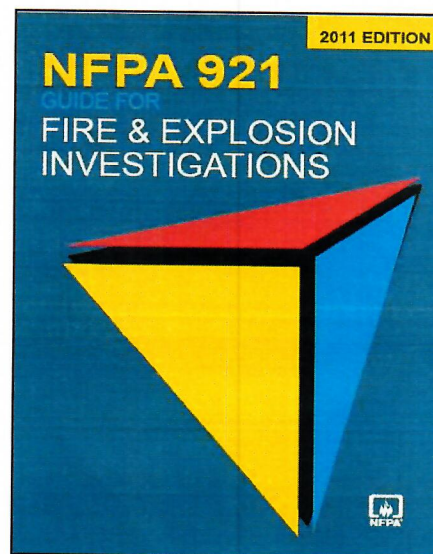


# THE MYTHS AND MYSTERIES OF NFPA 921

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## ABSTRACT

Misunderstandings about the nature and content of National Fire Code<sup>®</sup> NFPA 921 - *Guide for Fire and Explosion Investigations* abound in the fire investigation industry. These “Myths and Mysteries” tend to depreciate the value of the document, especially among those who need its guidance the most. This is caused by failures to understand and appreciate the nature of the NFPA consensus code promulgation system, the history of the fire investigation profession, the nature and history of NFPA 921 itself; and even semantics. This presentation is designed to expose and explain what the ill-informed see as the “myths and mysteries” and perceived shortcomings of this seminal document. One of the three, still serving, original Technical Committee on Fire Investigations members discusses the most common and controversial misunderstandings and misconceptions about NFPA 921.

## INTRODUCTION

The NFPA Technical Committee on Fire Investigations (TCFI) was created by the NFPA Standards Council in 1984 to:

“...have primary responsibility for documents relating to techniques to be used in investigating fires, and equipment and facilities designed to assist or be used in developing or verifying data needed by fire investigators in the determination of the origin and development of hostile fires.”<sup>1</sup>

Since that time the “Committee” has produced a rewrite of NFPA 907M *The Manual for the Investigation of Fires of Electrical Origin* (1985) into a new 907M *The Manual for the Determination of Fires of Electrical Fire Causes* (1988), and seven editions of a new document, NFPA 921 the *Guide for Fire and Explosion Investigations* (1992, 1995, 1998, 2001, 2004, 2008, and 2011).

NFPA 921 is currently the fourth best selling NFPA individual publication. It is arguable that NFPA 921 has been made by its audience into, not only an authoritative source for fire and explosion investigation science and methodology, but the “standard of care” for professional fire investigation practitioners, by which their investigations are being judged in both criminal and civil legal proceedings.

## “IT’S ONLY A GUIDE”

Among its many other fire protection, prevention, and fire safety services; the NFPA produces the National Fire Codes<sup>®</sup>. The National Fire Codes<sup>®</sup> are a collection of 360 Codes, Standards, Recommended Practices, and Guides promulgated in order to reduce the worldwide burden of fire and other hazards on the quality of life.<sup>2</sup>

NFPA 921 is an NFPA Guide. It is “a document that is advisory or informative in nature and that contains only non-mandatory provisions. A guide may contain mandatory statements such as when a guide can be used, but the document as a whole is not suitable for adoption into law.”<sup>3</sup>

No NFPA Guides, including NFPA 921, are mandatory. They are not in a format which would allow them to be adopted into law by any “authority having jurisdiction.” Nor have they ever been intended to be so. However, in recent years

In reaction to the burgeoning interest in NFPA 921 by the trial lawyers with the publication of the 1995 Edition, the IAAI conducted numerous seminars on how to avoid being disqualified. These seminars, *NFPA 921: Sword and Shield* conferences, were designed to both encourage attendees to read the document and to educate them on how they can get around the document’s precepts. The terminology recommended was: “It is only a guide. It is not a standard.”

Many nay-sayers on NFPA 921 continue to deprecate the document’s importance and authoritative nature by maintaining that “it’s only a guide.” The *de facto* position of NFPA 921 within the fire investigation and analysis profession is, in fact, as the industry’s “Standard of Care.”<sup>4</sup> This position as “standard of care” was achieved by both wide acceptance over the years by the individual, corporate, governmental, and judicial acceptance of the document, and NFPA 921’s position as the only truly peer-reviewed document in the field.

Generally, taking testimonial shelter behind the “it’s only a guide” argument has become little more than a trigger for aggressive, demeaning, embarrassing, and effective cross examination.

#### **“I Can Use It or Not.”**

Since NFPA 921 is non-mandatory no one is required to use or even to read it. Even NFPA 921 itself recognizes this fact.

##### NFPA 921 – 2011

“1.3 Application. This document is designed to produce a systematic, working framework or outline by which effective fire and explosion investigation and origin and cause analysis can be accomplished. It contains specific procedures to assist in the investigation of fires and explosions. These procedures represent the judgment developed from the NFPA consensus process system that if followed can improve the probability of reaching sound conclusions. Deviations from these procedures, however, are not necessarily wrong or inferior but need to be justified.”

“1.3.2 As every fire and explosion incident is in some way unique and different from any other, this document is not designed to encompass all the necessary components of a complete investigation or analysis of any one case. The scientific method, however, should be applied in every instance.

“1.3.3 Not every portion of this document may be applicable to every fire or explosion incident. It is up to investigators (depending on their responsibility, as well as the purpose and scope of their investigation) to apply the appropriate recommended procedures in this guide to a particular incident.

“1.3.4 In addition, it is recognized that the extent of the fire investigator’s assignment, time and resource limitations, or existing policies may limit the degree to which the recommendations or techniques in this document will be applied in a given investigation.

“1.3.5 This document is not intended as a comprehensive scientific or engineering text. Although many scientific and engineering concepts are presented within the text, the user is cautioned that these concepts are presented at an elementary level and

additional technical sources, training, and education may often need to be utilized in an investigation.

However, in the real world of fire and explosion litigation not knowing what NFPA 921 recommends or the accepted science, technology, and methodology which it espouses, can have real and negative consequences.

Those investigators that have refused to accept that NFPA 921 as the means to a better fire investigation are gradually being weeded out by the fire investigation and legal communities. As a result, the quality of fire investigations from 1992 until the present has increased by an immeasurable extent.

“You don’t have to use, but you do need to know it. You will be asked.”

#### **“THE CURRENT EDITION SUPERSEDES ALL PREVIOUS EDITIONS”**

Each NFPA National Fire Code<sup>®</sup> document contains the prescription that it “supersedes all previous editions.” This is especially true with NFPA Recommended Practices and Guides, such as NFPA 921.

On the introductory title page of every National Fire Code<sup>®</sup> document can be found a paragraph similar to this one from NFPA 921:

“This edition of NFPA 921, *Guide for Fire and Explosion Investigations*, was prepared by the Technical Committee on Fire Investigations. It was issued by the Standards Council on December 14, 2010, with an effective date of January 3, 2011, and supersedes all previous editions.”

#### **Updating of NFPA Documents**

Within the NFPA Code system all documents are updated on either a three or five year cycle. This allows for the code consensus system to update the science, technology, and methodology of the documents to be current. Fire science and technology are among the most fast-changing scientific disciplines, as new research and principles are being discovered on a continual basis. When evaluating the sufficiency and accuracy of fire and explosion investigations, it is the current science, technology, and methodology by which these investigations must be evaluated.

In every National Fire Code<sup>®</sup> document the NFPA warns that;

“Users of NFPA codes, standards, recommended practices, and guides (“NFPA Documents”) should be aware that these documents may be superseded at any time by the issuance of new editions or may be amended from time to time through the issuance of Tentative Interim Amendments.

An official NFPA Document at any point in time consists of the current edition of the document together with any Tentative Interim Amendments and any Errata then in effect.”

When appraising the sufficiency or accuracy of any particular fire investigation, only the current science and technology, not the “state of the art” at the time of the investigation, is germane. Likewise, citing an aspect of a superseded edition of NFPA 921 as scientifically substantiated fire investigation may well be similarly in error. Only the most current, updated, edition of NFPA 921 represents the substantiated, peer-reviewed science and technology.

The day that Copernicus published *De revolutionibus orbium coelestium* in 1543 was not the day that the earth began revolving around the sun. Citing previous publications which held that geocentrism was the true science does not change the fact, only its perception.

#### **“THE NFPA TECHNICAL COMMITTEE ON FIRE INVESTIGATION IS ELITIST”**

Somehow, there has come to be a popular false impression about the professions or expertise of the principal and alternate members of the TCFI. Largely because of NFPA 921’s strict fire science basis many have come to the misapprehension that the committee is mostly made up of elitist “ivory tower” academics with little practical world fire investigation experience. This has never been correct throughout the twenty six year history of the committee.

The current principal membership of the NFPA Technical Committee on Fire investigations contains 10 private sector investigators, 6 fire scientists/engineers, 2 manufacturer’s representatives, 4 Fire Marshals or fire marshal’s investigators, 2 state fire officials, 1 university educator, 3 fire department investigators, 3 attorneys, 1 Federal law enforcement official, and two insurance company investigators. Of this group, 11 are from the public sector and 21 from the private sector. Most of the committee members have had prior public sector fire service or law enforcement experience. Nearly all of the committee has had actual “dirty knuckles” fire scene investigation experience.

#### **ART VS. SCIENCE**

In the NFPA 921 first edition, 1992, through the third edition, 1998, the nature of fire investigation was described as:

NFPA 921-1998

“2-1 Nature of Fire Investigations. A fire or explosion investigation is a complex endeavor involving both **art and science.**” [Emphasis Added]

Some investigators took this commonly used description of fire investigation as a crutch for unsubstantiated *ipse dixit*<sup>5</sup> testimony; citing some ill-defined artfulness, which they alone possess, rather than proven science, technology, or methodology as authority.

In 2001, with the publication of the fourth edition, (and in all subsequent editions) the committee chose to remove any reference to fire investigation as an art.

NFPA 921-2001

“2-1 Nature of Fire Investigations. A fire or explosion investigation is a complex endeavor involving **skill, technology, knowledge, and science.**” [Emphasis Added]

#### **Experience ≠ Expertise**

Mere longevity as a fire investigator is neither an indication of accurate methodology nor scientific knowledge or acumen. The answer to the question: “What makes you a fire investigation expert?” should not be: “I have been doing this for twenty years.”

Though experience may well be one criterion for evaluating an individual’s expertise it is clearly not a substitute for scientific and engineering education and technical training. Using experience alone as a measure of proficiency is little more than another open invitation to *ipse dixit* opinion testimony

## **SIMPLE ENGLISH IS NOT SO SIMPLE**

Many of the misconceptions which are encountered about NFPA 921 are simply the result of not carefully reading and understanding each word of what is written. One frequently encounters arguments that 921 says this or that, when in fact, what the proponent alleges simply is not in the document. It is more what the proponent believes is “meant” by the text, not what the text actually says.

Since 2005 all of the NFPA National Fire Code<sup>©</sup> documents contain this paragraph in Chapter 3 Definitions:

**“3.1 General.** The definitions contained in this chapter apply to the terms used in this guide. Where terms are not defined in this chapter or within another chapter, they should be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster’s Collegiate Dictionary*, 11th edition, is the source for the ordinarily accepted meaning.”

Other terms and descriptive phrases which are particular to the document text are defined either in Chapter 3 or in the specific sections to which they apply. Many of these words and phrases have different meanings in other contexts, even in other NFPA documents. The NFPA publishes a Glossary of Terms which lists each specially defined term in the various National Fire Codes<sup>©</sup>. The Glossary gives the various definitions of the term, lists in which of the NFPA documents they appear, and assigns a rating as a “preferred” or “secondary” definition. For those terms which have varying definitions in more than one document only one definition is classified by the NFPA as “preferred.”

Most arguments about the meaning of a specific word or phrase in NFPA 921 denigrate into a meaningless exercise in semantics, rather than any meaningful discussion of prescriptions or proscriptions of the document. “Semantics is where reasonable arguments go to die”

## **UNDERSTANDING THE DIFFERENCES BETWEEN IGNITION SOURCE, FUEL, IGNITION SEQUENCE, CAUSE, FIRE CAUSE, AND CLASSIFICATION OF THE FIRE CAUSE**

Remarkable among the mysteries of NFPA 921 is the common failure, among otherwise presumably intelligent and well educated fire investigators, to comprehend the most elemental and essential concepts of their vocation – ignition source, fuel, ignition sequence, cause, and fire cause.

First, some NFPA definitions:

3.3.33 Competent Ignition Source. An ignition source that has sufficient energy and is capable of transferring that energy to the fuel long enough to raise the fuel to its ignition temperature.<sup>6</sup>

3.3.80 Fuel. A material that will maintain combustion under specified environmental conditions.<sup>7</sup>

5.1.2.1 Fuel. A fuel is any substance that can undergo combustion.<sup>8</sup>

18.4.4.1 Ignition Sequence. The ignition sequence of a fire event is defined as the succession of events and conditions that allow the source of ignition, the fuel, and the oxidant to interact in the appropriate quantities and circumstance for combustion to begin.<sup>9</sup>

“3.3.22 Cause. The circumstances, conditions, or agencies that brought about or resulted in the fire or explosion incident, damage to property resulting from the fire or explosion incident, or bodily injury or loss of life resulting from the fire or explosion incident.”

“3.3.60 Fire Cause. The circumstances, conditions, or agencies that bring together a fuel, ignition source, and oxidizer (such as air or oxygen) resulting in a fire or a combustion explosion.”

19.2.1 Classification of the Cause. Classification of a fire cause may be used for assignment of responsibility, reporting purposes, or compilation of statistics. The cause of a fire may be classified as accidental, natural, incendiary, or undetermined.<sup>10</sup>”

Not every investigation of a fire event deals with “the circumstances, conditions, or agencies that bring together a fuel, ignition source, and oxidizer (such as air or oxygen) resulting in a fire or a combustion explosion.”

Some investigations are to establish the fire cause or other outcomes of the fire: origin; responsibility; damage to property; fire and smoke spread; fire, smoke, or water damage; code and standard compliance; or bodily injury or loss of life resulting from the fire or explosion incident.

If one is hired by a product manufacture, your only marching order may be as to whether or not the particular product caused or contributed to the fire itself or to one or more of the other fire results.

Sometimes the fire cause is not in question but liability for these other fire consequences is the issue. That is why the cause and fire cause definitions are similar but different.

Section 19.2 et.seq. deal only with the classification FIRE CAUSE, not injuries, damage, or spread.

NFPA 91 is meant to be carefully written, with intentionally exact wording designed to say what it means and mean what it says. Though the document has the same failings of inexactitude of its imperfect authors, one should read it with the concept of “word for word” meaning. With so many “knee jerk naysayers” analyzing the document, it cannot be written in any other way. The problem of intelligent erudite readers like yourself is the authors failing, not yours – yet we strive for perfection, though we know it is unattainable. In relation to existing text, “word-smithing” has become the committee’s primary job in response to public input and comments.

Many of the honest complaints which I see here on the forum is because the readers have read what they think is there and not what is actually written on the page.

**18.6.5.2\* Ignition Source vs Fire Cause.** The investigator should remember that the cause of a fire is defined as “the circumstances, conditions, or agencies that bring together a fuel, ignition source, and oxidizer (such as air or oxygen) resulting in a fire or a combustion explosion” (*see the Definitions Chapter, Fire Cause*). The identification of an ignition source and a first fuel is not sufficient to determine a cause. Determining a fire cause and ignition sequence requires that any proposed hypothesis include consideration of the relationship between the competency of the ignition source and the first fuel ignited. The investigator should determine if the proposed ignition source is a competent ignition source for the proposed first fuel ignited (*see 18.4.2, Ignition Source Analysis*).

## **NEGATIVE CORPUS PREVENTS SPURIOUS ARSON PROSECUTIONS**

Discussion of the “Process of Elimination” in fire cause determination was added to NFPA 921 in the 2001 edition. The purpose of this addition was to prevent the use of “Negative Corpus” to identify cause as incendiary with the necessary evidence and proof.

**NFPA 921-2001 §16.2.5 Process of Elimination.** Any determination of fire cause should be based on evidence rather than on the absence of evidence...

*Negative Corpus* is defined in NFPA 921-2011 §18.6.5\* Inappropriate Use of the Process of Elimination as: “The process of determining the ignition source for a fire, by eliminating all ignition sources found, known or believed to have been present in the area of origin, and then claiming such methodology is proof of an ignition source for which there is no evidence of its existence... Negative Corpus has typically been used in classifying fires as incendiary...”

## **THE “SECRETS” OF NFPA FORMATTING.**

Despite that fact that the very first section of the NFPA 921 document contains a prominent “NOTICE” expanding in some detail the use of various forms of punctuation [asterisks (\*), bullets (•), brackets [ ], and vertical rules beside the text] many readers do not understand the meanings of these symbols.

An asterisk (\*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in “Annex A Explanatory Material.” The contents of Annexes to NFPA 921 are not a part of the recommendations of the document but are included for informational purposes only.

Changes from the previous edition, other than editorial, are indicated by a vertical rule beside the paragraph, table, or figure in which the change occurred. These rules are included as an aid to the user in identifying changes from the previous edition. Vertical rules, when utilized, mark the entire paragraph which contains a change. The presence of a vertical rule, despite marking the entire paragraph, can indicate that the entire paragraph is new or that only part of the text, such as a single sentence, phrase, or word, has been changed.

Where one or more complete paragraphs have been deleted, the deletion is indicated by a bullet (•) between the paragraphs that remain.

A reference in brackets [ ] following a section or paragraph indicates material that has been extracted from another NFPA document. As an aid to the user, the complete title and edition of the source documents for extracts in advisory sections of this document are given in Chapter 2 and those for extracts in the informational sections are given in Annex C.

## **ORIGIN, AREA OF ORIGIN, POINT OF ORIGIN**

**Origin** is defined in NFPA 921-2011 as: “§3.119 Origin. The general location where a fire or explosion began. (See 3.3.127, *Point of Origin*, or 3.3.9, *Area of Origin*.)

**Area of Origin** is defined in NFPA 921-2011 as §3.3.9 Area of Origin. A structure, part of a structure, or general geographic location within a fire scene, in which the “*point of origin*” of a fire or explosion is reasonably believed to be located.” and §17.1 The *area of origin* is defined as: a structure, part of a structure, or general geographic location within a fire scene, in which the “*point of origin*” of a fire or explosion is reasonably believed to be located. The *point of origin* is defined as: the smallest location which a fire investigator can define, within an “area of origin,” in which a heat source, source of oxygen,



and a fuel interacted with each other and a fire or explosion began. . For example, in practical use in the field a point of origin may be as large as a single chair or electrical appliance or as small as a specific location on the chair or within the appliance, depending upon smallest location which the investigator can define.

**Point of Origin** is defined in NFPA 921-2011 as: “§3.3.115 Point of Origin. The exact physical location within the Area of Origin where a heat source and the fuel interact, resulting in a fire or explosion.” and “§17.1 The *point of origin* is defined as: the smallest location which a fire investigator can define, within an “area of origin,” in which a heat source, source of oxygen, and a fuel interacted with each other and a fire or explosion began. . For example, in practical use in the field a point of origin may be as large as a single chair or electrical appliance or as small as a specific location on the chair or within the appliance, depending upon smallest location which the investigator can define.”

## **IMPORTANT NOTICES AND DISCLAIMERS CONCERNING NFPA DOCUMENTS ADDITIONAL NOTICES AND DISCLAIMERS**

### **Updating of NFPA Documents**

Users of NFPA codes, standards, recommended practices, and guides (“NFPA Documents”) should be aware that these documents may be superseded at any time by the issuance of new editions or may be amended from time to time through the issuance of Tentative Interim Amendments.

An official NFPA Document at any point in time consists of the current edition of the document together with any Tentative Interim Amendments and any Errata then in effect. In order to determine whether a given document is the current edition and whether it has been amended through the issuance of Tentative Interim Amendments or corrected through the issuance of Errata, consult appropriate NFPA publications such as the National Fire Codes® Subscription Service, visit the NFPA website at [www.nfpa.org](http://www.nfpa.org).

Only the current edition is the only official edition that applies to fire and explosion investigation.

### **CONCLUSION**

These “Myths and Mysteries” tend to depreciate the value of the document, especially among those who need its guidance the most. This is caused by failures to understand and appreciate the nature of the NFPA consensus code promulgation system, the history of the fire investigation profession, the nature and history of NFPA 921 itself; and even semantics.

### **ABOUT THE AUTHOR**

Patrick M. Kennedy, B.Sc. (Hons), CFEI, CFPS, MIFireE is the Principal Expert, Fire and Explosion Analyst, of John A. Kennedy and Associates, the oldest established private fire investigation firm. With over five decades of professional experience and a *summa cum laude* honors degree in Fire and Safety Engineering Technology from the University of Cincinnati, Patrick Kennedy heads the John A. Kennedy and Associates investigation and analysis team. In addition to his corporate duties he currently serves as: Chairman of the National Association of Fire Investigators; a charter, principal member of the NFPA Technical Committee on Fire Investigations; Principal member of the NFPA Technical Committee on Fire Investigator Professional Qualifications; and director and six term past Chairman of the NFPA's Fire Science and Technology Educators Section. Patrick Kennedy is the senior-most practicing Fire and Explosion Analyst in the profession.

### **ENDNOTES**

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<sup>1</sup> NFPA Standards Council charter to the Technical Committee on Fire Investigations, National Fire Protection Association, Quincy, MA, 1985.

<sup>2</sup> The NFPA Glossary of Terms – 2008 defines:

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NFPA Code: A standard that is an extensive compilation of provisions covering broad subject matter or that is suitable for adoption into law independently of other codes and standards;

NFPA Guide: A document that is advisory or informative in nature and that contains only nonmandatory provisions. A guide may contain mandatory statements such as when a guide can be used, but the document as a whole is not suitable for adoption into law;

NFPA Recommended Practice: A document that is similar in content and structure to a code or standard but that contains only nonmandatory provisions using the word “should” to indicate recommendations in the body of the text; and

NFPA Standard: A document, the main text of which contains only mandatory provisions using the word “shall” to indicate requirements and which is in a form generally suitable for mandatory reference by another standard or code or for adoption into law.

<sup>3</sup> Ibid.

<sup>4</sup> “In the Law of negligence, that degree of care which a reasonably prudent person should exercise in same or similar circumstances.” Black’s Law Dictionary, Sixth Edition, (1983).

<sup>5</sup> “The legal and philosophical principle of ‘Ipse dixit’ involves an unproven assertion, which is claimed to be authoritative because ‘he himself said it.’ It is asserted, but not proved” Garner, Brian A., Ed., ed. (1999). *Black’s Law Dictionary* (7th ed.). St. Paul, MN: West. p. 833

<sup>6</sup> NFPA 921-2011 §3.3.33 Competent Ignition Source.

<sup>7</sup> NFPA 921-2011 §3.3.80 Fuel.

<sup>8</sup> NFPA 921-2011 §5.1.2.1 Fuel

<sup>9</sup> NFPA 921-2011 §18.4.4.1

<sup>10</sup> NFPA 921-2011 §19.2.1 Classification of the Cause.