Underground Cable Fault Detection Using Arduino Microcontroller

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***Abstract* —In urban areas, electrical cables run underground instead of running over, because it does not affected by any adverse effect of weather such as heavy rainfall, snow, thunder storm. Whenever a fault occurs within the underground cable, it is difficult to detect the exact location of the fault for the repair process of particular cable. The proposed system found the point of the exact location of fault. The paper uses the standard concept of Ohm's law i.e. when a low dc voltage is applied at the end of feeder through series resister (cable lines) then the current will vary depending on the location of the fault. Short in the cable.**

This system uses an Arduino microcontroller and a rectified power supply. In this case, the current detection circuit in combination with the resister is connected to the microcontroller with the aid of an ADC device to represent the length of wire in Km. Error creation is performed by a set of switches. The relays are controlled by a relay exciter IC, which is used to check cable line. A 16x2 LCD is used to display information. Also one more feature is that using GSM the message of fault detection, location of fault and distance of fault from base station in kilometers this all information is send to base station. As soon as a fault occurs in a cable the buzzer produce the alarm to alert and to take an immediate action by field workers.

***Key Words* — Arduino microcontroller, Ohm's law, LCD, GSM, ADC, cable fault.**

I. INTRODUCTION

Even the last cables of the decades where made to put the overhead and is currently put to the underground cable that is superior to the previous method. Because the underground cable are not affected by adverse weather conditions, such as storm, snow, heavy rain as well as pollution. But when any fault occurs in the cable, then it is difficult to locate fault. When it is easy to detect and correct the faults in overhead line by mere observation, it is not possible to do so in an underground cable. As they are buried deep in the soil it is not easy to detect the abnormalities in them. Even when a fault is found to be present it is very difficult to detect the exact location of the fault. Due to which dugging of entire area has to do, for detecting and correcting the fault which in turn causes wastage of money and manpower. So it is necessary to know the exact location of faults in the underground cables [1]. So we will move to find the exact location of fault. Now world has been digitalized so the paper is intended to detect the location of fault in digital form. The underground cable system is the most common practiced followed in many urban areas. While the fault occurs for some reason at that time the repair process related to that particular cable is difficult due to not knowing the exact location of fault [2].

In the event of short circuit (Line to Earth) fault, the voltage accordingly. It is then fed to an ADC to develop precise digital data that is directed to the programmed Arduino to display the same in kilometers. Hence this paper is very helpful for determining exact location of short circuit fault. How to send this message to the base station, how the system works and alerts the field workers.

II. LITERATURE SURVEY

Mr.Pavan Suresh Warade, Lakshman k, Presented Design & Implementation Of Fault Identification In Underground Cables Using IOT [4]. They designed a system using 8051 microcontroller to detect the exact location of fault and this information of fault detection is also sent to a dedicated website over internet (IOT).

Dr. G. Joga Rao, S. Sharmilla, M. Mohan Avinash, N. Dileep Kumar, S. Mohan Swamy, B. Ranjith Kumar, Presented Analysis of Underground Cable Fault Distance Locator [5]. By analysing the existing system and to overcome the drawbacks occurs in the existing system they studied a system of finding exact location of cable fault using 8051 micocontroller.

Mohammed Basha, T.Govind, P.Gurumurthy Reddy, Presented Arduino Based Underground Transmission Cable Fault Location System [6]. In this paper they used the wide application of embedded system and using one of them i.e. Arduino they developed a system of finding exact location of underground cable fault and also gave the result.

Shaikh Shahir, Shaikh Tariq, Aqdas Bangi, Khizar Khot Presented Underground Cable Fault Detector Using Gsm [7]. In this paper, they used microcontroller AT89552 which is used to detect location of cable fault and here also GSM is used for conveying information to the desired location.