MEASUREMENT AND ANALYSIS OF NOISE LEVEL ADJOINING TO INDUSTRIAL ESTATE

[1]Abhay Pratap Singh, [2]Dr. A.K Mishra

[1]P.G scholar , [2]Assistant Professor, Civil Engineering Department,
Madan Mohan Malaviya University of Technology Gorakhpur, U.P, (India)

ABSTRACT

In the present study, Environmental Assessment of Highway adjoining to Deoria Industrial Developmental Authority (USARA 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 Noise Pollution Project Area.

Keywords: Noise Pollution

I INTRODUCTION

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

2.1 Study Area

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

The Project area consists of large, medium and small industries. At present, there are 48 industries with 30 small and 12 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.

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

III Methodology of the Work

3.1 For Noise level meter

Firstly we have collected data for 10 minutes at 15 second interval. Thus we have 40 data for every hour by which we have calculated L_{eq} for every hour by following formula :-

$$L_{eq} = 10 \log\left[\frac{1}{T^2} \int \left(\frac{PA}{P_{ref}^2}\right) dt\right]$$

$\qquad$ T= time period

$\qquad$ PA= sound pressure

$\qquad$ Pref = reference sound pressure

3.2 For FHWA Model

To use the FHWA model one needs to collect the following data:- $\qquad$ Hourly vehicle count for each type of vehicles(at least five). Average operating speed of individual type of vehicles.

Distance from the centre of the concerned lane.

$$Leq = Lo + \Delta Li$$

Jain and Parida in 2001 made some modifications which are represented by formula given below:

$$L_{eqi} = L_o + A_{vs} + A_D + A_S$$

Where,

L_{eqi} =Hourly equivalent noise level for each vehicle type.

L_o = the reference energy mean emission level.

A_{vs} =Volume and speed correction for subscribe.

A_D =Distance correction.

A_S =Ground cover correction.

S.no	Category of vehicle	Individual vehicle noise emission equation
1	2 wheelers	Y=59.364 +0.93 Ln(S)
2	3 wheelers	Y= 88.527 – 4.8433 Ln(S)
3	Car	Y= 68.992 – 0.0796 Ln (S)

4	Truck	Y= 39.012+10.074 Ln (S)
5	LCV (mini bus)	Y= 54.908 + 4.9153 Ln (S)
6	Bus	Y= 37.867 + 10.253 Ln(S)
7	Tractor/trailor	Y= 60.83 + 5.3257 Ln(S)

o **Source (Pandey and pattnaik,2011)**
Avs=10*log(Do*V/)-25

AD=10*log(Do/D)^(1+α)

Where,

Do=Reference distance taken as 10m

D=distance from centerline.

V=individual average velocity of vehicles.

α=Ground coefficient.

IV RESULTS AND DISCUSSION

Noise Levels and Solid Waste Management in Project Area are given here:

Noise monitoring was done at 3 locations on highway adjoining to Deoria Industrial Development Authority (USARA BAJAR) Project Area which are given in Table1. While the noise levels recorded from the locations are given in table 2

Table 1: Site Description

S.No	Site No.	Locations
1	Site 1	At Deoria to Rudrapur road
2	Site 2	In Front Of Hot Mix Plant
3	Site 3	Near Parag Industry

Table.2: Noise Assessment Results

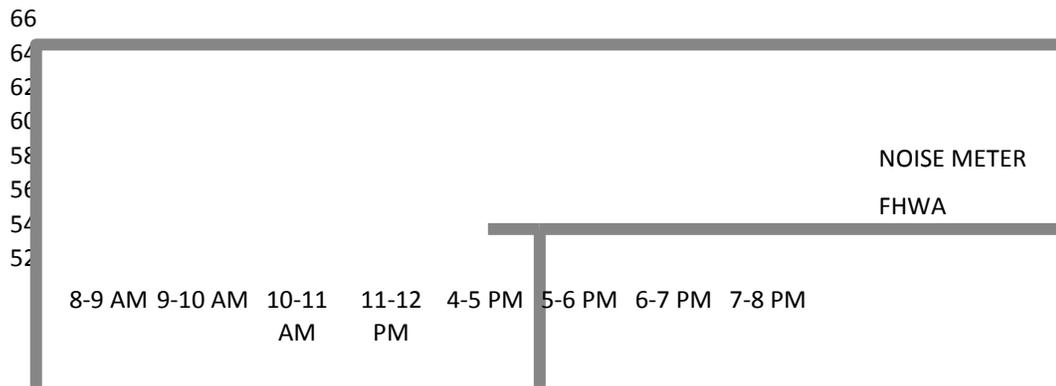| TIME	L_{eq} from Noise Level Meter	L_{eq} from FHWA
8-9 am	63.66	63.52
9-10 am	61.74	66.04
10-11 am	62.60	65.09
11-12 pm	60.69	63.25
4-5 pm	62.08	65.22
5-6 pm	65.27	68.01
6-7 pm	60.56	63.70
7-8 pm	58.48	57.68

Data at Deoria to Rudrapur Road
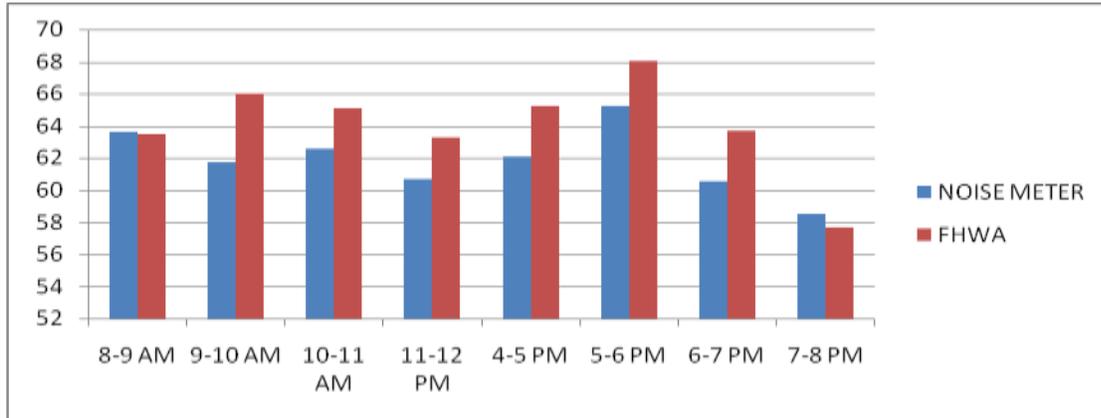
Graphical Data at Deoria to Rudrapur Road

| Time	L_{eq} from Noise Level Meter	L_{eq} from FHWA
8-9 am	60.67	62.14
9-10 am	60.15	62.95
10-11 am	61.69	64.44
11-12 pm	59.66	61.77
4-5 pm	63.48	62.59
5-6 pm	57.42	62.27
6-7 pm	60.99	61.68
7-8 pm	57.88	57.51

Data In Front Of Hot Mix Plant

Graphical Data In Front Of Hot Mix Plant

Time	L_{eq} from Noise Level Meter	L_{eq} from FHWA
8-9 am	60.29	59.43
9-10 am	59.63	60.01
10-11 am	59.37	60.09
11-12 pm	62.35	59.99
4-5 pm	61.01	60.25
5-6 pm	59.98	60.40
6-7 pm	60.47	60.58
7-8 pm	57.42	56.74

Data near Parag Industry
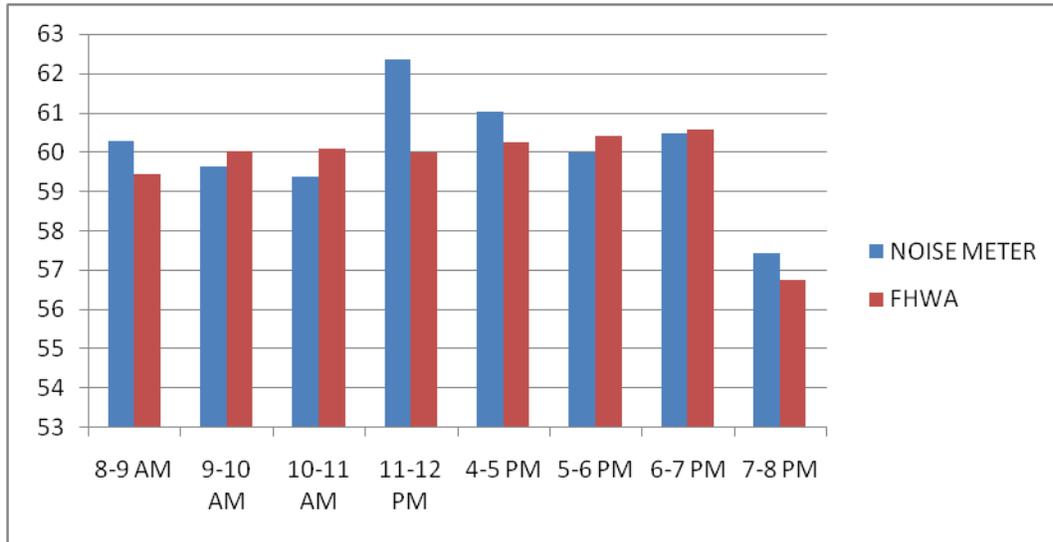
Graphical Data near Parag Industry

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

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.

V CONCLUSION AND RECOMMENDATIONS

The study carried out, regarding the Environmental Assessment of Highway adjoining to Deoria Industrial Development Authority (USARA BAJAR) project Area has revealed various important findings related to Noise Pollution.

In this context, the important findings and recommendations are given below.

1. 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.

2. The analysis of data has shown that the observed noise level along the highway corridor between Deoria to DIDA is under the prescribed limit but due to the huge increment of traffic volume the step need to be taken for the control of noise in future by prescribed authority.

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