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Sound, Noise and Noise Pollution

Sound is such a common part of everyday life that we rarely appreciate all its functions. It provides enjoyable experiences, such as listening to music or the singing of birds. It can also alert or warn us, as with the ringing of a telephone or a wailing siren. Sound can even be heard underwater, just as in the air. Whales and dolphins, for instance, have complex systems of communication that rely on sound.

The term "noise" originates from the Latin word "nausea," meaning seasickness or a similar feeling of disgust, annoyance, or discomfort. Noise is typically defined as an unwanted sound pollutant that causes undesirable physiological and psychological effects, interfering with social activities like work, rest, recreation, and sleep. A sound may be considered unwanted if it is:

- Loud
- Unpleasant or annoying
- Intrusive or distracting

Usually, the sound of a violin is regarded as music, which is something pleasing. However, depending on various factors, the same sound may be perceived as noise. The perception of noise is subjective and can be influenced by factors such as the magnitude, characteristics, duration, and time of occurrence. Noise is often described as a mixture of many different sound frequencies at high decibel levels.

Noise pollution refers to human-caused sounds in the environment that threaten the health or welfare of human or animal inhabitants. The most common source of noise pollution, affecting the most people globally, is motor vehicles. Aircraft and industrial machinery are also significant sources. Additional contributors to noise pollution include office machines, sirens, power tools, and other equipment. The ear's response to sound is highly dependent on the frequency content, with a peak response around 2.5 to 3 kHz and a relatively low response at low frequencies.

Effects of Noise Pollution

Noise health effects encompass both health and behavioural impacts. Unwanted sound, known as noise, can harm both physiological and psychological health. Noise pollution can lead to annoyance, aggression, hypertension, high stress levels, tinnitus, hearing loss, sleep disturbances, and other adverse effects. Stress and hypertension are major contributors to health problems, while tinnitus can cause forgetfulness, severe depression, and panic attacks. High noise levels can affect the cardiovascular system, with exposure to moderately high levels during a single eight-hour period causing a statistical rise in blood pressure of five to ten points and an increase in stress.

Type of Effect	Primary	Secondary
Auditory	Hearing Loss	Change in Predator-Prey relationships
	Threshold Shift	Mating Interference
Physiological	Stress	Reduced Reproductive Capacity
	Metabolic Change	Weakened Immune System
	Hormonal Change	Reduction in Functioning
Behavioural	Signal Masking	Change in Predator-Prey relationships
	Avoidance Behaviour	Population Reduction
		Migration and Loss of Habitat
		Mating Interference

The health consequences of elevated sound levels, referred to as noise health effects, include hearing impairment, hypertension, ischemic heart disease, annoyance, premature ejaculation, bowel movements, sleep disturbance, death, and decreased sexual performance. Although changes in the immune system and birth defects have been linked to noise exposure, evidence is limited. Elevated noise levels can also create stress, increase workplace accident rates, and stimulate aggression and other antisocial behaviours. The most significant sources of noise health effects are vehicle and aircraft noise, prolonged exposure to loud music, and industrial noise.

Prevention and Control of Noise Pollution

The increasing levels of ambient noise in public places, stemming from various sources such as industrial activity, construction, generators, loudspeakers, public address systems, music systems, vehicular horns, and other mechanical devices, have detrimental effects on human health and psychological well-being. Therefore, it is deemed necessary to regulate and control noise-producing and noise-generating sources to maintain ambient air quality standards concerning noise.

In response, the Central Government notified the Noise Pollution (Regulation and Control) Rules, 2000, published in the Gazette of India, Extraordinary, Part-II -section 3 (ii), vide S.O 123 (E) dated 14.2.2000. According to these rules, the following responsibilities are assigned to State Governments, District Magistrates, Police Commissioners, or any other officers not below the rank of Deputy Superintendent of Police:

1. Enforcement of Noise Pollution control measures and the due compliance of ambient air quality standards in respect of noise.
2. Restriction on the use of Loud Speakers/Public Address system.
3. Restriction on the use of Horns, Sound emitting construction equipment and bursting of Fire crackers.
4. Prohibition of continuance Music Sound or Noise.
5. Authority shall act on the complaint and take action against the violator in accordance with the provisions of rules.
6. Disallowing sound producing instrument after 10 p.m. to 6 a.m. except in closed premises.
7. State Government may permit loud speakers or public address system in night hours (between 10.00 p.m. to 12.00 midnight not exceeding 15 days in year).

Ambient Air Quality Standards in Respect of Noise

Area Code	Category of Area	Limits in dB	
		Day Time (6 AM to 10 PM)	Night Times (10 PM to 6 AM)
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence Zone	50	40

Do's

- Always maintain your motor vehicle and its exhaust silencer in proper condition.
- Ensure that your Diesel Generator Set is provided with acoustic enclosure which gives a reduction of a minimum 25 dBA (as per the provisions of the Govt. of India notification GSR 371(E), dated May 17,2002).
- Ask for copy of valid type approval certificate from the dealer while purchasing portable petrol/kerosene generator sets (as per Govt. of India notification viz. GSR 742 (E), dated September 25, 2000, which prescribes noise standards for petrol/ kerosene generator sets).
- Keep the volume of the loudspeaker or sound amplification system low so as not to annoy your neighbours.
- Ensure that the sound from your music system is played at volume which does not disturb your neighbour.
- Play fire-crackers only outdoors in large open areas and community level.
- Purchase only those fire-crackers that comply the noise standards as provided by the Govt. of India regulation GSR 682(E), dated October 5, 1999.

Don'ts

- Avoid using horns except at emergencies.
- Avoid use of multi toned/air horns in your vehicle.
- Do not install Diesel Generator Sets without prior approval of the competent authority, if required by local laws.
- Avoid use of loudspeaker in the open.
- Do not use loudspeaker or any sound amplification system between 10:00 P.M. and 6:00 A.M., except in closed premises.
- Do not make your neighbour a captive listener to your music system.
- Do not play fire-crackers between 10:00 P.M. to 6:00 A.M.

Sources

<https://gpcb.gujarat.gov.in/webcontroller/viewpage/dos-and-donts>

<https://cpcb.nic.in/openpdf.php?id=UHVibGijYXRpb25GaWxlLzk2OV8xNTg3NTI3OTkwX2I2IGhGhvdG8zMDY1My5wZGY=>

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Eco Tips

Use headphones instead of loudspeakers.
Plant trees to naturally buffer and absorb noise.