



FACT SHEET

NATURAL VENTILATION

DEFINITIONS

Cross ventilation, n. air flow through a space due to ambient wind patterns and resultant pressure differential.

Stack ventilation, n. air flow generally in the vertical direction caused by temperature and pressure differences. Also referred to as the chimney effect.

LEED

EA CREDIT 1

Optimize Energy Performance
1-10 points

EQ CREDIT 2

Increased Ventilation

EQ CREDIT 6.2

Controllability of Systems:
Thermal Comfort

EQ CREDIT 7.1

Thermal Comfort: Design

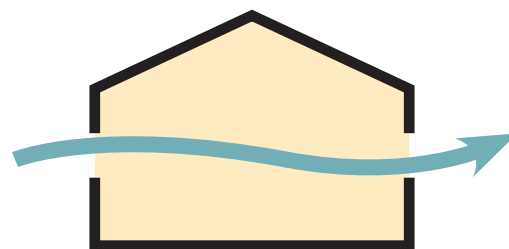
NATURAL VENTILATION is possibly the single most cost effective building design concept. Historically all buildings employed natural ventilation, yet ironically this practice was dismissed as energy inefficient as it was believed to increase heating and cooling loads. Natural ventilation is defined as passively supplying outdoor air to a building interior for ventilation and cooling. With proper design, appropriate to the building location and use, natural ventilation can replace all or part of a mechanical system, thereby reducing construction, energy and operating costs. Most importantly, natural ventilation strategies improve indoor air quality and improve occupant comfort, which translates directly to healthier, more productive building occupants.

PROCESS

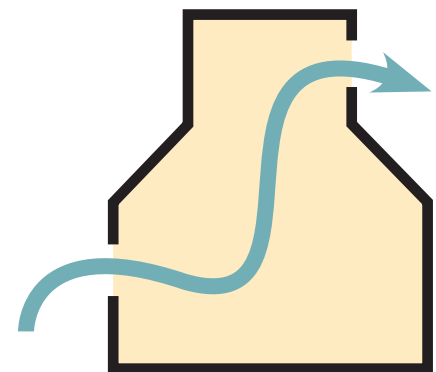
Natural ventilation takes advantage of naturally occurring phenomenon such as wind, humidity, and warm air buoyancy through design of building form to bring fresh outdoor air in and force stale indoor air out. Some strategies include:

- operable windows
- exhaust vents located high in the building's envelope
- intake vents located low in building's envelope
- open building plan to facilitate air movement
- atria
- internal stairwells
- ventilation chimneys
- small fans (solar powered)

Gerding/Edlen Development Company surprised even themselves when they learned that their new commercial office building was leasing faster and for more than the local market rate due primarily to operable windows.



CROSS VENTILATION: locate new inlets upwind; outlets downwind.



STACK VENTILATION: height separation of inlets and outlets promotes airflow.

ADDED VALUE

It is easy to imagine the construction cost savings and energy savings due to natural ventilation reducing the size of mechanical systems. However, energy and construction cost savings are minimal compared to the value realized with improved occupant health, quality of life, and productivity. Consider that the average annual investment in staff salaries and benefits is at least 200 times greater than the cost of energy to operate a building. If natural ventilation leads to only a one percent increase in worker productivity, the increased revenue dwarfs potential energy cost savings. *“Fifteen international case studies show that natural ventilation strategies improve productivity between 0.5% and 11%.” (Gurtekin-Celic presentation)*

Translate productivity to health and happiness in other market sectors:

- Patients recover more quickly
- Students perform better
- Residences sell/rent more quickly, for more money, and turnover less frequently.

CASE STUDY

TELUS - WILLIAM FARRELL BUILDING

The Telus building, formerly known as the William Farrell building, was constructed in 1947. Telus, a British Columbia based telecom company and owner, had to upgrade the building to meet business demands and seismic requirements. Telus chose to preserve the historic building but modify it to create an energy efficient, sleek, and functional structure. One artful and integrated design element is the “second skin” composed of double-wall, low-E coated glazing that is suspended three feet from the original building facade. This new layer provides insulation during the winter months and natural ventilation all year long. Solar powered louvers at the top and bottom of the facade open to draw cool air into the building. A floor-mounted plenum distributes air to each floor where individually-controlled diffusers enable occupants to regulate air flow to their space. The energy saving techniques employed in this building save 520 tons of green house gases every year.



RESOURCES

THE FOLLOWING RESOURCES SERVE AS A STARTING POINT FOR A LARGE QUANTITY OF AVAILABLE INFORMATION:

PORTLAND G/RATED WEBSITE
www.green-rated.org

ADVANCED BUILDING TECHNOLOGIES AND PRACTICES
www.advancedbuildings.org

WHOLE BUILDING DESIGN GUIDE
www.wbdg.org/design/naturalventilation.php

NATURAL VENTILATION IN NORTHWEST BUILDINGS (BOOK DEVELOPED BY BETTERBRICKS)
www.betterbricksresources.com/book

CHARTERED INSTITUTION OF BUILDING SERVICES ENGINEERS
www.cibse.org

FOR MORE INFORMATION ON THIS TOPIC AND OTHERS, VISIT
www.cascadiagbc.org

Total Project Budget: \$13 million CAD
Building Size: 130,000 sq ft
Intended Use: Office space/retrofit
Location: Vancouver, BC

Busby, Perkins + Will

A ROADMAP FOR SUSTAINABLE BUILDING

