



ACI- Airport Environmental Colloquium

26-27 Nov2008 Cairo Egypt

Cairo International Airport

Speaker : Mohamed Sherby

ACI Africa Representative on WESC
Cairo Airport Head of Noise and Air
Quality Center



Cairo Airport Company

General Administration
for Environmental
Operations

Air Quality Section





Basic information for pollutants

* Air Pollution

Any change in the properties or specifications of the natural air which causes hazards to human health or to the environment, whether resulting from natural factors or human activities, including noise

EPA (Environmental Protection Agency)

Under the Clean Air Act, EPA establishes air quality standards to protect public health, from harm, as well as protecting against decreased visibility and damage to crops, vegetation, and buildings.



EPA has set national air quality standards for six common air pollutants (also called the criteria pollutants):

- ⇒ particulate matter (PM)
- ⇒ carbon monoxide (CO)
- ⇒ sulfur dioxide (SO₂)
- ⇒ nitrogen dioxide (NO₂)
- ⇒ ozone (O₃)
- ⇒ lead (Pb)





Particulate Matter (PM)

* Primary PM Sources

- ⇒ Industrial Process.
- ⇒ Industrial, Commercial residential fuel combustion.
- ⇒ Windblown dust e.g., from mines.
- ⇒ Re entrained dust from Vehicle traffic on roads.
- ⇒ Open burning and agriculture burning.
- ⇒ Natural sources (sea salt and volcanoes).



Particulate Matter (PM) effects

* Environmental effects

- ⇒ Regional haze, visibility degradation and smog, pendent on PM size.
- ⇒ Soiling of building and Property.
- ⇒ Alteration of local weather.

* Health effects (fine PM)

- ⇒ Respiratory Problems.
- ⇒ Lung diseases.
- ⇒ Premature death.
- ⇒ Chronic bronchitis.





Carbon Monoxide (CO)

*Sources

Created by incomplete combustion of Carbonaceous fuel Sources Like:

- ⇒ Automobiles.
- ⇒ Residential heating and cooking.
- ⇒ Industrial processes.
- ⇒ Open burning.
- ⇒ Prescribed or agricultural burning.



Carbon Monoxide (CO) effects

* Environmental effects

- ⇒ Global warming.

* Health Effects

- ⇒ Heart diseases.
- ⇒ Prohibits the oxygen carrying ability of blood.
- ⇒ Respiratory problems.
- ⇒ Affects the central nervous system.
- ⇒ Death at higher concentration.





Sulfur Dioxide (SO₂)

SO_x used to categorize SO₂ and SO₃.

* Sources

- ⇒ Fossil-fuel combustion.
- ⇒ Combustion of sulfur containing materials (e.g., coal).
- ⇒ Industrial processes.
- ⇒ Volcanoes.



Sulfur Dioxide(SO₂)effects

* Environmental effects

- ⇒ Visibility degradation.
- ⇒ Acid deposition.
- ⇒ Secondary PM precursor.
- ⇒ Corrosion.

* Health Effects

- ⇒ Respiratory problems.
- ⇒ Lung diseases.
- ⇒ Aggravation of existing cardio-vascular diseases.





Nitrogen Oxides (NO_x)

NO_x used to categorize NO and NO_2 .

* sources

- ⇒ Vehicle traffic.
- ⇒ High-temperature combustion processes Like:
 - ⇒ Power plants (thermal and cogeneration).
 - ⇒ Industrial combustion (Fossil fuels).



Nitrogen Oxides (NO_x) effects

* Environmental effects

- ⇒ Photochemical smog.
- ⇒ Ozone formation.
- ⇒ Visibility degradation.
- ⇒ Acid deposition.
- ⇒ Secondary PM precursor.
- ⇒ Eutrophication.

* Health Effects

- ⇒ Respiratory problems.
- ⇒ Lung diseases.





Volatile organic compounds (VOC_s)

* Combustion sources

- ⇒ Stationary traffic.
- ⇒ Vehicular traffic.

* Evaporative sources

- ⇒ Surface coating and paints.
- ⇒ Petroleum products storage and distribution (e.g., refineries and fuel stations).
- ⇒ Solvents (consumer products, industrial uses).



VOCs effects

* Environmental effects

- ⇒ Secondary aerosol formation haze and particulate matter precursor).
- ⇒ Photochemical smog and ground-level ozone formation.

* Health effects

- ⇒ Respiratory problems.
- ⇒ Nose and throat infection.
- ⇒ Skin allergies.
- ⇒ Cancer.
- ⇒ Kidney, liver, and brain damage.
- ⇒ Damage to nervous, reproductive and immune systems.





Ozone (O₃)

- * Formed by free radical reactions of reactive VOC_s and NO_x in the presence of sunlight.
- * Temperature inversions (warm air is trapped near the surface) promote smog formation.

VOC + NO_x + Sunlight = Ozone



Lead (Pb)

**A metal found naturally in the environment.
Used in manufactured products.**

- * **Sources**
 - ⇒ Metal processing.
 - ⇒ Fuel combustion.
 - ⇒ Waste incinerators.
 - ⇒ Lead-acid battery manufacturing.
 - ⇒ Lead-based paint manufacturing.





Lead (Pb) effects

* Environmental effects

- ⇒ Slowing of vegetative growth.
- ⇒ Elevated levels in water causes reproductive damage to some aquatic and animal life.

* Health effects

- ⇒ Damage to kidneys, liver brain , and nerves.
- ⇒ Leads to osteoporosis and reproductive disorders.
- ⇒ Cause high blood pressure and increased risk of heart attacks.



Sources of Air pollution at Airports





Sources of Air pollution at Airports

* Mobile sources

- ⇒ Aircraft, ground support equipment, automobiles, maintenance and construction equipment.
- ⇒ Not typically subject to permitting.

* Stationary sources

- ⇒ Heating units, generators, fuel storage tanks.

* Area sources

- ⇒ Fuel facilities.
- ⇒ Construction.



Air Quality Monitoring Cairo Airport

- * Two Air Quality monitoring systems are installed Up and Down wind from TB3 to find out the impact of TB3 operations activities on ambient air quality in the Airport vicinity





Up Wind Air Quality Monitoring Station Hall 4



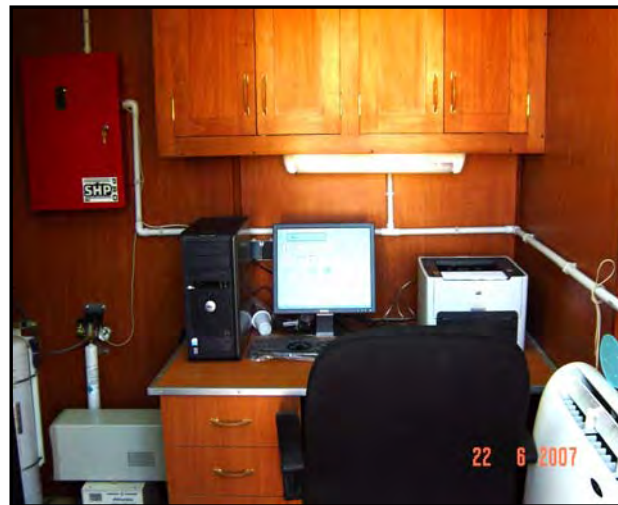
Down Wind Air Quality Monitoring Station

Terminal 2

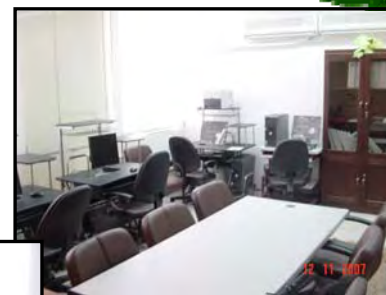
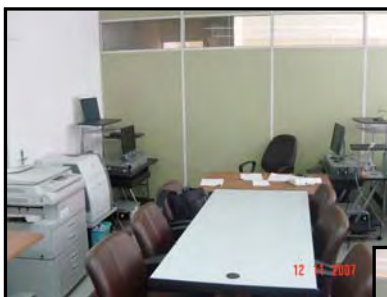




Air Quality Monitoring Station Interior View



Environmental Monitoring Control Center at CAI





Life Time DATA

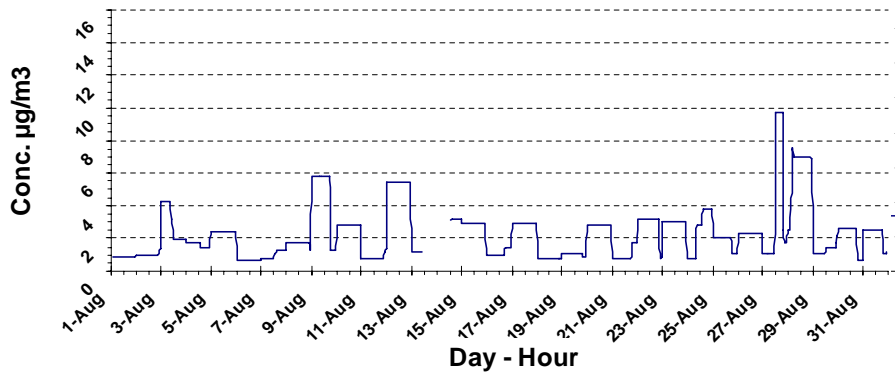


Annex 5

POLLUTANT	MAXIMUM LIMIT	EXPOSURE PERIOD
Sulphur Dioxide (SO ₂)	350	1Hr
	150	24 Hr
	60	1 Year
Carbon Monoxide (CO)	30 Milligram / Cubic meter	1 Hr
	10 Milligram / Cubic meter	8 Hrs
Nitrogen Dioxide(NO ₂)	400	1 Hr
	150	24 Hr
Ozone(O ₃)	200	1 Hr
	120	8 Hrs
Black Smoke (BS)	150	24 Hrs
	60	1 Year
Repairable Particles (PM10)	150	24 Hrs
	70	1 Year

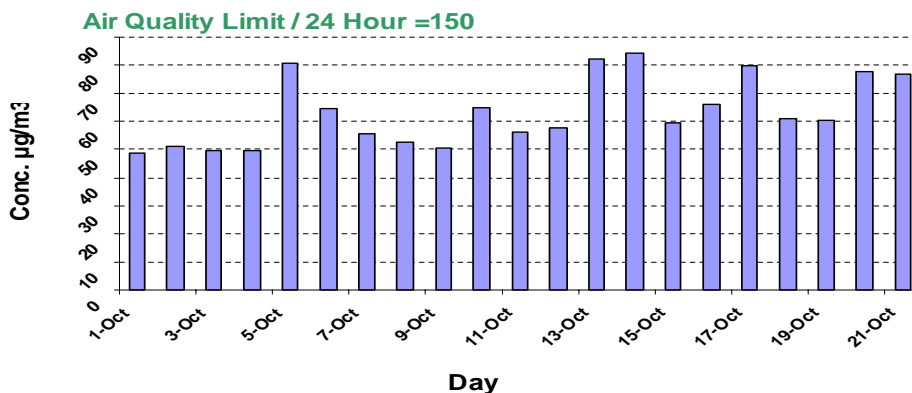


Hall 4 BS Concentration (AUG 2008)



B.S

Hall 4 Daily PM10 Concentration (OCT 2008)



PM10

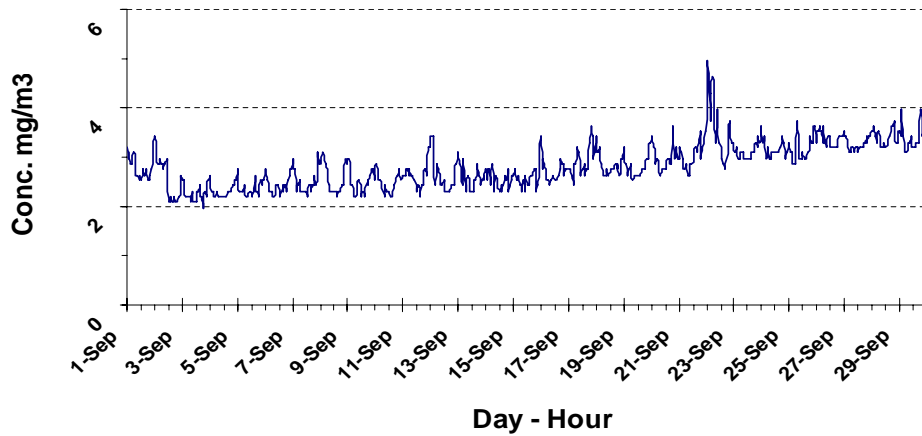


CO



TB 2 CO Concentration (SEP 2008)

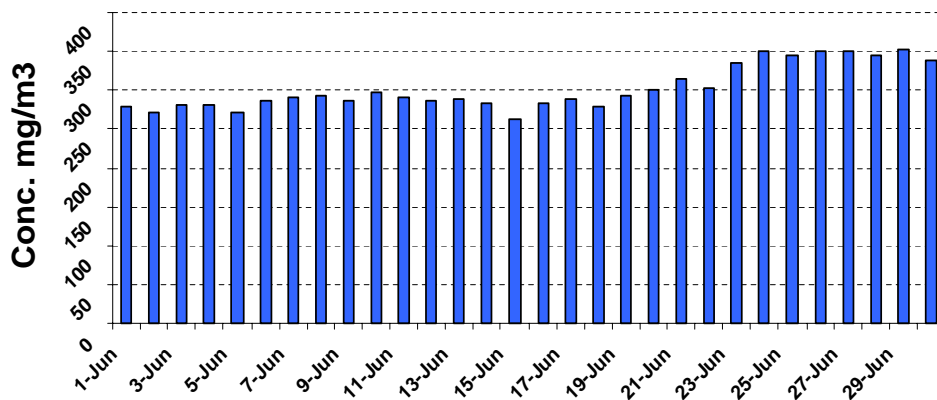
Air Quality Limit / Hour =30



CO₂



Hall 4 CO2 Concentration (JUNE 2008)

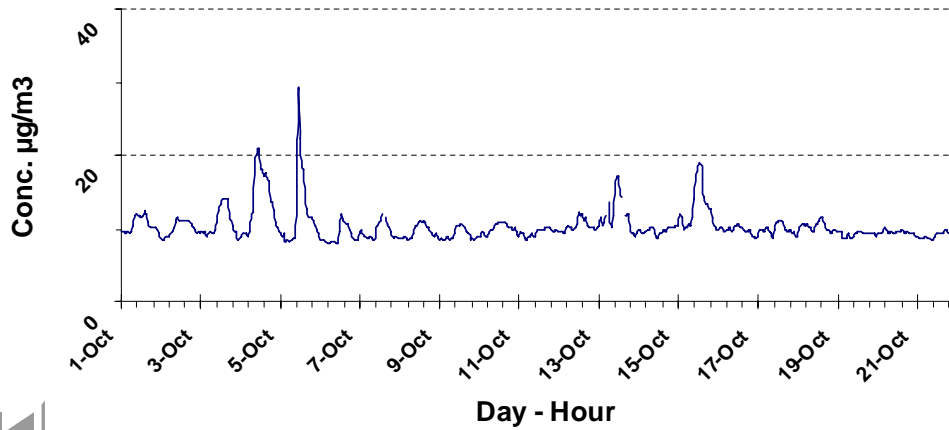




SO₂

Hall 4 SO₂ Concentration (OCT2008)

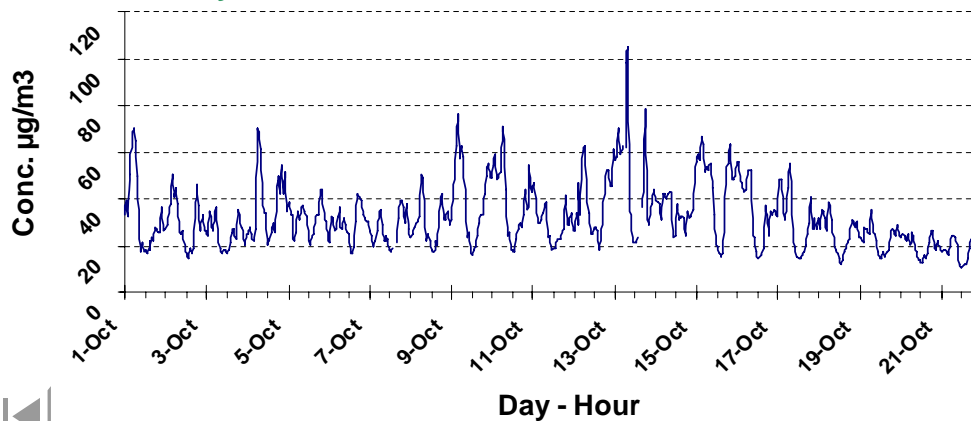
Air Quality Limit / Hour =350



NO₂

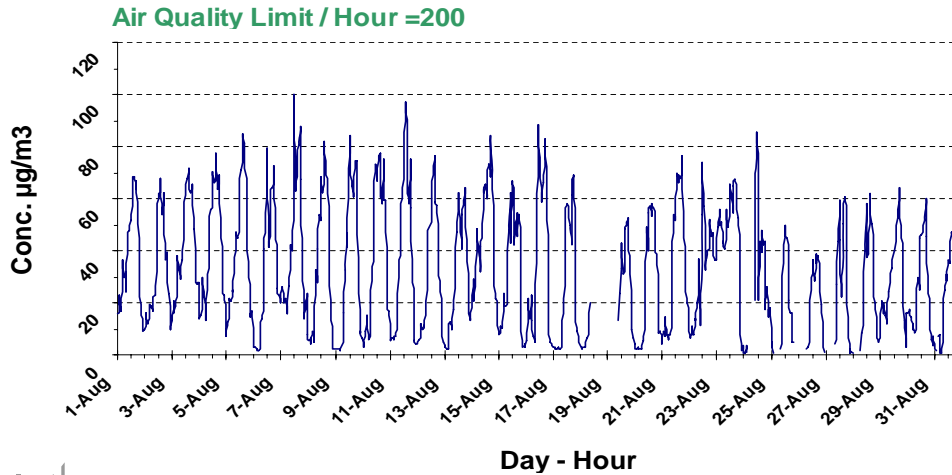
Hall 4 NO₂ Concentration (OCT 2008)

Air Quality Limit / Hour =400





TB 2 O₃ Concentration (AUG 2008)



Our Recommendations

1. Improve the quality of fuel and alternative fuel use less polluted environment.
2. Expansion of the project for replacement of old Vehicles and the development of standards and specifications for cars.
3. Spread environmental awareness for workers.
4. Masks provide protection for workers.
5. Increase green areas around the airport.
6. Prevent build new cities neighbor the airport.





Questions ?



Thank You



Mohamed Sherby

ACI Africa Representative on
WESC Cairo Airport Head of Noise
and Air Quality Center

