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BUILDING BAKE-OUT: EFFECTIVE REMEDIATION TOOL OR IAQ QUACKERY?

Most people in the environmental industry have heard of the terms “sick building syndrome” and “indoor air quality” (IAQ), but a much smaller number understand the concept of “building bake-out”. The technique is relatively new to the environmental field and has a checkered history of acceptance or derision among IAQ control professionals.

In its essence, a building bake-out is relatively simple. The term was coined to describe a process where the inside temperature of a building is elevated for a period of time in an effort to speed the curing of paints, mastics, or other finishes, or to accelerate the off-gassing of residual volatile organic compounds (VOCs) from carpet, office furniture, particleboard, etc. Since there are no formal procedures or standards for a building bake-out, there is a wide range of techniques that have been employed. Cases have been discussed at conferences and in industry literature where external heat sources were employed in addition to the existing HVAC system, and where ventilation was conducted at the same time as the heating.

At Wonder Makers Environmental our experience in dealing with IAQ concerns has resulted in a standardized process being utilized in nearly all cases where a building bake-out is a possible solution. The process, which takes approximately 32 hours to complete, is often implemented by maintenance or custodial personnel. First, the exterior doors and windows are closed and the heat inside the building is raised to its highest attainable temperature (85-95^{o}F in most cases). The building is kept sealed and allowed to “bake” for 16-24 hours. After this period, the building is re-opened and vented. This is done by directing the air (using industrial size fans) out of each room or area into the main hall, then out one end of the building. The building should be vented for approximately 8 hours.

But regardless of the technique employed, the key questions are “Does building bake-out work?” and “How should it be used as an IAQ remediation strategy?”. Unfortunately, there is limited data available from rigorously controlled scientific studies that compares the effectiveness of building bake-out to other remediation approaches—or even a comparison to doing nothing. This lack of hard data has led many IAQ investigators to discount building bake-out as simplistic foolishness, or, at best, a psychological salve for the unsuspecting occupants.

Despite its derision in some quarters, there is growing anecdotal data that building bake-outs have solved real problems. Since it is relatively inexpensive, our organization recommends it quite frequently as an initial corrective action when we suspect that chemical off-gassing is the primary or contributing factor in an IAQ problem situation. We also are careful to ensure that a proposed building bake-out is not used as a substitute for effective source control or needed improvements in HVAC performance or local exhaust. We are also aware that certain situations could be made worse by a bake-out attempt--in particular, mold infestation of the HVAC ducts. Therefore, we investigate the site and symptoms in great detail before recommending bake-out as a corrective remedy.

With such a background, and with a warning that building bake-outs should not be viewed as a cure-all, a documented case study may provide information necessary for IAQ professionals to add the bake-out procedure to their arsenal of possible remedies for building problems.

In mid-October 1998 Wonder Makers Environmental responded with an investigation to a complaint made by a teacher who worked in a newly built middle school in the mid-Michigan area. After occupying the building at the start of school two months before, she was complaining of headaches, malaise, lethargy, irritated eyes, and upper respiratory distress. The investigation included a detailed site inspection and interview. The affected individual told the investigator that she was allergic to many items, such as petroleum products, new car scents, and so forth. She was a blond-haired, blue-eyed woman, and she indicated that all of the fair-haired, fair-eyed students in her classroom were also experiencing similar symptoms. The teacher also reported that she felt much better in the hallway and the art room.

The visual inspection of the building revealed that the only difference between this teacher's classroom and the hallway and art room was that her classroom had carpet on the floor and the other areas were tiled.

Examination of the MSDS for the carpet identified one of the substances used in the manufacturing of the carpet to be petroleum distillates, one of the specific items the teacher reported being allergic to.

We recommended to the building representative that the bake-out process be initiated over the upcoming weekend. We explained to the school administrator how to conduct the bake-out and venting of the building.

Following the bake-out process, the teacher was surprised by her lack of symptoms when in the building. The students acted better, as well. Continuing follow-up over the next 30 days confirmed that the bake-out was a success. The school's principal stated that no more complaints had been brought to his attention.

In this example the bake-out process was a win-win-win situation for the building owner, the occupants, and for our organization as we carefully applied the building bake-out procedure rather than dismissing it as useless quackery.

About the Authors

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