

Urban Ambient Air Pollution In Latur City

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Abstract:

Air Pollution is essentially an urban phenomenon as the processes of urbanization and industrialization are intimately related. Now a day's 'Air Pollution' is rated as the root cause of several problems in the modern city living and it is increasing alarmingly though planners/authorities are trying to douse it by all means. The high density of population and industries in the cities contributes to industrial emissions affecting adversely, the health and property of in habiting citizens. Inadequate public transport system, poor road conditions, congested traffic and outdated automotive technologies have further aggravated the situation. The impacts are however dependent on factors like height of stacks, wind flow and direction, ambient temperature, humidity and other related factors. High rise buildings close to roads in metropolitan cities coupled with heavy traffic movement hinder the dispersal of pollutants and, increase in urban noise level, together impart a suffocating effect on city dwellers. In this paper I highlights on the status of Air pollution in Latur city.

Keywords: Air Pollution, Ambient Air, air quality, pollutants,.

Introduction:

The rapid growth of Population, urbanization and industrialization together with human activities resulted in the environmental Pollution. The pollution is the gift of Industrial development .there is number of industries and vehicles which are source of air pollution. In Latur city vehicular exhaust account for 70 % of all CO₂ 50 % of all hydrocarbons and nitrogen oxides, 30-40 % of all oxides and 30 % of all SPM. In air pollution SO₂, NO_x (Oxide of nitrogen), Co, SPM and hydrocarbons are concluded. The various air pollutants cause harmful effects on human being as well as environment.

Under Air (Prevention and Control of Pollution) Act, 1981, Central Pollution Control Board is entrusted with the responsibility of air quality management and, to undertake air pollution control programs at National level. Central Pollution Control Board initiated a nationwide network of National Ambient Air Quality Monitoring (NAAQM) in 1984 and as on now it has 290

monitoring stations covering 92 cities/towns in 24 states and 5 Union territories of the country (NAAQM, 1-11, 1999 - 2000).

Objectives: 1.To highlight on the Urban Ambient Air Pollution in Latur City

2. To discuss regarding Air Pollution centers.

Material and Methods:

The EPM-2000 filters used were digested and analyzed for ambient lead by Atomic Absorption Spectrometry. The level of gaseous pollutants like SO₂, and NO were also estimated following the standard procedures. (SO₂-West Gaeke method, and Nox - Modified Jaccob Hocchier method, APHA) Monthly monitoring was carried out in each station during day time using repearable dust sampler.

The principal sources and pollutants of possible concern in urban areas and health hazards caused by major pollutants are given in table 1.

Table-1: Principal sources and pollutants of possible concern in urban areas.

Type of Sources	Fuel	Main Pollutants
Domestic Heating, Cooking	Wood, peat, coal Biomass, etc.	Suspended Particulate Matter, Carbon monoxide, Oxides of Nitrogen, Suspended Particulate Matter, Sulphur Dioxide, Carbon monoxide, Oxides of Nitrogen
Industrial Boilers, Power Plants	Light oil, gas coal , Heavy oil	Oxides of Nitrogen, Sulphur Dioxide, Oxides of Nitrogen, Sulphur Dioxide, Suspended Particulate Matter
Manufacturing Industrial Processes		Specific Pollutants related to nature of process, e.g.. Sulphur Dioxide and mercaptanes from oil refineries; heavy metals from smelters; fluorides from aluminium smelters; iron oxides from steel works;
Transportation	Gas oil one Diesel	Carbon monoxide, Oxides of Nitrogen, Hydrocarbons, Oxidants, Ozone, Lead Suspended Particulate Matter, Oxides of Nitrogen, Odour, Sulphur Dioxide

Secondary pollutants formed in photochemical reactions in the atmosphere involving other pollutants.

Source: Compiled by researcher

Under NAAQM project, three locations have been chosen in Latur viz., Shivaji chowk and Gunj area (Commercial area/Residential area),

The monitoring stations are housed approximately 12 mt. above ground level. The sampling was conducted up to 2021, for a total duration of 8 hrs thrice in a week for SPM and 4 hourly 8 hours average for NO and SO₂ during day time. From 2018 onwards the monitoring was carried out twice in a week 8 hourly 24 hrs average for SPM, and for gaseous pollutants.

An attempt has been made to co-relate the above findings with the traffic density. Using

vehicular count, the movement of each category of vehicles (2W, 3W & 4W) was recorded and the density of vehicles was calculated.

Simultaneously the noise levels in the intersections were recorded for daytime using describer procedure (Vehicular Air Pollution, World Bank technical paper, 373, 1997).

Result and Discussion:

Further ambient lead and reparable particulates from ambient air were also analyzed for five commercial centers of Latur city viz.: P V Theatre, Shivaji Chowk, Gunj Golai, Vivekanand chowk, Renapur naka.

Table-2: Comparison of vehicular movement and noise measurements in selected commercial areas of Latur city

Area	Vehicular Movement/ Minute	Average dB	L Max dB	L Min dB
P V Theatre	88	76.6	104.3	62
Shivaji Chowk	104	80.4	106.2	57.7
Gunj Golai	185	77.5	108.9	57
Vivekananda chowk	86	77.3	104	61
Renapur naka	81	80.9	100.2	66.4

Source: Compiled by researcher

Note:

1. In the Residential and Control areas similar exercise has not been carried out.
2. The Measurements are carried out only during daytime. The standard for day time is 65 dB
3. The exercise for vehicular count was carried out during peak hours and results are reported for day time only (8.00 a.m. to 8.00 p.m.)
4. Hour interval 24 hours average. Gravimetric method was adopted for SPM measurement while gaseous pollutants were sampled by bubbling air through specific absorbents followed by analysis using spectrometric techniques.

The data on vehicular density and Noise level are provided in Table - 2. The vehicular density revealed that the Corporation Circle accounts for highest traffic congestion (185 vehicles/ minute) while at other Commercial areas it ranged from 81 to 104 vehicles/ minute. The maximum noise level ranged from 100 dB (A) while the minimum readings ranged from 57 to 64 dB (A). The range of Leq dB (A) was from 76.6 to 80.9 dB (A).

The results of air monitoring are shown in figures 1, 2 & 3. The permissible upper limit for SPM, RPM, SO₂, NO, and ambient lead as per Central Pollution Control Board are given in table-3.

Table-3: Concentration in Ambient Air

Paramitire	Sensitive Area	Industrial Area	other areas
Sulphur Dioxide	15	80	60
Oxides of Nitrogen	15	80	60
SPM	70	360	140
PM-10	50	120	60
Lead	0.5	1.0	0.75

Source: Compiled by researcher

The data for SPM showed an increasing trend up to 2018 and steady values thereafter for Gunj Golai, while at P V Theatre the results failed to depict wide range. The range value is 166 µg/m³ during 2018 to 215 µg/m³ during 2021. But at Graphite India the results showed a decreasing trend in the last two years. This may be probably due to less anthropogenic activity in this industrial area. There was a steady increase in the NO, at all the three stations and in the last three years nearly consistent values have been recorded,

The SO₂ also showed similar trend, except in 2021, when higher values are reported for Shivaji chowk and Gunj Golai. During the last three years the values are showing near consistency may be due to uniform 24 hrs sampling procedures adopted from 2018 onwards

In general the total suspended particulate concentration exceeded the limit at all the places. Shivaji chowk showed the highest value (1000 µg/m³) followed by Renapur naka, P V theatre, Vivekanand chowk and Gunj Golai. In the residential area (Vivekananda chowk) the value is

just above the limit while in the control station it is almost on par with the standards recommended for sensitive area.

The concentration of respirable suspended particulate matter (PM- 10) which is the carriers of many secondary pollutants and Carcinogenic trace elements also exceeded the limit at all the commercial areas: At Shivaji nagar RPM was $57.7 \mu\text{g}/\text{m}^3$ and at control station it is as low as $22 \mu\text{g}/\text{m}^3$.

The SO_2 concentration at all commercial areas are within the limit of $60 \mu\text{g}/\text{m}^3$, (Standard for Residential and others), except at West of Chord road where it is $67 \mu\text{g}/\text{m}^3$.

The NO values also stood above the limit ($60 \mu\text{g}/\text{m}^3$ for residential and other areas) for Shivaji chowk and Gunj area The value at Control station is in the expected line The concentration of ambient lead at Renapur naka and control station is below detectable limit, while at all other places, except West of Barshi road the values are above $75 \text{ ng}/\text{m}^3$ (Standard for residential and other areas). The highest value is recorded for Gunj area as $156 \text{ ng}/\text{m}^2$ The point to be noted here is that the study has been conducted before the introduction of unleaded petrol.

Conclusion for Minimizing Urban Air Pollution

The containment of Ambient Air Quality requires an integrated approach. The important

components of which includes (CPCB, Newsletter, "Parivesh", June 1999).

- A. Improvement of Public transport system (Introduction of more urban buses, circular trains, MRTPS etc.
- B. Optimization of traffic flow and improvement in traffic management.
- C. Phasing out of grossly polluting vehicles (like de-registration of all older vehicles that are 15 years and more should be made compulsory).
- D. By improving Fuel quality (eg. Unleaded petrol, benzene and aromatics in petrol, reformulated gasoline with Oxygenates/additives, reduction of Sulphur in diesel).
- E. Improvement in vehicle technology (eg.restriction on the 2 stroke engines, emission war ranty, on board diagnostic system, etc.)
- F. Checking adulteration of fuel.
- G. Checking evaporative emission from storage tanks and fuel distribution system.

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