

## Electro-Grid Security System Automation

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**Abstract:** Providing Security is primary concern in a living area. Electro-grid Security System Automation is an idea about providing security to the electric grid system. When the transmission line is affected immediately the flow of current will be terminated by the security module in an automated way. The process consists of an alert module along with the power cut module. The security system will check the flow of current for every interval of time as well as in abnormal situations. If any natural calamities affect the transmission line, the responsible person gets the alert and the flow of current termination occurs instantly.

**Keywords:** Transmission line, Electric poles, Electric-Grid, Alert module, Current Termination, Security system, Automation, Electrocutation, notch.

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### I. INTRODUCTION

In Electric-grid there are various actions such as Power generation, Maintenance, Power distribution but Security system in transmission line is absent. In general, the source of Electricity is from the power plant to various Substation through the transmission line.

Due to unavoidable reasons the power line may get cut, it may result in loss of power and human lives. Many people die frequently due to this above cause.

In untoward situations, electricity has various impacts and produces ruining injuries with heavy functional and esthetical consequences. Reported incidents of electrical current related injuries ranges from 3% – 17% in India.

Regions such as Madhya Pradesh, Maharashtra, Rajasthan, UP, Gujarat, Chhattisgarh, Andhra Pradesh, Karnataka and Tamil Nadu.

In the year 1992- 2002, 3,378 American workers were killed during the work due to Electrocutation. For a death due to electrocution Government pays Rs.1 lakh – Rs.3 lakh to their family.

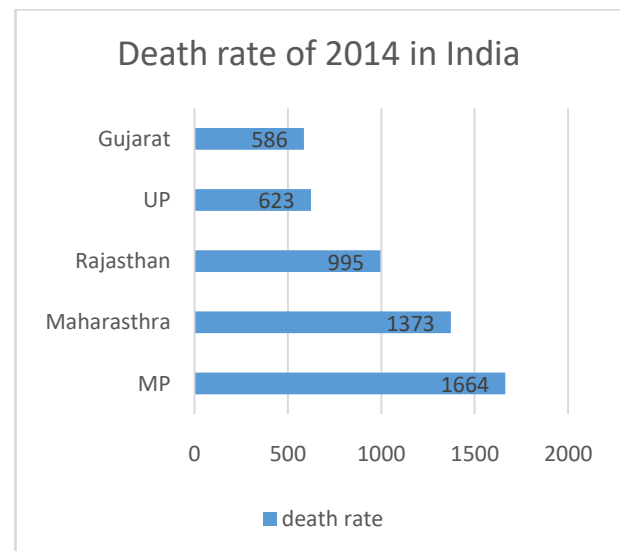


FIGURE 1.1

### II. ELUCIDATION

To overcome this electrocution devastation an Automation System can be used. The proposed automation system and the aim is to provide an easy solution by sending an alert to the corresponding substation, for instance if a transmission line got notched, the automation module senses

and sends the alert message to the allocated substation and even to the main electricity Board.

By this way, can avoid such kinds of deaths and also increases the security level. The Automation Modules consists of various embedded components [hardware and software]. And also the system can indicate the location of the power line notch. Automation module is fixed in all the poles in a series way and every pole has the unique ID. This series way of connectivity helps to traverse the alert message to reach the substation, likely to responsible person from substation.

Ultimate goal is to provide security to the people and then intimation to Electric Board.

### III. WORK FLOW

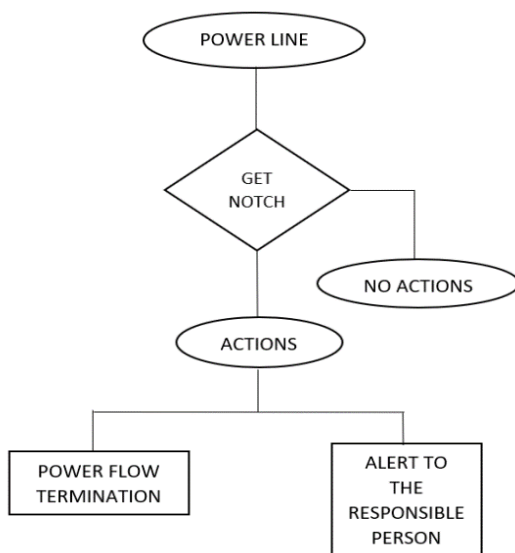


FIGURE 1.2

As the system remains in a state of invigilating the actual flow of current in transmission. If the line got notched, then sends an alert through the poles to substation as well as to the responsible person by sending a message and current gets terminated. This above process takes place sequence manner. First process is to terminate the flow of current because it's the primary goal or objective, later the intimation process will start.

### IV. ALGORITHM

There are two algorithms such as controller system and communication system. The below stated derived algorithm is to solve such kind of problem that discussed above.

Input: Command to Automation Module.

Output: Alert Message to Substation by Traversing and Routing Technique.

FROM [SYSTEM SENDER].

Step 1: Occurrence (Break in flow of power).

1.1: Sending message to Previous Node using ID.

1.2: Message to Substation (Using Traversing Principles and Routing Technique).

Step 2: Regularity inspection in means of power flow.

2.1: Inspecting Current flow break occurrence in phase 1, phase 2 and phase 3.

FROM [SYSTEM REECIVER].

Step 1: Indication of Transmission line Notch.

1.1: Identification of phase line and pole ID.

1.2: Receiving the message and inspecting whether previous pole connection got notched and traversing message towards the substation. (Using Traversing Principles and Routing Technique).

Step 2: Relay operation.

2.1: Relay Turn off in two Strategies.

2.1.1: Relay action in identified phase.

2.1.2: Relay action as well as other phases too.

Each module contains three tasks

- Checking the flow of current in each pole.
- Controller module working (On and Off the current flow).
- Traversing the message to the substation as well as the previous node too.

By this messaging system only all the automation operations will happen.

### V. MESSAGE TRAVERSING

For message traversing and progression both Encoders along with Transmitters, Decoders with receivers are used. Encoders such as HT12A/HT12E are  $2^{12}$  series type encoders got applied in many alarm system and also in security system. This type of encoders are able to encipher a data which consist of N address bits and also 12-N data bits. Decoders HT12D has follows the some features such as encoders but only changes is decrypting technique. Decoding information process contains of N address bits and also 12-N information bits. And also with this Transmitters and Receivers such as ASK, FSK, OOK RF modules can be applied. RF component is better because in past decades it

became stronger than the IR transmission. RF modules can do transmission in longer distance by neglecting the interference and also with Line of Sight Communication.

## VI.FUNCTIONALITY

The Electric grid network have connected with the security module in each pole. They are interconnected with other poles like a chain with one another. Every pole checks the flow of current frequently, if the current flow gets affected the power in the transmission line is jammed using the automation system. Here every particular pole acts as a sender and receiver, hence message can be traversed to the substation and it can find the pole where the transmission line got notched by providing id no.

Each and every short span of time particular security module get involved in testing power line. Alert system is functioned using frequency. Because the frequency could not be affected by the natural calamities. Through the frequency signal the alert is sent to the neighbour system and the nearby substation by using router algorithms.

## ADVANTAGES

- Easy future enhancement.
- Low maintenance cost.
- Electrocutation devastation compensation money from government can be neglected.
- Prevention module in Electric Grid.

## VII .CONCLUSION

Till now in electric board or Electric grid has only managing and distributing property of electricity is enhanced but security is not established properly. Due to various electrocution many people died in past decades. This particular paper also demonstrates the various combinations of components and some codes in the IC's at last the monitoring parameters. Thus the electro grid security system automation can avoid many electrocution deaths and also produce security in the Grid system.

## VIII.FUTURE ENHANCEMENT

- Location of transmission line notched can be identified by using a GPS module as future enhancement.

- Even high voltage transmission line can be observed using this automation module.

In past years and government provides compensation to the affected persons and for their family but by applying this security system all the above devastation is prevented.

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