

A Review on Noise Mapping

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Abstract- In this paper, noise exposure level of employees in the workplace of an industry has been studied. Average noise level of employees per day will be identified by using dosimeter. Values from the dosimeter were process by dB link software. Measurement of the personal exposures is important for noise reduction at workplace and controls the noise sources. This aims at identifying work situations in which employees may be affected by noise and improvement have to make to control the noise and proper training to employee to protect from the hearing loss.

Keyword: Noise, Hearloss, Dosimeter

I. INTRODUCTION

Noise pollution is the main source of nuisance in our society. Various aspects to identify the noise pollution: noise effect, ultrasounds effects, electromagnetic radiations effect (Ana PICU). In Industrial operation of machinery in shop floor generate excessive noise levels. Noise means any unwanted sound. Noise is produced in industry by many ways. Sources of noise pollution have increased due to fast development of the industry. Noise depends upon physical characteristics such as sound intensity, time, and frequency (NICULINA SCHIOPU, D. I. BARDAC). In general Noise mapping is Graphical representation of the sound level distribution and also creation of symbolic representation. Purpose of noise mapping is to identify the noise sources and also personal exposure to noise. Mapping tells about who are exposure to noise level > 85dB for 8hrs Average Lex and noise level >140dB is very high level noise or impulse noise it cause mechanical disruption of middle and inner ear structures (John J. May, MD).

II. EFFECT OF WORKER NOISE OCCURANCE

In Industry a worker exposed to 90dB in this frequency range is at greater risk of injury than one exposed to 90dB of 250Hz sound. To describe, noise in a uniform, it has wide variety of frequencies experienced by workers. Focusing on noise exposure during working hours is to determine how much decibel is exposed to noise. Measuring of the personal noise exposure because of various factors such as age, health, temperament or external factors may noise differently interpret for each person (NICULINA SCHIOPU, D. I. BARDAC).

Due to Excessive noise in industry creates permanent hearing loss, short term exposures can cause the hearing damage. A worker is exposure is high level noise over a long time may result in destruction of creation inner channel of human ear. Exposure of noise measured is often expressed as dB (A) (Peter M. Rabinowitz). This effect is taken into account by "Weighting network" designated as an A, B, C etc. For industrial noise measurement, frequency A-Weighting network is used as it corresponds to the frequency response of the human ear and also has a good correlation to the risk of noise induced hearing loss. Generally measurement of noise levels is expressed in decibels (dB) only. Measurement of the total sound energy present in a location over a given period of time, as if the sound was unvarying in its intensity parameters (Peggy A. Jackson-Oman, Michael K. Wynne, Roger N.Kasten).

III. EFFECTS OF OCCUPATIONAL NOISE:

Exposure to noise that is too loud or too long can cause a decrease in the ability to hear sound. Noise is damaging to the ears because sound pressure waves are collected in the ear and the pressure may cause damage to the delicate structures in the ear. Specifically Noise Induced Hearing Loss (NIHL) is caused by damage to sensitive structures in the inner ear when the ear is exposed to noise that is harmful. NIHL is slow, progressive, permanent and irreversible. NIHL is one of the Notifiable diseases in (The Factories Act, 1948 Pg.no 127). Work-related hearing loss remain a top priority for health and safety professionals as more individuals are reporting hearing loss at work. There are so many standards are required for specified work places. A Temporary threshold shift (TTS) is the increase in hearing threshold due to noise exposure, which is temporary and reversible upon removal from a noise exposure environment. A Permanent threshold shift (PTS) is the Irreversible increase in hearing threshold due to noise exposure. TTS indicate exposure to harmful level of noise. When the noise is repeatedly exposure to high level intensity will eventually lead to PTS (John J. May, MD). The primary effects of workplace noise exposure include noise-induced TTS and PTS, acoustic trauma, and tinnitus. A noise-induced TTS is short-term decrease in hearing sensitivity that display as a downward shift in the audiogram output. It returns to the pre-exposed level in a matter of hours or days. Assuming there is not continued exposure to excessive noise the development of noise induced TTS and PTS in an individual is the combined result of noise intensity, duration of exposure, and the frequency signature of the noise. Because the ear is more sensitive to different frequencies, predication of NIHL was not possible using simple SPL dB measurements. Noise exposure recommendations considered only the intensity is noise exposures and not the duration. The relationship between the intensity and duration of noise exposures relies on the equal energy hypothesis. Over one quarter of workers in Glass production, wood production, primary metal industries, rubber and manufacture of paper etc. were exposed to 90dB (A) or greater (John J. May, MD). Worker's sensitivity to excessive noise also may affect by the Temperature with greater temporary shifts (John J. May, MD)

IV. HEARING LOSS

The damage done by noise depends mainly on how loud it is and on the length of exposure. The frequency or pitch can also have some effect, since high-pitched sounds are more damaging than low-pitched ones. In practical, the degree of hearing loss will not be linear with respect to exposure (John J. May)

Noise may tire out the inner ear, causing temporary hearing loss and adding to NIHL employees working in some jobs they can experience hearing loss problem to the external ear or percussive injury. Human middle ear may be affected from mechanical or barotrauma (John J. May, MD) cross sectional view of the ear (Figure 1). After a period of time off, hearing may be restored. Some workers who suffer temporary hearing loss may find that by the time their hearing returns to normal, it is time for another work shift, so in that sense, the problem is "permanent" with continual noise exposure, the ear will lose its ability to recover from temporary hearing loss, and the damage will become permanent. Permanent hearing loss results from the destruction of cells in the inner ear-cells which can never be replaced or repaired. Such damage can be cause by long-term exposure to loud noise or, in some cases, by brief exposures to very loud noises.

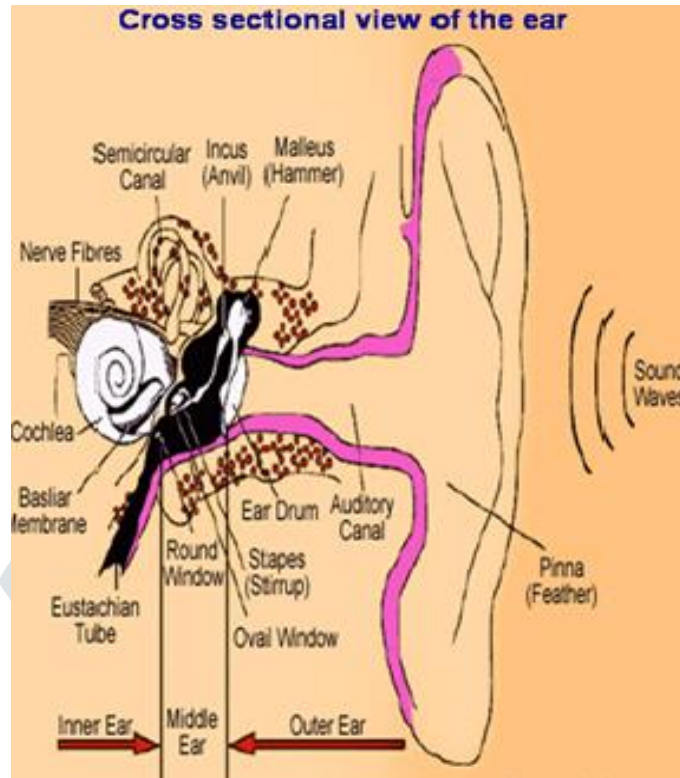


Figure 1(cross sectional view of the ear)

Normally, workplace noise first affects the ability to hear high frequency (high-pitched) sounds. This means that even though a person can still hear some noise, speech or other sounds may be unclear or distorted. Workers with hearing impairment typically say "I can hear you, but I can't understand you." Distortion occurs especially when there are background noises or many people talking. As conversation becomes more difficult to understand, the person becomes isolated from family and friends. Music and the sounds of nature become impossible to enjoy.

A hearing aid can make speech louder, but cannot make it clearer, and is rarely a satisfactory remedy for hearing loss. Workers suffering from noise-induced hearing loss may also experience continual ringing in their ears, called "**tinnitus**." At this time there is no cure for tinnitus, although some doctors are experimenting with treatment. The major effects of noise on the body are auditory fatigue, Sound trauma, Hearing loss professional, professional deafness, Stress and Cardio-vascular disorders (NICULINA SCHIOPU, D.I. BARDAC)

V. NOISE STANDARDS

Permissible Exposure Limit;

Standard is based on The Factories Act 1948(Tamilnadu Factories Rules, 1950) and European Union Regulations (EU). French NF EN 689 Industrial Hygiene standard about monitoring strategies, which defines that all measurements are based on Homogenous Exposure Group (HEGs), with statistical calculations about the probability of exceeding the Occupational Exposure Limit (OEL) or permissible exposure limit (PEL). As per the Factories Act 1948 (Tamilnadu Factories Rules, 1950, Pg.no 500) Schedule XXVIII operations involving high levels noise certain rules are framed. High level noise means noise measured on a weighted scale is 90dB or more. **As per Schedule XXVIII of Tamilnadu Factories Rules, 1950**, In every factory, suitable engineering control or

administrative measures shall be taken to ensure, so far as is reasonably practicable, that no worker is exposed to sound levels exceeding the maximum permissible noise exposure levels specified in (Tables I)

Table-I
Permissible Exposure limit

Duration (hours work/day)	European Union(EU) (decibels)	Tamil Nadu Factories Rules (decibels)
8	85	90
4	88	95
2	91	100
1	94	105
1/2	97	110
1/4	100	115

To control the noise exposure of workers European Union has established many directives (Ana PICU). European union Directive 86/188/EEC on the protection of workers from the risk related to exposure to noise at work. 2003/10/EC Noise –Safety and Health at work obligation lay down in the framework.

VI. CONCLUSION:

Noise levels at noise producing area are measured using sound level meter and dose badge used to measure employee daily noise exposure is calculated, compare with the standards and control method should be implemented.

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