



## Status of ambient noise levels in Jaipur city

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### Abstract

Transportation sector is one of the major contributors to noise in urban areas. Hence, as a first step towards assessment of noise pollution, measurement was taken up with emphasis on traffic noise. During the course of study ten heavy to medium busy commercial corridors were selected for monitoring of vehicular traffic activities and ambient noise levels as well. Sound Level Meter (SLM) SC-30 with a calibration source was used for measurement of equivalent noise levels. The results indicate that the noise levels were higher than the limits prescribed by Central Pollution Control Board (CPCB). It directly highlighted the necessity of effective mitigation measures of noise pollution levels in the city.

**Keywords:** *Ambient noise levels, Interrupted traffic flow, Permissible limits, Road intersection, Traffic congestion*

### Introduction

Environmental noise has been defined as one of the unwanted or harmful environmental pollutants which is created by human activities and directly affects the human health (Anomohanran *et al.*, 2008). It is a common experience which may interfere with our ability to communicate (Onuu and Menkiti, 1996). Noise is a prominent feature of the environment which comes from transport, industry and neighbour (Padhy and Padhi, 2008). It is recognized as a major problem for the quality of life in urban areas and all over the world (Ozer *et al.*, 2009).

Road traffic noise is considered as one of the important sources of noise pollution that adversely affects the human health (Pathak *et al.*, 2008; Aparicio and Surez, 1993). The Ministry of Environment and Forests, Govt. of India, has given a notification regarding allowable limits of noise. Through the comprehensive 1986 Air Act of the Ministry of Environment and Forests noise pollution has become an offence in India (Singhal,

2005). Permissible limits of noise have been specified for different urban environments. The latest one, the Noise Pollution (Regulation and Control) Rules 2000, released in February 2000, clearly classified our environment into four different categories and specified the allowable limits of noise separately for day and night time for each category (Table 1).

Jaipur is relatively a large industrial city which has been expanded in all directions, randomly (Agarwal and Swami, 2010). All modes of transportation are always present on roads, responsible for interrupted flow and traffic congestion in the city. The increased socio-economic status of the residents, availability of automobiles, lack of integrated mass transport system and increased demand of transport for daily journeys have resulted in steep growth of vehicle ownership in the city. The growth of registered vehicles in Jaipur city has shown in Fig. 1. It was found that two wheelers had increased at a rapid rate, while cars increased steadily at a slower rate.

The present study is aimed to assess the ambient noise levels at the major ten intersections of the city. Further, a detailed study has been carried out to investigate the increased noise pollution in the city.

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**Materials and Method**

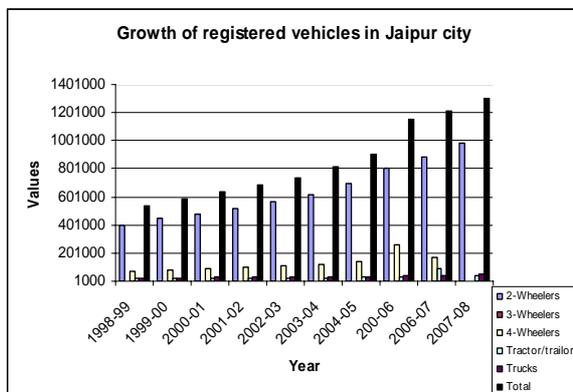
For this study, ten typical commercial road intersections with comparable geometrical feature, but associated with distinctly different types of traffic movement, were selected for monitoring of noise levels. Details of each selected location are given in Table 2.

As, the important part of the noise assessment is the actual measurement of the noise levels; the equivalent noise levels (Leq) were measured at all the selected locations.

The Sound Level Meter (SLM) (SC- 30; version 1.0-2.1) having digital display was calibrated before taking the measurement according to user manual. The ‘A’ weighted network was used as it is very closer to a person’s hearing sensitivity. It was mounted on a stand at a height of 1.2 m above the ground level and was located at 7.5 m distance from the centre line on the road way during interrupted traffic flow conditions.

**Table 1: Ambient noise level standards in Leq applicable in India (CPCB, 1998)**

Type of the Area	Environmental Noise Standards (Leq) in dBA	
	Day Time 0600-2200	Night Time 2200-0600
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Silence Zone	50	40



**Fig. 1: Total Number of registered vehicles in Jaipur city**

**Results and Discussion**

Since, it is found that all vehicles are the source of noise and measured noise is the resultant of all of them; traffic flow per hour has also been recorded with the ambient noise levels at all the similar locations. Fig. 2 shows the average traffic flow passed in one hour at all the selected locations.

The Fig. 2 shows that the mean hourly traffic flow was very high at all the selected locations. However, it was very higher at JDA circle. The reason could be that this intersection connects the older city to newer city. Therefore, heavy traffic flow is always present on the junction point. Further, the university and different colleges are also present at the end of the one arm of the intersection while, the presence of famous Ganesh temple at another arm also increases the traffic flow on the site. Yoshida *et al.* (1997) found that on densely crowded roads the sound levels for 24h can reach up to 75-80 dB. Increasing number of vehicles and electronic devices has created a serious threat of noise pollution (Tripathi *et al.*, 2006; Agarwal *et al.*, 2009).

The influence of noise on human health can be due to direct effects upon the auditory system. On non-auditory physiological processes and on purely psychological mechanisms (Sampath *et al.*, 2004). Fig. 3 shows a comparison between observed equivalent noise levels (Leq) Vs. Leq prescribed by CPCB.

**Table: 2 Details of Identified Locations**

S. No	Name of the Location	No. of Lanes	Nature of Traffic Flow
1.	Bus Station	4	Heavy, Congested
2.	Gopal Pura Mod	4	Heavy, Congested
3.	Government Hostel	6	Heavy, free flow
4.	J.D.A Circle	6	Heavy, free flow
5.	Khasa Kothi Circle	4	Medium, Congested
6.	Pani Paich	4	Medium Congested
7.	Queen’s Road	4	Medium, free flow
8.	Railway Station	4	Heavy, Congested
9.	Sodala Circle	4	Medium, Congested
10.	Transport Nagar	6	Heavy, Congested



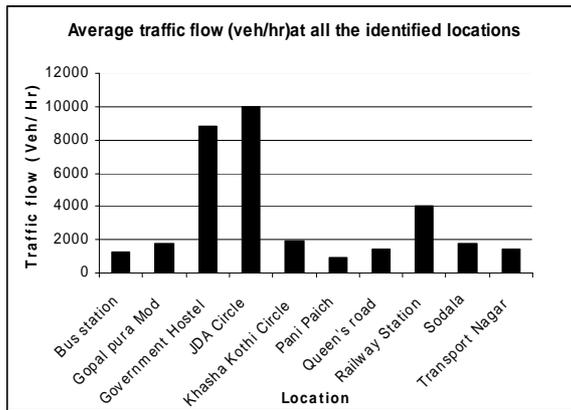


Fig. 2: Average traffic flow at all the selected locations

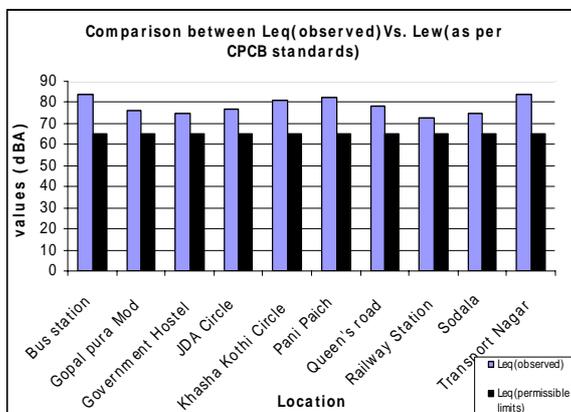


Fig. 3: Comparison between Leq (observed) and Leq (standard)

It was found that the leq values were higher (ranged between 74.7-83.9) as compared to the permissible limits of 65dBA prescribed by CPCB for commercial locations. This may be due to the fact that the public transportation system is inadequate and inefficient which directly develops the tendency of personalized vehicles among people. Besides this, all types of vehicles *i.e.*, fast moving vehicles along with slow moving vehicles on the roads which develop honking behaviors among drivers. Further, road are narrow, poorly maintained and are not designed properly for increased traffic flow, resulted in traffic congestion and tendency to blow horn among people.

### Conclusion

Noise is comparatively a newly recognized problem from last few decades. It did not get much

attention as compared to air or water pollution. The present study has two major objectives. Firstly, to investigate the contemporary traffic flow at all the ten selected locations. And secondly, ambient noise levels have been measured at the similar identified locations. Traffic data were recorded manually. While, Sound Level Meter having digital display was used for monitoring of leq level at all the locations. It was found that the vehicular traffic was very higher at all the locations and showing continuously increment from last ten years. Further, at none of the location, noise levels were less than 65dBA. The difference between observed Leq and standard Leq was ranged between 7.6-18.9. It clearly indicated that the ambient noise levels were very higher as compared to prescribed noise levels. Effective traffic management and continuous noise level monitoring are the tools for mitigation of noise levels in the city.

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