DESIGNING FOR HEALTH & WELL-BEING WITH FRESH AIR

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The movement of fresh air has an astoundingly powerful influence on the human body, mind, and spirit. Though we have adapted to spending most of our time in buildings, we need to consider the air quality in our indoor environment. The incredible impact of air on the human body and mind is conveyed in the astonishing fact that the average person intakes 15 kg of air per day while only consuming 2 kg of food and water; approximately 55% of it is inhaled indoors. The achievement of good indoor air quality hinges on the replacing of harmful exhaust air with clean, fresh air to ensure our health, comfort, and well-being.

Humans and their activities are the dominant creators of pollution and poor indoor air quality in their homes and workplaces. Activities such as cooking, cleaning, showering, or hosting a gathering can dramatically increase the relative humidity inside. High levels of humidity can cause mould growth, increase the presence of dust mites, and damage building envelope by condensation. Carbon dioxide (CO^2), a good indicator of indoor air quality, is produced as a natural bioproduct as we intake oxygen and is emitted from appliances such as gas cookers and boilers. A high indoor concentration of humidity and CO can produce damp environments while causing dizziness, headaches, asthma, allergies, and respiratory problems. Indoor air quality can also be affected by chemical pollutants that are found in building materials, such as insulation and paint, volatile organic compounds (VOCs), or outdoor sources such as pollen and vehicle pollution. Undiluted exhaust air filled with dirt, particles, and chemical compounds can further lead to the experience of dry cough, itchy skin, and irritation in the eyes, nose, or throat. The accumulation of such undesired airborne substances contributes to occupants' symptoms of illness, discomfort, fatigue, and lack of concentration that appears to be linked to time spent in the building.

The creation of a healthy and vivacious home is heavily reliant on the exploitation of the natural power of moving air. Today's buildings have become so airtight that infiltration alone is insufficient to properly ventilate a building and thus requires efficient strategies to replace exhaust air with clean, fresh air. Pollutants and harmful substances that severely degrade human health and well-being entering a building can remain trapped inside without the thorough ventilation of fresh air throughout all living and working spaces. Mechanical ventilation, which uses electrically-powered fan, can direct airflow in and out of the building but requires the regular changing of filters

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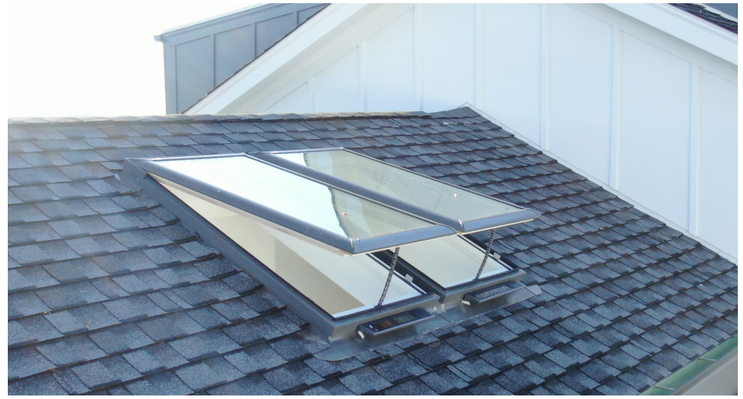
Mount Pleasant House: Designed and built by Roundabout Studio



that can become an added source of pollution. Natural ventilation, however, uses openings in the building envelope to allow the driving forces of wind and temperatures differences in air from outside to ventilate or cool the interior. Cross-ventilation involves the opening of windows at opposite ends from each other to facilitate the flow of air from the high-pressure windward side into the building while exhaust air exits the low-pressure leeward side. The natural bouncy of warm air will cause it to rise and leave through leakages, stack ducts, or open windows at higher elevations to promote stack effect.

Building design should strive to optimize these natural pressures and currents by placing windows in a variety of locations and heights, and consider the roof window to be of particular benefit. Opening the home at different areas and levels combines the effects of cross-ventilation and stack effect which promote efficient interior airing that simulates the natural rhythms and temperature variations of the outdoors. Hybrid systems allow mechanical systems to aid natural ventilation by facilitating airflow particularly when natural driving forces are inadequate. Regularly airing out all spaces within a building removes unwanted bioeffluents, CO^2, moisture and odours that have a negative impact on our perception of the indoor environment. Thoughtfully designed spaces should maximize ventilation and cooling with fresh air from outside, not only to dilute undesirable airborne substances, but to stimulate the senses and enliven living quarters.

The flow of fresh, clean air throughout our buildings is a vital proponent for the creation of an indoor environment that positively influences all scopes of the human experience. Opening our windows to the outside provides us more than mere ventilation, but maintains a strong connection to the outside world. The mobility of fresh air functions as a dialogue between the indoor climate and outdoor weather while increasing our mental aptitude, regulating body heat, and activating the human physique. Allowing the fresh, clean air to penetrate the inside provides a powerful sense of freedom that is distinctly felt when embracing the dynamism of our natural surroundings.