

NOISE A POLLUTANT MONITORING AND LEGISLATIONS

DR M. P. GEORGE , SCIENTIST
DELHI POLLUTION CONTROL
COMMITTEE

- Hearing is a form of touch. You feel it through your body, and sometimes it almost hits your face.

~ Evelyn Glennie (deaf percussionist), [Touch the Sound](#) (2004 documentary)

- If a man loudly blesses his neighbour early in the morning, it will be taken as a curse.

~ [Proverbs](#) 27:14

Environmental Pollutants

- ⦿ Environmental pollutants mean the excessive presence of solid, gaseous, liquid and noise in the atmosphere in such concentration as may be injurious to living and non-living things.

Noise Pollution

- ⦿ Noise /Sound pollution : it is pollution due to sound,
- ⦿ it is a word derived out of nausea and has also been slated as an unwanted sound, a hazard to health which means harming the natural habitat with boomed sound or high sound

- ① Noise is also considered to be a pollutant and it has significant harmful effects not only on human beings but also on animals, birds and non-living things.
- ① Problems due to noise increasing day-by-day especially in the urban and industrial areas. Highways, airports, industries and centres where construction activities are carried on, are also considered high noise level areas.

- ⦿ Noise is not a recent problem. It has a long history. Two thousand five hundred year ago, the ancient Greek colony of Syber knew of measures to check noise. They had rules to protect sleep and provide a quit and peaceful life to citizens.
- ⦿ Loud sounds was prohibited by Julius Caesar who also banned movements of noisy chariots at night.

NOISE AND SOUND

- ⦿ How to differentiate between these two terms,
 - when the effects of a sound are undesirable, it may be termed as a noise. Sometimes it has an agreeable musical quality.
 - It is a pleasant to a group of people or individual or undesirable to another individual or group of people or a sick person.

Physically, sound is a mechanical disturbance propagated as a wave motion in the air and other elastic or mechanical media such as water or steel.



A MUSICAL NOTE



B NOISE

Noise Monitoring Network

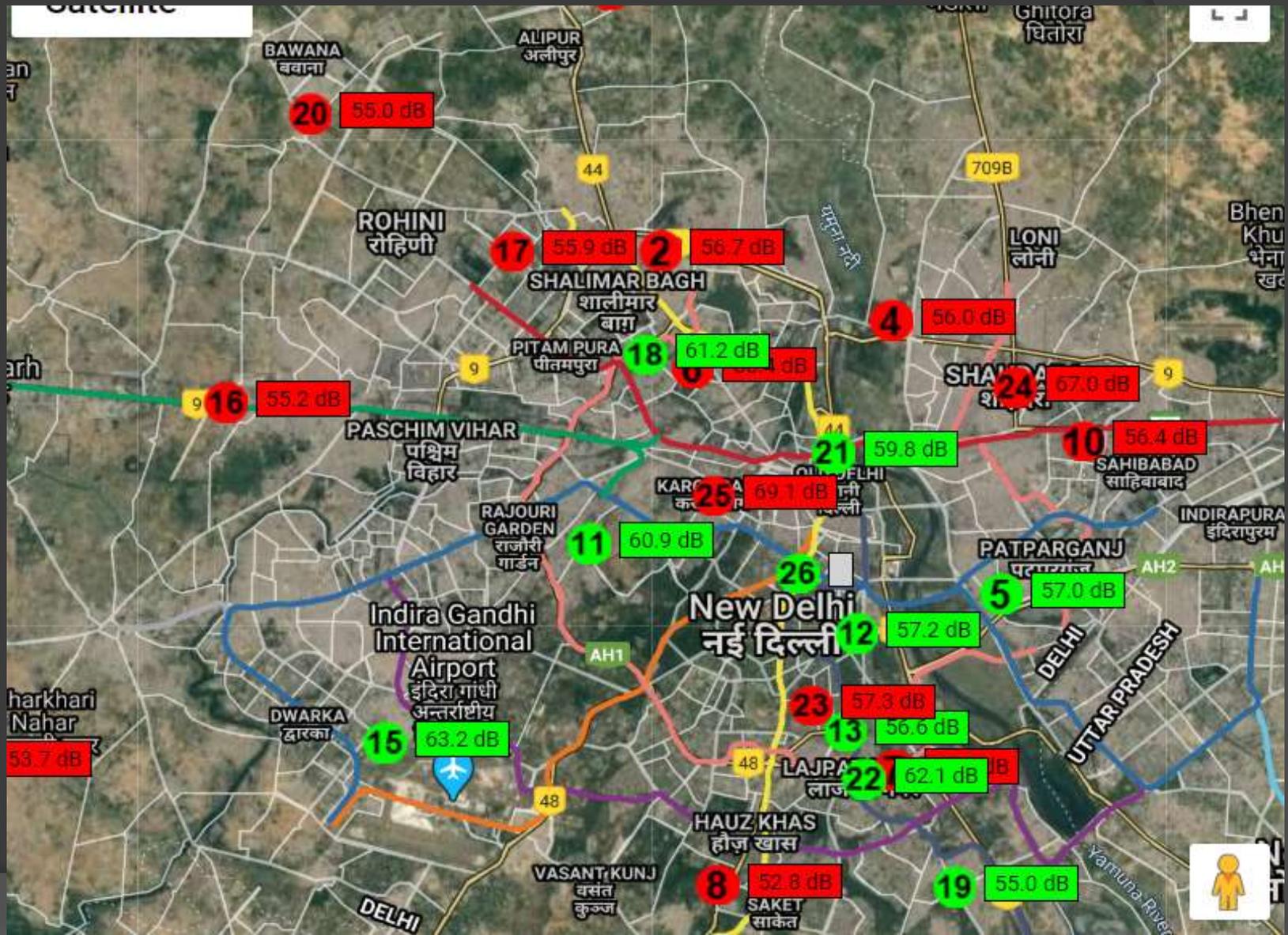
DPCC and CPCB jointly operating 10 real time Ambient noise monitoring systems in delhi since 2013 and 26 more stations added to network in June 2020

Real time data
transferred to CPCB
and DPCC
simultaneously.

Real time Ambient Noise station



Noise Monitoring Network





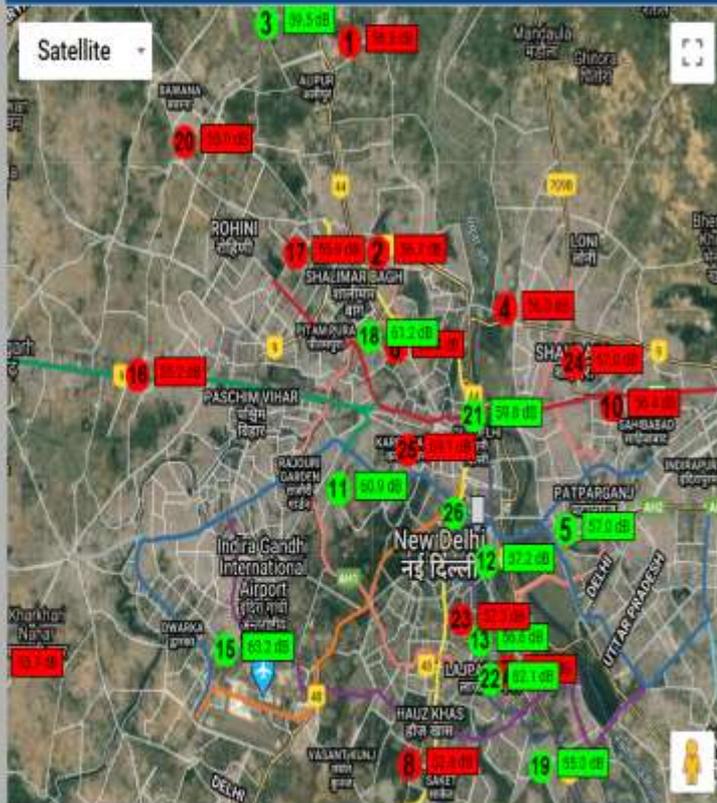
Delhi Pollution Control Committee

Department of Environment, Government of N.C.T. Delhi
4th to 6th Floor, ISBT Building, Kashmere Gate, Delhi-110006

Site

DPCC

Real Time Ambient Noise Monitoring Network



Indicators description:

LAeq: A-weighted, equivalent RMS (root mean square) continuous sound level in decibels, dB(A), measured over a stated period of time. LAeq can be considered as the continuous noise which would have the same total acoustic energy as the real fluctuating noise measured over the same period of time.

Lmax: Maximum sound pressure level measured in decibels over a certain period of time.

Lmin: Minimum sound pressure level measured in decibels over a certain period of time.

Day Time(06h-22h): A-weighted, Equivalent continuous sound pressure level measured from 6AM to 10PM (16 hours), which is also termed as day Time.

Night Time(22h-06h): A-weighted, Equivalent continuous sound pressure level measured from 10PM to 6AM (8 hrs), which is also termed as Night Time.

DIFFERED TIME INDICATORS

Results 02/07/2020

Location	L06h- L22h	06h
1 Ajmer	86.5	81.0
2 Jangpatti	86.7	84.1
3 Narela	59.5	58.0
4 Sonia Vihar	86.0	84.8
5 Patparganj	57.9	52.7
6 Ashok Vihar	80.8	86.0
7 Netaji Park	86.0	80.2
8 Sri Aurobindo Marg	80.0	81.1
9 Najafgarh	83.7	86.8
10 Vivek Vihar	86.0	84.0
11 Pusa	80.9	85.5
12 National Stadium	57.7	57.8
13 J.N Stadium	80.0	84.0

Site Selection Criteria:

- Site of an area shall be selected such that it meets the land use pattern as prescribed in the standard e.g. Industrial, Commercial, Residential & Silence Zone.
- (A) General: 1. The station should be located at the ambient level i.e. away from the direct source, away from any vibration and any obstruction.
- 2. Categorize the area with land use pattern.
(B) Specific : Always use tripod stand at above the ground level of 1 to 1.5 m for areas. Hand held monitoring should be avoided.

Case Specific Locations:

- ⦿ DG Sets up to 800 kW at about 1 m distances from all sides. DG Sets more than 800 kW at about 1 m distance of acoustic enclosure.
- ⦿ Concerned State PCBs / PCCs may regulate the norms with minimum reduction of 25 dB(A) to see the effectiveness of the enclosure.
- ⦿ Petrol and Kerosene Gensets Sound power level is measured in anechoic room so as to have segregated noise level.
- ⦿ Fire crackers 4 m from the bursting point, there shouldn't be reflecting surface around 15m radius.
- ⦿ Vehicle 0.5m from the exhaust point

Positioning of the instrument

- Microphone must be placed 1.2 -1.5m above the ground level.
- In dry conditions with a wind speed of less than 5 m/s.
- Isolate the instrument from strong vibration and shock.

Selection of Noise level meter:

- Noise measurements will be made with a Type 1 integrating sound level meter with free-field microphone which meets the Accuracy of noise measurement as per IEC 804 (BS 6698) Grade I or ANSI Type I or equivalent IEC 61672-1(2002-05) Class-I.

Calibration & monitoring time

- ① Monitoring is done by properly calibrated instrument .
- ① Measurements should be accepted as valid only if the calibration level from before and after the noise measurement agrees to within 1.0 dB.
- ① The sound level meter and calibrator will hold a current calibration certificate traceable to national standards. Start the calibrator and put on 1 KHz frequency calibration on two values 94 dB and 114 dB. If instrument is shows more than ± 0.3 dB differences adjust the calibration.
- ① Monitoring time: The monitoring should be carried out minimum 75% of the prescribed Day time (06.00 am to 22.00 pm) and Night time (22.00 pm to 06.00 am).
- ① The exercise has to be carried out for 6 to 8 hrs. in the said time frame of day & night. It is always preferable to have large number of data sets thus 1sec sampling frequency is recommended.

Monitoring Parameters & Protocol

- ⦿ : Leq, L10, L90, L50, Lmax, Lmin, (with 1 sec sampling period at all locations).
- ⦿ Monitoring Protocol:
- ⦿ a) During ambient noise monitoring sound comes from more than one direction, it is important to choose a microphone and mounting which gives the best possible Omni directional characteristics;
- ⦿ Noise measurements should not be made in fog and rain;
- ⦿ A wind shield will be used at all times to prevent interference of reflecting noise;
- ⦿ As far as is practicable exclude extraneous noise (e.g. low flying aircraft and road traffic passing in front of the microphone) so that the results recorded are representative of the site noise.
- ⦿ If possible for extraneous noise/other source background noise can be eliminated from final reading by using the following formula: $L_{\text{pressure}} = 10 \cdot \log [10(L_p/10) - 10(L_{p\text{Background}}/10)]$

Source Monitoring of Noise

Type- I Integrating Sound Level Meter is used for different source monitoring.

SOUND LEVEL METERS

- ① The electrical signal from the transducer is fed to the pre-amplifier of the sound level meter and, if needed, a weighted filter over a specified range of frequencies.
- ① Further amplification prepares the signal either for output to other instruments such as a tape recorder or for rectification and direct reading on the meter.:

FREQUENCY ANALYZERS

- ① Description The objective of frequency analysis is to determine how the overall level is distributed over a range of frequencies.
- ① The most usual analysis for occupational hygiene noise studies is octave band analysis. For more detailed information, narrower bands can be used such as one-third octave analysis or constant bandwidth analysis.

Noise Dosimeter

- ① The need to ascertain the noise exposure of workers during their normal working day, has led to the development of the noise dosimeter.
- ② This is a small, light and compact instrument to be worn by the worker.
- ③ It measures the total A-weighted sound energy received and expresses it as a proportion of the maximum A-weighted energy that can be received per day.
- ④ This instrument is particularly useful whenever the exposure varies appreciably during the working day

How do you identify noise problems in the workplace?

- ⦿ Noise is louder than busy city traffic.
- ⦿ People have to raise their voice to talk to someone at one metre (3 feet) away.
- ⦿ At the end of work shift people have to increase the volume of their radio or TV to a level too loud for others.
- ⦿ After working for a few years at that workplace, employees find it difficult to communicate in a crowd or party situation where there are other sounds or many voices.

What things do you consider when planning noise measurement?

- Before taking field measurements, it is important to determine the type of information required. The person making the measurement must understand:
 - The purpose of measurement: compliance with noise regulations, hearing loss prevention, noise control, community annoyance etc.
 - The sources of noise, and times when the sources are operating.
 - The temporal pattern of noise - continuous, variable, intermittent, impulse.
 - Locations of exposed persons.
 - The initial measurements are noise surveys to determine if:
 - Noise problem exists.
 - Further measurements are needed.
 - The second step is to determine personal noise exposure levels; that is, the amount of noise to which individual employees are exposed. If the workplace noise remains steady, noise survey data can be used to determine employee exposures. However, noise dosimetry is necessary if the workplace noise levels vary throughout the day or if the workers are fairly mobile.

○

Indian Constitution and Noise Pollution Control

- ④ The Indian Constitution of 1950 did not have any provisions directly dealing with environmental pollution. But the 42nd Amendment of Constitution passed in 1996 inserted article 48-A and Article 51-A to protect and improve the environment
- ④ Thus, India became one of the few countries of the world which enshrined in its Constitution, a commitment to environmental protection and improvement.
- ④ It has interjected a new dimension to public responsibility by obligating the Central Government to protect and improve the environment for the good of society as a whole. The
- ④ Constitution makes a dual provision by way of directives to the state for the protection and improvement of the environment and imposing a duty on every citizen to help in the preservation of the natural environment.

Other Laws regarding Noise Pollution

- ① **Section 133, Code of Criminal Procedure** the magistrate court have been empowered to issue remove or abate nuisance caused by noise pollution u/s 133 empowers and executive magistrate to interfere and remove a public nuisances in the first instance with a conditional order and then with a permanent one the provision can be utilized in case of nuisance of environment nature In
- ① **Law of Torts** noise pollution is considered as a civil wrong. Under Law of Torts a civil suit can be filed claiming damages for the nuisance. For filing a suit under Law of Torts a plaintiff is required to comply with some if the requirement of torts of nuisances which are interference should be with the use and enjoyment of land. , there should be reasonable interference.

- ① **Section-2 (A) of the Air (prevention and control of pollution) Act, 1981** includes noise in the definition of “Air Pollution” – This section states Air pollution means any solid, liquid or gaseous substance including noise present in the atmosphere. Such concentration as may be or tend to injuries to human being or other living creatures or plants or property or environment.
- ① **Section-2 (C) of the Environment Protection Act, 1986** defines environmental pollution to mean the presence in the environment of any environmental pollutant.

THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000

- The Principal Rules were published in the Gazette of India, vide S.O. 123(E), dated 14.2.2000 and
- subsequently amended vide S.O. 1046(E), dated 22.11.2000, S.O. 1088(E), dated 11.10.2002, S.O. 1569 (E), dated 19.09.2006 and S.O. 50 (E) dated 11.01.2010 under the Environment (Protection) Act, 1986.

- ① The increasing ambient noise levels in public places from various sources, inter-alia, industrial activity, construction activity, fire crackers, sound producing instruments, generator sets, loud speakers, public address systems, music systems, vehicular horns and other mechanical devices have deleterious effects on human health and the psychological well being of the people; it is considered necessary to regulate and control noise producing and generating sources with the objective of maintaining the ambient air quality standards in respect of noise;

Responsibility as to enforcement of noise pollution control

measures.-

- ① (1) The noise levels in any area / zone shall not exceed the ambient air quality standards in respect of noise as specified in the Schedule.
- ① (2) The authority shall be responsible for the enforcement of noise pollution control measures and the due compliance of the ambient air quality standards in respect of noise.
- ① (3) The respective State Pollution Control Boards or Pollution Control Committees in consultation with the Central Pollution Control Board shall collect, compile and publish technical and statistical data relating to noise pollution and measures devised for its effective prevention, control and abatement.

- **Responsibility as to enforcement of noise pollution control measures.**
- (1) The noise levels in any area/zone shall not exceed the ambient air quality standards in respect of noise as specified in the Schedule.
- (2) The authority shall be responsible for the enforcement of noise pollution control measures and the due compliance of the ambient air quality standards in respect of noise.
- **Restrictions on the use of loud speakers/public address system.**
- (1) A loud speaker or a public address system shall not be used except after obtaining written permission from the authority.
- (2) A loud speaker or a public address system shall not be used at night (between 10.00 p.m. to 6.00 a.m. except in closed premises for communication within, e.g. auditoria, conference rooms, community halls and banquet halls.

Complaints to be made to the Authority.

- ① (1) A person may, if the noise level exceeds the ambient noise standards by 10 dB(A) or more given in the corresponding columns against any area/zone, make a complaint to the authority.
- ① (2) The authority shall act on the complaint and take action against the violator in accordance with the provisions of these rules and any other law in force.

Power to Prohibit etc. Continuance of Music Sound or Noise.

- (1) If the authority is satisfied from the report of an officer incharge of a police station or other information received by him that it is necessary to do so in order to prevent annoyance, disturbance, discomfort or injury or risk of annoyance, disturbance, discomfort or injury to the public or to any person who dwell or occupy property on the vicinity, he may, by a written order issue such directions as he may consider necessary to any person for preventing, prohibiting, controlling or regulating:
 - (a) the incidence or continuance in or upon any premises of -
 - (i) any vocal or instrumental music,
 - (ii) sounds caused by playing, beating, clashing, blowing or use in any manner whatsoever of any instrument including loudspeakers, public address systems, appliance or apparatus or contrivance which is capable of producing or re-producing sound, or
 - (b) the carrying on in or upon, any premises of any trade, avocation or operation or process resulting in or attended with noise.
- (2) The authority empowered under sub-rule (1) may, either on its own motion, or on the application of any person aggrieved by an order made under sub-rule (1), either rescind, modify or alter any such order:
 - Provided that before any such application is disposed of, the said authority shall afford to the applicant an opportunity of appearing before it either in person or by a person representing him and showing cause against the order and shall, if it rejects any such application either wholly or in part, record its reasons for such rejection.

Ambient Air Quality Standards in respect of Noise

Area Code	Category of Area/Zone	Limits in dB(A) Leq *	
		Day Time	NightTime
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence Zone	50	40

1. Day time shall mean from 6.00 a.m. to 10.00 p.m.

2. Night time shall mean from 10.00 p.m. to 6.00 a.m.

3. Silence zone is defined as an area comprising not less than 100 metres around hospitals, educational institutions and courts. The silence zones are zones which are declared as such by the competent authority.

"A", in dB(A) Leq, denotes the frequency weighting in the measurement of noise and corresponds to frequency response characteristics of the human ear.

Leq : It is an energy mean of the noise level, over a specified period.

Noise standard for fire crackers

- ① The manufacture, sale or use of fire-crackers generating noise level exceeding 125 dB(AI) or 145 dB(C)pk at 4 meters distance from the point of bursting shall be prohibited.
- ① For individual fire-cracker constituting the series (joined firecrackers), the above mentioned limit be reduced by $5 \log_{10}(N)$ dB, where N = number of crackers joined together.

Thanks