

Industrial Noise Level and School Location: Implication for Teaching and Learning

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Abstract

This study sought to determine the industrial noise level, school location and the impacts on workers of industries, school pupils and teachers of schools located near the industries in Rivers State. To achieve this purpose, fifty (50) workers and fifty (50) school people comprising teachers and pupils totaling one hundred (100) were tested for blood pressure and hearing experiment. Noise level were measured at specific unit for the experimental study while ten (10) items structured questionnaire was developed and administered to one hundred (100) respondents for the impacts assessment. The findings from the study shows that noise level in the industrial areas is high and there is also indication that this high level of noise impact negatively on the health of the workers and school people. Recommendations were made.

Introduction

Noise is a type of pollution caused by the activity of man at home and industries. Wilson (1989), states that noise originate from sounds and vibration. Sound is a form of energy which require materials medium for propagation. Khophkar (2007), asserted that sounds propagate through solids and liquid but not through a vacuum. Any kind of vibration is capable of producing sound. Several studies have been carried out by an environmental management. Walter (2001), in his study, concluded that what we hear from musical instrument is melodious sound which we love to listen and which have soothing effect to the nerves, pleasing and enjoyable to the listener. Sahoo (2007), in his study concluded that what ever we do not like to hear is noise. This indicates that all unwanted sounds are noise. Burns and Faulkner (2002), identified sources of noise pollutions as machines such as automobiles, trucks and aircrafts, construction equipment, farm machines and industrial machines which are dangerously loud. Some home appliances, shop tools, lawnmowers, and leafblowers can also be noisy. Others are guns, far crackers and some toys. Even music played at very high volume is also as damaging to the ear as roaring chain saw. Shukla (2003), also identified engine of ships, super tankers as producing a lot of sounds, Offshore oil. Exploration and drilling are also identified to produce high noise.

Recently, very loud low frequency sonar signals are being sent through the seas to detect submarines and gain information about water temperature and global warming. No wonder Powel (2000), categorized sources of noise as domestic and industrial. Threshold of audibility is zero dB. If a pin falls on a hard floor it gives 10dB. Any sound between 50 to 90 dB is considered as noise while any sound from 90 to 120 dB is considered to be a health hazard. Such noise are produced by air craft, pop music, heavy truck, traffic and railways.

Alarming noise commence from 70 dB and can extend up to 140 dB. These a noise generated by air compressors, concrete mixers, scrapers, dozers, payers, power sand, generators, rock drillers, etc. This type of noise is uncomfortable and unwanted by the society. Jones (2001), states that effect of noise are both health and behavioural in nature. That unwanted sound damage the psychological health of individuals. Noise pollution, causes annoyance and aggressions, hypertension, high stress level, hearing loss, sleep disturbances, it makes conversation difficult and leads to productivity loses due to poor concentration.

Noise pollution also leads to ecological imbalance. Kryter (2006), outlined effect of noise on animals as stress, risk of mortality by changing the delicate balance in predator/prey detection and avoidance, and interfering with the use of sound in communication in relation to reproduction and navigation. On the other hand, school location according to Nwana (1988), are classified into urban and rural. In both cases, schools are usually located in the outskirts of the town and villages quite away from the noisy and busy areas for effective teaching and learning. Recent development have affected the previous arrangement. Urbanization and industrialization have extended and even subsumed the schools earlier locations making the schools environment noisy and thereby affecting teaching and learning.

Statement of the Problem

Environmental noise pollution caused by domestic and industrial activity has been on increase these days. Jones (2001), opined that noise pollution is responsible for some unexpected aggression of youths, hypertension, high stress level, hearing loss, sleep disturbance and forgetfulness. These are some of the problems commonly observed among school children these days, where schools one located in the hearts of towns and villages where domestic and industrial noise level are so high.

Now that the oil exploration with all the associated noise pollution occur around the schools areas, this research work is therefore carried out to identify the sources of and measurement of noise at various units of operations in and around the gas plant at Omoku in Ogba/Egbema/Ndoni Local Government Area of Rivers State. This research work also examined the possible impact of this noise level on the health of workers as well as school children and teachers of the schools located within the various range of the noise level.

Purpose of this Study

The purpose of this study is to ascertain the impacts of noise pollution on workers at Omoku gas plant and the school children in schools around the area of sources. In specific terms, the study attempt to achieve the following objectives

1. Identify the actual sources of noise pollution in Omoku gas plant.
2. Measure the level of noise in various units of operations within and around the gas plant.
3. Ascertain the impact of noise on the workers as well as school children within the gas plant.

Scope of the Study

This study focuses on the sources of noise pollution at the Omoku gas plant only. It intends to examine the impacts of the noise pollution on the workers at Omoku Gas Plant and the school children within the schools located around the Omoku gas plant.

Research Question

The following research questions are posed for the study

1. What are the possible sources of noise pollutions at Omoku gas plant?
2. What are the levels of noise pollutions at Omoku gas plant.
3. What is the health effects of noise pollution on the workers at the gas plant and school children in schools located within the areas.

Research Methodology

The following are discussed in this area:

Area of Study

The area of study is Nigerian Agip Oil Company Limited, Omoku, Gas plant situated along Onosiogu Orashi River around Obrikom, Omoku, Ogba/Egbema/Ndoni Local Government Area of Rivers State.

Research Design

A combination of experimental and survey design was used for this study. Experimental design was used to determine the levels of noise at the gas plant while the survey design was used to determine the health impacts on workers and school children.

Population of the Study

The population of this study comprises all the workers at the gas plant and a total of three hundred school children from schools located around the gas plant.

Sample and sampling techniques

The total sample used for this study was one hundred people (100) comprising fifty (50) workers of the gas plant and fifty (50) school children from the schools located around the gas plant.

Instrumentations

The instrument used consist of digital sound/noise level meter calibrated in dBA and dBC units, Sprague. Rappaport type stethoscope and mercurial sphygmomanometer used for blood pressure experiment while ten item questionnaire of strongly agreed, agreed, strongly disagreed to disagree was used to illicit information on the impact of noise pollution to the workers and the school children.

Data Analysis Techniques

The researcher having put an ear protection equipment, inserted the 9 volts dry cell battery and switched on the sound level meter, then turned the calibration switch high for the measurement of high noise level. The trigger was then pressed and an infra-rayed red lens light pointed at the point of interest and noise level was measured and recorded. During the time of the measurement, the researcher stayed some meters away from the gas turbines, air compressors, and oil compressors and farther away from the air craft, all at the Nigerian Agip Oil gas plant. The points of stay are where the workers are as well as where the school is located.

In blood pressure experiment, the researcher wears the clinical apron and magnetic lens and positioned the mercurial sphygmomanometer and rapped the samples with the inflatable cuff on the right fore arm, the nub on the pressure bulb was tightened and the diaphragm of the stethoscope placed on the brachial artery of the sample and the ear piece of the stethoscope placed on the ears of the researcher. The pressure was then inserted by pressing the bulb until the systolic and diastolic sounds were heard. At this point, the reading was taken and the instruments dismantled.

A ten item questionnaire was also administered to one hundred (100) respondents for the impact assessment.

Data presentation and Discussion of Results

The results of the data analysis are presented below according to the research questions

Research Question One:

What are the possible sources of noise pollution in Omoku gas plant?

The sources of noise pollution where the researcher determined the level of noise are shown in table one below.

Table one: Sources of noise pollution in Omoku gas plant

1. Outside plant environment around the school premises
2. Turbine Unit
3. Air Compressor Unit
4. Safety Arena
5. Offices
6. Heliport

Research Question Two: what are the levels of noise pollution at Omoku gas plant?

The noise pollution level as determined by the researcher through the measurement at designated points are shown in table two below:

Table two: Noise Pollution Level of Designated Points

- | | |
|---|----------------------|
| 1. Outside plant environment around the schools | -55 dBA- high |
| 2. Turbine Units | 122dBA- very high |
| 3. Air Compressors Unit | 95dBA- very high |
| 4. Safety arena | 83.4 dBA – high |
| 5. Offices | 65.3 dBA – high |
| 6. Heliport | 128.7 bBA -very high |

Research Question Three: what are the impacts of noise pollution on workers?

The impacts on blood pressure as determined through the blood pressure readings is indicated in table three A

Table three A: Blood pressure of three groups of workers

Group A – Office Workers – 110/70, 115/80, 120/70

Group B – Safety Workers – 120/80, 125/85, 127/80
 Group C – Turbine Workers – 125/90, 130/90, 135/80

From table three above, it is clear that noise has impact on the blood pressure of workers.

Table three B – Health impact of noise pollution on workers and school children.

S/NO	ITEMS	SA	A	SD	D	TOTAL
1.	The level of noise pollution in plant affect both workers and school children	72	26		2	100
2.	Noise pollution in gas plant causes high blood pressure	44	42	4	10	100
3.	High level of noise pollution causes headache	60	36	2	2	100
4.	The high level of noise causes stress and fatigue	78	22	-	-	100
5.	The high level of noise causes hearing impairment	78	22	-	-	100
6.	Impulsive noise causes shock and panic to the workers and school children	56	40	2	2	100
7.	High level of noise causes forgetfulness of the workers and school children	36	50	6	8	100
8.	high level of noise causes communication problems	60	40	-	-	100
9.	High level of noise causes accidents to workers and school children	40	40	10	10	100
10.	High level of noise reduces productivity of workers, teachers and school children	40	30	10	20	100

From the results of the responses in table three B above, it is clear that noise level impact adversely on the health of workers and school children and their teachers.

Discussion of Results

In table I, sources of noise pollution in Omoku gas plant were identified as outside plant environment which includes the school environment, turbine units, air compressors units, safety areas, offices and heliport. This finding is inline with Burns and Faulkner (2003), who in the study of sources of noise pollution identified aircraft, automobiles and other machines as the major sources of noise pollution. In table 2, the level of noise pollution in Omoku Agip gas plant was found to be very high. Turbines was 122dBA, air compressors units 95dBA, school environment was 53dBA and heliport 128.7dBA while air tolerating noise level is 50dBA.

This is in line with the findings of Tiwari (2007), who conducted a research on noise measurement. Although Tiwari (2007), focused on noise distance instead of noise produced by specific machine. Table 3A and B show the health impacts of noise pollution in Omoku Gas plant to the workers and school children. The results show that the high level of the noise causes and aggravates hypertension, causes chronic headaches, stress and fatigues. The people are also prone to hearing impairment; forgetfulness and also the noise interrupt communication of workers and school children/teachers as well as to industrial accidents. This finding is in line with that of Anthrop (1999), who studied the impacts of noise on late 80's and revealed that high noise causes high blood pressure, slow pulse beat, breathing problems, etc.

Summary

This study sought to determine the industrial noise levels and its impacts on workers as well as school children within and around the gas plant in Ogba/Egbma/Ndoni Local Government Area of Rivers State. To achieve this, the researcher conducted series of experiments such as measuring the noise level at different units within and around the Omoku gas plant. Conducting blood pressure tests. A set of questionnaire was also designed and administered to one hundred industrial workers and school children, including their teachers in the area for impact assessment.

The findings show that:

1. There is high level of noise in Omoku Agip Gas plant

2. The high noise level of has adverse health impacts on workers and teachers and learning in schools around there.

Conclusion:

From the results of this research, it can be concluded that there is a high level of noise in Omoku Agip gas plant in the area studied. Such high level of noise has serious adverse impacts on health of workers and school people leading to stress and fatigue, high blood pressure, hearing impairment as well as industrial accidents. It also leads to various kinds of illnesses as well as ecological imbalance.

Implication for Teaching and Learning

The high noise level in Omoku Agip Gas plant creates a lot of problems in teaching and learning in schools around the area. It causes stress and fatigue, high blood pressure to teachers and school children as well as hearing impairment, making teaching and learning uninteresting.

Recommendations

In view of the findings above, the following recommendations are made:

1. Government should make laws to regulate noise levels within the health friendly area
2. New technologies should include noise reduction components on new machines
3. Industrial plants should be sited far from living homes and schools.
4. Noise reducing gadgets should be provided for the workers at gas plant.

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