

# Noise Pollution

# Noise

- Sound is a form of energy. It can propagate through a medium like air. Sound wave is a pressure perturbation in the medium through which sound travels.
- The pressure of travelling sound-energy alternately causes compression and rarefaction.
- Number of compressions and rarefactions of the molecules of the medium (say, air) per unit of time is described as frequency of that sound.
- Expressed in Hertz (Hz), is equal to the number of cycles per second.

# Noise

- Noise is an unwanted sound that causes discomfort and psychological irritation to individuals.
- it may not seem as harmful as the contamination of air or water but it is a pollution problem that affects human health and can contribute to a general deterioration of environmental quality.
- Intensity of Noise or sound is measured on a scale decibel scale or dB scale.
- It measures the loudness of sound in terms relative units of energy.

# Noise

- The scale starts from 0 dB which is considered as the threshold of hearing. One can pleasantly hear a sound of certain units on dB scale beyond which it hurts or starts disturbing him.
- Our ears can hear ordinary conversation between 30-60 decibels. Modern conversation has a noise value of 60 decibels.
- A decibel value greater than 80 decibels causes noise pollution.
- Noise becomes troublesome above 140 decibels.

# Decibal levels of some common sounds

- **dB : Level Sound**
  - 0 : Threshold of hearing
  - 10 : Rustle of leaves
  - 20 : Broadcasting studio
  - 30 : Bedroom at night
  - 40 : Library
  - 50 : Quiet office
  - 60 : Conversational speech (at 1m)
  - 70 : Average radio
  - 74 : Light traffic noise
  - 90 : Subway train
  - 100 : Symphony orchestra
  - 110 : Rock band
  - 120 : Aircraft takeoff
  - 140 : Threshold of pain
  - 150 : Instantaneous rupture of membrane

# Sources of Noise Pollution

- Different sources of noise pollution in our environment.
- Outdoor noise pollution vs indoor noise pollution.
- Outdoor noise pollution: Noise emanating from factories, vehicles, playing of loudspeakers during various festivals.
- Indoor noise pollution: Loudly played radio or music systems, and other electronic gadgets.

# Effects of Noise Pollution

- Effects on man's physical health
- Noise pollution effects both health and behaviour.
- The most direct harmful effect of excessive noise is physical damage to the ear
- Temporary or permanent hearing loss often called a temporary threshold shift (TTS).
- People suffering from this condition are unable to detect weak sounds. However hearing ability is usually recovered within a month of exposure.
- Permanent hearing loss usually called noise induced permanent threshold shift (NIPTS) represents a loss of hearing ability from which there is no recovery.
- Chronic exposure to noise may cause noise-induced hearing loss.
- Noise pollution can cause hypertension. High noise levels can contribute to cardiovascular problems.

# Effects on man's mental health

- Noise pollution also is a cause of annoyance.
- Noise causes emotional or psychological effects such as irritability, anxiety and stress.
- Lack of concentration work efficiency and mental fatigue are significant health effects of noise.



# Effects on wildlife

- Noise can have a detrimental effect on wild animals.
- Increasing the risk of death by changing the delicate balance in predator or prey detection and avoidance.
- Interfering the use of the sounds in communication, especially in relation to reproduction and in navigation.
- Acoustic overexposure can lead to temporary or permanent loss of hearing in wild animals.

# Permitted noise level (dB)

Zone	Day time	Night Time
Silent Zone	50	40
Residential Zone	55	45
Commercial Zone	65	55
Industrial Zone	70	70

# Effects on wildlife

- An impact of noise on wild animal life is the reduction of usable habitat that noisy areas may cause.
- Noise also makes species communicate more loudly, which is called Lombard vocal response.
- Zebra finches showed abnormal behaviour to their partners when exposed to traffic noise.

# Control of Noise Pollution

- There are four fundamental ways in which noise can be controlled:
- Reduce noise at the source,
- Block the path of noise,
- Increase the path length and
- Protect the recipient

# Reduce noise at the source

- In general, reducing noise levels at the source is the best control method.
- In industries noise reduction can be done by using rigid sealed enclosures around machinery that produces high levels of noise.
- Regular and thorough maintenance of operating machinery helps in noise reduction.
- Noise levels at construction sites can be minimized using superior machinery, proper construction planning and scheduling techniques.

# Block the path of noise

- Creation of temporary barriers to physically block the noise
- Help contribute to reducing noise pollution.
- The path of traffic noise can also be blocked
- Construction of vertical barriers alongside the highway.

# Block the path of noise

- Planting of trees around houses can also act as an effective noise barriers.
- In industries different types of absorptive material can be used to control interior noise.
- Highly absorptive interior finish material for walls, ceilings and floors can decrease indoor noise levels significantly.
- Sound levels drop significantly with increasing distance from the noise source.

# Path length between the source and the recipient

- Increasing the path length between the source and the recipient
- Offers a passive means of noise control



# Protect the recipient

- Use of ear plugs and earmuffs
- Protect individuals effectively from excessive noise levels.