

Air Pollution Status at a Pocket in National Capital Delhi

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Abstract- Air pollution level in the national capital Delhi has been in the news from a long time. The highest pollutants are observed in Anand Vihar area which is a residential place. The National Emergency situation was declared on November second week of 2017. This paper gives an insight of the pollutants level before and after the National Emergency situation in Delhi with emphasis on the heart of the city area, at Anand Vihar, its exceedance factor for the period of one year from mar-2017 to feb-2018.

Keywords- Air Pollution, Delhi, Air Quality, Air Monitoring, Environmental Degradation,

I. INTRODUCTION

The heart of the city lies in its central area where many people landing takes place from different locality, different terrains, and even from different counties.

Anand Vihar which is the center place in has mixed type of scenario of travelling including the vehicles and people in that terrain. It has highest pollutants causing sources. The insight of pollution level at Anad Vihar comes from many sources are listed down below:

- ❖ It is composed of a two railway stations, bus stand and auto stand.
- ❖ It has Gazipur Drain, and Gazipur waste disposal area. The dumping ground situated in Gazipur that almost looks like a hill now.
- ❖ Anand Vihar is the enter and exit point of many interstate trucks and buses, high traffic due to the railway station, bus stand and border between Delhi and UP.
- ❖ The influx of vehicles, from the places Kaushambi, Vaishali, Noida, and other areas of NCR into Anand Vihar.
- ❖ Few industrial areas surrounding to this place (Patparganj industrial area is in the locality) Sahibabad and Patparganj industrial area that has many small factories continuously emitting pollutants, all the industrial areas surround to this place and of course the construction in the NCR that never stops.

1.1 AIR QUALITY STANDARDS

NAAQS is CPCB adopted standards, for reducing quality of emissions from all the sources and decreasing their effects for air quality management. CBSC made many revisions of air quality standards. The current 2009 revision guidelines limit as in below table 1.1

Table 1.1: National Ambient Air Quality Standards (NAAQS) – 2009 (Source: CPCB)

Pollutants	Time weighte d average	Concentration in ambient air		Methods of measur ement
		Industri al, residenti al, rural, & other areas	Ecolo gicall y sensit ive area	
Sulphur dioxide (SO₂), µg/m ³	Annual 24 hours	50 80	20 80	-Improved West and Gaeke -Ultraviolet fluorescence
Nitrogen dioxide (NO₂), µg/m ³	Annual 24 hours	40 80	30 80	-Modified Jacob & Hochheiser-Chemilumin escence
Particulat e matter (< 10 µm) or PM₁₀, µg/m ³	Annual 24 hours	60 100	60 100	- Gravimetric -TOEM -Beta attenuation
Particulat e matter (< 2.5µm) or PM_{2.5}, µg/m ³	Annual 24 hours	40 60	40 60	Gravimetric -TOEM -Beta attenuation

1.2 METEOROLOGY OF DELHI

Delhi has some topographic features such as high hills, deserts, central hot plains that made difficult in dispersing the concentrated pollutants. The desert comes in Rajasthan, west part of Delhi known as ‘Thar Desert’, North and east covered high hills, central hot plains found in South part of Delhi. Also the formers of nearest state making Delhi pollution to reach high by burning the crop residue.

II. METERIAL AND METHODOLOGY

2.1 STUDY AREA

Delhi comes in Northern part of Indian country. It has more then 16.6 million people leading their life. Thus it is the largest urban city in the world having an area of 1483 km².

2.2 SELECTION OF SAMPLING LOCATIONS

Anand Vihar: Anand Vihar is purely residential, but is has been known to be high pollution region, comes at outskirts of Delhi. It is near to city central railway station, bus stand etc.



Fig 2.1 Sampling Stations and Description Chosen from Delhi

2.3 PARAMETERS CONSIDERED AND DURATION

The pollutant parameter is considered based on the availability of data of pollutants for the studied period. Four air quality parameters PM₁₀, PM_{2.5}, NO₂ and SO₂ with 24 hour average concentration of studied pollutant are taken for the analysis purpose. The variation of pollutants of PM₁₀, PM_{2.5}, NO₂ and SO₂ are calculated and shown in fig 3.1, fig 3.2, fig 3.3, and fig 3.4 respectively. A dotted line in graphs shows NAAQS limit in respective graph The seasonal variation of pollutants shown in fig 3.5 while the annual variation of pollutants are shown in fig 3.6

2.4 EXCEEDANCE FACTOR

In exceedance factor, the annual average pollutant concentration is related with the specified Standard. Annual exceedance factor of particular pollutants is calculated by taking average of the annual variation of pollutants. The average values found are further divided by the NAAQS annual standards of respective pollutant to get the exceedance factor.

According to EF, pollution level can be in the following specified range of pollution:

- Critical pollution (C) : $EF \geq 1.5$;
- High pollution (H) : $1.0 \leq EF < 1.5$;
- Moderate pollution (M) : $0.5 \leq EF < 1.0$; and
- Low pollution (L) : $EF < 0.5$

Using annual average of studied pollutants of SO₂, NO₂, PM₁₀, and PM_{2.5}, the exceedance factors are calculated, for a period of one year from Mar-2017 to Feb-2018. That is shown in fig 3.7

III. RESULTS AND DISCUSSION

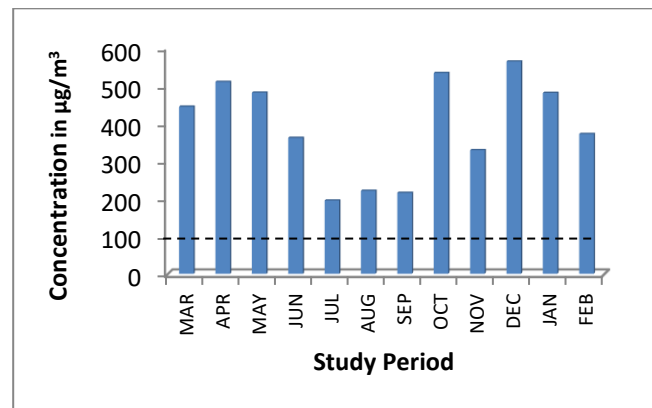


Fig 3.1 Variations of PM₁₀ at Anand Vihar

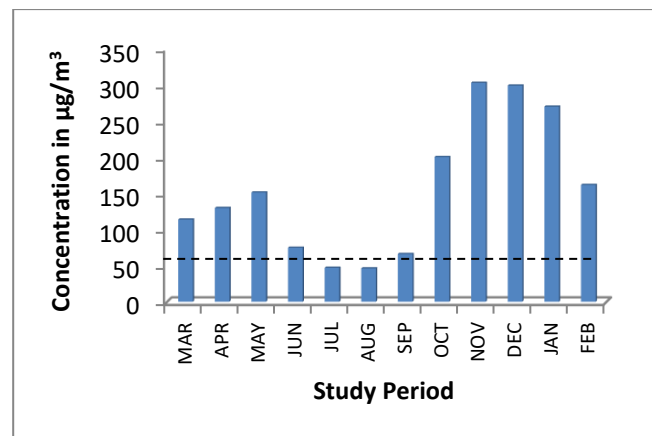


Fig 3.2 Variations of PM_{2.5} at Anand Vihar

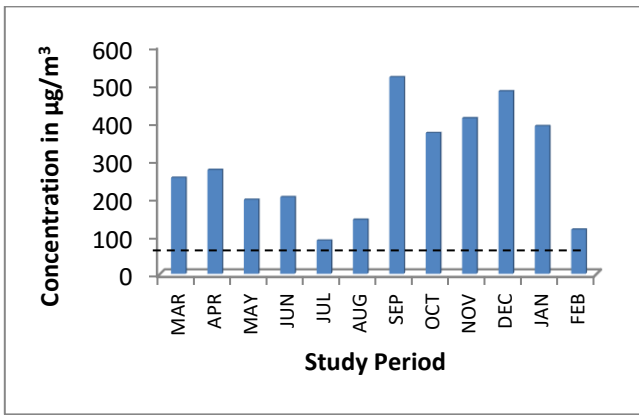


Fig 3.3 Variations of NO₂ at Anand Vihar

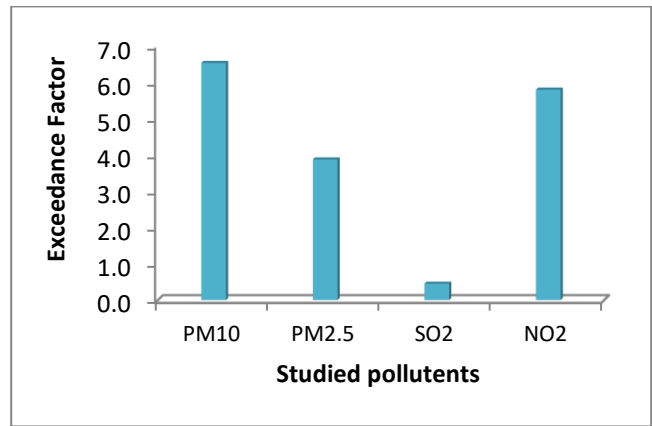


Fig 3.7 Annual Exceedance Factor at Anand Vihar

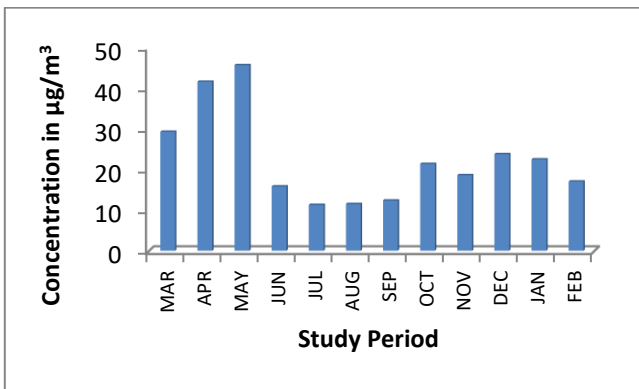


Fig 3.4 Variations of SO₂ at Anand Vihar

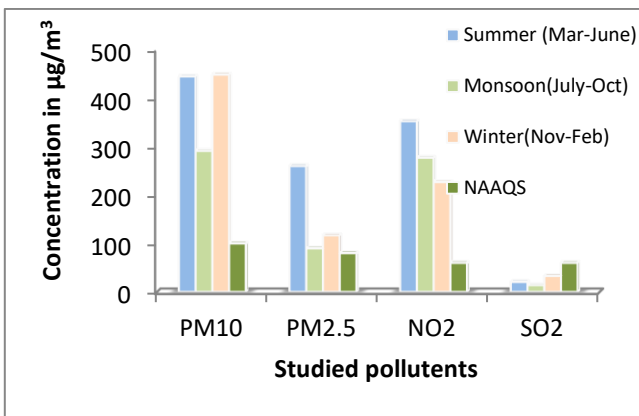


Fig 3.5 Seasonal Variation of Pollutants at Anand Vihar

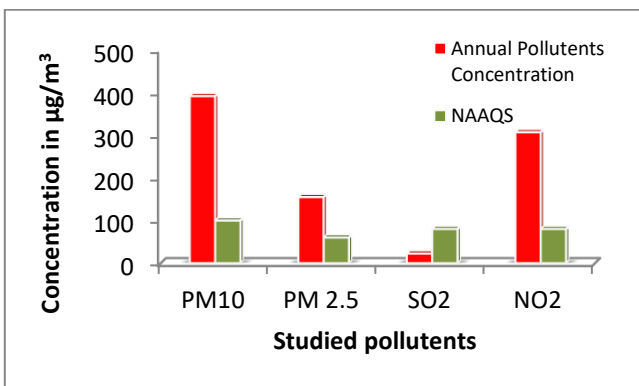


Fig 3.6 Annual Variations of Pollutants at Anand Vihar

IV. SUMMARY AND CONCLUSIONS

The pollutants concentration were studied in Anand Vihar area that comes in the premises of National capital Delhi for the year 2017-18, analysis was carried out the results are in graphs.

V. CONCLUSIONS

- ❖ The pollutants concentration of NO₂, PM_{2.5} PM₁₀ crossed the NAAQS standards
- ❖ The pollutants concentration found higher in winter and summer seasons. Overall, PM₁₀ concentration found higher in all the studied locations followed by PM_{2.5}, NO₂.
- ❖ The concentration of SO₂ pollutant shown within the limit of NAAQS.
- ❖ The Results revealed that the exceedance factor of NO₂, PM₁₀, and PM_{2.5}, pollutants at Anad Vihar crossed and found in critical pollution range in annual consideration. But the exceedance factor of SO₂ pollutant found in Low pollution range.
- ❖ The Authority has to invent more on reducing emission sources by encouraging maximum eco- friendly vehicles on- road, like electric buses, cars (Reducing their highest price cut with Govt. Subsidy in the emerging market as low as possible for encouraging to buy and use with peer level) apart from odd- even program implementation.

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