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# Pollution Due To Noise from Selected Places

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***Abstract***: *Noise pollution degrades environment and also causes health hazard to human beings. In urban areas major sources of noise pollution are traffic and construction activities. Available guide lines for noise pollution have been reviewed in the paper. Measurement of noise levels at selected locations reported in the paper, for example, railway stations, use of machinery at construction sites, etc., was made and compared with the guide line values. It has been observed that the noise level at all locations exceeds the value prescribed by the competent authorities. At the pedestrian locations the noise level is 60 dB to 110 dB. At the railway crossing the noise level is 45 dB to 110 dB. The above inference shows that the noise pollution is paramount at all sources. Due to the various adverse impacts of noise on humans and environment, noise should be controlled. The conclusion drawn from this study is that the technique or the combination of techniques to be employed for noise control depends upon the extent of the noise reduction required, nature of the equipment used and the economy aspects of the available techniques.*

***Keywords***: *noise, construction noise, noise pollution, noise control, noise attenuation*

## I. Definition Of Noise Pollution

The word noise is derived from the Latin term nausea. It has been defined as unwanted sound, a potential hazard to health and communication dumped into the environment with regard to the adverse effect it may have on unwilling ears. Noise is defined as unwanted sound. Sound, which pleases the listeners, is music and that which causes pain and annoyance is noise. At times, what is music for some can be noise for others (1,2,3). Sound is a form of energy which is emitted by a vibrating body and on reaching the ear causes the sensation of hearing through nerves. Sounds produced by all vibrating bodies are not audible. The frequency limits of audibility are from 20 Hz to 20,000 Hz(4).

## II. Noise Pollution Acts

Section 2 (a) of the Air (Prevention and Control of Pollution) Act, 1982 includes noise in the definition of 'air pollutant'. According to Section 2(a), air pollution means any solid, liquid or gaseous substance including noise present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment (5).

According to the Encyclopaedia Britannica, with respect to acoustic, noise is defined as any undesired sound. In Chambers 21st Century Dictionary, the definition of noise has undergone a change. Noise pollution stands carved out as a phrase separately from noise. The two are defined as under: Noise means a sound; a harsh disagreeable sound, or such sound; a din; and Pollution means an excessive or annoying degree of noise in a particular area, e.g., from traffic or aero plane engines.

Pollution is a noise derived from the verb pollute. Section 2(c) of the Environment (Protection) Act, 1986 defines environmental pollution to mean the presence in the environment of any environmental pollutant. Section 2(b) of the said Act defines environmental pollutant to mean any solid, liquid or gaseous substance present in such concentration as may be, or tends to be injurious to environment (6,7). Noise can be described as sound without agreeable musical quality or as an unwanted or undesired sound. Thus, noise can be taken as a group of loud, non harmonious sounds or vibrations that are unpleasant and irritating to ear.

## III. Effect Of Noise Pollution

Though noise pollution is a slow and subtle killer, yet very little efforts have been made to ameliorate the same. It, along with other types of pollution, has become a hazard to quality of life. Even relatively low levels of noise affect human health adversely. It may cause hypertension, disrupt sleep and/or hinder cognitive development in children. The effects of excessive noise could be so severe that either there is a permanent loss of memory or a psychiatric disorder. Thus, there are many an adverse effects of excessive noise or sudden exposure to noise. The effects on human being are: It decreases the efficiency of a man; Lack of concentration;

Fatigue; and Abortion. It also causes Blood Pressure and Temporary and permanent Deafness. It has the following effects on vegetation such as poor quality of crops and on the nervous system of animal like animal looses the control of its mind. They become dangerous and the effect on property is colossal. It creates waves which strike the walls and put the building in precarious condition. It weakens the edifice of buildings(8,9).

## IV. Sources Of Noise Pollution

Noise pollution like other pollutants is also a by- product of industrialization, urbanizations and modern civilization. Broadly speaking, the noise pollution has two sources, i.e., industrial and non- industrial. The industrial source includes the noise from various industries and big machines working at a very high speed and high noise intensity. Non-industrial source of noise includes the noise created by transport/vehicular traffic and the neighbourhood noise generated by various sources. Noise pollution can also be divided into two categories, namely, natural and manmade. Most leading manmade noise sources will fall into the following categories: road traffic, aircraft, railroads, construction, industry, noise in buildings, and consumer products (10).

This research paper explores the sources, effects, reactions and suggestions for the excessive noise which are generated.

## V. Construction

Construction and demolition works are usually noisy and frequently take place in areas which are quiet, such as residential streets. Although the work may not last long, the disturbance caused may lead to problems for people who live and work near the site. The municipal council has powers to control noise and other nuisance from building sites caused by contractors and sub-contractors under the Control of Pollution Act 1974 and the Environmental Protection Act 1990, if informal action fails to solve any problems. This can involve prescribing working hours and methods(7).

## VI. Guidelines For Noise Pollution

It is in everyone's interests to try to foresee any problems that could arise and plan ways to avoid them. There are certain guide lines containing information and procedures for noise control on Noise Pollution Control Rule 2000 under Environment Protection Act 1996 and are presented in Table 1(7) and in Table 2(11).

**Table 1 Guidelines on noise pollution from MOEF (GOI)**

| Category of Domestic Appliances/ Construction Equipments | Noise limits in dB(A) |
|---|---|
| (a) Window air conditioners of 1 tonne to 1.5 tonne | 68 |
| (b) Air Coolers | 60 |
| (c) Refrigerators | 46 |
| (d) Diesel Generator for domestic purposes | 85 - 90 |
| (e) Compactors (rollers), front loaders, Concrete mixers, Cranes (movable), Vibrators and Saw | 75 |
| Construction Activities – measures of abatement | |
| Acoustic barriers should be placed near construction sites. | |
| The maximum noise levels near the construction site should be limited to 75 dB(A) Leq (5 min.) in industrial areas and to 65 dB(A) Leq (5 min.) in other areas. | |
| There should be fencing around the construction site to prevent people coming near the site. | |
| Materials need not be stockpiled and unused equipment to be placed between noisy operating equipments and other areas. | |
| Constructing temporary earth bund around the site using soil, etc., which normally is hauled away from the construction site. | |

**Table 2 Guidelines on noise pollution from CPCB**

| Sl. No | ZONE | NOISE LEVEL IN dBA | |
|---|---|---|---|
| | | DAY TIME | NIGHT TIME |
| 1 | INDUSTRIAL | 75 | 70 |
| 2 | COMMERCIAL | 65 | 55 |
| 3 | RESIDENTIAL | 55 | 45 |
| 4 | SILENCE | 50 | 40 |

## 7.1STUDY AREA AND OBSERVATIONS FROM IT

The present study focuses with wide range of construction activity noise, pedestrian way and noise due to movement of train near railway station. The study area is selected in such a way that human and machinery is considered for. The noise pollution is recorded in the different sources and the noise generated hours are presented in Table 3.

**Table 3 Details of noise pollution sources and noise generation hours**

| S. No | Ref. No | Place of noise pollution measurement carried out | No. of hours of survey conducted |
|---|---|---|---|
| 1 | N-1, N-2 | Bored pile (during drilling, driving the casing and concreting) | 6 hours at two points |
| 2 | N-3, N-4 | Vibrator (during concreting ) | 45 mins. at two locations |
| 3 | N-5, N-6 | Mixer machine (when concreting work in progress ) | 4 hours at two locations |
| 4 | N-7 to N-11 | Pedestrian location | 8 hours for five days |
| 5 | N-12, N-13 | Inside subway | 8 hours for two days |
| 6 | N-14 to N-19 | Cars of different year of manufacturing | 10 mins. for 2002 to 2012 |
| 7 | N-20, N-21 | Railway station | 8 hours for two days |
| 8 | N-22, N-23 | Level crossing | 8 hours for two days |
| 9 | N-24, N-25 | Outside railway station | 8 hours for two days |

## 7.2 EQUIPMENT

An important part of noise assessment is the actual measurement of the noise levels. The 'A' weighted network was used as it corresponds very closely to a person's hearing sensitivity. The noise level at the locations mentioned in Table 3 were measured with the help of HTC make Sound Level Meter (3241 – c type II data logger) on a digital display type. The noise levels were recorded from morning at an interval of 10 seconds.

## 7.3 PARAMETERS CALCULATED FROM PRIMARY SURVEY

The following noise parameters(12) were calculated: Noise equivalent level, noise pollution level, noise index, and noise climate. These are presented in Figure 1.

Note:

$L_{10}$, $L_{50}$, $L_{90}$, $L_{eq}$, $L_{np}$, $L_{min}$, $L_{max}$, $L_{ave}$, NI and Nc

$L_{10}$, $L_{50}$, $L_{90}$ = noise level exceeded for 10%, 50%, 90% of the time in noise recording

$L_{eq} = L_{50} + (L_{10} - L_{90})^2/60$

$L_{np}, = L_{eq} + (L_{10} - L_{90})$

$NI = L_{90} + (L_{10} - L_{90}) - 30$

$NC = (L_{10} - L_{90})$

$L_{min}$, $L_{max}$, $L_{ave}$ from data logger from sound level meter.

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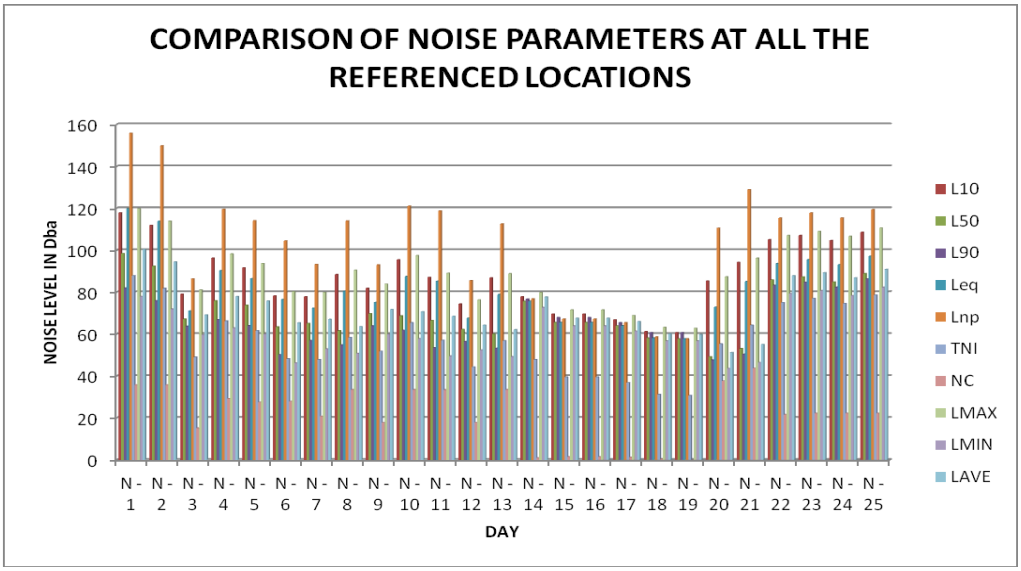


**Fig. 1 Comparison of noise parameters at all locations**

## 8.1 RESULTS AND DISCUSSION

The results are compared with the standards prescribed in Table 1 and 2 and are presented in Figure 2.

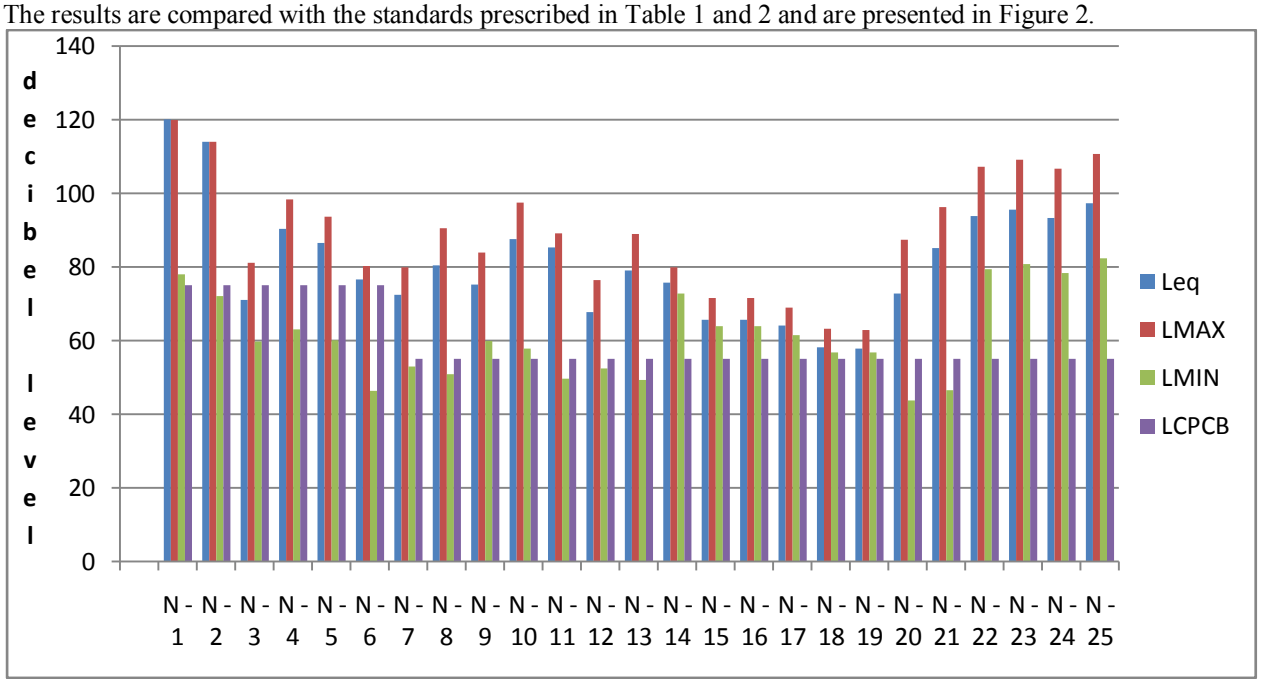


**Fig. 2 Comparison of noise values with standard value prescribed**

The noise level at all locations exceeds the value prescribed by the competent authorities. Even the $L_{min}$ value itself is above the prescribed noise limit. This shows that the noise pollution is predominant at all locations. The exposure time for $L_{eq}$ for the machinery is limited to 5 min as prescribed by the CPCB, but the results show that the exposure time is more than 5 mins. At the pedestrian locations the noise level is 60 dB to 110 dB. At the railway crossing the noise level is 45 dB to 110 dB. The above inference shows that the noise pollution is paramount at all sources.

## 8.2 CONTROL OF NOISE POLLUTION

Noise generation is associated with most of our daily activities. A healthy human ear responds to a very wide range of SPL from - the threshold of hearing at zero dB, uncomfortable at 100-120 dB and painful at 130-140 Db(8). Due to the various adverse impacts of noise on humans and environment, noise should be controlled. The technique or the combination of techniques to be employed for noise control depend upon the extent of the noise reduction required, nature of the equipment used and the economy aspects of the available techniques(13,14).

The various steps involved in the noise control strategy are illustrated at Fig. 3. Reduction in the noise exposure time or isolation of species from the sources form part of the noise control techniques besides providing personal ear protection, engineered control for noise reduction at source and/or diversion in the trajectory of sound waves(15).

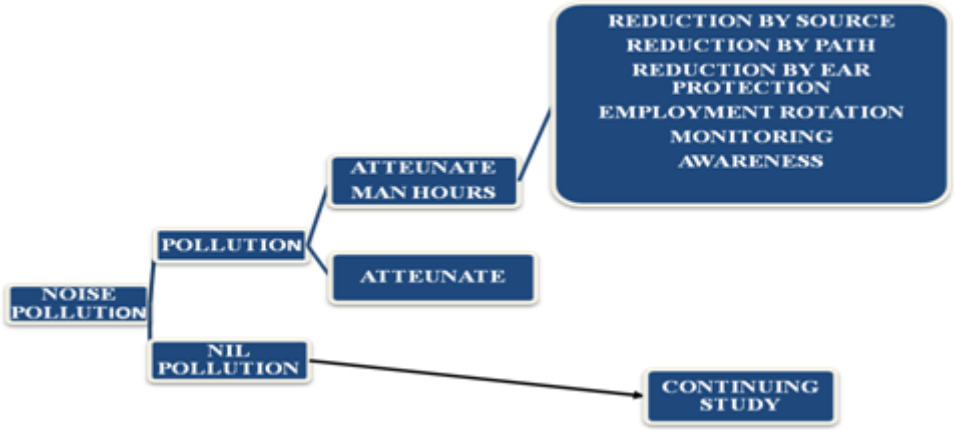


**Fig. 3 Noise control strategy in hierarchical manner(15)**

## VII. Conclusion

Knowingly or unknowingly everyone contributes to noise pollution, because most of the day-to-day activities of human beings generate some noise. Often neglected, noise pollution adversely affects the human being leading to irritation, loss of concentration, loss of hearing. One has to identify the sources of noise pollution. Once identified, the reason(s) for increased noise levels to be assessed. Measurement of noise level taken at a few locations such as railway station, railway gate, construction site with the operation of specific machinery, sounds alarming. The noise level at all locations exceeds the value prescribed by the competent authorities. Even the $L_{min}$ value itself is above the prescribed noise limit. This shows that the noise pollution is predominant at all locations. The exposure time for $L_{eq}$ for the machinery is limited to 5 min as prescribed by the CPCB, but the results show that the exposure time is more than 5 mins. At the pedestrian locations the noise level is 60 dB to 110 dB. At the railway crossing the noise level is 45 dB to 110 dB. The above inference shows that the noise pollution is paramount at all sources. Because of high level of noise it is imperative that noise level has to be abated by exercising control at the source. Reduction in the noise exposure time or isolation of species from the sources form part of the noise control techniques besides providing personal ear protection, engineered control for noise reduction at source and/or diversion in the trajectory of sound waves.

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