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RESEARCH ARTICLE

NOISE QUALITY STATUS OF DEWAS INDUSTRIAL AREA OF MADHYA PRADESH, INDIA

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ABSTRACT

A study has been conducted to assess the noise quality in ambient air of Dewas industrial area of Madhya Pradesh, India. Total nine locations were selected in Dewas industrial area for ambient air quality monitoring during different four quarters from April 2019 to March 2020. The noise data were collected from different monitoring locations at different time in order to assess the changing noise level at sites. Data collected during day time (6 AM to 10 PM) and night time (10 PM to 6 AM) at the all monitoring locations. All noise monitoring was done as per standard guidelines followed by Central Pollution Control Board which complying IS 9989: 1981. All results were compared with standard limits prescribed in Noise Pollution (Regulation and Control) Rules (2000).Noise level found within limit of standard of noise level 75 dB (A) Leq in day time and 70 dB (A) Leq in night time as per ambient noise rule (2000) for industrial area during this study. The main sources of noise pollution in Dewas industrial area, mainly are industry machines, pump sets, horns, and ill noise.

INTRODUCTION

Noise can be define as an unwanted or undesired sound whereas environmental noise is any unwanted or harmful outdoor sound created by human activities that is detrimental to the quality of life of individuals. The high noise levels are associated with higher population density, human activities, traffic density and lack of greenery (Banerjee and Mukhopadhyay, 2016). India and all other countries are facing noise pollution problem for a long period due to increasing number of vehicles, musical instruments, small scale industries, urbanization and human activities are the main source of noise pollution (Chauhan et al; 2010). Depending on its duration and volume, the effects of noise on human health and comfort are divided into four categories; physical effects, such as hearing defects; physiological effects, such as increased blood pressure, irregularity of heart rhythms and ulcers; psychological effects, such as disorders, sleeplessness and going to sleep late, irritability and stress; and finally effects on work performance, such as reduction of productivity and misunderstanding what is heard (Ozer et al; 2009). Industrial machinery and processes are noise generating media in which their sources include: rotors, stators, fans, vibrating panels, turbulent fluid flow, impact processes, electrical machines, internal combustion engines etc (Gerges et al; 2001). It was described that the increasing number of vehicles, musical instruments,small, small scale industries and urbanization also contribute to noise level. Human activities are the main sources of noise pollution (Chien and Shih, 2007). Hence, the term noise refers to a sound without agreeable musical quality, or an unwanted or undesired sound. Noise is no less a pollutant than the toxic chemicals in the environment. As a result of increasing mechanization, the use of increasingly voluminous and complicated machinery, equipment and the stepping up of the pace of production, noise is becoming an increasingly widespread and serious source of discomfort and danger (Gangwar et al; 2006). Noise ranging from mild to severe emanating from industrial sources is affecting a large number of individuals, including industrial workforce and people living in the vicinity of these industries (Salehin et al ; 2014, Sultan 2012; Sunny et al; 2012; Rahman et al; 2010). Exposure to high occupational noise causes annoyance and higher rates of hearing loss. Besides, it is related to many other health problems among the workforce serving in industries like metal processing, textiles, garments, construction, shipyards, and mining (Rabinowitz et al; 2010, Chang et al; 2009, Eleftheriou 2002). Premature hearing loss, blood pressure alteration, hypertension, several cardiovascular and non-cardiovascular diseases, and lack of concentration among industrial workers are well-known outcomes of noise exposure at work (Nawaz and Hasnain 2013, Atmaca et al; 2005, Chang et al; 2006). Because of the rapid increase in industrialization, urbanization and other communication and transport systems, noise pollution has reached to a disturbing level over the years (Hunashala, 2012). It has been established that excessive noise is not only adversely affecting the health of human beings but is also a health hazard to all living beings (Chauhan and Pande 2010). Therefore this study reveals the status of noise level quality in Dewas industrial area of Madhya Pradesh India.

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Table 1. Monitoring Locations

S.N	Code	Industrial Area	Monitoring Locations	Latitude & Longitude
1.	N1	Industrial Area 1	M/S White star milk and milk products , Dewas	22.5754 & 76.2453
2.	N2	Industrial Area 1	M/S Tata International Ltd, Dewas	23.1064 & 77.52432
3.	N3	Industrial Area 1	M/S Raj Pioneer Laboratories (India), Dewas	23.07689 & 77.55652
4.	N4	Industrial Area 2 & 3	M/S Roca Bathroom Products Pvt Ltd (Parryware Industry) Dewas	23.11448 & 77.51583
5.	N5	Industrial Area 2 & 3	M/S VE Commercial Vehicle Ltd unit 2 (Eicher), Dewas	23.10886 & 77.51757
6.	N6	Industrial Area 2 & 3	M/S Navin Fluorine International Ltd, Dewas	23.09844 & 77.52922
7.	N7	Sia Industrial Area	M/S Krishna Food Products Ltd, Dewas	23.08073 & 77.53493
8.	N8	Ujjain Road Industrial Area	M/S Kriloskar Brother's Ltd, Dewas	23.07719 & 77.54176
9.	N9	Ujjain Road Industrial Area	M/S Bank Note Press , Dewas	23.07449 & 77.53204

Table 2. Noise Level in Ambient Air

S.N	Duration	Unit	Ambient noise rule 2000 standards	N1	N2	N3	N4	N5	N6	N7	N8	N9
1	Day Time	dB (A) Leq	75	51.5	53.5	55.8	53.5	50.8	53.6	60.1	58.7	45.2
2	Night Time	dB (A) Leq	70	41.2	42.8	44.7	40.5	44.2	45.1	46.6	41.7	39.8

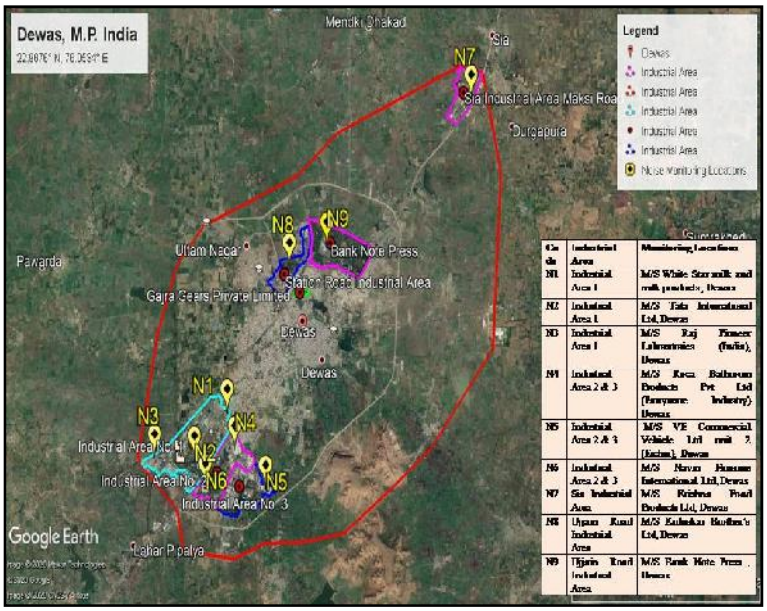

Figure 1. Monitoring Locations in Dewas industrial area

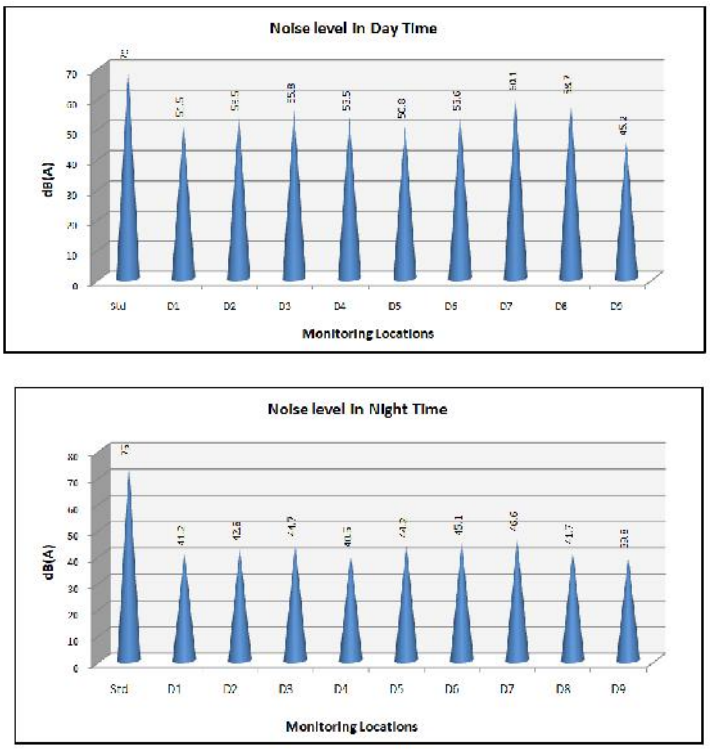

Figure 2. Noise Level in Day Time and Night Time

Therefore this study reveals the status of noise level quality in Dewas industrial area of Madhya Pradesh India.

METHODOLOGY

Study Area: Dewas District in Ujjain Revenue Division, is situated on the Malwa plateau in the West-central part of Madhya Pradesh, India and lies between 20°17´ and 23°20´ North latitude and 75°54´ and 77°08´ East longitude. The district is bounded by Ujjain district in the north, Indore district in the west, West-Nimar district in the south-west, East Nimar district in the south, Hoshangabad district in the South East, Sehore district in the east and Shajapur district in the North-East.

Monitoring Locations: Dewas industrial area is consist of four industrial area i.e. Industrial Area 1, Industrial Area 2 & 3, Sia Industrial Area and Ujjain Road Industrial Area. Total nine locations in different industrial area in Dewas were selected for noise quality monitoring is depicted in table no 1 and figure no 1.

Monitoring: Noise level measurements were carried out in "A" weight age using the Cirrus Sound Level Meter. The instrument was placed at selected site on a height of about 1.2 meter above the ground. Care was also taken to ensure that no reflections took place near the instrument. The noise data were collected from different monitoring locations at different time in order to assess the changing noise level at sites. Data collected during day time (6 AM to 10 PM) and night time (10 PM to 6 AM) at the all monitoring locations. All noise monitoring was done as per standard guidelines followed by Central Pollution Control Board. All results were compared with standard limits for industrial area of Noise Pollution (Regulation and Control) Rules (2000).

RESULTS AND DISCUSSION

The observed noise level at all selected monitoring locations of Dewas Industrial area are depicted in table 2. In figure no 2, Minimum average noise level was found D9 (45.2 dB (A) Leq) and maximum average concentration at D7 (60.1 dB (A) Leq) in day time (6 AM to 10 PM). Noise levels at the selected location under industrial zone were not exceeded the prescribed standard level for industrial area i.e 75 dB (A) Leq in day time. In figure 3, Minimum average noise level was found D9 (39.8 dB (A) Leq) and maximum average concentration at D7 (46.6 dB (A) Leq) in night time (10 PM to 6 AM). Noise levels at the all selected locations under industrial zone were not exceeded the prescribed standard level for industrial area i.e 70 dB (A) Leq in night time.

Conclusion

Noise level found within limit of standard of noise level as per Noise Pollution (Regulation and Control) Rules (2000) for industrial area during this study. The flow of ill maintained vehicles, honking of air horns industrial activities, instruments, encroachments and heavy vehicle activity of NH3 (Agra Mumbai Highway) highway may the reasons for observed noise level. Noise pollution may more due to a higher concentration of population, industries and transportation activities. The main sources of noise pollution in Dewas industrial area, mainly are industry machines, pump sets, horns, and ill noise. Noise like other pollutants is a byproduct of industrialization, urbanization and modern civilization. In Dewas industrial areas, industry machines, pump sets, horns and ill noise are main sources of noise pollution.

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