Subterranean Cable Fault Locater Using Iot

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Abstract— The cables are laid under the surface (directly or inside pressurized ducts), the visual methods of inspection of cables does not work efficiently. If the cable are buried in the electric system, there is always a chance for occurrence of ground fault. To examine the onset of fault is difficult and the entire cable should be taken out, from the ground to check and debug the faults. Thiswork is intended to catch the fault location in underground cable lines from the base station in kmusing a NodeMCU. This prototype uses the simple concept of Ohms law. The current would vary depending upon the length of the cable fault. Whenever the fault occurs in underground cable, it is difficult to find out the exact location of the fault in the cable for repairing and refinement. The proposed system identifying the fault in exactlocation. The prototype is formed with a set of resistors representing cable length in distance(km) and fault creation is made by a set of switches at every known distance to cross check the efficiency. In case of any kind of fault, the voltage across the resistors which are in series vary accordingly, digital datas are programmed in NodeMCU that further shows the exact fault location in the cable in terms of distance. The fault occurring phase, distance and time are displayed in the mobile phones with the help of NodeMCU and ESP8266 module. The benefits of accurate fault location is to fast repair and revive back the power system, it improves the system performance and it reduce the operating expense and reduce the time to locate the faults in the field.

KEY WORDS: Underground Cable, Ohms law, NodeMCU, WiFi module, Fault Location.

1. INTRODUCTION

The goal is to figure out the distance of the fault of the underground cable from base station in kilometers using nodeMCU. One can easily identify the faults in overhead lines, but in urban areas it is advised not to use overhead lines. So, we are moving to the underground cables. Underground high voltage cables are mostly preferable in this system, they are not influenced by

weather conditions, heavy rain, storm, snow fall and pollution etc. The fault occur in the underground cable is big problem till now. Whenever the fault occurs in the underground cable

it is difficult to find the faults in exact location. As it is very difficult to find the faulty location manually, which suddenly affect the efficiency of the cable wire due to losses occurred. Yet the problem came up is how to detect the fault wire when it is undergrounded and how to access retrieve those data related to the faulty location whenever it is required. The proposed system detects the exact location of fault by using node MCU and ESP8266 module. The idea deals with Node MCU,arduino IDE, relay, voltage divider, WiFi module. The objective of "subterranean cable fault locater using IoT" is used to find out and locating the fault. It consumes more time to find the fault by manual method. Here, a cable fault detection using IoT that detects the exact fault location which makes repairing

work in a easiest manner over IoT. Ohm's law concept is used to find the faults in exact location of the cable. Due to safety reason and high power requirements use of underground cable has been increased. The fault detecting and locating technique play a important role in maintaining the system and thereby increasing the reliability.

2.   RELATED WORK:

Programs uploaded in NodeMCU kit is used to detect the faults from the underground cable. When a fault occur in the underground cables, faults can be find out through ESP8266 Wi-fi module. Mobile phones which display the fault in kilometer. Here fault is created manually to test the working. There are different types of cable available. Every cable has different resistance and it depends upon the material used. The value of the resistance is depends upon the length of the cable. Here, change in resistance is the main role. If any changes occurs in the resistance, the value of the voltage will be changed in that particular point is called fault point. It is easy to finding out those faults.

3.   TYPES OF FAULTS

Based on the occurance of fault, it can be broadly classified as
- ❖ Short Circuit Fault

- ❖ Open Circuit Fault

- ❖ Earth Fault

Short Circuit Fault
When there is a chance of insulation failure between phase conductors or between phase conductors and earth or when both occur together in that condition there occurs a short circuit fault . This short circuit fault occurs as a result of failure of short circuit path which in turn triggers a short-circuit conditions.

Open Circuit Fault

Under the normal condition, if the circuit is interrupted by some failure it causes open circuit fault. If the circuit is not closed then it is called open circuit fault.

Earth Fault

When there is an accidental contact between an energized conductor and earth or equipment frame, it prevails to the condition where occurs the earth fault. The reversed path of the fault current is through the grounding system and any personnel or equipment that becomes part of that system.
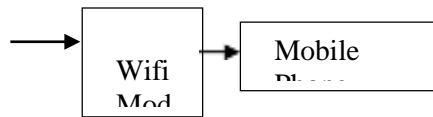
4. PROPOSED SYSTEM

The main approach of this proposal is to detect the distance of cable fault in underground from the base station in kilometers. In many metropolitan areas, the cable fault is a common problem. When a fault occurs due to some reason, the process of tracking fault is difficult without knowing the exact cable location. The proposed system is designed to create the exact location of the fault occurred in the cable. The work automatically displays the distance and time of occurrence of fault with the help of NODEMCU and ESP8266 Wi -Fi module in a mobile phones. IoT Based Underground Cable Fault Detector is used to display the information over Internet using the Wi-Fi module ESP8266. The type of fault at any particular distance is displayed on the mobile phone interfaced with the NodeMCU through ESP8266 module.

5. BLOCK DIAGRAM

The working module mainly consists of

Power supply unit, NodeMCU, Wifi module, faultcable, mobile phone, relay driver, relay 1, relay 2 and load.

The mobile phones displays the exact fault location and it create an alerting sound signal. If the fault is cleared in that particular faulty zone, then only it stops the sound.
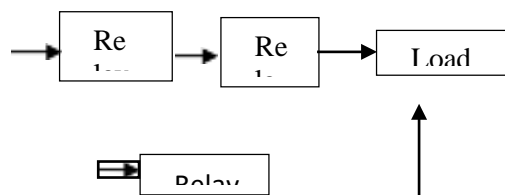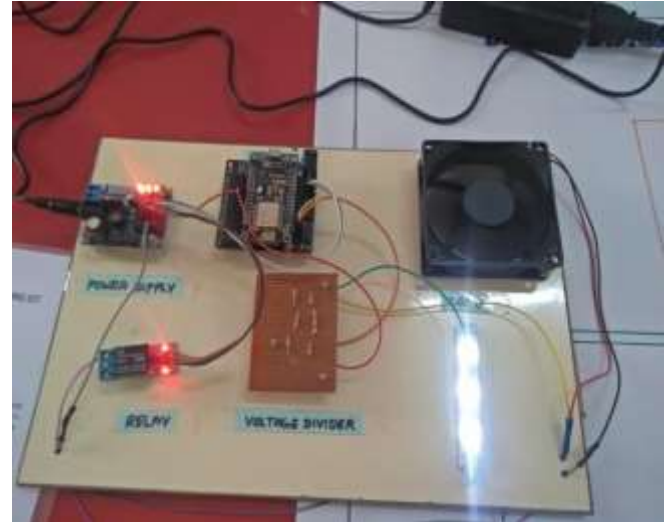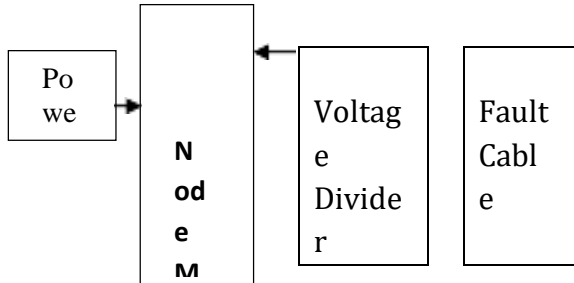
Figure1: Block Diagram of Proposed System

6. BLOCK DIAGRAM DESCRIPTION

The working of the proposed system has different segments like power supply unit, NodeMCU, Wifi module, fault cable, mobile phone, relay driver, relay 1, relay 2 and load. The presence of each module has been carefully placed and thus contributing the best working of the unit. The power supply is an important unit of an electronic circuit. It is an electrical device that supplies the electric power to atleast one load. The power supply is given to the NodeMCU. NodeMCU is helps to build an IoT product. The nodeMCU is the main component of the proposed system, it gives the input voltage as 3.3V. It is less compared to other voltage. ESP8266 wifi module is inbuilt in the NodeMCU. The fault cable is connected to the voltage divider. In case of fault occur in the cable, the voltage divider sense the faulty point and it turns a lager voltage into smaller one. Then it given to the NodeMCU. Uploaded the program in the nodeMCU kit. Program was written, in case any fault occurs in the cable, it will open the relay terminal immediately, it will

disconnect the fault line and then intimation about the faulty distance is accurately displayed in the mobile phone through ESP8266 wifi module. The output of NodeMCU is given to the relay. Relay is an electrical device that acts as a switch and if any fault occurs in the line, it will disconnect the line using relay.

Figure2: Hardware module of proposed system

Figure3: Fault detected by using mobile phones

7. CONCLUSION

The hardware model of Underground Cable Fault Locator is implemented and the favorable results were brought forward. This hardware model can locate the exact fault location in an underground cable. It is not easy to spot the faults in underground cables. By using NodeMCU , one can detect the exact location of circuit fault in the underground cables from the feeder end in km by using an NodeMCU. The NodeMCU works based on ESP – 12 module. Relay helps to separate the fault line from the healthy line. Problems related to receiving signals in delay can be focused in future.

8. REFERENCE

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