Fault Detection and Distance Locator for Underground Cables

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Abstract- *Underground cables have been widely applied in power distribution networks. So, it is now become a great need to detect and locate faults in underground cables. The objective of this project is to sense the fault and determine the distance from base station in kilometers using an Arduino board. This system uses an Arduino kit and a rectified power supply. Here the current sensing circuits made with a combination of resistors are interfaced to Arduino kit to help of the internal ADC device for providing digital data to the Arduino kit representing type of fault and the cable length in kilometers. The fault creation is made by the se of switches. A PC is connected to the Arduino kit to display the conformation.*

Keywords- *Arduino, Arduino UNO, Base Station, Buzzer, Cables, Current, DC supply, Display unit, Fault, ohm's law, Open circuit, Resistance, Short circuit, Underground cables.*

I. INTRODUCTION

Till last decades cables were made to lay overhead and currently it is lay to underground cable which is superior to earlier method. Because the underground cables are not affected by any adverse weather condition such as storm, snow, heavy rainfall as well as pollution. But when any fault occurs in cable, then it is difficult to locate fault. So we will move to find exact location of fault. Now the world is become digitalized so the project is intended to detect the location of fault in digital way. The underground cable system is more common practice followed in many urban areas, while 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 cable fault.

1.1 Types of Faults

Short circuit fault: A short circuit fault occurs when there is an insulation failure between phase conductors or between phase conductor and earth or both.

Open circuit fault: An open circuit fault occurs if a circuit is interrupted by some failure. When these fault occurs current flowing through cable becomes zero. The type of fault is caused by break in conducting path. Such fault occurs when one or more phase conductors break.

II. LITERATURE SURVEY

The faults in underground cables are identified by offline and online methods. In case of offline methods tracer method and terminal method are used. Terminal method is the technique used to detect fault location of cable from one or both ends without tracing. This method use to locate general area of fault. In tracer method fault point is detected by walking on cable lines. Fault point is indicated from audible signal or electromagnetic signal. Nowadays online method is used which utilize and process the sampled voltages and current to determine fault points.

III. BLOCK DIAGRAM DESCRIPTION

Figure shows the block diagram of the project. The power supply is given to the Arduino kit in the form of DC supply. We uploaded the program in the Arduino kit. Program is written and if any fault occurs in the cable it is detected by Arduino kit. Cable is nothing but the cable resistance connected to Arduino kit. Arduino is the advanced version of embedded system. Arduino easily adapts to other devices using serial port. We can easily find the fault and disconnect the faulty line. Display unit is connected to the Arduino kit which is used to display where and which type of fault is occurred. Once faults occur in the cable, the display unit displays the exact fault location and also displays which phase is affected in the cable and how long it is affected and buzzer system is used to create an altering signal.
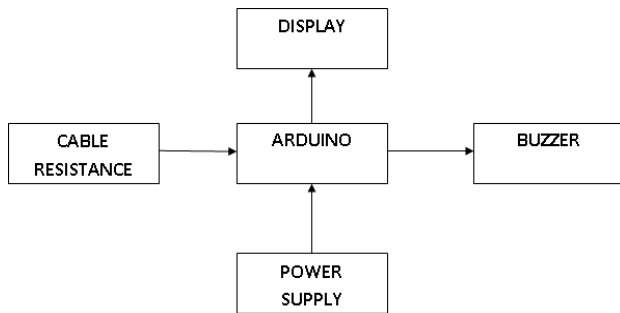
Fig No-1: Block Diagram

IV. PROPOSED SYSTEM

Underground cable fault detection deals with finding the exact fault location and type of the fault from the base station. Cables have some resistance. We are mainly focusing that resistance. Resistance can vary with respect to the length of the cable. If the length of the cable increases, the value of the resistance will also increase. If any deviation occurs in the resistance value, we call that as fault point and that point can be identified with the help of Arduino technology. That fault point represents the standard of distance (kilometer) and the type of the fault from base station. This value is then displayed by the display unit.
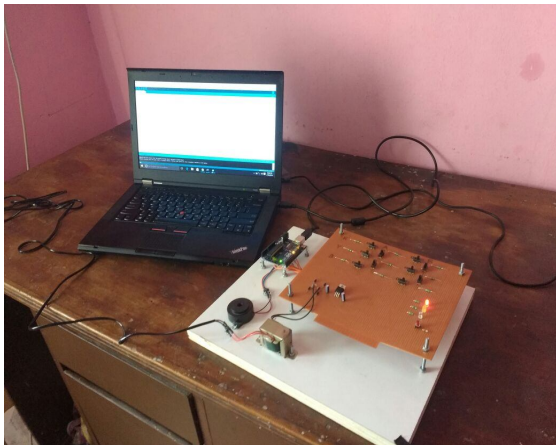
V. RELATED WORK

Fig No-2: Project Model

Program is uploaded in Arduino UNO kit to detect faults in underground cables. When the fault occurs in underground cables, we can find out faults through Arduino controller kit. Computer which displays the fault in kilometer. In this project we created faults manually with the help of switches. We use the resistance of the cable instead of the cable. The value of resistance is depends upon the length of the cable. Resistance is the leading role of the project. If any deviation occurs in the resistance, the value of the voltage drop will be changed at particular point is called FAULT. We are finding out the type and location of those faults. Buzzer

will automatically alarmed whenever this faults occur in the cables.

VI. CONCLUSION

This project is intended to detect the exact location in kilometer and type of the circuit fault in the underground cables from the feeder end by using Arduino kit. The Arduino kit works based on the output of the cable resistance that is ohm's law principle so fault can be easily detected and repaired.

VII. FUTURE SCOPE

The system can be interfaced with the SCADA system to indentify and repair the fault.

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