# Transmission Line Monitoring System

Prof P.H.Zodape
Dept.of E&TC
GCE Karad

Chakradeo Shubham
Dept.of E&TC
GCE Karad

Rohan Shailendrakumar
Dept.of E&TC
GCE Karad

Shaha Pritesh
Dept. of E&TC
GCE Karad

*Abstract-* **The main aim of this system is Transmission line monitoring through wireless system. Provide warnings before the damages caused by meteorological disasters caused by following parameters, Sag, Variations in the weight ,Temperature , Vibrations , Environmental effects due to seasons, wind etc. 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. To Minimize Manpower, Scheduled Maintenance, Maintenance Time and Maintenance Cost.**

*Keywords-* **Transmission line, wireless system, meteorological disasters, environmental effects, monitoring methods, cost, reliability.**

## INTRODUCTION-

In the smart grid system, power transmission is related to the security, so it is essential and important. 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.

In recent years, the occurrences of severe weather become more frequent, which caused severe collapse of power towers and broken of the power lines. The research on the monitoring of the transmission lines is one of the directions for the smart grid technologies. The device is designed to offer the meteorological data, which can help to make forecast and alarm before the accident, so as to lessen the loss of the power grid. Therefore, a smart system for the meteorological monitoring of transmission line based on GSM system

The research of the smart grid is important and necessary, and the research focuses are different countries. Because of the lack of uniform standards in the smart grid, most of the research of the transmission monitoring still remain in the theoretic step, and lags behind the practical application.

## I. OBJECTIVE

Monitoring of all Parameters by using PIC16F877A Microcontroller based Embedded System. Sending the status of all parameters using GSM Module to Mobile Receiver located in Main Station. i.e. to Operator. If status of each parameter is beyond the specified limit then display the warnings on LCD display and generate the alarm. System sends the information using mobile network to operator to take corrective action before any damage.

## II. LITERATURE AND SURVEY

Chandra shekhar P. has developed the system with the help of temperature sensor, ADC, Microcontroller 8051, LCD for displaying the faults and parameters, GSM board is used to send the fault message to electricity board..Their system is able to detect the multiple faults of three phase transmission lines, one can monitor the Temperature, Voltage, Current by means of GSM modem by sending message [1].

Sushil Chavhan *et.al* presented a paper for detecting and locating fault in power line is very necessary for healthy operation of power system. In electrical power line fault often occur many times making the power system unreliable. In this paper a novel concept using wireless sensor for detecting fault which includes phase to phase, short circuit and mainly line to ground fault in power line for better reliable and optimum operation of the system is presented [2].

Yang Yang *et.al* purposed the system for a smart grid application in monitoring the condition of transmission line with wireless sensor networks. GSM (Global System for Mobile) technology is useful for indication messages. The proposed system is used to provide warnings before the damage caused by meteorological disasters to ensure the line security. Their system is able to monitor few parameters like Sag, Wind speed and direction, Weight, temperature, Vibration [4].

Sauvik Das Gupta *et.al* has discussed the effect on transmission line due to climatic changes which decreases the efficiency of electrical transmissions. Extreme weather conditions would increase the chances of failure rate of power lines. Temperature rise also results in an increase in thunder storms and results in the lightning strike of power lines [5].

Nagaraju Kompally *et.al* proposed system which was working on PIC 16F877Amicrocontroller. Array of sensors (Humidity, temperature, wind speed) sense the transmission

line icing parameter. Sensors sends sensed analog value to microcontroller for analog to digital conversion. The transmission line icing parameter is transmitted from terminal nodes to monitoring data center section by GSM module [6].

## III. PROJECT INTEGRATION

Fig.1 Block Diagram for An approach towards a tireless arm using Arduino ATmega2560.

The block diagram shown in depicts the hardware configuration of the complete system. General faults in transmission line are caused due to (1) Sag, (2) Weight, (3) Temperature, (4) Vibrations and (5) Wind.

In order to reduce hazardous situations like risk of fire and explosions, several standards and protective devices have been installed. There are several parameters which will affect the working of the transmission 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, vibration. 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.



System block diagram:
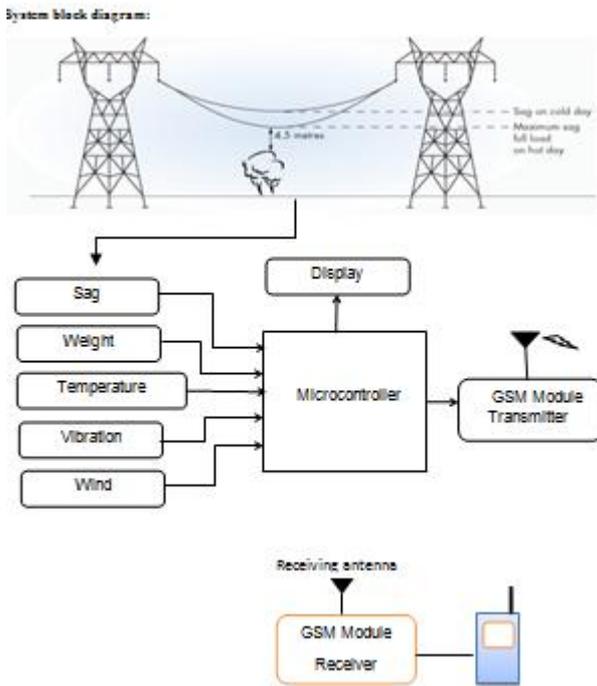
Flow chart for An approach towards a tireless arm using Arduino ATmega2560
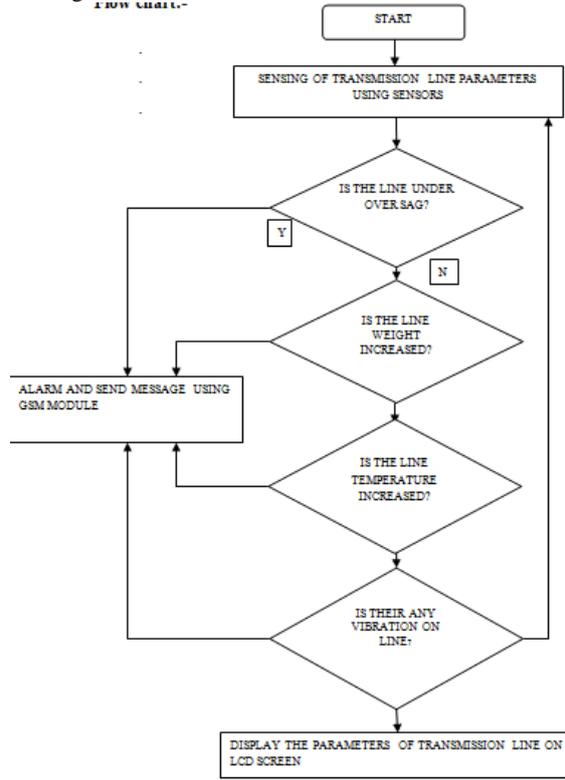


## A] HARDWARE IMPLEMENTATION

### 1. Power supply

Basic step in the designing of any section is to design the power supply required for that system .The step involved in the designing of power supply as follows.

1. Determine the total current that the system sinks from the supply.
2. Determine the voltage rating required for the different components

In below power supply circuit diagram, the 1 phase AC voltage regulator goes into rectifier section where single phase AC is converted into DC. The output of bridge is given to filter section where capacitors reduce ripple in DC output voltage.

### 2. PIC Microcontroller (16F886):

The PIC 16f886a is a low power, high performance CMOS 8 bit microcomputer with flash /EEPROM technology. The on chip flash allows the program memory to be reprogrammed in system or by a conventional nonvolatile memory programmer. It has low power consumption, power saving sleep mode. It has 10 bit up to 8 channel analog to digital converter (A/D). PIC 16f886 is a powerful microcontroller which provides a highly flexible and cost effective solution to many embedded control application.

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### 3 LCD (20*4):

In our system we prefer to choose a LCD instead of led or seven segment display because of the following reasons,

- It can display number, character and graphics whereas LED displays are limited to numbers and few characters.
- LCD has its own processor, so there is no need for refreshing it through Microcontroller. Ease of programming for characters and graphics.
- It is cost effective.

### 4. Temperature sensor (LM35):

The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly-proportional to the Centigrade temperature. The LM35 device has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient Centigrade scaling.

The LM35 device does not require any external calibration or trimming to provide typical accuracies of ±¼°C at room temperature and ±¾°C over a full −55°C to 150°C temperature range.

### 5. Accelerometer (MMA7660FC):

The MMA7660FC is a ±1.5 g 3-Axis Accelerometer with Digital Output(I2C). It is a very low power, low profile capacitive MEMS sensor featuring a low pass filter, compensation for 0g offset and gain errors, and conversion to6-bit digital values at a user configurable samples per second. The device can be used for sensor data changes, product orientation, and gesture detection through an interrupt pin(INT).

### 6. Weight Sensor:-

A load cell is transducer that is used to create an electrical signal whose magnitude is directly proportional to the force being measured. The various types of load cells include hydraulic load cells, pneumatic load cells and stain gauge load cell.

Here we used hanging load cell and their capability is 0 to 10kg.It gives maximum voltage output is 0.3mV (without amplifier) and 3v (with amplifier).It require power supply 9V to 12V.The output of load cell is inversely proportional to input /weight.

### 7. Wind Speed:-

In wind speed sensor, we used 10kohm potentiometer, PVC plug, and vane. We give +/-5v supply to this sensor and when vane is rotates because of air flow then it gives a different variable output voltage. Here we defined different voltage level for direction as shown in diagram.

### V.CONCLUSION

This research project gives remedies from the faults occurring in transmission line and it overcomes the drawbacks of traditional monitoring methods. The project 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.

### VI.REFFERENCE

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