FAULT FINDING OVER TRANSMISSION LINE BY USING IoT

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Abstract-*The present scenario is very complicated over finding the faults and repairing it, so new technology is designed which will automatically find the fault over the transmission line, this will help us to provide with maintenance. This technology will also save time and money over maintenance. Transmission of power generated from power plants to consumers has been vastly improved and expanded to every corner of the world during the last two decades. The recent development of series compensation in power systems can greatly increase power transfer capability, damp power oscillations (if carefully designed) and improve transient stability. However, fault clearing and finding in such transmission networks are considered to be one of the most important tasks for manufactures, operators, and maintenance engineers. The transmission lines are widely used in our day-by-day life to communicate or to transfer data. Some examples of transmission lines are telephone lines and cable lines. The problems arising due to physical or atmospheric conditions, in this transmission line. To find the problem according to the faulty line at a particular point our circuit is necessary. We know that time is money. In the future, we don't have time to find fault manually. So, with the help of this project, we can find fault in transmission line in control room easily. Due to this we can find fault and repair quickly and save time. This project reduces human efforts because this prototype is having great scope in the future.*

Keywords: Busbar Trunking, High voltage testing panel, various testing, bus-bar trunking equipment, panel modification, electrical testing parameters.

1. Introduction

It is known that when a fault occurs in the overhead transmission line system then instantaneous changes in voltage and current at the point of fault generate high frequency. Electromagnetic impulses are called traveling waves which propagate along the transmission line in both directions away from the fault point. The electric power infrastructure is highly endangered against any form of natural and spiffy physical events. Which can skeptically affect the overall performance and stability of the grid. The fault impedance being low. The fault current is relatively high, during the fault. The power flow is diverted towards the fault and supply to the neighboring zone is affected Voltage becomes unbalanced. It is important to detect the fault as early as possible that is why a kit is being made using a microcontroller to make its process faster. The transmission line conductor resistance and inductance are distributed uniformly along the length of the line. Traveling wave fault location methods are usually more suitable for application long lines. Power transmission lines employ at 50- HZ is more than 80-km long are considered to have the properties of voltage and current wave that travel on the line have the properties of voltage and current wave that travel on the line with finite speed of propagation. Traveling wave methods for transmission line fault location have been reported for a long time. Following developments employ high-speed digital recording technology by using the traveling wave transients created by the fault. Currently, the electric power infrastructure is more vulnerable to many forms of natural and malicious physical events [1], which directly affect the stability of the grid. There will be some parameter which is affected. With this, there is an approaching need to equip the age-old transmission line infrastructure with a high-performance data communication network, that supports future operational requirements like real in the time record and control necessary for smart grid integration. Due to this technique, real-time monitoring is necessary. Many electric power transmission companies have primarily depended on circuit indicators to detect the faulty sections of their transmission lines. However, there are still challenges in identifying the exact location of these faults.

1.1 Problem Statement

The power demand has been increasing extensively in the region of industrial, agriculture, banking sector, medical and school, and colleges. But nowadays problems with transmission lines are more and it is difficult to find the exact location. So the losses during the exact fault location are more which is not good for the transmission line. The time required to clear fault is more so the life of the transmission line is reduced. Modern technology is highly sophisticated to reduce the problem in the transmission lines i.e. by IoT system.

1.2 Literature Review

"Automatic Fault Detection and Location of Electric Transmission Lines with the help of internet of things" Sajal Menon. The method is provided us in low cost and very high reliable way to locate which is the faults in the electric transmission lines and also supports data storage. Hence this method can be implemented to detect the faults and retrieve the corresponding data anytime.

"Sag Calculation Difference Caused by Temperature Difference between the Steel Core and Outer Surface of Overhead Transmission Lines"- Gang Liu. This paper presents an optimal formulation for a cost-optimized wireless network that is capable of transmission of time-sensitive sensor data through the electric transmission line network.

"EPRI-Sponsored Transmission Line Wind Loading Research & Development"- Phillip G. Landers. In this paper, we have studied that how to calculate the wind calculation and also Wind how the effect on a Transmission line."

"Electric Transmission Line and Fault Monitoring and also Identification System by Using Internet of Things"- S. Suresh. In this paper, we had studied that IoT is How to Work and they are how to use it in our Project."

1.3 Objectives

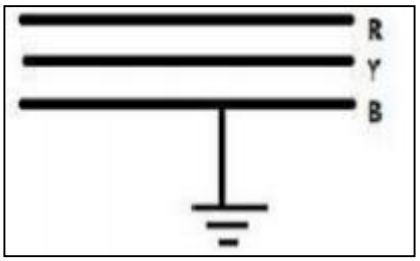
1. To monitor the entire transmission line.
2. To monitor the different parameters such as line faultand fire sensor, voltage.
3. To find out the fault in the system by using IoT Techniques.
4. To send data along with exact location to the operatoras well as to web page.
5. To improve transmission line efficiency.

1.4 Types of faults

1) Single Line-to-Ground Fault

The most common type of shunt fault is Single line-to-ground faults (SLG). This type of fault occurs when one conductor falls to the ground or gets into contact with the neutral wire. It couldalso be the result of falling trees in a rainstorm. This type could be represented as shown in Fig

Fig.: Single line-to-ground fault



2) Line-to-Line Fault

The second most occurring type of shunt fault is the Line-to-Line fault (LL). This is said to occur when two transmission lines are short-circuited. As in the case of a large bird standing on one transmission line and touching the other, or if a tree branch

happens to fall on top of two power transmission lines.

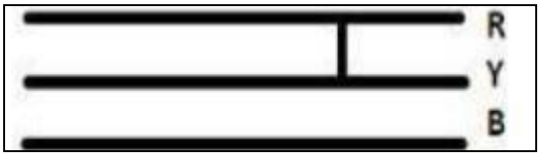


Fig. 2: Line to Line Fault

3) Line-to-Ground Fault

The third type of shunt fault is the Double Line-to-Ground fault (DLG) in the figure below. This can be a result of a tree falling on two of the power lines or other causes.

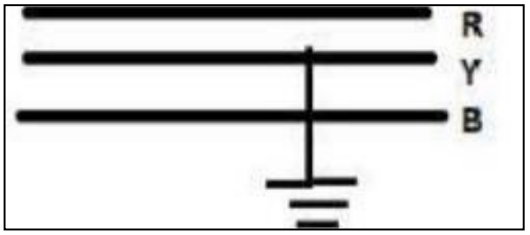


Fig. 3: Line to ground fault

4) Balance Three Phase

The fourth and the real type of fault is the balanced three phases, which can occur by contact between the three power lines in many different forms.

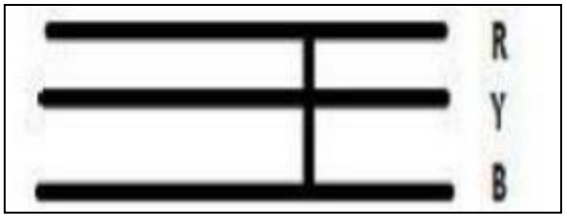
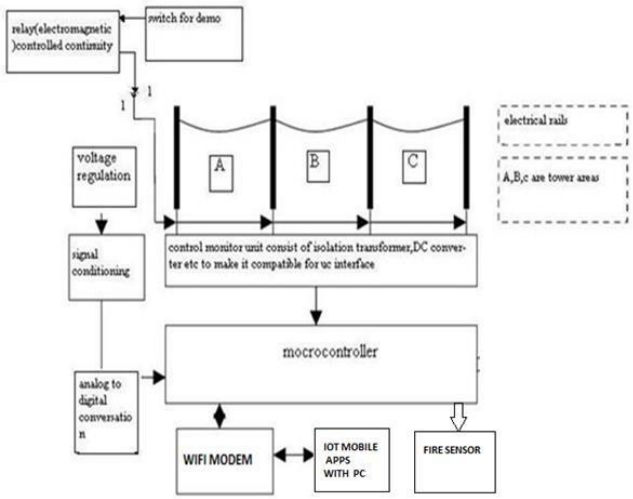


Fig4. : Balance three phase

2. Block Diagram



Components used-

I. Switches
II. Power supply
III. Microcontroller AT mega 16
IV. Wi-Fi Module ESP8266
V. Optocoupler
VI. Resistors
VII. Diode

Software used-

I. Arduino 'c"
II. Proteus

2.1 Working

Our prototype is used to detect the fault, which has occurred in a transmission line. By using ATMEGA16 microcontroller, optocoupler, LCD. A prototype is assembled with a set of resistors, cable length in km, by using a set of switches made to the creation of fault in a prototype. A 230v ac supply is fed to the terminal, let us consider the terminals (R, Y, B)we tooksupply and fed to the terminal there one resistor connected with diode, resistor rating is 470k ohm and diode IN4007 which rectify the voltage signal and gives variable DC as an output. A capacitor which is connected in parallel which is used to keep out all unwanted signal as well as gives constant DC supply. The DC supply is then given to the optocoupler and input Side of the optocoupler the DC supply is present that glows the LCD. Inside the optocoupler one LED and transistor are present. The transistor is an NPN transistor, the base terminal is the sense of the radiation of LED and the current flow inside the transistor from collector to emitter. The emitter terminal is connected to the ground and the collector terminal is connected to IC ATMEGA 16. The program is done in IC ATMEGA16 which compares the voltage level and gives the output on LCD and Wi- Fi module result shown on PC and Mobile. The diagram shows the fire sensor used to detect the pole 1 and pole 2 middle jumper connectivity that time created fire. Indicate the which pole on IoT.

2.2 Power Supply

When working with electronics, you always need one basic thing: Power. In every electronic circuit power supply is required. The proper working of every each component, the exact amount of voltage and current to be supplied to it. If the power exceeds its limit, it can be fatal.
Below is the circuit diagram of the power supply which gives the output of 5V, as only that much is required for the microcontroller.
The +5-volt power supply is based on the commercial 7805 voltage regulator IC. This IC contains all the circuitry needed to accept any input voltage from 8 to 18 volts and produce a steady
+5-volt output, accurate to within 5% (0.25 volt). It also contains current-limiting circuitry and thermal overload protection, so that the IC won't be damaged in case of excessive load current; it will reduce its output voltage instead.
The advantage of a bridge rectifier is you don't need a center tapon the secondary of the transformer. A further but significant advantage is that the ripple frequency at the output is twice theline frequency (i.e. 50Hz) and makes filtering somewhat easier. The use of capacitor c1, c2, c3, and c4 is to make the signal ripple-free. The two-capacitor used before the regulator is to make the ac signal ripple-free and then later which we are usingis for safety, if in case there is a ripple left after regulating, then c3 and c4 will remove it.

3 Advantages

i. Work in real-time response inter
ii. The coverage area is large compared to an existingsystem
iii. cost-efficient
iv. Devices enable by wireless communication
v. Less Number of components are used
vi. Economically reliable and low cost

CONCLUSION

By using such a method, we can easily detect the fault and resolve it. It is highly reliable and locates the fault in a three- phase transmission line and is also supposed for data storage. It works in real-time so we maintain all

datasheets and avoid the future problem in a transmission line.

REFERENCES

[1] M. M. Saha, J. Iżykowski, and E. Rosolowski, Fault Location
on Power Networks. New York: Springer, 2010.
[2] M. T. Sant and Y. G. Paithankar, "Online digital fault locator for an overhead transmission line," Proc. Inst. Elect. Eng., vol. 126, no. 11, pp. 1181–1185, 1979.
[3] T. Takagi, Y. Yamakoshi, M. Yamaura, R. Kondo, and T. Matsushima, "Development of a new type fault locator using the one-terminal voltage and current data," IEEE Trans. Power App. Syst., vol. PAS-101, no. 8, pp. 2892–2898, 1982.
[4] A. Wiszniewski, "Accurate fault impedance locating algorithm," Inst. Elect. Eng., Gen. Transm. Distrib., vol. 130, no. 6, pp. 311–314, 1983