Analysis of Carbon Monoxide in Gorguntepalya Study Junction Point of Bengaluru City - A Case Study

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Abstract

The air pollution is worst affecting the environment at present days, many activities are responsible for causing the pollution in atmosphere today, in that vehicular pollution is one of the major thing to disturb the atmospheric condition and change the status of air pollution. In this study traffic junctions were selected for conducting the analysis to find the level of Carbon Monoxide. The Bengaluru city is fastest growing city due to silicon activities, the population of vehicles are also increasing and causing the pollution problem, in study area the carbon monoxide is crossing the standard values.

Key Words*: Carbon Monoxide, Vehicles, Bengaluru.*

Introduction:

The Bengaluru is capital city of Karnataka state, is located at height of 900 meters above the sea level, The city is called now silicon city due to many more IT companies are actively functioning in different parts of the city, The city population is crossed the one crore and the vehicle population has crossed the more than 85 lakhs. The Bengaluru city is hub for getting employment to the outsiders and also is fastest growing city in Asia.   The mean annual rainfall is about 900 mm in June to September and October to November, with opposite wind regimes corresponding to Southwest and Northeast monsoons respectively. The average monthly relative humidity ranges from 85% between Jan to Oct to 44 % in dries in March. The high wind speed averages 17 km/h throughout the westerly winds in the month of July and a lowest of 8 to 9 km/h during the months of April and October (Air quality trends-2006, cpcb). The type of vehicles are different plying in the Bengaluru city, most of the vehicles are two wheelers and auto rickshaws. Many of the vehicles are old enough,   It has observe that two wheelers are more in number than light and other category of vehicles plying in the cities. It is alarming to note that 32 percent of all vehicles are plying in metropolitan cities alone. The urban expansion, industrialization, lack of services, energy and transport demands are leading to a various cycle of air pollution. The Bengaluru city is facing the problem of various pollutions in atmosphere due to increase in the vehicles, industrial activities and various constructional activities. This problem would be more severe in coming years considering the development rate of city. Hence serious studies are required to analyses and assess the pollution in city in order to better it.

Materials and Methods

  The present study was carried out during Feb 2019 to April 2019 with selected traffic junction points and instruments like electronic carbon monoxide measuring device for assessment of CO, Carbon mono-oxide analyzer is a handheld instrument used to collect carbon mono-0xide samples, it is a colorless, odorless, combustible and lethal gas produced by incomplete combustion fossil fuels (coal, natural gas). Which works on laser scattering principles. Using laser scattering principle: Fig. 1 shows that Carbon

monoxide measuring with electronic devise. In Bengaluru city most of the main traffic junctions are busy with heavy vehicles in peak hours and pollution level were also shows crossing the permissible limits(CO-2 mg/m³), keeping in that the important selected junction were identified for study, the selected junctions was Gorguntepalya junction. Gorguntepalya is a main junction point to connect Tumkur and also continuation to the major district headquarters of Karnataka state, the National high way connects to this, also this junction connects the IT park of Manyatha park area which has got so many IT industries and small scale industries are located. Also many educational institutes are located in surrounding area of this junction. Due to this effect, the population of both human and vehicles were showing is high. Gorguntepaly junction is connecting with major outer ring road of linking between Hebbal and Mysore road area and also it connects the Yeshwanthpur road, so that the junction is most of the time is busy with the vehicular population

Fig 1: Electronic Devise for Carbon Monoxide Measurement

Results and Discussion

The study were carried out at selected junction points of Gorguntepalya, those points were shows the pollution rate of Carbon Monoxide was crossing the permissible limits, it was due to high volume movement of vehicles and other activities like generator sets nearby shops due to power failure. It will be more in the morning and then gradually decreases towards afternoon then increase towards the evening. Table 1 and 2, Shows that the average values of Carbon monoxide in week days and weekend days respectively. As observed that traffic is only the major cause to pollution level variation. When the traffic is more it make dust particles on the road to raise, with this the pollution rate will become high. The fig No 2 shows that average percentage of vehicles plying at Gorguntepalya junction, here in peak hours the movement of vehicles were high volume due to more number of employ working nearby industrial of Penya which is located in surrounding area of Gorguntepalya, and also due to the main National Highway is passing through this junction.
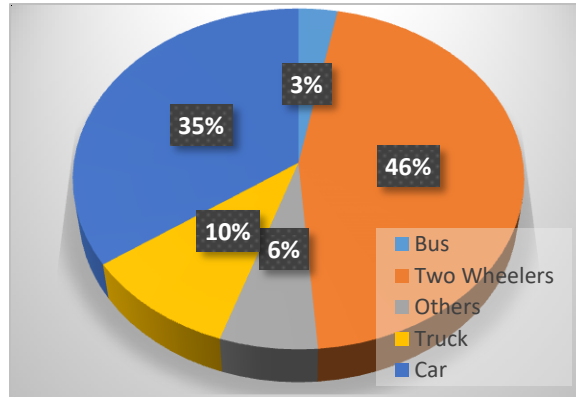
Fig No: 2. Average Percentage of Vehicles in Week Days near Gorguntepalya Junction

Table: 1 Average Values of Carbon Monoxide in Gorguntepalya Junction in Week Days and Weekend Days

Sl No	Time in Hours	CO mg/m³ Week Days	CO mg/m³ Weekend Days
1	07-08 am	1.86	1.60
2	08-09 am	2.60	2.00
3	09-10am	3.40	2.10
4	10-11 am	3.76	3.00
5	11-12 pm	4.10	2.80
6	12-01pm	2.56	3.40
7	01-02 pm	4.03	3.90
8	02-03 pm	3.56	3.00
9	03-04 pm	3.26	2.70
10	04-05 pm	4.16	4.20
11	05-06 pm	5.03	3.60

Fig. 3: shows that variation of carbon mono-oxide in weekday and weekend. It can be seen that the values vary in same trend in both cases but pollution levels quit high in the weekdays as compare to weekend.
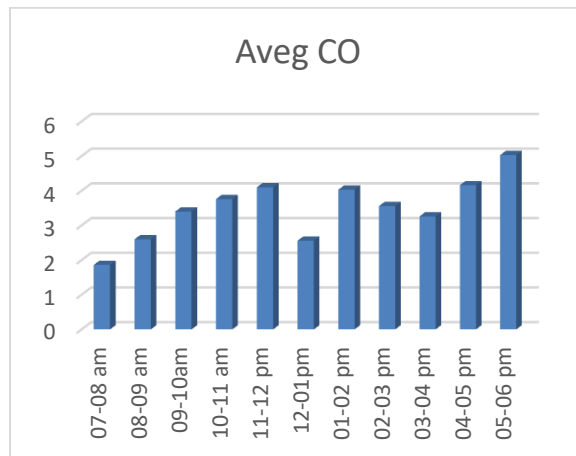
Fig 3: Variation of Carbon Mono-Oxide in Weekday

The table no 2 shows that the average values of Carbon Monoxide in the junction of Gorguntepalya, most of the time the values are varying and showing the high level than permissible value, it is due to the high density, improper function of Engine, and old vehicles are plying in the city.
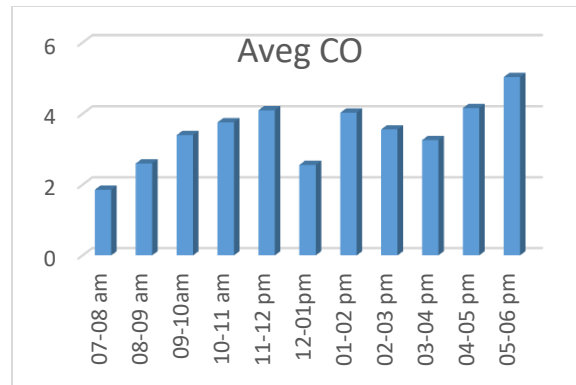

Fig 4: Variation of Carbon Mono-Oxide in Weekend days

The fig 4 shows that variation of Carbon Monoxide in Goruguntepalya from morning 7am to 6 Pm on weekend days. During peak hours of morning the CO is very high due to moment of vehicles from the city areas to outside the Bengaluru city. During evening hours the vehicle moments are also high, those vehicles were returning back.

Conclusions

Most of the vehicles were play a major role to pollute the Carbon Dioxide into the atmosphere. The trucks or four wheelers were predominate in this study area and also other vehicles also affect the pollution problem, the classification of vehicles like auto-rickshaws; heavy vehicles were also may cause pollution level more in that study junction points.. The value of pollutants show more than the permissible values during peak hours and other period of time.

Acknowledgement

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