



# Power Transmission Line Fissure Accident Control Using Arduino

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**ABSTRACT:** In India, We read news that Humans and Animals die in rural areas or in agricultural areas as contact with broken & hanging live wires. Because of insufficient electronic equipment for safe power distribution and this leads to live hang wire accident. This work describes a modification to existing power distribution system with remote control unit for wire break or fissure detection. Circuit breaker with shunt trip mechanism breaks the supply and avoid damages from electrical accidents caused by overhead transmission lines conductor and breakage issues.

**Keywords:** Remote Control Unit(RCU), Arduino with Wi-Fi module, Open circuit detector

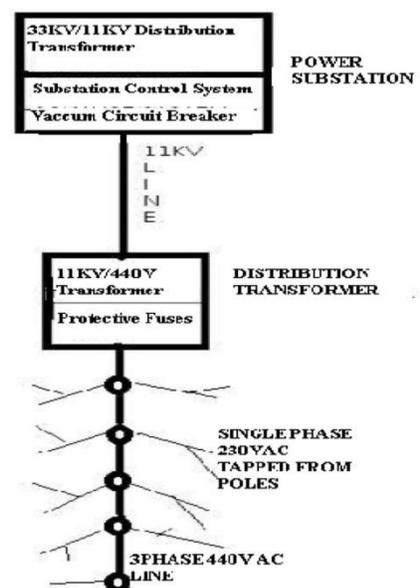
## INTRODUCTION

At present, power transmission and distribution system is not sufficiently safe for any disaster of physical breakage of overhead transmission line. several peoples death caused electrical shock hazards. This is due to medium voltage (440 volts) line is distributed through 11kv/440v transformers that aren't ruled for any centralized protection. Any fault over these distribution lines is simply ruled by fuses and if any tangency happens then only line is disconnected by fuses[1,2,3]. This work propose the remote control telemetry system with a wireless communication link and a distant controlled breaking mechanism that breaks the power supply and avoid damages from electrical accidents caused by overhead transmission lines breakage issues or fissure[4-7]. Combination of power transmission line breaking mechanism with Remote control Unit (RCU) with electric circuit detection will be an answer to the present drawback. Earlier research provides the solution by using electrical relays and detecting mechanism. In practical, it is not possible to install the relays in overall power

distribution areas. By using,RCU technique it is very efficient and economical to use everywhere at any climatic condition[ 8-12].

## PRESENT THEORIES AND PRACTICES

Presently there is no any power transmission line breaking mechanism for distribution transformers using wireless communication. power station consist of distribution transformers of 33kV/11kV and eleven kv line is transmitted up to 6km, distribution transformers 1kV/440V area unit used for end customers and may be 1km to 1.5km length from distribution transformers as shown in Fig.1.



### Fig.1. Existing Power Distribution System

When any crossing over fault or fissure happens over 11kv line station Vacuum breaker (VCB) travels by earth fault. And once earth fault gets cleared then solely vacuum breaker (VCB) may be charged. Just in case of any tangency happens over medium voltage (MV) 440 volts line solely fuses of distribution electrical device area units are blown. At present there is no any tripping/breaking mechanism for live open circuited hanging wires, and fuses operates only if provide get ground path when tangency (heavy flashover) and may cause accidents and fires. Additionally, any accidents on medium voltage (MV) line are not indicated to station, and operator had no management over faulty line.

### LITERATURE SURVEY

Accident due to electrical line fissure can be controlled by using the prevention measures such as Improve the quality of the electrical design, Lightning protection measures, Tower location and the correct choice of the rod, Prevention of pollution flashover, External damage prevention, Using Underground transmission lines[1]. Corrosion evaluation methods for power transmission lines and Type of conductor to be used. But, In practical it is impossible to follow all the criteria mentioned above[2]. ii. Breaking mechanism technology is advanced with microprocessor based and compact, also can be controlled remotely by using a shunt trip mechanism signal. The integration of breaking mechanism with Wireless link open circuit detection will avoid any electrical accidents due to open hanging wires [3]. In worse climatic condition this wireless communication may not work efficiently[4]. The specific measures to prevent electrical and lightning accidents is improving insulation, installing controllable discharge lightning rod, reducing the tower grounding resistance, adding coupling ground wire and the proper use of send arrester electrical circuit transmission line. Transmission lines equipped with lightning arrester (needle), to reduce the grounding resistance is effective lightning protection measures[5].

### PROPOSED SYSTEM

Short circuit breaking mechanism (fuses) for safety power transmission lines operates largely when accidents and mishaps happen. This work tend to propose the modification to existing distribution system as shown in Fig. 2. which can treat electric circuit of cable and can stop electrical accidents of wire breaks and live hanging wires.

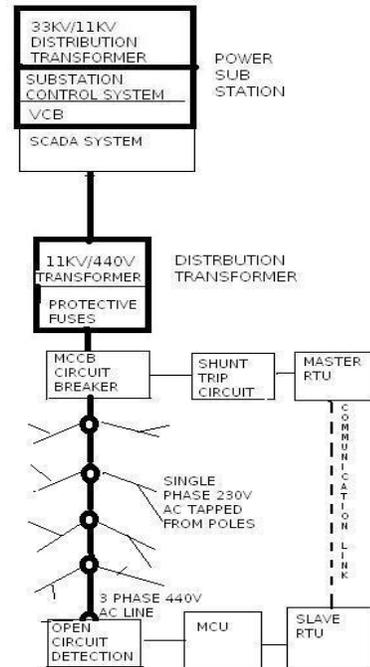


Fig2. Block diagram of proposed system

As shown in fig2. The RCU circuit always get attached with respective power transmission line. The open circuit detector continuously detect for the open circuit condition in the transmission lines. When three section voltage line does not provide forthwith signals to open circuit detector and it send fault command to arduino with Wi-Fi module. once it gets faulty line signal from open circuit detector, WiFi module send the trip command to the receiver which attached with distribution transformer. When receiver module receive the command it switch the shut trip mechanism ON. Thus, it shut the current flow to the distribution line. If receiver module also not get power, it does not react to any command.

#### Open circuit detector:

Sensing method-single section preventer basic circuit technique is employed for wire break detection, because it can monitor three sections and if any phase voltage is missing then it will signals to the slave remote control unit (RCU).

#### RCU(Remote control unit):

This unit consist of arduino wifi module and receiver module which provides the command to the shut trip.

#### Arduino with Wi-Fi module:

Wi-Fi module triggers TRIP command to the receiver module which is connected with distribution transformer

when it receive the 'fault' command from the open circuit detector. Thus, this arduino is coded in accordance to this work and it also capable of send the signal to receiver over any environmental condition. Wi-Fi module in arduino is shown in Fig.3

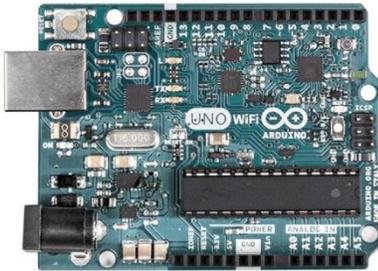


Fig.3 Arduino with WiFi module

#### Receiver module:

When this module receives the command from wi-fi module, it pass the command to the shunt tripper which is interfaced with the help of relay. The shunt tripper break the transmission line and stops the current flow in the transmission line. Specifically, this receiver has the ability to receive the signal from sending end over any climatic condition. thus ,it also supports the interface with tripper mechanism.

#### Shunt Tripper:

This is the basic element of the electrical appliances which prevent the devices from overhead voltage transmission. The Relay attached with the receiver module give the trigger to the tripper. Thus, the tripper connected with original power supply break the current flow.

#### CONCLUSION

Open circuit detection of power transmission cable system is extremely helpful to avoid cable breakage accidents compared to tangency fuse processing mechanism that is currently employed. Additionally, Wireless Wi-fi module and receiver may be used over years without maintenance. This electronic based arduino wifi module is mostly compact and reliable in emergency condition. Also, the shut trip mechanism done by wireless communication is highly reasonable to avoid the accidents than the currently employed fuse processing technique. This remote controlled system over a long range helps the power distribution department to make a better efficient power transmission. The combination of arduino based

communication system with shunt trip mechanism results in better electrical accident avoidance technique.

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