

NOISE POLLUTION – CAUSES, EFFECTS, ASSESSMENT AND REMEDIES

Dr. Jyothi P.

*Associate Professor and Head, PG Department of Chemistry, KAHM Unity Women's
College, Manjeri, Kerala-676122, India*

e-mail id: jyothipuramana@gmail.com

INTRODUCTION

The word Noise is derived from the Latin word “nausea” which means ‘unwanted sound’ or ‘sound that is loud, unpleasant or unexpected’. The noise is produced from human activities, especially the urbanization and the development of transport and industry. Though, the urban people are more affected by such pollution, small town or villages along side roads or industries are also affected by this problem. Noise is becoming an increasingly omnipresent, yet unnoticed form of pollution even in developed countries. Road traffic, jet planes, garbage trucks, construction equipment, manufacturing processes, and lawn mowers are some of the major sources of this unwanted sounds that are routinely broadcasted into the air. Though noise pollution is a slow and subtle killer, very little efforts have been made to control it. It along with other types of pollution has become a hazard to quality of life

CAUSES

Following are the main causes and sources of noise pollution:

1. Industrialisation:

Industrialisation has led to an increase in noise pollution as the use of heavy machinery such as generators, mills, huge exhaust fans are used, resulting in the production of noise pollution.

2. Events:

Weddings, public gatherings involve loudspeakers to play music resulting in the production of unwanted noise in the neighbourhood.

3. Construction sites:

Mining, construction of buildings, etc add to the noise pollution.

4. Vehicles.

Increased number of vehicles on the roads is a major reason for noise pollution.

EFFECTS

There are many an adverse effects of excessive noise or sudden exposure to noise. In India, the problem of noise pollution is wide spread. Several studies report that noise level in metropolitan cities exceeds specified standard limits. It is responsible for rising incidence of deafness among the inhabitants .A study by Singh and Mahajan conducted in Delhi and Calcutta, found that the noise level is 95dB as against the ambient limit of 45dB. Even at the “calm” places, it does not fall below 60dB. Another study by Murli and Murthy also found that traffic noise in Vishakhapatnam exceeds 90dB even in morning hours that acts as a source of nuisance.

Evidently, noise pollution has assumed alarming proportions affecting adversely the efficiency of various populations, mental health and general quality of life. Moreover, it is becoming a problem of law and order with the growing number of complaints to police and administration. Unless and until, measures are taken to control the level of noise, the ongoing urbanization and industrialization may complicate the problem so much that it becomes incurable .

The sound produced by a bursting cracker, exceeding 150dB, can cause a ringing sensation called ‘tinnitus’ and can impair hearing permanently. In general about 1 percent of the population suffers from noise-induced pollution. It is found that the noise level produced by household equipment and appliances sometimes reaches up to 97 dB which is more than double the acceptable (45dB) noise level. This excessive noise could carry several ill-effects viz. annoyance, speech interference, sleep disturbance, mental stress, headache, and lack of concentration. Similarly it is noted that the workers exposed to high noise levels have a higher incidence of circulatory problems, cardiac diseases, hypertension, peptic ulcers, and neurosensory and motor impairment. The adverse effects of noise have not even spare the birds and animals.

Noise pollution affects the physiological, neurological, endocrinological, and behavioural attributes of marine life. Anthropogenic noise causes sensory confusion, or masks communication among reef organisms for navigation, habitat selection, foraging, reproduction, and predator detection and avoidance

ASSESSMENT

Noise pollution is a major problem in urban environments, affecting human behaviour, well-being, productivity and health. The first step to be taken for controlling noise pollution is to assess the current noise climate by gathering real world data and building noise maps in order to better understanding of the problem and support the creation of local action plans.

1. Environmental noise assessment: Limitations of the current approach Nowadays assessments of environmental noise in urban areas are mainly carried out by officials who collect data at a sparse set of locations, e.g. close to roads, railways, airports and industrial estates, by setting up sound level meters during a short period of time. Propagation models are then used to generate noise maps by extrapolating local measurements to wider areas.
2. Alternative Approaches :
 - i) Wireless sensor network:

Recent years have seen an increasing interest in wireless sensor networks for environmental monitoring and urban sensing . A wireless sensor network (WSN) is a wireless network consisting of spatially distributed autonomous devices using sensors to cooperatively monitor environmental conditions, such as temperature, sound, air pressure or air quality, at different areas.

- ii) Participation of citizens to implement the requirements :

This is especially important with regards to local action plans, which often directly affect people living nearby. But citizens can also contribute in earlier phases, such as during the actual assessment of noise pollution. In geography and urban planning there is a trend towards support for such participation. Under the flag of participatory GIS and participatory mapping new methodologies are being researched to better support the participation and involvement of citizens in projects that are typically tackled using

geographical information systems (GIS), such as the mapping of spatial phenomena or land use and urban planning.

iii) Mobile phone as an Environmental Sensor:

The growing popularity of smart phones with significant computational power, always-on Internet connectivity and integrated sensors (e.g. microphones, cameras, GPS, motion sensors) opens the door to a wide range of new applications. These devices represent a cheap but powerful WSN platform that is readily available and widely deployed. In this perspective mobile phones can serve as sensors which are carried by humans. This idea is closely related to the concept of participatory sensing which advocates the use of mobile devices to form sensor networks that enable public and professional users to gather, analyze and share local knowledge. At the same time, people as individuals or in groups can apply these new sensing networks with a more personal focus. Their individual stories of everyday life can be aggregated to document the urban environment, fed back into a collective experience in urban public spaces, enabling people-centric sensing for personal, peer or public purposes.

iv) Democratising noise pollution measurement:

“How much decibel am I exposed to now?” This kind of information is currently hard to obtain for a citizen. By turning smart phones into personal environmental instruments, we are essentially taking advantage of the democratisation of technology to achieve a democratisation of environmental information. Previous participatory sensing projects have been conducted in the context of a controlled, local and short-term monitoring by selected volunteers as a proof of concept. However, due to a lack of scale, the full potential of the participatory sensing paradigm in an environmental context has yet to be validated empirically by real world use. How will the practice of pollution monitoring change if not just few volunteers but every citizen has access to mobile environmental measuring devices? In the context of noise pollution, by turning mobile phones into noise pollution sensors, we strongly lower the entrance barrier of such environmental measurement technology. Noise Tube has the potential to set up new kinds of experiments by enlarging the scope of potential participants.

REMEDIES

There are several methods that can be utilized for controlling the level of noise. First of all, the design and technology of machines/ equipment could be altered resulting in low noise emission. Secondly, noise barriers may help us control noise. A third method is to protect receptors of sound by a shield e.g. building may be insulated against noise. Similarly, body and window planes may be made sound proof. Apart from technology, we may undertake various steps to modify or regulate the behaviour of users of machines and equipment. Though a legal framework could be enforced to regulate users of vehicles/equipment, but it requires huge resources and good governance. The public education appears to be a good option because it is a social problem. Sheer ignorance about the adverse effects of noise pollution appear to be a key factor in laying inadequate stress on controlling or reducing its levels. To make India a world-class destination for tourism, industry, and a place for healthy living, the development and implementation of a comprehensive noise control programme is a dire need of hour. This study identifies the sources of noise that create noise pollution. Moreover, the study explores the effects of noise on publics and their reactions. Finally, various measures to control the pollution are contemplated. The hazards increase with the intensity of the noise and the period of exposure.

The noise pollution is not a unique problem for developing countries like India. Several initiatives have been taken by various countries to check the noise level. For example, USA has taken initiative to create sit European Union (with more than 250,000 inhabitants) requires that 'noise maps' of big cities are drawn up by 2002 . To safeguard against ill effects of noise, the laws of Netherlands do not permit building of houses in areas where 24-hour average noise levels exceed 50dB. And in Great Britain, the Noise Act empowers the local authorities to confiscate the noisy equipment and fine people who create excess noise at night. Recently, several countries are also investing in 'porous asphalt' technology, which can curtail traffic noise by up to 5dB. The movement against noise pollution is weak in India. Most of the people were not considering it as a pollutant, and take it as a part of routine life. Later it has been recognized as a pollutant. In India, the Noise Pollution (Regulation and Control) Rules, 2000 have been framed under the Environment (Protection) Act, 1986. These are a set of guidelines for regulation and control of noise. A survey by Central Pollution Control Board (CPCB) shows that in Delhi, the noise level in most places exceeds the permissible limit. The average noise

level in Delhi is 80 dB while the ambient limit is 55dB . Bombay too suffers from high levels of noise pollution.

Furthermore, as is the case with many issues affecting the sustainability of life, noise pollution cannot be tackled by policymakers alone. To manage noise pollution in cities one also needs to consider the behaviour of the citizens themselves. The first step towards changing such behaviour is to raise awareness. It can be done by involving them in the process of monitoring noise pollution.

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