

**Study on Level of Carbon Monoxide in Residential Area of GIDC, Vapi**Devang D. Parmar<sup>1</sup>, Deep H. Surati<sup>2</sup>, Kuldip B. Patel<sup>3</sup>, Jay V. Patel<sup>4</sup><sup>1</sup>U.G. Student, Civil Engineering Department, Government Engineering College, Valsad, India<sup>2</sup>U.G. Student, Civil Engineering Department, Government Engineering College, Valsad, India<sup>3</sup>Assistant Professor, Civil Engineering Department, Government Engineering College, Valsad, India<sup>4</sup>U.G. Student, Civil Engineering Department, Government Engineering College, Valsad, India

**Abstract:** -A study was carried out to evaluate the level of Carbon Monoxide in residential area of GIDC, Vapi. Some locations of residential area of Vapi were selected. For that purpose reading should be taken from the locations, they were Mahavir nagar, Bordi faliya, Ajit nagar, Charwada colony, Anand nagar, Housing sector, Khodiyar nagar, Gunjan nagar, Dungri faliya, Shivaji nagar. Two sets of samples one during monsoon and one after the monsoon were taken from each sampling point. The atmospheric parameter which include measurement of CO level were taken from each locations using CO level meter instrument and highest CO level was found out in all this ten locations and the value compared with (WHO) guideline. Data analysis was carried out and suitable measures were suggested to living healthy human life which free from harmful CO gas.

**Key Words:** CO level, Monsoon, Location, Samples.

**I. INTRODUCTION**

Carbon monoxide (CO) is one of the most common and widely distributed air pollutants. It is a colourless, odourless and tasteless gas that is poorly soluble in water. Complete combustion of carbon and oxygen produces carbon dioxide (CO<sub>2</sub>), a non-toxic gas. Incomplete combustion occurs when there is insufficient combustion air, insufficient time for complete combustion, incomplete combustion, incomplete mixing of air and fuel, or when the temperature drops below combustion temperature. CO is slightly lighter than air (0.97) and easily moves through small cracks throughout an entire house. Carbon monoxide has a slightly lower density than air. In the human body, it reacts readily with haemoglobin to form carboxyhaemoglobin. Small amounts of carbon monoxide are also produced endogenously. Carbon monoxide exposure is still one of the leading causes of unintentional and suicidal poisonings, and it causes a large number of deaths annually both in India.

Incomplete combustion occurs in all fires and even in the most efficient appliances and furnaces. All fossil fuels (e.g. coal, fuel oil, kerosene, gasoline, natural gas) contain carbon, as do other natural fuels (wood and charcoal). When these fuels burn (or oxidize), CO may be emitted as one of the gaseous by product. We are usually surrounded by potential surrounded by potential source sources, since so many home gas oil appliance (furnaces, refrigerator, clothes, dryers, ranges, water heater, space heater), fireplaces, charcoal grills, and wood burning stoves use fossil fuels as their source of energy. fumes from automobiles and gas-powered lawn tools also contain carbon monoxide. Tobacco smoke produces low level of CO in the smoker; however, the a long term effects are not clear and are overshadowed by other detrimental effects associated with smoking.

The present study aims to solve the problems in residential area of GIDC, Vapi and build pollution free areas by fulfilling the following objectives: The overall objective is to enhance the living standards of residential area of GIDC, Vapi by providing some suitable measures. The specific objectives of the Research were as follows:

- To study the existing status of CO levels in the study area by recording the CO intensity at various locations.
- Identification and consideration of suitable mitigation and abatement measures.

**II. STUDY AREA**

Vapi is a city and municipality in Valsad District in the state of Gujarat. It is situated on the banks of the Damanganga River and is the largest city in the Valsad district and also the second largest city after Surat in South Gujarat. It can be called the most developed city in Gujarat followed by Ahmedabad, Surat, Vadodara and Rajkot. Around 28 km south of the district headquarters in the city of Valsad, it is surrounded by the Union Territories of Daman to the west and Dadra and Nagar Haveli to the east. Economic and industrial growth in recent decades has blurred the physical boundaries, and a small stretch of roughly 21 km of Daman-Vapi-Silvassa has almost become a single urban area. Vapi, city of Gujarat, is a relatively the big industrial city, situated in the western region of India, is located at 22.3000° N, 73.2003° E. As per 2011 census, the population of vapi city has exceeded 1,63,630 lacs (vapi Municipality Statistics, provided by the VMC at the Government of Gujarat website)

This industrial estate in south Gujarat in Valsad district has been rated by the Union ministry as being "critically polluted" after it found the quality of air, water, land and ground water not meeting 'desired' standards.



Fig 1: Map of Vapi District

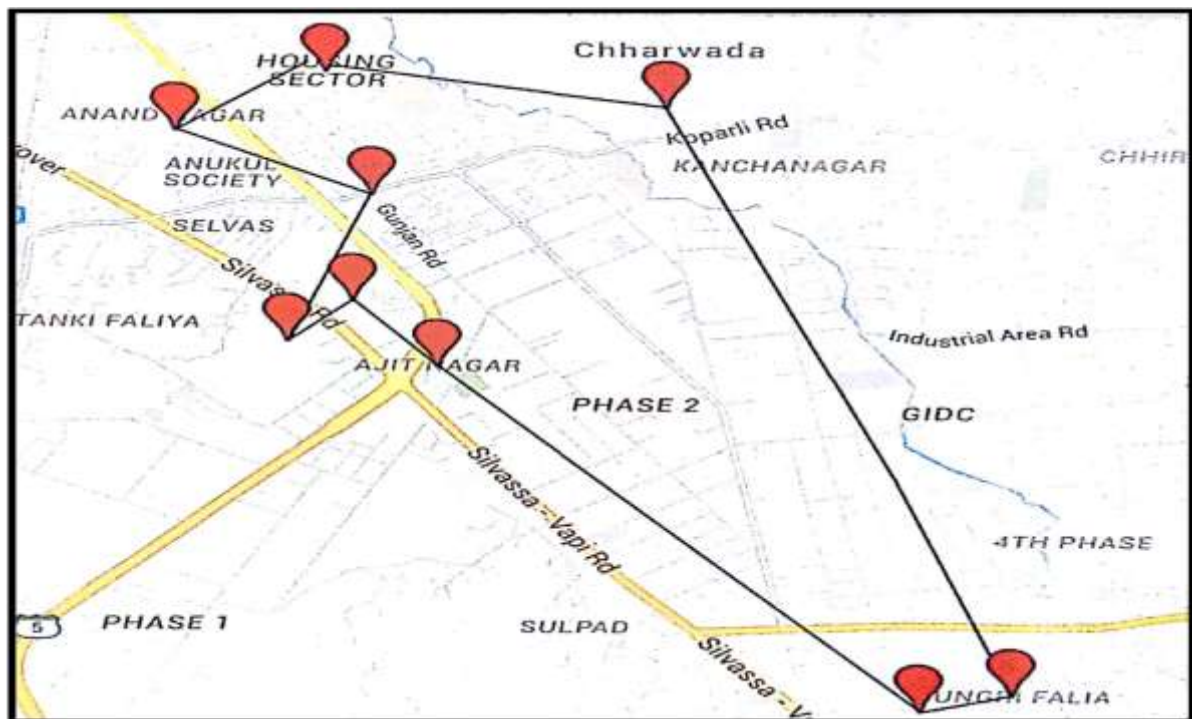
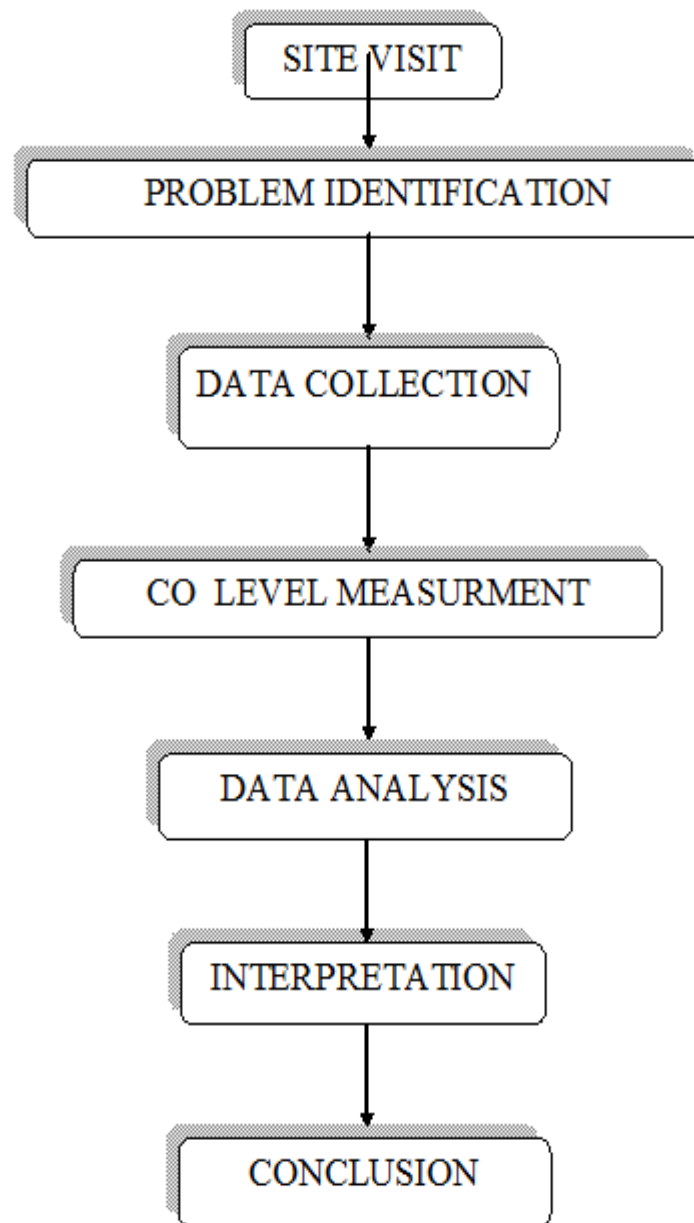


Fig 2: Study area of GIDC, Vapi

### III. METHODS & MATERIALS

The sampling area is the Vapi city. The CO level was recorded from residential area which was at variable distances depending on the location of the residential of GIDC, Vapi. Carbon monoxide sites of the city were identified and selected during the survey. These were Mahavir nagar, Bordi faliya, Ajit nagar, chanod colony, Anand nagar, housing sector, Khodiyar nagar, gujan nagar, Dugri faliya Shivagi nagar etc, which were representatives of entire area of residential GIDC in Vapi . All these sites have their unique characteristics i.e. heavy industry near the housing sector ,heavy traffic and industrial smoke, poor vegetation .

The methodology adopted in this project has been shown below through the flowchart.

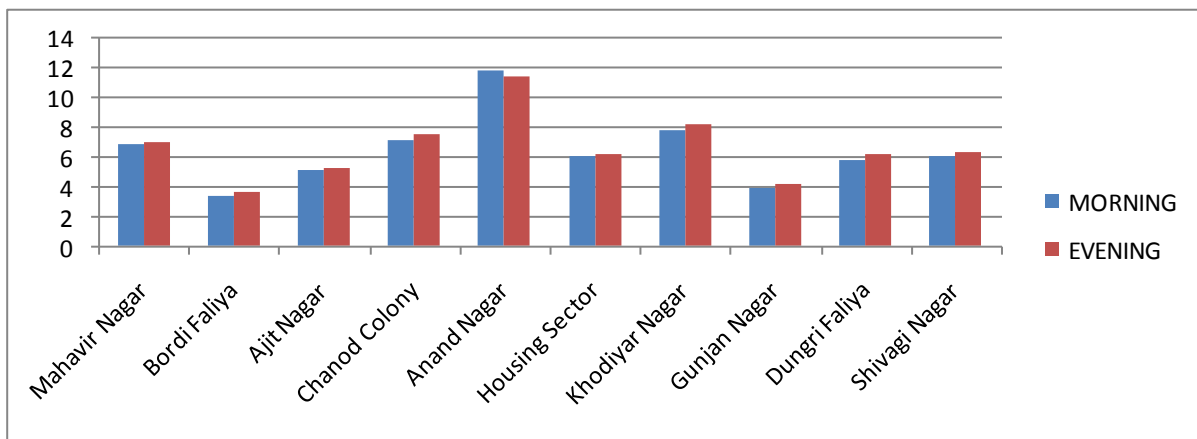


**Fig 3: Flowchart of Methodology**

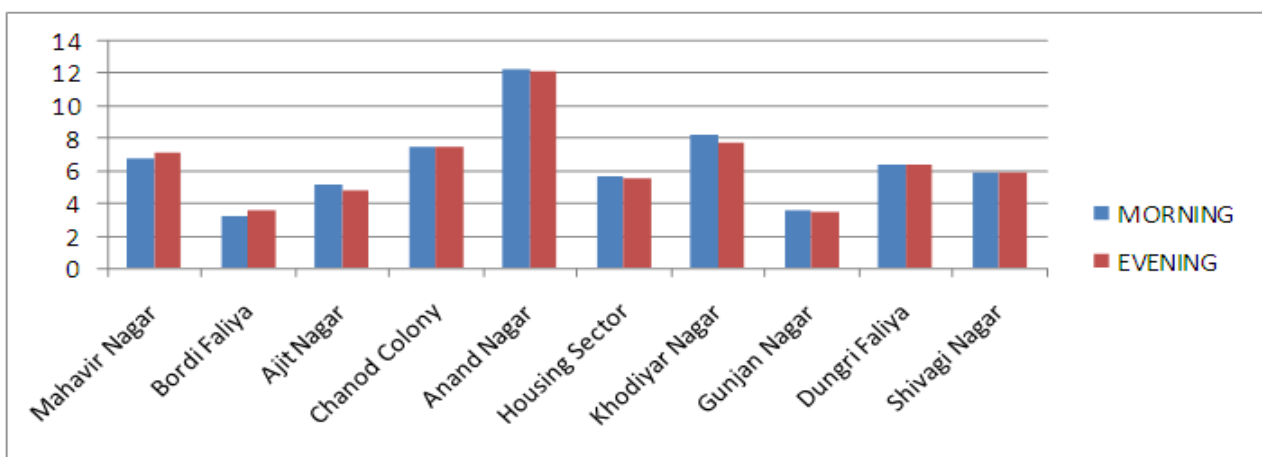
#### **IV. RESULTS AND DISCUSSION**

##### **Data analysis and Interpretation:**

The data were collected from all ten location i.e. Mahavir nagar, Bordi faliya, Ajit nagar, Charwada colony, Anand nagar, Housing sector, Khodiyar nagar, Gunjan nagar, Dungri faliya, Shivaji nagar. At each selected spot, the measurements were taken at different times during the day in Morning and Evening time. Two sets of samples one during monsoon and one after the monsoon were taken from each sampling point. Here Carbon monoxide survey was noted at every 5 minutes intervals and CO level was counted with special equipment. This equipment is known as "CO level meter". Collected data related to all the location were analyzed and suitable measures were suggested to control co level in this residential area of GIDC, Vapi.. The graphs of CO level vs all ten locations for morning and evening session for both during monsoon and after monsoon were drawn.



**Fig 4: CO level measurements at all ten locations in morning and evening during monsoon season**



**Fig 5: CO level measurements at all ten locations in morning and evening after monsoon season**

From all above observation and analysis, it was found that Maximum CO level occur in Anand nagar (12 ppm) and Khodiyar Nagar (8 ppm) locations during both monsoon season and after monsoon season. These locations are prone to unhygienic air quality. Bordi Faliya (3 ppm) and Gunjan nagar (4 ppm) were the areas in which there was minimum level of CO occur during both monsoon and after monsoon season and it was safe to the human health. From these locations some areas situated near the industry and it seems to increase CO level day by day which were Chanod Colony, Mahavir nagar, Dungari faliya etc.

## V. CONCLUSION

From the analysis of level of carbon monoxide in residential area of GIDC Vapi. It was clear that the existing level of CO was high comparatively and it varies dynamically from day to day. This variation in CO level was due to industrial, vehicular, commercial and other miscellaneous activities. It was endanger to the human life and causes hazardous diseases such as lung cancer, asthma, headache, irritation etc. CO level should be control over the region of GIDC Vapi area by such manually/mechanically operated devices (i.e. Cyclon Scrubber, Spray tower, Electrostatic Precipitator, Fabric filter Cyclon separator, Gravitational setting chamber). The atmospheric parameter which include measurement of CO level were taken from each locations using CO level meter instrument and the value compared with (WHO) guideline.

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