

INFORMATIVE CONSTRUCTIVE STEPS TO PREVENT ACCIDENTS RELATED TO ELECTROCUTION.

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Introduction

The most widely utilized type of energy is electrical energy. Today, it is impossible to imagine living without electricity. Today, electricity is acknowledged as a basic human need for achieving the goal of sustainable human development, alongside other necessities like housing, drinking water, health, nutrition, and education. The goal of the 2003 Electricity Act is to provide electricity to everyone. It is impossible to survive now without electricity. The National Crime Record Bureau calls attention to the increasing number of fatal incidents involving electrocution that occur in human populations.

The study examines the following subjects: human error, implementing effective awareness programs, and HRM's role in reducing electrical accidents within the company. Any unplanned, inadvertent event that causes property damage or casualties is considered an accident. These days, reducing accidents, promoting a safety-conscious culture, and providing essential information that improves workplace safety, lowers electrical accidents, and gives ordinary people confidence when using electricity are all paramount. One way to reduce the number of incidents involving outsiders is to implement appropriate public awareness programs.

Keywords: Electrocution, accidents, workers, safety, consumer

Reasons for Studying

What occurs during an accident? An accident implies a failure to follow safety procedures. This sub-insight, which is categorized as either fatal or non-fatal, affects both humans and animals.

Accidents affected a worker for a power utility, a contractor, and a regular person. What steps must be taken beforehand to prevent an accident? Moreover, how? Why is electrical safety such a big deal.

The Review of Literature and Gap Identified

From 1978 to 2022 at the latest, a thorough review of the literature was done as mentioned below.

Sr. No	Nature of kinds of literature	Nos.
1	Literature	06
2	Documents	12

3	Research Articles	18
4	PhD Thesis	13
5	Web page mentioned	03

The normative approach is commonly referred to as "A systems approach to safety" in literature [26]. There is incorporation of all the features (safety policies, procedures, committees, etc.) related to the organization's safety management system. This methodical process entails organising, carrying out, overseeing, and evaluating safety protocols.

This strategy focuses on management commitment and tactics to lower accident rates, prevent hazardous situations, and provide workers with safety training to encourage them to abstain from risky behaviour. Organising safety programmes such as contractor selection, training, investigations, commitments, etc. could help build workers' enforcement of prescribed 'safe behaviour' and foster a culture of workplace safety. Although there have been noticeable advancements with this method, it still cannot achieve the zero-accident

It is discussed how organisational procedures like human resource management are essential in lowering the number of accidents and injuries. Occupational Hazard and Safety (OHS) is improved by choosing people with the right personality, body type, and work experience, according to Lauver's [13] research. HRM Prior to the electrical mishap

The Munu paper [16] discusses several key HRM practices, including training and development, empowerment, performance evaluation and appraisal, systematic selection and job analysis, and empowerment. Further research is required to gain a deeper understanding of the relationship between HRM and accidents. There is no discussion of the actual implementation or the issues that arise during it. The hypothesis is not further explained when it is framed with an action that leads to the intended outcome. For instance, while extensive training is advised, there is no discussion of fewer human errors.

There is a gap in the literature because it does not elaborate on how safe operating procedures and the proper use of safety tools should be implemented.

As part of literature study available on accidents, no study found that special focus had been done on workers of power utilities and accidents happened to contractual workers in power utilities. Research had not done for electrocution cases in consumer premises or outside consumer premises to ordinary man.

The aim of study

- 1) To find the exact cause of accidents
- 2) To search for a feasible solution to avoid mishap.
- 3) To determine the variables which are barriers in human error while working.
- 4) To prepare a locking mechanism for workers to stop them from violating safety rules.
- 5) To easily make availability of safety tools which are necessary for working.
- 6) To create the awareness about appropriate use of safety tools
- 7) To have effective awareness programs which help common people to know about their safety from electricity.

- 8) To provide guidelines to the concerned authority to initiate action as per law on defaulter in case of misuse of electricity or mishandling of electrical network.
- 9) To create safety managers at all levels who can deliver safety information to every person.

Study-related Hypotheses

1. The way distribution companies have performed in safety awareness campaigns will satisfy the public.
2. Safety was not sufficiently addressed or guaranteed by the current method of working.
3. The litigation provisions in relation to imposition of action in electrocution cases are sufficient.
4. The collaboration between local authorities in safeguard of people from electrocution is sufficient.

Reach of the Study

The study was limited to a sample of Maharashtra State Electricity Distribution Company employees at different levels and consumers in all categories in few regions of state.

Data Collections

The primary data is collected from face-to-face interactions, keen observation at locations, answer given to ask different questions. The secondary data is collected from published information of utility, newspaper, articles in journals and data related to electrocution cases in printed form available to people.

Sample Size

An inspection was carried out at the places where accidents happened. It is further classified into rural area, urban area, and semi urban area. The accidents that occurred are differentiated based on those that occurred in consumer premises and those which occurred in outside premises. The consumer premises are further analyzed in two ways, one which occurred due to faulty electrical devices and another due to lack of knowledge about the fundamental use of electricity. The face-to-face talk was done with eyewitness of incidents and with relatives of victim. In case of electrocution cases to common people, surveys are carried out covering rural, urban, and semi urban areas where accidents occurred. A further sample is divided into accidents in consumer premises and outside consumer premises. The consumer premises are considered up to meter the supply provided by utility and beyond this to this consumer premise.

Sr.No.	Nature of respondents	Quantity of participants	Percentage of respondents
1	Rural	46	43.80%
2	Urban	25	23.80%
3	Semi urban	23	21.9.%
4	Tribal	11	10.47%
Total		105	100%

(Table: Number of respondents)

Sr.No	Outside Consumer Premises	Quantity of participants	Percentage of respondents
1	Domestic	15	40.54%
2	Commercial	12	32.43%
3	Agricultural	08	21.62%
4	Industrial	02	5.4%
Total		37	100%

(Table: Number of respondents Outside Consumer Premises)

Sr.No	Inside Consumer Premises	Quantity of participants	Percentage of respondents
1	Domestic	29	42.64%
2	Commercial	20	29.41%
3	Agricultural	13	19.11%
4	Industrial	06	15.78%
Total		68	100%

(Table: Number of respondents Consumer Premises)

In similar way, face to face talk had been done with workers, officers, operators, contractual workers, and office in charge of accidental area. The discussion with the concern where accidents occurred had been done for collecting relevant information in relation to the accident.

Sr.No.	Nature of respondents	Quantity of participants	Percentage of respondents
1	Domestic	52	36.11%
2	Business	38	26.38%
3	Industrial	22	15.27%
4	Agriculture	32	22.22%
Total		144	100%

(Table: Number of respondents category wise)

In these interviews, some questionnaires are prepared in relation to accidents that happened. The answers to questions are integrated in relevance to assure need for safety.

Analysis of Accidents

After a careful examination of all incidents, the following is discovered: Every accident has a safety rule violation at its root. Workers without authorization perform the tasks. Not using the safety appliances as directed. Not getting the right line to appear clear. Problem with unclear or incorrect instructions. Both overconfidence and ignorance pose a threat. Miss communication and unnecessary over confidence invite accidents.

Finding of research and main causes of accidents

Causes of accidents are observed after analyses of data collected. The reasons of accidents are mainly because of unsafe act, unsafe condition and unaccounted. Further reasons are classified as below .

Why Accident Happened???		
Unsafe act	Unsafe condition	Unaccounted
Unsafe practice	No instruction/Guide	Earthquake
Negligence	Lack of Knowledge / Skill	Strom
Over confidence	Lack of PPE/safety tools	Floods
Haste - Unplanned work	Unhealthy Equipment.	Natural Calamities

(fig: Causes of accidents)

It is seen that accidents occur in two parts, one as human error and other is of technological fault. Human errors are further classified as those errors done by himself and errors done by others. Technical errors can be identified and rectified. It is found that recurrence of accidents not seen at the same place and same location.

Certain locations were inspected where accidents happened. in some places it was observed that accidents were occurred due to improper installation of electrical infrastructure. In consumer premises accident occurred were mainly due to unsafe working procedure the unsafe condition had been created in household during renovated work. The safety measure is violated, and compromise has been made for considering cost effective. It has been come into knowledge that same rating and capacity of devices having substandard are available in the market with low cost. In case of electrical accident, the validity of device is judged only after smooth operation of the device the reliability appliances certified only after it is in used. The rules and regulations are available for the design, installation and operation of electrical appliances which are clearly neglected. It is seen that neither legal action nor periodic inspection is by done authority.

It is suggested that a proper check list for operation with safety precautions is easily available to the consumer in case of emergency. What remedial action is to be initiated should be known to the common people. 24X7 helpline number must be there for consumer enquiry safety precaution instructions in inter active voice mode should be available.

The most important requirements are proper tripping instrument must be known to the consumer



which he has to install in his premises which can protect him.

In case of accident those were occurred outside premises are mainly unauthorized interfere with electrical infrastructure, illegal extensions, or construction of building near and below line some accidents were occurred due to accidental contact with live part of (fig: Illegal extension having open joints on ground) electricity unknowingly.

In certain situation as unknown about safety knowledge consumer trap in such situation without having proper safety measures

during operation, installation, and maintenance of electrical fitting. Farmers are changing and diverting the basic electrical infrastructure provided by utility. In some situation temporary arrangement of electrical network has been created by farmer with minor mistake, due to not paying attention at proper time that minor mistakes were converted into major and invited accidents. Curtains false assumptions about safety are already inbuilt in the mind of common people by unknown sources and they feel like nothing will happen if they follow accordingly.



For example, pipes or tubes are inserted in the conductor of line above houses presuming that it is working as safeguard for them. It means while doing unauthorized extension or construction below line, they inserted pipe and tube in overhead conductor.

In the case of workers, in power utility it is observed that safe operating procedure is not followed. They are not using safety devices appropriately. They are not following safety instructions. The co-workers working with them are not paying attentions (fig: Construction below lines) at that time.

The worker who is working is not crosschecking the safety aspect related to the work. In some situation it is observed that workers have

overconfidence about their working style which may lead to accidents. Miss communication and haste play an important role in inviting accidents.

Proper permit procedure for working is not followed. Accident occurred means there must be violations of safety norms. Sometime accidents occur due to not installing the electrical network as per standard method of construction. In some situation incidents were occurred by using defective safety tools. Sometime miss appropriation of safety tools invites accidents.

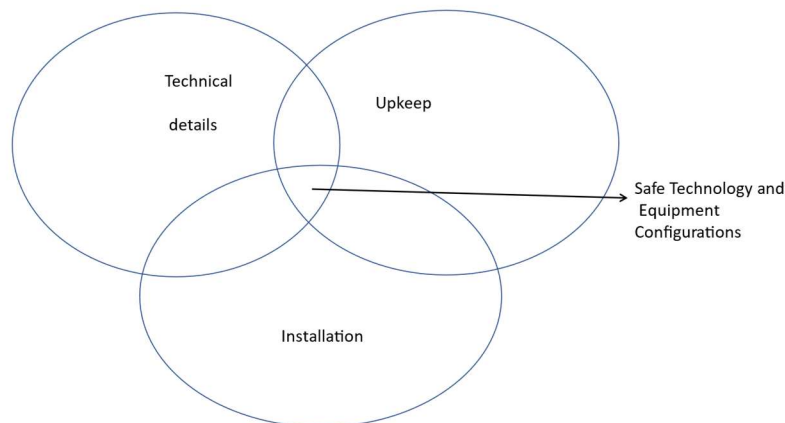
Informative Constructive Steps to Prevent Accidents Related to Electrocutation Guidelines for Action

To avoid the recurrence of accidents, certain precautionary measures must be taken. After analyzing of the accident, it come to the knowledge that in case of accident occurred in consumer premises are avoided by installing tripping mechanism such as ELCB (Earth leakage circuit breaker), RCCB (residual current circuit breaker) or AFDD (Arc fault detection devices) hence effective awareness program must be carried out repeatedly to know each and every consumer. The different types of awareness programs should be carried out for each category of consumer which may include mock drill, play, seminar, and poster at public places. Seminar must be conducted at various platforms such as school, college, society, bus stand and places where publics are having frequent visit.

The private contractors that are in the business of electrical fitting and installations of domestic electrical appliances are to be aware about to spread such safety messages at doorstep. The businessmen those were selling electrical appliances were frequently inspected by regulator and authority to ban shoddy and non-standardly devices. government should take proper steps to stop or ban such devices. The electrical appliances used should meet the standard prescribed by law and regulations. Legal proceeding and impositions of file on defaulter should be done.

Effective safety awareness programs are done by utility as per seasonal requirements. In rainy season more precaution is required to avoid electrocution cases. The utility should arrange special awareness training program to the worker as well as common people in such situations. The mind set of workers, officer, consumer, contractors, businessmen and those involved in electrical business must be changed in positive way of building a safe culture.

Holistic Approach Towards Equipment/ Technology regarding safety is described in the accompanying figure. It demonstrates how technological safety is a function of installation, maintenance, and technical details



Additional Crucial Safety Considerations for workers

Employee training: To make sure that all staff members are aware of the safety rules and guidelines that must be adhered to when working, regular training sessions should be arranged. By doing this, accidents brought on by ignorance will be reduced.

Equipment upgrade: New, safer equipment should be installed in place of any antiquated or old substation equipment. This will lessen the likelihood of mishaps brought on by defective machinery.

Maintaining accurate maintenance records equipment histories, and tool and plant registers is essential to guaranteeing that all pertinent data is accessible when needed.

Frequent maintenance: To keep the substation and network equipment operating safely and correctly, they should receive regular maintenance. Line patrolling, preventive maintenance, oil leak detection, verifying that all circuit breakers and isolators are operating properly, and inspecting the state of cables and connectors are all included in this.

Communication: Preferably, an on-duty operator will record all messages and instructions in the register of messages pertaining to the operation of AB switches, modifications to the network, and other significant communications pertaining to the work.

Procedure for obtaining a permit: The correct process for obtaining a permit ought to be adhered to, and only authorized personnel should be granted one. It's also important to keep the permit book up to date and properly numbered. Serial numbers should be assigned to each sheet in the permit books as well as the books themselves.

Putting these suggestions into practice will contribute to making the workplace safer.

Conclusion

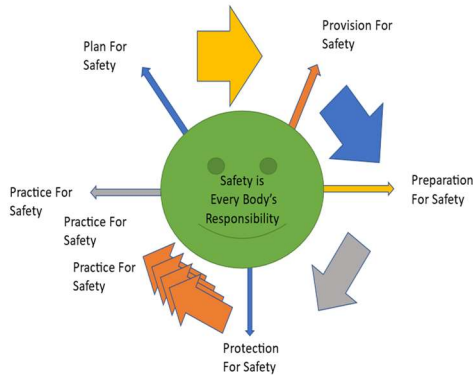
There is now some control over hiring practices and fewer accidents related to contractual person in the trial district because of the proposed changes to the tender documents. The establishment of safety committees and groups and the use of safety monitors are essential elements of accident

prevention programs is imperative to emphasise the phrase "Practice Safety" always every second, every minute and every time. Safety doesn't have a holiday.

Everyone must always take responsibility for everyone else's safety in order to maintain a safe culture.

Safety must be planned for by administration. The union leader should speak about the protection of safety, the safety officer has made provisions for safety, the supervisor has prepared for safety, and frontline workers or anyone who is working must adhere solely to safety procedures

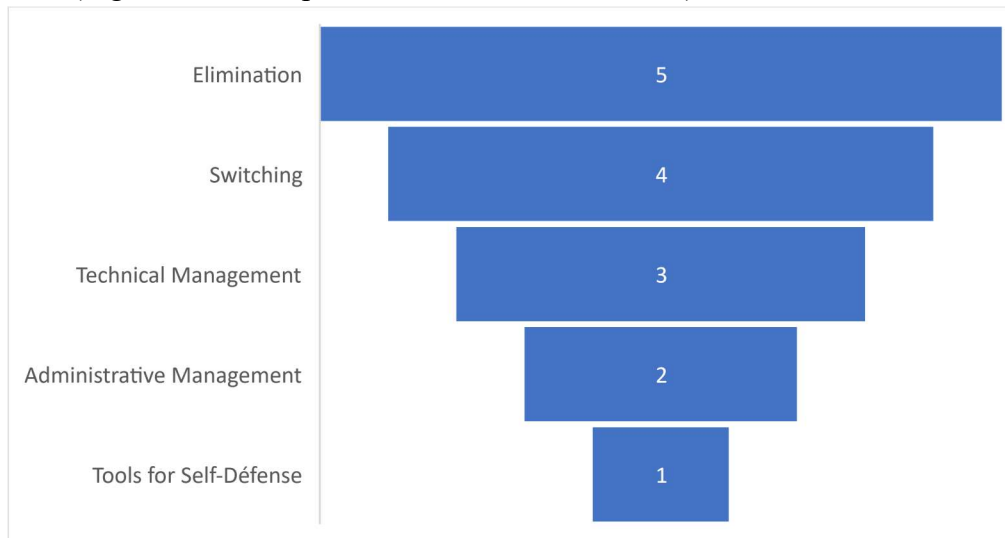
(fig: Everybody responsibility wheel for safety)



Avoid electrocution by taking preventative measures.

Accidents due to electrocutions are avoided by making priority to topmost to elimination of hazards then switch it into safer side then use of technology to isolate the faulty section immediately after occurrence then organizational decisions are important at this moment as we know last option is of self-defence to safeguard individuals. Top priority to highest number 5 to decreasing order to lowest priority number 1. The action to be taken on top priorities are illustrated as below.

(fig: Priorities of preventative measures actions)



- Elimination** : Immediate elimination of dangerous unsafe conditions.
- Switching** : As far as possible exchange unsafe conditions into safe positions.
- Technical Management:** To trip the feeder as soon as a fault occurs, sensitive protection

mechanisms and efficient earthing are necessary.

Administrative Management: Crucial actions are those taken by management and supervision without any delay.

Tools for Self-Défense : Anyone working close to electrical lines and equipment is required to wear personal protective equipment.

Study Limitations

The process for identifying pertinent variables is predicated on the happened events. Worker's resist participating in the research during the data collection phase and being receptive. The broad perspective of the study, which was limited to a particular subset of only one power company workers across multiple cities, was more advantageous. The public's response is not what was anticipated and is worse than anticipated.

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