

# Lecture 1

## Air Flow Round Buildings and Natural Ventilation

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# Air Movement

- The air movement phenomena occurs when there is a pressure difference between different zones on the earth. i.e due to the **Solar Intensity (KW/m<sup>2</sup>)** falling on the parts of the earth.
- **Wind Speed:** due to the difference between the any two zones.
- **The Wind Direction:** is defined by the geographical direction from which the wind comes from.

- **Wind High Pressure:** is due to the compression of air layers before barrier or wall.
- **Wind Shadow:** from the high pressure zone the wind will bend round building causing stagnant region on the other side called wind shadow. –ve pressure zone at this zone wind starts to recover its original direction. As shown



# The Importance of Natural ventilation

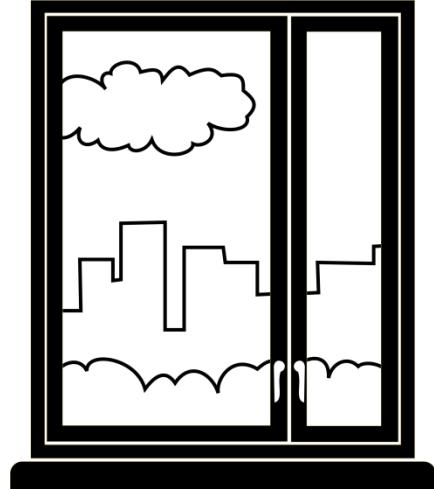
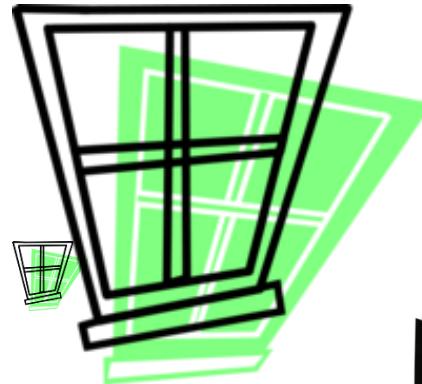
- There are many functions generated by the Natural Ventilation, those are:
  - a- **an air change** of the inside air by about 15 to 20% of the total circulated air within the built environment.
  - b-**the types of the activities** of the occupants within building dictate the amount of fresh air needed.
  - c-**Surgical operations theaters** and X-ray room requires 100% air change.

- d-In **general about 80%** of air circulated in rooms of normal functions.



# Windows and Natural Ventilations

- **The Natural Ventilation influences:**
- window design.
- Window size
- Window location
- Window relative location in relation with other windows.



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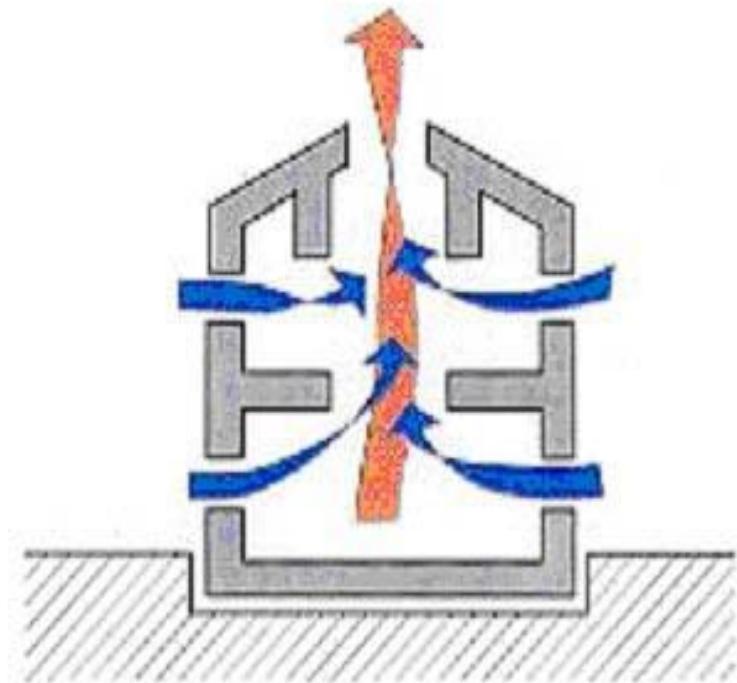
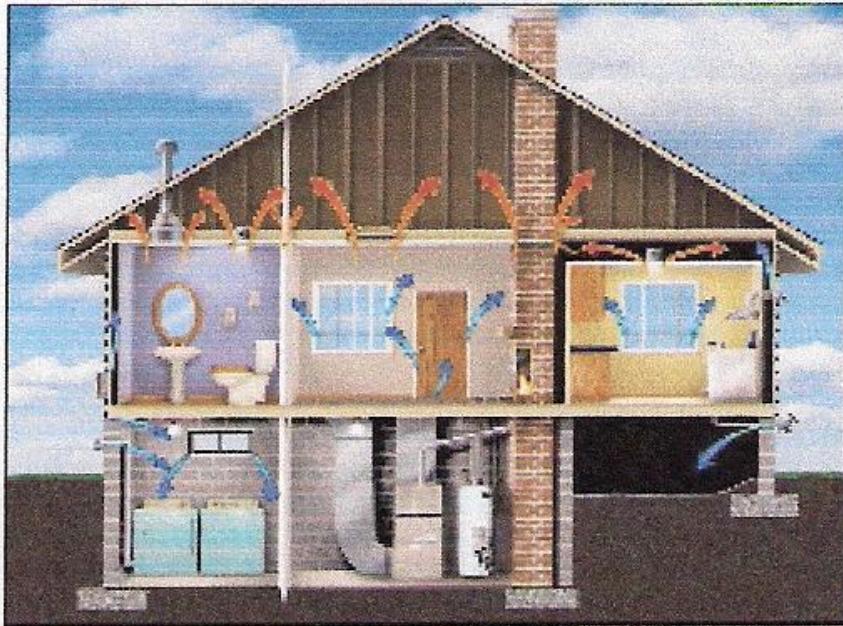
The 167.5 meter tall skyscraper was built to house telephone switching equipment and was completed in 1974.



# The Advantages of Natural Ventilations in Built Environment

- Advantages of natural ventilation are:
- 1-To provide healthy treated air for occupants- Sick building Syndrome.
- 2-To provide Thermal Comfort: to get rid off the latent and sensible heat from body.
- 3-Structral Cooling ventilation: where there are a reasonable temperature difference between inside and outside environment.

# The Advantages of Natural Ventilations in Built Environment



# Chimney Effect and Natural Ventilation

