

## Content Restoration and Electronic Deodorization

By Robert Kravitz

At around 7:00 in the morning on November 21, 1980, Tim Connor, a supervisor with the marble and tile maintenance crew at the MGM Hotel in Las Vegas, NV, reported for work as usual.

Because the busy first-floor deli in the mega-hotel was closed at this hour, he decided to inspect its kitchen floor and counter tiles to see if any were broken or needed re-grouting. As he entered the deli, he heard an unusual crackling sound as if something were frying on a stovetop, but he did not detect any cooking or unusual odors. Walking further into the kitchen, he noticed the reflection of a flickering light at the south end of the room. He then turned a corner and saw what could only be described as a wall of flames—from floor to ceiling—moving rapidly toward him and into the main section of the kitchen.



Acting quickly, he grabbed a fire extinguisher but was knocked to the floor by the smoke and pressure building up in the kitchen from the

approaching fire. His chief concern at that point was simply to get out of the deli alive, which he was able to do just minutes before the fire overcame the kitchen area.

At about the same time, another employee noticed flames in the keno section of the casino, located near the deli kitchen. She immediately notified other MGM employees, and the Las Vegas fire department was called in to fight what would soon become the most serious hotel fire in the gambling town's history. By day's end, the MGM Hotel fire became the second-largest hotel fire in the United States in terms of loss of life. Eighty-four people died that day as a result of the calamity, and another 679 were injured.

### **Extent of Damage**

Several months after the fire, the hotel began cleanup and rebuilding;

the first order

business was

ascertain the

extent of

damage to the

two-million-

square-foot

hotel and its

hundreds of

guest rooms. Construction engineers determined that thousands of

square feet of the hotel were so seriously destroyed that entire



of

to

sections would need to be torn out and removed, leaving nothing more than the bare bones of the building's steel structural frame.

Other areas appeared to be salvageable and not directly affected by the fire. But because of the fire's severity, these sections suffered considerable smoke and odor damage, resulting in contaminated upholstery, carpets, furniture, and draperies. Maintenance crews soon realized that the MGM fire would earn another unfortunate distinction—cleaning up the smoke- and fire-damaged hotel would become the largest restoration project ever attempted in U.S. history.

### **Content Restoration**

Some furnishings in the fire-free areas were subjected to such heavy soot residue that they were beyond cleaning or restoration and would need to be replaced. This included such items as upholstered furniture, lamp shades, mattresses, pillows, carpets, and drapes. Other furnishings appeared to be restorable because damage was more moderate and, in most cases, the furnishings and fabrics were made of colorfast, durable fibers—allowing dry and wet restoration cleaning methods to be employed.

The first stage of the restoration project with the salvageable furnishings was soot removal. As much dry soil had to be removed from soot-contaminated fabrics as possible using power blowers, vacuum cleaners, and dry cleaning sponges, which are often used in restoration to remove loose soot from ceilings and interior walls. Once the grime has been removed, dry cleaning is often the preferred

method of content restoration in smoke- and fire-damage situations. “It is safe and effective and eliminates the probability of “browning” or shrinking fabric, bleeding dye, or further fabric distortion,” said Stephen Hanig, Vice President of Sales of U.S. Products, a manufacturer carpet cleaning, restoration, and ozone-generating systems.

Wet cleaning methods can also be employed in fire- and smoke-restoration projects, often yielding excellent results if soiling and damage is minimal to moderate. The concern with wet cleaning, according to Hanig, is that it is a more aggressive form of cleaning than dry cleaning and can actually harm the fabrics it is intended to help.

Because the goal of any restoration project is to preserve the furnishings and fabric, dry cleaning should be considered before wet cleaning wherever feasible. Additionally, Hanig suggests that contractors take additional safety precautions—whether wet or dry cleaning—by using machines that:

- Sense if solvent (used for dry cleaning) or water-based cleaner (used for wet cleaning) is in the solution tank to prevent accidental misuse of a cleaning agent
- Have “fail-safe” systems that prevent the dry cleaning solvent from being heated above 125° F, eliminating its effectiveness.

## Electronic Deodorization

Once cleaning has been completed in a restoration project such as the MGM Hotel fire, the issue of deodorizing the smoke-contaminated fabrics becomes a central concern. Masking an odor rarely provides



much more than temporary relief and will certainly not work in a major restoration situation. Complete deodorization is necessary to

effectively control unpleasant odors.

According to Jeff Bishop, a carpet and restoration expert, Director of the International Society of Cleaning Technicians (ISCT), and Chairman of the Institute of Inspection, Cleaning, and Restoration Certification's (IICRC) Certification Board, "The most effective method of deodorization for upholstered furniture is electronic deodorization, otherwise known as ozone. After cleaning and drying, the furniture must be treated with ozone for 24 to 48 hours or possibly longer as needed. But, in most cases, this will eliminate the smoke odor completely."

## Ozone and Ozone-Generating Machines

Ozone is a gas. Its molecules consist of three oxygen atoms, designated by the chemical symbol  $O_3$ . In nature, it is created by lightning in the lower atmosphere and by solar ultraviolet rays in the upper atmosphere. In an ozone generator, ozone is produced by applying an electrical current to a conductor sheathed in ceramic and

encapsulated in a stainless steel tube. A corona is formed between the two conductors through the ceramic sheath. Oxygen ( $O_2$ ) molecules passing through the corona are split apart which then attach to other oxygen molecules forming ozone ( $O_3$ ).

When an  $O_3$  molecule encounters odor-producing molecules, it oxidizes the molecules, leaving only  $O_2$  molecules or pure oxygen. This simplified description of how ozone generators work explains how they kill odors. "Ozone generators are a restorative treatment," said Hanig, "once the source of the odor has been removed [in the case of the MGM Hotel, the smoke-damaged furnishings have been thoroughly cleaned or removed], ozone can restore carpets, drapes, fabrics, and interiors damaged by smoke or other air impurities in homes, offices, hotels, and even vehicles." Additionally, according to Hanig, ozone permanently eliminates a variety of airborne odors:

- Bacteria, mold, and mildew
- Smoke
- Garbage, fish, urine, feces, and pet odors
- Spores, viruses, fungus, and pollen
- Cigarette and tobacco odors
- Paint fumes and auto and truck pollutants
- Odors caused by insulation, carpeting, and furniture

### **Multiple Uses for Ozone and Safety**

Ozone generators can also be used in buildings to improve indoor air quality or where odors from bacteria, formaldehyde, pesticides,

smoke, or carbon monoxide create a health hazard. However, in cleanup situations, “they are very effective when used to deodorize after fire restoration, trauma, and death scene cleanup,” said Bishop.



According to Bishop, ozone gas is among the safest and most effective of the deodorizing alternatives. But when amateurs or those not trained in working with ozone utilize it, ozone can cause serious hazards. “Because ozone toxicity levels are impossible for you to measure in the field, your best course of action is to use this highly effective tool in unoccupied areas only,” said Bishop. Overall, he said that the same common sense needed when working with powerful cleaning agents such as bleach or ammonia should be applied when using ozone.

Though the MGM Hotel fire was an unprecedented disaster due to its size and the number of people who were injured or killed as a result, it did teach the cleaning industry a great deal about content restoration, fire- and smoke-damage cleanup, fabrics, and upholstery. Scores of standards and guidelines for cleanup restoration have been published since the MGM fire, many of them learned from work on this restoration project. It also helped define cleanup restoration, which is now a specialized and very lucrative segment of the carpet cleaning industry. For the carpet cleaning professional, training from IICRC-approved schools, certification, and the proper equipment such as ozone machines to remove odors are all necessary to be successful as a content-restoration expert.

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### **Editor: Suggested Sidebar**

#### **Ozone Helps Save Doctor's Records**

Calamities like the fire at the MGM Hotel are not the only types of situations where ozone may be needed. In Ohio, a fast-traveling rainstorm last July left a trail of damage, flooding one doctor's office in more than four feet of sewage water. "The entire storm was over in two hours, but it made a horrific mess," said Andrew Byrd of Electronic Restoration Services (ERS) in Brunswick, OH.

For the doctor, it was much more than a mess; it was a disaster. His office had not digitized his patient records, leaving hundreds of client files drowning in sewage. “Everything they had was on paper and appeared to be destroyed,” said Byrd, whose carpet cleaning and restoration company was called in to tackle the situation. “We soon realized we could not save the original files, so our goal was to salvage them so that they could be photocopied.”

Byrd’s firm first freeze-dried the paperwork, a procedure that removes water and prevents the growth of mold and mildew, which left the records legible. “But they smelled terrible,” said Byrd. “The files soaked up the sewage water like a sponge. We had to use ozone to kill the odor.”

### **Ozone for Odor Control**

Byrd’s weapon of choice was the Oasis Ozone machine built by U.S. Products. ERS has more than 40 Oasis machines. “It’s the only brand we buy,” said Byrd. The Oasis is dependable, easy to regulate, and portable. “Portability is important when working with ozone because you never know what type of emergency you’ll encounter.”

Used over a four-day period, the Oasis removed all trace of odor. “We were 100 percent successful,” Byrd said. “The staff at the doctor’s office was thrilled. They could not believe we saved all their records.”

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