

Ambient Air Quality at Breathing Level in Bangalore City

As per the discussions held in the 17th Task Force Meeting on 16.11.2007, action has been taken to monitor ambient air quality at breathing level in Bangalore city. The ambient air at breathing level (2 meters above the ground level) was collected at 4 different traffic intersections for 24 hours as per the CPCB guidelines. The following traffic intersection were selected for the study

1. City Railway Station (Majestic area)
2. BTM Circle (near Central Silk Board)
3. Badami House (near Corporation Circle).
4. 11th Cross. Malleswaram (Yathiraja Mutt)

Sampling locations : 4 different traffic intersections



City Railway station, Bangalore



Central silk Board (BTM circle)



Badami House (Corporation Circle)



11th Cross Malleshwaram

Note: - All the Stations operated are mixed urban area where traffic is maximum

- a) At City Railway station the majority of the traffic near the station is predominantly Buses, Cars, and Auto rickshaws
- b) At Central Silk Board the traffic in this junction is predominantly four wheelers with buses out moving other types of vehicles.
- c) At Badami House (Corporation circle) the traffic moves in one-way and it comprises of all kind of vehicles including two wheelers
- d) Malleshwaram: The traffic at this station predominately two and three wheelers, and occasionally busses.

The monitoring work of ambient air at breathing level was carried out for 24 hrs twice a week, the parameters SO₂, NO_x, CO, PM_{2.5}, PM₁₀, and elemental analysis in PM_{2.5} and PM₁₀ were analysed.

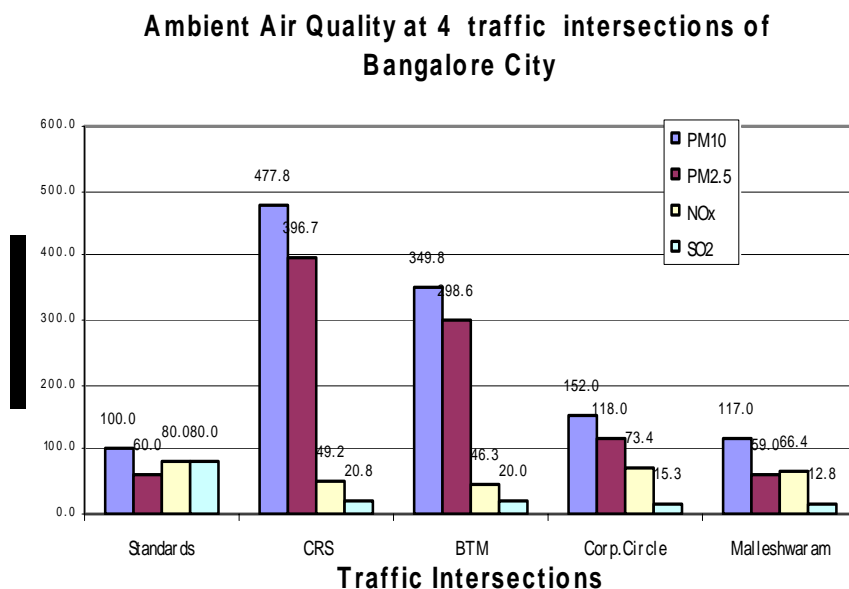


Figure.1

Figure 1 shows that the SO₂, NO_x, CO, PM_{2.5} and PM₁₀ are 1.5 to 4 fold higher than the National ambient air quality standards (NAAQS) . At breathing height of 2 meters in all the 4 traffic intersections of Bangalore city are exceeded the NAAQMS.

Site: 1. City Railway Station (CRS):

- PM_{2.5} contains 18 elements namely Na, Mg, Al, Si, S, Cl, K, Ca, Ti, V, Cr, Mn, Fe, Ni, Cu, Zn, Br and Pb.
- PM₁₀ contains 22 elements: Na, Mg, Si, S, Cl, K, Ca, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Se, Br, Rb, Sr and Pb.

Site: 2: Central Silk Board (CSB):

- PM_{2.5} contains 23 elements namely Na, Mg, Al, Si, S, Cl, K, Ca, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, As, Se, Br, Rb, Ag and Pb,
- PM₁₀ contains 25 elements Na, Mg, Al, Si, S, Cl, K, Ca, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, As, Br, Rb, Sr, Ag, I, Ba and Pb,

Site: 3. Badami House (Corporation circle):

- PM_{2.5} contains 21 elements namely Na, Mg, Al, Si, S, Cl, K, Ca, Ti, V, Cr, Mn, Fe, Ni, Cu, Zn, As, Se, Br, Rb, and Pb,

- PM10 contains 23 elements namely : Na, Mg, Si, S, Cl, K, Ca, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Br, Rb, Sr, Ag, Cd, Ba and Pb,

Site: 4. 11th cross, Malleswaram:

- PM 2.5 contains 21 elements namely Na, Mg, Al, Si, S, Cl, K, Ca, Ti, V, Cr, Mn, Fe, Ni, Cu, Zn, As, Br, Rb, Y and Pb.
- PM10 contains 23 elements namely : Na, Mg, Si, S, Cl, K, Ca, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, As, Br, Rb, Sr, Y, Ba and Pb.

In PM2.5, the total weight of 18-23 elements is of 21- 25 µg/M³ and in PM10, the total weight of 22-25 elements is of 71-143 µg/M³ are present in the ambient fine particles

Elemental carbon, Organic carbon (not analysed due non availability of equipment)

Conclusions:

- Air quality monitored at 4 traffic junctions in Bangalore
- PM10, PM2.5, SO₂ and NO_x monitored for 24 hours for 2 weeks
- Concentration of PM10 & PM 2.5 and NO_x found to be 2 to 5 times the national limits
- Chemical composition : 42 elements analysed using ED-XRF:
- PM2.5 and PM 10 analysed for metals, anions and cations
- 23 to 25 metals including toxic metals found
- Metal content in PM 2.5 (6 to 35%) and in PM10 (21 to 60%)