



# Carbon Monoxide Phenomenon in Some Areas of Owerri Municipality of Imo State, Nigeria

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## ABSTRACT

Carbon monoxide, colourless, odorless, poisonous gas, is predominantly in our air, caused mainly from human activities. Monitoring is necessary to enable mitigation of its effect on our ecosystem. Data on carbon monoxide was obtained using Crowcon Gasman air monitoring gadget, at designated sites. The average result showed that the level of carbon monoxide concentration at warehouse is 54.6ppm, Owerri club is 6.8ppm and East Gate is 6.4ppm. Warehouse junction has the highest carbon monoxide concentration due to daily traffic flow and needs to be redressed, than the other sites.

**KEYWORDS:** Mitigation, Carbon monoxide, Ecosystem, Traffic flow, Phenomenon.

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## I. INTRODUCTION

In climatology, Carbon monoxide consists of one carbon atom and one oxygen atom, connected by a triple bond that consists of two covalent bonds as well as one dative covalent bond. However, carbon monoxide is the simplest Oxocarbon and Isoelectronic with the cyanide ion and molecular nitrogen sequence complexes. In coordination of the carbon monoxide ligand is called carbonyl, [11]. Carbon hydroxide (CO) is present in outdoor and indoor air, and is produced by burning fuels such as wood, oil, natural gas, propane, kerosene, coal and gasoline. Carbon monoxide in outdoor air is due primarily to exhaust from vehicles. Carbon monoxide in indoor air is related to the presence of appliances which use carbon monoxide producing fuels, [2]. Carbon monoxide (CO) is a colourless, odorless gas with certain degrees of toxic elements to human beings and animals. When encountered in a higher degree of concentrations, it can be dangerous; it can be produced in normal animal metabolism. In a lower quantity, it may have some degree of irritating gas, [3]. In atmospheric condition, is thought to have reasonable biological functions. Is a product of incomplete combustion of fuel like coal, wood and natural gas. Vehicular exhaust is a major source of carbon monoxide, [2].

The Importation and excessive reliance on the use of automobile during recent times have numerous benefits to human life. The benefits, however, have been accompanied by changes in the environment detrimental to man. In numerous cities across Nigeria, driving private car is probably a typical citizen's most "polluting" daily activity, as emissions from millions of personal vehicles on the road add up. Automobile exhaust emission has been found to be the most widespread and intractable urban air pollution problem, [4] To see automobile emission problem in Nigeria in proper perspective, the shores of Nigeria were kept wide open from importation of fairly used cars popularly called "Tokunbo" cars, by the Obasanjo administration of 1999 to 2007. Sequel to increase in workers' salary being skyrocketed. In Imo State, the Governor Ohakim's clean and green concept, encompass the ban of motor cycle in Owerri Urban. The introduction of multitude of tricycles popularly known as "kekenapep" and "kimkim" as an alternative means of transportation. The scenario worsened the already chaotic traffic congestion in Owerri, and increased automobile emissions and air pollution, [5]. It is noted when in history, sequel to automobile emission, Los Angeles city experienced air shed, climate change and obscuring of the sun causing eyes to smart and stuffed-up noses. Exhaust pollutants; hydrocarbons, nitrogen oxides (No<sub>x</sub>), carbon monoxide and carbon dioxide exert deleterious effects on human health and the environment [6]. Hydrocarbons react in the presence of nitrogen oxides and sunlight to form ground-level ozone. Ozone irritates eyes and damages the lungs, [7]. A number of hydrocarbons are toxic, with the potential to cause cancer. Under the high pressure and temperature conditions in an engine, nitrogen and oxygen atoms in the air react to form various nitrogen oxides, which also are precursors to the formation of ozone. They

contribute to the formation of acid rain. Carbon monoxide (CO) reduces the flow of oxygen in the blood stream and is particularly dangerous to persons with heart disease [8]. Carbon dioxide does not directly impair human health but it is a "greenhouse gas" that traps the earth's heat and contributes to the potential for global warming with solastolgc effects.

## II. METHODOLOGY

Gas Analyzer (using electrochemical cells), determines carbon monoxides levels in air, in an environment. Gas diffuses through semi-permeable membrane into the cell and an electrode of carbon dioxide (CO<sub>2</sub>), at the rate proportional to concentration of carbon (C) in air. The response time is fairly short and interference from the other air pollutants are normally encountered, but the level are minimal. An analyzer based on electrochemical cells are also available for measuring sulfur dioxide and oxide of nitrogen in the air.

Crowcon Gasman Air Monitoring Gadget; uses 6 volt cell battery. Direct sensor element that measure the concentration of carbon monoxide in air. Over a certain interval, it measures CO in the environment in ppm. The Crowcon Gasman hand measuring gas meter for (CO) is very simple to use in the sense that it is simplified to sport and measure CO in the air. The gas meter is raise upward over a period of time. A knob is moved from off position to test position. An alarm will be raised. This alarm indicate that the instrument is working and that the batter}- is fully charged. Then you move the knob from test to gas position. The reading will ascend upward and cause down cell to get stabilized at a certain levels. The concentration of (CO) in ppm of that location appears on the screen and is recorded directly.

## III. RESULTS

Table 1: Carbon Monoxide Concentration (Ppm) by Location

Time (hr)	Ware House	Owerri Club	East Gate
8am	54.0	6.2	6.5
10am	56.5	6.4	7.3
12noon	50.5	6.0	5.0
2pm	51.0	5.8	5.2
4pm	58.0	7.9	7.2
6pm	57.5	8.2	7.3

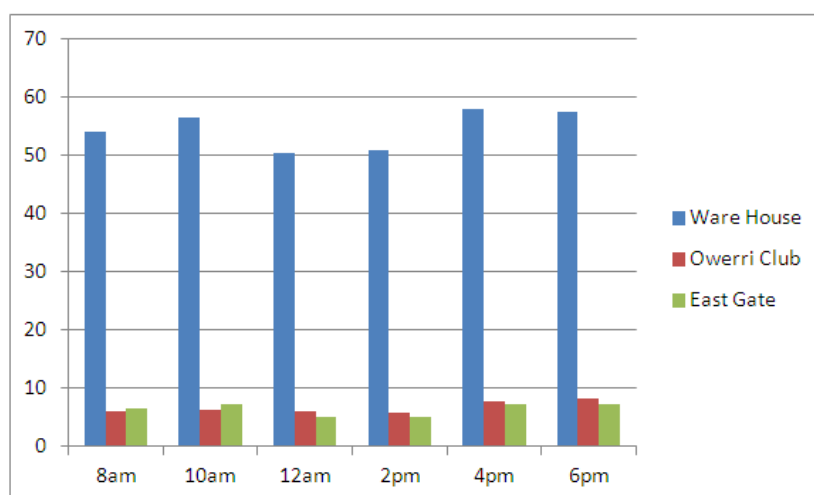


Figure 1: Bar chat of Carbon Monoxide Concentration (Ppm) by Location and Time

## IV. DISCUSSION

Ware House located in the globe using GPS is 5.48959N longitude and 7.02699E latitude, Owerri Club located at 5.50328N longitude and 7.047E latitude and East Gate 7.04437 longitude and 5.51412N latitude.

Ware House is situated at a T-junction connecting the roads that leads from Orlu, Control, Bank Road and Freedom Square. It is a very high traffic congested area, because all traffic entering into Owerri Municipal must pass through the junction.

Owerri club is located at the back of Imo State University, opposite Aladinma Alliance. It comprises of sports center, hotels and shops, always busy in the evening.

East Gate is a street where East Gate Hotel is located. It has less congestion because of traffic moving along the street.

At Ware House junction, we used nose mask because of heavy pollution of carbon monoxide. The reading of the Crowcon gas meter from Ware House junction is very high, in the morning and evening. The roads are always congested. Owerri Club is the least location with almost traffic free. In East Gate, the reading increased in the morning when people are going to work and in the evening when people are coming back.

## V. CONCLUSION

Carbon monoxide emissions are found to be higher during slow movement that is, at traffic clogged areas than fast acceleration. The overall assessment of air quality at traffic clogged areas indicated a result that will be described as unhealthy. Therefore, environmental management policy should be seriously pursued to help reduce the adverse consequences of high concentration of carbon monoxide levels in those areas that are highly concentrated.

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