

## **BRIDGE DISASTER MONITORING AND ALERT SYSTEM**

Rohokale Pooja R.

Electronics and telecommunication and AVCOE, Sangamner, India  
rohokalepooja33@gmail.com

Walunj Pallavi M

Electronics and telecommunication AVCOE Sangamner, India,  
pallaviwalunj42@gmail.com

Yadav Nilu J.

Electronics and telecommunication AVCOE Sangamner, India,  
yadavnilu22r@gmail.com

**Abstract—A sensor technology had brought the automatic real time bridge health monitoring system. The system has the utilized a ZIGBEE based data acquisition unit a GPRS communication network. The simulation and the actual real time result were matched with acceptable error that not after the health status of the bridge.**

### **I. INTRODUCTION**

The existing development of bridge monitoring mainly focus on the special structure and vulnerable component of the bridge. The technology of wireless sensor network take advantage of multiple-hop relay to disseminate environmental data. Furthermore, it makes use of sensor nodes as a backup scheme of bridge monitoring. GSM is used for long distance (between the bridge and the management Centre) data communication. This technology can be called MBM (Monitoring Based Maintenance) that enables the bridge maintenance engineers to monitor the condition of the bridge in real time. The sensors installed on various parts of the bridge as shown in Fig. monitors the bend, beam sustainability, weight of the vehicles etc. At any point of time if any of these parameters cross their threshold value the communication system informs the management center giving an alarm for taking precautionary measures. The communication established between the intermediate module and the database center is using GSM technology. use when formatting individual papers, (2) automatic compliance to electronic requirements that facilitate the concurrent or later production of electronic products, and (3) conformity of style throughout a conference proceedings. Margins, column widths, line spacing, and type styles are built-in; examples of the type styles are provided throughout this document and are identified in italic type, within parentheses, following the example. Some components, such as multi-leveled equations, graphics, and tables are not prescribed, although the various table text styles are provided. The formatter will need to create these components, incorporating the applicable criteria that follow.

### **II. LITERATURE REVIEW**

As per with the help of the wireless technology many problems due to data cables and expensive optical cable are now minimized and eliminated. Sensor and ZIGBEE module combined becomes u-node (ubiquitous

node). ZIGBEE is proved to be excellent solution in short distance wireless data communication. For long distance data transferring CDMA which is a mobile phone carrier network in Korea is used instead of optical cable which is expensive in installation and maintenance.

A multi-functional wireless bridge monitoring system has been developed for concurrent deployment of accelerometers, strain transducers, and temperature sensors. The hybrid sensing capabilities of these nodes satisfies the immediate requirements for economic, low maintenance load ratings and short-term dynamic measurements in addition to providing the hardware functionality for development of a long-term continuous bridge monitoring system.

3. **MODIFICATION:** This system includes the GSM module for long & short distance wireless data communication which is mobile phone carrier network. This system also uses four sensors and interface LCD (Liquid Crystal Display) for displaying output of all sensors.

4. **TECHNOLOGY:** Development of (Sensor + GSM module). The output data from the sensors are in the form of voltage, resistance or pulse depending on the type of sensors. The sensor outputs are analog data which needs to be converted into digital form. An A/D converter for each type of sensor is developed in this research work. Thus, the A/D converter reads analog data from the sensor and delivers the data to the GSM module which sends the data to other the GSM modules using wireless network. A sensor module with the A/D converter and GSM module is called u-node. Development of USN (Ubiquitous Sensor Network) The term WSN (or wireless sensor network) is a combination of the wireless communication network and sensor technology. Sensors and network modules are combined into one unit, which often called ubiquitous sensor, and communication network delivers sensor data wirelessly. Accelerometer sensor can measure level of acceleration where it is mounted. For temperature sensing here we use thermometer LM35 sensor. To measure strain here uses Load Cell which convert a force into electrical signal. Anemometer is used to measure the wind speed.

**III. METHODOLOGY**

Figure (1) and figure (2) represent the methodology use in our paper. As per with the help of the wireless technology many problems due to data cables and expensive optical cable are now minimized and eliminated. Sensor and ZIGBEE module combined becomes u-node (ubiquitous node). ZIGBEE is proved to be excellent solution in short distance wireless data communication. For long distance data transferring CDMA which is a mobile phone carrier network in Korea is used instead of optical cable which is expensive in installation and maintenance.

**IV. BLOCK DIAGRAM**

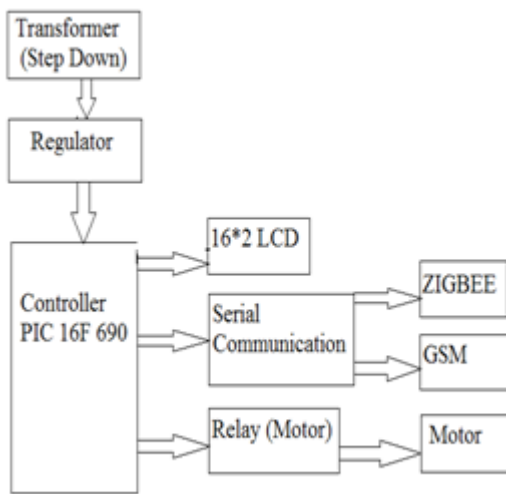


Figure 1: Slave unit

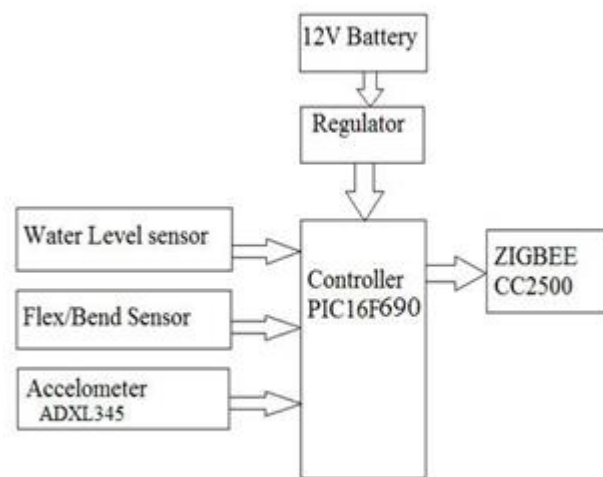


Figure 2 :Master unit

**WORKING OF BLOCK DIAGRAM**

In this project we will use one master unit & no of slave units all sensors which will use to sense bridge collapse. limit switch & river water level are connected to slave unit. The limit switch here use in a bridge collapse sensor by sense the any damage of bridge and send the

data to microcontroller. Water level sensors are joined to above the bridge. The water level goes above bridge then these sensor send the information to a controller and to the ZIGBEE through send information master mode and then the bridge gate will be automatically Accelerometer sensor is declare the any bend bridge concrete.

By using ZIGBEE module all slave units communicate with master & data will display on LCD display of master unit. Master unit consist of LCD display which display difference parameter or status of all sensors of slave unit them GSM module. GSM module are send the messages in respective engineer and ambulance. Here PIC 16fXXX microcontroller we'll use it is 20 pin IC having one UART to communicate with GSM ZIGBEE. 5v & 12v power supply is required to run a Whole project. If bridge collapse detects by Using unit switch or river water level change. The safety level them buffer will blow & GSM Will send SMS to inform about that change to Control room.

**V. Acknowledgment**

We would like to take this opportunity to express our respect and deep gratitude to our guide Prof. Kachare A.E., for giving us all necessary guidance required, for this project, apart for being constant source of inspiration and motivation. It was our privilege to have worked under him .We are thankful to H.O.D. Prof.R.P.Labade & Principal Dr. M.A.Venkatesh for the regular guidance, co-operation, encouragement and kind help. We are highly obligated to our entire friends, whose contribution intellectually and materially in the words and deeds for preparation of this Seminar report. We are also thankful to all our teaching and non- teaching staff for their enormous support.

**VI. CONCLUSION**

In this project, a cost-effective and real-time monitoring technique is adopted to trace the scouring depth of bridge pile foundation. A simple mechanical principle combined with a digital I/O switch forms a sensing device. This method has advantages of real-time alarming and little computation, which provides an efficient and effective algorithm for real-time alarming of extreme events in structural health monitoring. The system utilized a ZIGBEE based data acquisition unit, a GPRS communication network and a fuzzy logic algorithm. The simulation and the actual real-time results were matched with acceptable error that did not alter the health status of the bridge.

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