

THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000

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THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000

S.O. 123 (E), dated 14th February, 2000.1-Whereas the increasing ambient noise levels in public places from various sources, inter-alia, industrial activity, construction activity, generator sets, loud speakers, public address terms, music systems, vehicular horns and other mechanical devices have mysterious effects on human health and the psychological well being of the people; it is considered necessary to regulate and control noise producing and venerating sources with the objective of maintaining the ambient air quality standards in respect of noise.

1. Published in the Gazette of India, Extraordinary, Pt.II, Sec. 3 (ii) dated 14th February, 2000.

Now, therefore, in exercise of the powers conferred by Cl. (ii) of sub-section (2) of Sec. 3, sub-section (1) and Cl. (b) of sub-section (2) of Sec. 6 and Sec. 25 of the Environment (Protection) Act,

1986 (29 of 1986) read with rule 5 of the Environment (Protection) Rules, 1986, the Central Government hereby makes the following rules for the regulation and control of noise producing and generating sources, namely: –

1. Short title and commencement. –

(1) These rules may be called the Noise Pollution (Regulation and Control) Rules, 2000.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. Definitions. – In these rules, unless the context otherwise requires, –

(a) “Act” means the Environment (Protection) Act, 1986 (29 of 1986);

(b) “Area/zone” means all areas which fall in either of the of four categories given in the Schedule annexed to these rules;

(c) “Authority” means any authority or officer authorised by the Central Government, or as the case may be, the State Government in accordance with the laws in force and includes a District Magistrate, Police Commissioner, or any other officer designated for the maintenance of the ambient air quality standards in respect of noise under any law for the time being in force;

(d) “Person” in relation to any factory or premises means a person or occupier or his agent, who has control over the affairs of the factory or premises;’

(e) “State Government” in relation to a Union territory means the Administrator thereof appointed under Art. 239 of the Constitution.

3. Ambient air quality standards in respect of noise for different areas/zones. –

(1) The ambient air quality standards in respect of noise for different areas/ zones shall be such as specified in the Schedule annexed to these rules.

(2) The State Government may categorize the areas into industrial, commercial, residential or silence areas/zones for the purpose of implementation of noise standards for different areas.

(3) The State Government shall take measures for abatement of noise including noise emanating from vehicular movements and ensure that the existing noise levels do not exceed the ambient air quality standards specified under these rules.

(4) All development authorities, local bodies and other concerned authorities while planning developmental activity or carrying out functions relating to town and country planning shall take into

consideration all aspects of noise pollution as a parameter of life to avoid noise menace and to achieve the objective of maintaining the ambient air quality standards in respect of noise.

(5) An area comprising not less than 100 meters around hospitals, educational institutions and courts may be declared as silence area/zone for the purpose of these rules.

4. 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.

5. Restrictions on the use of loud speakers/public address system. –

(1) A loudspeaker 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, conference rooms, community halls and banquet halls.

6. Consequences of any violation in silence zone/area.-Whoever, in any place covered under the silence zone/area commits any of the following offence, he shall be liable for penalty under the provisions of the Act :-

(i) Whoever, plays any music or rises any sound amplifiers,

(ii) Whoever, beats a drum or tom-tom or blows a horn either, musical or pressure, or trumpet or beats or sounds any instrument, or

(iii) Whoever, exhibits any mimetic, musical or other performances of a nature to attract crowds.

7. Complaints to be made to the authority-

(1) A person may, if the noise level exceeds the ambient noise standards by 11) dB (A) or more given in the corresponding columns against any area/zone, make a complaint to the authority.

(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.

8. Power to prohibit etc. continuance of music sound or noise.-

(1) If the authority is satisfied from the report of an officer in charge 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 risk of annoyance, disturbance, discomfort or injury to the public or any person who dwell or occupy property on the vicinity, he may, by 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 premise 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.

SCHEDULE

(See rule 3 (1) and 4 (1))

Ambient Air Quality standards in respect of Noise

Area Code

Category of Area/Zone

Limits in dB(A) Leq*

Day Time Night Time

(A)

(B)

(C)

(D)

Industrial area Commercial area Residential area

Silence Zone

75 70

65 55

55 45

50 40

Note: -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 meters around hospitals, educational institutions and courts. The silence zones are zones, which are declared as such by the competent authority.

4. Mixed categories of areas may be declared as one of the four-abovementioned categories by the competent authority.

*dB (A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

A “decibel” is a unit in which noise is measured.

“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.

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- (vii) Aircraft Act, 1934 and Noise Control
- (viii) Motor Vehicles Act and Noise
- (ix) Factories Act, 1948 and Noise Control
- (x) The Air (Prevention and Control of Pollution) Act, 1981 and Noise Control

1. General. -Noise is unwanted sound. Ambient noise is all encompassing noise associated with any given environment and is usually a composite of sounds from many sources near and far. Any abnormal sound which irritates human being is called as noise pollution.

Noise is one of the undesirable products of technological civilization. Admits this civilization, wherever we go, noise surrounds us. The roar of traffic, the passage of trains and aeroplanes, the bustle of crowds and the working of industry and the public utilities deafens our ears. Even home is invaded by noise. The noise from whatever source it comes from is undoubtedly, physiologically as well as psychologically harmful. Invading environment in dangerous proportions, it is an invisible but insidious form of pollutant Noise as a potentially harmful pollutant is being recognised as a great nuisance these days affecting the quality of life, particularly, in urban areas.

The Environment (Protection) Act, 1986, under Sec. 6 has mentioned “Rules to regulate environmental pollution”. This section has explained the maximum allowable limits of concentrations of various environmental pollutants (including noise) for different areas.

2. The noise nuisance. -Noise is not only a nuisance; it is a health hazard, Indians who have the dubious distinction of being amongst the noisiest people in the world-are deaf to this fact.

Addressing the Indian Science Congress’ annual convention in January 1981, its president, Prof. A.K. Sharma, said, “in the absence of any preventive measures, Indian towns are noisier than those in the West. Calcutta, Bombay and Delhi are regarded to be among the noisiest cities in the

world, where the average noise level even 10 years back was 90 decibels. (Decibels is a unit of noise on a logarithmic scale.)”

In addition to factories, automobiles, trains and aeroplanes, religious and social ceremonies are also a noise nuisance. “Perhaps the most important source of noise of immediate concern in our country, is that associated with the social and religious ecstasies patterned by us notes a study made by SOCLEEN. A noise level survey by-SOCLEEN in the most crowded localities of Bombay during the Ganpati-festival in 1980, found levels upto 97 decibels. The noise level at airports measures about 90 decibels”.

Loudspeakers are a big way of expressing mutual favour in India. Births, marriages, deaths, all appear to be apt occasions for their use. “Loudspeakers wars” between temple and mosques are known to have sparked communal riots.

Prolonged exposure to noise levels about 90 decibels can cause permanent deafness-factory workers show neurological, digestive and metabolic disorders under such conditions. Researchers claim that if present noise levels continue unchecked, further generations may be born deaf.

In the West, noise pollution is checked by legislation. In India, we do not have any law regarding noise levels. Says Dr. V.D. Kulsreshtha of the Indian Law Institute at New Delhi. “A separate legislation in India to control noise sources is extremely significant and timely”. But no amount of legislation will help, unless we are convinced that noise is a menace and take steps to curb it.

3. Noise and psychology. -The most common and best-understood physiological effect of noise is hearing impairment-either temporary or permanent. The amount of permanent hearing loss produced by sufficient exposure to high-level noise depends on the nature of the noise, the time distribution of Particular exposures, the total duration of the exposure over a lifetime, and individual susceptibility. For essentially continuous types of noise, such as that in many factories, enough research has been done to permit some statistical prediction of the risk of hearing damage. More research is needed, however, to predict damage, which results from noise of a discontinuous nature.

Noise is known to produce various temporary changes in man’s physiological state, in particular a constriction of the smaller arteries. This can mean a speeded up pulse and respiration rate. Some medical authorities believe that continued exposure to loud noise could cause chronic effects such as hypertension or ulcers. Startling noises elicit involuntary muscular responses. Research is still necessary to permit quantitative prediction and understanding of the extra-auditory physiological impact of noise.

4. Concept of noise pollution. -The word noise which is derived from the Latin word ‘nausea’, has been defined in different ways. In law, noise may be defined as an excessive, offensive, or

startling sound. In short, the best definition of noise is 'sound which is undesirable-by the recipient'. This subjective definition of noise differs from the scientific description of noise. An objective definition of noise coupled with measure and assessment techniques is yet to be drawn up by the law.

A legally significant objective definition of noise is a complex and difficult to discern, for noise is not purely a matter of acoustics but of psychology. Subjective factors such as mental attitude, environment, time and place, etc., are important in the determination of actionable noise, which differ and are hard to quantify. The law cannot take into account every unwanted noise. On the other hand, any sound, which becomes excessive, unnecessary or unreasonable, has to be put under regulation in order to shield public against unbearable and harmful noise or for its cessation. Scientific methods to that extent may be useful in determining situations where noise steps out from its background and becomes actionable.

Noise becomes a pollutant when it contaminates the environment, which becomes a nuisance and affects the health of persons their activities and mental abilities. In other words, noise pollution is unwanted sound which is dumped into the atmosphere without regarding to the adverse effects it may be having.

Noise though not defined in any statute, but it now included as an environmental pollutant in Section (a) of the Air (Prevention and Control of Pollution) Act, 1981 and hence, recognised as a kind of air pollution.

TABLE

Ambient Air Quality Standards in respect of Noise

Area Code

Category of Area/Zone

Limits in dB(A) Leq*

Day Time Night Time

(A)

(B)

(C)

(D)

Industrial Area

Commercial

Area Residential

Area Silence Zone

75 70

65 55

55 45

50 40

Note: –

1. Day Time shall mean from 6.00 a.m. to 10.00 p.m. (16 hours)
2. Night Time shall mean from 10-00 p.m. to 6.00 a.m. (8 hours)
3. Silence zone is defined as an area comprising not less than 100 meters around hospitals, educational institutions and Courts. The silence zones are zones, which are declared as such by the competent authority.
4. Mixed categories of areas may be declared as one of the four-abovementioned categories by the competent authority.

*dB (A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

A “decibel” is a unit in which noise is measured.

“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.

5. Combating the smog and noise in cities.1-The pollution caused by the explosion in the number of automobiles in cities can be reduced by upgrading the quality of Indian fuel, enforcing higher emission standards and regulating traffic, write DILIP BISWAS, Chairman, and S.A. DUTTA, Scientist, of the Central Pollution Control Board.

In the last two decades the urban population in India has nearly doubled, from 109.5 million in 1971

to 217.0 million 1991 and it is expected to reach 325 million by the turn of the century. With the increasing urbanisation along with a conglomeration of industries and commercial activities in the urban areas, the transport demand has also consequently increased. Due to an inadequate public transport system, the use of personalised vehicles has been steadily increasing. The total number of vehicles has been steadily increasing. The total number of vehicles in India has increased from about 11 million in 1986 to more than 21 million in 1991. About one fifth of the vehicular population in India is concentrated in the major majoropolitan cities.

1. Vide the Hindu Survey of the Environment, 1994, pp .41, 42, 43 and 44.

6. Measurement of the intensity of sound.1-The ISO (International Organization for Standardization) defines noise intensity level as:

$$L = 20 \log_{10} p/p_0 = 10 \log I/I_0$$

Where p equals the measured sonar pressure level given in N/m²

I equal the measured intensity of sound given in W/m²;

P₀ equals the pressure level at the limit of audibility for the normal ear when the frequency of emission is 1000 cycles per sound.

I₀ equals the intensity of sound at the limit of audibility for the normal ear when the frequency of emission is 1000 cycles per second.

The relationship between sound pressure, sound intensity and intensity level is given as follows :

Sound pressure

N/M²

Intensity W/M²

Intensity level

Decibels (dB)

2 x 10⁻⁵

2 x 10⁻⁴

2 x 10⁻³

2 x 10⁻²

2 x 10⁻¹

2 x (2 x 10⁰) 20(2 x 10¹) 200 (2 x 10²)
10⁻¹²

10⁻¹⁰

10⁻⁸

10⁻⁶

10⁻⁴

10⁻²

1 (10⁰)

100 (10²)
0

20

40

60

80

100

120

140

1. Vide India's Environment (Health), 1984-85.

TABLE

Weighted sound levels and human response

Sound Source
dB(A)*

Response Criteria

Carrier Deck Jet Operation

150

Painfully Loud

Jet Takeoff (200 feet)

140

Limit Amplified Speech

Discotheque, Auto horn (3 feet)

130

may Maximum Vocal Effort

Riveting Machine

120

Very Annoying

Jet takeoff (2000 feet)

Hearing Damage (8 hours)

Shout (0.5) feet

110

Annoying

N.Y. Subway Station

100

Telephone use difficult Intrusive

Heavy Truck (50 feet)

90

Quiet

Pneumatic Drill (50 feet)

80

Very Quiet

Freight Train (50 feet)

70

Just Audible

Freeway Traffic (50 feet)

60

Threshold of Hearing

Air Conditioning Unit (20 feet Light Auto Traffic (50 feet)

50

Living Room

40

Bedroom

30

Library

20

Soft Whisper (15 feet)

10

Broadcasting Studio

0

*Typical A-Weighted sound levels taken with a sound-level metre and expressed as decibels on the scale. The "A" scale approximates the frequency response of the human ear. Source : Department of Transportation

7. Sources of noise pollution. -The following are the possible sources of noise

TABLE

(i) Noise limits for domestic appliances

Domestics appliances

Limits in dB (A)

Sound pressure

Level at one metre

Distance from the

Operating appliance

(a) Window Air conditioners of 1 Ton to 1.5 Ton

68

(b) Air Coolers

60

(c) Refrigerators

46

Apart from above sources, crowding with the increase of population and urbanisation, community activities such as political and public meetings religious functions, weddings, festivals, etc., have been contributory factors in rising environmental noise pollution.

(ii) Noise due to loud speakers.-Extensive and common use of loud speakers whether for political meetings, marriages, religious functions, musical nights, advertising, etc., are most disturbing source of noise to the urban dwellers in particular. Though the use of loud speakers is governed by administrative restrictions and some laws but their widespread use remains continuing, as the restrictions and the laws are not seriously imposed. If loud horns are used near hospital zones, they disturb the patients and also doctors at serious operations. Loud horn noises in school zones, create disturbance in teaching work.

Statutory Control on loud speakers. –

(i) The permitted strength of the power amplifier should be adjusted to cover the audience, and noise level beyond the boundary limit of the noise source premises should not be increased by more than 5 dB above the ambient noise level.

(ii) Licence must be obtained by all parties intending to use loud speakers or public system for any other occasion.

(iii) Public address system and loud speakers should not be used at night between 9.00 p.m. to 6.00 a.m. except in closed premises.

(iv) Loud speakers should be directed at the audience and not away from audience (i.e., not towards the neighborhood).

(v) Loud speakers should not be allowed for advertisement and commercial activities.

(iii) Noise due to bursting of crackers. –

(a) Manufacture and sale of crackers having an impulsive noise of more than 90 dB at 5 meters distance from the site of bursting should be banned.

(b) Manufacture and bursting, of joined crackers should be banned.

(c) Bursting of crackers during night between 9.00 p.m. to 6.00 a.m. should be banned.

(d) Bursting of crackers should be permitted only during public festivals.

Source: Annual Report of Central Pollution Control Board (1989-90) at p. 47-48.

(iv) Noise due to vehicles. -The noises from individual vehicles includes

(1) Noise from engine, transmission.

(ii) Exhaust noise.

(iii) Noise due to slamming of car doors.

(iv) Use of horns.

The noises from Engine and transmission depend upon the support used for moving parts. Good quality has more efficient and elaborate system for dampening noises. Considerable improvements are being made to improve the mounting systems even in chapter vehicle. Exhaust noises have been brought under control to maximum extent by using efficient silencing system, which also do not effect the power out put of the engine. Prosecution, in Great for excessive noise from exhaust system does occur but seem somewhat illogical, as it being only the subjective judgment of the policeman.

The noise due to closures of car doors is intense, but intermittent. This noise disturbs the sleep. This problem can only be solved at the design stage. This is only possible by enforcing legislation on motor manufactures to produce noiseless door shutting devices. The motor cars are fitted with horns, to attract the attention of other movers. These horns when not used in proper way produce appreciable nuisance.

The table shows the relative noise of vehicle type. The tests are carried by the Motor Industry Research Association, using Test procedure as prescribed in BS 3425 (1965).

Luxury Limousine
77 dB

Small passenger car
79 dB

Miniature passenger car
84 dB

Sports car
91 dB

Motor-cycle (2 cylinder 4 stroke)
94 dB

Motor scooter (1-cylinder-2-stroke)
80 dB

The difference between the noise level of a standard small passenger car and a sports car is no less than 12 dB, which means the sports car is roughly 15 times more noisy than the saloon car. Motor cycles, with their exposed engines and inadequate silencing arrangements, are notorious noise producers, with a sound level roughly 30 times higher than that of a saloon car. Motor scooters, on the other hand, only produce the same noise as a motor car.

It is debatable whether there is any longer room on modern roads for fast motor-cycles and sports cars, which not only contribute excessive noise to the environment, but also figure prominently in road accidents. It can be argued with objective justification that these vehicles should be used only on enclosed race tracks, and not on the congested public highway.

TABLE

Noise Limits for Automobiles at Manufacturing Stage

(Achieved by the Year 1992)

Categories of automobiles
Limits in dB (A)

(a) Motorcycle, scooters and three-wheelers

80

(b) Passenger cars

82

(c) Passenger or commercial vehicles of up to 4 MT

85

(d) Passenger or commercial vehicles of above 4 MT and up to 12 MT

89

(e) Passenger or commercial vehicles exceeding 12 MT

91

It is worthwhile to emphasise here that the Air Act is not an adequate legislation to prevent and control the noise pollution. The Act suffers from inherent shortcomings and the standards for control of noise pollution thereunder remain unimplemented in the paucity of effective control mechanism.

(v) Noise due to trains. -Noise from steam engines fast trains and railway operations has been a cause of great concern as the impact of the noise produced has been reported to be maximum in those areas where railway tracks pass through residential areas. The community response is denunciatory of the annoying noise and disturbing vibration emitted by the fast moving trains.

Railway noise is less annoying than aircraft traffic noise of equivalent noise level at least an L.A. eq. 24 hr of 50 to 65 dB. Further, it is an annoyance to a given observer as an incident event and when the train has passed the point, the ambient sound level is restored. These facts by themselves, do not mean that the noise control be ignored. On the other hand, in view of the increasing speeds and frequencies of the railway services, the community/ public needs protective attention from the point of noise control.

(vi) Noise due to aircrafts. -This source of noise pollution has been increasing steadily during recent years and, especially close to international airports, already constitutes a very serious problem. This problem has mainly arisen because of the widespread use of heavy long-range jet aircraft. Noise made by jet planes is intrinsically more disturbing than that of propeller driven aircraft because it is of far higher pitch. jet noise is caused by the violent mixing of the jet of gases from the engine with the surrounding air, it is at a maximum during take-off when the engine must deliver maximum thrust, and falls away rapidly as the aircraft climbs. During landing, the main source of high-frequency noise is the whine of the air compressor and turbine blades at the engine is throttled back. Aircraft pass close to the ground for quite a distance during the landing operation and this noise often constitutes a more sustained environmental nuisance than the intense noise of shorter duration produced during take-off.

Military aircraft often cause annoyance in areas away from airfields because they have to be flown at low altitudes as part of normal training procedures. Little can be done about this national defence-even in peacetime-will always take priority.

The fast growth of air traffic, the invention of supersonic aircrafts and devices employed to scare birds have contributed to the creation of aircraft noise. Aircraft generate, generally unbearable roar during take offs and landings. Aircraft noise is obstructive, persistent and unpleasant besides being a serious health hazard for the communities living in neighborhood of airports.

Aircraft precautions. –

(a) Aerodrome should be- located away from the city and growth of the city should not be allowed to extend up to the aerodrome.

(b) Aeroplanes should take off in direction radically away from the city.

(c) During boarding and unboarding operations, the plane should be sufficiently away from the airport buildings.

(d) Night-time operations of the aircraft should be minimised.

(e) During maintenance and repairs of the aeroplane workers should use ear puffs.

Portable silencers should be used in the plane intake as well as exhaust during idling period at the air craft.

(vii) Noise due to projection of satellites into space. -The launching of satellites, a regular space activity these days, has now come to be recognised as a new source of air and noise pollution. Lifting of satellite with the aid of high explosive rockets produce deafening noise.

(viii) Noise from construction and civil engineering works.-Noise from construction sites is generally far worse than noise originating from factories. There are two main reasons for this. One is that wherever construction takes place like erection of roads, bridges and buildings noise emissions levels are higher. The other is that civil engineering equipment is inherently noisy. The worst of these pieces of equipment, from the noise generation point of view, are the following: –

Equipment

Noise levels t15m.

Tractor-scraper

93 dB

Rock drill

87 dB

Unmuffled concrete breaker

85 dB

Hand-held tree saw

82 dB

Large rotary diesel compressor

80 dB

11/2 tonne dumper truck Diesel
75 dB

concrete mixer
75 dB

In the era of fast urbanization of buildings and roads, the demolition and the repair activities along with the huge machines used for the purposes create a great deal of noise to the annoyance of the people living near the sites of construction. Hence such works are also a potential source of noise pollution.

Precautions in Construction Activities. –

- (a) Acoustic barriers should be placed near construction sites.
- (b) The maximum noise levels near the construction site should be limited to 75 dB (A) Leg (5 min) in industrial areas and to 65 dB (A) Leg (5 min) in other areas.
- (c) There should be fencing around the construction site to prevent people coming near the site.
- (d) Materials need to be stockpiled and unused equipment to be placed between noisy operating equipments and other areas.
- (c) Constructing temporary earth and around the site using soil etc., which normally is hauled away from the construction site.
- (ix) Noise from industries.-Noises in industry originate from processes causing impact, vibration or reciprocation movements, friction, and turbulence in air or gas streams.

Impact and vibration noises are considerably reduced if machines are mounted on flexible supports. In addition, vibration noises can be reduced by the mass, careful design of shape and arrangement of parts of machines so that resonance is avoided. Nevertheless, certain machines will remain inherently noisy, and demand to be surrounded with absorbent or insulating screens. Noise caused by gas stream can be attenuated or even eliminated by the use of suitable ducts and by correct design and positioning of inlets and outlets.

At the present moment industry is not making particular efforts to cut down pollution by noise, mainly because the laws which apply are not particularly stringent. This is yet another field in which there is scope and need for considerable improvement.

The textile mills are some of the noisiest workplaces in the country. The TLV is 85 decibels (dB), but mills invariably exceed this limit, as shown by an overview by the ITRC of health problems in

the textile industry from 1925 to 1981. For instance, shuttle looms create such a din that workers usually communicate with each other by lip movements. The machinery in woollen and jute mills is even noisier than in cotton and silk. The noise level in a large weaving section ranges from 100 dB to 105 dB, and can cause permanent loss of hearing. In the US, no textile mill is allowed to exceed 100 dB for more than two hours a day-but Indian mills run three 8 hours shifts.

The situation elsewhere is similar. In the machine tool and automobile industries the maximum noise is caused by hammering in fertiliser factories, compressors make the biggest racket. No wonder that many Indian workers find themselves shouting even at home, out of the sheer habit says the ITRC : "The harmful effects of noise include increased annoyance, mental tension, irritability, and emotional disturbances at work and at home. Greater circulatory, heart and equilibrium problems were found in textile workers exposed to very noisy environments. The most pervasive and dangerous harm from noise hazard is the permanent, incurable deafness is a result of continued exposure to noise levels above 85 dB to 90 dB".

However, Dr. G. G. Davay, medical inspector of factories in Maharashtra, rules out the noise hazard in textile mills. "I have not yet come across any textile millhand with loss of hearing due to overexposure to noise" he said a few years ago. "I do not mean that noise does not affect hearing. But in the absence of any direct proof, it is against the ethics of science to exaggerate the hazard. It will amount to creating a scare". But in the very same breath, he admitted that his department was not equipped to measure and study the problem "as the scientific world has been seized of it only recently".

In 1976, the Government includes "noise-induced hearing loss" as a notifiable disease. Any medical practitioner who detects such impairment has to report the case to the chief inspector of factories; failure to do so can be punished. An official committee has suggested that such disability should be brought under the scope of the WCA as well.

Noise can often be checked by using attenuators between different sections in a factory and protecting the relatively quiet areas from the menace. The CLI has experimented with some attenuators and found that these do not only reduce dB levels but are also more economical because they raise workers' productivity sharply. Dr. Davay believes that "it is difficult to control noise in certain departments with the present technical knowledge". But even simple precautions like issuing employees in noisy sections with earplugs or muffs are never taken.

Yet another occupational health is psychological, which medical experts would term, "behavioral toxicology". Very often, such symptoms are early warnings of impending physiological trouble ahead. Furthermore, different dusts and chemicals affect workers' behaviour in a wide variety of ways.

The earliest study was on manganese workers in 1958. Some of the common psychological symptoms were impotence, lack of concentration, irritability, insomniac somnolence, unmotivated,

laughter, bad memory and depression. The lead storage battery units were exposed to levels higher than permissible and complaint number of mental symptoms. It was found that 375 workers suffered from impairment of visual intelligence their ability to react pictures.

Noise is an inescapable by-product of industrial environment, which is increasing very fast with the advancement in industrilisation. The workers are most readily sufferers to the noise hazards of industrial functioning. Industries located in the residential areas, particularly such as printing press agro-based industries, automobiles repairing, grinding' mills, general engineering, etc., are the sources of community noise affecting the public continuously, living in the vicinity.

TABLE

Permissible Noise Exposure for Industrial Workers

Exposure Time (in Friday)

Limit in dB (a)

8

90

4

93

2

96

1

99

1/2

102

1/8

108

1/16

111

1/32 (2 minutes) or less

114

Exposure to continuous or intermittent noise louder than 115 dB (A) should not be permitted. Exposure to pulse or impact noise should not exceed 140 dB (peak acoustic pressure).

8. Control and abatement.- Dampening the source noise level or making its noise characteristics less annoying are typical first approaches to noise control. Replacing the noise source with a quieter machine is second, but often-costlier approach. Adjusting operating hours to restrict the length or time of day that noise is made is a third approach. Often the simplest solution is to put distance between the noise source and the people-such as truck routes away from residential areas and noisy industry and airports away from homes. This often involves special zoning. Attacking the problem where the noise is heard often effective. Acoustic insulation (and air conditioning) in residences and offices near airports and highways is one way. Ear protectors for individuals in the industrial work environment is another.

Control Measures

1. Ear-Plugs, Ear-muffs
2. Use of sound barriers
3. Modified machineries
4. Green Cover

9. Impact on environment. -Although air quality measurements are being carried out in several cities, not much of data is available about vehicle generated pollutants. The measurements provide data on the ambient air quality but the contribution of individual sources is difficult to assess. Here, air quality models can play an important role. The air pollutant concentration in the atmosphere is not only a simple function of the emission, but it depends on the height of the emissions, meteorology, topography and several other factors. The impact of vehicular pollutants is comparatively more due to the fact that these are ground level emissions. Particularly in metropolitan cities, high rise buildings close to the roads affect dispersal of pollutants. Air quality modelling studies being carried out by the Central Pollution Control Board in Delhi indicate that vehicular activities contribute about 70 per cent of the total NO_x emissions while its impact in the region is about 98 per cent of the total impact. Air quality measurements are, therefore, required to be supplemented by air quality modelling techniques to compute the contribution of sources with regard to the impact, which would help in planning the control strategies.

Over the years, different organisations have made estimates of vehicular pollution loads in urban areas. The total population load in major cities estimated by CPCB during the year 1991 shows that Delhi tops the list in pollution load, followed by Bombay. Among the pollutants, carbon monoxide emission was found to be the maximum. Two-stroke vehicles (Two/three wheelers) were found to be major contributors of CO emissions. These vehicles, despite a low displacement volume and fuel combustion, dominate simply due to their large proportion in total vehicle fleet and the high average number of kilometers driven. Hydrocarbon and oxides of nitrogen together constitute a substantial portion of total vehicular emissions.

10. Effects. -The effects of noise pollution are multifaceted and interrelated. Noise pollution has ill effects not only on the human beings but also on other living and non-living things, which will be discussed broadly as follows.-

(i) Effects of noise interference with people's life.

It may be classified under the following topics :-

(a) Repeated interference with sleep of Human beings.

(b) Effect on hearing or Deafness

(c) Effect on communication or speech interference.

(d) Mental or Physiological Effects

(e) Effects on physical health and working efficiency or psychological.

(ii) Effects on other animals and other living things.

(iii) Effects on Non-Living things.

(i) How noise interferes with people's lives. -The generation of unreasonable noise within the environment is considered a form of pollution because it lowers the quality of life. There are several specific ways in which excessive noise can affect people adversely.

(a) Repeated interference with sleep.-In a social survey carried out amongst people living in the vicinity of London Airport, some 22 per cent said that they sometimes found difficulty in getting to sleep because of airport noises. In areas where the noise level was particularly high, up to 50 per cent complained about the noise. An even higher percentage said they were awakened by high intensity noises, usually early at night when sleep was not yet deep. After people have been asleep for some hours, they do not readily wake up, even when subjected to very loud noises. Different people have different depths of sleep and they can adjust to natural sounds. Undoubtedly,

however, noisy conditions near residential areas at night must be avoided lack of continuous sleep has as counteract it. Many techniques for sound insulation are available today and can be applied at relatively modest expense.

(b) Effect on hearing or Deafness. -These effects only become of real importance if the sounds are exceptionally loud. Continuous exposure to noise levels much above 100 dB has an adverse effect on hearing ability within a fairly short time. Many workers who are exposed to the noise of jet aircraft or very noisy workshops for even moderate periods soon develop detectable hearing defects. Today it has become the practice for workers in these situations to be equipped with ear protectors and provided these are worn all the time-hearing ability is not affected.

(c) Effect on communication or speech Interference. -External sounds can interfere with conversation and use of the telephone, and well as the enjoyment of radio and television programmes and like pastimes. It can thus affect the efficiency of offices, schools and other places where communication is of vital importance. The maximum accepted level of noise under such conditions is 55 dB. 70 dB is considered very noisy and serious interference with verbal communications is inevitable.

(d) Mental or Physiological Effects.-Many people complain that noise makes them mentally ill. Experiments have been performed to attempt to confirm or disprove these claims. According to the H.M. Stationery Office report Noise; noise certainly does not contribute in the least to mental illness. Doctors and scientist have now medically confirmed that noise disturbs the biological organisms and their respective functions of the humans. Fire crackers and other excessive and continuous explosives become physically painful giving rise to neurosis, mental illness, cardiovascular diseases, stomach ulcers and respiratory disorders reducing human life. Recent researches have concluded that short exposures to noise (in excess of about 100 dB) leads to adverse effects on foetus, headache and, dizziness, dilatoriness in intestines, stomach problems and effects on eye sights to the extent that these at times become incurable.

(e) Effects on Physical health and working efficiency or Psychological problems. -Noise has little physical effect on the biological performance provided that the noise level is below about 90 dB. Damage to the inner ear may result if continuous noise levels exceed about 100 dB as has been observed by the Doctors leading to physical illness. Psychiatrists and psychologists have in recent researches have made observations that noise has certain relation with physical health causing tension resulting in problems such as speech interference, annoyance, fatigue, sleep interference and emotional distress. Noise levels in industries causes interference in efficiency and communication and raises possibilities of accidents. World Health Organisation has estimated remarkable loss in the industries annually.

Loss of concentration and weakening of memory are the indirect consequence in the metropolitan cities of India causing adverse effect on students and growing child. To conclude, every individual is suffering directly or indirectly due to rising noise levels which will surely be fatal to the coming

generation and if precautions are not taken from today we will surely ruin the total personality of physical beings of the universe.

The biggest contributor to the noise pollution as a source which had been identified as small scale power generating sets used for domestic and commercial purposes causing tremendous effect on working efficiency to the users as well as non-users causing serious psychological problems.¹

Experience has shown that the following environmental noise levels will be found satisfactory for most people

1. "Noise Pollution a Serious Risk", Indian Express, Chandigarh, 16th June 1987 at p. 5

Close to Hospitals, old people's homes etc.

35 dB at night
45 dB during day
Peak noise 55 dB

Residential zones

45 dB at night
55 dB during day
Peak noise 70 dB

Commercial areas

60 dB average
Peak noise 75 dB

Industrial areas

65 dB average
Peak noise 80 dB

Maximum acceptable sound levels inside buildings are lower than this:

Film, broadcasting and TV studios Concert

30 dB

balls and theatres

35 dB

Hospitals, hostels, etc.

40 dB

Offices, libraries etc.
45 dB

Shops, bands etc.
50 dB

Restaurants, precision workshops, etc

The following table shows the sound levels in Decibels and their zone equivalents for different environment

Environment
Decibels at 1000 c/s
Sones

Quiet garden
30
0.5

Room in dwelling at midnight
32
0.5

Soft whisper at 1 metre
35
0.8

Residential area without traffic
40
1.0

Room in dwelling day
45
1.6

Country side within 3 meters of quiet brook or stream

50

2.0

Inside small shop

55

3.3

Inside super market

60

4.0

Inside typing pool office with about 10 typewriters in use

65

6.5

Inside small car at cruising speed

70

8

2 meters from telephone bell

75

13

Inside a tube train

75

13

Ringling alarm clock at 0, 6 metre

80

16

Inside concert ball during

performance

80

16

Inside newspaper printing press room

85

26

Inside jet aircraft

85
26

8 metres from pneumatic demolition hammer

85
26

8 meters from heavy diesel propelled vehicle

90
32

8 metres from car horn

90
32

1 km. from being 707 taking off

95
52

Inside propeller-driven passenger aircraft during takeoff

100

64

Inside foundry

100
64

5 metres from car horn

100
64

Inside weaving shop

105
104

Inside bollermaker's shop

110

128

Inside small aircraft (club plane)

110

128

1 metre from pneumatic hammer

120

256

10 metres from aircraft jet engine

130

512

3 metres from aircraft jet engine

140

1024

These figures are Naturally, only approximate, because individual conditions vary considerably. By application of the inverse square law, doubling the distance between the observer and the noise source reduces the intensity of the noise to a quarter, and the number of decibels is reduced by six.

TABLE

Noise Effects on Human Beings

Noise hazards

Permanent hearing loss

Neurol-humoral stress response

Destruction of artifacts

Noise Suisance

Efficiency mental stress Frustration

Task interference Irritability

Comfort

Sleep Interference Communication Invasion of

Privacy

Damage of artifacts Habit of talking

loudly

Enjoyment Concentration Interference

Meditation

Interference

Recreational

Temporary

hearing loss

TABLE

Effects of High Intensity Noise on Human Beings*

Noise dB

Effects Observed

0

Threshold of audibility

150

Significant change in pulse rate

110

Stimulation of reception in skin

120

Pain threshold

130-135

Nausea, vomiting dizziness, interference with touch and muscle sense

140

Pain in ear, prolonged exposure cause insanity

160

Minor permanent damage if prolonged

190

Major permanent damage in short time

*Source: Chhatwal et al. Encyclopedia of Environmental Pollution and its Control, Vol.III, (1989), at pp. 48-49.

(ii) Effects on other animals and other living things. -The effect caused by industries, railways, crackers, explosions and commotion in the cities, aircrafts etc., can be felt on animals, birds, mice, fishes and domestic animals for they are susceptible to various effects of due to exposure noise levels change their places. Birds avoid migrating to places where noise level is above 100 dB. The noise emissions caused by supersonic aircraft, railway noise emissions etc., may cause miscarriage in mammals and fishes as well as birds are observed to have stopped laying eggs. Thus to sum up animals and other living things become upset more than human beings and in the direct cause of ecological in balance.

(iii) Effect on non-living things. -Intense noise levels affects non-living things too. The noise booms cause cracks in national and archeological monuments as well as very high levels of noise are the cause of cracks in hills. High intensity explosions can break glass panes and vibrations in the buildings. Research work at India and abroad is being done so as to assess its gravity on non-living things so that precautions could be taken beforehand to reduce impact thereof.

11. Statutory provisions of noise pollution. –

(i) Constitution of India and Noise Control.- Rapid industrial development, urbanisation and regular flow of persons from rural to urban areas has made major contribution towards environmental degradation but at the same time the Authorities entrusted with the work of pollution control- Pollution Control Board cannot be permitted to sit back with folded hands on the pretext that they have no financial or other means to control pollution and supported the environment.

Apart from that Art. 21 of the Constitution of India, which guarantees right to life, Arts. 48A and 51A (g) of the Constitution are as under :-

Article 51 A (g)-"to protect and improve the natural environment including forest, lakes, rivers and wildlife and to have compassion for living creatures".

Article 48A-"Protection and improvement of environment and safeguarding of forests and wildlife. The State shall endeavour to protect and improve the environment and to safeguard the forests

and wildlife of the country”.

(ii) Law of Torts and Noise Control. -Noise in India is actionable under the law of torts. As regards the statutory control of noise, it is surprising that there exists no law, under the Indian legal system exclusively dealing with the problem of noise or its control, whereas many countries of the world have already enacted specific laws to control the noise menace. We have stray provisions here for the control of noise despite the fact that public health is greatly threatened here due to increasing noise pollution.

(iii) Indian Penal Code and Noise Control.

(a) Provisions under Sec. 268 of the Indian Penal Code, 1860, noise is actionable as “public nuisance”. The section reads : “A person is guilty of Public nuisances who does any act or is guilty of an illegal omission which causes any common injury, danger or annoyance to the public or to the people in general who dwell or occupy property in the vicinity, or which must necessarily cause injury, obstruction, danger or annoyance to persons who may have occasion to use any public right”. People who by any offensive means corrupt the air or by any means cause loud and continued noise- and thereby cause injury or annoyance to those dwelling in the neighborhood in respect of their health or comfort and convenience or living are liable to prosecution for causing public nuisance.

(b) Noise nuisance can also be punishable under the provisions of Sec. 290 of the code, which prescribes a punishment, which may extend to two hundred rupees, for those cases of nuisance not specifically covered under the Code. Neither the right to make noise can be acquired by prescription nor it can be accepted as a defence to a charge of nuisance.

In spite of the serious consequences of noise, nuisance by noise has not been accorded its proper place under the Indian Penal Code. It is till date relegated to the residuary provision in Sec. 290 which prescribes just nominal punishment. The provisions of the Code, in view of the recent scientific and industrial developments, is inadequate to cope with increasing menace of noise pollution.

The provisions of the Code also do not lead us to uniform and certain rules for application to the criminal cases of noise nuisance. There have been very rare prosecutions for nuisance by noise as the offence of public nuisance under Sec. 290 is non-cognizable.

Nuisance action under the penal code is a poor remedy as it is nominally punitive rather than preventive or compensatory.

(iv) Criminal Procedure Code and Noise Control. -Provisions under the Sec. 133 of the Criminal Procedure Code, 1973 the Magistrate has the power to make conditional order requiring the person causing nuisance including that of noise to remove such nuisance.

(v) Police Act, 1861 and Noise Control. – The Police Act, 1861 also deals with noise pollution and punishment thereof.

(i) Provisions under Sec. 30 of the Act, District Superintendent or Assistant District Superintendent of Police are authorised to direct the conduct of all assemblies and processions on public roads or in the public streets or thoroughfares. They can prescribe the routes by which and the times at which such processions may pass. These police officers may also require by general or special notice for the procurement of a licence in cases where in the judgment of Magistrate of the district, the convening of the assembly or of a procession likely to be formed or pass through such road, street or thoroughfare, if uncontrolled, is likely to cause a breach of peace. Under the same section, the above-mentioned police offices are also empowered to regulate the extent to which music may be used in the streets on festivals and ceremonies.

(ii) Provisions under Sec. 30-A, the above said police officers and Inspectors of Police or any Police Officer incharge of a station are authorised to exercise the power of stopping, dispersing or declaring the assemblies or processions as unlawful which violate the conditions of licence.

(iii) Provisions Sec. 32 of the Act, (on conviction before a Magistrate), provides for a penalty of a fine not exceeding two hundred rupees, for violation of the conditions of any licence for the use of music or for the conduct of assemblies and processions, issued by the district Superintendent or Assistant District Superintendent of Police.

(vi) Railways Act, 1890 and Noise Control.-It is surprising to note that railway engines and carriages are a big source of noise in India but railway locomotives enjoys a statutory protection under the Indian than Railways Act, 1890 against any action for the noise created thereby. There is no provision in the Act, which provides for the regulation of noise by railway locomotives. Sec. 16 of the Act gives statutory authority for the use of locomotives to railway administration.

[The section reads: “16-Right to use locomotives

(i) A railway administration may with the previous sanction of the (Central Government) use upon a railway locomotive engines or other motive powers and rolling stock to be drawn or propelled thereby”.]

The Railway Act, 1890 has been repealed by the Railways Act of 1989 but the new Act also does not contain any specific provision dealing with the control of noise pollution resulting from railway locomotives. Noise from railway locomotives cannot be subjected to strict statutory control, for railways constitute the largest means of public transportation in India.

(vii) Aircraft Act, 1934 and Noise Control. -The impact of civil aviation on the environment is evident in the rising public concern regarding noise, which is most irritating and the most responsible element for the rising opposition to further growth of aviation. The concern over the increasing

noise levels from aircrafts has been appreciated by the world aviation community.