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Solar Powered Transmission Line Monitoring System

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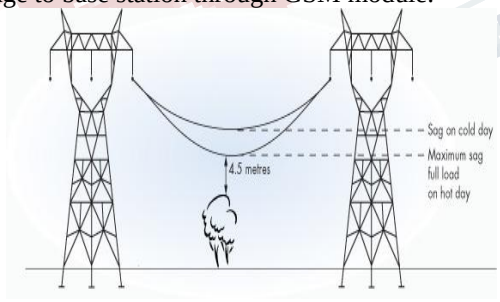
***Abstract*:-- The transmission line is one of the important components in electrical power system, and its reliability and operational state are directly relevant to the safety of the system, likewise, it determines the quality and the stability of power supply. In the domestic electric industry, the management of the transmission line is still in the stage of patrol on foot, which is a relatively initial state. So it is difficult to meet the increasing reliability requirements and the need of smart grid's development. High voltage transmission lines, especially for a long distance, often need to cross mountains. The whole line may be in different meteorological areas, which brings certain difficulties for the management of the line. Therefore, a smart system for the meteorological monitoring of transmission line based on GSM system is developed.**

***Index Terms*—GSM ,Accelerometer, Hanging load cell, PIC16F886, LM35**

I. INTRODUCTION

In proposed system, we use PIC16F886 microcontroller and sensors system to sense the parameter. Sensors are attached to transmission line which gives the output according to its parameters. For monitoring purpose we test the different parameter such as sag, weight, temperature, wind speed and direction. Sensors output is fed to microcontroller. Microcontroller continuously read the sensors outputs and each parameter display on LCD. If any parameters cross its preset limit then microcontroller turn on the buzzer and send alert message to base station through GSM module.



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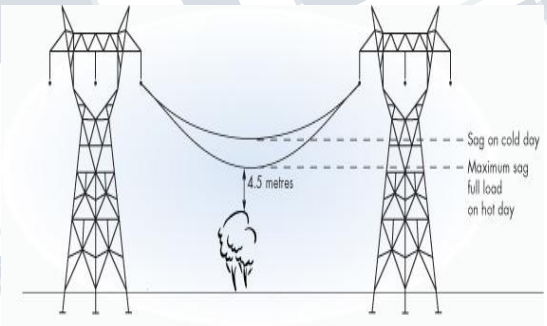

II. LITERATURE SURVEY

The transmission line is one of the important components in electrical power system, and its reliability and operational state are directly relevant to the safety of the system, likewise, it determines the quality and the stability of power supply. The snow-ice disaster is one of the natural calamities which have a serious influence on the safety of transmission line. Icing on transmission line may lead to the accidents such as transmission line overload, trip, conductor galloping, ice flashover of insulator string etc. Especially in 2008, the severe snowstorm in southern china caused the southern grid to heavy icing, which resulted in the fracture of the transmission line and the collapse and crack of the pole in multiple places, thus causing huge economic loss. There is no existing system available for monitoring the ICING effect of the transmission. Thus the way we go for the

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proposed system in this system this parameters are continuously monitor through wireless.

Block diagram

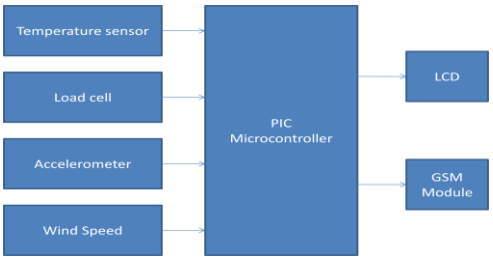

Fig:Block Diagram of proposed system.

Microcontroller used: - PIC 16F886
Sensors Used: - Accelerometer Sensor, Weight Sensor, Wind Speed Sensor and Temperature Sensor.
System Output: - Alarm and Warning Messages through GSM Module

III. WORKING OF SYSTEM

The proposed project work is concentrated on the monitoring of high transmission line on multiple towers. For monitoring purpose we test the different parameter such as sag, weight, temperature, wind speed and direction. Based on the above parameters sensors are used and after sensing the physical information they are send to microcontroller by using transmission GSM module.GSM module transmits it to GSM receiver module and get alert indication message on mobile screen.

- Temperature measurement:-
  We use lm35 for measurement of temperature.The resistance of lm35 varies with temperature. This change in resistance is converted in voltage using resistive bridge circuit. The output of bridge is given to microcontroller. Then this voltage is converting into equivalent temperature and used in monitoring system.

- Weight measurement:-
  We use hanging load cell to measure the weight. The output of load cell is given to amplifier to increase its output voltage. This output voltage is linear with corresponding weight of line wire. This output is given to microcontroller. Then controller convert it into corresponding weight.

- Wind speed:-
  We use simple dc motor to measure the wind speed. We connect the propeller to dc motor which rotates when it comes in contact with wind. As propeller rotates, the shaft of motor also rotates. This generate voltage across motor connection. This voltage is proportional to rotation of propeller and which is proportional to speed of wind. This voltage is given to controller. Then controller displays wind speed is high, medium or low.

- Sag measurement:-
  We use ADXL335 accelerometer to measure the sag of line. ADXL335 can convert the change in its angle into voltage. This sensor is connecting to one end of line. As sag increases, the angle of sensor also increases. This increase the output of sensor . This output voltage is given to microcontroller. Then controller displays the sag.

Algorithm

Step1: Initially sensors will sense the variations in transmission line parameters.
Step2: The sensed information is sent to PIC Microcontroller.
Step3: Depending on the sensed information microcontroller will send respective signals to the GSM module for transmission.
Step4: The sensed parameters are sent to the operator by using GSM network.

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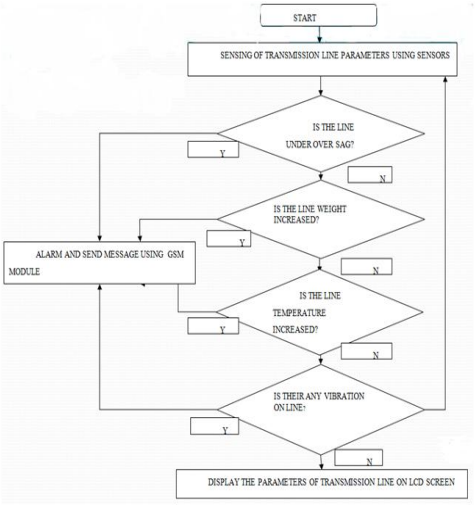

Fig: Flow chart description of snaps

- Following snaps shows the related steps of this project.
- The snap gives us the information regarding the parameters. If any one of the parameter exceeds it limit receiver will get to know.

VII.ACTUAL IMPLEMENTATION

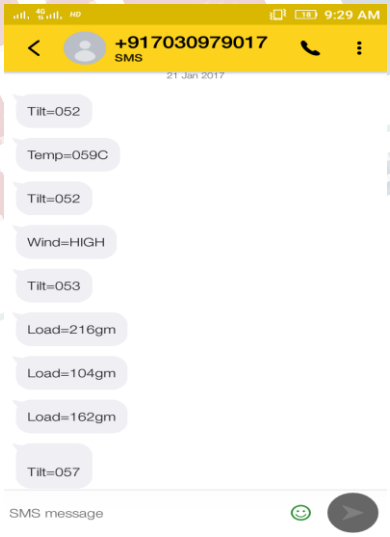

Fig: Received messages when parameters exceeds limit.

Fig: Final Project.

Conclusion And Future Work

This research project gives remedies from the faults occurring in transmission line and it overcomes the drawbacks of traditional monitoring methods. The paper focuses much on the efficiency of monitoring process of line and mainly through wireless communication that eliminates the use of large cables which are of high cost, low reliability and maintenance.

The GSM transmission scheme is helps in better way of communication which enhances the improvement steps in this process. Therefore the use of PIC microcontroller makes the system real time embedded system and aids very much in industry needs. This project work can also be extended to handle several numbers of transmission lines by assigning RFID tags to each tower which in turn is monitored and controlled by a single microcontroller.

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REFERENCES

[1] Yang Yang, Guangzhong Xie, Xiangdong Xu, Yadong Jiang, Monitoring System Design in Transmission Lines based on Wireless Sensor Networks", ICSGCE, pp.- 27–30, September 2011.

[2] Sauvik Das Gupta, Souvik Kundu, Abhishek Mallik, Monitoring of Sag & Temperature in the Electrical Power Transmission lines", International Journal of Recent Technology and Engineering (IJRTE), pp.-2277-3878, Volume-1, Issue-4, October 2012.
[3] Chandra shekar P., "Transmission Line Fault Detection & Indication through GSM", International Journal of Recent Advances in Engineering & Technology (IJRAET), pp.-2347 - 2812, Volume-2, Issue -5, 2014.
[4] Sushil Chavhan, Vaibhav Barsagade, Abhijit Dutta, Shubhangi Thakre, "Fault Detection in Power Line Using Wireless Sensor Network", International Journal of Electrical Engineering (IIJEE), pp.- 2321-600X, Volume 3, Issue 3, March 2015.
[5] Nagaraju Kompally, G. Sai Kumar., "On-Line Monitoring System of Transmission Lines Based On WSN", International Journal of Emerging Trends In Technology Sciences enhanced Icing, pp.- 2348-0246, Volume-03, Issue-03, November 2014.