Comprehensive Review on Evaluation and Analysis of Traffic Noise in Amravati City

Mr.Pranay M. Fate[1], Dr. A. V. Parwate[2], Prof. Vaibhav A. Fulari[3]

[1] PG Student, M.E Transportation Engineering and Management, Dr. Rajendra Gode Institute of Technology and Research,(SGBAU) Amravati, Maharashtra,India

[2] Principal, Dr. Rajendra Gode Institute of Technology and Research, (SGBAU)Amravati,Maharashtra,India

[3] Assistant Professor, Civil Engineering Department, Dr. Rajendra Gode Institute of Technology and Research, (SGBAU)Amravati,Maharashtra,India

Abstract

Noise pollution is unwanted or harmful sound that intrudes upon human or faunal activity. Noise pollution is almost entirely human generated, whether by machine sources or amplified sound of human creation. In developing country like India with the vehicle population increasing at an alarming rate, the residents of cities are experiencing severe environmental problems that results from road traffic in population from Automobiles. Noise from road traffic is major source of environmental pollution and it has detrimental effects on human beings. In this project road traffic noise survey was conducted at different locations in Amravati City. Various parameters are evaluated e.g. Noise Pollution Level, Traffic Noise Index and Equivalent Sound Level. Based on this study broad conclusions are presented and suggestion made to reduce noise due to traffic.

Keywords: Noise Pollution Level, Traffic Noise Index, Equivalent Sound Level.

I. INTRODUCTION

Sound in the environment is caused by vibrations in the air or some other medium that reach human ear and stimulate a sensation of hearing. When the sound becomes too loud or disagreeable or unwanted, it becomes noise. Since the noise produces several undesirable effects on human body, health, it can be termed as environmental pollution.

Today's world is a noisy world. Twenty-four hours a day, seven days a week, we are exposed to sounds we do not want, need, or get benefited from. There are few places on the planet where in our daily lives we are free from unwanted sounds. Noise from many outdoor sources assails our hearing as it invades our homes and workplaces i.e. because of traffic, aircraft, barking dogs, neighbor's voices. Noise within the workplace i.e. from office machines, telephones, ventilating systems, unwanted conversation in the next cubicle distracts us from our work and makes us less productive.

Noise from within the home i.e. from appliances, upstairs footsteps, TV sound traveling from room to room keeps our homes from being the restful. Noise can frustrate and impede speech communication. It can imperil us as we walk or drive city streets. It can be a physical health hazard as well. Exposure to high noise levels may cause permanent hearing loss.

In short, Noise is unwanted sound. Sound is the result of pressure changes in the air caused by vibration. Unwanted sound to some may be considered wanted sound by others, as in the case of loud music. Noise, which is often referred to as unwanted sound, is typically characterized by the intensity, frequency, periodicity (continuous or intermittent) and duration of sound.

Traffic noise is one of the most immediate and identifiable environmental problem associated with rapid industrialization, urbanization and population growth. Rapid urbanization, industrialization, expansion of road network and infrastructure cause serve noise pollution problem. (Pathak ef al. 2008).Traffic noise is considered as one of the important sources of noise pollution and adversely affects human health. The increasing number of vehicles, musical instruments, small scale industries and urbanization activities are the main sources of noise pollution. Noise affects may include annoyance, deterioration of sleep quality and stress related ischemic heart diseases. (Singh & Kaur, 2013). Generally high exposure to noise level may cause feeling of annoyance and irritation, damage to auditory mechanisms, number of health related effects like physiological disorders, psychological disorders, disturbance of daily activities and performances, hypertensions, etc. the most serious health hazards associated with high level of noise exposure is deafness which initially causes temporary hearing problem or prolonged exposure to high noise level causes permanent deafness. Nowadays, noise pollution is considered as one of the main problems of urban communities which have many hazardous effects on urban environment and many result in great deal of costs to the society.

In the present study the ambient noise monitoring was carried out in residential, commercial, industrial and silent zone in Amravati city to find out the noise level. The sound level was measured at interval of 15 min. during 7:00 AM to 9:00 PM with help of noise level meter. The maximum reading was recorded at every 15 min. interval.

II. LITERATURE REVIEW

2.1 Sound

Sound energy is transferred through compressions and rarefactions .If the intensity is very high it can harm human as well as animal ears, and do damage to physical structure. When sound reaches the human ear it causes structure to vibrate. Intense vibration can rupture the eardrum, but more often loudness related hearing loss generally develops over time. Sounds of frequencies less than 20 HZ are called infrasonic and greater than 20, 0000 HZ is called ultrasonic.

In simple words sound is the sensation produced by stimulation of the organs of hearing by vibrations transmitted through the air or other medium.

In physics, sound is a vibration that propagates as a typically audible mechanical wave of pressure and displacement, through a medium such as air or water. In physiology and psychology, sound is the reception of such waves and their perception by the brain.

Richard E.Berg says that, a mechanical disturbance from a state of equilibrium that propagates through an elastic material medium.

Book- The physics of sound third edition.

2.2 Noise

Sound can be defined as atmospheric or airborne vibration perceptible to the ear. Noise is usually unwanted or undesired sound. Consequently, a particular sound can be noise to one person and not to others, or noise at one time and not at other times. Sound loud enough to be harmful is called noise without regard to its other characteristics. Noise is a form of pollution because it can cause hearing impairment and psychological stress. This section introduces the subject of sound in engineering terms and includes appended references which pro- vide detailed back-up material. It includes the general principles of sound production and propagation, a description of the ear and its functions, a description of the effects of noise on the hearing apparatus and on the person, and an introduction to hearing measurement and hearing aids.

Noise may be continuous or intermittent. Noise may be of high frequency or of low frequency which is undesired for a normal hearing. For example, the typical cry of a child produces sound, which is mostly unfavorable to normal hearing. Since it is unwanted sound, we call it noise.

According to Encyclopedia Britannica: In acoustic noise is defined as any undesired sound. Defination of Noise is the sound which causes pain and annoyance is noise.

Written by Deepak miglani - LLM from M. D. U. Rohtak.

"Unwanted sound, a potential hazard to health and communication dumped into the environment with regard to the adverse effect it may have on unwilling ears ".

Author – R. Lahoti

In Re: Noise pollution restricting use of louds speakers.

Judgement : 18/7/2005.

2.2.1 Traffic Noise and Roadway Noise

Traffic noise is unwanted sound that comes from vehicles operating on roadways. Roadway noise is the collective sound energy emanating from motor vehicles. It consists chiefly of road surface, tire, engine/transmission, aerodynamic, and braking elements.

2.2.2 Measurement of Noise

Although we may hear background noise at a constant volume, sound waves fluctuate rapidly and include frequencies outside our range of hearing. The decibel scale measures the intensity of sound, where 0 decibels represents the human hearing threshold and 130 decibels represents the human pain threshold. Typical daily noise levels are expressed as dBA Leq24, which is a logarithmic average of all noise over a 24 hour period. A decibel is the standard for the measurement of noise. The zero on a decibel scale is at the threshold of hearing, the lowest sound pressure that can be heard, on the scale acc. 20 db is whisper, 40 db the noise in a quiet office. 60 db is normal conversation, 80 db is the level at which sound becomes physically painful.

Deepak Miglani - Noise pollution, source, effects and Control.

2.2.3 Noise pollution

Noise pollution refers to sounds in the environment that are caused by humans and that threaten the health or welfare of human or animal inhabitants. The most common source of noise pollution by far, the one that affects the most people on the planet, is motor vehicles. Aircraft and industrial machinery are also major sources. Additional noise pollution is contributed by office machines, sirens, power tools, and other equipment. Noise pollution is not easy to measure, because the very definition of noise depends on the context of the sound and the subjective effect it has on the people hearing it. One person's idea of exultant, joyful music might be another person's pure torment.

2.2.4 Definitions of Noise pollution

Noise pollution is unwanted or harmful sound that intrudes upon human or other faunal activity. Noise sound of human creation.

By C.Michael Hogan. pollution is almost entirely human generated, whether by machine sources or amplified

Noise pollution is defined as unwanted sound, a potential hazard to health and communication dumped into the environment with regard to the adverse effect it may have on unwilling ears.

By: Deepak Miglani - LLM from M.D. U. Rohtak.

A form and level of environmental sound that is generally considered likely to annoy, distract or even harm other people. Most industrial plants operated by a business located near a residential area will need to be respectful of others residing within earshot regarding their production of noise pollution.

By business dictionary.Noise pollution refers to sounds in environment that are caused by humans and threaten the health or welfare of humans and animal inhabitants.

III. CONCLUSION

Noise levels in different zones of Amravati city like silence zone, industrial zone, commercial zone, residential zone are measured and analyzed. The analysis has revealed that the noise pollution levels are more than permissible limits. Traffic noise was found to be interfering with daily activities. Concluding remarks are as follows.

The noise level at all the ten locations under study have exceeded the acceptable limits as laid down by Central Pollution Control Board.

Higher the volume of traffic, higher is the value of the traffic noise parameters.

Higher percentage of slow moving vehicles retard the mixed traffic stream and consequently also reduce LNP and TNI.

It has been observed that poor surface condition of road area, poor condition of vehicles are also responsible to a great extent for higher noise level.

Heavily loaded vehicle, tempo, auto-rickshaw, tractor-trolley are main reasons of highly intolerable noise-level.

Road side tress and road divider with shrubs considerably reduce noise pollution.

Special provisions in the law should be made to control the noise pollution. It should be implemented strictly.

The necessary preventive measures should be taken in different areas such as proper maintenance of vehicles and roads, proper checking of vehicles, poor and old vehicle should be banned and plantation should be encouraged to improve the present status of human health, to reduce the noise levels and to improve the environment of the Amravati city.

There is an urgent need for an alternative public transport system. The government should strictly enforce traffic rules. The Government should equip vehicles with approach horns and silencers. Environment protection agency should re-determine the limit of noise to protect healthy and welfare to set noise emission standard to major source of noise pollution in the environment.

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Chauhan Avnsh, Pawar Mayank, Kumar Dharmendra Kumar Navneet and Kumar Rajeev, Department of Applied Sciences and Humanities. Department of Computer Science, College of Engineering, Teeerthanker Mahaveeer University, Morradabad, Uttar Pradesh-24400 (avnishchauhan_phd@aol.in, rajeev2009mca@gmail.com)