

Guide for Fire and Explosion Investigations





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NFPA[®] 921

Guide for

Fire and Explosion Investigations

2021 Edition

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 April 5, 2020, with an effective date of April 25, 2020, and supersedes all previous editions.

This edition of NFPA 921 was approved as an American National Standard on April 25, 2020.

Origin and Development of NFPA 921

NFPA 921, *Guide for Fire and Explosion Investigations*, was developed by the Technical Committee on Fire Investigations to assist in improving the fire investigation process and the quality of information on fires resulting from that process. The goal of the committee is to provide guidance to both public and private investigators based on accepted scientific principles and scientific research.

The first edition of the document, issued by NFPA in 1992, focused largely on the determination of the origin and cause of fires and explosions involving structures. The 1995 edition of the document included revised chapters on safety, explosions, and the collection and handling of physical evidence. NFPA 907M, *Manual for the Determination of Electrical Fire Causes*, was withdrawn as an individual document and integrated, with revisions, into NFPA 921.

The 1998 edition of the document included a new chapter on fuel gas systems in buildings and the impact of fuel gases on fire and explosion investigations. Revisions were made to the chapters on electricity and fire, fire patterns, and physical evidence. The 1998 edition also included new text regarding ignitible liquid detection canine/handler teams.

The 2001 edition of NFPA 921 was reorganized for usability and included new chapters on building systems, fire-related human behavior, failure analysis and analytical tools, fire and explosion deaths and injuries, and wildfire investigations. The 2004 edition included a revision of the document to comply with the new *Manual of Style for NFPA Technical Committee Documents*. A new chapter, "Analyzing the Incident for Cause and Responsibility," was included, and chapters relating to legal considerations and recording the scene were revised.

The 2008 edition included rewrites of Chapter 5, Basic Fire Science; Chapter 6, Fire Patterns; Chapter 17, Origin Determination; Chapter 25, Motor Vehicle Fires; and Chapter 27, Management of Complex Investigations. A new Chapter 28, Marine Fire Investigations, was added to the document.

The 2011 edition saw changes to Chapter 4, Basic Methodology, and a new section on Report Review Procedures. Chapter 12, Safety, was revised to include chemical and contamination exposure to the fire investigator. Chapter 18, Fire Cause Determination, was revised to mirror Chapter 17, following the scientific method. This edition also saw the introduction of *negative corpus* and significant rewrites of Chapter 21, Explosions; Chapter 23, Fire and Explosion Deaths and Injuries; and Chapter 26, Wildfire Investigations. Chapter 25, Motor Vehicle Fires, was substantially expanded to further address recreational vehicles and agricultural equipment. The members of the NFPA Technical Committee on Fire Investigations dedicated the 2011 edition of NFPA 921 to the memory of long-time staff liaison Frank Florence (1943–2010). Frank passed away on July 27, 2010, after a brief illness. Frank served with the Salt Lake City Fire Department for 31 years before retiring as Fire Chief. He then joined NFPA in the Public Fire Protection Division and served as the Staff Liaison for the 2001, 2004, and 2008 editions of NFPA 921. Frank was an invaluable resource to the committee and a strong supporter of the fire investigation profession.

The 2014 edition was the first NFPA standard to be published in color. The color photographs greatly enhance the effectiveness of the document and are especially beneficial in the chapter on

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Fire Patterns. In addition, the concept of negative corpus was further clarified with additional information.

A new chapter, Fire Protection Systems, was added based on the 16 knowledge topics found in NFPA 1033, *Standard for Professional Qualifications for Fire Investigator*. The chapter Analyzing the Incident for Cause and Responsibility was divided into two chapters, and the committee added information and photographs that further illustrate concepts of electrical arcing.

The 2017 edition of NFPA 921 included many updates to accurately reflect current practices, technologies, research, and concepts. Chapter 8, Fire Protection Systems, was renamed Active Fire Protection Systems since passive systems are addressed in Chapter 7, Building Systems. The changes to Chapter 16, Documentation of the Investigation, brought the document up to date with current technology in the area of digital photography and 3D scanning. The concept of the origin matrix was included in Chapter 18, Origin Determination. That concept addressed the impact of ventilation on origin determination. One of the most important changes can be found in the scope of NFPA 921. Chapter 1 was revised to address the misapplication of reports from the National Fire Incident Report System (NFIRS) as Fire Investigation Reports.

The 2021 edition of NFPA 921 marks some of the most substantial changes since the original publication of the document. During this cycle the committee reviewed extensively the location and structure of fire patterns. After careful review and substantial public comment, the committee decided to relocate fire pattern text found throughout NFPA 921 into Chapter 6. Not only did this result in a restructuring and rewrite of Chapter 6, it also saw the combination of fire patterns and arc-mapping as a single process of origin determination. Essentially, the committee identified arc mapping as a form of fire pattern analysis.

In addition, the committee thoroughly reviewed and sought public comment on the usefulness of a classification system previously found in Chapter 20. Throughout various editions of NFPA 921, classification of fire cause and fire cause determination in Chapter 19 has resulted in confusion. Based on an examination of the scope of NFPA 921 for the 2021 edition, it was determined that the completion of reports for incident classification are outside the scope of NFPA 921. The committee identified incident classification as a topic addressed in other standards and more dependent on jurisdiction/ organization use. Hence, the former Chapter 20, Classification of Fire Cause, has been deleted from the 2021 edition of NFPA 921 and an addition was made at the end of Chapter 19, Fire Cause Determination, directing investigators to other standards should they need to classify the fire cause.

Other changes included the addition of and revision of text covering ignitible liquid detection canines (IGL canines), which includes training and certification. The committee also revised Chapter 14, Sources of Information, and completed a substantial rewrite in relation to non-scene data.

Finally, this cycle saw a thorough review of Chapter 28 (now Chapter 27), Wildfire Investigations. After substantial debate, public review, and task group proposal, the committee reached the consensus that further work is required concerning the revision of this chapter.

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NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall 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.

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