

**SAFETY MANAGEMENT SYSTEMS IN KSEB
A CRITICAL ANALYSIS AND
SUGGESTIONS FOR IMPROVEMENT**



**KSEB OFFICERS' ASSOCIATION
CCAPSS SUBCOMMITTEE**

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CONTENT

	Page No
1. Introduction	1
2. Cultural Factors	2
2.1 Awareness about Consequences	2
2.2 Punishments and Incentives	4
2.3 Local Advisory Committees	4
2.4 Public Awareness Programmes	5
3 Organisational Factors	6
3.1 Formulation of a Safety Policy	7
3.2 Independent Wing for Safety	9
3.2.1 Responsibilities of the Safety Wing	9
3.3 Qualification and Training	12
3.4 Model Section and Safety	13
4 Factors Connected with Electrical Installations	15
4.1 Age and Deterioration	15
4.2 Quality of Materials and Standardisation	17
4.3 Quality in Construction	17
4.4 Safe Feeding Arrangements	19
5 Procedural and Operational Factors	20
5.1 Operational Errors Leading to Accidents	20
5.2 Operational Problems in 33kV Substations	23
5.3 Maintenance and Safety	24
5.4 Safety Equipments and Tools	25
6 Conclusion	27

1. INTRODUCTION

Safety of persons and installations should be the highest priority item for any country or organisation. Every year, accidents wipe out many valuable lives in our country. Human resources are the major strength of our country and it is high time to think about more effective steps to protect this resource. Apart from the loss of human lives, physical loss involving plant, machinery and installations and the consequent loss of production and downtime also have detrimental effects on the national economy. Frequent accidents tarnish the image and reputation of an organisation and also lead to low employee morale. Good safety systems and practices are very important in improving the quality of life of the people and the quality work life of the employees.

Safety of the employees who work in the installations, safety of the consumers who utilise the services and the safety of the general public should be of prime importance to the Board. Every year many valuable lives vanish from this world or live a miserable life due to

accidents caused from electrical installations. It is disheartening to note that the number of accidents only increase even after several steps to control it. The number of fatal accidents reported during 2010-11 from Board's installations were 115 and that from consumer premises were 92. The number of non fatal accidents were 177 and 18 respectively. One of the major reasons for the increasing number is that the installations are expanding and becoming complex year after year. There are cultural, organizational, installational and procedural aspects leading to accidents. Whatever may be the reasons, we cannot justify even a single accident leading to death or injury. The accidents show that the stipulated safety measures itself are ineffective or the factors mentioned above reduce their effectiveness. In order to chart out effective control measures, it is very important to address each of the above factors and their effects on safety.

2. CULTURAL FACTORS

Kerala has a position comparable to that of developed countries in the fields of health, education and culture. But we cannot ignore the fact that there is a tendency to the people here to disregard the rules. We often see persons hanging their helmet on to the rear view mirror of the bike and riding fast without any consideration to law or to their lives. This is not because they are unaware of the law or the consequences of their action on their lives and not because it is a difficult task to obey the rules. This is a cultural barrier which is

applicable to the rules of electrical safety also. Different means to overcome these barriers are mentioned below

2.1 Awareness About Consequences

People tend to disregard the rules not because they do not know the consequences, but because it is merely a knowledge and not amount to a revelation which can trigger an action in their minds. Linemen do not carry earthrodes and gloves not because their superiors or trainers have not instructed them to do so. It may be because they themselves have not really felt the need of using it. It is necessary that our training programmes should be oriented towards this. A video show on the real aftermath of working without earthing the line or opening the AB switch without using gloves will benefit more than ten classroom instructions. The video shows should be properly designed to depict the horrible death of the victims, condition of the family and friends and similar effects to influence the minds of the trainees. The video show should be prepared with professional assistance to obtain the desired effects. This can be further augmented in the daily toolbox talks and monthly or quarterly video shows and talks. The talks should be inspirational and not merely informative. Continuous programmes, feedbacks and follow up programmes to improve safety awareness level shall be conducted in every section. Discussions on lapses in safety and consequent events are very important in improving safety consciousness level and avoiding future mishaps. An intense

programme is required initially to overcome the cultural barriers so that the concepts will stick to the minds and employees will gradually accept them.

The coming year shall be exclusively declared as Safety Year and intense programmes for safety awareness shall be conducted at all levels as part of it. It will be easier to inspire the field staff on safety by practicing safety by superiors at all levels. For example while carrying out inspections by higher officers, they shall also wear helmets, ID cards etc so that the working staff will feel the importance more clearly. Introducing uniform for all employees will be a right step towards ensuring discipline and hence safety.

2.2 Punishments and Incentives

Presently, inspections and investigations are initiated only after an accident. Instead of that, routine inspections shall be conducted by an independent safety wing within the organisation. Punishments and fines shall be imposed on employees who do not comply with the safety instructions and rules. The fines shall be arrived on the basis of negative points accumulated by each employee. The employee shall be given opportunity to earn positive points to compensate by his compliance to safety, involvement in training and public awareness activities related to safety. Safety awards shall be declared to employees and various offices based on performance in safety. The

mode of giving awards, incentives, punishments and fines shall be arrived after proper study and made known to all employees.

2.3 Local Advisory Committees

The local advisory committees which were formed to monitor progress of works can also be utilised to report unsafe working practices and also to inform unsafe installations and feeding arrangements. This shall be directly monitored by the safety wing in K S E Board. Accident to employees and contract staff is not just an organisational issue, it is a social problem and hence the co-operation and involvement of people's representatives is desirable to control it.

2.4 Public Awareness Programmes

Many accidents are caused to the public from our supply lines. These are mainly due to the lack of awareness about the consequences in interfering with our supply lines. It is also a fact that the pressure of the local public to rectify the defects very fast sometimes makes the employees do the work without taking proper safety measures. Non co-operation of the public for removal of trees and tree branches from lines is also a reason for accidents. Public awareness programmes is very much essential for reducing accidents involving the general public. Professionally prepared video shows will be very useful in conducting such programmes. Safety awareness programmes can be conducted among public with the help of LACs. The electrical wiring contractors and new applicants for power connection shall be given proper

awareness on keeping the electrical panels in safe and clean places and with all switches and fuses in functional condition. This will be a step towards ensuring safe operation in consumer premises to avoid accidents. While effecting service connections, a card can be issued to the consumer showing details of the connection and necessary information about safety and energy conservation.

3. ORGANISATIONAL FACTORS

The commitment of the organisation to safety and its safety policy are very important factors in maintaining a safe environment. The safety policy document of a power distribution company starts with the following statement: 'There is no higher priority in WPD than the safety of our staff'. We should examine whether we have this priority in our organisation or whether we are just contented with orders, circulars and safety manuals for the sake of a formality. Many times it appears that speedy clearance of faults has higher priority than safety. We should examine whether we consider it more economical to give compensation to the family of the victims than to invest a higher amount in accident prevention measures. Special provision shall be given in annual budgets for purchasing safety equipments, modifications and rectifications in installations to improve safety and for conducting safety awareness programmes.

The decision to declare all Assistant Executive Engineers as safety officers, who shall carry out their safety responsibilities secondary to their original duties, shows lack of commitment in top management and Government to the cause of safety. This lack of commitment will radiate to all employees and reflect in their actions. Each person in the organisation should be a watchdog of safety, the bottom and middle management should be custodians of safety and the top management should be ambassadors of safety. At the same time

the organisation set up for safety must be independent from the other functional responsibilities. APTS is the right example before us. Creation of APTS as an independent wing for detection of tampering and theft has contributed a lot to arrest revenue drain and to discourage the people from such acts.

3.1 Formulation of a Safety Policy

If any organisational function is to be performed effectively, the objectives, policies, procedures and the organisational structure and responsibilities have to be clearly defined. It is disappointing to note that KSEB do not have a properly defined safety policy and the organisational set up to carry out the objectives. Apart from issuing some scattered orders, there are no sincere attempts to create a safe working environment in the organisation. We suddenly wake up to think about safety only when there is a major accident. It is to be understood that mere safety instructions, slogans or directives will not improve the safety in any organisation. The safety policy should aim at driving safety as a way of life in to the minds of the employees, contract workers and the general public. A clearly defined Health and Safety Policy shall be evolved and the policy document should be published in the website and made available in all our offices. The core of the safety policy should be displayed in all offices and the important installations of KSEB. Under the broad Health and Safety Policy, there shall be a high level policy document for each profit centre. Clearly defined

procedures incorporating safety measures shall be evolved for each work under the profit centre, which shall conform to the policy.

Some important aspects of the safety policy to be formulated are given below:

- It shall be in concordance with the aim and overall vision/policy of the organisation.
- It shall be envisaged to meet all statutory and legal requirements.
- Integrate safety procedures and best practices into every operational activity with functional responsibilities at all levels for improving the safety performance of the organisation.
- Develop a culture of safety through active leadership and provide appropriate training at all levels to enable employees to fulfill their safety obligations. Training programmes to be imparted to each category of employees shall be listed and it should be ensured that they undergo the training.
- Ensure adequate resources at all times to implement the safety policy of the organisation.
- It shall be discussed and introduced in consultation with all stake holders.
- Safety goals and responsibilities should be reviewed and safety achievements should be appreciated in all conferences and meetings.

3.2 Independent Wing for Safety

At present, KSEB do not have a proper safety organisation apart from the safety commissioner and the namesake regional safety officers. It is absolutely essential that each person is responsible for his safety and the safety of others. But the safety organisation should be independent from the normal O&M function. Acts such as designating all Assistant Executive Engineers as safety officers are only an escape from the real responsibilities of the Board and will never have any influence on safety.

Some suggestions for organisation set up for safety in KSEB are given below:

- Safety Commissioner in the rank of Deputy Chief Engineer shall head the department and directly report to the Chairman
- Independent Regional Safety Officers in the rank of Executive Engineer shall be in charge of safety under the jurisdiction of each Chief Engineer in Generation, Transmission and Distribution
- Independent Field level safety officers in the rank of Assistant Executive Engineer shall be in charge of safety in each circle in Generation and Transmission and each division in Distribution.

3.2.1 Responsibilities of the Safety Wing

Basic responsibilities to be carried out by the safety organisation are listed below:

- Advise KSEBoard on all issues related to electrical safety.
- Develop and revise the Safety Policy and Manuals.
- Identify unsafe conditions and practices and develop remedial action plans.
- Investigate into accidents and submit reports and measures to prevent them in future
- Review all near-misses, and formulate preventive measures.
- Perform electrical safety inspections at work sites in Generation, Transmission and Distribution.
- Document meetings, inspections, and other activities with regard to electrical safety.
- Works to increase the level of electrical safety and electrical safety awareness
- Inspect various installations of Board in Generation, Transmission and Distributions and suggest improvements in safety measures.
- Preparation of safety procedures and documents for working on various equipments.
- Attend conferences convened by various officers and present reports on safety under its jurisdiction.
- Identify the training needs of the employees on safety and prepare syllabus for training programmes.

- Prepare case study analysis of accidents and incorporate in training.
- Formulate evaluation methods for incentives, awards and punishments
- Conduct precommissioning inspections of installations in Generation, Transmission and Distribution and certify safety requirements.
- Take lead role in safety promotional activities and celebration of safety day, safety week etc.
- Conduct public awareness programmes on safety.

The present procedures for reporting on accidents by the concerned officers shall be continued. A copy of the report shall be given to the safety wing also. The function of the safety department shall be aimed at developing remedial measures to avoid accidents. Hence it is better that they investigate the accidents with a corrective rather than a punitive objective. It is very important that the investigating officials shall get the real reasons for the accidents so as to develop the measures to avoid them. If their reports happen to be the basis for punishments, the employees are unlikely to co-operate with them. Rather, if the employees feel that the efforts of the safety wing are aimed at avoiding the accidents which can happen to them, they may willingly disclose the right information to the safety officers and this will be useful in formulating preventive measures.

3.3 Qualification and Training

Knowledge about safety hazards is very important in avoiding accidents. The qualification for electricity workers in KSEB is 10th standard fail. If this qualification is to be continued, it is very important that sufficient knowledge should be imparted to them through training programmes in safety. Also the electricity workers are being promoted to overseers in a few years and overseers are the supervisors in LT works who have the responsibility of ensuring safety precautions. For this they should have sufficient knowledge and experience about the system. It is very important to ensure necessary training in the existing category before being promoted and the training in their new responsibilities after the promotion. Similar is the case of meter readers being promoted to Sub Engineers. Sub Engineer is the most important link in safety, being the supervisors for LT and HT works. They should be given sufficient training to carry out their responsibilities.

Training and retraining is very important in all categories of officers and workmen for safe working. The safety wing should identify the training needs of officers and workmen and prepare the syllabus in co-ordination with HRD wing. The HRD wing should have proper data base on the training imparted. The syllabus and mode of training should be continuously modified based on the case studies and feedback from the field. The training programmes should be aimed at a cultural change rather than class room feeding of study materials. Case studies and video shows are very important in this aspect. The HRD wing in co-ordination with the safety wing shall prepare a set of

case studies, both actually happened and theoretically prepared, and these case studies can be used for the section level talks taking one case study on a day. For field level training, it is advisable that AEs and AEEs shall conduct training in other sections on a rotational basis so that the training programmes will be more interesting and the trainees will get diverse information.

Intensive induction level programmes should be conducted to all category of newly recruited officers and workmen. Their future possible promotions and responsibilities also should be a criterion for devising the training programmes. For example, the electricity workers with SSLC fail are likely to be promoted to linemen and overseers with important responsibilities in future. The induction level programmes should also aim at grooming them for this. Safety should be an important topic in such training programmes.

In KSEB, the contract staff are not usually given any training. Actually, the contract workers are an integral part of the organisation. Development of the contract personnel is essential for the progress of works and giving proper training is extremely important in creating a safe working environment. KSEB shall conduct programmes leading to certification of contract workers and supervisors. This will help to increase the availability of licensed contractors for our works and improve safety as well.

3.4 Model Section and Safety

All the electrical sections are now reorganised as model sections with functional responsibilities. Safety during work is to be ensured by the breakdown wing and the maintenance and capital wing. But the

major responsibility of ensuring safe installations is the responsibility of the latter. Preventive maintenance is very important in keeping the installations in operational readiness and avoiding accidents to workmen and the general public. Regular patrolling, rectification works and touching clearance are important jobs to ensure safety. The staff assigned to the maintenance and capital wing is one sub engineer, two oversears, two linemen and four workers. Due to the high priority given and the strict monitoring done by the higher officers in revenue collection, the Assistant Engineers tend to divert the staff in the maintenance and capital wing to the revenue wing whenever there is deficiency in the latter. Hence the preventive maintenance becomes a second priority item in electrical sections. Apart from this, the staff strength in the wing in sections having high consumer strength and large quantum of electrical installations is inadequate to carry out the preventive maintenance properly. Some solutions are:

- Separate out the works such as streetlight maintenance, LT and HT touching clearance etc. which can be given on contract.
- Based on the extent of installations and the quantum of work, the staff strength shall be reworked.
- Oversears are supervisors for LT works. Alternate arrangements shall be made in enquiry counters and the oversears shall be made available for field works.
- The preventive maintenance shall be properly scheduled and achievements based on targets shall be reviewed in conferences.

- Material availability shall be ensured on priority for safety related works.

4. FACTORS CONNECTED WITH ELECTRICAL INSTALLATIONS

Apart from the safety procedures and precautions, the healthiness of the installations plays a vital role in reducing the accidents. Poor quality materials and aged installations in generation and transmission mainly lead to catastrophic failures involving heavy losses and prolonged interruptions. Accidents to operating personnel also result especially in indoor installations as happened at Moolamattom. In distribution, the effect will be mainly accidents to the public. Unsafe feeding arrangements also cause accidents.

4.1 Age and Deterioration

Age and deterioration of installations in generating stations and substations and that in distribution has to be treated separately.

Points to be taken care of in distribution are listed below:

- Patrolling of lines to be ensured and observations shall be properly recorded.
- Help of local advisory committees shall also be sought to identify unsafe installations.
- Works shall be scheduled on priority based on the above observations
- Targets shall be set for the above works and monitoring shall be done in conferences.

- Priority shall be given for issue of materials for works concerning safety aspects. There are instances where deteriorated poles are not changed for years and allocation is given for capital works. Material flow should be ensured whether it is capital work or maintenance work.
- Kerala is a thickly vegetated area. It is not always practical to cut away all the trees and tree branches near the lines. There are many instances of conductor breaking by rubbing on tree braches and fatal accidents occurs to persons coming it contact with such lines. In such places, Arial bunched cables (ABC) shall be used. The cost also may come down if there is bulk use.
- All the AAC conductors shall be replaced with ACSR.

In the case of generating stations and substations, following points shall be noted:

- PET and Relay wing are testing the equipments at generating stations and substations and giving recommendations for maintenance and replacement of equipments. But these recommendations are not properly followed and many accidents result like those happened at Moolamattom and Madakkathara.
- In many cases shutdown is not received in time to rectify the defects noticed. Sufficient spare capacities shall be provided for critical equipments and feeders.
- Spares for replacement shall be made available in time.

- Old panels shall be replaced in a phased manner.
- It is seen that very old panels replaced at one station is being used in some other station. This shall be discouraged.

4.2 Quality of Materials and Standardisation

Quality of materials is an important factor in ensuring safety. Feedback shall be collected from field and also from safety wing and this shall be used in future purchase decisions including blacklisting of poor quality firms. Especially in the case of indoor switchgears, poor quality panels lead to many accidents. Policy of purchase under lowest price shall be replaced with a proper evaluation of quality and price and its effect on long life and safe working. Standardisation of equipments is an important factor in ensuring quality and timely availability of spares for replacement.

4.3 Quality in Construction

Many accidents result from lapses in ensuring construction standards. Hence it is very important that construction standards shall be clearly specified and followed. It shall be the responsibility of the safety organisation to conduct an audit based on safety aspects before energisation of any installation in Generation, Transmission and Distribution.

Some suggestions for modification of installations to improve safety in distribution side are listed below. The Board shall arrange to study the feasibility of these proposals and arrange to implement.

- There are instances of accidents by removing the LT fuses of the wrong feeder at transformer stations and also by putting fuses by somebody else while persons are working in the line. To avoid this, the LT fuses in transformer stations shall be fixed in metallic boxes with locking arrangements and the name of feeders shall be labeled. Common type keys shall be used for locking so that it can be easily opened in case of emergency. 'Men at work' boards shall be hung on the box while people are working.
- The staff tend to avoid earthing in the case of simple LT works of very small duration as the earthing process may take more time compared to the actual work and finally fall in accidents. In some poles, grounding may not be there and driving earth spikes may be difficult. Hence it is advisable to provide in built shorting and earthing provisions in LT lines at intermediate locations especially at transformer stations and interlinking points. The shorting and earthing should be possible by putting fuse links.
- There are instances of fatal accidents from the operating handle of AB switch due shock from broken belt or damaged insulators when the handle earthing is not proper. Such cases can be avoided by splitting the operating pipe into two parts and joining them by an insulator which will serve the purpose of a stay

insulator. The bottom portion and the top portion shall be separately earthed. The operating handle shall be fiber coated or completely fibre material.

- On the HT side, permanent earthing arrangement shall be provided in AB switches as in the case of line isolators in substations. In line ABs, both side earth will be required and in transformer ABs only one side may be required. Mechanical interlock shall be provided between isolator and earth switch. This will make the earthing easier to do so that accidents resulting from non earthing can be avoided to a great extent.

4.4 Safe Feeding Arrangements

Some suggestions for safe feeding arrangements to avoid accidents are given below:

- In HT/LT lines, provision shall be given for isolating LT lines at HT isolation points by providing LT fuses at line AB switch point. Eventhough the HT is isolated by the AB, the LT may be live as it may be coming from the transformer which is not isolated.
- Section fuse must be provided where the LT line of one HT feeder enters the HT portion of another feeder. Such mixed feedings may be inevitable in the case of interlinked or ring feeders.
- One span shall be kept dead at LT interlinking locations.
- At LT interlinking points, the neutral line also shall be terminated with shackle insulator.

- All branch lines shall be provided with section fuses of adequate rating.
- At the location of LT fuses, street mains shall also be provided with fuses
- Street mains shall not be overlapped to different transformer feeding areas.

5. PROCEDURAL AND OPERATIONAL FACTORS

Safe operating procedures shall be framed for all activities in Generation, Transmission and Distribution. These procedures should address qualifications, tools, protective equipments, approval levels, safety documents and number of personnel required for various tasks. Also, the existing procedures and safety instructions should be critically reviewed to identify practical difficulties, if any, in implementing them. Based on the review, the procedures shall be modified or systems shall be incorporated for the proper implementation.

5.1 Operational Errors Leading to Accidents

Some common errors leading to accidents in operation of generating stations and substations are mentioned below:

- Isolators not opened before providing earthing.
- PTW Board fixed in wrong panel.
- Rubber mats not provided in front of indoor switch gears.
- Racking out of 11 kV Breakers without switching it off.

- Switching on the wrong breaker
- Non confirmation of physical isolation of blades.
- Providing earth rod in the wrong side of breaker before opening isolator.
- Non isolation of work place from the other energized areas.
- Keeping the tools and testing equipments in the work place/over the equipment even after completing the work.
- Not making the work place isolated from all probable back feeding.
- Connecting earth rod to conductor before connecting the other end to earth.
- Climbing on the structure of the nearby similar energised bay while resuming work after a break. This may happen if the safe and unsafe areas are not properly distinguished.
- Inadequate precautions to suppress or safely discharge any inducted or impressed voltage on the equipment.
- Improper hand and footholds
- Improper use of personal protective equipments.
- Improper communication among the working teams.
- Working with imbalance state of mind.
- Back feed through station service or potential transformers.

Many of the above operational errors are common to distribution side also. Some other real situations of common errors which had resulted in accidents in distribution are given below:

- Removing the fuse in a particular circuit in transformer station and working in another circuit. The accident due to this can be avoided if the circuits are properly tagged and if efforts were made to confirm presence of supply in the circuit and earthing done before working.
- One person removing the fuse carrier and another person putting open fuse without confirming whether anybody is working in the line.
- Two sets of people working in a particular section of 11 KV line; Closing the line AB switch after getting the information of one set completing the work.
- Working in a 11 kV feeder after providing shorting and earthing; wrong energisation from substation due to miscommunication; shorting and earthing leads burning out and the person getting minor shock; feeder closing on autorecloser and fatal accident results. This could have been avoided if the leads were of adequate capacity and if switch on to fault (SOTF) lock out protection was provided.
- In the case of multiple feeding structures, isolating the ABs in all directions; shorting and earthing both sides of the working point; not anticipating back feeding in another point in the structure; getting shock from that point while climbing up or getting down.

It is very important that all the possibilities of accidents shall be anticipated by the supervisor and precautions taken. Such incidents and case studies shall be taken up in training programmes and the supervisors and workers shall be educated about the remedial measures.

5.2 Operational Problems in 33 KV Substations

The installations of 33 KV substations were started during 2000. The operation of the substations were envisaged as unmanned substations with autoreclosers and sectionalisers. Later, problems were observed in the operation due to the special nature of the feeding areas and one 'technical security' with ITI qualification was placed on contract in each shift. One more person was additionally placed during night. The 33 KV substations now being constructed are with outdoor or indoor switchgears like any other 66 or 110 KV substation. As per the existing rules, only Sub Engineer/diploma holders are competent to operate in 33 KV and to issue permit to work. Also, it is not at all safe to leave one person in a 33 KV substation for the operation of the electrical installations. Hence it is essential to place one Sub Engineer/diploma holder as operator and one Overseer/ITI holder as shift assistant in each shift. Attaching electrical section offices to 33 kV substations can also be considered to avoid the problem of single operating personnel being left alone in the substation.

5.3 Maintenance and Safety

Proper maintenance is a major factor to keep the installations in safe working condition. In generation and transmission wings, scheduled maintenance and condition based maintenance are followed. Scheduled maintenance shall be planned based on the frequency in approved standards. Keeping the indoor panels clean and dry is very important considering safety. Condition based maintenance is done based on the absolute values and trend in insulation resistance, thermal imaging, tan delta values, moisture and gas content in transformer oil etc. These values shall be periodically measured and interpreted. This is mainly done by the PET wing. But it is observed that the recommendations of PET are not being implemented in time and this results in many accidents. Major hurdles in implementation are non receipt of materials and shutdown in time. This has to be ensured by the board management.

In distribution, scheduled maintenance is done as per standards and condition based maintenance is done as per the observations based on visual inspections during patrolling. Major hurdles and solutions are explained in section 3.4 of this report. In distribution sections, the work load is very high especially in large sections. They cannot postpone the jobs in revenue wing as the collection efficiency is clearly available in ORUMA reports and is closely monitored. They cannot postpone the breakdown jobs and fuse off calls as standards of

performance is in force. They cannot postpone the capital works since the achievement is closely watched. Hence the only thing they can postpone is the preventive maintenance for which they are not much answerable. Since lack of preventive maintenance is a major factor leading to accidents to the public from electrical installations, the above strategy is always at the cost of safety. This situation is to be changed by proper intervention by the Board management.

5.4 Safety Equipments and Tools

Quality equipment and tools in adequate quantity and in good working condition is essential for safe working. Board has to approve the list of safety equipments and tools required in each office and make it available.

An indicative list of minimum requirement is given below:

Generating Station and Substation:

1. Safety Rubber gloves (3 sets)
2. Safety Shoes – for each employee
3. Earth rods (6nos)
4. Fire Extinguishers (As per CBIP standards)
5. Red Safety tapes (200 m)
6. Torch/search light (2 nos)
7. Do Not Operate Boards
8. Proximity Voltage detector staiscope-with overhead extender-1
9. Padlocks (6nos).

10. Tape –White with red stripe
11. Helmets- for each employee
12. Artificial breathing equipments/Oxygen mask.
13. Safety belts(3 nos)
14. Red and Green flags.

Distribution Sections:

1. Rubber Gloves : To all field staff.
2. Ladder : 1No(FRP Ladder) collapsible type.
3. Earth electrode with spikes : 6 sets
4. Earthing chain : 6 Nos.
5. Safety Belt : each to LM and worker
6. Torch : 2 Nos (Rechargeable)
7. Rain coat : To all field staff
8. Helmet : To all field staff
(good quality with emblem)
9. Rope : 2 Nos(20 Mtr Nylon)
10. Rubber safety shoes : To all field staff.
11. Tool Box-Standard items. : 1 Set to each LM
12. Pedestal Halogen Lamp : 1 No.
13. Wood cutter : 1 No.
14. HT Tester : 2 Nos
15. Caution Board (Men at work / Do Not Operate): 8 Nos.
16. Caution Tape & Reflector Board

6. CONCLUSION

Safety in working and safe installations should be given top most priority in the policies and objectives of KSEB. The installations are becoming more and more complex and accordingly safety becomes more and more important. Eventhough the drain on the finance of KSEB due to unsafe practices may not be that much alarming, the resulting loss of life of the human beings is invaluable to their families and to the society. The numerous accidents are tarnishing the image of the Board before the general public. Safety is a culture which has to be inculcated in the minds of each person by proper intervention by the organisation. The Board management, employees, employee organisations and the general public have to take a wholehearted effort to avoid accidents and create a safe KSEB.

This report is a preliminary study report. More extensive study is proposed to be conducted.