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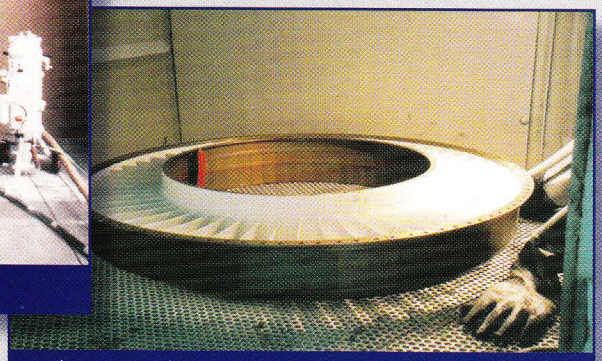

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entle enough to restore wood surface, powerful enough to remove char and odors.

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Cleaning and Coating Removal Systems

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The ORIGINAL Baking Soda-Based Media

	Application	Formula	Micron Size	Flow Aid	Value Plus
HEAVY COATING REMOVAL	General purpose	Maintenance XL	270	2	Value-priced
	Surface prep for new coating	Maintenance XL with SupraKleen®	270	2	Rinse accelerator
	High humidity or poor quality air supply	Flow XL	270	8	Advanced Moisture Control
	Hard surface, rust removal or anchor pattern required	Profile® XL up to 1.5 - 2 mils on steel	270	2	10% 70 grit aluminum oxide
	Hard surface, rust removal or anchor pattern required	Profile® XL 2+ up to 2 - 4 mils on steel	270	2	20% 36 grit aluminum oxide
LIGHT COATING REMOVAL	General purpose	Maintenance	170	2	Value-priced
	Surface prep for new coating	Maintenance with SupraKleen®	170	2	Rinse accelerator
	High humidity or poor quality air supply	Flow M	170	8	Advanced Moisture Control

Flow aid number refers to ARMEX® resistance to moisture vs. regular baking soda. A number 2 represents twice the resistance to moisture than regular baking soda and an 8 is 8 times more resistant to moisture than regular baking soda.

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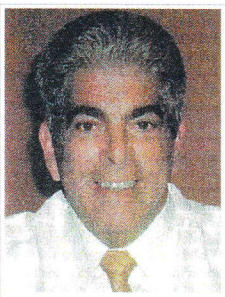
Specially Engineered ARMEX® Formulations

SPECIALTY FORMULAS

Application	Formula	Micron Size	Flow Aid	Value Plus
Cleaning. grease and oil removal, for wet blasting	HydroFlex® XL	270	2	surfactant
Coatings removal or cleaning of soft substrates and composite materials	Composite	70	8	Advanced Moisture Control Foil lined bag
Cleaning or preparation of electronic components or medical devices, excellent as preparation for adhesion	Electronics	70	8	Advanced Moisture Control 35 lb plastic pail
Cleaning and ink removal on anilox printing rolls	Anilox Roll Cleaning	70	8	Advanced Moisture Control Foil lined bag
Coatings removal on metals (aluminum) leaving a brushed surface. Use for heavy carbon deposit removal	Turbine Formula up to .5 mils on steel	70	2	10% 220 grit aluminum oxide

Flow aid number refers to ARMEX® resistance to moisture vs. regular baking soda. A number 2 represents twice the resistance to moisture than regular baking soda and an 8 is 8 times more resistant to moisture than regular baking soda.

Testing the Effectiveness of Baking Soda Media Blasting for Cleaning Fungal Contamination in Buildings



Dennis Melandro, Founder
First Alert Emergency Services
Rockville Centre, NY

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.

Photo 1

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.

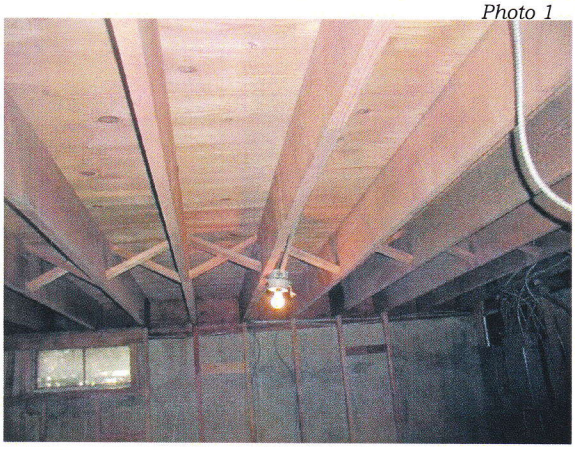


Photo 2

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 scenario's where there are windows, doors and opening 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 aero biologist 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 indicates 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.

Photo 3

Photo 4

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 and 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.

Daniel Friedman is an aero biologist specializing in fungal spore identification. He has worked as a building failures investigator since 1978 and has specialized in indoor mold contamination and fungal spore identification since 1986. His laboratory is in Poughkeepsie, N.Y. His background and credentials are at www.inspect-ny.com/danbio.htm. He can be reached by e-mail at dfriedman@inspect-ny.com and by phone at (845) 463-0092. *Reprinted with permission from the JUNE 2003 edition of Indoor Environment Connections newspaper. For subscription information, visit www.ieconnections.com.*

Photo credit: Church & Dwight Co., Inc.

MUNICIPALITIES AND CONTRACTORS FIND A NEW WAY TO Clean Up

Municipalities, contractors, and other users across the country have discovered the benefits of baking soda to remove grime, grease, and graffiti from bridges, tunnels, monuments, and other structures.

Delia L. Downes
Ms. Downes is Marketing Manager, ARMEX® Cleaning and Coating Removal Systems, Church & Dwight Co., Inc., Princeton, New Jersey.

The water-soluble and versatile compound's initial claim to fame in the public works arena was for the removal of coal tar resin from the delicate interior copper skin of the Statue of Liberty before its centennial celebration. The soda blasting process was developed by Church & Dwight Co., Inc., makers of Arm & Hammer brand products, as part of its ARMEX® cleaning and coating removal systems. The process uses specially engineered baking soda-based formulations and has been used in many other restoration and industrial maintenance applications.

John Zoubek of Zoubek Associates, Inc. (Parlin, New Jersey) was one of the first people in the restoration/public works field to recognize baking soda's potential. His company distributes construction supplies and equipment to restoration contractors and concrete contractors specializing in preserving and repairing highways, roads, bridges, and buildings. Zoubek has worked with top New York City architects and contractors, explaining and demonstrating the benefits of "soda blasting" for various projects. Its non-toxic properties allow it to be used safely in confined spaces and it is easy to clean up, adding to its practicality for use in a crowded city, he says.

VARIETY OF PROJECTS

The following are just a few examples of soda blasting projects across the country.

Holland Tunnel—New York City. The more than 17 million vehicles passing through the Holland Tunnel each year caused its once gray granite walls to become coated with an unsightly black grime. Soda blasting was recently used to remove the grime, along with a coating that had

Main photo: Worker shown cleaning the National Memorial Arch (photo inset) at Valley Forge National Park.

Reprinted from *Public Works*®, April 1999

Photo credit: Church & Dwight Co., Inc.

Traffic passing through the Holland Tunnel caused its once gray granite walls to become coated with black grime.

been applied to the walls some seven years earlier. Maintenance personnel had tried just about everything to remove the coating, including a special cleaner for tunnels, an all-purpose liquid cleaner, even a household cleanser. But nothing worked until they tried soda blasting.

It took a blast air pressure of just 50 psi to remove the grime and stubborn coating at rate of approximately 3 sq ft per minute. Work was done between 12:30 a.m. and 4:30 a.m., with one lane of traffic moving through that tube of the tunnel while the blasting was underway. Now that the granite substrate is thoroughly clean, regular cleaning of the walls is planned for every six months.

Tacony-Palmyra Bridge—Philadelphia. Cleaning the bridge bearings of the Tacony-Palmyra Bridge linking Philadelphia to New Jersey was a small but important part of an overall refurbishment of the structure. The bearings, which help to provide flexibility to the bridge, needed cleaning to allow application of a penetrating oil and a protective coating. Baking soda media was a logical choice for the job because it does not damage bearings or rotating parts. A small, portable WADU® Soluble Media Injector, a Church & Dwight accessory that works with a power washer, delivered the media to the areas being cleaned. According to Jim Heffer, president of ESCA Industries Ltd. (Hatfield, Pennsylvania), a company involved with the project, the WADU's light weight made it easy to maneuver on the bridge. "Also, the bridge bearings were packed tight in a very hard-to-reach space. The narrow nozzle we were working with made it possible to reach way in to do the cleaning."

Cleaning was done at about 3,500 psi water pressure using a special baking soda-based media called ARMEX HydroFlex® Formula XL. It was chosen because of its ability to capture grease and wash it away. The process was also used to clean the drawbridge machine house, an area containing huge gears and much heavy grease.

Picasso Sculpture—Chicago. The unnamed 50-ft tall Pablo Picasso-designed steel sculpture is probably Chicago's most famous piece of outdoor art. Located in the recently renovated plaza of the Richard J. Daley Center, the sculpture was cleaned this past spring by Soda-Strip Systems, a local company that has built its business around soda blasting technology.

The Picasso sculpture is made of CorTen steel, which develops an overall rust patina when exposed to the elements. During the years since its 1962 creation, however, the sculpture had become dirty, its rust patina marred by small sections of denser rust, with some areas defaced by graffiti. According to Soda-Strip President Ray Sullivan, it took just one and a half days of soda blasting to clean and restore the sculpture's surface, without any unwanted etching of the steel. Following blasting, the water-soluble baking soda-based media was rinsed off and the plaza was washed down. The ARMEX media used is nontoxic and nonhazardous per EPA and OSHA regulations. Its benign nature and relatively low pH pose no special disposal problems. In fact, if the waste goes for further treatment, the spent media can act as a buffering agent in the process. Contractors should consult applicable worker and environmental safety regulations before use, however.

It took crews just one and a half days of soda blasting to clean and restore Chicago's famous Picasso Sculpture.

National Memorial Arch—Valley Forge, Pennsylvania National Park. Cleaning the granite base of the National Memorial Arch at Valley Forge was part of a year-long reconstruction project. The arch, built between 1912 and 1917 to honor the soldiers of the Continental Army, had been in such a severe state of disrepair that the National Park Service had closed it until repairs could be made. The $1.5-million project—paid for by the Grand Lodge of Free and Accepted Masons of Pennsylvania—included structural repairs, cleaning, and stone replacement. Soda blasting was used to remove unsightly calcium and other hard-water deposits from the structure's base. The smooth-flowing ARMEX media used contained special additives that eliminated clumping and clogging. **PW**

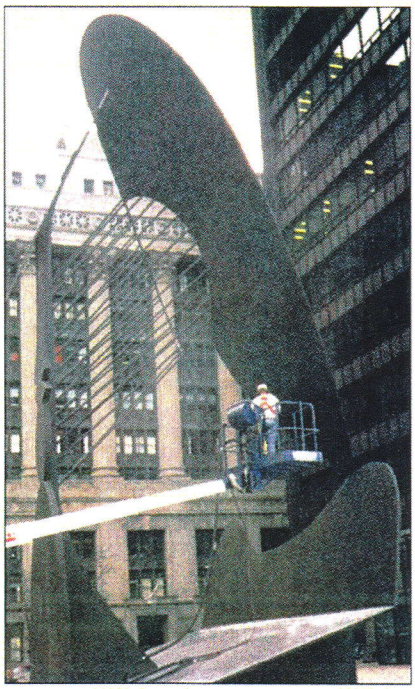


Photo credit: Ray Sullivan

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  Remove the dirt, grime and pollution of the ages while preserving the past.

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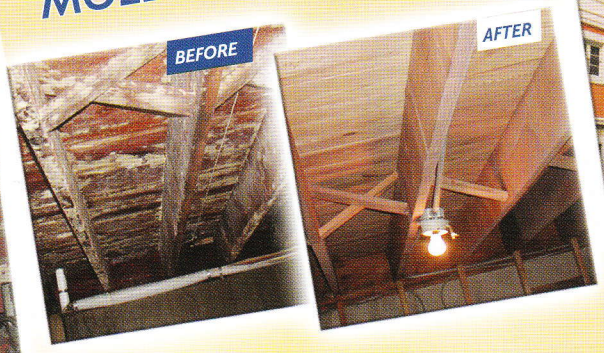

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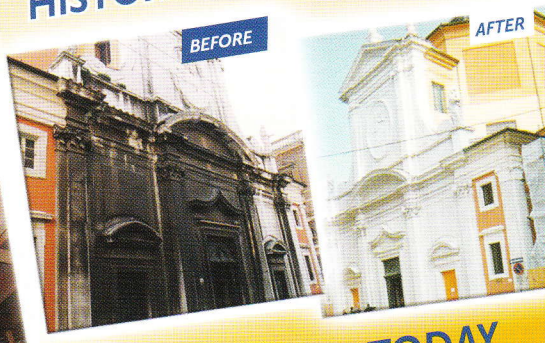

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ISO9002

A modern architectural cleaning method for an historic hotel

by Benny Yam, Church & Dwight Co., Inc.
and Steve Young, Young Restoration

The Westin William Penn had suffered from more than three quarters of a century of accumulated carbon dirt from the city's old steel mills, modern bus traffic and other vehicle exhaust.

Occupying an entire city block in downtown Pittsburgh, the 78-year-old Westin William Penn suffered from more than three quarters of a century of accumulated carbon dirt from the city's old steel mills, modern bus traffic and other vehicle exhaust. These pollutants had completely blackened one side of the hotel and significantly defiled the other three sides. As a result, more than 50,000 square feet (4,645 sq.m) of the hotel's exterior of substrates terracotta, granite and limestone required cleaning.

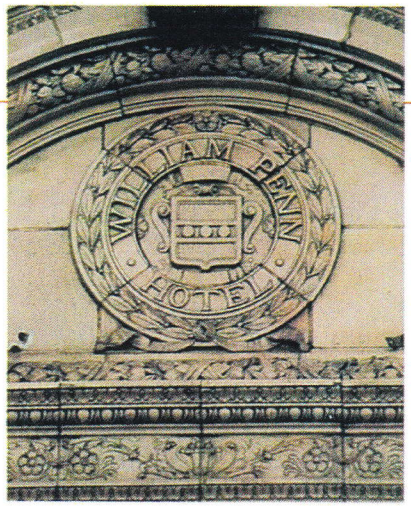
For this application, there were several special concerns. It was important to study the history of cleaners used on the structure and evaluate how to treat each substrate based on this information. For example, chemical cleaners that may have been absorbed by the substrate could have weakened its integrity, making normal blast pressures inappropriate. In addition, it was important to test the cleaning method on each substrate in various locations to determine specific cleaning parameters.

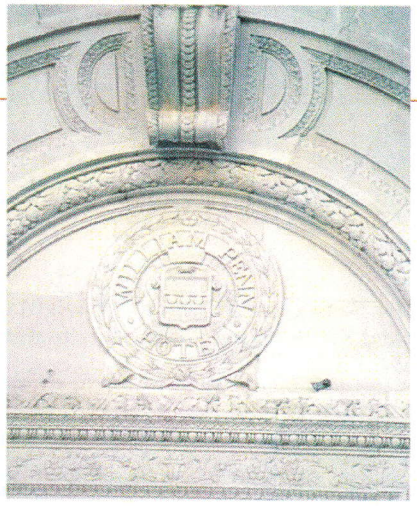
While previous cleaning methods included acid and alkaline chemical cleaners, the most recent effort took a different approach. Because of the desire for a low impact blast method, Armex Cleaning and Coating Removal Systems were chosen. They are designed to provide a non-toxic and environmentally sensible alternative to chemical solvents and harsh abrasives.

The systems use Armex Blast Media, a patented formulation based on sodium bicarbonate (baking soda). Baking soda is a natural, inorganic salt with a soft crystalline structure that makes it an ideal, mild abrasive. Soft baking soda crystals actually break down on contact with the substrate, resulting in a gentle cleaning process. Baking soda also is completely soluble in water and poses no special safety or disposal problems.

The baking soda-based formulation has a number of unique attributes designed to provide optimum performance. These include:

- Large crystals (up to four times greater than typical baking soda) for improved cleaning and depainting capabilities
- Reduced clumping and significantly better flow than regular baking soda
- Enhanced rinsing qualities for superior cleaning capability and easier cleanup compared to baking soda.





The Armex cleaning method effectively addressed the building's ornate limestone elements.

The media used was Armex Maintenance XL formula with SupraKleen™ Rinse Accelerator for faster removal of the sodium bicarbonate residue. The delivery device was the Accustrip 12SX with a Win nozzle that injected the water into the air/media stream. This helped to keep dust to a minimum.

The delivery system is used with conventional air compressors. It provides consistent blast media flow control and is designed for optimum portability and ease of use. Typical blasting conditions are:

- Media: 0.5 - 3.0 lbs./min.
- Air: 100 - 300 cfm
- Pressure: 10-80 psi.

The pressure used to clean the limestone ranged between 40-45 psi and between 50-55 psi for the terracotta and granite. Although the distance from contact varied with conditions, the contractor always remained at least 18 inches (460 mm) from the hotel walls.

Water curtains were positioned around the swing scaffolding to encapsulate the blast mist and prevent it from covering area objects. After each shift, the crew water rinsed the blast area, washing the effluent down the sewer. Rinsing was required as many as 10 times until the effluent was fully dissipated. There was no need to mask the hotel windows to prevent etching typical with chemical cleaning using hydrochloric and hydrofluoric acids and high pressure water.

To avoid heavy pedestrian traffic, the crews typically began cleaning after 5 p.m. They concluded before 11:30 p.m. so the equipment noise did not inconvenience hotel guests. The cleaning took approximately three to four hours per day for 10 weeks.

The environmental and safety profile of the system provided a number of ancillary benefits, including reduced workman's compensation insurance liability costs. There also was no need for concern about damage to cars parked around the hotel or etching the hotel windows. For disposal, it was easy to satisfy the requirements of the stringent Residual Waste Act because the baking soda was able to be freely disposed down the sewer. Additionally, the contractor was able to cut materials costs in half and increase productivity by nearly 20%. ❑

Benny Yam is a senior manager of research and development at Church & Dwight Co., Inc., and Steve Young is president of Young Restoration. This article was originally presented at Restoration '95 in Boston, MA.

The limestone was cleaned at a pressure of 40-45 psi.