DEVELOPMENT OF AN VIBRATION MONITORING SYSTEM FOR BUILDING0020STRUCTURE

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ABSTRACT

The project describes measurements of train and vehicle induced ground vibrations. Vibration impacts relate to annoyance and potential for structure damage. Buildings in around of mass transit projects respond to these vibrations with varying results ranging from perceptible effects, low frequency rumbling sounds and even slight surface damage to structure. Thus, it is imperative to ascertain the extent of vibrations generated by the train and traffics for characterizing the ground borne noise radiated due to it and possible reduction measures to be adopted either at the path or receiver ends, if source can't be diagnosed. The present work consider the measurements of vibration amplitude generated due to mainly focus on lab machine vibration traffic and trains on track and underground metro trains and correlates them with the various damage criteria for building elements.

Keyword: - *rail track, rail traffic, vibrations, vibration sensor, esp8266 Wi-Fi module*

1. INTRODUCTION

Vibration outside the respondent's control like railway construction and operation affecting the living environment. In order to assess the human exposure, the approach suggested by the standards, 24 hour internal recording, does not seem to be practical for its implementation in a 'large scale' survey. So implement the system which measures the vibration and using ANSYS software we analyse the building structure. Here take a building near a railway station. By product of the exposure methodologies based on measurement is the generation of one of the largest databases of vibration caused by railway vibration.

Vibration is a frequent problem in buildings. External sources as a cause of vibration include earthquakes, wind, and construction operations, and road and rail traffic. Some historical old building and residential area are there near railway track, so for the building and for people safety we develop system for the measurement of vibration in old building surrounded by vibration sources.

1.2 OBJECTIVES

Following are the objective of my system that for design:-

- To design and develop a system for measuring vibration parameter in weak building structure.
- To establish wireless communication between sensor nodes and aggregator node.
- To analyse sensor data for identifying the building structure health.

2. PROPOSED BLOCK DIAGRAM

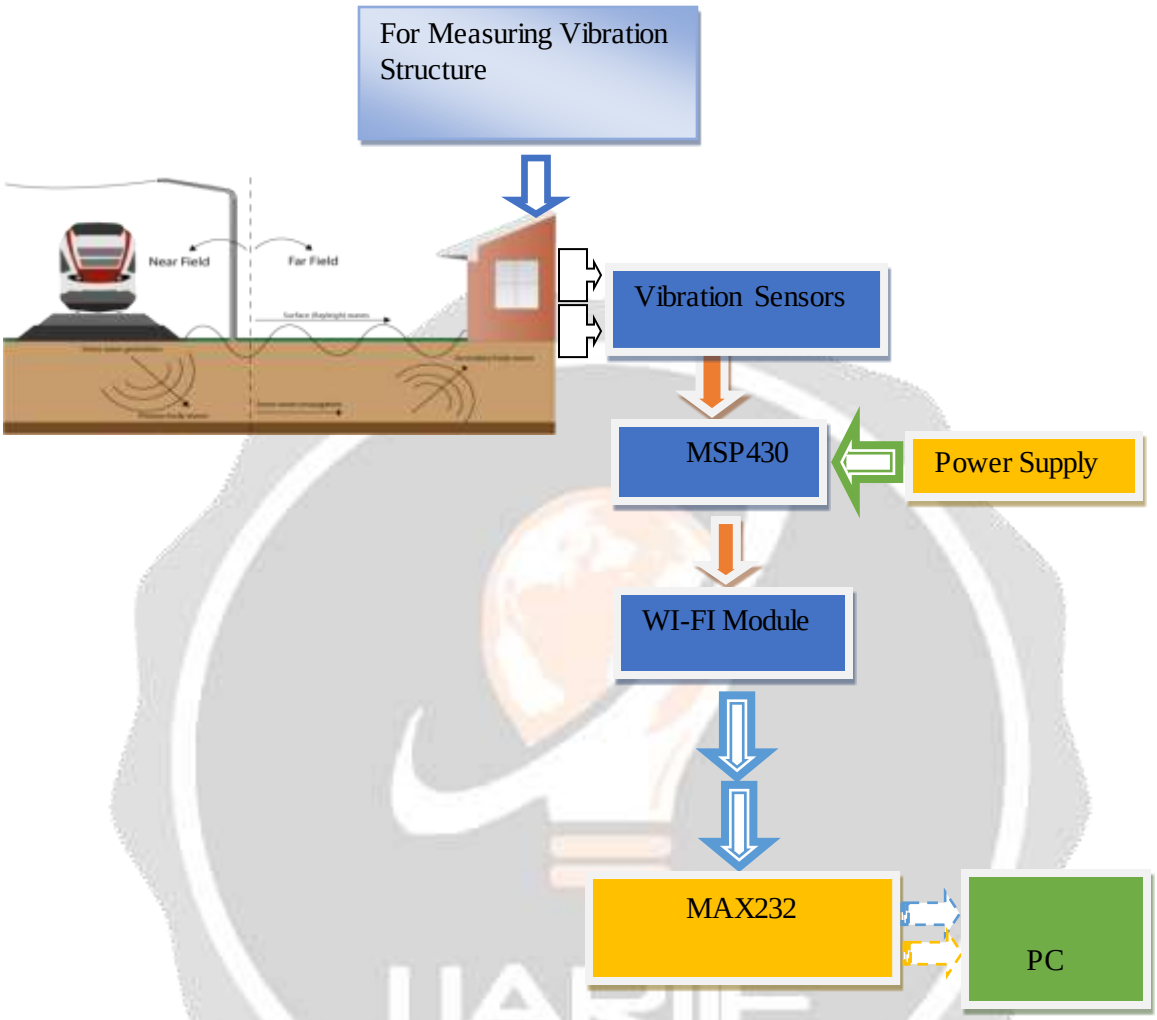

Fig-1 Block Diagram of My System

In above block diagram, I am used adxl335 for measure the vibration of building near a railway track these measured data will be sent via esp8266 Wi-Fi module this module is work as server and receiver and using max232 I will collect data on the computer these all controlling programming in msp430f2617.

As shown in the figure vibration sensor adxl335 measure the vibration and it gives to the msp430f2616 where all process complete and then msp430 send that data through TX pin and receive by the esp8266. This esp is called the Host server and it receives the data .Here esp connect with the another esp and send data through Wi-Fi and receive by client server. These esp transfer data via TX pin and msp430 Rx pin this msp430 and using MAX232 we can see the data on PC.

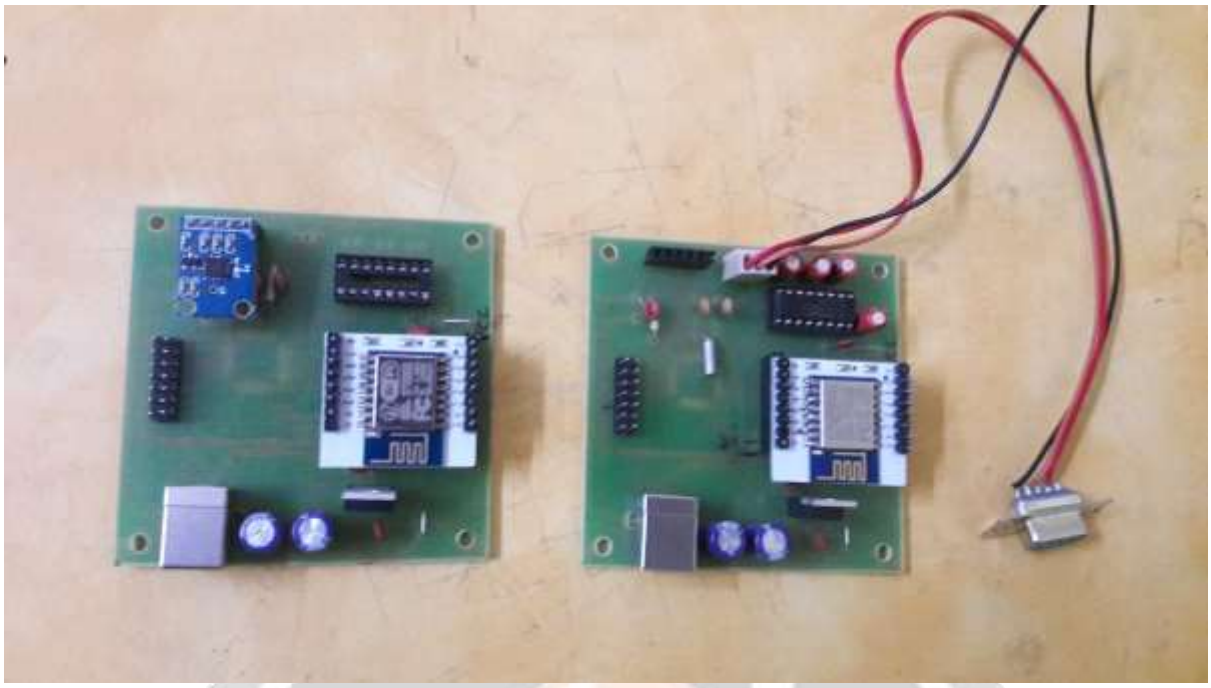

Fig-2 Hardware of My System

In my system esp8266 as Wi-Fi vibration sensor335 and msp430f2616 as a controller max232 for connect pc and lm1117 for voltage regulator these component used in my system.

The present work reports limited in-situ measurements conducted to evaluator the amplitude and characteristics of vibration levels generated due to mechanical machine in lab correlate with the damage criteria for building elements.

3. Field measurement and analysis

The in-situ vibration measurements were carried out with the help of a fig 2(using vibration sensor 553and whole circuit).These circuit was fixed on the vibrating surface, wall and on the machine. A field study was conducted for different machine speed in the college lab for monitoring vibration. Table 1 summarizes with three axis x,y,z three digital output value monitored at a distance of 2 m and 3 m from the machine.

My system will be fixed on lathe machine for measuring a vibration data and at 2m distance on the floor and 2-3m distance system will be set for measuring vibration data at a different speed of lathe machine.
Highest vibration will on the machine and on the wall we will measure very less vibration.

This system is used as a vibration indicator in my system there is saturated point is set if the vibration is higher than that value the led will be blink.

Vibration on lathe machine	Vibration on floor when high speed of machine at 2m distance	Vibration on Wall when high speed of machine at 2-3m distance
X:120 Y:121 Z:122	X:123 Y:131 Z:150	X:123 Y:128 Z:151
X:123 Y:128 Z:151	X:120 Y:121 Z:122	X:123 Y:129 Z:151
X:124 Y:128 Z:151	X:127 Y:128 Z:151	X:124 Y:129 Z:151
X:122 Y:120 Z:147	X:124 Y:124 Z:151	X:125 Y:128 Z:151
X:123 Y:128 Z:151	X:124 Y:128 Z:151	X:124 Y:128 Z:151
X:123 Y:128 Z:152	X:124 Y:128 Z:151	X:124 Y:128 Z:151
X:123 Y:128 Z:151	X:124 Y:128 Z:151	X:124 Y:128 Z:151
X:123 Y:129 Z:152	X:124 Y:128 Z:151	X:126 Y:130 Z:153
X:123 Y:127 Z:151	X:124 Y:128 Z:151	X:122 Y:126 Z:149
X:124 Y:129 Z:151	X:124 Y:128 Z:151	X:124 Y:128 Z:151
X:123 Y:128 Z:151	X:124 Y:128 Z:151	X:124 Y:128 Z:151
X:124 Y:128 Z:151	X:124 Y:128 Z:151	X:124 Y:128 Z:151
X:124 Y:128 Z:151	X:124 Y:128 Z:151	X:124 Y:128 Z:151
X:123 Y:128 Z:150	X:124 Y:128 Z:151	X:124 Y:128 Z:151
X:120 Y:121 Z:122	X:124 Y:128 Z:151	X:124 Y:128 Z:151
X:124 Y:128 Z:151	X:124 Y:128 Z:151	X:124 Y:128 Z:151
X:123 Y:128 Z:151	X:127 Y:135 Z:159	X:124 Y:128 Z:151
X:124 Y:128 Z:152	X:124 Y:128 Z:151	X:124 Y:128 Z:150
X:124 Y:128 Z:152	X:124 Y:128 Z:151	X:124 Y:127 Z:151
X:124 Y:127 Z:151	X:124 Y:128 Z:151	X:124 Y:128 Z:151
X:124 Y:128 Z:150	X:124 Y:128 Z:151	X:124 Y:128 Z:151
X:124 Y:128 Z:151	X:123 Y:127 Z:150	X:124 Y:128 Z:151
X:124 Y:128 Z:152	X:124 Y:128 Z:151	X:124 Y:128 Z:151
X:120 Y:121 Z:122	X:124 Y:128 Z:151	X:124 Y:127 Z:151
X:123 Y:128 Z:151	X:124 Y:128 Z:151	X:124 Y:128 Z:151
X:124 Y:129 Z:152	X:124 Y:128 Z:151	X:124 Y:128 Z:151
X:125 Y:128 Z:151	X:124 Y:128 Z:255	X:124 Y:128 Z:151
X:123 Y:127 Z:150	X:124 Y:255 Z:255	X:124 Y:128 Z:151

Table -1: Summary of instantaneous vibration measurements in mechanical lab

4. CONCLUSIONS

Limited study of vibration and vibration sensor components are not capable of measure a vibration for long distance because of this reason my system will be used for only measure a vibration in lathe machine in the mechanical lab and my system work as a high level indicator.Now a day's lathe machine are put on the rubber pad so not very much vibration goes outside. My system will set on the machine, wall and floor at 2-3m distance measure some vibrations.

5. REFERENCES

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