



Soot Damage

A challenge in any fire claim

BY MATTHEW ALLEN



One of the most challenging types of damages in fire claims arises out of the soot residue produced by the fire. Soot is essentially made up of very fine black particles composed primarily of carbon, which is created through the incomplete combustion of the fire's fuel (e.g. wood, plastic, etc.). Fire damage residues also contain many other incomplete combustion products that are contained within the generated smoke, including harmful chemicals, carcinogens and toxins. In controlled industrial processes, it is possible for combustion to occur very efficiently, thereby producing very small quantities of soot. In a typical structure fire, the opposite is true and soot can be a major problem. Concerns raised over residual soot and the related odours on contents, building materials, etc. following completion of property restoration can result in costly recleaning and assessment – underlining the importance of investigating and addressing soot contamination correctly in the first place.

The basics

Let's review the basics: fires generate heat and light energy. The heat

causes the air around the fire to expand. When this occurs in an enclosed space, such as a house, the expanding air pressurizes the space. This results in hot air being forced throughout the house, as it seeks to equilibrate the pressure in the house. Unfortunately, the hot air also contains the products of combustion – the soot. Hence, wherever the hot air can go, the soot will too.

Assessment

When performing an assessment of soot damage in a structure after a fire loss or restoration, one must carefully consider where the hot air could have travelled to during the fire. This requires not only knowledge of the physics of a fire but an intimate knowledge of building construction and materials. It is insufficient to simply look for the soot in all the easily visible spaces. Pressurized air can easily penetrate the many openings, voids, cracks, gaps, etc. that are typically present in a house. Pot lights, receptacles, cold air returns, heat registers, gaps at pipe and wiring penetrations, ducts and utility chases all present locations where soot could be present. After all, absence of evidence is not evidence of absence.

One must also have a logical and

rational sampling process. It is easy to look for soot in all the places where one would not expect to see it, if one is trying to downplay the effects of the fire. Unfortunately, we have seen this tactic employed all too often, where the investigator hired by one insurer tries to minimize the damage that they are responsible for. In our experience that inevitably comes back to bite someone, usually the insurer. Accordingly, when determining where to take samples, one must consider the location of the fire and all aspects of the structure, which could affect air movement within it. For example, an attic fire is unlikely to result in soot in the basement. Similarly, factors such as whether or not the furnace fan was running, whether or not windows and doors were open, the intensity and direction of wind on the day of the fire, how quickly the fire department responded and use of emergency ventilation are amongst the many factors that should be considered by the investigator.

When actually analyzing samples that have been removed from the appropriate locations, what should the investigator look for? There are two basic methodologies employed: Does the suspect material have the appearance of soot when viewed under a micro-

scope? If the answer to this question is yes, then in most cases that's the end of the analysis – the next step is remediation. However, in certain cases the next step may be to test for the specific composition of the soot, by having the suspect material sent to an accredited laboratory to determine the exact chemical composition. One might ask the question, why do that, since the soot could only be from the fire, right? Wrong! Soot is generated from many sources of incomplete combustion. It can come from various sources in our urban industrialized environment, so all potential sources for the soot, and if they could be a real and substantive potential contributor, must be considered. Not doing so would run the risk that pre-existing non-loss related damages would be included in coverage and restored unnecessarily.

When to analyze

In a house fire, if a microscopic analysis determines that soot is present, why spend the extra time and money trying to establish whether or not the soot was from the house's furnace or from the fire? Even if the analysis shows that the soot was predominantly from the furnace (and it is not always possible to make that type of determination), how certain will your expert be as to the likelihood that absolutely none of the soot was from the fire? Moreover, it would be difficult to justify how such contamination can be left in a residence when most homeowners would expect there to be no soot present.

In an industrial plant fire, where the boiler room had a number of very large, oil-fired boilers in use, it may be very useful to analyze the soot found in the boiler room. This is to see if any of the soot from the fire in the adjacent office made it into the boiler room. It is quite possible the boilers would have contributed a meaningful amount of soot to the room. If only a small amount of soot was due to the fire, one might suggest the additional soot made no meaningful difference to the baseline contamination in the boiler room, so why saddle the insurer with the associated cleanup costs? That might still be a difficult argu-

ment to advance, and would certainly depend on the specific findings, but it is more logical to make that argument in an industrial setting as compared to a residential setting.

In conclusion, when making decisions concerning residual soot contamination in a structure fire, one must carefully consider the circumstances of the fire before embarking upon an investigation to determine where the soot is and where it came from. Many factors should be consid-

ered, otherwise the efforts (and costs) may be wasted or misleading. In most cases, a simple, microscopic examination of suspect material should be able to establish whether or not the material was in fact soot, or just dirt. A bit of straight-forward environmental engineering can go a long way to simplify a potentially costly claims problem. 🍁

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