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Urban Wildfires & Hot Smoke

By [Everette Lee Herndon, Jr.](#)



Of the various types of wildfires, including forest, brush, and urban fires, it is urban wildfires that generally consume more structures, more vehicles, and more industrial items, and are in much closer proximity to inhabited structures, which means they are the type of fires adjusters would most likely see more of. As such, urban wildfire smoke is generally hotter when it contacts structures and contains more chemicals, making them problematic.

A History of Wildfires

The [National Geographic](#)¹ reports that:

“On average, more than 100,000 wildfires, also called wildland fires or forest fires, clear 4 million to 5 million acres (1.6 million to 2 million hectares) of land in the U.S. every year. In recent years, wildfires have burned up to 9 million acres (3.6 million hectares) of land. A wildfire moves at speeds of up to 14 miles an hour (23 kilometers an hour), consuming everything (trees, brush, homes, even humans) in its path.”

[Calif.](#)², however, has seen a notable amount in comparison to the other states:

- In 2003, [wildfires](#)³ in southern Calif. burned over 800,000 acres and destroyed 3,640 homes. In 2006, wildfires in Texas burned over 3.7 million acres and

destroyed 400 homes. In 2007 wildfires in southern Calif. burned over 500,000 acres and destroyed 1,500 homes.

- According to the [Insurance Information Network of California \(IINC\)](#)⁴, in 2007, the southern California firestorms alone destroyed 3,107 structures, 2,180 of which were homes. In 2008, the California Department of Insurance (CDI) estimated losses of up to \$2.36 billion on an estimated 38,000 claims for these 2007 fires.
- In 2009, the [Station Fire](#)⁵, the largest and deadliest of the California wildfires that year, burned over 160,000 acres and destroyed 209 structures, including 89 homes, and threatened over 12,000 structures.

Counting the [number of acres burned](#)⁶ or structures destroyed gives an incomplete picture of the damage. While hundreds of structures are destroyed by fire, the partial fire losses and the more numerous smoke damage claims run into the tens of thousands. About 3,000 of the Station Fire claims have been combined into a dozen or more lawsuits, most of which focus on smoke, ash, and soot damage.

Lasting Effects

There is a difference in the nature and extent of the [damage](#)⁷ that can be caused by cold smoke as opposed to hot smoke. The last two editions of a standard industry textbook, *Property Loss Adjusting*⁸, which has been used as part of the nationally recognized Associate in Claims program since 1995, discuss the distinctions between cold smoke and hot smoke.

Smoke from a fire, be it a forest fire, an urban wildfire, or a kitchen fire, cools as it spreads and gets further from the source. If the smoke has the time to cool sufficiently before it contacts a surface, it tends to settle on the surface as particulate. Hot smoke, however, can penetrate the surface it contacts and cause damage that simple cleaning cannot correct. Hot smoke may also contain acids or chemicals that react with the surfaces contacted causing physical damage to metals or discoloration of painted surfaces, masonry surfaces, plastic surfaces, etc. Hot smoke is generally closer to the source, moving faster and is more invasive of structures including attics, wall cavities, insulation, porous surfaces, and soft goods.

Smoke can and often does consist of more than just simple particulate matter found on the surface of materials after a nearby fire. In his manual [SOOT PARTICLES: A Procedural Guide for Containing and Removing Wildfire-Caused Soot in Buildings](#)⁹, Patrick J. Moffett states that:

“According to a 1994 scientific study prepared for the Fire and Aviation Management division of the U.S. Department of Agriculture Forest Service, contaminants of forest fire smoke can include carbon monoxide, hydrocarbons, benzo[a]pyrene, nitrogen oxides, volatile oxygenated organic compounds, acids, ketones, alcohols, and aldehydes, among other chemicals.”

Urban wildfires generally contain additional chemicals and substances from burned structures, vehicles and possibly even industrial items. Proper resolution of a smoke claim is not just a simple matter of cleaning away visible particulate smoke, ash, and soot. The chemicals in the smoke, especially in hot smoke, can cause more [serious problems](#)¹⁰ than some adjusters expect in physical damage to property—not to mention habitability problems and additional living expense (ALE) problems if the occupant has medical problems and experiences difficulty in living in a smoke damaged environment.

Using the Right Tools

Many smoke damage claims appear to be settled promptly since the number of lawsuits is significantly less than the number of claims. Hopefully, all of the damage is properly scoped and covered. If the settlement is made too quickly, it may not take into account some of the hot smoke damages that do not appear immediately.

Some of the discovery being conducted in the litigated 2009 Station Fire claims has indicated a deficiency in the education and training of a number adjusters on how to handle claims involving hot smoke. Discovery concerning these smoke, ash, and soot claims indicates that some adjusters are being given minimal training, consisting primarily in the use of a chemical or dry sponge to detect smoke particulate residue in a structure. Some adjusters are merely trained to sniff for odors and wipe a dry sponge over a surface to see if the sponge picks up particulate matter. These adjusters are either not establishing a proper scope of loss or are arbitrarily discounting or ignoring some hot smoke damages that they wrongly attribute to age or lack of routine maintenance.

When in doubt, or when the policyholder points out such items as etched metal or discolored items or cracks that were not apparent or visible before the fire, the adjuster should conduct additional investigation as to the condition of the property and items prior to the fire and smoke as compared to after the fire and smoke.

Deciphering Damages

A dry sponge, often called a chemical sponge, merely picks up surface particulate, like a dust rag would pick up dust. The chemical sponge (a very porous rubberized sponge) can be used to detect and/or remove surface smoke, ash, or soot. The sponge does not contain any testing chemicals necessary to detect or determine whether the object has been penetrated and/or damaged by hot smoke.

Moffett has also prepared an excellent glossary of terms associated with wildfires. Titled [Wildfire Glossary of Environmental, Insurance and Restoration Terms and Definitions: Building Assessment, Cleaning, Restoration and Clearance](#)¹¹, this glossary is also instructive of many elements of wildfire smoke damage.

- **“Dry sponge (chemical sponge):** *A surface cleaning process for the removal of dry dirt, dust, hair, smoke, soot and residue. Dry sponges are made from natural*

rubber, a blend of natural and synthetic rubber and sometimes cellulose materials that absorb dry particles through physical action. Even though the fire restoration industry refers to the sponge as a chemical sponge, the sponge does not contain chemicals.

- ***Smoke, types of:*** *There are two types of smoke: corrosive and inert. Corrosive smoke contains chlorides or sulfates which combine with water to form hydrochloric or sulfuric acids. Inert smoke is primarily carbon-based particles. Though carbon-based smoke is like a fine dust without corrosive properties, it can be cleaned off of the surface of contents and appliances more easily in some situations without harming or staining the substrate.*
- ***Yellowing and discoloration:*** *The development of yellowing can be a result of thermally induced heat caused or from material contact with smoke and soot residue. Yellowing is often caused by nitrogen dioxide (NO₂) in smoke and soot.”*

Some adjusters are seemingly unaware of or intentionally ignore the existence of “hot smoke” or “corrosive smoke.” These adjusters handle hundreds or thousands of claims looking only for “cold smoke” or “inert smoke.” Their training has not included knowledge about the existence of hot or corrosive smoke and they are not equipped to look for or recognize something they have not even been taught exists as a peril to be aware of.

Additionally, a simple dry/chemical sponge may not detect all of the soot. Moffett, in his booklet/guide on [“SOOT PARTICLES”](#) indicates that:

“Organic vapors in soot have a relatively high boiling point, requiring high temperatures. When soot settles and vapors condense on cooler surfaces, they can be very difficult to remove, especially on porous building materials such as wood, drywall, plaster, acoustical finishes, and concrete and cement block framing because they bind and absorb into porous materials.”

If the structure has been exposed to hot smoke, the adjuster needs to be more thorough in the preparation of a scope of loss and should obtain additional information from the occupant of the structure to determine whether there is additional damage, other than a simple surface residue of particulate smoke, ash, or soot. Such damage could be to metal surfaces such as aluminum or metal window frames, plumbing fixtures, or other metallic items such as electronics or appliances. Plastics, tile, ceramics, porcelain fixtures, and more could be discolored. Painted surfaces, porous stone surfaces, or masonry could also be damaged or discolored.

Home Restoration

According to the [Institute of Inspection, Cleaning and Restoration \(IICR\)](#)¹²:

“Home Restoration After The Smoke Clears

Smoke damage from wildfires can be as [harmful to your home](#)¹³ as that from typical in-home fires. Forest fires create significantly more destruction outside the home, but because of the amount of smoke generated, along with high winds, it is inevitable that some or a lot of that smoke will penetrate homes and other buildings. What is often not understood is that after the smoke clears and the ashes have fallen, the damage has just begun.

In the wake of a wildfire that has [covered homes with smoke and ash](#)¹⁴, it is important to begin clean up as soon as possible in order to prevent permanent damage or discoloration from soot residue.

The following is a timeline of the effects of fire and smoke on a home.

- **Within Minutes:** Acid soot residues cause plastics to yellow; small appliances located close to the source of combustion discolor; highly porous materials (marble, alabaster) discolor permanently.
- **Within Hours:** Acid residues stain grout in bathrooms; fiberglass bath fixtures may yellow; uncoated metals tarnish, counter tops may yellow; finishes on appliances, particularly refrigerators, may yellow; furniture finishes may discolor.
- **Within Days:** In time, acid residues cause painted walls to yellow permanently; metal corrodes, pits, and rusts; wood furniture requires refinishing; vinyl flooring requires refinishing or replacement; clothing becomes soot stained; upholstery stains permanently.
- **Within Weeks:** Restoration costs escalate tremendously. Synthetic carpet fibers may yellow or discolor permanently; silver plate is corroded permanently; glass, crystal, and china may require replacement due to severe etching and pitting caused by prolonged exposure to acid soot residues.

Cleaning up soot residue must be done as quickly as possible. During combustion, soot residue and volatile vapors are carried by rising and expanding air to surfaces throughout a structure, and are deposited. This process occurs repeatedly until combustion ends, with soot residue building up on surfaces layer by layer. By the time restoration technicians arrive, lacquer-like soot residue may be quite difficult to dissolve and remove.”

The [Loss Recovery Guide with Standards](#)¹⁵ (LRGS), (chapter 6.0), offering advice similar to that of the IICRC, states that “. . . Surfaces react quickly to smoke, soot, and gases, resulting in contractors to be racing against the clock. This is especially true when a corrosive atmospheric condition exists.”

The Double-Edged Sword

During a catastrophe situation, such as an urban wildfire with thousands of claims coming in over a few days, the insurance company should bring in staffing that has the necessary training required to properly handle the types of claims anticipated.

While an insurance company and its adjusters are, or should be, well versed in the nature of the damages that can result from urban wildfires, such as hot smoke damage, the average homeowner or policyholder may not realize the damages that can occur if cleaning is delayed. Adjusters may handle hundreds or even thousands of these type claims, but this could be the first time this policyholder has had experience with damages of this nature. The need for immediate and timely cleaning in order to avoid the damages to set in presents both the insurance company and the policyholder with a dilemma.

If the adjuster does not promptly inspect the property and work with the policyholder to have the major cleaning begin immediately, additional damages may result that could have been prevented. Most policyholders, having been advised by their agent or the call center they reported the claim to, will wait for the adjuster to inspect the damage before proceeding with major cleanup or repairs. Some adjusters then take the position that the delay and the additional damage is the fault of the policyholder and decline to pay for all of the damage. In other instances, the adjuster may deny the additional damages, such as the etching of metals and other discoloration as not being related to the fire and smoke.

If a [knowledgeable policyholder](#)¹⁶ does their own immediate cleanup before the adjuster arrives, then the adjuster may be inclined to conclude that the damage was minimal and refuse to compensate the policyholder for the effort and cost incurred.

During the adjustment process, or even later during the litigation process, if the policyholder claims and points out damages the policyholder believes was caused by the fire or smoke and the adjuster disagrees, it may be necessary for the adjuster to engage the services of an expert before denying or continuing to deny the damages. Most claims will probably be presented under an all-risk or open-perils policy in which the burden shifts back to the insurance company once the policyholder claims a damage that could be covered. Most adjusters are not qualified to simply and arbitrarily state that etched metal or discolored materials were not caused by smoke, considering what the insurance industry knows or should know about the damages that can arise from hot smoke.

All adjusters should be [educated and trained](#)¹⁷ concerning the distinctions between run-of-the-mill cold smoke damages and the lasting effects that can be caused by hot smoke. If they do not know the difference, they will not be able to promptly and accurately serve their clients.

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