



Strengthening Fire and Explosion Investigation in the United States: A Strategic Vision for Moving Forward.

After five years of work, the NIST/OSAC Subcommittee on Fire and Explosion Investigations has released its strategic vision document. This document and its title are modeled after the 2009 National Academy of Sciences report, *Strengthening Forensic Science in The United States: A Path Forward*. This NAS report formed the basis for the formation of OSAC.

OSAC was founded in 2014, as a result of a joint understanding between the US National Institute of Justice (the research arm of the DOJ) and the National Institute of Standards and Technology (NIST). The first chair was Dr. Craig Beyler, and he led the subcommittee through its initial six years. I was honored to serve as a charter member. Our first task was to identify standards for fire investigation that were worthy of being added to the OSAC registry of approved standards. NFPA 921 was the second document added to the registry and NFPA 1033 was the fourth.

The Subcommittee contributed public input to both NFPA 1033 and NFPA 921 and provided the impetus for the removal of Chapter 20 on Classification (see the History of How Chapter 20 went away below). The Subcommittee also provided the impetus for the reorganization of the “list of 16” subject matter areas in NFPA 1033 and the addition of Appendix D, which defines and limits what that list means. I described most of the changes coming to NFPA 1033 in the Spring, 2021 edition of this newsletter, available at this link.

<https://drive.google.com/file/d/1eKnL900gr29g30EPxDetki9itvn-61Aj/view>

The 2022 edition of NFPA 1033 is now available on the NFPA website. The most important changes, in my view, are those that comprise Appendix D, Terms and Concepts. This is the part of the document that will be used to challenge fire investigator qualifications for the foreseeable future. The current edition of NFPA 1033 is less than 30 pages.

The Strategic Vision, on the other hand, is 150 pages long. This document was Dr. Beyler’s idea to describe where we are today as a profession, where we should be, and importantly, how we can get there. The document is available at this link.

<https://www.nist.gov/osac/osac-technical-guidance-documents>

The first five chapters describe the current state of affairs in fire investigation. The recommendations begin with Chapter 6, “Improving Methods, Practice, And Performance in Fire and Explosion Investigation.” This chapter has an extensive discussion on how to mitigate bias, a problem in all of forensic science.

Chapter 7 describes “Research Needs in Fire and Explosion Investigation” and how to get research into practice. Chapter 8 proposes means of “Strengthening Oversight of Fire And Explosion Investigation Practices” including certification, accreditation of certifications, accreditation of fire investigation units, the proposal for Science Advisory Workgroups (first endorsed by the IAAI in 2015), and the need for a Code of Ethics.

Chapter 9 describes “Education and Training in Fire and Explosion Investigation,” and Chapter 10 wraps up the document with Conclusions.

The Subcommittee, once we finished the text of the document, also put together a PowerPoint presentation which can be made available or even better, presented at local fire investigation seminars. I have already given one such presentation to the UK Fire Investigators Association via Zoom, and I and other members of the Subcommittee are willing to come to your meeting and present this (approximately) one hour presentation. All you have to do is ask.

A Little Summer Reading

I just finished *Autopsy of a Crime Lab* by Brandon Garrett. This is a wide-ranging expose of the problems in forensic science. What resonated with me the most was the chapter on Qualifications. "If we allow forensic experts to provide evidence in court, then we should require them to provide evidence that they are in fact experts."

The lack of qualifications is a major problem in the field of fire investigation. This was brought home to me once again in an arson/homicide case I am consulting on where the fire burned in a fully involved state for more than 30 minutes. Nevertheless, the fire investigator (who has since left the profession) insists that he was able to narrow the area of origin to a very small area, and because the defendant stated that he discovered the fire burning elsewhere, the defendant must be lying. The same fire investigator was unable to explain the basic units of energy or power or the difference between energy and power. In his deposition, he insisted that he once knew all those things, but since he has not been working as a fire investigator for the last two years, he has forgotten them. With any luck, the judge will do his duty and exclude this guy's unreliable testimony.

Autopsy of a Crime Lab also discusses is the NAS 2009 report, *Strengthening Forensic Science in The United States: A Path Forward*, and the forensic science community's response to it. He laments the disbanding of the National Commission on Forensic Science and proposes a multi-prong solution for fixing the problems we have. Of course, most of those solutions were proposed back in 2009, and only some of them have been implemented. Judges still allow discredited forensic science testimony because it has been allowed previously by other judges.

Anyone interested in the criminal justice system would be well advised to check out this book, especially if you ever plan to be a juror in a criminal case.

<https://www.amazon.com/Autopsy-Crime-Lab-Exposing-Forensics/dp/0520379330>

References Related to Cognitive Bias in Forensic Science

Here are some links to articles on bias in the forensic sciences. The first is a must-read from the NCFS (may it rest in peace). The appendix to this article contains a formal definition of task-relevance. The next piece is a short (one page) editorial in *Science* magazine by Dr. Itiel Dror. That is followed by a longer piece published in *Analytical Chemistry* (June 2020). The next article from *Forensic Science International*, also from 2020, discusses the value of studying “inconclusives.” The last article, from the *Journal of Forensic Sciences*, (February 2021) addresses forensic pathology, which has many parallels to fire investigation, including the resistance of some practitioners to acknowledging the influence of task-irrelevant data.

<https://www.justice.gov/archives/ncfs/file/818196/download>

<https://science.sciencemag.org/content/360/6386/243/tab-pdf>

<https://pubs.acs.org/doi/10.1021/acs.analchem.0c00704>

<https://www.sciencedirect.com/science/article/pii/S2589871X20300553>

<https://onlinelibrary.wiley.com/doi/full/10.1111/1556-4029.14697>

These articles should underpin any discussion about minimizing the effects of cognitive bias in any forensic science, including fire investigation.

How Chapter 20 Got Deleted

What follows is a history of the Technical Committee on Fire Investigations’ response to a proposal from the OSAC Fire and Explosion Investigations Subcommittee to do away with NFPA 921 Chapter 20 on Classification in the 2021 edition.

Nothing in NFPA 921 prevents fire investigators from classifying a fire if they want to, and some fire investigators are required to classify fires. The NFIRS system, however, has 16 different classifications whereas NFPA 921 only had four.

There was (and is) an extensive discussion of this issue in the fire investigation Phorum, located here.

<http://www.forumworld.com/arson-investigations/read.php?3,27313>

Below are the public inputs, committee responses, and committee statements.

OSAC Proposal: Delete Chapter 20- Classification of Fire Cause

Substantiation: The Classification of Fire Cause chapter attempts to assist the fire investigator with regard to the assignment of responsibility and with regard to reporting/compilation of statistics. These are quite disparate activities that are not well served by a single system. Further, modern reporting and compilation of fire statistics does not use a simple four category classification system as is advocated by NFPA 921. For instance, the NFIRS system uses a 16-category cause classification system. The four-class system simply provides inadequate discrimination of causes to be useful to the fire prevention community. Given the inadequacy of the 921 categories and the inconsistency of 921 with modern fire reporting and classification systems, there is no point in providing the simplified method reported in chapter 20. Further, 921 has divorced itself from NFIRS explicitly. It would be contradictory and confusing to address NFIRS in Chapter 20 after having divorced 921 from NFIRS. In this regard it is wise to put cause classification for statistics outside the scope of 921. With regard to the assignment of responsibility for the starting of a fire, the salient question is that of intent. Chapter 20 as currently configured provides no guidance to the fire investigator toward the determination of intent. The Incendiary chapter of 921 includes extensive discussions of indicators as well as motives and motive classifications but provides no information or methodology for the determination of intent. Since nowhere in NFPA 921 is there methodology or guidance on the determination of intent, investigators are left to their own devices in the determination of intent. The incendiary fire cause classification is simply a means to memorialize their subjective opinions in a manner that creates credibility that is not inherently deserved. This does not serve the community.

Committee Response:

Extensive revisions were proposed. (Since the Chapter was eliminated, the revisions will not be reproduced here, but may be accessed under “first draft report” on the NFPA website.)

<https://submittalsarchive.nfpa.org/TerraViewWeb/ViewerPage.jsp?id=921-2017.ditamap&pubStatus=FDR>

Committee Statement:

Chapter 20 is revised to be consistent with the 2017 ed. revision to Chapter 1 by distinguishing the responsibilities of fire investigators as stated in s. 1.1 from classifying fire incidents and completing incident reports as described in 1.2. Since classifying fires for incident reporting is not the same as fire cause determination as addressed throughout this guide or assigning responsibility as addressed in chapter 21, we adjusted the classifications to indicate that it is the fire incident that is being classified (which may include fire cause), rather than conflating the process of classification with cause determination, which is a problem with Chapter 20 in the 2017 edition.

With respect to classifying an accidental fire incident as such in the absence of a known ignition source, the wording in the 2017 edition allows for an incendiary classification based on single factors but does not address similar accidental events. The revision allows an accidental classification when the specific ignition source cannot be identified but other factors indicate that the ignition source is not an intentional / incendiary act.

The TC has decided to leave the word “wind” in the definition of natural fire incident classification because wind is a well-known factor in the ignition scenario of some wildfires.

The classification of incendiary fire incident is revised to be consistent with the definition of incendiary fire.

A new category of “unclassified” is added to allow for situations where the fire incident is still under investigation or where there is insufficient data to make a classification.

OSAC Response to the First Draft Revision:

The committee statement is inconsistent with the stated scope of NFPA 921. Instead of treating incident reports like NFIRS as outside the scope of the document as stated in 1.1, Chapter 20 is dedicated to completing such incident reports. Classifying incidents is outside the scope of NFPA 921. As such Chapter 20 should be omitted. Each of the incident reports included in 20.3.1 have their own instructions which are generally inconsistent with the instructions in Chapter 20.

Beyond being outside the scope of 921, Chapter 20 will create confusion for users of the five incident report formats.

Committee Response:

Delete the chapter in its entirety but add a new paragraph on Incident Classification to Chapter 19.

19.8 Incident Classification. Classifying a fire incident is different from cause determination or analyzing the fire incident for the purpose of assigning responsibility. Classifying a fire incident requires the application of a common language achieved through a classification system that consists of a series of definitions and labels ascribed to certain phenomena. If an incident requires classification, the investigator should refer to the appropriate classification system. Examples of national classification systems used for incident reporting of fires and explosions follow (this list is not meant to be all-inclusive):

- (1) The United States National Fire Incident Reporting System (NFIRS)
- (2) NFPA 901
- (3) The Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) Bomb Arson Tracking System (BATS)
- (4) The Uniform Crime Reporting (UCR) Program maintained by the FBI
- (5) The Canadian Code Structure on Fire Loss Statistics developed by the Council of Canadian Fire Marshalls and Fire Commissioners
- (6) National Incident-Based Reporting System (NIBRS) maintained by the FBI

Committee Statement:

The scope of NFPA 921 specifically states that the completion of reports for the United States National Fire Incident Reporting System (NFIRS) are outside the scope of this guide. However, the classification of incidents is a topic that is addressed by various entities for various reasons. As such, there is a need to provide guidance on where incident classification information can be found and to clarify that incident classification is not the same as cause determination. The technical committee has fielded debates over Chapter 20 text over the past editions and has determined that the Chapter creates more issues than benefits. Since

incident classification is addressed in other standards and is dependent on jurisdiction/organization use, providing specific definitions for incident classifications in NFPA 921 is not necessary.

The removal of Chapter 20 was passed by a vote of 28-3.

Case Study: Sometimes You Can Determine Intent

The deletion of Chapter 20 on Fire Cause Classification from NFPA 921 came about largely as a result of the document not providing any significant guidance on *how to determine the intent* of someone who may have started a fire.

According to the Chapter on Incendiary fires, Chapter 23 in the 2021 edition,

Intent refers to the purposefulness or deliberateness of the person's actions or, in some instances, omissions. It also refers to the state of mind that exists at the time the person acts or fails to act. Intent is generally necessary to show proof of crime. The showing of intent generally means that some substantive steps have been taken in perpetrating the act.

The classic example of the inability to determine intent is the cooking fire. Did the homeowner intentionally cause the food to catch on fire by not attending to it in the hopes of getting a new kitchen? Or was it just a simple case of negligence? The physical evidence is unlikely to shed any light on this question.

In the OSAC Subcommittee on Fire and Explosion Investigations, we had a long discussion about whether it was possible to scientifically determine intent and reached the conclusion that most of the time such a determination was not likely to happen.

There are times, however, when the physical evidence can lead to the development of hypotheses that cannot be disproved regarding a fire setter's intent. I have seen several of these over the course of my career where the fire was clearly incendiary, and where the fire

setter tried and failed to make the fire look accidental. In such situations, the only likely culprit is the homeowner.

Figure 1 shows a fire origin, one of three, found next to a recessed light fixture. There is no rational explanation for the cloth that was placed around the fixture other than an attempt to make the fire appear accidental.



Figure 1. The cloth is clearly visible in this photo and has no innocent explanation.

Fires originating in concealed spaces are often the result of accidents, so the corrugated cardboard shown in **Figure 2** can also be interpreted as someone attempting to stage an accidental fire. A third origin located above the basement ceiling in which the first fuel ignited was also corrugated cardboard is shown in **Figure 3**.

This is an unlikely scenario, but one that happens occasionally, and in this particular case, resulted in a successful denial of a fraudulent insurance claim.



Figure 2. Burned corrugated cardboard in plenum/chase behind the air return grate.



Figure 3. Burned corrugated cardboard found above the basement ceiling.

*Scientific Protocols for Fire Investigation, Third Edition Recognized as
One of the Best Forensic Science Books of All Time!*



I'm pleased to announce that my book, "*Scientific Protocols for Fire Investigation*, Third Edition (Protocols in Forensic Science)," made it onto

[BookAuthority's Best Forensic Science Books of All Time](#)

Reviews of the Third Edition from Amazon.com

Dr. Craig Beyler:

[A Must-Read Book for All Fire and Explosion Investigators](#)

Scientific Protocols for Fire Investigation is a must-read for every fire and explosion investigator. John Lentini is an experienced and highly regarded fire investigator and chemist. Importantly, he is also a great writer. His use of a combination of direct explanation and case studies is very effective. Through this approach, he keeps the reader's attention and brings points home more than once. His approach to writing allows the reader to think they discovered the concepts he amplifies through case studies, firmly cementing the concepts for the reader. It's a book you will keep on your desktop.

Steve Carman:

[A Must Have \(and Must Read\) for Fire Investigators](#)

The 3rd edition of *Scientific Protocols for Fire Investigation* is most certainly a book that professional fire investigators and those seeking a more complete understanding of the science of fire investigation should have in their library. John Lentini has presented an up-to-date digest of the science and practices at the center of our profession. In recent years, the importance of understanding the role of ventilation in structure fires has gained much attention. In this book John offers readers an easy-to-read synopsis of this science and an explanation of how and why it must be at the forefront of every investigator's mind particularly when investigating fully involved structure fires.

The advancement of NFPA 921 in the last twenty years has moved our profession in a positive direction. This book takes that progression even further towards an even more thorough approach to the practice of this important forensic science.

Steve Riggs:

[Best Edition Yet](#)

I would highly recommend this edition to anyone who wants to expand their knowledge in the area of fire investigations. I have the first and second editions, but this edition is absolutely the best of all. This is a great edition to add to your personal library.

Wayne Chapdelaine:

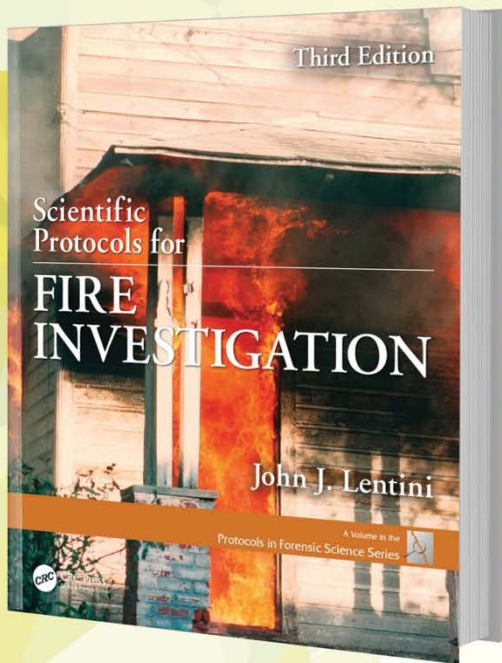
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