

Testing the effectiveness of baking soda media blasting for cleaning fungal contamination in buildings

Dennis Melandro

Founder

First Alert Emergency Services

Rockville Centre, N.Y.

While we have performed the baking soda media blasting technique many times to clean irregular building surfaces, here we report on a specific test case for which we collected a variety of samples selected to test the effectiveness of the cleaning process at several points.

Remediation of large areas of fungal contamination in residential and commercial buildings is usually performed by a company with experience in construction demolition and cleaning, airborne particle contaminant control and use of special equipment to protect both workers and building occupants from contaminated or irritating dust and organic debris. When large areas are contaminated, mold remediation should follow a protocol specified by an independent third party who has expertise in defining the scope of work and experience in recognizing, sampling, and identifying problematic mold in buildings. These experts are drawn from several professions including industrial hygiene, mycology, aerobiology, and building science.

I, Dennis Melandro, received a protocol for a single-family, two-story home with full, unfinished basement. The house was wood-frame construction. It was an unoccupied rental property in which a basement pipe break and leak had gone undiscovered for approximately three weeks. By the time I was contacted, the basement had heavy visible mold growth on the two- by eight-inch joists, sub-flooring of the floor above, and on the triple two- by 10-inch main headers. Insulation and the building contents were assumed to be contaminated as well. The first floor consists of four rooms, all of which had mold on plaster walls, and ceilings. The second floor has two bedrooms where mold was visible on the walls.

The client's insurance company's protocol specified removal of all basement ceiling joists, supporting girders, and first floor subfloor, along with the building contents. In other words they specified that the entire first floor structure be removed. There was no mention of how the house was to be supported during this step. All wall and ceiling coverings were also to be removed.

In my view, the call for complete framing removal was drastic and unnecessarily costly, particularly as in this instance there was no report that the building structure had been damaged by fungal contamination.

As an alternative approach, I proposed removal of mold contamination from the framing surfaces using the Armex Accustrip system. This method entails a high-pressure compressed-air spray (consisting of a hopper holding the baking soda and a handheld gun for precision) using a baking soda abrasive. We've found that this method cleans irregular and problem surfaces such as subfloor with protruding nails and the multiple building framing cavities which would otherwise be both labor intensive and difficult to clean by manual scrubbing and vacuuming. I proposed that the Armex process be used to remove mold spores from the ceiling joists and main triple headers (as well as other surfaces).

The spray blasting was to be followed by HEPA vacuuming to remove any media or debris residue, followed by vacuuming with a bio-wash. The client accepted my proposal. The problem area before and after our blasting treatment is shown in Photos 1 and 2.

In order to contain the mold, debris and baking soda residue while using the Armex Accustrip system, we kept the first-floor sub-floor in place until the media blasting was completed. Then, we removed the first-floor sub-floor and we hand sanded the now-exposed top side of the joists, followed by HEPA vacuuming and damp wiping. In other scenarios where there are windows, doors and openings we would set up critical barriers to contain the residue from the media blasting, while an air scrubber is filtering the air borne mold spores, baking soda and residue from the surface of which this method is being applied. During this procedure, all personnel were equipped with protective clothing and respirators.

When the mold remediation was complete, samples of the remediated surfaces were examined. To evaluate the effectiveness of our cleaning effort, we called on Daniel Friedman, an independent aerobiologist with expertise in both building inspection and fungal spore identification.

Mold Testing Results

In my aerobiology lab, I, Daniel Friedman, examined the tape samples using a light microscope and appropriate slide preparation methods. Dennis and I had agreed on the time, type and location of surface samples to be collected during the project. My own research as well as that of others in my field indicate that surface sampling combined with visual inspection is both more reliable and more important than stand-alone air sampling or culturing methods for characterizing building contamination.

Chaetomium globosum, *Chaetomium aureum* and *Stachybotrys chartarum* are dark molds frequently found in buildings that have been subjected to flooding. Their medical risk has been somewhat overblown by the excited news media, but they are indeed telltale organisms very often pointing to a presence of more serious fungal contaminants such as *Penicillium* sp. and *Aspergillus* sp. in the same buildings. These latter molds are lighter in color and often grow hidden within building cavities. Unless they are quite heavy, colonies of these genera are often missed by a casual inspection which finds and reports "black mold."

Because we wanted to understand the effects of blasting and to evaluate the possibility of recontamination of the "cleaned" surface by fungal debris that might be transported by airborne blast-media, we decided to examine samples of surface conditions at several steps in the cleaning process:

1. After blasting and before HEPA vacuuming, the sample area included contamination, which I speculate settled as airborne debris. In these samples, I found fiberglass fragments, debris, cellulose fragments more frequent than in after-HEPA vacuuming sample below, and I found both individual fungal spores spore clusters including basidiospores, *Periconia* sp., and unidentified fungal conidia and hyphal fragments which appeared to be *Chaetomium globosum* particles, perhaps fractured by the blasting process. See photos below. On other studies, I have

also found fairly uniform surface contamination by fungal debris, mostly hyphal fragments, when an inexperienced contractor used contaminated wipes and a contaminated vacuum attachment across many surfaces.

2. After HEPA vacuuming and wiping, the sample was clean of fungal spores. It contained incidental occurrences of media particles less than one micron in size, cellulose particles that I speculate were removed from the blasted wood surfaces, and skin cells. There were no fungal spores found in the sample. See Photo 5.

From Daniel Friedman

These results suggest that the media blasting approach is effective in cleaning exposed wood surfaces of fungal contamination, but that special care needs to be taken to avoid recontamination by airborne, contaminated dust, vacuum attachments, or surface wipes. Contractors need to look carefully at dust control, vacuuming and wiping methods to take full advantage of the cleaning provided by surface blasting.

While more research would be useful to refine the procedure and confirm its long-term efficacy, even with these incomplete pre and post-blasting tests there was good evidence that there was no substantial post-blasting and cleaning surface contamination.

From Dennis Melandro

First Alert Emergency Services has completed numerous mold remediation projects. We have saved structures and have received successful final clearance test results leaving both residential and commercial building owners very pleased with our completed projects.

The media blasting process is more cost effective and less time consuming than extensive demolition. Most importantly, the final result is a cleanup which has successfully removed the problem mold in order to provide a mold-safe indoor environment.

We've had great success using the media blasting method for mold, and we've also used it for the removal of soot from roof rafters, ceiling joists, sub-flooring and wall framing. As it is less abrasive and thus less destructive to brick than sand blasting, it can be used on masonry exteriors as well.

By contrast with common remediation methods which hand clean and seal the framing and sub-floor, leaving everything white or shiny with paint, the media-blasting process leaves a fresh, clear wood surface at which you would never know that there was a previous fire or mold problem. The contamination has been removed.

Dennis Melandro is an ASCR certified restorer, MEHRC mold supervisor, IAQA certified mold remediator and an expert in mechanical hygiene for HVAC systems. He founded First Alert Emergency Services and has been servicing the insurance industry for fire, water, smoke and mold remediation for the past 14 years. He can be reached by e-mail to info@firstalertemergency.com or by phone at (800) 924-1119.