NATURAL VENTILATION and SOLAR SHADING for HIGH RISE by RENSON
About Renson

**Belgian family owned company**

- More than 100 years experience
- HQ in Waregem, Belgium
- Team of 1,000 enthusiastic employees
- T/O 200 Mio €
- Core business: ventilation, solar shading & outdoor
- Focus on Innovation
Renson® develops innovative concepts for a healthy and comfortable living- and working environment with a minimum energy consumption.
Products

SOLAR SHADING

VENTILATION – SUNPROTECTION - OUTDOOR
Products

STRUCTURAL SOLAR SHADING

VENTILATION – SUNPROTECTION - OUTDOOR
Products

CONTINUOUS LOUVRE SYSTEMS
Why We Ventilate

Max Sherman
Lawrence Berkeley National Lab
ASHRAE Distinguished Lecturer
CONTAMINANT SOURCES

- CO = carbon monoxide
- CO₂ = carbon dioxide
- HCHO = formaldehyde
- NOₓ = nitrogen oxides
- Pb = lead
- TPM = respirable particulate matter
- VOC = volatile organic compounds

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Why We Ventilate

- We do NOT ventilate for contagion control
  - Maybe in hospitals but not in homes or offices
- We do NOT ventilate to supply "fresh air"

- We do NOT ventilate to supply anything

*Ventilation is about chronic pollutant removal*

*Local Exhaust is about acute source removal*
“The damage attributable to indoor air is, comparatively, somewhere between the health effects of road traffic accidents (4 mili-DALY*/p/yr) and all-cause heart disease (11 mili-DALY/p/yr) in the U.S. The compounds that dominate that total are PM2.5, acrolein, and formaldehyde.”
Max Sherman, AIVC Conference 2011

* DALY = number of years lost due to ill-health, disability or early death
Household hazards

Home truths
What are the various dangers that lurk in your home that can affect the quality of indoor air? Below is an explanation of various elements and their impact on your health.

Chemicals
Volatile Organic Compounds (VOCs) are a large group of carbon-based chemicals that easily evaporate at room temperature. While most people can smell high levels of certain VOCs, other VOCs have no odor.

Carbon Dioxide
CO2 is a by-product of cell respiration and cannot be used as a tracer gas.

Tracer gas
CO2 is a by-product of cell respiration and cannot be used as a tracer gas.

Statistics
4.3m
Die of exposure to household pollutants every year: WHO

21
Hours people spend indoors daily, it is estimated.

2.5
Times higher pollutants can be indoors than outside.

Sources:
VOCs may be found in most household products, such as paint and adhesives.

Sources:
CO2 levels can be monitored using a CO2 meter.

Visible red flags

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Ventilation in High-rise Buildings

- Most towers have a centralised ventilation system in place

- But people want physically to feel & smell fresh air => psychological ventilation
  So, users still expect the possibility to open something

- Architects have to take measures in this regard

  But …

- Integrating opening windows in high-rise facades comes with problems
Ventilation in Facades

- **Problems**

- Tilt & Turn, top-hung,… windows not possible:
  - Stability – wind load
  - Watertightness
  - Uncontrolled airflow
    - Too much hot air
    - Dust
    - Insects
    - Traffic noise
  - Safety issue
Ventilation in Facades

- **Problems**

  - POW – Parallel Opening Window has to be used
    - A POW has 2 motors to operate opening & locking
    - Hard to build
    - Expensive (accessories and profiles)
    - Cannot be used above 76m (country dependent legislation)
Ventilation in Facades

- **Problems**
  - Architects do not like extra “vent” profiles on the facades
  - Integrating vents in structural and unitised facades is difficult
Ventilation in Facades

Renson answer => window ventilation profiles:

- Controlled airflow and volume
- Elegant and narrow profile
- Doesn't affect too much the facade aesthetics
- Easy to install
- Economically interesting compared to full vents and respective accessories
Typical horizontal ventilation solution:
Typical vertical ventilation solution:
Vertical & horizontal window ventilation

- Controlled air volume:
  - Hygienic ventilation => 1 volume per hour
  - Limited energy losses compared to ‘open the window’
  - Also in humid regions as the ‘1 volume per hour’ can be managed by the A/C – central ventilation

- Possibility to add acoustical foam

- Possibility to add electro-static filter 10 PM – Pollux type

- Insect proof, burglar proof,… can remain open at all times
Providence Tower, London, > 100 m height
Providence Tower, London
Plot 16, Moscow, 354 m height
Plot 16, Moscow
Panorama City, Bratislava > 100 m height
Solar shading results in a considerable reduction of the need for artificial cooling and cuts peak load on power plants.
Building Regs: Saving Energy & Carbon Reduction

- Leads to changes in the way we build
  - Use of energy efficient techniques
  - Use of renewable energy
  - Design with large windows
    - The sun provides heating through solar impact
    - Allows for effective use of natural daylight

> 40% energy into HVAC
Typical values for external and internal solar shading systems

100%  
15% = g-tot 0,15  
60%  
100%  
50% = g-tot 0,5
VENTILATION

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SUNPROTECTION

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OUTDOOR
External sun protection screens:

- External blinds provide are most efficient from a energy point of view
- You block the heat before it hits the glass
- Till 90% heat reflection in function of fabric used
- Wind tight thanks to the original SHY zip technology => 130 km/h
- Glare control
- Transparency from inside to outside
Black Forest, Shanghai > 100 m height
Black Forest, Shanghai
Shocked about your own matrass? Go home and ... ventilate
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No speed limit on Innovation!