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Underground Cable Fault Location Detection by Using Microcontroller

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Abstract - The objective of this project is to determine the distance of underground cable fault from base station in Meters or kilometers. The underground cable system is a common practice followed in many urban areas and metropolitan cities. While a fault occurs for some reason, at that time the repairing process related to that particular cable is difficult due to not knowing the exact location of the cable fault. The proposed system is to find the exact distance of the fault The project uses the standard concept of Ohms law i.e., when a low voltage DC is applied at the feeder end through a series resistor (Cable lines), then current would vary depending upon the location of fault in the cable.
In case there is a short circuit (Line to Ground, Line to Line, Line to Line to Line), the voltage across series resistors changes accordingly, which is then fed to an ADC to develop precise digital data which the programmed microcontroller of 89s52 family would display in Meters or kilometers**.**

***Key Words*:** cable system, series resistor, microcontroller.

1.INTRODUCTION *(Size 11, Times New roman)*

The proposed system is to find the exact distance of the fault the project uses the standard concept of Ohms law i.e., when a low voltage DC is applied at the feeder end through a series resistor (Cable lines), then current would vary depending upon the location of fault in the cable. In case there is a short circuit (Line to Ground, Line to Line, Line to Line to Line), the voltage across series resistors changes accordingly, which is then fed to an ADC to develop precise digital data which the programmed microcontroller of 89s52 family would display in Meters or kilometers This system operates capably. Many times faults happen because of construction works and other reasons. When fault happen it is difficult to hollow out cables because of not knowing the correct fault location. In the recent years the development of the fault analysis has been developed with the signal processing algorithms and results in transient study base techniques.

2. LITERATURE REVIEW

In this project we have knowing the different types of faults and fault location methods fault in cable can be classified in two groups Open circuit fault-This type of fault is caused by break in conducting path. Short circuit fault – Further short circuit fault can be classified into two types. Symmetrical fault- In this all three phases are short circuited.

Unsymmetrical fault – In this fault magnitude of current is not equal and not displaced 120 degree.

Fault Location Method – It is classified into following methods. Online method: This method utilizes and processes the sampled voltages and current to determine the fault points.

Offline method- In this method special instrument is used to test out service of cable in the field. There are two types of offline method. Tracer method- In this method fault point is detected by walking on cable lines.

Terminal method- It is a technique used to detect fault location of cable from one or both end without tracing.

3. OBJECTIVE

1.The objective of this project is to determine the distance of underground cable fault from base station in Meters or kilometers

2.Till the last decade the cables are made to place on overhead and currently a day's mostly uses land cables.

3.There are some techniques in overhead cables like phase gauge system which is able to identifying the accurate location of faults and its types.

4.The underground cables are essential in some places particularly in cities, Air ports and defense services.

5.We can't easily identify the faults in underground cables.

This project deals with Adriano microcontroller, resistor circuit, fault switches, LCD and buzzer.

4. BLOCK DIAGRAM

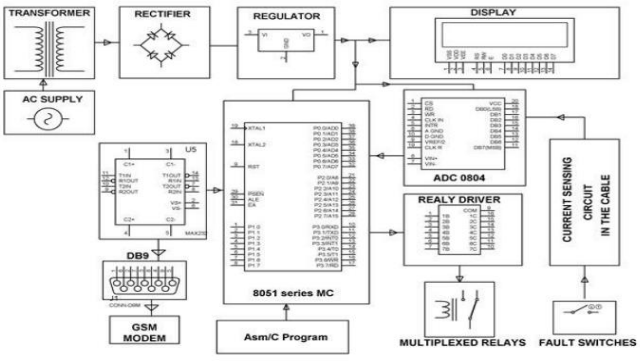

Fig.1. Block Diagram

5. WORKING LIST OF COMPONENT

1. 89s52 Microcontroller,
2. PCB Board
3. LCD
4. Crystal
5. ADC0804
6. Relays
7. Relay Driver IC
8. Transformer
9. Diodes
10. Voltage Regulator
11. Resistors
12. Capacitors
13. LEDs

6. WORKING

The 230V AC supply is first stepped down to 12V AC using a step-down transformer. This is then converted to DC using a bridge rectifier.
The AC ripples are filtered out by using a capacitor and given to the input pin of voltage regulator 7805.At output pin of this regulator, we get a constant 5V DC which is used for Microcontroller and other ICs in this project.
This project works on ohm's law. The feeder is fed through a resistor by a DC supply and as per the fault occurrence, the current through this resistor changes.
Now depending upon this change in resistance the voltage across the resistance also changes. This change in voltage is fed to the microcontroller through ADC which converts this voltage signal to a readable form to the microcontroller.
The microcontroller is coded to read various data given by ADC and give the signal to LCD for displaying consonant distances

7. ADVANTAGES

1. Installation and Maintenance cost is less
2. Economically viable
3. Times Spent for searching damaged point in cables are reduced.
4. Easy to find the cable faults.

8. APPLICATIONS

Further this project can be enhanced by using capacitor in an ac circuit to measure the impedance which can even locate the open circuited cable, unlike the short circuited fault only using resistors in DC circuit. The current project is able to find short circuit fault conditions. So by use of capacitors the open circuit fault and be analyzed and rectified easily. Fewer Fires Improved Property Values: Improved aesthetics removal of unsightly poles and wires, enhanced tree canopies Used in Industrial Hubs inside Metropolitan Cities. Used by Electric Power Supply Industries / All Company.

9. CONCLUSION

1. The project is designed using structured modeling and is able to provide the desired results.

2. It can be successfully implemented as a Real Time System.

3. Science is discovering or creating major breakthrough in various fields, and hence technology keeps changing from time to time.

4. Going further, most of the units can be fabricated on a single along with microcontroller thus making the system compact thereby making the existing system more effective.

5. To make the system applicable for real time purposes components with greater range needs to be implemented

10. REFERENCES

1. http://ecmweb.com/content/locating-underground-cable-fault
2. Sawatpipat, P., Tayjasanant, T., "Fault classification for Thailand's transmission lines based on discrete wavelet transform",International Conference on Electrical Engineering/Electronics Computer Telecommunications and Information Technology (ECTI-CON),Page(s): 636 – 640, 2010.
3. M.Jaya BaragaReddy, D.Vanuatu Rajesh, D.K. Mohanta,"Robust transmission line fault classification using wavelet multi-resolution analysis.", Computers & Electrical
4. Ali Rainier, Jamal Moshtagh, "A new approach to fault location in three-phase underground distribution system using combination of wavelet analysis with ANN and FLS", International Journal of Electrical Power & Energy Systems, Volume 55, Pages 261-274 , February 2014.