Air Pollution Control Technology

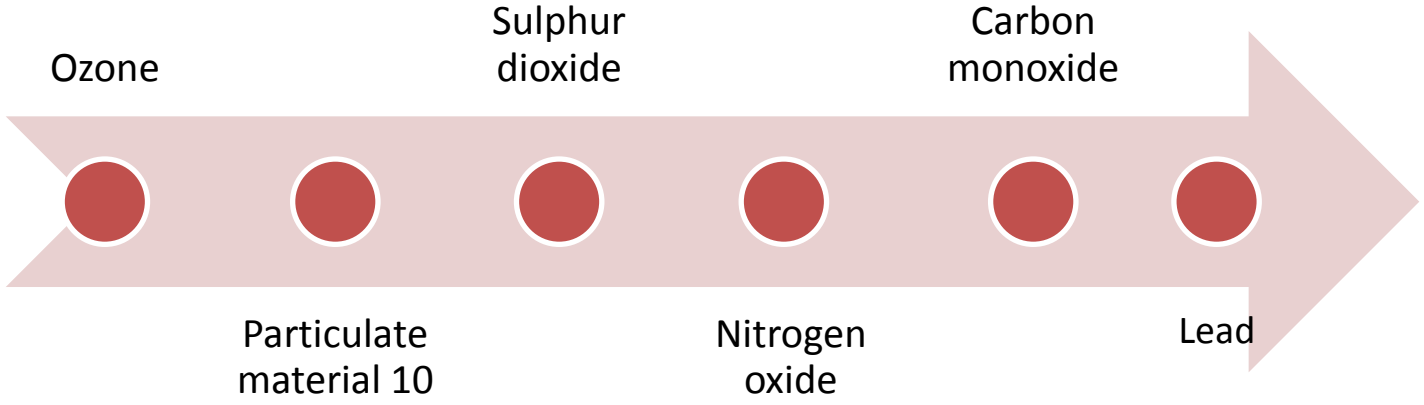
Air Pollution Monitoring

by
Nurud Suria Suhaimi
Norhidayah Abdull
Faculty of Engineering Technology
email: nurud@ump.edu.my

Chapter Description

- Aims
  - To identify a suitable methodology for real time and integrated monitoring of air pollution
- Expected Outcomes
  - Students are able to determine the existing quality of air
  - Students are able to evaluate the effectiveness of control method
- References
  - de Nevers, N. (2000). Air Pollution Control Engineering. 2nd Edition. McGraw-Hill. USA.

Types of Pollutants



National Ambient Air Quality Standard (NAAQS)

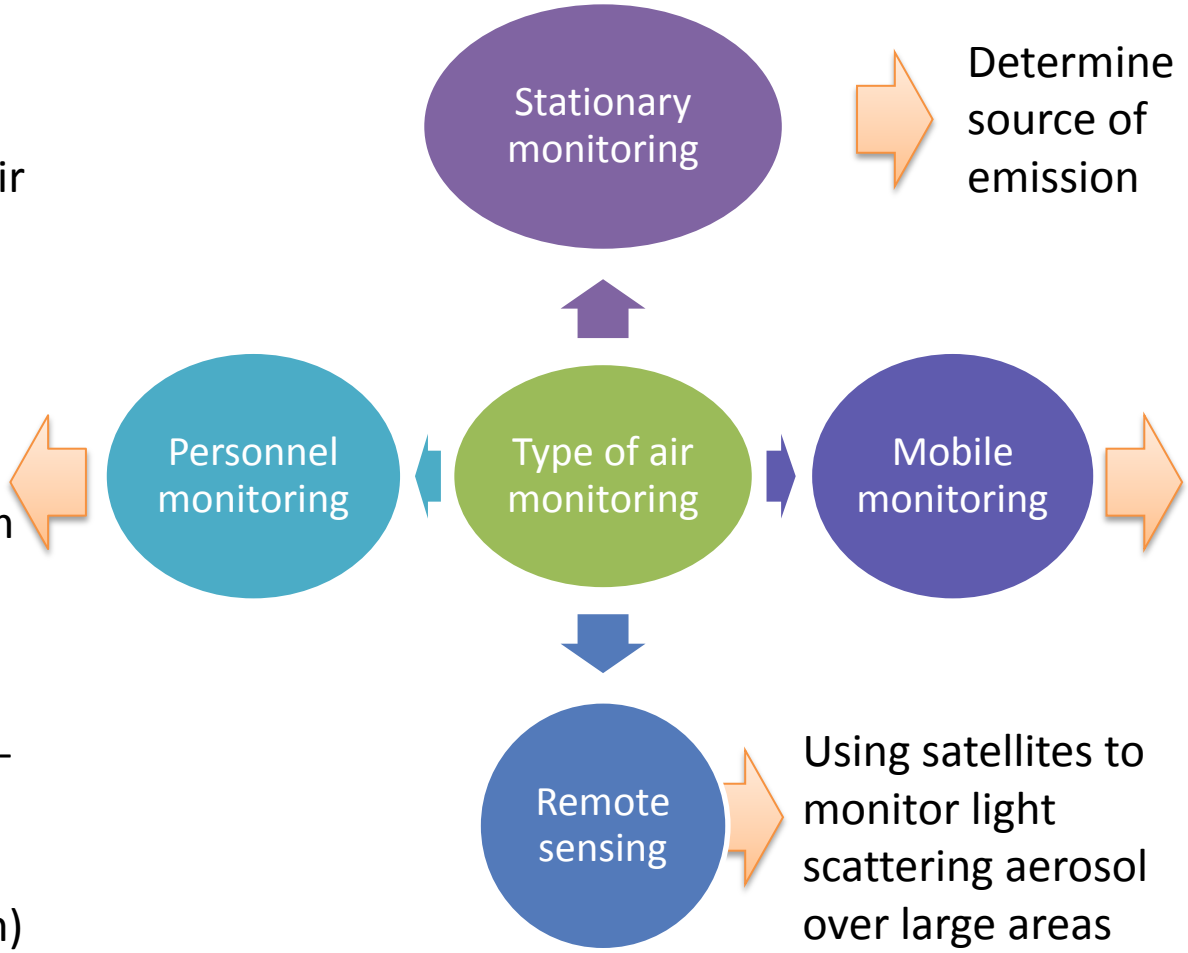
Set to protect public health

Primary Standards

Secondary Standards

Set to protect public welfare

Type of monitoring



Pollutants/ Method	Equipment
- (IS 5182 Part 2 Method of Measurement of Air Pollution: Sulphur Dioxide)	- Calibrated flow-measuring device to control the airflow from 0.2 to 1 l/min. - Absorber: all glass midget impinger - spectrophotometer
Modified Jacobs & Hochheiser Method (IS 5182 Part 6 Methods for Measurement of Air Pollution: Oxides of nitrogen).	- Calibrated flow measuring device: To control the airflow from 0.2 to 1 l/min. - Absorber: a midget impinger
Method IO-2.1 Sampling of Ambient Air for Total Suspended Particulate Matter (SPM) and PM10 Using High Volume (HV) Sampler	- Sampler : High Volume Sampler - Calibrated flow-measuring device to control the airflow at 1132 l/min.
40 CFR Parts 53 and 58 Revised Requirements for Designation of Reference and Equivalent Methods for PM2.5 and Ambient Air Quality Surveillance for Particulate Matter	- Sampling equipment designated as FRM (Federal Reference Method) or FEM (Federal Equivalent Method)
Method 411, Air Sampling and Analysis, 3rd Edition (Determination of oxidizing substances in the atmosphere)	- Calibrated flow measuring device to control the air flow from 1 to 2 l/min. - Absorber: All glass midget impinger
Method IO-2.1 Sampling of Ambient Air for Total Suspended Particulate Matter (SPM) and PM10 Using High Volume (HV) Sampler – Lead	- Sampler : High Volume Sampler - ICP-MS

LOCATION OF SAMPLER

- The monitoring should be done at outside the zone of influence of sources located within the designated zone of representation for the monitoring site.
- Height of the inlet must be 3 – 10 m above the ground level. And at a suitable distance from any direct pollution source including traffic.
- Large nearby buildings and trees extending above the height of the monitor may present barriers or deposition surfaces for PM. Distance of the sampler to any air flow obstacle i.e. buildings, must be more than two times the height of the obstacle above the sampler.
- There should be unrestricted airflow in three of four quadrants. Certain trees may also be sources of PM in the form of detritus, pollen, or insect parts. These can be avoided by locating samplers by placing them > 20 m from nearby trees.
- If collocated sampling has to be performed the minimum distance between two Samplers should be 2 m.

- Real Real Time monitoring: used direct reading instrumentation; supported with Meteorological Data

- Data interpretation
  - Trend and Spatial Variations
  - Seasonal Variations
  - Diurnal Variations

- There are a few sensitive areas that acquire extra attention during air monitoring
  1. 10 km all around the periphery of health resorts
  2. 10 km all around the periphery of biosphere reserves, sanctities and national parks
  3. 5 km all around the periphery of an archeological monument
  4. Areas where some delicate or sensitive to air pollution crops/important to the agriculture/horticulture
  5. 5 kms around the periphery of centers of tourism and/or pilgrim due to their religious, historical, scenic or other attractions

NURUD SURIA SUHAIMI
NORHIDAYAH ABDULL

LECTURER OF OSH PROGRAM
UNIVERSITY MALAYSIA PAHANG
(UMP)