

Green Real Estate News submission
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Title: How do occupants actually use mechanical ventilation systems in condo suites?

160 Character Description: Toronto condo dwellers in LEED buildings are using (and not using) their ventilation systems in unpredictable ways, with unpredictable consequences.

160 Word Description (in case you need it): Many of the towers making up Toronto's condo boom are equipped with in-suite, mechanical ventilation systems which are controlled by their occupants. Researchers from Ryerson University recently found that many occupants prefer to use their balcony doors and windows instead, causing implications for energy efficiency and indoor air quality. The study involves four separate towers and used occupant questionnaires and interviews to understand how people were ventilating their suites. Over half of respondents in four LEED-certified high-rise residential buildings in Toronto, Canada, were found not to use their heat recovery ventilators (HRV). This information was then combined with energy data from thermal submeters and with indoor air quality measurements to produce interesting insight into how people ventilate and the effects that this has on energy consumption and indoor air quality.

One page (500 word) description of the study.

Carried out in 2013, this study involves data from four LEED Gold condominium towers in Toronto, built by two separate developers, and occupied for at least 20 months at the time of the study. Occupant questionnaires were delivered to all suites in each building, resulting in 165 responses, out of 926 suites, for a response rate of 17.8%. These questionnaires collected information about how occupants were using their mechanical ventilation systems, as well as various other questions which could be used to understand their satisfaction and behaviour within their suite. The questionnaire also allowed occupants to consent to releasing their consumption data from their thermal, electricity, and water submeters. All respondents agreed to releasing their consumption data, adding to the richness of the study. Follow up interviews and indoor environmental quality measurements were taken in limited suites to provide further insight.

Over half of respondents were found not to use their heat recovery ventilators (HRV). Questionnaire scores, comments and interview results found the following reasons: acoustic dissatisfaction, difficulty with the accessibility of filters, inhabitant knowledge and preferences, and lack of engagement with training materials. These factors led many occupants to choose passive ventilation (via windows and balcony doors) over their mechanical system. This preference for passive ventilation had interesting consequences.

Results suggest that abandoning mechanical ventilation in favour of passive ventilation can actually lead to greater satisfaction with indoor air quality. One possible explanation for this is that giving occupants access to effective environmental controls is an important factor in their satisfaction. Those with a preference for passive ventilation also used less energy for heating and cooling, as would be expected given that they are likely bringing in less outside air than those using mechanical ventilation.

These results suggest that a disconnect exists between the expectations of designers and the thinking and behaviours of inhabitants. It is recommended that designers use resilient design in such a way that embraces the agency of inhabitants, giving them the ability to exercise their preferences in ways that do not short circuit the IAQ or energy performance of their suite or their building. Designers need to remember that inhabitants are embedded in design decisions made long before they come to occupy a space and bring with them expectations, perceptions, capabilities and preferences, all of which combine to produce the achieved performance of their dwelling.

The study also highlights the importance of using post-occupancy evaluation methodology to understand how occupants interact with (new) technology in order to optimize performance and satisfaction in high-rise residential buildings. Further work in this area should involve measuring occupants' preferences for passive, mechanical, and mixed modes of ventilation and develop appropriate design and management strategies which reflect these. Second, a study in which a greater number of IAQ and noise measurements are conducted in HRV user and non-user suites would address what was a major limitation with this paper.

Link to paper: <http://www.tandfonline.com/doi/full/10.1080/09613218.2015.963350#.VL1VxC6GMXg>