Industrial noise - lab report example

Health & Medicine

Industrial Noise

The paper “ Audiometric Industrial Hygiene - How Noise Pollution Affects Different People" is a worthy example of a lab report on health sciences & medicine. Noise is described as any sound that is unwanted at a place and is normally produced randomly. Such sound is normally loud and unpleasant to the human ear and usually prevents one from perceiving the required sound. This may include such things as other people’s conversations, the sound of machinery, and any other sound that prevents one from perceiving the required sound. Noise in itself has a number of health effects on the human body and health. Noise causes hearing loss, cardiovascular-related diseases like high blood pressure, stress, annoyance, and retards child’s physical development. This experiment was set up to measure hearing sensitivity for different people and for their different ears. The main lesson in this experiment is to show how noise pollution affects different people in society differently. The audiometry equipment produces specific tones into the ear, which tests the hearing sensitivity of the entire auditory system. Pure tones are presented at different frequencies across the range of human hearing. The outcome is then recorded to see the difference in hearing between different individuals and between different ears for the same individual.

The following formulas can then be used to calculate the different aspects of sound at the specified frequency. Such things as frequency, wavelength, velocity, and pressure of sound are crucial to determine the level at which one’s ear can perceive sound. Time to time experimentation using this method will help to conserve hearing. This experiment, therefore, is normally

called the hearing conservation program.

Maximum exposure time: T max = 8 (Formula 1)

2 ((L - 90) / 5)

Noise dose: D (%) = C * 100 (Formula 2)

T max

Estimated exposure (single protection): L adj = L - (NRR-7) (Formula 3)

Estimated exposure (double protection): L = L adj - [(NRR h - 7) + 5]

(Formula 4)

Objectives

The objective of this experiment is to perform audiometry as part of the hearing conservation program. The experiment is supposed to highlight the effect of noise on hearing to different people in a class or organization. The hearing conservation program is normally aimed at analyzing the effect of noise on an individual over time and helps establish the maximum exposure time required to reduce hearing loss. The program also helps to ascertain the noise dose required to a person over some period. This helps to put in measures to reduce the effect of noise on an individual and thus prevent hearing loss.

Instruments and materials

This experiment needed a number of instruments and materials, which are listed below:

i. Belton audiometry set: In this experiment, two different Belton audiometry sets were used; model 9D and model 12D. They had initial measurements of 0 Hz in frequency and 0 decibels in sound level. The audiometry sets were to

measure frequency from 0 Hz to 8000 Hz and measure sound intensity from 0 dB to 120 dB.

ii. Audiometer sheets were also needed for recording the different frequencies at which a person perceived sound. Two sheets were needed, one for each person.

Methodology

Once the experiment is set up with the Belton audiometry and the headphones, one person is supposed to wear the audiometry headphones as the other person adjusts the hearing level and the frequency of the audiometry from 125 Hz up to 8000 Hz. The frequency is first set then the hearing level knob is adjusted to get the level at which an individual perceives sound at the specified frequency. The experiment is done for the left and the right ear independently. The hearing level for the different frequencies is then recorded on the audiometer sheets to show the level at which an individual perceived sound or was able to hear a quality sound. The audiometry set is initially at zero frequency and is varied every time the experiment is repeated up to the highest frequency, which is 8000 Hz.

The operator of the audiometry and the subject hears the sound is supposed to be aligned such that the subject does not see the audiometry equipment. The operator is supposed to face the back of the subject. This is a precaution to enable recording of accurate results from the hearing exercise. The experiment is repeated 7 times for each ear and the results recorded.

Results

The results of the experiment were recorded as shown below:

Table 1: Results for the first subject

Table 2: Results of the second subject

The results were analyzed using graphs and gave the following set of graphs.

Graph 1: Left ear of the first subject

Graph 2: Right ear of the first subject

Graph 3: Left ear of the second subject

Graph 4: Right ear of the second subject

From the results tabulated above, it is clear that every individual perceives sound at different levels. To add to this, an individual can perceive sound differently in each specific ear. It can also be seen that perceiving sound is not directly proportional to frequency and sound level. Different frequencies are perceived at different sound intensities. This shows that different intensities of sound and frequency affect our ears differently.

Conclusion

In conclusion, it is clear that noise has negative effects on the human body and especially to the ears. This is evident from the experiment, which shows that different individuals perceive sound differently. To add to this, the different ears for the same person perceive sound differently.

A number of factors can affect the accuracy of audiometry experiments; one of the most common is the headphone fit. This is how tight or how well each ear’s headset fits to give optimum sound. Another factor that can affect

audiometry is background noise. Such noise affects one in that he perceives sound at a later stage other than the required one. This causes errors in the experiment. To add to these, the learning effect also affects audiometry experiments. The ear used to test the accuracy of the experiment tends to be poor in perceiving sound as compared to the other ear. Technical limitations also affect the accuracy of the experiment. Such things as the accuracy with which sound can be perceived and the accuracy with which the sound intensity knob is adjusted all affect the accuracy of the experiment. Some subjects may delay reporting if they perceive sound, which causes errors in the experiment.