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COVID-19 and the Risk from Recirculated Air

KAPL GREEN AND SUSTAINABILITY LAW

in Buildings

By Stuart Kaplow on April 29, 2020 **POSTED IN ENVIRONMENTAL, GREEN BUILDING, STATE**



The Federation of European Heating, Ventilation and Air Conditioning Associations (REHVA) has in recent days issued guidance on how to occupy commercial and public buildings, from offices to schools, "in order to prevent the spread of the coronavirus."

As Americans begin to end coronavirus lockdowns, which were of course intended to keep hospitals from being overwhelmed but not reducing the number of people who will ultimately get infected, with no vaccine yet available, much of the instruction is now for people to six feet of social distance and wear a face mask, but there is apparently no U.S. government guidance on how to operate and use a commercial building. Most would expect more frequent cleaning of buildings, but not anticipate much more. Antimicrobial materials and ultraviolet lights for cleaning may be the future, but will not yet be in place as most people go back to school and work. And as people return to their commercial buildings, codes and standards for heating, ventilation and air conditioning in the U.S., and even the green building movement, are driven principally by energy efficiency not preventing the spread of viruses.

The REHVA guidance is based on WHO documents and the best evidence and knowledge from 27 countries in Europe focusing on HVAC systems in buildings to articulate a set of measures that help to control the airborne transmission of COVID-19 in buildings (apart

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Green Building Law Update is published by attorney Stuart Kaplow providing strategic intelligence on environmental law, including critical insights into sustainability and green building for the business community, .. not just for lawyers.

Originally launched in 2008 by Chris Cheatham, this blog served as a forum to discuss green building laws. Today, published by Stuart Kaplow, the blog has expanded to provide critical insights into the broader environmental industrial complex. The blog is popular because posts are positive, often fun, but always forward thinking briefs on the key environmental issues of the day.

Blog posts track Stuart Kaplow's law firm business model of "environmental risk as an opportunity." ...MORE

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from frequent surface cleaning).

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Important for every pandemic are the transmission routes of the infectious agent. In relation to COVID-19 the standard assumption widely discussed in the U.S. is that there are two dominant transmission routes, droplets emitted when sneezing or coughing or talking and via fomite surface and hand-hand, hand-surface contact.

But Europeans and some Asian countries have also identified another key transmission route of concern, airborne transmission through small particles (< 5 microns), which may stay airborne for hours and can be transported long distances. REHVA describes,

The size of a coronavirus particle is 80-160 nanometers, and it remains active for many hours or couple of days (unless there is specific cleaning). COVID-19 remains active up to 3 hours in indoor air and 2-3 days on room surfaces at common indoor conditions. Such small virus particles stay airborne and can travel long distances carried by airflows in the rooms or in the extract air ducts of ventilation systems. Airborne transmission has caused infections of SARS (an earlier coronavirus outbreak)."

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While it has received little if any public discussion in the U.S., the NIH reached the same conclusion about airborne transmission on March 17, 2020, "scientists found that severe acute respiratory syndrome coronavirus 2 was detectable in aerosols for up to three hours."

The latest studies cited in the REHVA guidance concluded that aerosol transmission is plausible, as the virus can remain viable in aerosols for multiple hours. Another recent study that analyzed superspreading events showed that closed environments with minimal ventilation strongly contributed to a characteristically high number of secondary infections. The manuscript draft discussing airborne transmission concludes that evidence is emerging indicating that COVID-19 is transmitted via airborne particles.

In response to that clear and convincing evidence, albeit preliminary, REHVA provides practical recommendations for building operations:

– The most significant REHVA recommendations is "no use of recirculation" in any building with a mechanical ventilation system. "Virus particles in return ducts can also re-enter a building when centralized air handling units are equipped with recirculation sectors." It is recommended to avoid recirculation of air during COVID-19 episodes by closing the recirculation dampers (via the Building Management System or manually). Sometimes air handling units and recirculation sections are equipped with return air filters, but most of these filters, even HEPA filters may not filter out virus size particles effectively. Ultraviolet light can be used to disinfect indoor spaces and could be installed to destroy viruses, but has not yet been proven effective against COVD-19.

– Increase air supply and exhaust ventilation by extending operation times, changing the clock times of system timers to start ventilation at nominal speed at least 2 hours before the building usage.

– There is a general recommendation to stay away from crowded and poorly ventilated spaces, so in buildings without mechanical ventilation systems it is recommended to actively use operable windows (much more than normally, even when this causes some thermal discomfort).

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Humidification and air-conditioning have no practical effect as coronaviruses are quite resistant to environmental changes and are susceptible only for a very high relative humidity above 80% and a temperature above 30 °C.

Note, duct cleaning has no practical effect and changing of outdoor air filters is not efficacious.

Arguably retro commissioning or otherwise tuning up HVAC systems could be advantageous. And if the system is beyond its useful life this may be an ideal time for replacing it with a modern system with a MERV-13 filter, ultraviolet light treatment or the like.

Certainly a lower population in a building can affect the spread of the coronavirus.

Owners of existing buildings in Europe are doing this today and American building owners should implement these practices now and for as long as the COVID-19 outbreak lasts (i.e., until there is a vaccine).

Green building programs, that have at their core energy efficiency (e.g., LEED is an acronym for Leadership in Energy ..) will have to promptly change and evolve if they are to remain relevant as 'stay at home' orders are lifted and people return to their places of school and work, concerned about the spread of COVID-19 within the buildings. The environmental community elevated reduced energy use to an environmental issue while relegating indoor air quality, including recirculated air necessary to achieve those energy goals, to an unimportant externality. Such may have been well and good when the associated cost savings of reduced energy use could drive green building for many owners. But on April 20 when oil in America went for negative \$37 a barrel, reduced building energy costs were no longer a current priority for owners and certainly not a matter that will trump concern for building occupant exposure to coronavirus.

ASHRAE 62.1, the standard specifying minimum ventilation rates "to provide indoor air quality that is acceptable to human occupants and that minimizes adverse health effects" is perceived to not be enough in a post coronavirus building. And the use of no recirculated air, at all, is considered extreme by some, but possibly is necessary for a period of time (i.e., until there is a vaccine?) in order to prevent the spread of coronavirus. ASHRAE's Executive Committee has issued two statements in response to COVID-19, including, "changes to building operations, including the operation of heating, ventilating, and air-conditioning systems, can reduce airborne exposures." But many believe ASHRAE should consider and promptly provide direction on suspension of its standards, in particular those related to recirculated air and/ or provide greater guidance on filtering viruses.

The just released California COVID-19 Industry Guidance: Office Spaces, is significant when it raises the issue but makes it a consideration and not mandatory when it provides,

"Consider installing portable high-efficiency air cleaners, upgrading the building's air filters to the highest efficiency possible, and making other modifications to increase the quantity of outside air and ventilation in offices and other spaces."

There is a growing call for local code officials to immediately evaluate the efficacy of new executive orders or otherwise suspend code (BOCA, IECC, IgCC, etc.) requirements mandating use of recirculated air. Related to code requirements, demand controlled ventilation should be disabled.

If you think this is not a real issue, a front page story today in The Washington Post describes, several of the studies linked above, and a new one published this week in the journal Nature, that found evidence that the coronavirus can remain suspended in inside building air in aerosol particles.

The current pandemic should be a wake up call to operate and use commercial buildings, from schools to offices and more, to truly provide shelter, on a philosophical and existential basis, including not letting the tail of energy efficiency wag the dog of better and healthier buildings. Maybe the Europeans, who are already beginning to end lockdowns, know something about not using recirculated air and increasing airflow at this time in commercial buildings in order to prevent the spread of coronavirus. And across America we should open minimum outdoor air dampers, as high as 100%, eliminating the use of recirculated air.

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