

ASSESSMENT OF NOISE POLLUTION LEVEL IN TRANS-AMADI INDUSTRIAL LAY-OUT IN PORT HARCOURT RIVERS STATE, NIGERIA

¹Digha, O.N. and ²Tabe, A.E.

^{1&2}Department of Geography and Environmental Science,
University of Calabar, Calabar, Cross River State, Nigeria.

E-mail: dighaopaminola@yahoo.com

ABSTRACT

The study seeks to assess noise pollution level in Trans-Amadi Industrial Layout in Port-Harcourt Rivers State Nigeria. Port-Harcourt is an industrialized metropolitan city with over 6.5million population. The methodology was basically instrumentation and maletical. The instruments used for the study were GPS, and a BK precision digital sound level meter (IE C6.5/type II) model. The instrument was set on the weighting and slow response at an interval of five (5) minutes per reading. The noise meter microphone was held facing the source of the noise at a highest of 1.2 meter. The findings of the study indicates that all sampled located had noise above the cunbiant limit. Rivoc Road locations 1 has an average noise level of 77.2dB, Mother Cat Odokwuku is 78dB, Ordinace road is 70dB, Danjuma drive 81dB, Eastern by pass road is 82dB, Elk Road is 82dB, Slaughter market is 76dB, Destiny Drive is 7dB, Abuloma road 5dB and total Gospel Road is 76dB. All the values were above the ambient limit 80, by implications, the inhabitance of the study area were subjected all forms of noise pollution related diseases. Therefore steps should be taken to ameliorate the evils of noise pollution on human health and loss of man hours as well as human resources.

Keywords: Noise, Pollution, Health and Diseases.

INTRODUCTION:

History has it that, noise pollution first resulted from mass activities which followed the revolution that rocked Europe in the 16th Century (Smriti, 2009). The atmosphere is the thin enveloped of gasses which surround our planet earth; it is divided into four layers known as the troposphere, about 18km from the earth's surface into the atmosphere, the stratosphere, the mesosphere and the thermosphere. The thermosphere is 100km away from the ground surface (Robert and Cutler, 2008).

Environmental scientist have been aware of the fragile nature of the atmosphere for a very long time, however until recently, no action or steps were taken by the Word leaders to abate the threat suffered by the atmosphere by reason of man's activities arising from industrialization as well as noise pollution. Sound is a mechanical energy from vibrating source. Noise can be defined as an unpleasant and unwanted sound and has become part of urban life in the industrial centres of the world (Smriti, 2009, Agbalagha and Olali, 2009).

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Noise is not a new problem in industrial centres, although it is only until recently that it has been recognized as a problem. In the past noise was considered as a part of the normal jobs and this was due to the fact that the effects of noise pollution were not given attention (Gupta, 2010). While the consequences of improper guarding of machines and exposure to toxic substances are well understood, this is rarely the case with noise pollution. Besides being an annoyance, noise interfere with working efficiency, it may cause accidents and even damage workers hearing. Thought the world, government, trade unions, managements are getting organized to meet this new challenge.

Environmental noise pollution may impact and cause physical ailments, stress in earing process and affects workers productivity (Gupta, 2010). Sudden noise such as coro-back firing can course a hike in pulse rate. Other health effects of noise pollution includes vasocorstriction, change in heart beat rate, muscular activities, diastolic pressure, respiratory rate, diseases in salivary and gastric secretion, slowing of digestion function etc. (Inyang, 2000, Agbalaba etal, 2007, Agbalaba and Olali, 2009 and Apkofure, 2010). Port Harcourt metropolitan city has a very high population density with a great influx of people, multi-national oil giants, oil servicing companies, food processing and manufacturing industries, sea port, air port numerous higher institutions and the seat of administration of Rivers State is experiencing high traffic and hold-ups as a result of industrial growth and urbanization. More so, a survey conducted recently reveals that most of the industries in Port-Harcourt were located around Trans-Amadi industrial layout. There have been recent complaints and claims of sleeplessness at noon and at night due to noise from traffic an operations of companies and industries as well as health problems associated with high level of noise lay credence to this study. By and large, the study seeks to:

- (a) Ascertain the noise level in Trans-Amadi industrial layout in Port-Harcourt.
- (b) Examine the health implications of the results of the study.
- (c) To proffer educations which ameliorate the problems into the study.

MATERIALS AND METHODS

The Study Area

The study area is Trans-Amadi industrial layout in Port-Harcourt at the North Eastern flank of Port-Harcourt metropolitan city. It is bounded in the North by Elenwo, to the East by Abuloma, to the South by Amadi creek and at the West by Okujuku Ama. It is located between longitude 6 10" and 6⁰28' East of the Greenwich Meridian and latitude 4⁰ 35' and 5⁰ 05' North of the equator. Port-Harcourt is situated in the Eastern Niger Delta of Nigeria. It is about 25km distance from the Atlantic Ocean (see figure 1).

CLIMATE: The study area experiences heavy rainfall for about 8-9 months annually, the climate of the area is 18 "A" type of Koppens system of climatic classification (Oyegun, 1999). The weather condition of the study area is influenced by the moist tropical maritime air mass and the dry dusty laden tropical continental air mass. The highest rainfall values are obtained in June (322.93), July (413.84mm). Port-Harcourt also experience double maxima rainfall regime thus, normally experience "August Break"

between late July and the first two weeks in August. Average temperatures are typically 25⁰C – 28⁰C in the city.

INSTRUMENTATION AND SAMPLE COLLECTION

The instruments used for collecting the data-seta include GPS and a BK precision digital sound level meter (IE C65/type II) models. The digital sound level meter was set on the weighting and slow response at interval of five (5) minutes per reading. The A-weighting is a frequency correction that correlates over all response of the human ear (Agbalagba, 2007). The noise meter microphone was held facing the source of the noise at a height of 1.2 meter above the ground level which is the approximate average ear-ground distance for an average human being (Agbalagba and Olali, 2007). The field work was carried out between the hours of 8am to 11.30 am.

RESULTS AND DISCUSSION

Table 1: Obtained equivalent continuous level (leq.) values at a sample location and the computed pollution level Lnp.

S/no	Area of Location	Name of Area	Geographical Location	Average		Noise level dB (A) average leq.
				Min	Max	
1	Trans-Amadi 1	Rivoc road	N4 ¹¹ 48.3624 E7 ¹¹ 0.5411	72.48	82.60	77.54
2	Trans-Amadi 2	Mother cart Odokwuku	E4 ¹¹ 47.4277 E7 ¹¹ 2.221	66.9	89.20	78.05
3	Trans-Amadi 3	Ordinance road	N4 ¹¹ 48.3551 E7 ¹¹ 05069	55.1	85.80	70.45
4	Trans-Amadi 4	Danjuma drive	N4 ¹¹ 49.3166 E7 ¹¹ 1.112	67.5	95.30	81.40
5	Trans-Amadi 5	Elk road	N4 ¹¹ 49.2441 E7 ¹¹ 1.4058	72.7	90.40	81.55
6	Trans-Amadi 6	Eastern by pass road	N4 ¹¹ 47.2513 E7 ¹¹ 0.4311	70.5	93.20	81.85
7	Trans-Amadi 7	Slaughter market	N4 ¹¹ 46.1499 E7 ¹¹ 2.3211	70.1	81.90	76.00
8	Trans-Amadi 8	Destiny drive	N4 ¹¹ 42.34211 E7 ¹¹ 3.235	61.2	81.40	71.30
9	Trans-Amadi 9	Abuloma road	N4 ¹¹ 49.2541 EF ¹¹ 0.3422	48.9	53.70	51.30
10	Trans-Amadi 10	Total Gospel road	N4 ¹¹ 45.5921 EF ¹¹ 0.3092	67.2	84.40	75.80
			MEAN	65.258	83.79	74.524

Source: Researcher's Fieldwork (2012)

The results of the measured averaged equivalent continuous these (Leg) is presented in table 1 and also shows the geographical location (GPS) where samples were taken. From the results presented in table 1, average noise level ranges between 65.26dB (A) and 83.79dB (A) with a mean noise level of 74.52dB (A). This is due to the activities of companies operating in the area. The Eastern by pass road recorded the highest noise level of 81.85dB (A). This may be as a result of the noise from vehicles and industrial noise generated from the routine operation of machines and equipment. ELK road come second in term of highest level in the study are with an average values of 81.55 dB (A). This route is also a very busy route with high industrial concentration. The high noise level may be due to transportation and the use of outdated and un-service machines. Along Danjuma drive, LNG road also recorded high noise level which is attributed to construction and building services noise as well as population explosion in the area. The noise level value for Danjuma drive LNG road is 81.40dB (A).

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The lowest noise level of 51.30dB (A) was recorded at the Abuloma road and these may be due to technology as this area comprises of hotels and most of the hotels use sound proof generators and listers which are less noisy when compared with the heavy duty machines used in Eastern by pass road and ELK road.

The result of the dispersion measurements conducted within selected houses to these roads shows that the rate ranges between 0.32–0.64 dBm⁻¹ with a mean dispersion rate of 0.48Bm⁻¹. These values obtained agrees with those recorded in Ughelli city is 1-5% lower than the previously reported in Yenagoa and is 18.1% lower than the mean value recorded for Port Harcourt metropolis by Abumere *et al.*, (1999). These value obtained in Trans-Amadi industrial lay-out are within the values reported by (NDES, 1999) in the Niger Delta. According to Abgalabga and Olali (2009) that when the overall mean noise level of 76-21±6.8dB (A) and mean noise dispersion rate of 0.21Bm⁻¹ house with 30 metres proximity to road side will have a noise reduction of about 6.7dB (A) outdoor. Hence average noise level within these vicinities will be within 70dB (A) mark. The finding of this study stands at 74.52dB (A). This means that the outdoor noise level for day and night time recommended by WHO (1980) is exceeded. More so noise level received by the residence of Trans-Amadi is 74.52dB (A) which is for higher than the 45dB (A) recommended by WHO for indoor background levels to ensure good speech intelligibility and that recommended by the state of California (2007) for land use compatibility for community Exterior noise environment.

Abgalabga and Olali (2009) affirmed that this may impair some level of annoyance sleep disturbance and speech interference. This was equally supported by Gupta (2010). Schools children within a radius of 30 metres approximate to road may have their rate of assimilation ability reduced by about 17% and may reduce some physiological and psychological effects (Cohen *et al.*, 1981 Green, 1982, Abgalagha and Olali, 2009; and Gupta, 2010). Further implications of the study shows that hospitals and other health institutions located within this distance from the road may have their patients recovery rate reduced by a factor of 3 especially patients with high pressure, vasoconstriction and cardiac patients.

RECOMMENDATIONS:

Based on the findings of this study, the following recommendations are made.

- The federal government should provide adequate incentive and guidelines as well as enforceable laws on noise pollution in the environment.
- Federal government of Nigeria should come out with a blue print (ACT) through legislation, on the noise standards for residential/domestic environment, which will serve as residential areas as obtained in developed countries.
- Federal environmental protection agency should design a comprehensive but usable format to make environmental auditing a compulsory activity in every industry-such requirement of this stage of gathering setting should not be formal so that federal environmental protection agency can receive meaningful information to help set functional rules and regulations.

- The State government should enact laws that will prohibit street activities capable of generating high noise records, stores that play loud music in the old Rivers
- States noise edit of 1986; noise from churches and mosques should be controlled by the state government through legislation to check noise level in the city.
- A task force or natural committee should be set to take case noise pollution released in those areas.
- Drivers of vehicles, street hawkers should be sensitized on the dangers in indiscriminate hawking of horns.
- A caustic engineers or noise experts approval should be sought before opening new streets, layout and before developing new sites.
- There should also be a need for continuous formal and informal public education on the nature and effect it causes to human health.
- Federal government should pursue the passage into law the bills to prohibit the use of Siren by some individuals and some government functionaries this is before the senate.
- Establishment of more schools and hospitals within 50 meters proximity to the main industries should be prohibited in the interest of our children and the general public.

Finally, government should be organizing seminars yearly to educate the people on the dangers of these problems.

CONCLUSION:

The environmental noise pollution assessment of Trans-Amadi Industrial Layout in Rivers States has been carried out. The investigation reveals that noise level bothering the people in the area is high but still within the range reported in NDES, in the Niger Delta and below the FEPA recommended maximum limit. Thus may not cause any immediate hearing damage. But noise level within the range 30-40 meters proximity to the main roads exceeds the annoyance speech interference and sleep tolerance level recommended by WHO and the State as California, exterior noise environmental level, hence may induced sleeplessness, annoyance, reduce assimilation ability among school children and impair patients recovering rate and other health related side-effects among people living within this vicinity. Systematic approaches to limit this increasing noise level in the city have been suggested so that possible health hazards associated with noise pollution will be minimized.

From the result of this study, there is no gain saying the fact that there is human health, human comfort, human understanding and human mental disturbances in study area. The cause of the above mentioned disease is noise.

Therefore there is the need to seriously address the issue of noise pollution in the area in order to curb the outbreak of the diseases.

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Biographical Note:
