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STUDY OF EFFECT OF VIBRATION ON DIFFERENT TYPES OF FLYOVERS

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Abstract: This paper studied the road construction in different places and corridors on both sides of the metro. This research read the headers along the three dimensions of the accelerator log. Delhi is responsible for inspecting and maintaining about 30 bridges. The age of these structures depends on many factors, such as structure type, impact on bridge environment, loading date, etc. The purpose of this study is to study the effect of vertical acceleration due to load and vibration of the upper corridor's service life. The development of new high-strength materials has led to a lighter structure thanks to advanced design and analysis that allows increasingly thin parts, in part because of increased vehicle load, to be an increasingly important factor in bridge design. The use of vibration meter calibration analyzer and earthquake acceleration vibration in combination to influence the data on the way through the subway train and comprehensive to the housing unit collect the baseline. Under the existing environmental conditions, measured in the housing influenced on the 5th floor of the outer ring Deli in the road, and. Background of numerous major concerns of vehicle traffic Background of the vibration unit housing, carpenter cargo traffic congestion, and near the airport terminal operation, a small number to the second place it will contribute 3 traffic Because it is mainly caused by the flow of the train.
Keywords: Vibration Measuring Instruments, Vehicle speed, Pavement Roughness, Vehicle suspension system.

I. INTRODUCTION

Vibration monitoring was conducted at ten selected locations and alleviated discomfort experienced by local people over a long period of time. Therefore, in addition to the subway line and the road above the expressway, we studied the structure of the crowded roads in different places and corridors on both sides of the subway. We are reading vertices along all three dimensions of Acceleration Log. Delhi is in charge of inspection and maintenance of about 30 bridges. The useful life of these structures depends on many factors such as the type of structure, the impact on the environment of the bridge, the loading date, and so on. The purpose of this study is to study the effect of vertical acceleration due to load and vibration of the upper corridor's service life. The development of new high strength materials has led to a lighter structure due to sophisticated design and analysis procedures that allow the use of increasingly thin parts, partly due to increased vehicle loading, it is becoming an increasingly important factor in bridge design. To increase. Vibration research has not caught up with these factors and engineers did not evaluate the actual performance of the highway by incorporating them into the model. Vibration usually does not cause breakage, but it may cause fatigue fracture. They can also contribute to concrete surface problems. Vertical acceleration shows that negative psychological effects are important to pedestrians and parking lots. Delhi Central Road Research (CRRI) has received reports from citizens that some bridges are not safe due to vibration. Departments need to evaluate the procedures of these reports. An example is Panchsheel Bridge in Vasant-Vihar City, New Delhi. The scope of this research involves combining oscillation information on the various particles of the compound with preliminary studies of these bridges and their sensitivity to important oscillations. Develop information, prepare further proposals for comprehensive field research, reduce analytical work described in the literature, aim for the flight of research and lack of appropriate analytical techniques for the complexity of these outer rings. Perform a three-dimensional analysis of Sky Bridge vibration using a software package such as SAMURAI.

II. LITERATURE REVIEW

Many studies have been done in dynamically loaded engineering dynamic loads. "With the upgrade and expansion of the subway underground network in the city center of India, it is increasing in many cases, as well as vibrations and ground noise problems: he not only publishes Dr. Naseem CHANGE (etc) , The survey said, "The earth's vibration and noise are transient standard train" economically, due to the logistics of various factors, and maintain the metro underground tunnel and receive the point to the minimum safe distance of 30 meters accuracy It is not a commitment to basic standards. Also, due to lack of funds, many of the latest trucks and tunnel trends to develop cars. Not compliant with the design and resilience of support K point rail, source and receiving county points, station isolation and superior control means but it is acceptable for the development of standards and guidelines for limitation of exposure The essence of all these means and programs in. Different according to differences in basic data and evidence of basis for choosing them vibration transmission between including various standards available in vibration and other useful measures in terms of cost and very important Threshold literature. Attempt to review standards available in major international standards in this area and explain experimental data available according to these guidelines. " Another project written by CE, R. Brincker, P. Anderson's work on 'Variant Street / Vibration Level Painter Bridge Dynamic Characteristics', as a result of its research, the environmental vibration bridge painter California Del Rio

Street It describes a series of. Painter is a concrete bridge on both sides diagonally on both sides, the public pillar is a bridge in California. In 1977, a powerful sports tool was installed on the bridge, and since then there have been more than ten major earthquake movements. The purpose of the environmental vibration test is to determine the dynamic characteristics of the bridge at low vibration and compare it with the measured vibration characteristics during strong motion due to the strong motion data value. In this article, we first describe strong recorded vibration events, describe environmental vibration tests, and compare the analysis results of specific strong vibration records with the results. The range of the 4.4 size research event is M = L ML = 6.9, and the base station is 1.3 G, and the deck is 0.86 grams, to generate up to 0.54 grams acceleration in the free field. The results of this study indicate that the overall dynamic characteristics of the bridge are very sensitive to the seismic motion level. The interaction of the soil structure is very important for this type of structural system. Although the superstructure showed a nearly flexible response, the base movement of each incident with the platform pillar was significantly different. In addition, there are very few international studies including ground vibrations caused by road construction activities. For example, Hiller and Crabb (2000) and Crabb and Hiller (2002) measured the vibration of several types of construction machinery at the UK test site and construction site. Jackson et al. (2007), Hanson et al. (2006), Jones & Stokes Associates (2004) and Hendrix (2002) provide government and federal methods to evaluate construction machine vibration in the United States. The main results are summarized in the subsection "Basic theory" and "Surface vibration source" for easy reference.

III. METHODOLOGY

A comprehensive flowchart of this method is provided, including primary survey research components, followed by primary and secondary data collection. The next phase is analysis of noise prediction model data. At the final stage of this survey, we propose measures to reduce noise

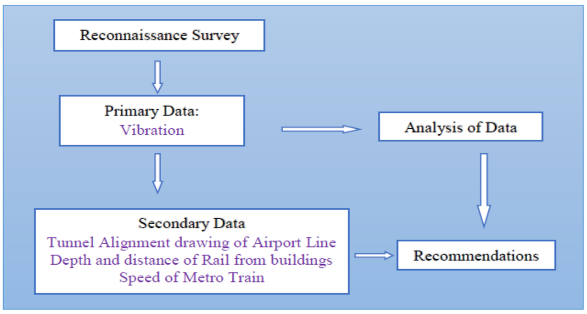

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Fig 1Flow Diagram of Methodology

3.1 Vibration Measuring Instruments

Vibration Sensors

Structural vibrations are usually measured using an electronic sensor called an accelerometer. These sensors convert the acceleration signals into electronic voltage signals that can be measured, analyzed and recorded using electronic devices. There are many kinds of speedometers. The most common condition is that the voltage is connected to acceleration via wire as shown in Figure 3. Some accelerometers have internal circuitry and analysts can supply energy without power. The signal analyzer includes a calibration setting that converts the voltage signal to an accelerometer. The manufacturer calibrates each accelerometer and gives a sensitivity value. For example, the acceleration rate of 100 mV / gn can be 102.3 mv / gn. Accurate measurements will depend on whether the signal analyzer uses the correct sensitivity value and whether the accelerometer is used with the correct sensitivity in the application. High sensitivity (eg, 1000 mV / gn) may not be suitable for high acceleration applications. In this case, an excessive voltage may saturate the input signal analysis circuit. If the acceleration is too low, the signal may be too weak with small sensitivity (10 mV / gn etc.) and it may not be able to measure accurately. Sensitivity also has a significant effect on the signal-to-noise ratio. The signal-to-noise ratio is the signal level divided by the noise level and is measured with dB = 20 log (signal noise level).

3.2 Flyovers of Outer Ring Road Delhi.

Delhi's outer ring road is a ring road surrounding Delhi. It has three corridors in each direction and a total length of 47 kilometers. Despite the existence of signals and intersections in the past, the number of lights has been reduced to 2 by the exchange of mushrooms, and the flow of traffic is smoother. Delhi has two circular roads, one main road and one end road. The total length of the two ring roads is 87 km. IIT Bridge is a viaduct from SarvpriyaVihar to the main entrance of Delhi in IIT Delhi. This is an important intersection of the ring road of Delhi. Bus stop 620 is located at the end of the bridge in front of IIT. Panicle’s flight near the IIT plane the signal under the bridge is called the IIT signal. Robinson intersects the road beneath the bridge. Here, the person of SDA entered Delhi's rich south, Essex Farm, Surrey Aurobindo ashram, and the right into IIT. Go further and go one place to the land of Sarvodaya. Top passages of New Delhi, Lajbat Nagar

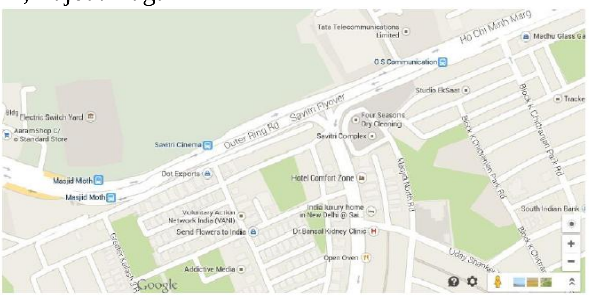


Fig 2 Flyovers of Outer Ring Road Delhi

IV. DATA ANALYSIS

This chapter presents preliminary results based on the dynamic behavior of various types of bridges in Delhi. The Samurai program is used to determine the behavior of free vibration, i.e. the shape of the situation associated with natural frequency and free vibration. In addition, we are trying to combine the effect of load transfer with a very complex solution that goes beyond traditional solutions.

SAMURAI is used to determine the first three natural frequencies along the x, y, and z axes.

More than 10 papers on Skybridge's vibration studies have been reviewed by text searches such as field studies, model studies, analytical studies, human capability studies. A comprehensive review of the literature indicates the following reasons for vertical vibration of the bridge:

Vehicle speed – increased speed increased the dynamic increment.

Pavement roughness – this can be a major factor.
Vehicle suspension system – this involves both the springs and tires.

Approach condition – this involves the surface roughness on the approach and the joint between approach and flyovers.
Eccentricity of load – torsional vibration modes result if this is large.

Natural frequency – the relation between natural frequency of the flyover and that of the vehicle is related to the magnitude of the dynamic increment in the deflections.

Flyover structure – the type of structural members and the layout are directly related to the overall behavior. Large capacity proved to occur when the normal frequency of a bridge on the road and the approach of the vehicle and the bridge have a large constant deviation. When the width is large and the natural frequency of the bridge is high, people are often aware of vibration. Studies have shown that basic vibration bending and twisting patterns control behavior, field surveys usually need to deal with them. It is best to measure the behavior of the vibration by installing an accelerometer at the top bridge or near the top bridge Extension of the middle bridge. These should be placed on both sides so that twist and bend patterns can be measured. In addition to direct measurement of acceleration, you can obtain speed and deviation by integration. Spectral analysis is used to determine the characteristics of the frequency content. In our research, we converted electronic sounds using electronic sensors (disk sensors) into electronic signals sensed by acoustic sensors. These sensors give the same representation in accelerometers or decibels, and various vibrations are provided for these vibrations.

4.1 Flyover Description
IIT Flyover
Similarly, data was collected using a 3-axis speedometer (SOUNDBOOK) and the noise absorption data of the upper road surface was measured with a surface impedance meter. Graphically aggregated data is described in the graph below.
The following table shows the bridge design data. The intersection of IIT extends to 750 meters, the frame width is 7.5 meters, and other details can be easily read from Table 1.Physical Data is available at the site and Obligatory Data to be considered here is for preparation of project report. Obligatory requirements given herein shall be followed scrupulously in design of the Highway and Structures.

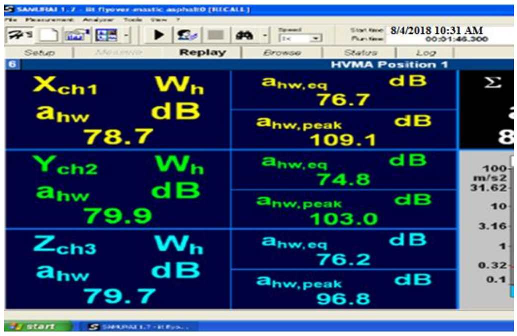
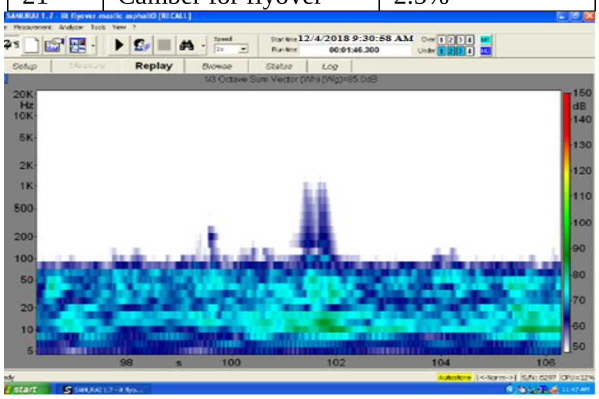


Fig 3Vibration Data of IIT flyover

Table1 Design Specification of IIT Flyover

S.NO	Parameter	Values
1	Carriageway width	7.5 m
2	Overall length	750m
3	Overall width of elevated road	8m
4	Seismic effects	Zone IV,1.3
5	Design speed of vehicles	60kmph
6	Super elevation (max).	Restricted to 4%
7	Radius	As per design
8	Horizontal curves	60kmph
9	Vertical curves	60mph
10	Exposure condition	server
11	Temperature range	12-43^{0}c
12	Underground water table	As per soil investigation
13	Minimum clearance to be maintained for traffic	5.5 cm
14	Live load for every of 7.5m width of carriageway	As per IRC 6 (latest)
15	Bearing type	POT PTEE
16	Expansion joint	Strip seal / modular type
17	Wearing course	25 mm mastic & 40 mm AC
18	Foundation type	Pile foundation
19	Minimum pile	1200mm
20	Founding level of piles	As per bore data
21	Camber for flyover	2.5%



East variation in vibration along the three axis was found thus does not allow to feel drag or jerks. This was also provided with Mastic Asphalt surface coating which also reduce the impact of loading. This was also f
Fig 4 Sonograph of IIT flyover found to be safe.
Panchsheel Flyover
Data were collected using a 3-axis speedometer (SOUNDBOOK).
The following table shows the bridge design data. Panchsheel's pedestrian bridge is 1250 meters, along the width of 7.5 meters from the car. Other details can be easily read from Table 2

Table 2 design specification of panchsheel flyover

S.No.	Parameter	Value
1	Carriageway width	8.5m
2	Overall length	1350m
3	Overall Width of Elevated Road	10m
4	Seismic Effects	Zone IV, 1.8
5	Design Speed of Vehicles	58 kmph
6	Super Elevation (max.)	Restricted to 4%
7	Radius	As per design
8	Horizontal curves	58 kmph
9	Vertical curves	58 kmph
10	Exposure Condition	Severe
11	Temperature range	17 - 48°C
12	Underground Water Table	As per soil investigation
13	Minimum Clearance to be maintained for traffic	5.8m
14	Live load for every of 7.5m width of carriageway	As per IRC 6 (latest)
15	Bearing type	POT PTFE
16	Expansion Joint	Strip Seal/ Modular
17	Wearing Course	25mm Mastic &
18	Foundation Type	Pile foundation
19	Minimum Pile	1250mm
20	Founding level of piles	As per bore data
21	Camber for Flyover	2%

Physical Data is available at the site and Obligatory Data to be considered here is for preparation of project report. Obligatory requirements given herein shall be followed scrupulously in design of the Highway and Structures.

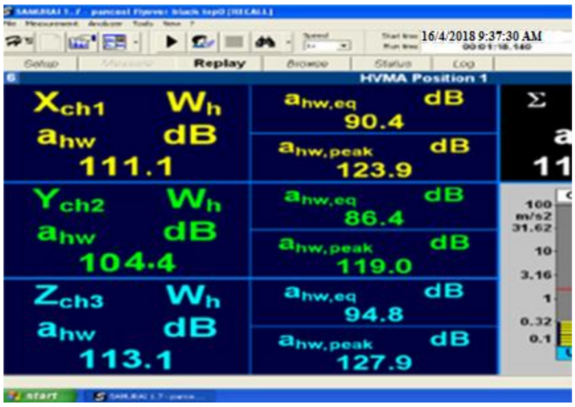


Fig 5 vibration data of panchsheel flyover

With all the bridges, this bridge has great value in vibration and the impact on the surface of the surface crack bridge of 4 meters high is very clear. When monitoring, it seems like vomiting, discomfort is very important. This turned out to be unsafe. From this figure it can be seen that the vibrations of all three directions are high and questions are raised about safety issues.

Nehru Place Flyover
Data was collected with the aid of a 3-axis accelerometer (SOUNDBOOK).The following table shows the bridge design data. The Neel Square flyover has a span of 1,000 meters and is line aligned with a frame width of 7.5 meters. Other details can be easily read from Table 3.

Table 3 design data of Nehru place flyover

S.No.	Parameter	Value
1	Carriageway width	9.5m
2	Overall length	9000m
3	Overall Width of Elevated Road	7m
4	Seismic Ef&cts	Zone IV, 1.5
5	Design Speed of Vehicles	70 kmph
6	Super Elevation (max.)	Restricted to 4%
7	Radius	As per design
8	Horizontal curves	6 kmph
9	Vertical curves	65 kmph
10	Exposure Condition	Severe
11	Temperature range	12 - 43° C
12	Underground Water Table	As per soil investigation
13	Minimum Clearance to be maintained for	5.9m
14	Live load for every of 7.5m width of carriageway	As per MC 6 (latest)

15	Bearing type	POT rut
16	Expansion Joint	Strip Seal/ Modular type
17	Wearing Course	25mm Mastic & 40mm
18	Foundation Type	Pile foundation
19	Minimum Pile	1350mm
20	Founding level of	As per bore data
21	Camber for Flyover	2%

Obligatory Data to be considered here is for preparation of project report. Obligatory requirements given herein shall be followed scrupulously in design of the Highway and Structures.

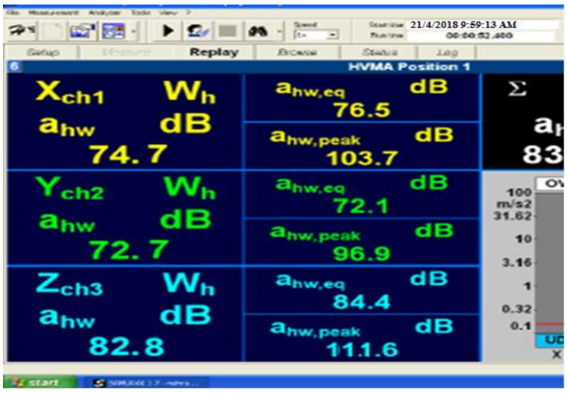


Fig 6 Nehru Place Flyover Vibration Data

Vibration in this flyover was found to within permissible limits but slightly larger values than Chirag Delhi Flyover and IIT flyover. This may be due to increase in span. This cannot be assured because it not the only parameter which influence the characteristics of flyover. In context with the safety, the flyover over is safe enough with the present traffic of Delhi.

V. CONCLUSION

In this chapter, we summarize project reports, clarify the boundaries of research and provide recommendations for future research. In this study, the purpose of vibration analysis was achieved at selected places in Delhi. This survey provides a wide range of options for policy makers, academics and researchers.

• Provide literature review of vibrations around the world including India.

• Create new recommendations on road traffic in different situations.

• Understanding and understanding the details of Intelligent Transportation is easy.

• An important practical advantage associated with bridge vibration studies is 95% accuracy.

• The impact of earthquake ground motion is included in the report and its importance in construction.

• Survey completed horizontal and vertical noise mapping at specific locations in South Delhi.

Future Work

Vibration studies (horizontal and vertical) are the process of starving data, the more data the more accurate it is. Vibration analysis data in Delhi requires vibration analysis data, but this survey is impossible in more than 100 places. Vertical mapping prediction software requires the size of all bridges and existing buildings, but this survey is impossible.

Another limitation of this work is that not all current traffic models are provided at no cost, so it is not possible to validate all current models.

Another limitation of the work proposed in this report is that vibration in the structure is not fixed. Vibration level depends on the number, type and speed of the vehicle.

The number of devices and software used to measure all the parameters developed by the noise model is also a difficult task.

• Vibration changes from border wall to position 5 from 113 to 74 V dB.

• As shown in the following figure, the main frequency of border walls is 113.3 acres.

• At the initial stage when both tracks disappeared at the same time, the maximum vibration record was 113.3 V dB.

• The vibration of a private car passing through the border is about 85 V dB.

• Drilling data clearly shows a depth of up to 15 meters, rocks and soil are not Babitathini or soft mats. Therefore, vibration cannot propagate very quickly.

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