DISTANCE CALCULATION FOR UNDERGROUND CABLE FAULTS

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ABSTRACT:

The present studies paper is recognition on to determine the space of underground cable fault from the base station in kilometers and displayed over the internet. Underground cable gadget is a common practice observed in important urban areas. at the same time as a fault happens for a few purpose, at that time the repairing method associated with that precise cable is tough because of genuine unknown place of the fault within the cable. Proposed device is used to discover the precise area of the fault and to send information in graphical format to a dedicated website collectively with on board liquid crystal display show using a GSM module. We use the standard idea of Ohms regulation, i.e., whilst a low DC voltage is applied at the feeder stop via a series resistor (Cable traces), then the current would range depending upon the place of the fault inside the cable as the resistance is proportional to the space. In case there's a quick circuit (Line to floor), the voltage throughout series resistors modifications consistent with the resistance that modifications with distance. that is then fed to an ADC to expand particular virtual records and send it to shows in kilometers.

Key words: *Microcontroller, LCD, IoT, GSM module, Underground Cables*

INTRODUCTION

maximum of the transmission strains are laid the usage of the overhead line method, but now-a-days underground cable is widely used for protection and to expand the clever city. Underground cable installations are high priced in comparison to overhead cable, but are more dependable and also the lifestyles of underground cables is extra in comparison to overhead lines. Fault detection in underground cable is difficult in comparison to overhead line cable. Underground cable isn't always affected by damaging situations like a hurricane, rainfall, blizzard and varying in temperature. whilst the fault takes place in the underground cable its detection will become hard, so in this venture we are going to discover the vicinity of the fault and which sort of fault occurred.

FAULT LOCATION METHODS

Fault location methods may be classified as

on line technique: This technique utilizes & procedure the sampled voltages& current to determine the fault points. online methods for underground cable are much less than overhead traces. Offline approach: on this technique special instrument is used to check out service of cable inside the field. There are two offline strategies as following. Tracer technique: on this approach fault factor is detected by using taking walks on the cable traces. Fault factor is indicated from audible sign or electromagnetic signal. it's far used topinpoint fault place very appropriately. example:1) Tracing current approach 2) Sheath coil method. Terminal approach: it's far a method used to hit upon fault vicinity of cable from one or each ends with out tracing. This approach use to discover standard area of fault, to expedite

tracing on buried cable. instance:1) Murray loop approach 2)Impulse contemporary method.

TYPES OF FAULTS

A fault in a cable can be categorised into different types inclusive of

Open Circuit Fault: This type of fault is better than brief circuit fault, due to the fact whilst the open circuit fault occurs, then the drift of cutting-edge thru an underground cable becomes zero. This fault may be took place by using disruption in carrying out direction. Such faults occur while one or extra phase conductors destroy.quick Circuit Fault: while two or extra conductor of the same cable in touch with each other ,then that is referred to as a brief circuit fault. it's miles not possible to discover visually with out taking the cable aside. A quick circuit fault takes place whilst the individual insulation of the cables is broken. quick circuit fault can be categorized in two typesSymmetrical fault: 3-phase fault is referred to as symmetrical fault. in this all 3 phases are brief circuited.Unsymmetrical fault: in this fault importance of cutting-edge is not identical & no longer displaced by 120 diploma.

LITERATURE REVIEW

Until ultimate a long time cables have been made to put overhead& presently it is lay to underground cable which is advanced to in advance approach. due to the fact the underground cable aren't stricken by any unfavorable climate condition together with typhoon, snow, heavy rainfall in addition to pollutants. however when any fault occur in cable, then it's far difficult to locate fault. The maximum commonplace kinds of fault that occur in underground cables are:

1. Open circuit fault.
2. Short circuit fault.
3. Earth fault.

1. Open circuit fault

while there may be a break inside the conductor of a cable, it's miles referred to as open-circuit fault. The open-circuit fault can check by a megger. For this purpose, the three conductors of the three core cable at far give up are shorted and earthed. Then resistance among every conductors and earth is measured by using a megger. The megger will imply 0 resistance within the circuit of the conductor that is not damaged. but if a conductor is broken the megger will suggest an infinite resistance.

2. Short-circuit fault

When two conductors of a multi core cable come in electrical contact with each other due to insulation failure, it is so called as short-circuit fault. Megger can also be used to check this fault. For this the two terminals of a megger are connected to any two conductors. If the megger gives a zero reading it indicates short-circuit fault between these conductors.The same is repeated for other conductors taking two at a time.

3. Earth fault

When the conductor of a cable comes in contact with earth, it is called earth fault or ground fault. To identify this fault, one terminal of the megger is connected to the conductor and the other terminal connected to the earth. If the megger indicates zero reading, it means

the conductor is earthed. The same procedure is repeated for other conductors of the cable.

TYPES OF CABLES

1. Cable types are basically defined as low-, medium- and excessive voltage cables. The maximum commonplace designs of medium- and high voltage cables are shown underneath. in keeping with the cable type, distinctive requirements to cable checking out, cable fault place in addition to upkeep method are defined.

2. three-conductor cables had been in use inside the decrease voltage levels. The tendency of the remaining 12 months's show the shifting to unmarried-center systems as they're decrease in price, decrease in weight and cheaper with regard to restore prices.

3. moreover oil impregnated or oil crammed cables are used less and much less, because the environmental sustainability can't be guaranteed. specially in industrialized international locations, those cable types had been changed and aren't any greater hooked up.

4. however a high call for for protection of those cables is given because the installed oil-insulated networks do show up a lifetime of fifty years and extra.

5. these days mainly XLPE insulated cables are used. The development of the XLPE insulation fabric mixed with the modern-day layout of the cable enable to fabricate cables even for the more excessive voltage stage.

Figure.-core EPR, incl. 3-core XLPE 11kV 1-core XLPE 115kV Data line, radial type

All kind of low-, medium- and high voltage cables are delivered and stored on cable drums. The maximum available cable length is mainly specified by the diameter (1-core ore 3-core cable) and the voltage level of the cable.

CABLE FAULTS

1. A cable fault can be defined as any defect, inconsistency, weak point or non-homogeneity that affects the overall performance of a cable. All faults in underground cables are one-of-a-kind and the achievement of a cable fault place depends to a tremendous volume on sensible components and the revel in of the operator.

2. to perform this, it's far important to have personnel skilled to test the cables correctly and to reduce their malfunctions.

3. The improvement of delicate strategies inside the discipline of high voltage checking out and prognosis, further to the style of techniques for locating power cable faults, makes it vital that qualified and experienced engineers and service operators be hired.further, it's far important for the trained employees to be very well acquainted with the fundamentals of energy cable layout, operation and the upkeep.

4. The cause of this file is therefore to be an additional aid to the user manuals of the different equipment's regarding all elements of the fault area for you to make up a volume of reference so one can with any luck be useful for operators and field engineers.further, it's miles critical for the skilled employees to be thoroughly acquainted with the basics of strength cable layout, operation and the preservation.

5. The reason of this record is therefore to be an extra help to the person manuals of the distinct system's regarding all factors of the fault vicinity on the way to make up a volume of reference so as to optimistically be useful for operators and field engineers.

CONCLUSION

The assignment "show of underground cable fault distance over net (IoT) of factors and GSM" is successfully tested and applied that's the first-class cost-efficient, low-priced electricity technique to common human beings. this will be used for lots applications in rural regions where electricity availability is much less or totally absence. As India is a growing u . s . where power control is a massive task for big population. in this assignment we discover the exact area of brief circuit fault in the underground cable from feeder end in km via the use of microcontroller8051.for this we Use simple concept of ohm's law so fault may be effortlessly detected and repaired

FUTURE SCOPE

In this project we detect only the location of short circuit fault in underground cable line, but we also detect the location of open circuit fault, to detect the open circuit fault capacitor is used in ac circuit which measure the change in impedance & calculate the distance of fault.

REFERENCES

1. *M.-S. Choi, D.-S. Lee, and X. Yang, A line to ground fault location algorithm for underground cable system, KIEE Trans. Power Eng., pp. 267–273, Jun. 2005.*

2. *E. C. Bascom, Computerized underground cable fault location expertise, in Proc. IEEE Power Eng. Soc. General*

3. *Meeting, Apr. 10–15, 1994, pp. 376–382.J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rded, Volume 2 Oxford: Clarendon, 1892, pp.68–73.*

4. *K.K. Kuan, Prof. K. Warwick, Real-time expert system for fault location on high voltage underground distribution cables, IEEE PROCEEDINGS-C, Volume 139(3), MAY 1992.*

5. *T. Kawai , N. Takinami , T. Chino , K. Amano , K. Watanabe , Y. Nakamura and N. Shiseki, A New Approach to Cable Fault Location Using Fiber Optic Technology, IEEE Transaction on Power Delivery, 10 (1), pp. 85-91, 1995.*

6. *M.-S. Choi, S.-J. Lee, D.-S. Lee and B.-G. Jin, A new fault location algorithm using direct circuit analysis for distribution systems, IEEE Trans. Power Del, 19(1), pp. 35-41, 2004*
7. *B. Kasztenny, I. Voloh, C.G. Jones, and G. Baroudi, Detection of Incipient Faults in*

8. *Underground Medium Voltage Cables, 61st Annual Conference for Protective Relay Engineers, pp. 349-366, April 1-3, 2008.*

9. *M. J. Mousavi and K. L. Butler-Purry, A novel condition assessment system for underground distribution applications, IEEE Trans. Power Syst, 24(3), pp. 1115-1125, 2009*

10. *Tarlochan S. Sidhu, Zhihan Xu, Detection of Incipient Faults in Distribution Underground Cables, IEEE Transactions on Power Delivery, 25(3), July 2010.*

11. *Md. Fakhrul Islam, Amanullah M T Oo, Salahuddin. A. Azad , Locating Underground Cable Faults: A Review and Guideline for New Development , 2013 IEEE*

12. *B. Clegg, Underground Cable Fault Location. New York: McGraw- Hill, 1993.*

13. *Bhavana Godavarthi, Paparao Nalajala, VasaviGanapuram, Design and implementation of vehicle navigation system in urban environments using internet of things (IoT), International Conference on Advanced Material Technologies (ICAMT)-2016, India.*

14. *Bhavana Godavarthi, Paparao Nalajala, Wireless Sensors Based Data Acquisition System using Smart Mobile Application, Internet of things, International Journal of Advanced Trends in Computer Science and Engineering, 5(1), pp. 25-29 Jan 2016*

15. *Paparao Nalajala, D Hemanth Kumar, Intelligent Detection of Explosives using Wireless Sensor Network and Internet of Things (IOT), International Journal of Control Theory and Applications, Dec 2016,.9(45), pp 391-397.*

16. *Paparao N, G Bhavana, RTOS Based Image Recognition & Location Finder Using GPS, GSM and OpenCV, International Advanced Research Journal in Science, Engineering and Technology,.2(12), pp. 85-88, Dec 2015.*

17. *Dr. Kavitha, C. Ramesh Gorrepotu and Narendra Swaroop, Advanced Domestic Alarms with IOT, International Journal of Electronics and Communication Engineering and Technology, 7(5), 2016, pp. 77–85.*

18. *B. Durga Sri, K. Nirosha, P. Priyanka and B. Dhanalaxmi, GSM Based Fish Monitoring System Using IOT, International Journal of Mechanical Engineering and Technology 8(7), 2017, pp. 1094–1101.*

19. *Viswanath Naik.S, S.Pushpa Bai, Rajesh.P, Mallikarjuna Naik.B, IOT Based Green House Monitoring System, Volume 6, Issue 6, June (2015), pp. 45-47, International Journal of Electronics and Communication Engineering & Technology (IJECET).*

20. *Snehal R. Shinde, A. H. Karode and Dr S. R. Suralkar, Review on - IOT Based Environment Monitoring System, Volume 8, Issue 2, March - April 2017, pp. 103–108, International Journal of Electronics and Communication Engineering and Technology (IJECET).*

21. *Paparao Nalajala, Bhavana Godavarthi, K Madhavi, MB Naga Aditya, Provide safety in School children's vehicle in Urban Environments using Navigation System, International Journal of Applied Engineering Research, 12(13), July 2017. Pp. 3850-3856.*