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A Study of Environmental Impact Assessment of Highway Adjoining Industrial Estate

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Abstract-In the present study, Environmental Assessment of Highway adjoining to Deoria Industrial Developmental Authority (USSRA BAJAR) Project Area is carried out with a view to look into the present status of environmental quality and issues relating to public health. Environmental Assessment of This Project Area has never been done earlier. Industrial pollution is considered to be the major problem in this area. Environmental Assessment should carefully examine the various environmental parameters related to water, air, and noise because the pollution may adversely affects the adjoining areas and ultimately the city. So, there is a need to assess the environmental condition of the area and to look into improvement measures to reduce, prevent or avoid the potential adverse environmental penalty from the project activities and to ensure a high quality environment in the region. Significance of this work lies in dropping environmental acquiescence issues, waste minimization and to protect occupational safety of workers and to promote sustainable development. Mitigation measures are needed in order to eliminate or minimize adverse environmental impacts. Various environmental issues are existing and discussed. The Environmental Assessment has included the assessment of Ambient Air Quality, And Noise Pollution Project Area.
Keywords: Ambient Air Quality, And Noise Pollution

I. INTRODUCTION

Air pollution due to anthropogenic sources is a matter of concern in whole world. The urban areas may be viewed as dense sources of enormous anthropogenic emissions of pollutants which can alter the atmospheric composition, chemistry and life cycles in it's down wind regimes, extending over several hundred kilometers. Moreover, worldwide epidemiological study on the effect of air pollution has revealed that gaseous pollutants and particulate matter has enough potential to cause severe health effect like respiratory, cardiovascular diseases and cardio pulmonary mortality. Modernization and Industrialization of developing countries has led to the increased use of fossil fuels and their derivatives.

Noise can be defined as an unpleasant and unwanted sound. Exposure to loud noise is indeed annoying and harmful too. Various noise scales have been introduced to describe in a single number, the response of an average human being to a complex sound made up of various frequencies at different loudness levels. The scale has been designed to weigh various components of noise according to the response of a human ear.

II. MATERIALS AND METHODS STUDY AREA

The Environmental Assessment was conducted on Highway Adjoining to Deoria Industrial Development Authority (USSRA BAJAR) Project Area.

The Project area consists of large, medium and small industries. At present, there are 46 industries with 38 small and 2 large units. Deoria Industrial Development Authority emerges as a model industrial township with latest technology and modern urban facilities. It is being developed in the shape of a new Deoria City with the self-sufficient industrial township keeping in view its future needs.

Mainly, three components of air are analyze during the monitoring of Ambient Air Quality in Project Area including RSPM, SO_2, NO_X..

Progress in industrialization has resulted in creating noise pollution. So, the noise levels were also monitored in Project Area

III. RESULTS AND DISCUSSION

The results of the assessment of Ambient Air Quality, Wastewater and Groundwater samples,
Noise Levels and Solid Waste Management in Project Area are given here:
The results of Ambient Air Quality monitoring are given below

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Parameter	January 2015 (Winter)	April 2015 (Summer)	June 2015 (Monsoon)	NAAQS (Permissible limit) µg/m^3
RSPM	156.3	137.8	120	100
SO_2	24.2	22.1	21.3	80
NO_X	45.2	39.8	33.6	80

Table.1: Seasonal Variation in Ambient Air Quality (2015)

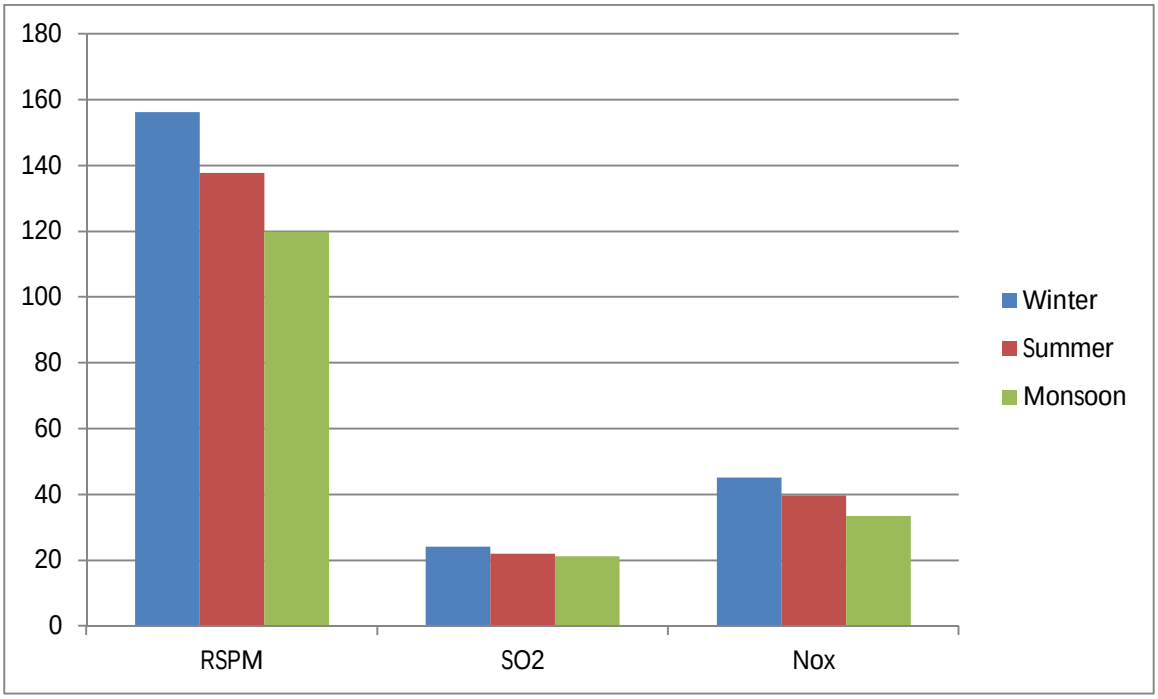


Fig 1: Seasonal Variation in Ambient Air Quality Parameters in Project Area

It is revealed from Table.1 that repairable suspended particulate matter (RSPM) is found to be more than the permissible limit whereas sulphur dioxide (SO2) and nitrogen oxides (NOx) are within the limits. It is also evident from Fig.2 that the highest values for all the air quality parameters are observed in winter season followed by summer and monsoon seasons.

Noise monitoring was done at 4 locations on highway adjoining to Deoria Industrial Development Authority (USSRA BAJAR) Project Area which are given in Table2. While the noise levels recorded from the locations are given in table 3

S.No	Site No.	Locations
1	Site 1	In Front Of School
2	Site 2	In Front Of Hot Mixed Plant
3	Site 3	In Front Of Brick Industry
4	Site 4	In Front Of Highway

Table 2 : Site Description

Sites		Site 1	Site 2	Site 3	Site 4
Noise Level (Day)		55.3	56.2	60.8	70.1
Noise Level (Night)		45	50.3	49.9	60.2
Prescribed Limits	Day	75	75	75	75
	Night	70	70	70	70

Table.3: Noise Assessment Results

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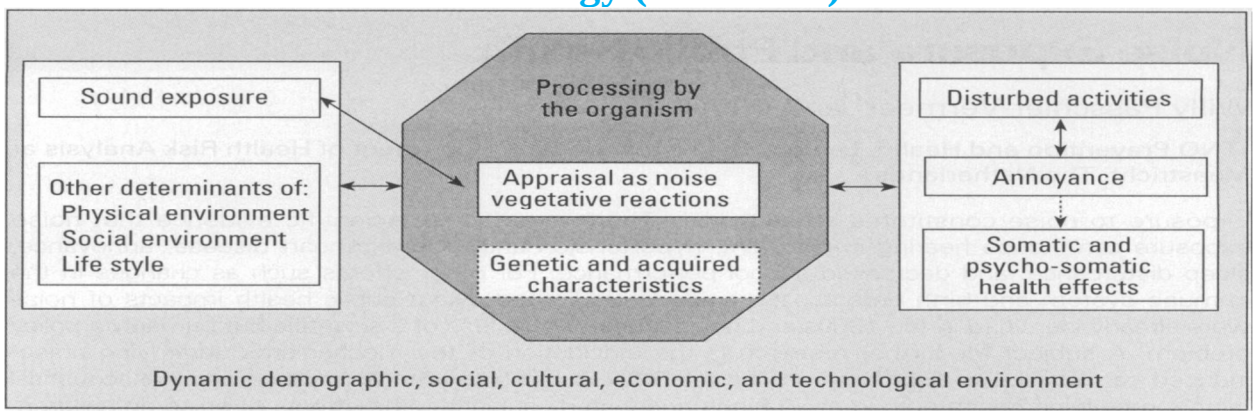


Fig 2.Conceptual model of the interaction of sound with the organism and the occurrence of effects on health and quality of life

IV. PASSCHIER-VERMEER AND PASSCHIER

Cause-effect sequence

Environmental agent	Exposure	Harm

Fig 3. Simple cause-effect chain for the assessment of the health effects of an environmental agent, such as a xenobiotic substance.

The human hearing organ is not equally sensitive to sounds of different frequencies. Therefore, a spectral sensitivity factor is use that rates sound pressure levels at different frequencies in a way comparable to that of the human hearing organ; this is called A-weighting. The biophysical quantity A-weighted sound pressure level (L) is expressed as dB(A) and is referred to as sound level. Examples of sound levels in some common situations are falling leaves (very quiet), 10-20 dB(A); vacuum cleaner, 55-65 dB(A); location close to a main road or highway, 70-80 dB(A); pop music concerts, 1 00-1 1 0 dB(A).

V. EQUIVALENT SOUND LEVEL AND DAY-NIGHT LEVEL

Sound level is the basic metric from which other biophysical metrics to specify long-term exposure to noise are derived. Usually a noise metric is assessed on an annual basis. In environmental and occupational situations, sound levels fluctuate with time. From these fluctuating sound levels, the equivalent sound level ($L_{Aeq,T}$) over a period of time, T, is determined from

$$L_{Aeq,T} = 10 \log \frac{1}{T} \int_T 10^{\frac{L(t)}{10}} dt$$

Common exposure periods T are 24 hr (full day) and 8 hr (work day). For some environmental health assessment purposes, the day-night level (Ld") is used. This metric is the equivalent sound level over 24 hr with the sound levels during the night (11 PM-7 AM) increased by 10 dB(A). Also a day-evening-night level (L1, is used, which is constructed similarly, such that the sound levels during the evening (7 PM-1 1 PM) are increased by 5 dB(A) and those during the night (1 1 PM-7 AM) by 10 dB(A). These adjustment factors of 10 or 5 dB(A) take into account that night-time and evening-time noise are more annoying than day-time noise with the same equivalent sound level. Because of road, railway, and aircraft traffic noise, most of the urban population in industrialized countries are exposed to outdoor Ld, levels of > 50 dB(A). Rural populations usually are exposed to outdoor traffic Ld, values of < 50 dB(A). Rough estimates of the percentage of people in Europe living in locations with Ld,, values > 60 dB(A) vary from 2 to 8%, depending on the country in which they live. For the India population this percentage is 4%. It is further estimated that 0.6% of the India population is exposed to traffic noise with Ld,, values of > 70 dB(A) (8,9). Both in research and in policy, Ld,, or Ld,, is applied in a specific way: the metrics are used as location-specific quantities to be measured in front of the facade of residential buildings

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Fig 4: Mixed Traffic

The Day time noise level were recorded in the range of 55.3 -70.1 db (A). Noise levels at all industrial locations during day time were found below the prescribed limit of 75.0db(A) whereas during night time the noise level were recorded in range of 45.0 dB(A) - 60.2 dB(A) which were also below the prescribed limit of 70 dB(A). During industrial process and operations, heavy equipment and machinery generate noise, thereby causing a nuisance to the surrounding population and environment. The noise levels vary widely and depend on the type of activity performed. Thus, it is revealed that the noise levels in Project Area are within the permissible limit prescribed
by Noise Pollution (Regulation and Control Rules, 2000).
However, there is a need to keep vigil on noise levels in near future also in view of the fact those industrial areas in surrounded by rural areas and any further increment in noise levels weight render adverse effects in the adjoining areas.

VI. CONCLUSION AND RECOMMENDATIONS

The study carried out, regarding the Environmental Assessment of Highway adjoining to Deoria Industrial Development Authority (USSRA BAJAR) project Area has revealed various important findings related to Air, And Noise Pollution.
In this context, the important findings and recommendations are given below.

A. The Ambient Air Quality Monitoring has revealed that the Reparable Suspended Particulate Matter (RSPM) exceeded the permissible limits, which is a point of worry in respect of respiratory health of human beings living in the adjoining areas. However, the value of sulphur dioxide (SO2) and NOx are found inside permissible limits. It is also revealed that the concentrations of these air pollutants are found to be maximum in winter season with receding values during the summer and monsoon seasons. Thus, there is a need for regular Ambient Air Quality Monitoring in the area and to ensure the effective control of air pollutants in the industrial units. In addition, it is also necessary to take up Stack Monitoring in the area and to ensure safe dispersion of air pollutant by providing an effective stack height.

B. The Assessment of Noise Pollution in Project Area has revealed that the noise level is found to be within the permissible limits during the day time as well as night time. However, Noise Level Monitoring should also be done regularly to make sure that the adjoining rural belt is not subjected to any adverse effect in future.

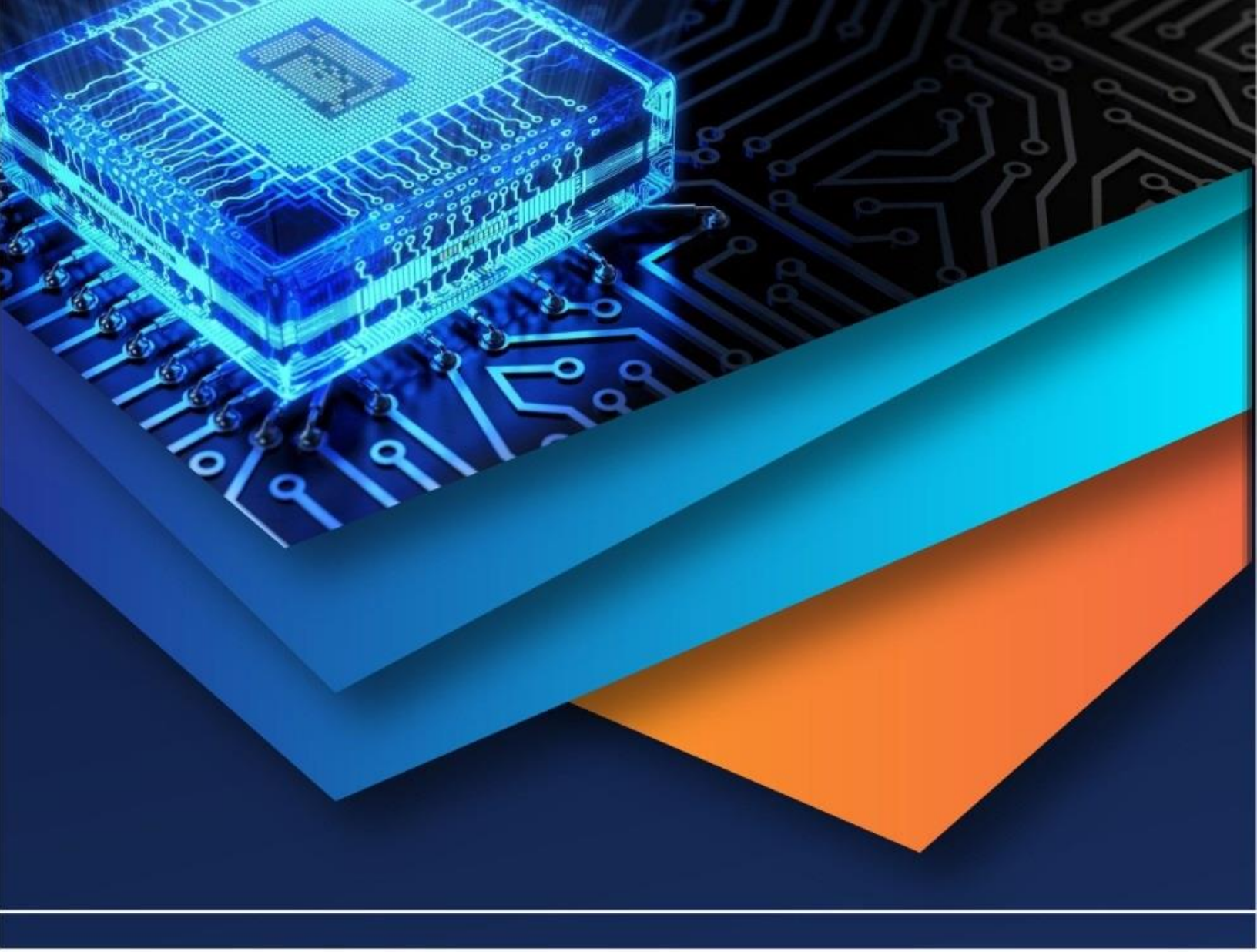
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[7] In the equivalent sound level over a period T, the highest sound levels occurring during this period are counted more heavily than those in the 'normal' average sound level over period T. This is demonstrated by the following example. Suppose that during half of period Tthe sound level is 80 dB(A) and during the other half it is 40 dB(A). Then the equivalent sound level over period T is 77 dB(A), whereas the arithmetic average sound level is 60 dB(A).
[8] If during a period T(in s) n noise events occur with the same SEL value, the following formula applies: LAeqT= SEL + 10 lgn -10 lg T
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