BAQ
BUILDING AIR QUALITY

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INSIDE THIS ISSUE

VIRTUAL REALITY IS REALLY HERE

WHAT VR IN 2017 LOOKS LIKE

One of the biggest tech stories to come out of 2016 was the emergence of virtual reality technology. Microsoft took the tech world by storm when it announced a line of VR headsets with built-in tracking sensors, starting at the remarkably affordable price of $299.

The coolest part about this particular virtual reality option is its "six degrees of freedom" tracking. In many cases, virtual reality is just the 360-degree panorama. But with six degrees of freedom, the tracking system can also see when you're moving through space! That's the main difference between the pricey VR options like Oculus Rift and the cheap entries.

These headsets are designed to work with a Windows 10 computer, which makes this technology accessible to millions of potential users who may not have a specialized platform like a game console.

Competition is heating up among the major players in virtual reality, which is great for consumers and tech enthusiasts. Along with virtual reality, augmented reality is continuing to develop, and these technologies are predicted to make up a combined $150 billion market by 2020. Not only will AR and VR transform entertainment, but they'll also have a dramatic effect on fields like health care, education, sports, and tourism.

Expect to see virtual reality truly enter the mainstream this year. Looking back, 2016 was the first year where virtual reality systems were widely available for consumers to purchase, as well as for developers and content creators to work with. If virtual reality is today's television revolution, we've just hit the era of full color.

Get ready to experience the sights in faraway places, socialize in a virtual space, play immersive games, complete job training in private, and so much more!

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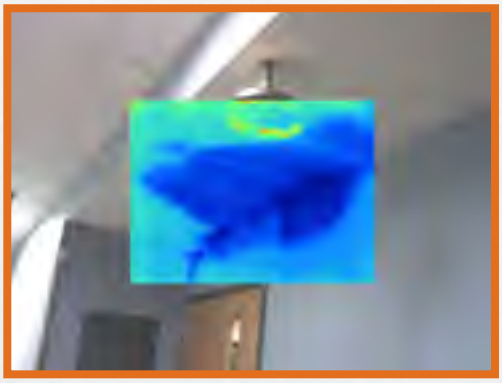
SMILE FOR THE CAMERA

THERMAL IMAGING AND BUILDING SCIENCE

Several years ago, thermal cameras became accessible to the general population, and I decided to invest in one for my work. You might have seen thermal cameras used on some TV show about the Army or a SWAT team. The characters will be scoping out a building, and someone in charge will demand they get thermal cameras on the building to see what's going on inside. Within moments, another character reports they see two adults and a child moving around on the second floor, or something similarly revealing. This looks really cool. Unfortunately, it's complete science fiction. In fact, seeing through a wall would be almost the opposite of what I need my thermal camera to do when I'm working on a site!



"Moisture can behave erratically, making it difficult to predict, which is what makes the thermal camera necessary."

In the simplest terms, my thermal camera lets me check the temperature of a surface, usually a certain spot on a wall. This information helps me determine if there's air leaking in or out of the building, or if there's moisture behind the drywall. I'm able to achieve this by using my camera to get a reading in one place before checking the temperature in another location. If the first reading comes back at 72.5 degrees Fahrenheit and the next drops to 71, 70, or even 68.6 degrees, then I know there's a problem. We then use handheld meters to confirm that moisture is causing the temperature difference.

When I first bought my camera in 2007, I also took a five-day course from a company which provided thermal imaging training, followed by a two-day course to focus on thermal imaging as it relates to building science. The investment cost me over $20,000, but it's been worth it. I've primarily used the camera for finding moisture, which can be a real challenge. As a colleague of mine puts it, "Water will go downhill, unless it decides to go sideways or up."

Moisture can behave erratically, making it difficult to predict, which is what makes the thermal camera necessary. Some time ago, I was called out to a 28-story building which had suffered a water leak in the men's restroom on the 25th floor. The water restoration team wanted me to use the thermal camera to check for water in the walls — what they call moisture mapping. Though they had shut off the water right away, I still found water in the stairwell all the way down to the 15th floor!

Two days later, they brought me back to check the drying. This time, I found the water had continued to move down to the 10th floor. Then, I was back again two days later to report that, while everything was drying properly, the water had migrated down to the seventh floor. That leak from Saturday morning managed to get down 18 flights of stairs by Tuesday! Without the thermal camera, no one would have realized it until the moisture in the walls started to cause problems.

This building was a fascinating case, as I'd never seen water behave so extremely before. That being said, it wasn't the first time my thermal camera helped me identify potential problems before they got out of hand. My camera is 12 years old, and while it might not let me see through walls, it still works like a charm, and I wouldn't be nearly as efficient without it.

Travis Wade

Are You Burning Out?

HOW TO FIGHT FATIGUE AT WORK

Everyone wants to be as productive as possible at work, but there can be a number of reasons that your output suffers over the course of your career. One such problem is job burnout, which can wreak havoc on your time management and the quality of your work. If you begin to experience job burnout, there are some steps you can take to get your attitude and work rate back on track.

Work burnout is so common that the world-famous Mayo Clinic has gone so far as to create a specific definition for the condition. They call work burnout "a special type of job stress — a state of physical, emotional, or mental exhaustion combined with doubts about your competence and the value of your work."

How do you know when off-days happen often enough to constitute burnout? Largely, it is a matter of degree. According to Psychology Today magazine, some telltale symptoms include "physical and emotional exhaustion; cynicism and detachment; and ineffectiveness and lack of accomplishment." In essence, if you are dreading going to work every day and feel you are getting nothing from your career, you are likely burning out.

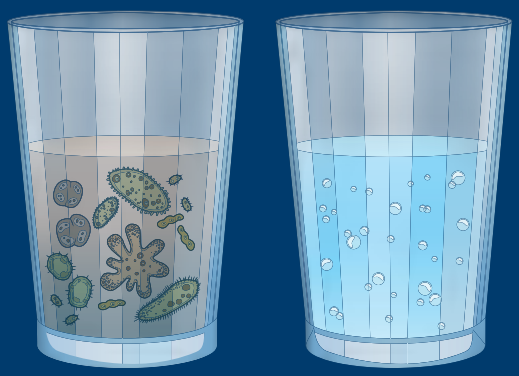
There are lots of steps you can take to overcome feelings of disenchantment with your professional life. If you often take work home with you, make an effort to bolster other areas of interest. While at work, try to engage with what you do. Disinterested employees burn out faster than those with passion. In a Scientific American article titled "Conquering Burnout," Michael P. Leiter and Christina Maslach suggest surrounding yourself with co-workers who are positive rather than pessimistic. "Receiving good vibes from others is an uplifting experience," they write, "but so, too, is expressing them to others."

If a simple reset does not work, try consulting some resources, both external and internal. Internally, you can discuss the problem with your human resource team — professionals who have seen this problem before. A great external support is the book "Reclaiming the Fire: How Successful People Overcome Burnout" by Dr. Steven Berglas.

If you feel burnout setting in, do your best to get a handle on your mental state as early as possible. With a fresh perspective, you can be back to your best productive self and enjoy work again.

A Watery Grave

The Real Cost of Black Water



Not all water is equal. You wouldn't drink water from a fish tank or bathe in an irrigation ditch — most people know the dangers. Unfortunately, this cautious approach to water can disappear when one is faced with a leak or spill inside a building. Many property managers or building owners forget there is not just one type of water — there are three:

- **Category 1 Water:** Potable or "clean water" does not pose a threat to humans if ingested. Category 1 water might cause problems if a sink overflows or a water line malfunctions.
- **Category 2 Water:** Also referred to as "gray water," category 2 water is contaminated by certain microorganisms and is found in toilets containing urine (not feces), or dishwashers and washing machines.
- **Category 3 Water:** This extremely unsanitary "black water" contains bacteria, fungi, feces, or dangerous chemicals. Black water can come from sewage pipes or a leaky fish tank, or it can blow in through broken windows during a hurricane.

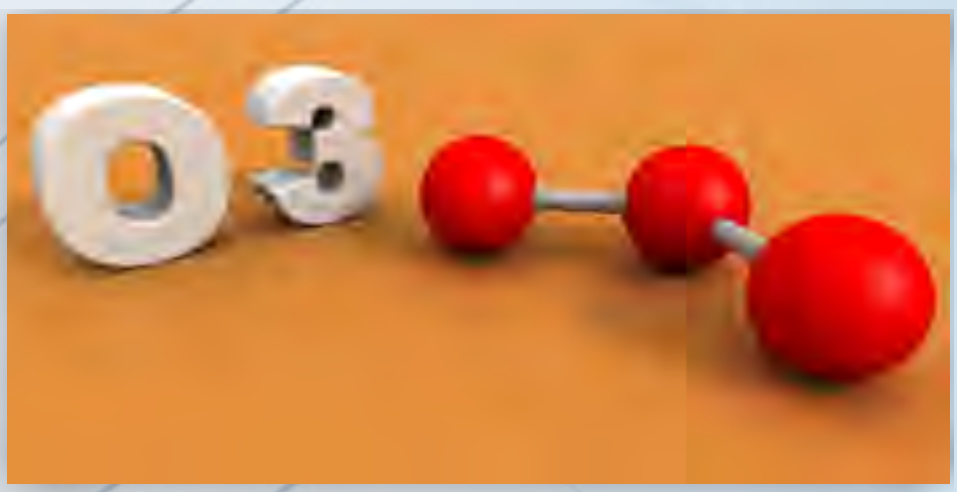
Every category of water should be addressed quickly and with great care, but black water particularly should only be handled by experienced professionals. Most people don't understand how dangerous black water is, and injury or illness often follows the mismanagement of category 3 water. Black water should be treated as if it contains infectious organisms, which it often does. If a person cleaning up a black water spill has a cut on their hand, that cut can become severely infected; breathing in spores from black water can lead to respiratory problems; and accidentally ingesting black water can cause a person to become extremely sick.

This can be avoided if individuals who clean up black water take proper safety precautions, such as wearing gloves, rubber boots, or a breathing mask, and fully sanitize afterwards. However, if a building owner or property manager treats a black water spill as "just another water leak," their carelessness puts everyone at risk. When a property manager sends one of their staff to clean up black water with just a mop, they are putting that person in a great deal of danger and leaving themselves open to a very large **and** expensive liability claim.

No Zone for OZONE

WHY OZONE MIGHT BE MORE TROUBLE THAN IT'S WORTH

The use of ozone (O3) is often touted as an "all-natural" way to rid an environment of unpleasant odors. Some claim that an ozone generator can successfully remove odors caused by everything from mold to cleaning products. The truth is, while ozone is technically natural, that doesn't mean it's safe.



Ozone is created by exposing oxygen (O2) atoms to electricity. The oxygen atoms break apart, creating the unstable compound we call ozone. Seeking to return to a more stable compound, one of the ozone atoms will bind to other compounds in the surrounding air. People who market and sell ozone will claim it eliminates chemical odors by bonding to the molecules and destroying them, but this isn't really what happens.

If you think back to your high school chemistry class, you'll remember matter cannot be destroyed, only changed. When the oxygen atom leaves ozone and binds to another chemical in the air, it creates a chemical reaction. The ozone isn't destroying the molecules that cause the odors; it's changing them into something different. Sometimes, the reaction does eliminate the odor, but other times it creates an even more harmful chemical. Take formaldehyde (CH2O), for example. If ozone is introduced to formaldehyde, the chemical reaction will create compounds that can be more dangerous than the original offending formaldehyde.

There is a time and a place for ozone, but it should always be used with great care and only in unoccupied environments. The EPA warns prolonged exposure to ozone can lead to respiratory problems, asthma symptoms, chest pain, throat irritation, irritated lung tissue, and a greater risk of lung disease. When utilizing ozone after cleaning air ducts, for example, it is imperative the ozone has enough time to fade from an environment before people are allowed in, with a recommended wait of at least six hours.

Experts agree ozone shouldn't be used to cover odors every day. Your first step should be to identify the source of the bad smell and have the problem addressed by a professional. Keep these facts in mind before you try to rely on an ozone generator to freshen a building. If you do decide to use ozone, under no circumstances should you allow the generator to be turned on in an occupied environment. The risks are too great to justify putting people in danger because a room smells a bit musty.

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