

NOISE POLLUTION MONITORING Using IOT

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Noise pollution: Causes, effects and control measures

Sound is main means of communication in many animals, including humans. A low sound is pleasant and harmless. A loud, unpleasant or unwanted sound is called as noise. A given sound can appear music to some and noise to others. It depends upon loudness, duration and mood of a person.

Noise (La. *nausea*=seasickness) is physical form of pollution. It is not harmful to air, soil and water but affects the animals including humans.

Noise is unwanted sound, that is unpleasant, loud and disruptive.

Humans have a hearing range called as audible range. Audible range depends upon frequency and



loudness of sound. For a person with normal hearing, frequency ranges from 20 to 20,000 Hz and loudness ranges from 0 to 120 dB. Sound is measured in decibels (dB). A decibel value above 80 is considered to be noise pollution.

Sources of Noise Pollution:

1. Industrialization: Most of the industries use big machines which are capable of producing noise. Apart from that, various equipment's like compressors, generators, exhaust fans, grinding mills also participate in producing noise.

2. Poor Urban Planning: In most of the developing countries, poor urban planning also play a vital role. Congested houses, large families



sharing small space, parking lots, street noise, honking, commercial zone leads to noise pollution which disrupts the environment of society.

3. Social Events: Noise is at its peak in most of the social events. Whether it is marriage, parties, pub, disc or place of worship, people normally defy rules set by the local administration and create nuisance in the area. People play songs on full volume and dance till midnight which makes the condition of people living nearby pretty worse.

4. Transportation: Large number of vehicles on roads, aero planes, trains produce heavy noise. The high noise leads to a situation wherein a normal person lose the ability to hear properly.

5. Construction Activities: Construction



activities like mining, construction of bridges, dams, buildings, stations, roads, flyovers take place in almost every part of the world. These construction activities have to be continued to meet the demand of ever increasing Population. It also creates noise pollution.

6. Household Chores: We people are surrounded by gadgets and use them extensively in our daily life.

Gadgets like TV, mobile, mixer grinder, pressure cooker, vacuum cleaners, washing machine and dryer, cooler, air conditioners are also contributors to the amount of noise that is produced and but many times it affects the quality of life of our neighborhood.

7. Fireworks: Firework is a common thing during various fairs, festivals and



cultural ceremonies. Apart from air pollution, the intensity of their sound creates noise pollution.

8. Agricultural Machines: Tractors, thrashers, harvesters, tube wells, powered tillers etc. have all made agriculture highly mechanical but at the same time highly noisy.

9. Defence Equipment and launching of satellites: A lot of noise pollution is added to the atmosphere by artillery, tanks, launching of rockets, explosions, exercising of military airplanes and shooting practices.

Screams of jet engines and launching of satellite, sonic booms have a deafening impact on the ears.

10. Miscellaneous Sources: The automobile repair shops, market places, schools, colleges, bus stands, and railway stations etc. are other sources



of noise pollution.

Effects of noise pollution:

Human response to noise varies from man to man according to age and temperament. It may vary even in the same individual from time to time because of change in health, fatigue and other conditions (Fig). The effects of noise on human beings are as under:-

1) Auditory effects: It includes deafness or auditory fatigue.

Deafness or impaired hearing:

Prolonged exposures to noise lead to gradual deterioration of internal ear and subsequently hearing loss or deafness. It may occur due to continuous exposure to noise level of more than 90 dB. It may be temporary or



permanent. Explosions or other high intensity sounds can also cause immediate deafness by rupturing the ear drums or damaging the cochlea. Many time hearing loss is attributed to occupation.

Auditory fatigue: It is defined as a temporary loss of hearing after exposure to sound. Continuous humming

sound such as whistling and buzzing in the ears.

2) Non auditory effects: These are:-

Irritation and annoyance: Noise, sometimes, leads to emotional disturbances and makes people loose their temper. It can interfere with proper rest and sleep. Annoyance seems to increase with the loudness of the sound.

Work efficiency: It has been observed



that noise reduces the efficiency of work.

Physiological effects: It includes dilation of the pupils, paling of skin, tensing of voluntary muscles, diminishing of gastric secretions, increase in diastolic blood pressure and the sudden injection of adrenalins into blood stream which increases neuromuscular tension, nervousness, irritability and anxieties. It can adversely affect the development of unborn babies.

Other health effects: Noise is also associated with headache, giddiness, sweating, nausea, fatigue, difficulty in breathing, disturbed sleep pattern, psychological stress.

Trouble Communicating: High decibel noise can put trouble and may not allow people to communicate



freely. Constant sharp noise can give you severe headache and disturb your emotional balance.

Effect on Animals: Animals rely heavily on sounds to communicate, to find food, avoid predators etc. Pets react more aggressively due to exposure to constant noise. They become disoriented more easily and face many behavioral problems.

Overexposure to high intensity of noise affects the hearing ability of many animals. Man-made noise affects mating calls and echolocation. This leads to reduction in survival and reproduction rates. At an ecosystem level, noise pollution could lead to migration of animals. Their migration can affect the crop production. Because many animals such as bats pollinate bananas, peaches,



agave and other cash crops.

Effect on non-living things: The noise booms cause cracks in walls of buildings as well as in hills. Sonic boom can break window panes and buildings.

Steps to Control Noise pollution

Noise pollution can be effectively controlled by taking the following measures:

(1) Control at receiver's end: For people working in noisy installations, ear-protection aids like ear-plugs, ear-muffs, noise helmets, headphones etc. must be provided to reduce occupational exposure.

(2) Suppression of noise at source: It can be achieved by following methods:

(a) Designing, fabricating and using quieter machines to replace the noisy



ones.

(b) Proper lubrication and better maintenance of machines.

(c) Installing noisy machines in sound proof chambers.

(d) Covering noise-producing machine parts with sound-absorbing materials to check noise production.

(e) Reducing the noise produced from a vibrating machine by vibration damping i.e. making a layer of

damping material (rubber, neoprene, cork or plastic) beneath the machine.(f)

Using silencers to control noise from automobiles, ducts, exhausts etc.

(3) Acoustic Zoning: There should be silence zones near the residential areas, educational institutions and above all, near hospitals. Zoning of noisy industrial areas, bus terminals and railway stations, aerodromes



etc. away from the residential areas i.e. increasing the distance between source and receiver.

(4) Sound Insulation at Construction

Stages: It reduces the chances of noise nuisance in future. Some of these measures could be:

a) The space/cracks that get left between the door and the wall should be packed with sound absorbing material.

(b) Sound insulation can be done by constructing windows with double or triple panes of glass and filling the gaps with sound absorbing materials.

(c) Acoustical tiles, perforated plywood etc. can be fixed on walls, ceilings, floors etc. to reduce noise (especially for sound proof recording rooms etc.)



(5) Planting of Trees: Green muffler scheme involves planting green trees and shrubs along roads, hospitals, educational institutions etc. to reduce noise to a considerable extent. Trees like Ashoka, Neem, Tamarind are good for this purpose.

(6) White noise:- It is a special type of sound signal which is used to mask background sounds. White noise helps to mask out sounds which might otherwise prevent one from either falling asleep or waking up whilst asleep.

(7) Legislative Measures: Strict legislative measures need to be enforced to curb the menace of noise pollution. Noise standards (Table) should be strictly followed. Minimum use of loudspeakers and amplifiers especially near silence zones. Banning



pressure horns in automobiles. Albeit, noise has been considered as pollutant under Air act and The noise pollution (regulation and control) rules(2000) have been framed under Environment protection act. But still **people need to be educated about harmful effects of noise.**

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)	Industrial area	75 70
(B)	Commercial area	65 55
(C)	Residential	45



	area	50
(D)	Silence Zone	35 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

