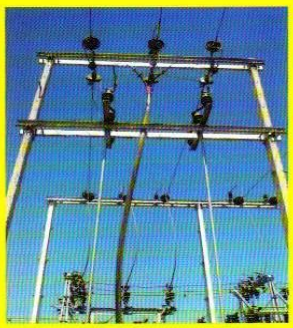

MAHAVITARAN

Maharashtra State Electricity Distribution Co.Ltd.

Safety Manual

DEPARTMENT OF TRAINING & SAFETY

FOREWORD

1. We understand the importance of safety but unfortunately our track record of accidents clearly indicates non adherence to safe practices. Analysis of statistics of accidents show that most of the accidents are attributed to unsafe acts. Accidents cause avoidable injuries, loss of life and loss of property. This is a matter of great concern for M.S.E.D.C.L. and we need to do everything to ensure safe working environment and avoid accidents at any cost.

2. Keeping in view the above, M.S.E.D.C.L. is taking various steps to improve safety standards. One of the steps is the publication of Safety Manual by HR Department. I compliment Shri N.G.Misal, C.E.(Training and Safety) and his team for their sincere efforts in producing comprehensive and updated Safety Manual.

3. I hope the Safety Manual will go a long way in educating the employees on safety and will help in achieving high standards of safety.

Ajoy Mehta

Ajoy Mehta, IAS
Managing Director

PREFACE

1. Safety is a very important aspect of our life and we at M.S.E.D.C.L. understand the requirement of creating a safe environment for our employees, consumers and others.

2. Based on C.E..A.'s guidelines on safety, we initiated number of steps like creating Safety Organization, regular safety training and conduct of safety audits. There was also a need to have updated safety manual. Accordingly, this safety manual has been prepared.

3. This manual covers important aspects of safety like organization, general instructions, devices, first aid, audit and procedures for permit and reporting accidents/near miss accidents. Disaster management has also been covered.

4. This manual will provide excellent training aid and ready reference for following rules and instructions on safety

Col. R.B. Gowardhan (Retd.)
Executive Director (H.R.)

SAFETY MANUAL

INDEX

1. Purpose and Scope

This Safety Manual is for the guidance of employees in prevention of accidents to themselves, public and damage to company property. Accidents can be practically eliminated with forethought, carefulness and planned protection on the part of supervisor and workmen. This book also outlines St. John's First Aid methods which are to be used at the time of accidents before medical aid becomes available.

The safety instructions are divided into following parts:-

1. General (applicable to all situations)
2. Safety at work
3. Safe working - permit system
4. Treatment for Electric shock
5. Disaster Management

Omissions of any safety practice herein, does not reduce the individual responsibility for alertness and good judgement in performance of work.

RESPONSIBILITIES OF SUPERVISORS :-

Controlling Officers/Supervisors have a definite responsibility of ensuring the following.

a) Safe working conditions.
b) Use of necessary protective equipment.
c) Properly maintained tools and equipments.
d) Proper planning & performing work in a safe manner.
e) Obeying general and special safety instructions by the workmen.
f) Assigning jobs to the employees as per their capabilities
g) Immediate steps to correct any violation of safety rules observed or reported .

Each supervisor shall make sure that his men understand the following.

a) Work to be done.
b) Hazards that may occur.
c) Proper procedures for doing the work safely.

Frequent inspections of construction, operation and maintenance of equipments, materials, work areas, conditions and methods should be made by supervisors as a part of their routine duty. Such inspections help to prevent fires and accidents.

2. Safety Organization in the MSEDCL

The top management in the MSEDCL understands the importance of safety and is committed for implementing safety measures.The management has initiated necessary steps to nominate safety officers at Corporate office, Zone office,Circle office,Division office and Sub-Divisional offices for safety awareness and training. The safety organization is briefly described below.

(a) **Corporate Office :-** The Chief Engineer(Training and Safety),under the guidance of Director(Operations) and ED(HR) will carry out the key responsibilities like formulating safety policy, safety training, safety audit, analysis of accidents.

(b) **Zone Office :-** The Ex. Engr. (Administration) has been designated as E.E. (Administration & Safety). He will be responsible for training, audit and all safety aspects including procurement, issue and periodic inspection of safety equipment. He will also be responsible for safety at office.

(c) **Circle Office :-** The E.E. at circle office will be the Circle Safety Officer and will perform the duties as directed by the zone office.

(d) **Division Office :-** The Dy.EE at Division office will be responsible for safety matters regarding training, safety audit, inspection and issue of safety equipments.

(e) **Sub-Division Office :-** At Sub-Divisional Level, J.E. (Quality Control) will be responsible for all safety matters within a subdivision and is supposed to carryout duties as per the directives from the concerned division office.

The safety organization will ensure that safety is given prime importance and will also provide necessary support to the field staff.

The nominated safety officers at each level will be responsible for safety awareness, training etc. The nomination of safety officer is an additional responsibility assigned over and above their normal duties, as such for any safety lapse the nominated safety officers will not be held responsible.

Safety officer have to play following roles :-

(1) To support field engineers and staff directly responsible for electrical safety and other safety related functions.

(2) To seek support and work closely with the SEs and other EEs, Dy EEs & AEs and Government Inspectors etc. for implementing safety practices.

(3) To ensure that each facility and 33/11 kV substations of MSEDCL are equipped with first-aid services, fire-fighting equipment and insured for fire in an eventuality.

(4) To do cause-effect analysis of near-misses.

(5) To transmit accident related information to government bodies and corporate office.

(6) To investigate reports of accidents, dangerous occurrences, fatal and non fatal casualties and fire damage.

(7) To determine the causes and make recommendations for avoiding recurrence.

(8) To monitor all accidents for proper investigation and lessons learnt to be shared across the circles.

(9) To provide statistical summaries to the Chief Engineers concerned and Corporate Office.

(10) To arrange Training for staff in consultation with CE(Training &Safety)

(11) To identify the training needs of staff, prepare the training schedule, and coordinate with EEs for staff training.

(12) To monitor staff training and report training targets to the Chief Engineer.

(13) Ensure that staff and contractors (including new employee of a contractor) are inducted, as per the Safety Procedure on Induction and Training.

(14) Ensure that equipment/electrical apparatus purchased meet the safety standards.

(15) Ensure Fire Arrangements are maintained in good order and fire drills carried out on all the premises and every MSEDCL employee has attended the fire drill

(16) Develop the audit process in consultation with CE(Training & Safety)

(17) Prepare and coordinate the safety audit in consultation with CE(Training & Safety)

(18) Ensure audit recommendations are being implemented within agreed timescales.

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3. General Safety Instructions

RESPONSIBILITY OF AN INDIVIDUAL :-

1. Your definite responsibility is to act so as to provide
   a) Safety to yourself and fellow employees
   b) Protection to the public.
   c) Protection to the company and national property.
2. Every employee is expected to study the Safety Manual, familiarize himself with its contents and apply them during work. Ignorance of rules and regulations may result in accident to you or to your co-workers.
3. Any doubts regarding rules, regulations or procedures may be consulted with your supervisor or the person in charge of the work.
4. Before attempting any work under conditions that are unsafe, it is required to report these conditions to the concerned person-in-charge of work and seek necessary advice.
5. It is duty of every employee to promptly report the supervisor about any dangerous or improper condition of apparatus or equipment which comes to his notice.
6 Every employee must report Near-Miss Accident within 24 hours in the format given (Refer Appendix).

PERSONAL CONDUCT :-

1. Consuming liquor, drug, smoking or any sort of intoxication while on job is strictly prohibited. No employee shall report for work while he is under the influence of liquor and no Officer / Supervisor shall knowingly permit a man to go to work while he is under the influence of liquor / drug.
2. Practical joking and horse play while on the job is strictly prohibited.
3. No employee shall distract the attention of another worker from his job unless he thinks that the worker is doing something which is dangerous or risky either to the person or equipment.
4. Any employee who endangers his own or others' safety by violating the foregoing requirements of personal conduct shall render himself liable to disciplinary action.

PERSONAL CAUTION :-

It is in the workman's own interest to exercise utmost personal caution as indicated below so as to prevent accidents and injury to him.

1. Every employee should consider the result of each act and no chances should be taken that will endanger workman's own or other employees' lives.

2. Always Be Careful (ABC). The workman should place himself in a safe position while working to avoid falling, stumbling, slipping or moving backwards against live parts.
3. The workman should satisfy himself regarding the safe working condition before starting the work. The care exercised by others should be checked.
4. Before commencing the work he should examine all the required safety equipments like ladders, gloves, strup and rope etc.

PHYSICAL FITNESS :-

1. Any employee who is unable to perform his duties due to illness or other disability shall promptly report his condition to the immediate supervisor.
2. After absence from work due to illness or injury, an employee may be required to pass a physical examination to determine his fitness for duty.

FUNDAMENTALS OF SAFETY :-

Unsafe Condition AND / OR Unsafe Act create the potential for accident to occur.

1. Prevention of accident requires the whole hearted co-operation of all members of the organisation. A capable, mentally alert employee will avoid accidents.
2. An unsafe man is a liability to the organisation. He is a danger to himself, his fellow workers, the public and the company.
3. Accident does not happen but it is caused. Accident is the result of unsafe conditions or unsafe acts or a combination of both.
4. **Unsafe Acts** which may cause accident include the following.
   a) Operating without authority or warning, such as closing switches without authority, operating hoists and trucks without warning, failure to block or guard equipment against unexpected movement, failure to place warning signs or signal men wherever needed.
   b) Operating or working unsafe, such as driving too fast, throwing away material or tools to another worker, jumping from a vehicle or platform, or unnecessary haste.
   c) Making safety devices inoperative such as using over size fuses, blocking safety valves etc.
   d) Using unsafe equipment or using improper equipments like dull cutting tools or mushroom head chisels, pipe extensions on wrenches not appropriate for the purpose, wrong tool for a job, using hands instead of hand tools.

e) Overloading the material transport vehicles,Unsafe loading of objects that are likely to fall, improper packing, combining chemicals to form a dangerous mixture.

f) Taking unsafe position or posture like walking under suspended loads or too close to openings, lifting while in awkward position, riding on running vehicles.

g) Working on dangerous equipment for example cleaning, oiling or adjusting moving machinery or working on live electrical equipment.

h) Distracting, teasing, practical joking, horse play, quarrelling or annoying.

i) Failure to use safe clothing or protective equipment such as wearing loose sleeves, neckties, or jewellery near moving machinery, failure to use rubber gloves on energised equipment and failure to use goggles, helmet, gas masks, respirator, safety belt, ladders or gloves when necessary.

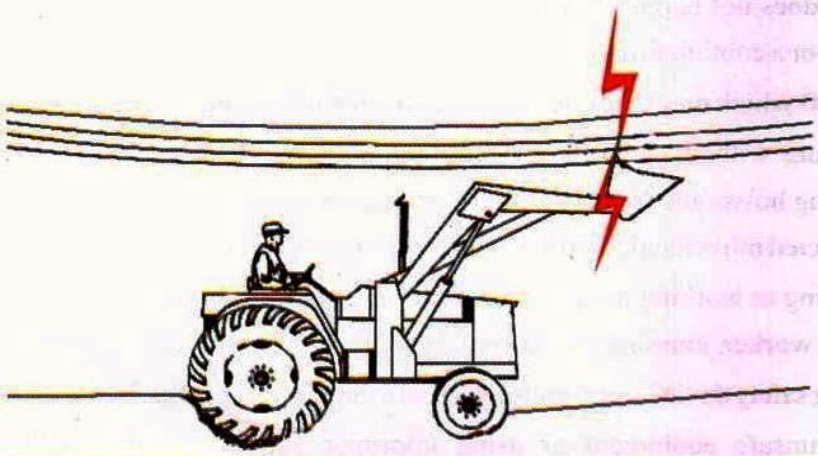
5. **Unsafe Conditions** which may result in accident include the following:-

a) Unguarded Equipments that have unshielded moving parts, saws, etc. unbarricaded floor opening, excavations or high voltage circuits which are unisolated, live, unguarded or without caution notice plates.

b) Defective Material or Equipment such as mushroomed chisels, split handles, poorly constructed scaffolding, broken ladder, torn or cracked gloves etc..

c) Insufficient Illumination at work place, unsuitable location producing glare or objectionable shadows.

d) Unsafe Design and Construction:- Structures like platforms should be designed with large factor of safety and the construction and design in general should incorporate necessary safety features. All anticipated hazards should be pointed out to workers.



Unsafe working condition results in accident. The boom of Crane moving under electric conductor is seen touching electric line/coming in the vicinity of electric line creating shortcircuit. Conductor may snap or may cause injury to the crane operator.

ISO FORMATTED SYMBOLS FOR SAFETY :

ISO Formatted symbols can be used as safety labels. Use of such symbols should be encouraged as these symbols communicate across language barriers. ISO safety symbols come in three categories as shown below.

1) Yellow warning triangle / Black graphical symbol, indicates what the hazard is (Fig-A).

A

2) Red circle with slash / Black graphical symbol, indicates a prohibited action to avoid the hazard (Fig-B)

B

3) Blue mandatory action circles / White graphical symbol, indicates an action to take to avoid the hazard (Fig-C)

C

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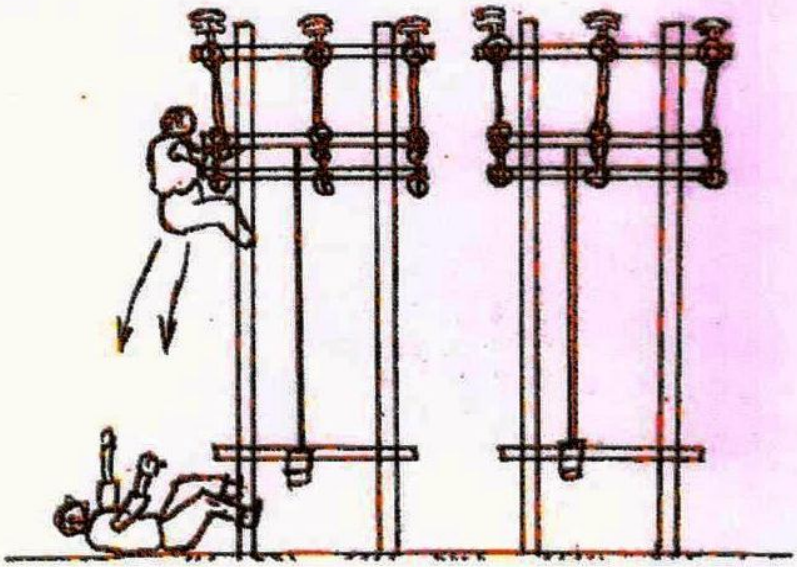
4. Safety at Work

GENERAL SAFETY PRECAUTIONS :-

1. All voltages shall be considered dangerous even though voltage may not be high enough to produce serious shock.
2. All electrical circuits are to be treated alive and no work (maintenance, repairs, cleaning) is to be carried out on any part of electrical apparatus or circuit unless such parts are:-
   a) Electrically dead
   b) Isolated from live conductors.
   c) Efficiently earthed at either sides at actual work place
   d) Permitted to work by taking permit.
   e) Checked for de-energisation.

AUTHORISATION FOR DOING WORK :-

1. Maintenance, repair and construction work on electric circuits or apparatus shall be done only after making sure that working conditions are safe by obtaining proper authorization permit for doing the work.



Line man climbed on 11 KV Nimon feeder

Permit taken on 11 KV Nandur feeder.

2.. "Proper Authorization" means both the notification by the person in charge that a particular job is to be done and also the approval by the person or persons responsible for the equipment to be worked on.

3. No man shall begin work on any circuits or equipment until instructed by the supervisor to do so.

WORKING CONDITIONS REQUIRING MORE THAN ONE WORKMAN :-

1. The person in charge must adjudicate the right number of people required to do a particular job. Risk of assigning such jobs to a single person should be avoided even if the person is capable of doing the job single handedly.
2. All hazardous jobs,jobs under difficult working conditions need to be carried out under the close supervision of an observer. The observer should exclusively supervise the work and no other job should be assigned to him.

PROTECTIVE EQUIPMENT :-

USE AND CARE OF RUBBER PROTECTIVE EQUIPMENT

1. Rubber goods such as gloves, sleeves, blankets etc. should be used as per the manufacturer specifications.
2. All rubber goods shall be of high-grade material, carefully inspected and stored with utmost care .
3. When not in use rubber should be shielded from sunlight, heat, ozone and oil.
4. Rubber will age or oxidize quickly at points of distortion. Rubber gloves should not be worn wrong-side out. Blankets should be rolled rather than folded.
5. Rubber gloves shall not be continued in use more than specified number of days without an approved electrical test.
6. Rubber gloves shall be worn during the following operations or conditions:-
   a) Working on 220 to 5000 volts circuits and also on lower voltage circuits where safety requires gloves because of presence of moisture, grounds and other conditions.
   b) Working on street lighting circuits.
   c) Stringing wire near live 220 to 5000 volts circuits.
   d) Raising or lowering poles near 220 to 5000 volts circuits.
   e) Connecting, disconnecting or replacing energised fuses with tongs and switch sticks.
   f) While operating A.B. switch handles.
   g) Working on circuits within reaching distance of 220 to 5000 volts circuits.

h) When earthing lines or other equipment which have been just cut off from the power supply either by using a hot stick or earthing rods.

i) When removing earthing rods from the lines.

j) In using rubber gloves care must be taken to keep the hands away from any contact points where an arc is likely to form. The arc may burn the rubber gloves and bare hand may come in contact with the live point, resulting in electric shock or electrocution.

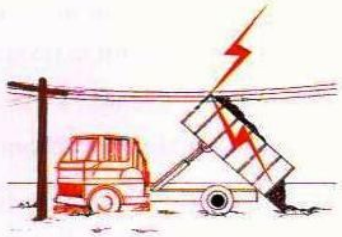
k) Uncertified rubber coats, boots, shoes, hats etc. should not be used as insulation from electric charges. Their protection is not against electric shocks but only against weather.

WORKING ON LIVE LINES AND EQUIPMENT :-

1. Handling and working on live electric circuits and apparatus shall be done only by workmen who are qualified, trained and experienced to do the work safely but only after authorisation.
2. Before starting any work on live lines or equipment, the work should be clearly understood by everyone concerned.
3. Workers doing live line work shall devote their attention to the work on hand. Unnecessary conversation should be avoided.
4. Two men should avoid working on different phases, when working within reach of one another
5. When working on new conductors or apparatus operating at voltages above 220 volts, and below 5000 volts, the use of rubber protective equipment such as gloves, sleeves, blankets and hose and other insulating equipment is required for protection.
6. All precautions for handling live conductors should be taken even while handling insulated wires and cables.
7. All live conductors within reachable distance shall be covered with rubber protective equipment or isolated by suitable barriers.
8. Secondary circuits, guys, ground wires, telephone lines and similar attachment within the working area should be treated as live conductors.
9. Rubber protective equipment should be installed from a safe position below the conductors or the apparatus to be covered.
10. Live lines and equipment rated above 5000 volts should be handled only after grounding or by using approved live line tools.

WORKING ON LINES AND EQUIPMENT ADJACENT TO LIVE EQUIPMENT OR LINES :-

1. No work or inspection shall be carried out on any equipment close to energised H.T. equipment. If necessary, work close to energised equipment shall be carried out only with explicit permission from a Controlling officer / Supervisor and under his direct supervision.
2. When working near lines or apparatus, each man should plan his move and take extreme care in moving from one position to other.
3. Where impractical to erect barriers between men at work and live parts within reach, ensure that continuous watch shall be kept by the foreman or some one specifically designated by him for the purpose.
4. Wherever truck is being used near live lines care should be taken that all workers except the driver are away from the truck. The driver should ensure a safe distance from the lines while passing below the line.



Operating voltage	Minimum safe distance
240/440 V	610 mm (two feet)
1.3/6.6kv	913 mm (three feet)
11KV/22KV & 33 KV	1530 mm (Five feet)
66 KV	3050 mm (Ten feet)

5. Whenever, it is required to inspect an energised equipment or work close to it, the minimum safe clearances must be maintained.

   All inspection or work must be carried out by maintaining safe distances from live parts. All grounded parts of an insulator like arcing horns, grading rings etc. shall be treated as fully live when the conductor is live.
6. Outdoor work in the proximity of live H.T. equipment shall be discontinued if signs of adverse weather conditions like high humidity, thunder lightning or rainfall are encountered.

WORKING ON DEAD LINES AND EQUIPMENT GROUNDING :-

1. Before doing any work on dead lines or equipment having possibility of being energised from any other source, such lines or equipments should be grounded between the location of work and all possible sources of energy.
2. Before grounding apparatus or conductors it shall be ensured that the corresponding A.B. switches are properly opened.

3. Temporary grounding cables shall be flexible stranded copper / aluminum and they should be equipped with approved clamps at either ends.
4. Grounding cables should be inspected before actual use.
5. While grounding lines or equipments the connection to the ground shall be made first and to the circuit or equipment next. While removing grounds, first remove the connection to the circuit or apparatus and then remove the ground connection. Approved discharge rods should be used in making ground connection to the circuit or apparatus.
6. Grounds shall be placed on all phases even if the work is to be carried out on single phase only. While placing the ground discharge rod, it is to be held inclined such that the grounding cable hangs at least 610 mm (2 feet) away from the person.
7. During work on lines, grounds shall be placed at the nearest tower/pole on either side of the work point, but in no case the earths be placed more than six spans apart.

   As an additional safety measure, lines should also be grounded on the tower/pole where the work is to be carried out.
8. Temporary earth should be provided by a portable earth stake whenever work is carried out at insulated places and no natural earth is available.
9. Where two or more crews are working independently on same line or equipment, each crew shall properly protect themselves placing their own temporary grounds.
10. Conductors used for temporary grounding shall be kept clear of the working area and the workmen should be warned not to handle these conductors without adequate safety precautions while they are connected to H.T. equipment or lines.
11. Use rubber glove on both hands while operating discharge rods.

WORK ON DOUBLE CIRCUIT OVERHEAD LINES WITH ONE CIRCUIT ALIVE

1. To distinguish a dead circuit from a live one, green flags should be fitted on the towers/poles for single circuit and on the side of dead circuit in case of double circuit towers/poles. Flags of any other colour shall not be used for indicating a dead circuit.
2. Flags will be removed only after work is finished and temporary grounds have been removed.

INSPECTION OF EQUIPMENT ON LIVE LINES :-

1. Inspection will be carried out from ground level.
2. No man shall climb above the anti-climbing device until through observation is done.

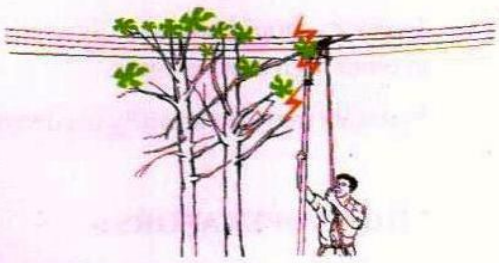
3. Works shall be carried out under "Caution Order" as in the case of Hot Line work.
4. One man (observer) will be stationed on ground to see that the man testing the insulator of electric line maintains necessary clearances.

LINE WORK ON POLES AND TOWERS :-

1. Before climbing any elevated structure every employee shall first assure himself that the structure is strong enough to sustain his weight safely.
2. If poles or cross arms are apparently unsafe because of decay or unbalanced tension of wires on them, they shall be properly braced or guyed before they are climbed.
3. Workers shall use Zoola, Safety rope, Helmets while working on poles and towers.
4. No tools longer than 12" (300 mm) , including length of its handle/grip shall be taken up the tower when both the lines are alive.
5. All light equipment and tools to be used should be raised and lowered by means of hand line and canvas bucket or any other suitable container. Men on the ground should stay clear of overhead work to prevent being struck by falling objects.
6. Tools and materials should not be thrown from the ground to a lineman working aloft, nor should lineman throw tools and materials from top.
7. Broken insulators or other sharp edged material shall not be left at places near the pole that may cause any injury to a person or animal passing nearby.
8. While stringing wires across streets and highways, danger signs should be erected on both sides of the work location and if necessary, flagmen should be stationed.
9. Materials, tools or equipment must not be scattered around streets, side walks, highways, etc. but must be kept in a neat orderly & safe manner to avoid accidents.
10. No wire be raised or lowered on the poles/towers where adjacent lines are live.

TREE TRIMMING :-

1. The public shall be protected against hazards of tree trimming along public streets and highways by placing danger signs and signals.
2. Before climbing a tree, the trimmer should look carefully to decide how best to climb, the best location to work and the ground area where bushes and branches may be safely dropped.



3. Before climbing, the branches should be carefully inspected to make sure that they will hold the trimmer's weight. Dead or decayed links are not safe to climb.
4. Avoid dropping tools from the top to the ground. All tools should be raised and lowered by hand lines in such a way as to avoid touching hot conductors.
5. Tree branches in contact with live wires should be handled as live wires.
6. While tree trimming ensure that the falling branches do not damage the electric lines and installations.

PATROLLING LINES :-

1. Line patrolling should be carefully done, especially during the night so as to avoid any contact with the snapped live conductors.
2. Avoid smoking while patrolling the lines.
3. Patrolmen should be alert to avoid stumbling, hazards, poisonous plants and snakes.

AIR BREAK SWITCHES :-

The handles of the air break switch levers should be effectively connected with the ground by means of ground wire so as to fully protect the Lineman or other authorised person operating the switch.

The switch should be inspected from the ground or platform or any other safe place after it has been opened so as to ensure that all blades have opened properly. Provision for locking up of air break switch should be made.

DISCONNECT SWITCHES (ISOLATORS):-

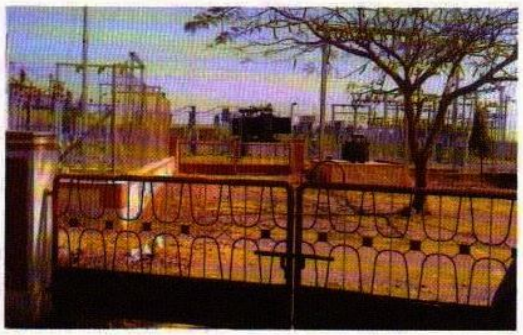
1. Isolators may be used with care to open a live line but not under load.
2. Isolators should be carefully used to open switches of dead lines where these lines are parallel to other high tension lines.
3. Isolators may be carefully used to open a tie line or to break two parallel high tension lines.

SWITCHING OPERATORS :-

1. Every telephone message related to switching operations of high voltage system shall be in writing. Every such message shall be repeated in full to the sender to ensure that the message has been accurately received.

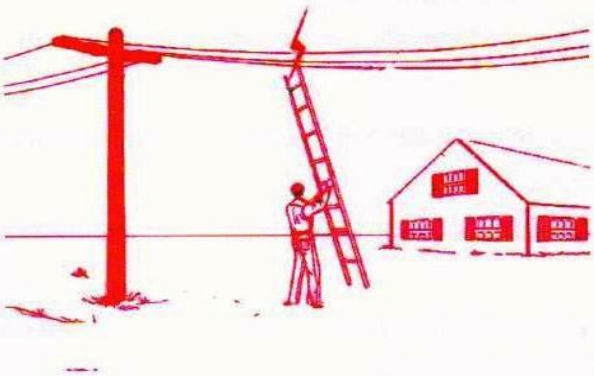
2. A record of high voltage switching will be entered in station logs.
3. All switches and disconnects should have lettering or sign boards to indicate the circuit they control.
4. While releasing electric circuit breakers or equipment for work , the associated breaker and disconnecting switches (isolators) shall be opened in the following order:-
   a) The breaker will be opened first.
   b) Then the disconnecting switches will be opened, but before operating the disconnects it shall be made sure that the breaker is open.
5. After opening disconnects (isolators), air break switches, check carefully that all blades are in full open position.
6. When lines and circuits are taken out of service, the breaker controller circuit should be opened either by operating the opening device or by removing the control circuit fuses.
7. If the circuit is controlled by an automatic reclosing breaker, the autoreclosing mechanism shall be made inoperative.
8. Disconnects shall be closed with sufficient force to make full contact of blades.
9. Switches (if provided) should be opened before removing fuses. Removing fuses, from an inductive circuit carrying current without opening the switch is hazardous.
10. Removal of fuses from circuits where no switches are provided should be done with approved fuse pullers.
11. Interlock system should not be made inoperative unless authorised by the Engineer-in-charge.

STATIONS :-



1. Danger signs should be placed on all enclosures of high voltage, equipment and wherever necessary to warn the presence of high voltage equipment.
2. Gates in switchyard fences and doors to bus compartments and other enclosures containing live equipment or other hazards should be locked at all times except when men are working inside.
3. Unauthorised persons should not be allowed inside a hazardous operation area like a bus compartment, switchyard etc. unless such a person is accompanied by a responsible person who shall always be present while such a person remains in the area. Any person deputed to

clean the floors or parts of the plant in such areas must be given clear instructions and a responsible person must be present while the man is carrying out the work to ensure that the man does not endanger his own safety.



4. While carrying ladders, pipes, conduits, reinforcing rods and other long material in stations, switch yards, bus compartments rooms and other places where there is danger of touching live parts, the material should be held by two men, one at each end and should be carried below the shoulder height.
5. When working in the vicinity of fuses, circuit breakers or buses, use every precautions to avoid injury from arcing.
6. Before doing any work on rotating equipment, it should be shut down and properly disconnected from power source except when necessary to change commutator brushes, clean with compressed air or add oil.
7. Care should be taken to prevent clothing, wiping clothes, waste dusters, oil cans or tools from catching in the moving parts of machinery.
8. When using compressed air on live electrical machinery an insulating hose and nozzle should be used. Dust proof goggles should always be used when cleaning with compressed air. Compressed air should never be used for cleaning or dusting clothes or any part of the body.
9. If men are working on H.T. (Voltage above 650 V) equipment, the area safeguarded for work shall be cordoned off by tying a white rope or cotton tape all around and danger boards shall be fixed within the safe guard area at various locations with the inscription facing the safe working area to warn the men not to cross over the area with live equipment during the progress of work.
10. The metal bodies of portable equipment or hand tools shall never be grounded by connecting them to the main station ground to which the neutrals of H.T. equipments are connected. Separate ground should be provided for such equipments.

    a) Detailed and clear operating and maintenance instructions shall be issued to the personnel, in charge of each of the equipments, together with responsibilities and nature of hazards involved in each. It should be frequently checked to see that they understand their duties and are complying with the standing instructions.

b) It should be ensured that maintenance and repair works are done promptly before the equipments deteriorate further and become a source of danger. It shall be also ensured that defective equipment is not retained in operation till it is rectified.

c) D.O. (Drop out) fuses should not be opened or closed by any other means other than the D.O. operating rod. The person using the D.O. operating rod should ensure himself of a secure footing and proper clearance from other equipment and should wear good condition rubber gloves of adequate insulation value for disconnecting the switch or fuse.

d) Disconnecting switches and fuses from which power has been switched off should not be touched by any one, before their static charge is removed. They should be opened out with the hot switch stick, the top hook of which is connected to an insulated wire, connected to an efficient earth. This will ensure that the equipment is really dead and will discharge the static potential after which it can be handled safely. Disconnecting switches or fuses, opened out by an operating gear shall also be checked and static charge removed with the use of hot stick as described above.

e) In general, it should be assumed that all electrical equipments are alive, till they are known to be dead and are adequately grounded. Bare fingers shall never be used on electrical equipment to determine whether they are dead or before the equipments are connected to earth.

f) In handling portable motors or lamps or other equipments, which are metal enclosed, 3 pin plug shall be used and the metal covers shall be connected to the earth terminal.

g) All employees shall be familiar with the use of fire extinguishing apparatus, locations of the apparatus, sand pails, water hoses, etc. The fire extinguishers shall be suitable for use on or near electrical equipment.

Soda acid extinguishers should never be used on electrical fires

h) Any person about to open alive fuse, disconnect or any equipment which might caused an arc flash shall protect his eyes by goggles or turn aside his head at the time of opening.

The following tests shall be done at least once a week, results to be recorded, any defect to be rectified at once :-

1) Insulation tests of all machinery, plant and equipment.

2) Earth resistance tests of all machinery, plant and equipments earthing.

3) Tests to check the proper functioning of the earth leakage relay or other devices provided under Electricity Rules 91, to promptly earth or switch off power to line conductor if it breaks.

STORAGE BATTERIES :-

1. While making electrolyte for storage batteries always pour acid into water, the reverse method may cause an explosion. Suitable goggles or face shields should always be worn while making electrolyte.
2. Smoking, use of matches or other open flames are not permitted in battery rooms or while inspecting, filling, testing or handling batteries.

TRANSFORMERS :-

1. When work is to be carried out on a transformer both low and high tension breakers and disconnects shall be opened. Similarly, when isolating transformers to which potential transformers are connected, Such potential transformers shall be isolated and P. T. fuses removed to prevent any possibility of transformer being made alive through synchronizing or voltmeter plug.
2. Before commencing any work on a transformer, the transformer winding should be discharged to ground. In case the transformer is isolated from the supply by single point of disconnection e.g. fuse disconnects or disconnects only, the transformer shall be safeguarded by shorting the phase terminals together and connecting them to ground, before commencing any work. The neutral ground of a transformer should never be treated as the ground for phase terminals, as required above.
3. Whenever transformers are replaced the new transformer should be checked carefully for voltage, polarity and phase rotation before taking into service.

INSTRUMENT TRANSFORMERS :-

1. The metal body of all instrument transformers should be grounded.
2. Current transformer secondaries should never be open circuited when current is flowing in the primary.
3. One lead of the secondary circuit of the current transformers should be connected to ground at all times when the C.T. is in service.
4. Potential transformer secondaries should never be shorted.
5. The low voltage winding of potential transformers should always have one side permanently and effectively grounded.

STATIC CAPACITORS :-

1. Every capacitor shall be treated as hot until ensured otherwise. Capacitors store energy and are not necessarily dead when disconnected from the lines. Once charged, a capacitor may retain this charge for several hours after it has been disconnected.
2. When a capacitor is to be worked on, first open all cutouts or disconnecting devices to the capacitors, then wait for at least five minutes for the internal resistor to reduce the voltage. Next using a hot stick, short circuit and ground all terminals of the capacitor. The short circuiting grounding jumpers should be left attached while work is being done on the capacitor.
3. To place the capacitor banks in service, first remove the jumpers with hot sticks, then close the cutouts.

LIGHTNING ARRESTERS :-

No work shall be done on a lightening arrester unless it is disconnected from the line circuit and grounded at both the line and ground terminals.

UNDERGROUND SYSTEMS :-

1. When manhole cover is removed, the hole must be guarded by properly constructed railings and warning signs. Warning flag during day and red lights during night should be placed at all open manholes, excavations and on tool carts located on public right of way or exposed to traffic of any kind. The warnings should be placed in such a manner as to be visible from a distance and give persons or vehicles ample time to avoid the obstruction.
2. If the supervisor considers that manhole working conditions warrant the precaution, one person should remain at the top of the manhole or within easy calling distance of occupant to render assistance in case of emergency and also to warn traffic so as to avoid any danger.
3. The entire layout of underground cables should be known to all staff.
4. Care should be taken to put the locking strip in its correct position.
5. Faulty fuse in the fuse unit should be replaced only after isolating the unit.
6. Before commencing the work, the removed fuses are carried with the workman instead of keeping them in pillar box/ distribution box.

STREET LIGHTING :-

Street light wires, unless grounded should be considered alive at all times. The voltage of the street light circuits should be considered to be that of the highest voltage wires occupying one or more poles, on which the street light circuit is run in those cases where this voltage is in excess of the street lighting voltage.

Street lighting and street light fixtures wires should always be considered alive unless they are grounded effectively.

Where ladders are used to clean street lamps they should be securely fastened to the pole before they are put in use. Ladders should be so located that they will not interfere with the traffic.

TESTING :-

Regular testing of street lighting circuits for open circuits, short circuits and ground should be undertaken every day.

PROTECTION :-

All Linemen engaged in street lighting work should always wear rubber gloves where it is necessary to climb the poles.

CONSUMER SERVICE :-

The leakage on each consumer's premises shall be tested.

i) At least once a year, during the wet season.

ii) If frequent fuse calls are received from a consumer.

SAFEGUARDING THE PUBLIC :-

1. All efforts should be made to protect the public at all times whenever company work is in progress, by the use of sign postings and warning signals.
2. When working at consumer's premises or public property every effort should be made to avoid hazards that may lead to personnel or physical damage.
3. When work is conducted along a public street or a highway, vehicular traffic shall be warned by signs and flags during the day and by red light during the night. Wherever necessary signalmen should be deployed.
4. Barriers shall be placed around all open manholes, exposed open ditches and excavations.

LINE WORK UNDER ADVERSE WEATHER CONDITIONS :-

In case of adverse weather conditions like storms, lightning etc. the work should be stopped immediately.

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5. Permit System

GENERAL :-

These instructions are intended primarily to provide safe working conditions for staff of the company and should be strictly complied with in a spirit of co-operation. It is to be emphasized that these are intended for the safety of the personnel themselves and their observance will be in their own interest.

PERMITS :-

No employee of the company shall climb any pole, tower or apparatus or work in proximity of an open conductor unless the person or incharge of the work has necessary permit to work.

COMPETENT AND AUTHORISED PERSONS :-

a) Permits for work shall be issued by person in charge of operation and competent to issue such permits. Such persons are referred to herein as competent persons.

b) Permits for work shall be taken only by authorised persons. Such persons are referred to herein as authorised persons.

c) Competent and authorised persons under (a) and (b) above, shall be those declared in writing by EE/Dy.EE/AE to carry out duties incidental to the position held, such persons being competent for these duties.

d) The competent or authorised persons shall be competent to issue or take permits respectively for work only in the area stated in the declaration.

e) A list of such competent and authorised persons shall be exhibited in the prescribed form in the sub stations, power houses and center of distribution or activity. The list shall clearly define the extent of declaration.

f) A consolidated list of such competent and authorised persons shall be maintained at the office of the Superintending Engineer / Executive Engineer of the area.

g) In addition to (c) above, the Executive Engineer (Testing) or Superintending Engineer or Chief Engineer shall be competent to declare technical staff of the testing divisions to be authorised persons to take permits for work.

Such authorised persons shall be included by the Executive Engineer, Dy. EE, AE in their list.

h) The EE/Dy.EE/AE shall obtain from the various bulk supply consumers and adjoining areas, a list of competent and authorised persons declared by them. He shall also provide them a list of competent and authorised persons from his side.

i) Competent or authorised persons shall usually be one of the rank of the Section Officer / Line Inspector or equivalent for high tension works, but AE / DYEE will be competent to declare persons of lower ranks in special cases when exigencies of work demands, it being understood that the person so declared is competent to do the duties and understand the rules.

PROCEDURE TO ISSUE, TAKE AND RETURN PERMITS :-

a) Permits for work shall be applied for by an authorised person to take line clear and shall be issued by the Engineer (or competent person in charge of operation) in writing in the form prescribed (Refer appendix).

b) Where written permits can not be given and taken, line clear (permit) should be given and taken on phone/mobile. The duplicate copies of the line clear permits should be sent by post as soon as possible for record at either end after duly cancelling the same. These books should be periodically reviewed by the AE/Dy.EE.

c) Permit book should be treated as important record. The sheets and the books themselves should be serially numbered. No page should be detached or used for any other purpose but for bonafide line work. If any paper is inadvertently detached a dated and initialed statement must be recorded in the book by the person responsible for it.

d) The same person who took the permit should return it. Even the issuer and the receiver of a permit should be one and the same person, a permit should be issued for self and cancelled after the permit is returned. This procedure should be rigidly followed.

e) A system of 'code words' may be adopted for permits issued and returned over phone/mobile.

f) Whenever a worker is working on line alone, he should follow the self permit system.

g) The sample formats are enclosed in the appendix.

PRECAUTIONS TO BE TAKEN BY ISSUER OF PERMIT

It shall be the duty of the Engineer (or the issuer of a permit) to effectively cut off juice to the apparatus (or line) for which permit of work is needed, discharge the static charge and ground the equipment (or line) to earth before handing it over for work.

First he shall cut off juice to the equipment (or line) as per standing instructions issued to him on the subject. Then the following general lookout and grounding instructions should be observed for the various equipment.

a) Power Transformers in step down and step up station :- The isolators (and also OCB wherever provided) on HT and LT sides controlling the transformers shall be locked out in 'off' position and danger notices with the words "Do not close, Men working" should be hung securely at the isolator and OCB controlling switches.

Where the OCB mentioned above are controlled remotely, additional danger boards shall be

hung at control switch handles also. Control circuit fuses of the control panels shall also be removed and kept in the custody of the issuer of the permit.

The transformer shall be effectively discharged both on the LT and HT terminals by means of discharge grounding rods, which shall be left in position till the permit is returned.

b) High voltage potential transformers, lightning arresters and capacitor banks are located at ground levels in enclosures. These shall be first discharged from outside the fencing and latter grounded effectively from inside. The door of the enclosure shall be locked in the open position.

c) Outdoor circuit breakers shall be discharged at all the six main terminals and must be connected to earth.

d) Indoor HT panels and potential transformers shall be racked out of position, discharged, grounded and handed over for work.

e) It is important that whole section of the switch gear or bus bars on which permit for work is required is carefully made dead from all sources and grounded properly.

The limits of the such section must be specially pointed out to the receiver and noted in the permit. It is often that one pole of the isolating switches at the limits is likely to be live. This should be pointed out to the receiver and noted in the permit. Maintenance work which involves ascending above ground level may in some cases bring workmen within reduced clearance of conductors which are alive. This should be pointed out so that the receiver may put up temporary barrier or screen or take necessary precaution.

f) Power transformers HT fuse structure in outdoor sub station.

Procedure would be as in the case of item (a) above and in addition it is to be noted in cases the fuse structure also incorporates the transformer isolator then the structure should not be climbed but the fuses should be reached by means of a ladder as the bus side isolator is live.

g) Out door HT kiosk :-

The OCB shall be opened, the incoming and outgoing side links opened out by means of operating rod, OCB, PTs and CTs discharged to earth and handed over. It is to be noted that the bus side isolator chambers may be live.

h) Indoor cubicle Gears :-

The OCB opened, the incoming bus side link opened by means of operating rod, the equipment earthed and handed over. The isolator chambers or incoming cables may be live.

i) L T Lines / H T Overhead lines.

The circuit and conductors to be worked on shall be made dead by opening the controlling circuit breaker (or breakers) and opening the line links. In case of double circuit feeder the switches on both ends of the line should be opened then the earth switch(es) at both ends if

provided shall be closed, the line should be earthed and permit to work should be issued. In case where earthing switch is not provided for the circuit, the line conductors shall be discharged/earthed by earth rods.

j) H T Underground Cable Feeders :-

The general procedure for overhead lines shall apply and in addition the conductors should be discharged and earthed at a suitable point at cable boxes before the cable is handed over for work.

k) Low and Medium Pressure circuit and apparatus :-

The apparatus or circuits shall be made dead by cutting of supply and concerned switch or switches near the apparatus controlling the circuit, the circuit fuses if any shall be removed or breaker unit racked out of position. The switch or switches shall be locked in off position and danger notice hung up. The conductor of overhead lines shall be earthed by means of earth rods before work is commenced.

l) General Application to all cases :-

Where remote operation of the apparatus or switches is possible the concerned control circuit fuses shall be removed and kept in the custody of the issuer of the permit or operator. The semaphore indications wherever provided should also be checked for the correct position.

In all cases danger notice **"MEN WORKING, DO NOT CLOSE"** shall be installed at the controlling switches and at concerned control boards. The key of switches and controls locked in the off position as well as fuses etc. removed as stated above shall be kept separately by the issuer of the permit and shall be handed over to the incoming shift man. If the permit work continuous for more than one shift period, they shall be kept in-accessible for other concerned persons.

LOGGING OF PERMIT ISSUE AND RETURN :-

The issuer of the permit shall carefully log the various operations performed by him in connection with the issue and return of a permit in the daily main station log book, the sequence in which the operations are done.

The operations reported to have been done by the down or up stations or any other person or operator in connection with the issue or return of a permit shall also be logged.

The final issue (or return) of the permit shall be logged in the book in red ink.

During change of shift, if the issued permit is not returned back and the work is in progress, the outgoing operator should orally(specifically) inform the incoming operator regarding the pending permit and should also enter the same in the log books while handing over the shift charge.

The incoming operator shall also sign the log book while taking over the shift charge so as to take cognizance of the pending permit.

All the stations and operators concerned with the permit shall adopt similar logging procedure.

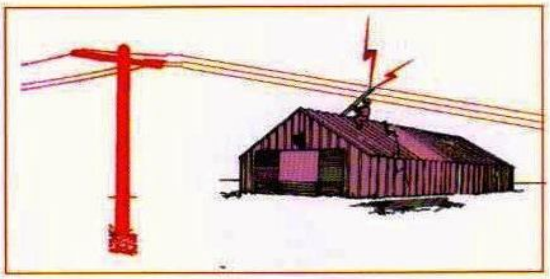
No line or equipment should be made again live until the permit/s issued on it is/are returned.

The same person who took the permit should return it not necessarily to the same issuer but to the Operator or Engineer on duty at the place from which the permit was obtained.

PRECAUTIONS TO BE TAKEN WHEN WORKING WITH A PERMIT :-

a) On equipment gears and sub-stations :-

It is also the duty of the receiver of the permit holder to check if the equipment has been properly earthed.



The workman should be pointed out the position or equipments which are dead and the limiting switches and structures on which they should not climb. Temporary barriers such as ropes, flages, etc. be installed or other suitable precautions should be taken if necessary to warn off workmen from entering live sections or climbing live structures.

When men have to climb structures or apparatus which bring them under reduced clearance to live parts the authorised person shall be present at site to see and direct the work.

b) Overhead Lines :-

Before touching the conductors, all the conductors shall be discharged and connected well to earth by means of discharge rods.

This shall be done at two points on either side of the place of work. In addition the conductors should be earthed on poles (or towers) on which work is actually carried out as per standard practice.

The work on one of the two circuits of a double circuit line shall be carried out in accordance with the following regulations:-

a) The minimum distance between the two circuits of a double circuit line shall be ... 1050 mm (3.5 feet) for 66 kv & below lines. If the distance is less than 3.5 feet then the permit on both the lines should be taken.

b) Only minor works of the nature of renewing insulators, binding etc. may be done when the other circuit is alive, works such as stringing conductors etc. involving greater risks may be done only if it is possible to do it without coming into contact in any way with the live circuits, only under special circumstances under the personal supervision of an officer specially deputed for such a purpose.

c) A responsible person should supervise the work on the spot.

d) Sturp and safety rope should be used wherever possible.

e) Repair work on H.T. lines on poles where L.T. is also running below HT should be carried out only after switching off the LT effectively. Work on the LT lines should not be carried out unless there is an efficient earth screen between HT and LT lines.

f) Live working on LT lines.

Working on live lines up to 240 V is permitted to authorised persons, only by using proper hand gloves, safety belt and a torch during night hours. Under no circumstances the authorised person is allowed to work alone on such live lines.

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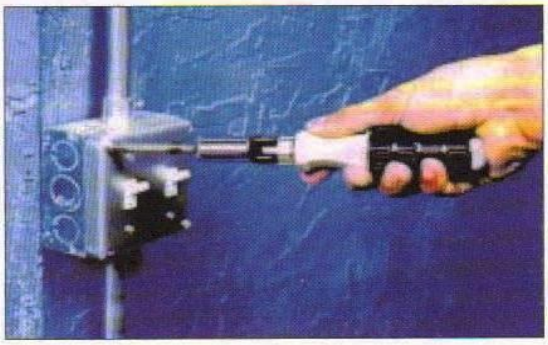
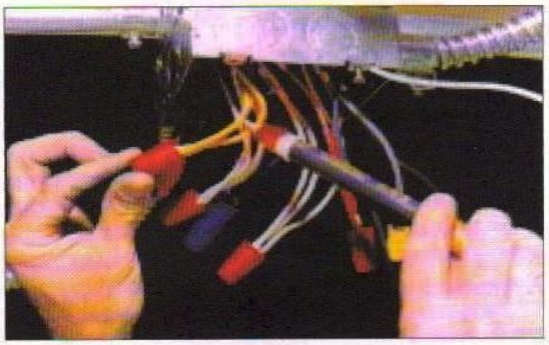
6. Safety Devices

HAND TOOLS :-

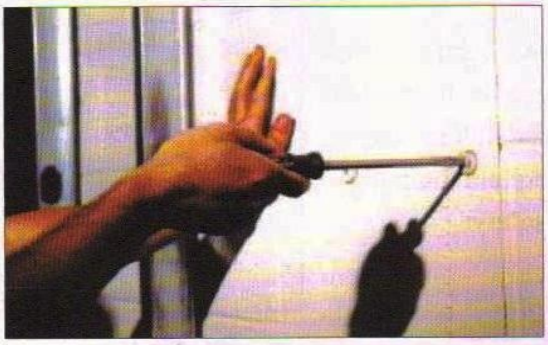
1. Many accidents result from improper use of tools or use of defective tools and equipment. Employees should use those tools and equipment which are in good condition and meant for the purpose for which they are designed. If proper and safe tools are not available for the work at hand the employee shall report the fact to the Controlling Officer /Supervisor.



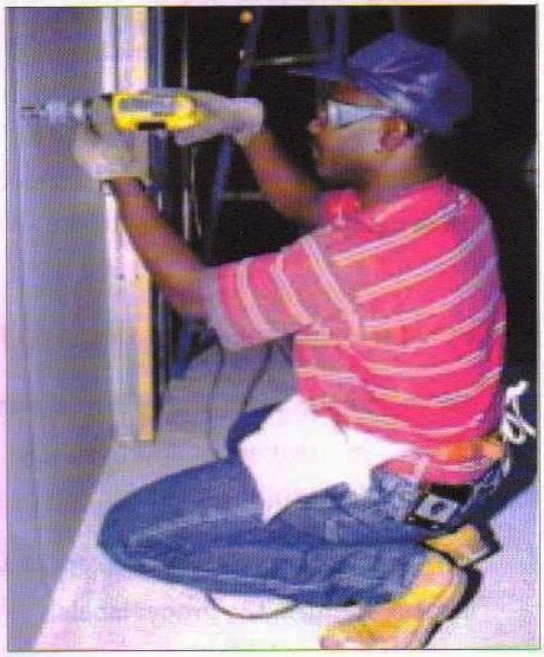
Metal boxes should be grounded.



Always test a circuit before work.



Tools should have insulating handles and insulating grips.



Power Drills use 30 times as much current as what will kill.

2. Tools which develop defects while in use should not be used. These tools should be tagged 'defective' and should be sent for repairs/replacement.

3. Impact tools such as chisels, drills, hammers and wedges with mushroomed heads should not be used until they are reconditioned.

4. Hammers, axes, shovels and similar tools should not be used with loose, cracked or splintered handles.

5. Defective wrenches such as open and adjustable wrenches with spread jaws or pipe wrenches with dull teeth should not be used as they are likely to slip.

6. Rope or other extensions should not be used on a wrench handle to increase the leverage unless the wrench is specifically designed for such an extension.

7. Portable electric tools are equipped with 3 wire cord having the ground wire permanently connected to the tool frame and means for grounding the other end.

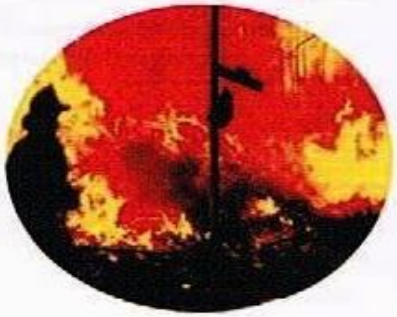
8. Metal rules, metal tape lines or tape lines containing wires shall not be used around electric conductors or equipment.

9. All tools should be inspected every month and defective tools should be repaired or replaced.

USE OF PROTECTIVE EQUIPMENT :-

Use suitable protective equipment like rubber gloves, mats, zoolas etc. wherever required as per instruction or whenever it provides greater safety. All safety devices should be checked before starting the work. Safety equipment should be tested at frequent intervals to ensure that equipment would provide the desired safety.

PREVENTING FIRES AND EXPLOSIONS :-



1. Waste paper, rags and other combustible material should be disposed appropriately to ensure safe operating conditions.

2. Inflammable liquids shall be kept at safe locations and also be identified by proper labels.

3. Varnish paints, thinners are highly inflammable and should be stored away from open flames or all possible sources of ignitions, matches. Also, open flames should not be used where varnish paint or thinner is being applied with a spray gun.

4. Open flames and smoking is prohibited in all access where inflammable liquids or gases are stored or being used. Such areas shall be pasted with appropriate signs, warnings.

5. All employees should be familiar with the location and proper use of fire extinguishers in their work area.

6. No employee should smoke or use matches or open flames at customer's premises unless it is known that such action does not conflict with the customer's rules.

DIFFERENT TYPE OF EXTINGUISHERS AND ITS USES :-

I. Foam extinguisher :-

Should be used on fires involving inflammable liquids. e.g. petrol, varnish etc.

II. Soda Acid extinguisher :-

Should not be used on fires involving electricity or inflammable liquids.

III. CTC and carbon dioxide:-

CTC and carbon dioxide extinguisher should be only used for electrical fires. These shall be kept in cable bays, switch yard and control rooms and also in other places where there is possibility of fire. When the current is switched off, then fire should be treated as an ordinary fire.

IV. Fire Hydrants :-

The fire hydrants should be operated only after the power supply is cut off to the transformer and other equipments. It is also necessary to keep some foam powder and foam branch pipe for use in case of oil fire in the substation.

V. All the extinguisher should have the following information

a) Serial Number
b) Date of charge
c) Date of test

A history sheet for each extinguisher in service should be maintained giving

a) Source of Receipt
b) Date of Receipt
c) Date of initial charge
d) Date of subsequent charges.
e) Date of hydraulic test carried out.
f) Date of subsequent painting
g) Date when repairs, overhauling work carried out so as to ensure that the extinguishers installed all over the premises are kept in serviceable condition.

INSTRUCTIONS REGARDING USE OF EXTINGUISHERS :-

Water and sand buckets :-

(i) About 2/3rd of the bucket should be filled with sand.

(ii) Only loose sand will be filled for about 2/3rd capacity of the bucket. No water will be poured on the sand in the bucket.

(iii) Buckets will not be removed from the fire points except for fire fighting. And shall not be used for any other purposes.

II. Foam extinguishers :-

i) **To operate:- (Operated by one man)** Release locking device on top of extinguisher. Grasp extinguisher by handle and base, invert, keep inverted and direct jets of foam so that a blanket is formed on the surface of burning liquid

ii) **Recharging:-** Refill consists of two separate powders. Thoroughly clean the extinguisher (inside & outside) with water. See that the nozzle and vent holes are free from obstructions. Mix the powders with water according to instructions issued with refill. Pour into the respective containers. Insert inner container. Replace filler cap, close locking device.

III. Soda Acid Extinguisher :-

i) **To operate:-** (operated by one man) Remove protecting cap if in use. Grasp extinguisher by handle. Invert, strike, on ground so that plunger is driven into the extinguisher. Keep inverted and direct jet on fire.

ii) **Recharging :-** Refill consists of a quantity of powder and a bottle containing an acid. Thoroughly clean extinguisher (inside and outside) with water. See that nozzle and vent holes are free from obstructions. Mix powder into ten liters of water and pour into extinguisher. Place acid bottle in position. Replace filler cap and screw tight.

MAINTAINING-TOOLS AND EQUIPMENT OF WORK

Supervising Officials shall regularly examine safety ropes, ladder, rubber gloves, earthing devices and ensure that they are in good condition.

Rubber gloves should be kept clean and carefully preserved in French chalk. Rough use should be scrupulously avoided.

PRESERVATION OF RUBBER GLOVES :-

a) The Lineman should carry his rubber gloves in canvass bag. They should not be carried crumpled in Lineman's pockets or otherwise. They should never be carried mixed up with hard-ware, metallic tools or other abrasives.

b) Wet Rubber gloves should be thoroughly dried out before they are stored. Oil damages rubber and when gloves come into contact with oil, the oil should be cleaned off by using petrol or any other substance before storing.

c) The rubber gloves should be stored in a cool place as excessive heat damages them.

d) The rubber gloves in use shall be subjected to an electrical breakdown test every fortnight in accordance with the I.S.S. 4770/1968 as amended latest.

e) Before putting on the gloves a Lineman should test it for cuts or weak spots by rolling it up lightly, beginning at the gauntlet end. If there is a cut or hole or weak spot in the palm or in the fingers he will notice air escaping from the cut, hole or from the weak spot.

f) Gloves that do not satisfy the electrical tests or those having cuts, holes or weak spots should be condemned and should not be used for work.

METHOD OF TESTING RUBBER GLOVES BY COMPRESSION

The following test should be made on the rubber gloves before every job. In connection with this test each glove should be carefully inspected for possible defects in palms, fingers and thumbs. Where weak or punctured parts are indicated by this test the gloves should be immediately replaced with a pair in good condition before the Lineman uses them on high voltage lines/ equipments.

Gloves should first be inspected for general condition, softness and size.

Each glove should be tested separately. The gauntlet end should then be turned back a very short distance and rolled up tightly.

When the gloves have been rolled up to the bottom of the palm it should be held securely with one hand so as to prevent air escaping from the gloves. The other hand may be used for checking the surface of the palm, fingers and thumb for punctures and weak spots.

Gloves which pass this test satisfactorily may be worn

Rubber gloves must be worn by a Lineman when he is making test on the high tension and low tension sides of the transformers, when they are being connected on the circuit for the first time, when they are being tested, and when they are being inspected after burn outs.

Prior to every occasion of use, the gang head or the authorised person should examine the rubber gloves before issue to his men.

LADDERS :-

1. All wooden ladders shall be inspected at regular intervals and maintained properly.
2. Portable metal ladders shall not be used unless specifically authorised.
3. Wooden ladders for outdoor use should be given a suitable coating such as clear varnish or linseed oil, metallic paint shall not be used on wood ladders.
4. When a ladder has fallen or been struck, it should be carefully inspected for possible damage before use.
5. Split, broken or otherwise defective ladders should be destroyed or cut to smaller lengths.
6. A ladder shall never be placed on slanting, oily, slippery or on vibrating footings, unless the ladder is held by another person or securely fastened to prevent it from slipping or twisting.
7. The base of a ladder should not be placed less than quarter the length of the ladder from a wall or supporting surface and not more than half the length of the ladder.
8. The overlap of sections for extension ladders should be sufficient to prevent collapse of extensions.
9. Ladders placed near doors or in passage ways should be protected against being struck by doors or traffic.
10. Ordinarily bamboo ladders 6 to 7 metres to be used for Village work and 8-9 metres for distribution centre.
11. While going up or down a ladder, always face the ladder and use both hands for climbing.

12. Several workmen should not climb a ladder at the same time.
13. Wherever possible one man should hold the ladder when another is climbing or descending.
14. In using a ladder workman should not attempt to reach sideways , to avoid throwing his weight off the ladder.
15. If ladder is to be placed on a roof, please ensure that the roof is strong enough to bear the overall weight.
16. In crowded or areas of heavy traffic, the ladder placed for a job should be guarded exclusively by a workman.

17. While carrying ladder in a switch yard of a sub station or near live electric lines , care should be taken not to touch the ladder to live line.

7. First Aid

A person/animal is electrocuted when current passes through the body. The body gives passage to the current and the chances of being electrocuted are high if the body is wet. The severity of the shock depends on the current magnitude and duration of the current passing through the body. A current of 10 mA is sufficient to paralyze a human being and a current of 30 mA may cause respiratory paralysis to the victim. If a person is electrocuted, first aid given in time can save the life of a victim. FIRST AID is the immediate and temporary care, given to the victim of an accident or sudden illness. The purpose of first aid is to preserve life, assist recovery, prevent aggravation and minimise complication at the later dates with help of such materials as may be available. Hence two basic things that need to be done are mentioned below.

1. Releasing the Electrocuted Victim
2. Providing First-Aid after releasing the Victim

Switch off the current immediately or send some one to do so. Do not attempt to isolate the victim from the supply with bare hands, use of proper insulated articles is highly recommended for the purpose. When attempting to free a person from contact with low or medium voltage use rubber gloves, boots, mat, or insulated stick, but if not available use a loop of rope, cap or coat to drag the person free. Whatever being used should be dry and non-conducting.

Once the victim is isolated from the supply, first-aid should be immediately provided. In many cases artificial respiration is required to be given immediately to save the victim. Some of the methods of artificial respiration are mentioned below.

HOLGER NEILSON METHOD :-

Place the patient face downwards, with head turned slightly to one side, with head resting where the hands join. Slap patient between the shoulders smartly with the flat of the hand several times. Kneel on right knee opposite to the patient and place left foot by the patient's elbow.

*** FIRST MOVEMENT :-**

Keep arms straight, palms of hands between & below shoulder blades and thumbs on spine. Rock forward with firm pressure taking 2.5 seconds for this movement.

*** SECOND MOVEMENT :-**

Release pressure quickly and gradually slide your hands out to the patient's elbows and then raise the patient's arms and pull slightly towards you, taking 2.5 seconds for this movement.

*** THIRD MOVEMENT :-**

Lay the patient's arms down again and replace your hands below shoulder blades.

Repeat the complete Cycle twelve times in one minute.

*** IF THERE ARE CHEST INJURIES :-**

Let the patient face downwards with head turned slightly to one side, with arms raised and bent, and the side of the head resting where the hands join. Grasp the patient's elbow and then pull slightly towards you, taking 2.5 seconds for this movement.

Return the arms to the first position and repeat the movements at the rate of 12 times per minutes, (In case of chest injuries, if possible the Hip-lift back pressure should be given preference).

*** IF THE ARMS ARE INJURED :-**

Lay the patient face downwards with his arms in such a position as to minimise risk of increasing injury. Keep your arms straight with palms on patient's shoulder blades and thumbs on spine, rock forwards with firm pressure for 2.5 seconds, release pressure gradually and slide your hands to the armpits and pull slightly towards you, taking 2.5 seconds for this movement.

Continue the artificial respiration without interruption until natural breathing is restored, or until a physician arrives. A brief return to natural respiration is not a certain indication for stopping the resuscitation.

The patient must be watched and if natural breathing stops, artificial respiration is resumed at once.

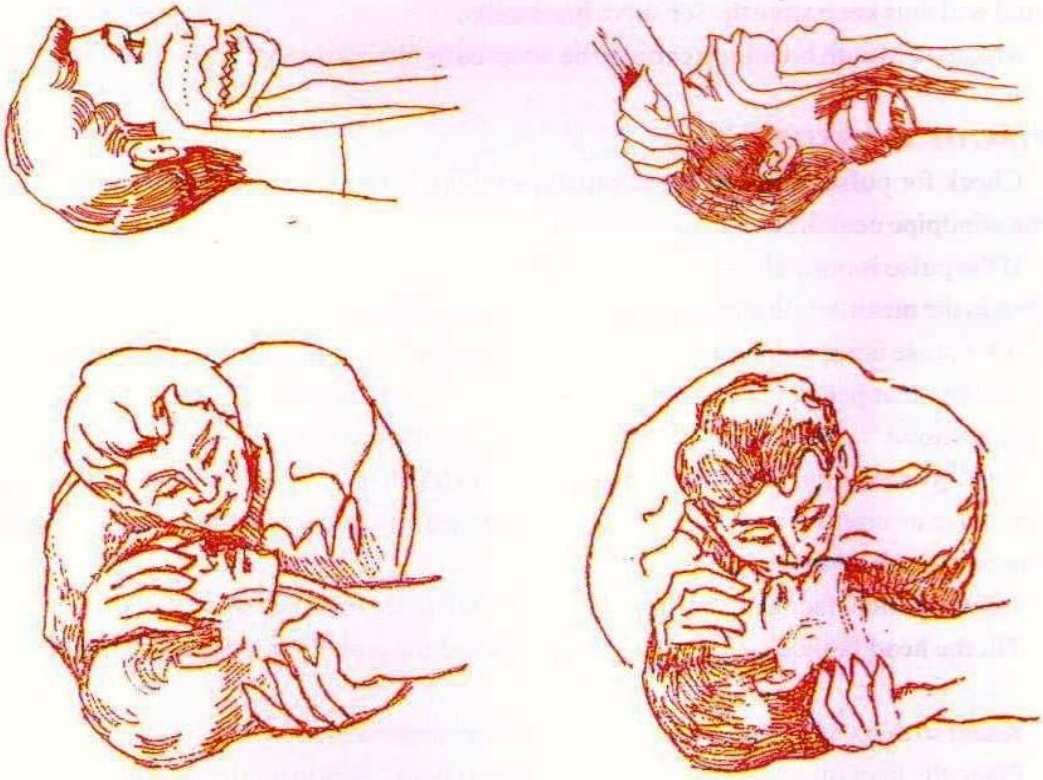
In carrying out resuscitation it may be necessary to change the operator. This change must be made without losing the rhythm of respiration. By this procedure no confusion results at the time of change of operator and a regular rhythm is kept up.

Send for medical assistance.

MOUTH-TO-MOUTH METHOD :-

It is easily applied and particularly suited where the patient has suffered chest injuries.

Insert thumb of your left hand between victim's teeth. Hold the jaw upwards so that the head is tilted backwards. Close victim's nostrils with your right hand. Take a deep breath and place your mouth tightly over victim's mouth and your own thumb. Blow forcefully enough to make victim's chest rise. Repeat inflations every three or four seconds.



When dealing with children, using both hands grasp the angres of the child's jaw at the ear lobes and lift up gently so that the head is tilted backwards. Push child's lower lip towards the chin with your thumbs. Never let the chin sag. Take a breath and place your mouth tighltly over child's mouth (for a small child cover both mouth and nose.) Blow in gently until his chest moves, then take your mouth off and let him exhale passively. Repeat inflations about once every two or three seconds. For infants use light puffs of breath.

The mouth-to-mouth method has been found to supply ten to twelve times more volume of air into the lungs than any of the other methods. One point to remember in all methods of artificial respiration is the danger of the sagging of the victim's tongue into the throat and blocking

the air passage. In the new technique, this is prevented, if the victim's head is tilted back and the jaw is held jutting out upwards to pull the tongue forward and clear of the throat. It is also advisable to insert your thumb between the teeth of the victim to keep his mouth open.

Another important point to remember is that, of all the parts of the body, the brain is the most vulnerable, if fresh blood supply does not reach it continuously, the brain cells suffer irreversible damage within three minutes and nothing can save the person from dying. As long as the heart is beating, therefore, there is hope of recovery and artificial respiration should be continued for one hour if required, since fresh air drawn into the lungs will prevent the blood from becoming impure and will thus keep alive the sensitive brain cells.

Mouth to Mouth breathing can also be adopted as alternative to Holger Nielson method.

REVIVING HEART STOPPAGE :-

Check for pulse-the easiest place to detect it is not in the wrist but in the throat, on either side of the windpipe near the collar bone.

If the pulse is normal; but the victim is unconscious or in serious distress, send for a doctor at once, but in the mean-while allow the person to rest where he is.

If no pulse is apparent, start working at once. Don't waste seconds in going for equipment or help. For the great peril of any heart or breathing arrest is annoxia i.e. lack of sufficient oxygen carried in the blood, to feed the brain. The brain is the most sensitive tissue of the body, and the results of oxygen starvation become irreversible within a few minutes-usually about three minutes-after respiration or circulation is cut off. A victim who survives belated treatment thus faces the possibility of extensive brain damage.

Lay the patient facing up on a solid support like floor, bed or couch.

Tilt the head far back. (If the head sags forward the patient may be asphyxiated while you work).

Kneel so that you can use your weight in applying pressure.

Place the heel of your right hand on the breast bone, as illustrated in the Fig. on next page with fingers spread and raised so that pressure is only on the breast bone, not on the ribs.

Place your left hand on top of the right and press vertically downwards, firmly enough to depress the breast bone 2.5 to 3 cms. (With a child, use only one hand and relatively light pressure). The chest of an adult, resistant when he is conscious, will be surprisingly flexible when he is unconscious.

Release the pressure immediately, lifting the hands slightly, then repeat in a cadence of 60 to 80 thrusts per minute approximating the normal heart action.

The patient should be taken to hospital as soon as possible. Even if apparently normal heart beat and respiration have resumed, professional care will be needed.

Continue the massage until you get professional medical aid to take over, or right into the emergency ward of the hospital.

Continue too if possible the mouth-to-mouth breathing, until someone arrives with a supply of oxygen, If you are on your own and the victim shows no response, continue trying until RIGOR MORTIS sets in.

PRECAUTIONS REGARDING BURNS, PHYSICAL SHOCK, DRINKS ETC :-

1) BURNS :-

Burns should be treated with 'Burn Dressings' and covered to exclude the air.

2) PHYSICAL SHOCK :-

In addition to suffering from electrical shock it is also possible that the patient may be suffering from physical shock and it is important that this condition be treated. The patient must be kept warm with blankets or coats and if available hot water bottles should be placed near the feet.

3) DRINKS :-

Drinks must on no account be administered unless the patient is fully conscious. Alcoholic drinks should not be administered unless recommended by a Doctor. If the patient is conscious give him plenty of water, preferable with a tablespoon of bi-carbonate of soda or table salt added to it.

Drinks should not be given except when recommended by a Doctor whenever injury to an external organ is present or suspected or if the patient is having difficulty in swallowing. Samples of patient's first urine after the accident should be retained for clinical test.

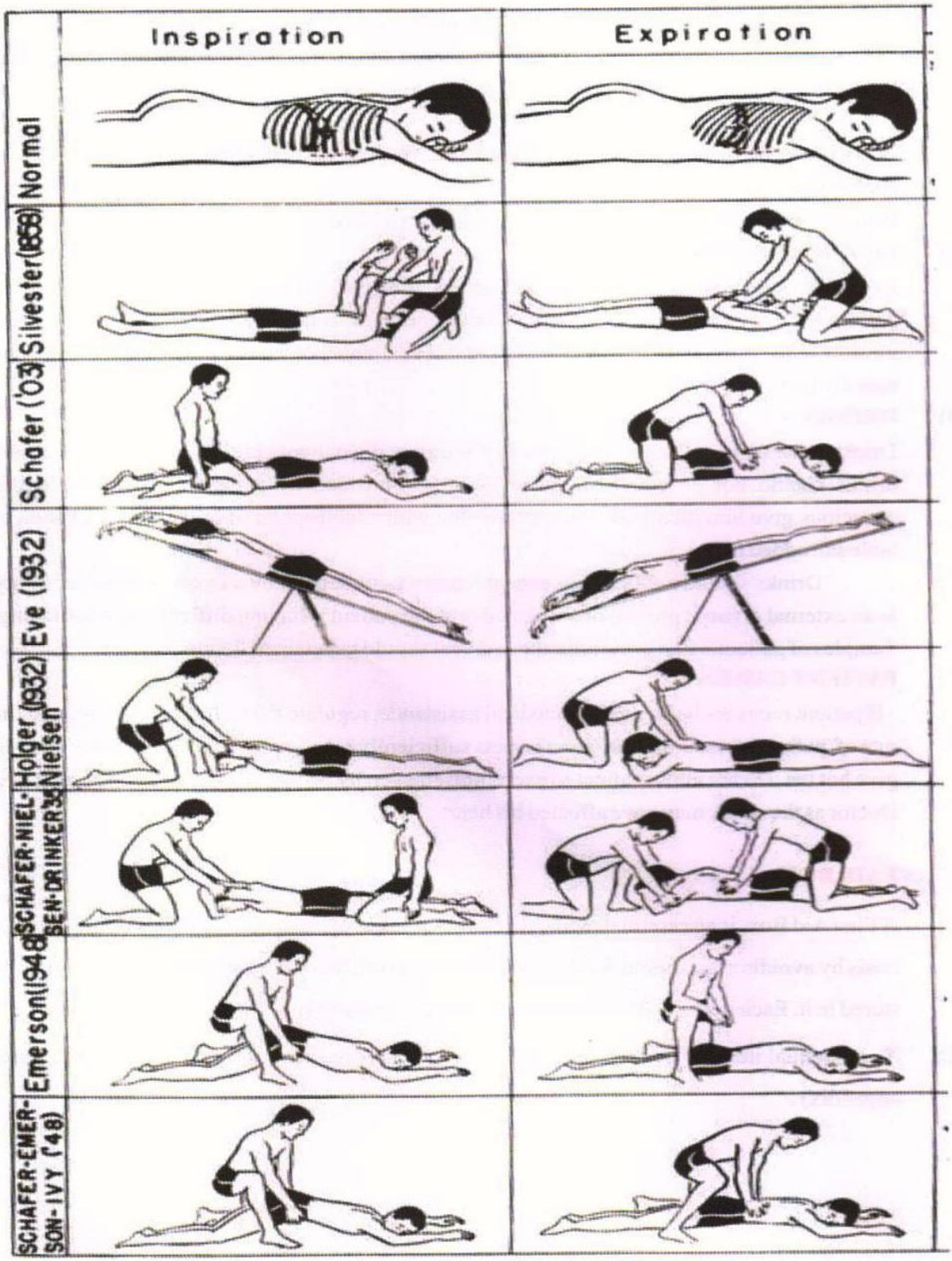
4) PATIENT CARE :-

If patient recovers before giving medical assistance, regulate the artificial respiration to the rate of patient's breathing and when he gets sufficiently recovered make him comfortable and give hot tea. Do not allow patient to exert himself even by walking until he has been seen by a Doctor as the shock may have affected his heart.

FIRST AID BOX

1) A First Aid Box, is an essential medical unit in any habitual premises. It ensures tiding over the crisis by avoiding last minute hunts. It should be kept at accessible place and bare essentials be stored in it. Each item must be replaced, as soon as it gets used up.

2) The essential items to be preserved in a First Aid Box are mentioned in the list (Please refer appendix).



"Time is important but safety is more important."

8. Reporting of Accidents

ACCIDENT REPORTS, RECORDS AND INVESTIGATION

1. Accident records are essential aids for prevention of accidents. They provide vital information regarding the frequency of occurrence, type of accident, place of occurrence and its relative severity. A study of above information will emphasize common hazards and promote a better understanding about the cause of accident and effective methods to prevent them.

2. All accidents whether they result in a injury or not, shall be promptly reported to Controlling officer / supervisor.

3. All accidents to the public involving company personnel, equipment or property shall be reported promptly.

4. Every accident should be investigated to determine the cause and identify steps so as to prevent the recurrence. It shall be the responsibility of the person in charge of the job to collect the detailed information about the accident at the earliest after its occurrence

5. All accidents whether they result in personal injury or not, shall be promptly investigated by the Divisional Head or his representative.

6. Under Section-33 of Indian Electricity (Amendment) act, 1992, all the electrical accidents including mechanical injury caused due to electrical shock should be reported by the concerned, within 24 hrs to the Electrical Inspector and in case of death, the notice should be sent by telegram or telephone confirmed on the same day in writing. The message should also be conveyed to concerned Police Station, E.E./S.E. and concerned Safety Officers.

7. A detailed accident report must be submitted upto the Zone Level, C.E. (Training & Safety), Corporate Office within 48 hrs. The report should also contain employee statements actually present at the accident spot, including the diagram describing the accident.

8. All the evidences at the accident spot must be preserved for further investigation.

9. The reporting format for accidents is enclosed in the appendix.

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9. Safety Audit

Frequent interruptions are observed due to failure of equipments in the system thus leading to loss of generation, inconvenience to the consumers and adversely affecting the reputation of the distribution company. So it is necessary to conduct Safety Audit of the sub stations, controlling officers should monitor the working systems, the status of equipments, gaps in operational/maintenance/monitoring systems, compliance of the processes laid down by the organization, ,compliance of the statutory and regulatory requirement to avoid recurrence of such incidences.

BENEFITS OF SAFETY AUDIT :-

The safety audit if conducted in its true spirit can provide both tangible and intangible benefits as below:

- Prevention of accidents
- Identification and elimination of safety hazards
- Improvement of employee morale and enhancement of employee/employer relationship
- Development of a dynamic record of safety performance
- Improvement of management awareness of problems
- Audit allows a critical review of current information (updating the information).
- Audit highlights the need for specific knowledge/information, the acquisition of new skills and the development of existing ones.
- Audit improves communication.
- Audit enables 'self evaluation'.
- Audit promotes learning by answering the following questions:
- What am I doing?
- How am I doing it?
- Why am I doing it in that way?
- Can I do it better or differently?

HOW TO CARRY OUT AN AUDIT :-

Audit is a cyclic process with four main features:

- Identify the need for change
- Setting standards
- Collecting data on performance
- Assess performance against standards

Audit results help to develop action plans for further improvements.

- The results can be used to develop an action plan i.e.

  * what needs to be done,

  * how it needs to be done,

  * who is going to do it and

  * when is it going to be done.

SOME GUIDELINES FOR NETWORK AND INSTALLATION AUDIT :-

1. Start from the source (for MSEDCL it is 33/11 kV Substation) and end at various tail end consumers of LT network.
2. Check system parameters with design criteria.
3. Check every component/apparatus in the chain e.g. Transformers, Circuit Breakers, Isolators etc.
4. Develop a maintenance schedule and a system to create conducive environment for maintenance without any miss.
5. Check the earthing results periodically along with proper connection criteria.
6. Check the clearances as per rules.
7. Check the loading conditions of each current carrying apparatus.
8. Check the cradle guarding and its condition at Road crossing and along the path (wherever provided).
9. Check the condition of Danger Board and its reflection capacity during night time.
10. Check the condition of network components e.g. pole, conductor, cable etc.
11. Check the cable route marker and its visibility over a period of time along the cable path.
12. Establish a system of proper communication with other utilities and district administration.
13. Usage of reflective cloths if working on road side.
14. Usage of proper tools for breakdown maintenance.
15. Prepare an asset retiring program.
16. Check the usage of all the safety gadgets while working on mains.
17. Check that only authorized person is working on the network.
18. Check the system of "Work permit", its adherence and adequacy.

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10. Near-Miss Accidents

All serious accidents or injuries are preceded by a number of **near-miss accidents**. Commonly called "close calls," near miss accidents should be investigated. A close call may seem insignificant, but in reality it should be a powerful wakeup call that could prevent a serious accident or injury. Close calls should be much more than an internal alarm warning us of our own unsafe behavior. They can also warn us of the unsafe acts and conditions that need to be corrected.

Every near-miss accident carries an important message, wake up, pay attention, take action! Do not ignore these close calls. Investigating near-miss accidents help to avoid probable accidents by taking corrective measures.

Employees injured at work normally report accidents but most of the employees do not report accidents if not injured. This is because they feel that action will be taken and responsibility will be fixed against them. For example (i) if someone slips on a wet floor and falls down, one may be more embarrassed than injured, on the other hand some other person may break an arm or sustain something more serious. The cause of the accident is the same (the wet floor) but the injury outcome may vary. So our focus should be in controlling the causes of the wet floor to prevent a whole range of possible consequences. Staff should be encouraged to report near miss accidents. (ii)If we observe sparking in our network and just keep watching , then over a period of time the sparking will grow and may result into fire or line conductor may snap down resulting into an accident. Had the sparking reported in time, the accident would have been prevented.

Hence staff should report all accidents including near miss accidents at work, and co-operate in the investigation of accidents. It is therefore important to note that no action to be initiated against any employee if any near-miss accident is reported in his jurisdiction. Therefore, employee need not fear while reporting near-miss accidents.

Near miss is a cheaper learning tool than learning from actual injury or property loss due to an accident. We must learn to follow that "Prevention is better than cure".

All of us have heard statements like

- It's a good thing no one was around.
- One more inch and he would have had me.
- Good thing we checked for power.
- Watch for that hole! I almost fell in.
- That's why we wear hardhats.
- That thing should have been taken off the job.

All of these statements represent a near miss accident and a potential for loss of property or life. Each statement prompts some investigation and follow up action to avoid a future accident.

Virtually all accidents are preceded by a chain of events or circumstances that warn about potential danger. Supervisors and managers should always encourage employees to report all potential safety hazards and near miss accidents. Each report should be taken seriously, investigated thoroughly and preventative action should be taken.

A standard form should be used to ensure that the procedure is correctly followed and that concerned authorities are informed.

To best utilize a near-miss and ensure that the incident does not recur, the following seven steps are to be followed.

1. Identification
2. Disclosure
3. Distribution
4. Root-Causes Analysis
5. Solution Identification
6. Dissemination to Implementers
7. Resolution

1. Identification

Identification of a near-miss is the first stage of near-miss processing.

2. Disclosure

Though a near-miss is identified, its value may be lost if management does not facilitate and encourage disclosure of the recognized occurrence. Management must create a culture where disclosure of near-misses is actively encouraged, and individuals do not hesitate to disclose because of fear of disciplinary action, or peer pressure.

3. Distribution

In the distribution stage, near miss information is transferred from the disclosure to 'decision makers', who make decisions as to what preventive actions are necessary. Rapid distribution of information pertaining to near-misses is paramount. Quick distribution helps to ensure fast resolution, which reduces the likelihood of occurance of any accident. Near Miss Incident Report be forwarded within 24 hours as per format given to nominated Executive Engineer Zone office (safety) with a copy to CE(Training & safety) MSEDCL, Eklahare,Nashik.

4. Direct and Root-Cause Analysis

In the analysis of an incident it is necessary to:

1. Assess the direct and underlying root causes that enabled an incident.

2. Determine corrective actions or solutions to rectify the root cause so that recurrence is less likely.

Root-cause analysis is a well-developed field in accident investigation and many of the techniques can be transferred to near-miss investigation. When transferring techniques it is necessary to ensure that the methods do not overburden the investigation such that future reporting is deterred.

Depending on the potential severity and complexity of the near miss, determination of causes may be performed informally between disclosure and direct supervisor, or may require formation of an investigation team for a thorough analysis with subsequent recommendations. Executive Engineer, Zone office nominated as safety officer will be responsible for root cause analysis and will send investigation report to CE, Training and safety, Eklahare, Nashik within 7 days. CE(T&S) after due study will recommend solution & disseminate the information to all Zones within 15 days of receipt of investigation report.

5. Solution Identification

For each cause corrective actions need to be determined. Ideally these corrective actions should eliminate the potential for recurrence, though this may not always be feasible.

Therefore, it is desirable that solutions reduce the likelihood of recurrence (mitigation) or reduce the potential impact in case of recurrence (contingency planning).

All solutions should also be scrutinized to assess whether there are other detracting factors (such as expenses, employee acceptance, management acceptance, new incurred risks, etc.)

6. Dissemination to Implementers

In the dissemination stage, corrective actions must be sent to all parties that will be benefitted by the information. This should include people implementing corrective actions at the location where the near-miss occurred. However, at this stage, it may also be appropriate to disseminate the near-miss to a much larger audience. For example, it is quite possible that other business units, as well as other sites can benefit from the information pertaining to the near-miss. CE(T&S)will disseminate up to Zone level and Zone officer will forward the same to all concerned within zone.

7. Resolution

It is not only important to resolve a near-miss to ensure that the potential accident does not occur, but also intrinsic to the success of a safety program. If, based on the observations, individuals perceive that near-misses are not acted on, they may not disclose near-misses in the future. Consequently, in this stage, systems that ensure the full value of near-misses is assessed using criteria, such as good tracking mechanisms and effective promotion of resolutions.

Near-miss: An opportunity to improve safety practice based on a condition, or an incident with potential for more serious consequence.

The above definition captures the quality of a near-miss, without dwelling on how by this definition a wide variety of occurrences are defined as near-misses. These include:

- Unsafe conditions
- Unsafe behavior
- Minor accidents/Injuries that have potential to be more serious
- Events where injury could have occurred but did not
- Events where property damage resulted
- Events where a safety barrier was challenged
- Events where potential environmental damage could result

A near -miss form is attached in the appendix. The form should be submitted within 24 hours to E.E. (Admin & safety), Zone office and C.E. (Training & Safety), Eklahare, Nashik.

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11. Disaster Management

Disaster causes disruption of normal operating conditions as these are sudden and unexpected events that cause severe disturbance to people, objects and environment, resulting in loss of life or / and damage to property. Hence disaster management is necessary to avoid loss of life / damage to property. The basic purpose of disaster management is prevention and mitigation of risks, quick response and preparedness in case of occurrence of a disaster and recovery and restoration of normal working conditions at the earliest. The main goal of disaster management is to avoid the occurrence of probable disaster or at least to reduce the impact of such occurrences. The general and specific safety instructions mentioned in the manual help to avoid such occurrences. Disasters are unplanned and non-routine in nature and in spite of safety precautions accidents may happen. Hence the aim of disaster management is to prepare an emergency action plan for quick response under such adverse conditions and take necessary steps for quick recovery and restoration of normal operating conditions.

GUIDELINES FOR DISASTER MANAGEMENT :

1) Immediately first aid / medical assistance should be provided to the victim. (Send for, never wait for a doctor.)
2) Communication and Co-ordination are imperative to successful implementation of disaster management plan. Up-to-date important phone numbers, addresses of following should be kept available. (Doctor, Veterinary Doctor, Police Stations, Ambulance, Fire Brigade, Electrical Inspector, BSNL Office, Blood Bank, Hospitals, Insurance Company, Advocate, Sarpanch / Gram-Sevak / Corporator, Safety Officers)
3) Safety audits and investigating near-miss accidents are integral part of disaster management.
4) Inherit the culture of predictive maintenance.
5) Forming Cross Functional Teams at Division / Sub-Division level for quick responsiveness. The CFTs should be headed by Safety Officers concerned.
6) Promote effective public participation by way of safety awareness programmes.

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APPENDICES

Appendix - 1 : List of Safety Devices

The following are the minimum requirements of safety devices and special tools :

1. Rubber Hand Gloves, Gauntlets (11 kV class)
2. Safety Belts
3. Leather Protective Gloves
4. Hand Lines
5. Ropes
6. Helmets
7. GOS Rod (11 kV insulated)
8. Goggles
9. Fibre Ladder
10. Rubber Mat
11. Telescopic Earthing Rods
12. Hand Tools
    a) Insulated Cutting Pliers
    b) Insulated Screw drivers
    c) LT Line tester
    d) 11 kv Line tester
    e) Adjustable Screw spanner
    f) Rain Coat
    g) Chargeable Hand Torch

Appendix - 2 : Line Clearances

Overhead lines: Rules 74 to 93 :-

*Rule 76: Factor of safety for various supports shall be as under:

1)	Metal supports	1.5
2)	Mechanically processed concrete supports	2.0
3)	Hand-molded concrete supports	2.5
4)	Wood supports	3.0

*Rule 77: Minimum clearance above ground of the lowest conductors shall be as under:

- Across a street :-

a)	For low and medium voltage lines	-	5.8 meters
b)	For high voltage lines	-	6.1 meters

- Along a street :

a)	For low and medium voltage lines	-	5.5 meters
b)	For high voltage lines	-	5.8 meters

- Elsewhere

a)	For low, medium and high voltage up to 11 KV	-	4.6 meters.
b)	For low, medium and high voltage up to 11 KV insulated.	-	4.0 meters
c)	For high voltage lines above 11 KV	-	5.2meters
	Extra high voltage lines	-	5.2m + 0.3m for every 30KV.

Rule 79 : Minimum clearance from buildings of low and medium voltage lines and service lines.

a)	Vertical clearance	-	2.5 meters.
b)	Horizontal clearance	-	1.2 meters.

Any conductor less than the above clearance shall be adequately insulated and shall be attached at suitable intervals to bare earthed bearer wire having a breaking strength of not less than 350Kg.

*Rule 80: Clearance from buildings of high and extra high voltage lines.

a)	Vertical clearance :-		
1)	High voltage including 33KV	-	3.7 meters.
2)	Extra high voltage	-	3.7meters plus 0.3m for every 33KV or part thereof.
b)	Horizontal clearance :-		
1)	High voltage up to 11 KV	-	1.2 meters
2)	Voltage above 11 KV	-	2.0 meters
3)	Extra high voltage lines	-	2.0 meters plus 0.3 m for every 33KV or part thereof.

Appendix - 3 : Work Permit Format

FORMAT OF PERMIT

S.No.

MAHARASHTRA STATE ELECTRICITY DISTRIBUTION COMPANY

..... Circle ..... Div ..... Sub-Div.....

Permit to work on Electrical Equipment or Line.

I hereby declare that the following Electrical Equipment / Line is dead and isolated from all live conductors.

Caution notices have been affixed to all the controlling switches.

Here state exactly the electrical equipment/line on which it is safe to work:-

Here state exactly at what points the electrical equipment/line is connected to earth:-

Here state any specific limits or instructions which the user may like to add.

Signature with date, time and designation of issuer .....

Signature with date, time and designation of receiver .....

Remarks :- (Details of work carried out to be mentioned while returning the permit.)

Application

From ..... To .....

At .....

Please issue me permit to work on .....

Appendix - 4 : Reporting of Electrical Accidents

Annexure XIII of IE Act.

1. Date and time of Accident.
2. Place of accident: (Village/Town/Tahsil/Thana, District & State)
3. System and voltage of supply (whether EHV/HV line/substation/generating station/ consumer's installations/ service lines/other installations).
4. Designation of the officer in charge of the supplier in whose jurisdiction the accident occurred.
5. Name of the owner/user of energy on whose premises the accident occurred.
6. Details of victim(s)

a) Human

Sr. No.	Name of Victim	Sex of Victim	Full Postal Address	Approx. age	Fatal/ Non-Fatal
1	2	3	4	5	6

b) Animal :-

Sr. No.	Description of Animal (s)	Number (s)	Name (s) of owner (s)	Address (es) of owner (s)	Fatal/ Non-fatal
1	2	3	4	5	6

7. In case the victim(s) is/are employee(s) of supplier
   a) Designation of such person(s)
   b) Brief description of the job undertaken if any.
   c) Whether such person/persons was/were allowed to work on the job.
8. In case the victim (s) is / are employee (s) of a licenced contractor :-
   a) Did the victim(s) possess any electric workmen's permit(s) supervisor's certificate of competency issued under rule 45? If yes, give number and date of issue and the name of issuing authority.
   b) Name &designation of the person who assigned the duties of the victim(s)
9. In case of accident in the supplier's system, was the permit to work taken?

10. a) Describe fully nature & extent of injuries, e.g. fatal/disablement (permanent or temporary) of the portion of body or burns or other injuries.
    b) In case of fatal accident, was the post mortem performed?
11. Detailed causes leading to accident.
12. Action taken regarding firstaid, medical attendance etc. Immediately after occurrence of accident (give details).
13. Whether District Magistrate & Police station concerned have been notified of the accident (if so, give details)
14. Steps taken to preserve the evidence in connection with the accident to extent possible..
15. Name and designation(s) of the person(s) assisting, supervising the person(s) killed or injured.
16. What safety equipment were given to & used by the person(s) who met with this accident, (e.g. rubber gloves, rubber mats, safety belts & ladders etc.)?
17. Whether isolating switching and other sectionalising devices were employed to dead the sections for working on the same? Whether working section was earthed at the site of work?
18. Whether the work on the live lines was undertaken by authorised person(s)? If so, the name and the designation of such person(s) may be given.
19. Whether artificial resuscitation treatment was given to the person(s) who met with the electric accident? If yes. how long was it continued before its abandonment?
20. Names & Designations of persons present at and witnessed the accident.
21. Any other information/remarks.

PLACE :

TIME :

DATE :

SIGNATURE

NAME/DESIGNATION

ADDRESS OF THE PERSON REPORTING

Appendix - 5 : Contents of First Aid Box

Sr. No.	Contents	Quantity
1.	Wound dressing (sterilised) a) 3 cm wide roll b) 8 cm wide roll	 6Nos. 3 Nos.
2.	Burn dressing (sterilised) Large	3 Nos.
3.	Adhesive plastering (for fastening dressing) (2 cm x 1 mtrs.)	1 No.
4.	Washable Bandage	6 Nos.
5.	Triangular Bandage (for fractures)-large	1 No.
6.	Safety pins (for fastening bandages)	1 Bunch
7.	Scissors (of stainless steel) 8 cm plank	1 Pair
8.	Tweezers (to put off strings)	1 Pair
9.	Absorbent cotton wool (for cleaning wound)	100 Grams
10	a) Potassium Permangnate B.P. (Antiseptic solution) b) Tincture iodine B.P. (for all wounds) c) Dettol or Savion d) Hydrogen peroxide (Antiseptic and bleeding stopper)	 1 Bottle 1 Bottle 1 Bottle 1 Bottle
11.	Snake bite lancet	1 No.
12.	Burn Ointment (for burns, cuts & insect bites) e.g. Burnol or Badiohnat	1 Tube
13.	Tourniquet (for stopping bleeding)	1 Set
14.	a) Soda-bi-carb, BP (For acid burns) b) Vinegar (for Alkali burns)	1 Bottle 1 Bottle
15	a) Eye Drop b) Sterilised eye pads (separate by seal)	1 Bottle 6 Nos.
16.	Anti Allergy tablet (avil or bonodryl)	50 Nos.
17.	Analgesic tablet (crocin or pyrigesic)	100 Nos.
18.	a) Spirit of Sal volatile b) Smelling salts	1 Bottle 100 Grams
19.	First Aid Leaflet	1 Copy

Appendix - 6 : Safety Audit Reports

Area ..... Date audit conducted: .....

Name of Concerned Engineer(s) : .....

DETAILS OF PERSONS CONDUCTING THE AUDIT

Name : ..... Position : .....

Telephone Number : .....

Name : ..... Position : .....

Telephone Number : .....

Name : ..... Position : .....

Telephone Number : .....

Review Date : .....

1. FIRE SAFETY

1.01 Is there an effective fire alarm?

1.02 Is the fire alarm tested every three months?

1.03 Is the fire alarm functioning correctly?

1.04 Are fire exits clearly marked and easily identifiable?

1.05 Are fire exits free from obstruction?

1.06 Are emergency procedures displayed?

1.07 Are the telephone numbers of emergency services clearly displayed?

1.08 Are there regular fire evacuation practices?

1.09 Are fire extinguishers available?

1.10 Are the fire extinguishers suitable to the type of fire that may occur (eg carbon dioxide for electrical fires).

1.11 Are fire extinguishers serviced regularly?

1.12 Are hose reels available and connected to water supply?

1.13 Is access to the hose reels unobstructed?

1.14 Are flammable materials properly stored?

2. FIRST AID

2.01 Are first aid kits full stocked?

2.02 Are first aid kits readily accessible?

2.03 Are there sufficient numbers of first aid kits?

2.04 Are the contents of the first aid kits checked regularly?

2.05 Are first aid kits replenished as necessary?

3. MACHINES AND TOOLS

3.01 Are all operators trained to use machines and tools?

3.02 Are machines adequately guarded to prevent accidental contact?

3.03 Are machines periodically maintained?

3.04 Are records kept of maintenance on machinery?

3.05 Are safety notices clearly displayed?

3.06 Are appliances tested regularly?

4. PERSONAL PROTECTIVE EQUIPMENT

4.01 Are proper equipment provided to perform the designated task?

4.02 Are safety gloves, earth rod etc. tested for use at suitable voltage level?

4.03 Are different equipments used as per the need depending upon voltage level?

4.04 Is a replacement policy of consumable items is in place and adhered to?

5. LADDERS/STEPS

5.01 Are ladders/steps suitable for the task performed?

5.02 Are ladders/steps in a good condition?

5.03 Are rungs made of non-slip material or fitted with non-Skid strips?

5.04 Are ladders/steps stored in a safe manner?

5.05 Are ladders/steps fitted with rubber feet?

6. SAFETY SIGNS/POSTERS

6.01 Are signs/posters in a prominent position and easy to understand?

6.02 Are signs/posters available in other languages as necessary?

6.03 Are signs/posters close to the source of the hazard?

6.06 Are signs/posters adequately maintained?

7. GENERAL

7.01 Are employees aware of hazards in their workplace?

7.02 Do employees report accidents?

7.03 Is access/egress to work place safe?

8. TRAINING

8.01 Is induction training provided for all employees including contractors employees?

8.02 Does initial training include a thorough review of hazards and accidents associated with the job?

8.03 Is training provided for the use of emergency equipment?

8.04 Have managers and supervisors attended safety training?

8.05 Are training records maintained for all safety training?

9. EMPLOYEE PARTICIPATION

9.01 Are workers consulted on the safety aspects?

9.02 Are employees encouraged to raise issues for consideration?

9.03 Is safety a standing agenda item?

9.04 Are employees encouraged to bring their concerns regarding safety to the attention of management?

9.05 Are the names of safety representatives displayed?

Appendix - 7 : Near-Miss Report

Report of an accident or near miss ..... Date of Report: .....

Part-A: About the injured / ill person or person observing the near miss

Personal details

Name : Post held :

Work details

Division / Department Section :

Work Telephone No. Email address :

Supervisor : Contact details :

If the person is a **contractor or agency staff**, give name of employer or agency plus contact details:

If the person is a **visitor**, give reason for visit and / or department / person being visited:

Part-B : About the incident

Date of occurrence :

Time of occurrence :

Name of Engineer or Line Staff / Operator Present at the time of incidence :

Description of the incident : (include as much detail as possible)

What could be done to prevent this Near miss?

Recommendations to prevent recurrence:

Follow-up action taken:

Name & Signature of reporting officer / employee

To,

1. Executive Engineer (Administration & Safety, Zone Office)
2. CE (Training & Safety), Eklahare, Nashik.

महावितरण

महाराष्ट्र राज्य विद्युत वितरण कं.मर्या.

सुरक्षिततेबद्दल महत्वाच्या सूचना

असुरक्षितपणे काम करणारा कामगार हा कोणत्याही संस्थेवर बोजा स्वरूप असतो.
तो स्वत:ला, सहकर्मचाऱ्यांना, जनतेला व कंपनीला धोकादायक असतो.

- अति घाईची नशा करी जीवनाची दुर्दशा.
- सुरक्षित जीवनाचे एकच सूत्र, सुरक्षा साधने हेच खरे मित्र.
- आत्मसात करून सुरक्षा मंत्र, सुरक्षित राखू जीवनाचे यंत्र.
- सुरक्षेला सुरूवात असते पण शेवट नसतो.
- अपघाताला सुरुवात नसते पण शेवट असतो.
- कामात असावे सदा सावध आणि दक्ष, अनावधनाने होऊ नये अपघाताचे भक्ष्य.
- मेहनतीला दिल्यास सुरक्षेची साथ, सहन करावा लागणार नाही अपघातांचा आघात.
- सर्वात मोठी हानी जिवीत हानी.
- सुरक्षित साधनांची निगा स्वत:ची निगा.
- जरी पाहिजे सुरक्षा तुला रे । सुरक्षा साधनांची निगा राख तु रे ।
- अनावधानता, काळ मागे उभा हो । डिस्चार्ज रॉडने त्वा जीवदान लाहो ।
- शिडी झुला रस्सी, तेथे सुरक्षिततेची वस्ती.
- डिस्चार्ज रॉड व हॅन्डग्लोज ही कवच–कुंडले आहेत.
- अपघात हा नाही देवघात, तो टाळणं आहे आपल्याच हातात.

महावितरण

महाराष्ट्र राज्य विद्युत वितरण कं.मर्या.

सुरक्षिततेबद्दल महत्वाच्या सूचना

असुरक्षितपणे काम करणारा कामगार हा कोणत्याही संस्थेवर बोजा स्वरूप असतो.
तो स्वत:ला, सहकर्मचाऱ्यांना, जनतेला व कंपनीला धोकादायक असतो.

- वेळेपेक्षा सुरक्षितता महत्वाची.
- सुरक्षित कामासाठी काम करण्याच्या ठिकाणी दोन्ही बाजूस अर्थिंग करणे विसरू नका.
- अंमली पदार्थ सेवन करून काम करू नये.
- काम करीत असतांना चेष्टामस्करी करू नये.
- स्विचगियर ऑपरेट करतांना योग्य हॅन्डग्लोज वापरा.
- डी. पी. वर फ्युज टाकतांना किंवा काढतांना हॅन्डग्लोज वापरा.
- असुरक्षित काम म्हणजेच अपघाताला निमंत्रण.
- वीज फाजील आत्मविश्वासला क्षमा करीत नाही.
- सेल्फ परमिटची सवय अंगी बाणा, काम होईल चुकाविना.
- ट्रान्सफॉर्मर चालू असो वा बंद डी.ओ. फ्युज ऑपरेटींग रॉडनेच काढा.
- डबल फिडींग पोलवर कलर कोड वापरा, सुचना लिहा.
- लाईन परमीट घेतल्याशिवाय लाईनवर काम करू नये.
- एकाग्र व सतर्क राहण्यास्तव काम करतांना इतर गोष्टींचा वापर करू नका.
- सुरक्षिततेशी करा गट्टी ; अपघाताची होईल सुट्टी.