

Hazardous Noise Pollution of Pink City (Jaipur)

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ABSTRACT: Call it post-Diwali blues as number of people with respiratory problems queuing outside city hospitals saw a sharp rise over the last two days. The level of air pollution increased significantly during Diwali compared to previous year. At certain places, it was two times the figures recorded for 2011. According to the Rajasthan State Pollution Control Board (RSPCB) which measured the air quality at its monitoring stations, in almost every part of the city, except one place, the pollution level went up during the festival.

KEYWORDS: noise, pollution, Jaipur, Pink City, hazardous

I. INTRODUCTION

Noise is a disturbance to the human environment that is escalating at such a high rate that it will become a major threat to the quality of human lives. In the past thirty years, noise in all areas, especially in urban areas, have been increasing rapidly because it is associated with rapid industrialization, urbanization, (expansion of road network) and population growth. The drastic rise in the number of vehicles has increased noise pollution in the Jaipur city. The present study on Jaipur city was performed to find out the impact of traffic noise level on attitudes of exposed pollution. The study was carried out at 5 different locations with Sound Level Meter to assess the day noise level. The study revealed the fact that noise levels have reached an alarming level. People reported that traffic noise is the main cause of headache, high BP and dizziness problems. It is observed that all the selected location, the level of noise was found to be above prescribed noise standard level of Central Pollution Control Board (CPCB) India and Bureau of Indian Standard (BIS). This is considered to be harmful for physiological well being of people and which can interfere with normal activities for humans. The present study is aimed to investigate the impact of noise pollution on residents/community residing near roadside. The degree of annoyance was assessed by means of a questionnaire. It was found that among all noise-generating sources, road traffic was the major source of noise. A health survey reported about 55% of population was suffering by frequent irritation. 46% respondent felt hypertension, and 48.6% observed loss of sleep due to noise pollution. The most serious health hazards associated with high level of noise exposure is deafness which initially causes temporary hearing problem which has been reported in the study area. It is also observed from the study that places with high traffic congestion, narrow roads, and poor traffic management are more vulnerable to high levels of noise and more ill health effects.

Noise has become an increasingly important problem in urban life. Thanks to fast growing population of Jaipur, housing facilities are developing near highways. Increasing public awareness of the loss of amenity adjacent to the heavily trafficked highways has led to think about the matter of environmental pollution thanks to traffic. Among various environmental nuisances arising from traffic, road traffic noise contributes the foremost portion of the environmental pollution. The noise levels have exceeded the safe levels of human tolerance. This study deals with the traffic noise surveys conducted on Jaipur six locations and three zones in Jaipur. The sites possess different land uses. The least bit six stations; traffic volume count and amplitude measurement with a display, noise sound meter, handy sound level meter were made. Noise levels were measured for duration of three hours on whole day this process will repeat for 15 days. A multiple correlation equation was obtained with the assistance of computer which describes relation of amplitude with traffic volume and logarithm of distance from the middle of road. Whose land use pattern is sort of same; depict same style of models when analyzed separately. Noise levels are found high in residential and commercial areas, compared to agriculture lands. Average noise levels at any stations, show similarity with the amount calculated, using regression of y on x developed in present study.[1,2,3]

Noise is becoming an increasingly important problem in urban life. It is one of the bye products of the modern mechanized age and much of the noise, heard in cities, comes from machinery of one kind or another, principally from the various forms of transport-road, rail and air. In the metropolitan and big cities, the traffic noise is a major constitution of the environmental pollution. In some of the big Cities, the noise levels have far exceeded the human tolerance levels.

Noise is defined as 'unwanted sound'. Noise is audible sound that causes disturbance, impairment or health damage. 'Noise' and 'sound' are terms often synonymous used when purely acoustical dimension is meant (e.g. noise level,

noise indicator, noise regulation, noise limit, noise action plan, aircraft noise, road traffic noise, occupational noise, etc.). The link between exposure and outcome (other terms: endpoint, reaction, response) is given by reasonably well-established exposure-response. Manage noising is crucial for enhancing the living condition of a dwelling. Noise can be generated internally within a building noise from surrounding neighbor's voices, music or appliances and externally traffic noise from automobiles, buses, trains, aircraft, industrial activities or surrounding construction activities). Noises are transmitted through building materials from sound sources such as vehicular or foot traffic, banging, or objects being dropped to the floor and can also be associated with vibrations.

II. DISCUSSION

Today, pollution is an increasing environmental stressor. Noise maps are recognized because the most tool for assessing and managing environmental noise, but their accuracy largely depends on the sampling method used. Sound level meter could also be a tool for turning physical properties of sound into numeric values. Psychological, physiological and subjective aspects can't be measured. A reverse curve appreciate the equal loudness curve at 40 phon is applied to the pressure (this is termed "A" frequency weighting). The resulting level is termed aweighted sound level and is expressed in dB dissertation describes the road traffic noise surveys conducted on national highways passing through Jaipur. In past one decade, the population of Jaipur has grown in no time. Due to rising demands for housing, the JDA (Jaipur Development Authority) has decided to develop housing facilities near highways. The loss of amenity adjacent to highways has led to think about the assessment of noise near these highways. Sound level meters are divided into two categories: Class 1 and sophistication 2. There's a difference in performance between these classes. Performance specifications and test methods of sound level meters are laid out in the international standards IEC 61672 series. Two performance categories, Class 1 and sophistication 2, are per the quality. Basically, specifications for sophistication 1 and sophistication 2 sound level meters have the identical design goals and differ within the tolerance limits. Tolerance limits for sophistication 2 specifications are greater than, or up to, those for sophistication 1 specification.

In this study, an effort has been made to observe traffic and average noise levels and to develop graph between noise levels and 15 days for important locations like industrial, residential, commercial, hospitals etc. The following conclusions can be readily drawn by the on side collected data: All Six stations are fixed in commercial, residential and industrial zones in the Jaipur. Noise levels are higher in residential and commercial areas, compared to agricultural land use areas. The noise levels increase with increase in traffic volume, observed at the same point. The high intensity of sound produced by machines in various industries, mills, and factories are the major causes of industrial noise pollution. Engineering companies, printing presses, textile mills, and metal works immensely generate noise pollution. The noise levels decrease with increase in distance from noise source i.e. as one walks away from road; noise is reduced, provided the same traffic volume is flowing on the road. Sound Level at Gourav Tower Road for 15 Days In the commercial zone (GOVER TOWER AND WTP) the noise level are 110.5 dB more than the limit have given by the CPCB which was 65dB. There have present more people and vehicles and motor that is produced the high noise level in the afternoon time then morning. [4,5,6]

Sound Level at Subodh College for 15 Days At Subodh College the noise level are 114.5 dB more than the limit have given by the CPCB which is 60-65dB. There have present more people and vehicles and motor that is produced the high noise level in the evening time then morning. Traffic control on this location applied on 9 am to 3pm because of working hours of institute and maximum level of noise is 91.5 dB on 12pm to 3 pm. Sound Level at SMS Hospital for 15 Days At SMS hospital which required silent zone the noise level is 110.5 dB more than the limit have given by the CPCB which is 50-40 dB. Traffic control on this location required to redesign the traffic route. Sound Level at Sitapura (Industrial Zone) For 15 Days In the Industrial zone (Sitapura) the noise level are 110.5 dB more than the limit have given by the CPCB which is 70-75 db. Sound Level at Amarpali Circle for 15 Days There have present more people and vehicles and motor that is produced the high noise level in the evening time then morning. In the commercial zone and residential (Amarpali Circle) the noise level are 101.5 dB more than the limit have given by the CPCB which is 65 dB. Sound Level at Sitapura (Residential Zone) For 15 Days At Residential zone (Sitapura) the noise level are 109 dB more than the limit have given by the CPCB which is 75-70dB. There have present moments of heavy vehicles and motor that is produced the high noise level in the evening time then morning.

The noise pollution in industries could be used to produce electricity and certain low voltage machine. To get a clear insight of the problem and to develop analytical models, it is therefore, need of hour that further research work should be done on noise measurement, analysis and abatement measures. Within available time, it was tried to assimilate maximum observations possible on traffic & noise survey. But due to lack of time and unavailability of a team to

record speed & traffic observations; many parameters have to be omitted which would have strengthened analytical presentation of work. The noise pollution in runway could be used to produce electricity.

III. RESULTS

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.

Noise is defined as unwanted sound. Industrialization and urbanization is the main cause for undesirable environmental noise, which makes a significant damage to human beings and environment. Industrial, commercial, residential and silence zones are the main cause of noise. To measure the impact of noise, this study was carried out at fifteen different locations of Jaipur to assess the noise level for two continuous days during morning and evening time. This comparative analysis shows that the values are higher in fifteen different locations of Jaipur city as per the various standards established by the Central Pollution Control Board (CPCB) and World Health Organization (WHO).

Motorized road vehicles are the major source of noise; always responsible for creating annoyance among people. The present study is aimed to investigate the correlation between annoyance level and different noise indices and its impact on residents/community in terms of annoyance index. Noise and attitudinal response of local population were carried out at ten commercial road networks of the city. To define the noise annoyance quantitatively, a new point scale [i.e. Mean Dissatisfaction Score (MDS)] has been used in the present study, a strong correlation was observed between percentage highly annoyed and various noise indices.

A study related to measurement of ambient noise levels at the UNESCO world heritage city Jaipur. The equivalent continuous sound level (L_{eq}) is calculated for the morning and evening peak hours using noise levels measured with a sound level meter. The study has been conducted during January to March 2011 and the sampling locations consisted of major tourist spots, famous markets and the large gates constructed at the time of establishment of the old historic walled city. The time interval of peak hours was chosen from 0800-1100 hr in the morning and 1700-2000 hr in the evening. The noise levels were recorded at all the 15 sampling locations and compared with the permissible limits/standards prescribed by the Central Pollution Control Board (CPCB) of India under the Noise Pollution (Regulation and Control) Rules, 2000. It has been found that all the results are beyond the prescribed limits as per CPCB, which is a very serious issue looking to the UNESCO world heritage site status recently awarded to Jaipur city. It is the duty of all concerned stakeholders including govt. authorities, businessmen, non-govt. organizations and general public to uphold the status of UNESCO world heritage city in its truthful manner.

Noise has become an increasingly important problem in urban life. Due to fast growing population of Jaipur, housing facilities have been developing near highways. Increasing public awareness of the loss of amenity adjacent to the heavily trafficked highways has led to consider the problem of environmental pollution due to traffic. Among various environmental nuisances arising from traffic, road traffic noise contributes the major portion of the environmental pollution. The noise levels have exceeded the safe levels of human tolerance. [7,8,9] This study deals with the traffic noise surveys conducted on NH-8, NH-12, NH-11 & bypasses through Jaipur. The sites possess different land uses. At all six stations; traffic volume count and noise level measurement with a digital display, handy sound level meter were made. Noise levels were measured at varying distances from centre of road i.e. 5 metre, 25 metre, 50 metre & 75 metre. A multiple regression equation was obtained with the help of computer which describes relation of noise level with traffic volume and logarithm of distance from the centre of road. Station nos. 3,4 & 5 (NH-8, NH-12 & NH-11) whose land use pattern is almost same (all having agricultural fields), depict same type of models when analysed separately. Noise levels are found high in residential and commercial areas, compared to agriculture lands. Average noise levels at any stations, show similarity with the levels calculated, using regression equation developed

The main objective of the present study was to develop an empirical noise prediction model for the evaluation of equivalent noise level (L_{eq}) in terms of equivalent traffic density number under heterogeneous traffic flow conditions. Ten commercial road networks are selected for monitoring and modeling. A new factor, i.e., equivalent number of light vehicles (EqL_v) and for heavy vehicles (EqH_v), has been used for evaluating the equivalent traffic density for each class of vehicles, and correlation graphs are plotted between equivalent traffic density with respect to EqL_v and EqH_v and observed equivalent noise level [$L_{eq}(o)$] for the calculation of equivalent noise levels in terms of light vehicles [$L_{eq}(L_v)$] and heavy vehicles [$L_{eq}(H_v)$] for different identified locations as well as for the entire city. [10,11,12]

Furthermore, regression noise prediction equations have been developed between $Leq(o)$, $Leq(Lv)$, and $Leq(Hv)$. After comparison of the results, it can be depicted that the light motor vehicles are the main source of noise pollution in the city and gives significantly higher correlation coefficient values. This model can be applied for the calculation of road traffic noise under interrupted traffic flow conditions in urban areas of Pink City, Jaipur.

IV. CONCLUSION

Noise is a disturbance to the human environment that is escalating at such a high rate that it will become a major threat to the quality of human lives. In the past thirty years, noise in all areas, especially in urban areas, have been increasing rapidly because it is associated with rapid industrialization, urbanization, (expansion of road network) and population growth. The drastic rise in the number of vehicles has increased noise pollution in the Jaipur city. [13,14,15] The present study on Jaipur city was performed to find out the impact of traffic noise level on attitudes of exposed pollution. The study was carried out at 5 different locations with Sound Level Meter to assess the day noise level. The study revealed the fact that noise levels have reached an alarming level. People reported that traffic noise is the main cause of headache, high BP and dizziness problems. It is observed that all the selected location, the level of noise was found to be above prescribed noise standard level of Central Pollution Control Board (CPCB) India and Bureau of Indian Standard (BIS). This is considered to be harmful for physiological well being of people and which can interfere with normal activities for humans. The present study is aimed to investigate the impact of noise pollution on residents/community residing near roadside.[16,17,18] The degree of annoyance was assessed by means of a questionnaire. It was found that among all noise-generating sources, road traffic was the major source of noise. A health survey reported about 55% of population was suffering by frequent irritation. 46% respondent felt hypertension, and 48.6% observed loss of sleep due to noise pollution. The most serious health hazards associated with high level of noise exposure is deafness which initially causes temporary hearing problem which has been reported in the study area. It is also observed from the study that places with high traffic congestion, narrow roads, and poor traffic management are more vulnerable to high levels of noise and more ill health effects.[19,20]

REFERENCES

- [1] Jakovljevic, B., Pavnovic, K. and Belojevic, G., 2009. Road-traffic noise and factors influencing noise annoyance in an urban population. *Environment International*, 35: 552-556.
- [2] Mischaud, D. S., Keith, S. E. and McMurchy, D., 2005. Noise annoyance in Canada, *Noise and Health*, 7, 27: 39-47.
- [3] Sato, T., Yano, T., Bjoerkman, M. and Rylander, R., 1999. Road traffic noise annoyance in relation to average noise level, number of events and maximum noise level. *Journal of Sound and Vibration*, 223, 5: 75-783.
- [4] Golmohammadi, R., Addaspour, M., Nassiri, P. and Mahjub, H., 2007, Road traffic noise model. *Journal of Research in Health Sciences*, 7, 1: 13-17.
- [5] World Health Organization (WHO).2005. Occupational and community noise. WHO-OMS. <http://www.who.int.inffs/en/fact.html>.
- [6] Phatak, V., Tripathi, B. D. and Mishra, V. K., 2008. Evaluation of traffic noise pollution and attitudes of exposed individuals in working place, *Atmospheric Environment*, 42: 3892-3898.
- [7] Zannin, P. H. T., Ferreria, A. M. C. and Szeremetta, B., 2006. Evaluation of noise pollution in urban parks. *Environment Monitoring Assessment*, 118: 423-433.
- [8] Alam, J. B., Alam, M. J. B., Rahman, M. M., Dikshit, A. K. and Khan, S. K., 2006. Study of traffic noise level of Sylhet by multiple regression analysis associated with health hazards. *Iranian Journal of Environmental Health Science & Engineering*, 3, 2: 71-78.
- [9] Kiernan, V., 1997. Noise pollution robs kids of language skills, *New Scientist*, 10, 5: 120-126.
- [10] Banerjee, D., Chakraborty, S. K., Bhattacharya, S. and Gangopadhyay, A., 2008. Evaluation and analysis of road traffic noise in Asansol: an industrial town of eastern India. *International Journal of Environmental Research and Public Health*, 5, 3: 165-171.
- [11] Griffiths, I.D., Langdon, F. J. and Swan, M. A., 1980. Subjective effects of traffic noise exposure: Reliability and seasonal effects. *Journal Sound and Vibration*, 71: 227-40.
- [12] Lambert, J., Simonnet, F. and Vallet, M., 1984. Patterns of behavior in dwellings exposed to road traffic noise. *Journal Sound and Vibration*, 92: 159-72.
- [13] Bluhm, G., Nordling, E. and Berglind, N., 2004 Road traffic noise and annoyance: An increasing environmental health problem. *Noise Health*, 6: 43-9.
- [14] Boman, E., Enmarker, I. and Hygge, S., 2005. Strength of noise effects on memory as a function of noise source and age. *Noise and Health*, 7: 11-26.
- [15] Scultz, T., 1978. Synthesis of social surveys on noise annoyance. *Journal of the Acoustical Society of America*, 64: 377- 405.

- [16] Miedema, H. M. and Oudshoorn, C. G., 2001. Annoyance from transportation noise: Relationships with exposure metrics: DNL and DENL and their confidence intervals. *Environmental Health Perspectives*, 109: 409-16.
- [17] Sato, T, Yano, T, Bjorkman M, Rylander R., 1999. Road traffic noise annoyance in relation to average noise level, number of events and maximum noise level. *Journal Sound and Vibration*; 223:775- 84.
- [18] Mortensen, F. R. and Poulsen, T., 2001 Annoyance of low frequency noise and traffic noise. *Journal of Low Frequency Noise, Vibration and Active Control*; 20: 193-6.
- [19] Ouis, D., 2002. Annoyance caused by exposure to road traffic noise: An update. *Noise Health* 4:69-79.
- [20] Rylander, R., Bjorkman M. 2002. Road traffic noise annoyance and window orientation in dwellings. *Journal Sound and Vibration*, 249: 828-31.