

Study of Vehicular Noise Pollution at Prominent Place of Tikamgarh City, MP (India)

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Abstract— In developing country like India with the vehicle population increasing at an alarming rate, the residents of cities are experiencing severe environmental problems that results from road traffic in particular from automobiles. Noise from road traffic is major source of environmental pollution and it has detrimental effects on human beings. In this paper road traffic noise survey was conducted in Tikamgarh city at Five sites viz. 1. State bank Square 2. Bus stand square 3. Civil hospital square 4. katra market square 5. Collectorate Square. Based on this study broad conclusions are presented and suggestion made to reduce noise due to traffic.

Key words: Noise, Leq, Vehicle, Regression, Squares, Decibels

I. INTRODUCTION

Fast growing vehicle population in town in the recent years has resulted in considerable increase in traffic on roads causing alarming noise pollution, air pollution. Noise level increases with traffic volume in an exponential manner. In India like many other developing countries traffic noise is major contributors of environmental pollution and now it has become a permanent part of urban and sub-urban life. It is very harmful to human beings. In the new millennium, for protection of environmental degradation it is imperative to pay greater attention towards measuring noise pollution, enforcing regulation for noise emission limits elimination and control noise pollution. Taking a step in this direction a case study was undertaken in JEC Jabalpur in post-graduate M.E. dissertation work. Noise pollution level was measured in Tikamgarh city and various parameters determined and the same are briefly presented in this paper.

II. MATERIALS & METHODOLOGY

In the present study an Environmental sound level meter. (Envirotech SLM 100, Sound Level Meter, Type 2 dBA) is used. It is used to measure the existing equivalent noise level (Leq) dB (A) at the various intersections (locations). The noise levels were measured during day time i.e. between 6am to 10pm along with simultaneous counting of different types of vehicle. Whole study duration was divided into time slot of 2 hours each and for each time slot sampling was done in middle half an hour from 20th to 29th December 2020.

The readings were taken on four major squares of Tikamgarh city viz. 1. State bank Square 2. Bus stand Square 3. Civil hospital Square 4. Katra market square 5. Collectorate Square.

First 4th squares come under commercial area and Collectorate Square comes under silent zone.

The instrument was kept almost to chest level (1.2m) in order to reduce errors due to reflection of sound from the body of investigator and the instrument was kept at 5m away from the roadside. The noise monitoring was done on working days excluding Sunday local holidays in good climatic conditions in order to get consistent results. Further, Leq and total number of vehicles for different time slots were correlated.

III.RESULT &DISCUSSION

The Leq for each sampling time showed a minimum and maximum value of 62.2 dB(A) and 68.8 dB(A) during early morning between 6-8 am and between 2-4 pm time slot respectively at Collectorate Square itself. Other 4th study location namely State bank Square, Bus stand square, Katra Market square, Civil hospital square have maximum value Leq 80.2, 78.0, 83.0 and 68.5 during 6-8 PM, All location time slot respectively. 6-8 am time slot for all the squares have least value because of least number of total traffic during this time. According to Environment Protection Act, 1986 permissible value of noise level at day time at commercial area is 65 dB and that of silence zone is 50 dB. Thus our observations are much above the prescribed limit.

Correlation between equivalent noise level (Leq) dB and total vehicles count for different study locations was analyzed by linear regression. The Figure 1-4 shows the total vehicle count for each sampling time was plotted with the respective Leq and regression equations were found using linear regression for all study locations

TIME SLOT	SAMPLING TIME	STATE BANK SQUARE (Leq)	BUS STAND SQUARE (Leq)	CIVIL HOSPITAL SQUARE (Leq)	KATRA MARKET SQUARE (Leq)	COLLECTORATE SQUARE (Leq)
6-8AM	6:46-7:15	63.6	63.7	65.6	64.3	62.2
8-10AM	8:46-9:15	69.8	66.4	67.0	67.2	64.6
10-12AM	10:46-11:15	68.0	66.0	67.0	65.3	68.2
12-2PM	12:46-13:15	66.1	65.0	65.0	65.2	64.5
2-4PM	14:46-15:15	65.0	64.0	67.0	66.0	68.8
4-6PM	16:46-17:15	73.0	72.2	65.0	78.3	64.3
6-8 PM	18:46-19:15	80.2	78.0	68.5	83.0	66.8
8-10 PM	20:46-21:15	72.0	74.0	66.2	75.3	66.3
MAXIMUM VALUE		80.2	78.0	68.5	83.0	68.8
MINIMUM VALUE		61.6	63.7	65.6	64.3	62.2

Table 1: Values of (Leq) Db (A) During Different Sampling Time at Selected Squares in Tikamgarh

There is a strong correlation between total vehicles and Leq at Bus stand square where regression

coefficient (R^2) was found to be very good and its value was found as 0.831. State bank Square also showed good correlation having regression coefficients (R^2) value of 0.734 while the Collectorate Square which comes under silent zone also showed good correlation of 0.612. katra market square showed the least correlation having a value of $R^2 = 0.524$. It is also satisfactory correlation. Generally, correlation coefficient R^2 value of 1.0 is considered to be the best fit, whereas values above 0.6 is considered to be good. So, we can say there is overall good correlation between total vehicles and Leq at all study locations.

It can be well correlated that the minimum value of Leq at all squares are due to the presence of very less traffic during 6-8am time slot. In case of maximum traffic it is obvious that it will produce more noise. But it may not have exactly linear relation. An unregulated traffic will result in greater noise pollution. Furthermore unnecessary use of horn is a psychological tendency of driver. Old vehicles and inferior engine design which do not consider produced noise as a major factor for consideration also contributes to that. Reflection of noise from nearby wall, building or any other structure may be another factor. Size of the squares also affects measured noise pollution level at any square as the proximity from the source of noise pollution i.e. vehicle and noise level measuring instrument decreases or increases accordingly.

IV. CONCLUSION

The study revealed that noise level had exceeded permissible limits at all the four locations due to excessive traffic and due to too much use of horn by the drivers. From the above observations we can conclude that there is a need to apply guidelines to control the noise level by relevant authorities. Hence, controlling the noise pollution is impossible without making people aware about its impacts. So there is a need to educate people about the hazards of loud sound. This can be done by communication means of entertainment like radio, theater group etc. Proper spacing near the study sites and dense tree plantation can reduce the sound pressure level effectively. Our government and we must bring this noise pollution to an end for our own peace.

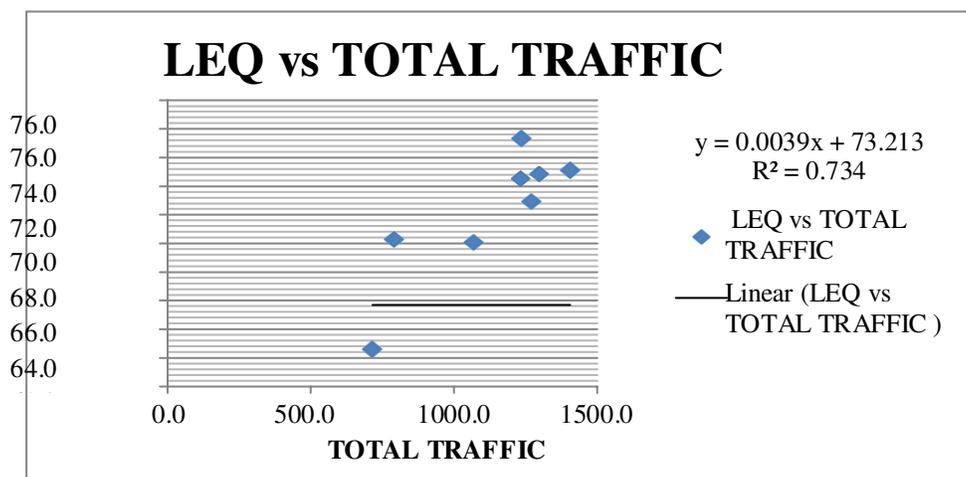


Fig1: Variation LEQ in dB(A) with no. of total traffic at State bank Squares

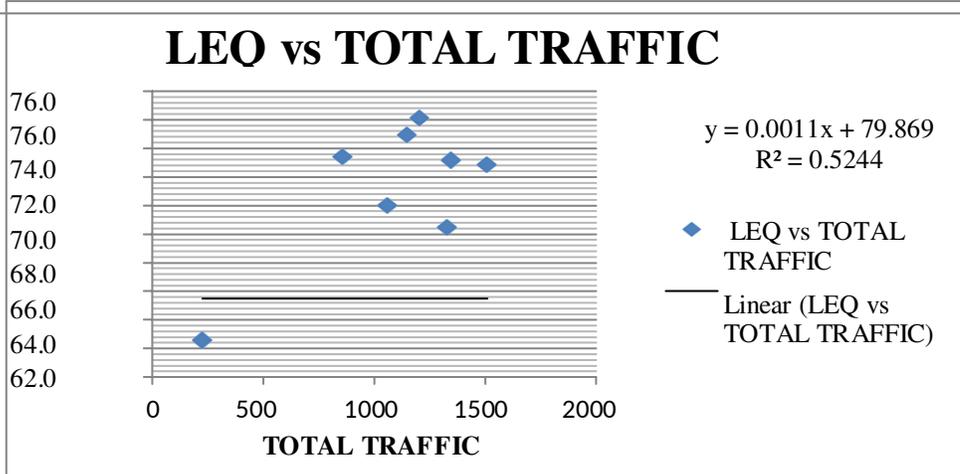


Fig2: Variation LEQ in dB(A) with no. of total traffic at Bus stand Square

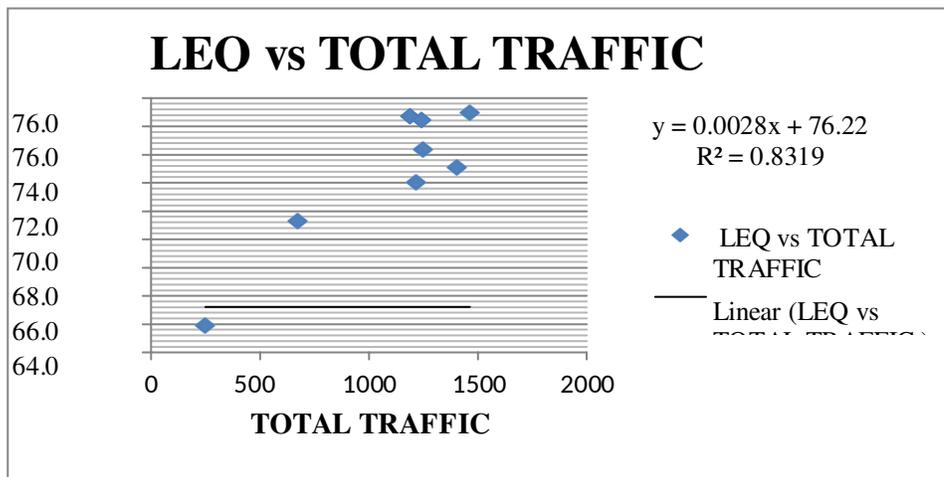


Fig3: Variation LEQ in dB(A) with no. of total traffic at Katra market Square

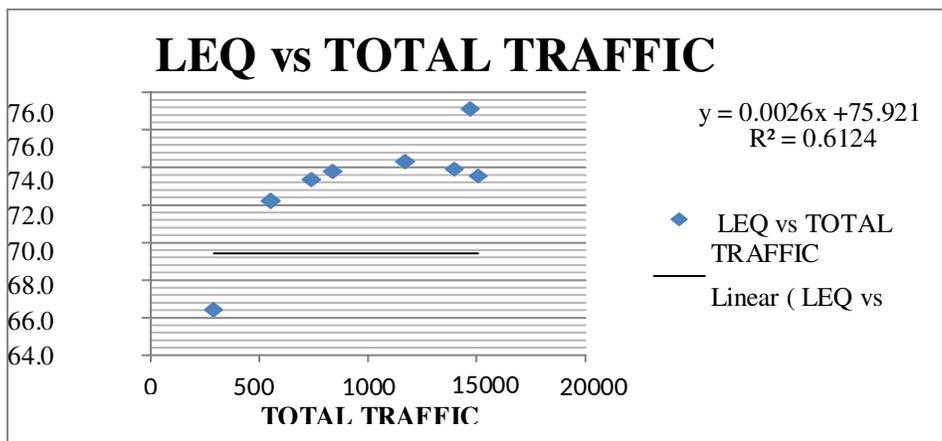


Fig4: Variation LEQ in dB(A) with no. of total traffic at Civil Hospital Square

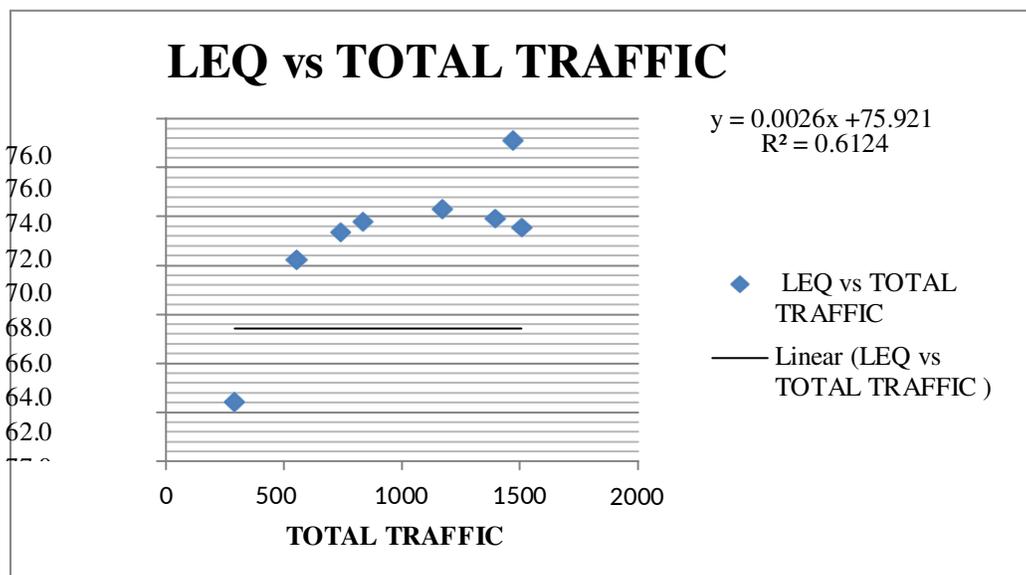


Fig5: Variation LEQ in dB(A) with no. of total traffic at Collectorate Square

X. REFERENCES

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