Identifying and Removing Pollutants from Heat Recovery Ventilators
by Terry Watters
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Pre-filtering of all exhaust grilles should be considered.

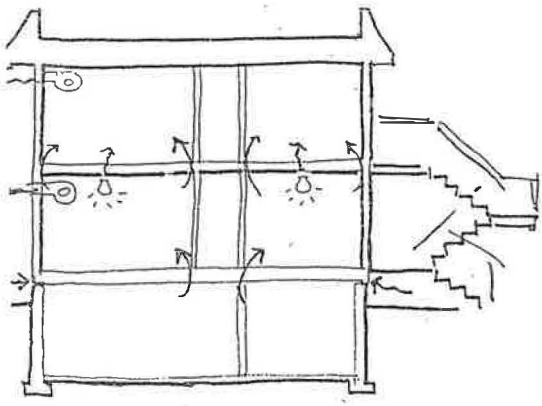
Homeowners need to be instructed on or reminded about maintenance requirements for their HRVs.

More promotion must be done about the information available to homeowners on maintaining HRV systems. One example is to make NRCan and CMHC publications available through HRV supplier/installer operations, local CHBA offices, CMHC offices and provincial departments and agencies that deal with housing and/or energy use.

Ventilation in Small Multifamily Buildings

The renovation market in Canada is outpacing the new construction market. Renovations also provide an excellent opportunity to promote energy efficiency.

There is large potential for energy savings in older multifamily buildings, which are poorly insulated and not airtight. These buildings typically have no mechanical ventilation and rely on air leaking through the exterior envelope to provide adequate air exchange. Ventilation in multifamily buildings depends on both the exterior leakage area and the airtightness between dwellings.



ntilation in 2 or 3-unit ultifamily buildings ore and after atherization to Gerbasii RICON+ CMHC Research ision

What happens when air sealing and insulation at or near the ceiling/roof junction are done? Is exhaust-only mechanical ventilation effective in small multifamily buildings after they have been retrofitted?

To provide minimum recommended fresh air flows, weatherization programs often rely on exhaust-only mechanical ventilation to compensate for the reduction in fresh air flows caused by draft proofing and upgrading of insulation. Although exhaust-only mechanical ventilation may be suitable for single family houses that have no risk of combustion spillage or backdrafting, this may not be the case in multifamily buildings. Codes or standards do not deal with ventilation requirements for retrofitted buildings.

Draft proofing the building can greatly reduce the equivalent leakage area of the exterior shell and change the location of the neutral pressure plane, which will alter the pattern of the passive air change. In many buildings, the leakage area is concentrated near the ceiling, which causes the neutral pressure plane to be at or near the top of the building. For this reason, even the top floor units may usually be under negative pressure and receive a substantial quantity of fresh air. This has a major impact on the outdoor air supply and how it is distributed on a unit-per-unit basis.

Quantifying fresh airflows in multifamily buildings is a more complex issue. Installing exhaust fans does not automatically ensure adequate outdoor air supply to individual dwellings. If outdoor air requirements are to be met with exhaust-only fans, it is important to understand how the fan affects air movement in the multifamily buildings in order to calculate how much fresh air is actually supplied to individual dwellings.

A study by Siricon for CMHC looked at the outdoor air supply for a 2-unit building before and after weatherization and evaluated the effectiveness of exhaust-only ventilation. The building type studied is a 2-storey up-down duplex typical of the buildings targeted by recent energy retrofit programs in Quebec. Simulations were done to evaluate the impact of air sealing and the effectiveness of exhaust-only mechanical ventilation.

A common energy retrofit for these buildings consists of insulating and sealing the roof cavities. Insulating and air sealing has a dramatic impact on natural air changes and how fresh air is distributed to the units. The neutral pressure plane is lowered and this leads to a decrease in fresh air for the upper floor unit, giving rise to potential indoor air quality problems.

The National Building Code ventilation requirements are based on the CSA F326 standard,

which states that each dwelling unit must have a mechanical ventilation system with the capacity to supply outdoor air at a rate of the greater of either 0.3 ACH or the sum of individual room requirements. The ventilation system must be capable of running continuously and must supply a minimum amount of outside air to each of the main rooms of the dwelling. The required air change rate refers to the installed capacity of the system, not the rate of ventilation that is actually used in the house.

Meeting the requirements of this standard would ensure a continuous and controlled supply of fresh air to each dwelling. Each unit would be supplied with fresh air directly, thus ensuring fresh air distribution. However, the amount of outdoor air that can be supplied through infiltration depends on the location of the leakage points, the location of the unit and how isolated the dwelling is from the adjacent unit.

For buildings whose units are relatively well connected to each other, the fresh air change rate of the upper unit due to infiltration is negligible. Exhaust fans are not effective at increasing outdoor air supply to the upper floor unit. Upgrading insulation and air sealing the roof space does reduce the air leakage between dwellings, but exhaust-only ventilation benefits only the lower units.

For buildings whose units are relatively well isolated from one another, exhaust-only ventilation is an effective means of providing outdoor air, especially during mild outdoor temperatures.

Possible solutions include the installation of a balanced mechanical ventilation system or air sealing to increase the airtightness between the units. Although very difficult to install in an existing building, a balanced ventilation system is the most effective means of ventilating the top unit of a building with well-connected units. Another alternative would be to seal the floors and bypasses between the units in order to render them relatively isolated from one another. Both alternatives are seldom implemented.

Since an airtight separation between dwellings is also the goal of fire prevention codes, fire safety will be enhanced if the separations are air sealed. A second bonus to airtight separation is that there is better sound separation if common assemblies do not allow transmission of air borne sound.

Letters to the Editor

Re: Response to Editorial (letters, Solplan Review No. 96, January 2001)

Looks like your editorial struck a nerve with Paul Rawlings at least. However, I think he missed the point. I did not read anywhere in the editorial that you thought that builders were "rolling in the bucks" or were not allowed to make a reasonable profit. On the contrary, I would suggest that if more attention were given to doing it right the first time, in the end total costs would be lower and a happy customer would be a bonus.

As long as industry players look only to defend themselves from these real observations rather than recognize and try to correct problems, they are their own worst enemy.

Doug Lorriman
Georgetown, ON

Re: Editorial (Solplan Review No. 96, January 2001)

I enjoyed your latest editorial. The thought has often occurred to me that we as an industry are not doing all we can. Very bright people have done research, interpreted results, written papers, tested ideas and generally brought the available science and technology to the "available to consumer" level.

Many consumers are benefiting from their R-2000 homes and even more have features added as a direct result of the program. These homes and their features save energy and environmental damage every year for as long as they stand. Unfortunately the converse is also true. Every house built to a lower standard, and every feature not installed, wastes resources and energy every year. Do the arithmetic and you realize the size of the missed opportunities is huge.

We have the technology and skills to do much better. It appears that we will wait a long time for the consumer to demand quality in smaller packages. Why do we build 8' ceilings when most consumers would accept 7'6" especially in bedrooms? Why put in four bathrooms when 2 or 2½ may be more than enough? Why build 3,000 square feet when 2,500 square feet may be more than enough with the proper design?

If we intend to rely on market demand to drive advances then we had better tell the market, in no uncertain terms, what to demand.

Rod Parsons
St John's, NF