How COVID-19 made healthy indoor environments and wellness a priority

The importance of a comfortable, healthy and engaging workplace has been thrust into the spotlight during this global pandemic. People understandably want to work in an environment where they feel safe. Although good lighting, access to water and appropriate levels of air quality may seem like very basic needs, they are consistently the most requested elements whenever office workers are questioned as to what would make their environment more comfortable.

Now, as a result of the pandemic, Indoor Environmental Quality ("IEQ") is more important than ever. IEQ is simply the conditions occupants experience within a building, particularly those related to health and wellbeing, comfort and productivity — this is no doubt a focus for companies as they review return to the workplace initiatives.

Although there are no technologies commercially available today that can directly measure viruses in buildings in either the air or on physical surfaces in real-time, there is still plenty that can be done to reduce transmission risk. Enhanced cleaning procedures, social distancing, one-way systems, plexiglass and hand sanitizers are just a few ways to promote healthier and safer buildings.

The time has also come for smart buildings to be just that. Buildings need the capacity to understand themselves and to heal themselves where possible. The process of measuring air quality, humidity, temperature, occupancy and flows of people – a myriad list of perhaps previously 'nice to haves' – has become integral to the successful reopening of a building.

Increasingly both building owners and occupants will become more invested in a holistic, measured and data-driven approach to IEQ – especially indoor air. IEQ frameworks, building systems and the latest indoor air quality monitoring technology are three critical aspects of creating a "healthy and smart building" that owners and occupants must consider.

MEASURING HEALTHY ENVIRONMENTS

We spend almost 90 percent of our lives indoors. The ability to measure wellness with certification programs (see graphic) provides companies and building owners an opportunity to showcase how they're improving the health and wellness of the built environment and, in turn, protecting the health of the building's occupants.

Interest in wellness has increased dramatically since the onset of the pandemic. Companies want to know what they can do to improve indoor air quality and air flow, change cleaning habits, increase ventilation and more. Working towards a wellness certification helps provide reassurance to employees that their workplace is recovery ready – meaning that their building is safe and ready for re-entry post-COVID-19.

In addition to the most well-known IEQ and wellness frameworks, there are two newer standards focused specifically on Indoor Air Quality (IAQ) that have recently emerged: RESET and AirRated. The RESET program is unique in its focus on real-time data and long-term monitoring, providing certifications not just for buildings, but also for IAQ monitors (sensor hardware) and data providers (software platforms). AirRated takes a different, but complementary, approach based on a shorter-duration environmental survey that gathers information and directly measures data on the building's IAQ.

While LEED and Fitwel both address Indoor Environmental Quality as specific categories in their frameworks, WELL and RESET take it a step further by requiring testing (WELL) and ongoing air monitoring (RESET) to achieve certification.

THE WELL BUILDING STANDARD™ (WELL)
Marries best practices in design and construction with evidence-based medical and scientific research — harnessing the built environment as a vehicle to support human health and wellbeing.

FITWEL
A building certification system that optimizes buildings to support health by focusing on a scorecard rating of design and operational strategies to address a broad range of health behaviors and risks that impact occupants.

AIRRATED
A new certification system for Indoor Air Quality that uses sensor technology to collect detailed information about air quality, then grade it based on leading medical research and industry best practice.

LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED)
One of the most popular green building certification programs used worldwide, with multiple frameworks that focus on the complete life cycle of a real asset.

RESET
An international building standard and certification program for healthy buildings, as measured by sensors, focused on quality, transparency and actionability of live data.

IMPROVING VENTILATION

It's important to note that some mechanical heating, ventilation and air conditioning (HVAC) systems are no longer fully fit for purpose. This is especially true for ventilation in many buildings. What do you need to know to improve ventilation?

1. Don't assume that your HVAC system is designed to maintain peak ventilation loads

Odds are, it isn't. And that's why it's important to review and have a thorough understanding of the design of HVAC systems to determine fresh air design capabilities, as well as potential technological and physical improvements such as demand-control ventilation.

2. IAQ in occupied spaces, especially small enclosed spaces, deteriorates quickly

CO_2 concentration increases rapidly in rooms with people and closed doors, and the rate of change is fast. Based on data from a two-week sample period performed with a leading-class commercial IAQ sensor, our team of experts found that the CO_2 concentration doubled in one hour from the unoccupied baseline in an enclosed, unventilated space that is 100 square feet with eight-foot ceilings and occupied by one person. Since we exhale CO_2 continuously, it is the most important IAQ variable to monitor because it is a direct indicator of ventilation performance in rooms.

3. Occupancy schedules for HVAC should be verified

While it seems obvious that the HVAC should be on when people occupy the building, it is not always the case for a variety of reasons. It's best to trust **and** verify. Start occupied modes earlier, end them later, and try to verify when the building is occupied.

The next thing to consider is building automation and control systems. Automation is the "nervous system" of HVAC and is fundamental to ventilation performance, especially in modern variable air volume ("VAV") systems found in most buildings today. These systems are commonly referred to as a BMS (building management system).

Cushman & Wakefield's recent survey of its managed portfolio of U.S. commercial office buildings larger than 150,000 square feet indicates that 95 percent of such buildings have an integrated BMS in some form. However, these systems are complex, operate behind the scenes and can be easy to ignore.

Common limitations on BMS come in three forms:

1. Underinvestment

2. Lack of regular maintenance and updates

3. Minimal standardization

All three common limitations point to the same general solution, which is to treat building automation like a contemporary technology and not like a traditional building asset. This means periodic, planned upgrades of hardware, regular software updates from the manufacturer, reliable maintenance from the service contractor (e.g. replace dead sensors and restore failed network connections), and standardization, including consistent programming, data management and user interfaces across similar assets or in some cases even across entire portfolios.

Lastly, the most impactful action that can be taken to maximize ventilation performance is implementing automated analytics on HVAC. While preventative maintenance is undeniably important, many assets are inaccessible, too numerous, or are otherwise difficult to observe and diagnose without data. This is commonly called Fault Detection & Diagnostics or "FDD."

The bottom line is that complex HVAC issues are too costly or, in some cases, impossible to identify with traditional maintenance processes and tools, so they often go undiagnosed. Automated analytics enable a proactive approach.

IAQ MONITORING TECHNOLOGY

Real estate has seen valuable solutions develop with the ongoing evolution of the Internet of Things (IoT). One key area is IAQ monitoring technology. The leading IoT-style solutions combine sensor hardware—usually small devices designed to mount on walls—and an associated software platform used to access the data, configure and manage the sensor devices, and provide some user interface for analytics, utilizing the data collected from the sensors. These offerings are built with modern cloud-based architectures that should feature well-documented,

published APIs, allowing for relatively simple integrations with other technology systems.

As mentioned, while there are no IoT products commercially available today that measure virus particles directly, the combination of CO_2, PM2.5 and VOC measurements from a quality IAQ sensor provides a good indication of ventilation performance. IAQ measurements like CO_2 have historically been difficult to monitor accurately because the sensors can drift, becoming more inaccurate over time. One key advantage of the IoT-style solutions with hardware directly integrated to a purpose-built software platform is the ability to automatically recalibrate the sensors periodically to account for the drift, which the leading solutions do.

IoT sensors provide the detailed data needed to track IAQ as a "health performance indicator" in real-time. Sensors can be deployed to cover all occupied spaces, both enclosed spaces and open areas. They can also be implemented in a lower cost model only for key points of interest like conference rooms, huddle rooms or high-density public areas like cafes.

USING COVID-19 AS A PRIORITY RESET

The pandemic has highlighted the importance of developing, operating and maintaining healthy buildings. The benefits are clear to see: a more appealing building for occupiers, a more valuable asset for owners, and better air quality for everyone.

The often discussed 'flight to quality' takes on a different meaning when it comes to the welfare of your people.

Take this time as an opportunity to evaluate the indoor quality of your building.

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