ISSN XXXX XXXX © 2017 IJESC

Research Article Volume 7 Issue No.5

Bridge Monitoring System

Priyesh Pawar[1], Rahul Jagtap[2], Umesh marathe[3], Ashish Jawake[4]
B.E Student[1, 2, 3], Assistant Professor[4]
Department of E&TC
JSPM's Rajarshi Shahu College of Engineering, Pune, India

Abstract:
Under the term Structural Health Monitoring (SHM) the proper implementation of appropriate methods for data acquisition and analysis to detect changes to the material, geometric and dynamic characteristics of structures is summarized. We will also study various factors which cause the bridge damage. The development of sensor technology for vibration monitoring of bridge is introduced in this paper. Applying accelerometers information about changes within the dynamic characteristics of structures can be detected. Accelerometers are a component of Ambient Vibration Methods (AVM). Hence this data can be used to derive additional information about the capacity and condition of a structure. In this paper we present a measurement system based on low-cost accelerometers that performs vibration measurements with high accuracy. Finally the future of bridge health monitoring and damage are discussed.

Keywords: accelerometer, vibration, monitoring, bridge.

I. INTRODUCTION

Traditional visual inspection tools, which are typically carried out annually, can only detect obvious damages like disruption, cracks or rust on the surface of bridges. This is not enough; there should be a proper system for the continuous monitoring of bridge. Implementation of bridge monitoring is to detect structural damage and take measures timely to prevent sudden disasters. Since 2008, at least six bridges have failed under the weight of heavy vehicles. All told, in the past 12 years there have been over 23 bridge failures in India, killing 310 people and injuring more than 450.Near Mahadan old bridge connecting to the Mumbai-Goa highway collapsed and was washed away by the SavitriRiver on 4th August 2016.

At least 29 people are missing since two buses and about 10 private vehicles fell into a swollen Savitri river. To avoid such losses there should timely monitoring of bridges and repair the detected faults. The dynamics and physical behavior of bridge can be change due to continuous exposer to environmental conditions like wind, temperature, rain, and earthquake. Vibrations of the bridge is one of the many variables that can be monitor Structural Health Monitoring (SHM) of bridges has gained of importance during the last years and has been applied in various problem domains.

The field of vibration monitoring is based on the analysis of vibration characteristics of bridges. In this paper the 3 axis accelerometers are deployed on various critical places of the bridges. The analog data from these sensors is given input to the microcontroller. The microcontroller performs the function according to the program. It will send the serial data to the base station computer via USB cable. The data is represented in the graphical format. An alert system is deployed on the site and on the base station. The alert system will alert the concern authorities about the situation and certain actions can be taken in the response to the alert.

II. LITERATURE SURVEY:

In [1] for detect vibration response from Bridge Modelan accelerometer (ADXL 202JE) is used. The data from accelerometer is converted into digital form using the ADC port on Mica2 mote. Mica2 mote serves as wireless router from Mica2 mote. The acceleration data is sent to the base station. The base station receives data from sensor nodes as well as transmits command to sensor nodes.

In [2] there is discussion over sensing systems and communication system using sensors for the monitoring of bridge. There is also discussion over the Non –destructive testing (NDT) which means to test the macro-defect of materials or members and assess geometric features, chemical composition, structure and mechanical properties and evaluate the suitability of particular application of materials or members without damaging its future use and reliability.

In [3] smart sensing technology is used for structural health monitoring. This includes some units using the ADXL210 accelerometer and some using high performance planar accelerometer is used along with a 16-bit analog to digital (A/D) converter. There is brief discussion over the smart sensors and MEMS sensors. There is a discussion over the use of various accelerometers like ADXL210, ADXL05, and ADXL202.

In [4] the monitoring system consists of the parts: the wireless network which includes 3- axis accelerometer and a temperature and humidity sensor and a Matlab program (GUI) for the graphical representation of the real time data from the sensors.

III. CONCLUSION

A low-cost monitoring system for vibration monitoring of structures as well as necessary steps for data acquisition, analysis and interpretation have been presented in this project report.

Here the vibrations are successfully detected by the 3-axis accelerometer and represented on the computer.

IV. REFERENCES

[1]. Shamshad Ali, Faisal KarimShaikh, Bhawani S. Chowdhry_ and EmadFelemban. "*Smart Structural Monitoring - A Case of Bridge Damage Detection*" in IICT, Science and Technology Unit, Mehran University of Engineering & Technology.

[2]. Discussion on health monitoring and damage detection of a large-span bridge SunjieSchool of transportation, Wuhan University of Technology School of civil engineering, Wuhan University of science and technology Wuhan, China

[3]. Billie F. Spencer Jr., Manuel Ruz-Sandoval, NaritoKurata*"Smart Sensing Technology for Structural Health Monitoring"* 13th World Conference on Earthquake Engineering Vancouver, B.C., Canada August 1-6, 2004 Paper No. 1791

[4]. M. Bocca1, E. I. Cosar1, J. Salminen1, and L.M. Eriksson1 "*A Reconfigurable Wireless Sensor Network for Structural Health Monitoring*"4th International Conference on Structural Health Monitoring of Intelligent Infrastructure (SHMII-4) 2009 22-24 July 2009