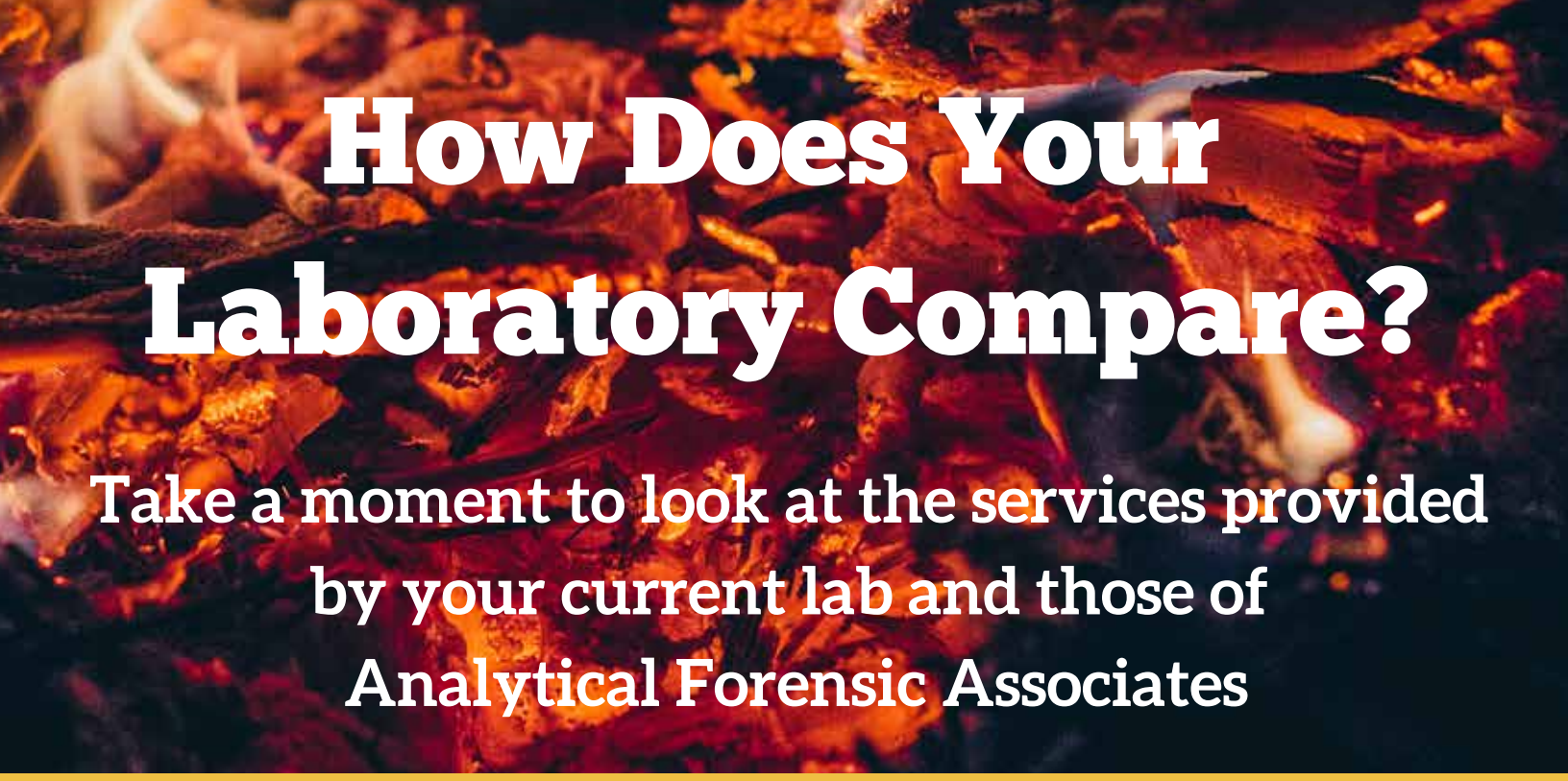
FIRE & ARSON INVESTIGATOR
JOURNAL OF THE INTERNATIONAL ASSOCIATION OF ARSON INVESTIGATORS, INC.
SPRING2022 • Volume 72 • Issue 4

What's Inside:

In Memory

John DeHaan
1948-2022



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journal is the official publication of the IAAI, and is published solely by the International Association of Arson Investigators, Inc., 16901 Melford Boulevard, Suite 101, Bowie, Maryland 20715

IAAI Position Statement
It is the position of the International Association of Arson Investigators that ***National Fire Protection Association (NFPA) Document 921*** is widely recognized as an authoritative guide for the fire investigation profession. In addition, NFPA 921 is an important reference manual, and sets forth guidance and methodology regarding the determination of the origin and cause of fires. This Association uses NFPA 921, along with other documents including NFPA 1033, as a foundation for its training and certification programs.

The statement reaffirms the IAAI's longstanding recognition of the importance of NFPA 921 to the knowledge and methodology of fire investigation. "Authoritative" means the guide is an accepted source of information, and known to be accurate and reliable. By its own terms the document is not a "standard," and is subject to revision and updating on a periodic basis to allow it to remain current with the expanding scientific and technical knowledge in the fire investigation field.

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The ***Fire & Arson Investigator*** journal is the official publication of the International Association of Arson Investigators, Inc. The publication is solely an educational and advisory aid to members working to suppress the crime of arson and related offenses; and to assist in raising the level of expertise in fire investigation.

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president's perspective

Robert K. Toth, IAAI-CFI(V), MIAAI

To the Members of the International Association of Arson Investigators.

As I write this letter, it has been one week since our ITC in Jacksonville, Florida. With a grateful heart, I thank you all for the honor of serving as your President this past year. Your kind words of support throughout the year and during the ITC were a true blessing.

Whatever I may have done this last year to lift the organization and direct it toward increasing its value to our members could only have been accomplished with many other people's support and wise counsel.

I am humbled to have worked alongside some of the most passionate people in our Association who have only the very best interest at heart for our members. The IAAI Staff, along with Executive Director Scott Stephens, are the unsung heroes of this Association. I watched them this past year rise above and beyond what was expected to serve the IAAI. I now have a new and greater respect and admiration for what you have done for me and all of our members.

Thank you to Past President Jones and President Watson for your support and guidance throughout my term as President. I am blessed beyond measure and grateful for our friendship. I look forward to many years filled with opportunities to spend time together to grow and nurture our friendships.

To the Board of Directors, thank you for stepping up and serving on the board. Only those who have served can know how thankless your service to the members can be at times. But as I watched, you persevered and did what's right. Our members and this Association are better because of your service. As we move forward in the "Watson" term, I challenge you to accept President Watson's challenge and lift each other up to make us all better – individually and corporately.

To all the past presidents who provided their Solomon-like counsel during my time on the executive team, a deep and heartfelt thank you for your leadership. During many (if not all) the decisions I was part of this last year, I took counsel directly as I reached out to you for your guidance. I also benefitted from your collective pearls of wisdom indirectly as well, recalling your leadership and decisions made during your term as President. You left your mark on me, this Association, and the future IAAI leaders.

Our Association is stronger than it has ever been and heading in the right direction. In this past year, we have placed this organization on the path to implementing a solid strategic plan soon, providing more and varied opportunities for members worldwide to access training, increase member benefits, and improve the efficiencies in the services we offer to our members. There are exciting times ahead, and I am happy to have one more year on the executive team as your immediate Past President to serve in any capacity I can.

May Grace and Blessings be in your path.

Robert K. Toth

IAAI President 2021-2022

IAAI leaders

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We invite you to connect with us!
International Association of Arson Investigators

IAAIhq

Code of Ethics for the International Association of Arson Investigators Inc.

All IAAI Members agree to abide by the Association's Code of Ethics.

I will, as a fire/arson investigator, regard myself as a member of an important and honorable profession.

I will conduct both my personal and official life so as to inspire the confidence of the public. I will exhibit professionalism and integrity in all aspects of the performance of my duties.

I will not use my profession and my position of trust for personal advantage or profit.

I will regard my fellow investigators with the same standards as I hold for myself. I will never betray a confidence nor otherwise jeopardize their investigation.

I will regard it my duty to know my work thoroughly. It is my further duty to avail myself of every opportunity to learn more about my profession.

I will avoid alliances with those whose goals are inconsistent with an honest and unbiased investigation.

I will make no claim to professional qualifications which I do not possess.

I will share all publicity equally with my fellow investigators, whether such publicity is favorable or unfavorable.

I will be dutiful to my superiors, to my subordinates, and to the organization I represent.

I will utilize electronic media and other communication technologies in a professional manner that does not exhibit, dishonor or demean my profession or the International Association of Arson Investigators.

As a fire/arson investigator, I am first and foremost, a truth seeker.

Approved by the IAAI Board of Directors - 10.10.2020

Tribute to John DeHaan

by President Randy Watson:

Immediate Past President Bob Toth presents the Hall of Flame award to 41-year member Dr. John D. DeHaan at the 2022ITC in Jacksonville on April 12, 2022.

Based on the tragic news of the passing of fire investigation icon Dr. John DeHaan, I feel a time of reflection is important. One of the measures of a leader is, what are the first thoughts that come to your mind when you hear a person's name or hear of their passing? When I heard of John's passing, my first thought was what a tragic loss of an icon in this profession. I am not sure anyone knows the thousands of people John impacted over the years and around the world. My first interaction with John was 35 years ago as a new private side fire investigator. He was so kind, gracious, and humble. We got to be close friends over the years, and he remained that same kind, gracious, and humble person. Kind, gracious, and humble are great character qualities for a leader. I think we could all learn something about leadership by John's example. I am grateful that we had the opportunity to present John the Hall of Flame Award in Jacksonville. I know it meant a lot to John, and given the news of his passing, it means even more to our association. God Bless you, John, and Rest In Peace, My Friend!

IAAI leaders

FOUNDATION, INC. update

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IAAI Membership,

The Board of the IAAI Foundation would like to thank everyone for their continued support. The Foundation was able to award 15 scholarships to the ITC, where 14 of those awarded were able to attend the 2022 ITC in Jacksonville. As discussed in past updates, the Foundation elected to honor the awards to those previously selected for the two canceled ITCs.

Scholarship information and applications are available on the FIrearson.com website by clicking the IAAI Foundation logo.

The mission of the IAAI Foundation is to support training and education as well as professional development and research. Working with the IAAI and individuals who are Friends of the Foundation, exciting things are in the works. More projects are in development and will be pushed out as they become finalized.

If you want to support our efforts or move this industry forward and support the investigator that may need assistance, please consider helping out with a donation.

The IAAI Foundation Board would like to thank the IAAI Board and, specifically, the ITC Site Selection Committee, Chaired by Past President Scott Bennett and Co-Chaired by Director Joe Herzberg, for their support and help with the Jacksonville 2022 ITC. A position on the Site Selection Committee for the Foundation has been solidified. The Foundation is looking forward to continuing the top-notch training experience to which the attendees have become accustomed.

Again, thank you for your support, and check out the training scholarship opportunities as deadlines are present for each scholarship.

Robert Cabral
IAAI-CFI, CI, ECT, OFE, OFO
President, IAAI Foundation, Inc.

IAAI Foundation Academic Scholarship

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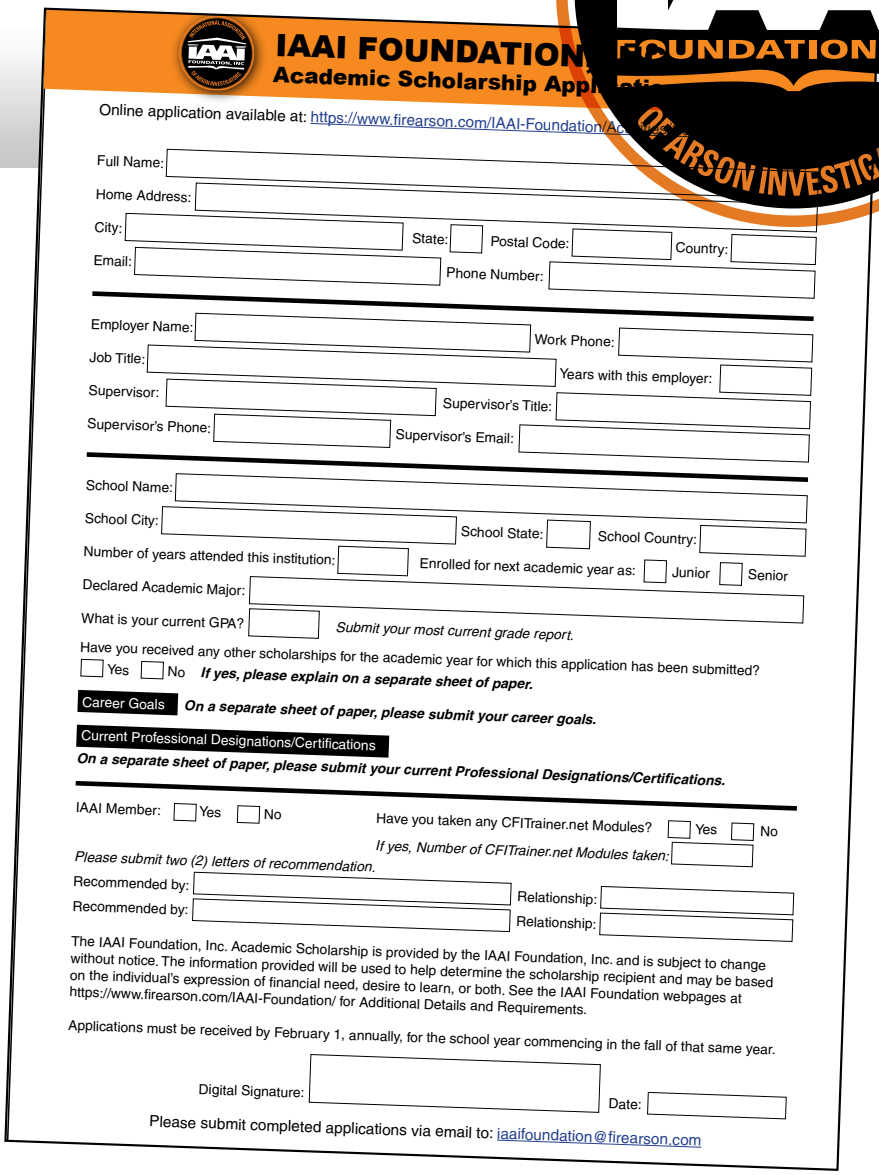

IAAI FOUNDATION, INC
Academic Scholarship Appl

Online application available at: https://www.firearson.com/IAAI-Foundation/Ac

Full Name:
Home Address:
City: State: Postal Code: Country:
Email: Phone Number:

Employer Name: Work Phone:
Job Title: Years with this employer:
Supervisor: Supervisor's Title:
Supervisor's Phone: Supervisor's Email:

School Name:
School City: School State: School Country:
Number of years attended this institution: Enrolled for next academic year as: Junior Senior
Declared Academic Major:
What is your current GPA? *Submit your most current grade report.*
Have you received any other scholarships for the academic year for which this application has been submitted?
Yes No ***If yes, please explain on a separate sheet of paper.***

Career Goals ***On a separate sheet of paper, please submit your career goals.***

Current Professional Designations/Certifications
On a separate sheet of paper, please submit your current Professional Designations/Certifications.

IAAI Member: Yes No
Have you taken any CFITrainer.net Modules? Yes No
If yes, Number of CFITrainer.net Modules taken:
Please submit two (2) letters of recommendation.
Recommended by: Relationship:
Recommended by: Relationship:

The IAAI Foundation, Inc. Academic Scholarship is provided by the IAAI Foundation, Inc. and is subject to change without notice. The information provided will be used to help determine the scholarship recipient and may be based on the individual's expression of financial need, desire to learn, or both. See the IAAI Foundation webpages at https://www.firearson.com/IAAI-Foundation/ for Additional Details and Requirements.

Applications must be received by February 1, annually, for the school year commencing in the fall of that same year.

Digital Signature: Date:

Please submit completed applications via email to: iaaifoundation@firearson.com

Scan the QR code

Or visit:
www.firearson.com/IAAI-Foundation/Activities/Scholarships.aspx.

Applications must be received by February 1, annually, for the school year commencing in the fall of that same year. Address all questions to iaaifoundation@firearson.com or by phone 410-451-3473.

The IAAI Foundation Academic Scholarship provides financial assistance to students pursuing formal education, at an appropriately accredited college or university, in a curriculum consistent with the mission of the International Association of Arson Investigators (e.g., Fire or Forensic Science - with emphasis on fire investigation, Fire/Explosion Investigation, Fire Protection Engineering). This scholarship is supported by the IAAI Foundation and its benefactor partners. One $5,000 scholarship may be awarded annually, at the discretion of the IAAI Foundation Board of Directors. The scholarship funds may be spent on tuition, books, and other course fees.

Applicants must be enrolled in an undergraduate program with junior or senior standing, and be a current IAAI member or the legal dependent of a current IAAI member. Applicants must submit an application, along with a narrative describing their eligibility, goals, need, involvement in the industry as well as any community service experience. A grade report for the prior semester shall accompany the application. Funds will be disbursed to the successful applicant as follows; 50% on the award of the scholarship and 50% upon successful completion of the academic year, accompanied by grade reports.

executive director's view

Scott Stephens

Greetings,

I wanted to share with you our Press Release that went out prior to Arson Awareness week about the IAAI Podcast, ARSON. In the first two months we had over 63,000 downloads and a lot of awareness within the media for our organization.

ATF releases all fires from 2005 DC Serial Arsonist
Featured on "Arson" the Podcast created by the IAAI and ATF

WASHINGTON, April 26, 2022. Just in time for Arson Awareness week (May 2-6) comes new information on the DC Serial Arsonist.

For the first time, ATF released all fires from the 2005 conviction of Thomas Sweatt. The fires were admitted to during a proffer session with the arson task force as part of a plea deal in 2005. Over 300 fires were released to our producer through a FOIA request for our podcast ARSON. Previously only 45 fires were made public. The fires are catalogued in an interactive map on www.iaaiarson.com.

Season one, with seven episodes, follows the two-year investigation to capture what some have described as "the most notorious serial arsonist in U.S. history." Kara McGuirk-Allison, executive producer, introduces listeners to the talented team of investigators who dedicated 22 months of their lives to bring the arsonist to justice. A seasoned journalist, McGuirk-Allison did the background research, conducted the interviews, put together the story and is the voice of "Arson." It takes listeners through the crime scenes with detectives as they recount how they collected evidence while working against the clock to try to capture the arsonist before another tragedy.

The case brings together arson investigators, community firefighters, homicide detectives, law enforcement throughout the DMV and ATF. An official task force was created based in Prince Georges County and run by the ATF Baltimore field office. Eventually, it involved 15 agencies across the DMV. McGuirk-Allison describes season one—"It's a story of dedication, of frustration and victories that culminates into an eventual win for law enforcement and the community, but not after much destruction and tragedy."

Tom Daley, an ATF arson investigator (now retired), was brought into the case early on. He recounts in episode one of the podcast how he had been assigned to work at the Pentagon in 2001 following the 9-11 attack; then he was assigned to Montgomery County, Md. to work on locating the "Beltway Sniper." On the heels of the snipers in 2003, a serial arsonist in the D.C. area began lighting fires to doors and porches of homes while residents slept. Daley was assigned to investigate. He spent hours at various locations throughout the DMV over a two-year span, gathering evidence that eventually brought the arsonist to justice. Fires numbered in the hundreds and lives were lost.

"Arson impacts communities throughout the nation with an incalculable cost in lives and property," said Brice McCracken, acting special agent in charge of ATF's National Center for Explosives Training and Research, who directs ATF's fire investigation and arson enforcement training programs. "ATF's relationships with its state and local partners allow it to combine resources and expertise to solve these violent acts."

To stream the podcast visit: www.iaaiarson.com or wherever you listen to your podcasts.

Stay safe,

Acting Deputy Director Thomas Chittum

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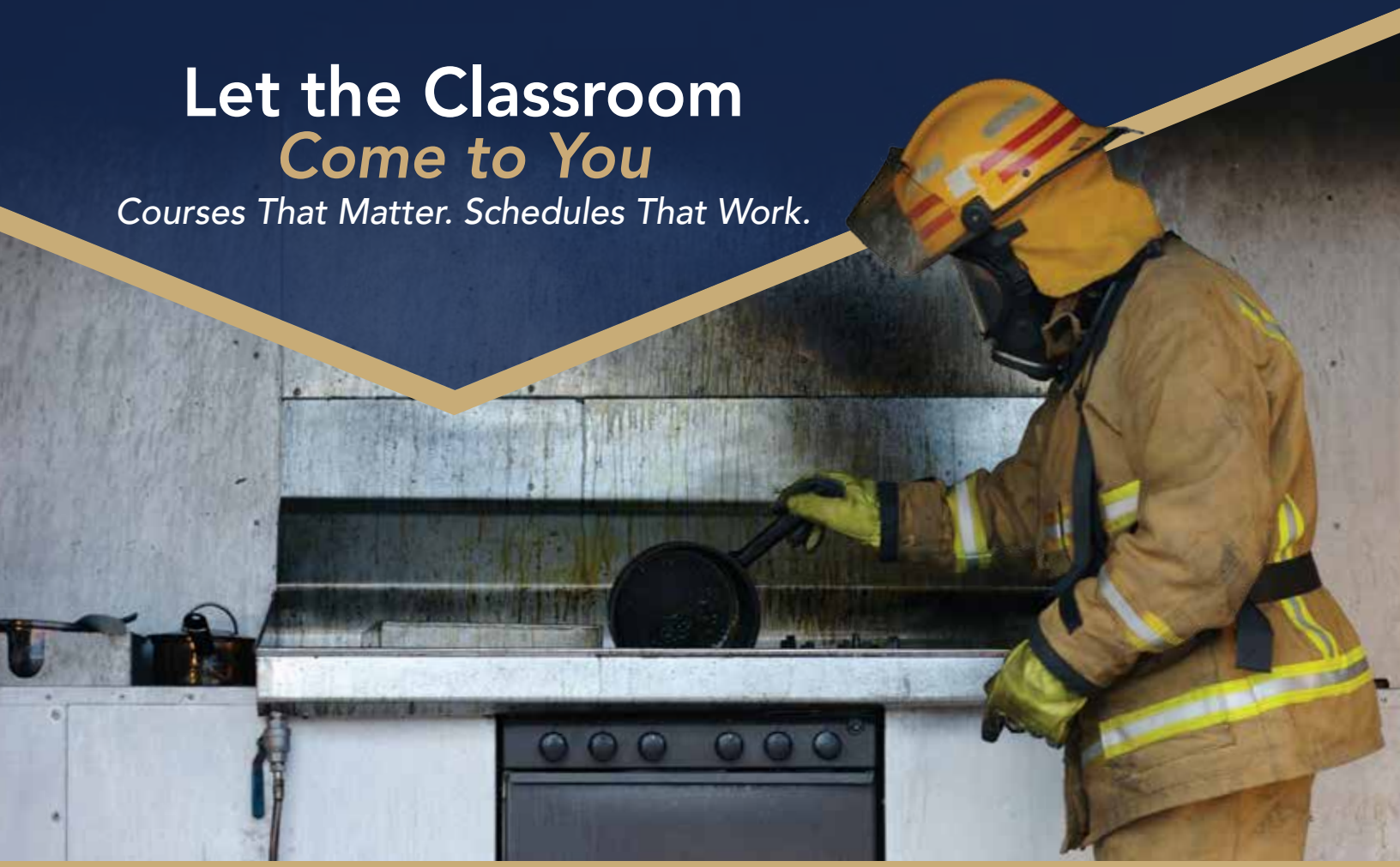

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CSU is proud to partner with IAAI to provide an annual scholarship to its members. The IAAI Scholarship application period is April 21, 2022, through July 22, 2022. Eligibility required.

- » Associate in Fire Science
- » Bachelor's in Fire Administration
- » Bachelor's in Fire Administration – Fire Investigation
- » Bachelor's in Criminal Justice Administration – Arson Investigation
- » Bachelor's in Criminal Justice Administration – Forensics
- » Master of Public Administration
- » Master of Science – Emergency Services Management

Stop by our booth at IAAI ITC to learn more.

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membership committee

Steven Straight

Hello fellow IAAI Members!

Let me first introduce myself, my name is Steven Straight, and I am your new IAAI Membership Committee Chairman. I am also the immediate past president of Chapter 22, the California Conference of Arson Investigators. My career spans both public and private, which is why I also have a sincere desire to help bridge understanding between the two sides of the "investigative coin." It is also my sincere honor to serve you in the capacity of Membership Chair.

I'd like to ask you a question…what is membership all about? Sure, we all understand it's literally being part of a body, but what does that functionally mean? We get to enjoy benefits like voting, discounted rates, the FAI Journal, and access to other members/resources. It also means we all represent the IAAI and in doing so, we should all have the intent to grow the body of membership and voice our opinions through the process of voting.

I humbly challenge each one of you to go out and speak with that person you know should be a member but isn't. Tell them about the discounted rates on training. Maybe explain to them how important it was to have access to another member who had knowledge on a particular topic that helped you with a case. So, share your story with them and help grow OUR membership. It's through membership that we can do more through revenue generated by dues and the increased resource pool of talented members.

I would also like to point out, as members, we have the responsibility to vote for the direction of this organization. With a membership approaching 11,000 members strong, our voter turnout should be much, much stronger.

Moving forward, this Membership Committee will be working hard for you to promote growth both here in the U.S. and Internationally with the valued experience of my co-chair and Past Director Claire Mansi. I've sat down with Director Chris Ward, Chapters Chairman, and we are working closely to help grow the IAA through both Chapters and Membership working together. I've sat down with Executive Director Scott Stephens, and we've begun to work on refining social media platforms like LinkedIn, Facebook, Twitter, Instagram, and promotional spots to help promote programs like our Student Membership program, spearheaded by Student Membership Coordinator Mary Mc Kinley. I've also had the sincere pleasure of speaking with Immediate Past President Bob Toth and current President Randy Watson on their vision for OUR organization and what they expect from this Membership Committee.

So, I encourage you to reach out to any one of the committee members with your questions, concerns, or maybe your fresh idea. This is OUR organization, let's take ownership of it!

The following are the current statistics, as recently stated at the 2022 AGM.
Members: 10,513
Student Members: 105
CFIs: 2152
FITs: 2544
ECTs: 652
Certified Instructors: 117
Motor Vehicle Endorsements: 261
Let's work together to grow all these statistics by the 2023 AGM.

Be safe and stay healthy,

Steven Straight

Steven Straight
IAAI Membership Chairman
Smsonfire@fastmail.com

global member news

Fundamentals of Fire Investigation Training
Feburary 28-4, 2022,
Altoona, WI

global member news

continued

Evidence Collection Technician Practicum

February 16, 2022, Marriottsville, MD

Motor Vehicle Fire Investigations

January 25 –27, 2022, Tucson, AZ

Washington Wire and Advocacy Committee update

Advocacy of The Fire Caucus

Washington Wire

news and views from the Hill

Past President Roger Krupp
Director of Governmental Relations

Steve Austin
Director of Governmental Affairs Emeritus

It was nice to see many at this year's ITC in Jacksonville Florida. There were many new initiatives involving the office of Governmental Relations and the Advocacy Committee.

After serving the IAAI for many years, Director of Governmental Affairs Steve Austin has retired and President Robert Toth announced Steve would serve as Director of Governmental Affairs Emeritus. This is an honor well deserved for the work Steve has done for the IAAI in Washington and the opportunities the IAAI received due to his work and connections. Roger Krupp was appointed Director of Governmental Affairs.

During the ITC, Roger provided a report on the Advocacy Committee. The committee will be renamed the Governmental Relations Committee. We will be reaching out to those who served on the committee as liaisons to determine if they wish to remain on the committee. The committee basically relies on the local liaisons to reach out to their members of Congress when we learn of legislation that would be beneficial to the fire or law enforcement communities or the insurance industry to educate your local members of Congress on why they should support the legislation. If you would be interested in serving as a liaison, please reach out to Roger Krupp.

Dr. Lori Merrell-Moore was appointed as the United States Fire Administrator. She is a good friend of the IAAI and we look forward to working with her. Dr. Merrell-Moore has established the Fire and Safety Communications Initiative which will work to provide coordinated messaging from the fire service organizations on various topics on a monthly basis. We will be sharing these messaging points with our Chapters when they are released.

AFG Grants

We continue to provide grant reviewers and thank those who volunteered for this year's round of grant reviews.

Legislation creating and sustaining the Assistance to Firefighter Grant Program specifically tasks the IAAI with providing not only assistance in promulgating the rules for the program but also providing panelists to peer review the applications submitted by the fire service and other eligible organizations.

Since the establishment of the program, IAAI Government Affairs has taken this responsibility very seriously. We attend and participate in the Fire Grant Criteria meeting held by FEMA. We also strive to submit panelists that can make informed and impartial decisions. Our qualified peer reviewers best ensure that the scarce federal dollars are awarded to the applicants who best meet the award criteria.

We attempt to divide our panel members between the career, volunteer, and combination fire service. We also give preference to those members who are first-time panel members. We encourage all our members to consider applying as a panelist if they feel they are qualified. Members who are employed in professions outside the fire service will be considered if they have previous fire service experience either retired or currently serving as a volunteer. Questions about the program or eligibility as an IAAI peer reviewer can be directed either to Roger Krupp or Steve Austin.

We want to hear from you ►►► Please feel free to contact us anytime to seek ideas or share your successes in advocating for our profession. What we learn from each other, we can share with all.

ELECTRICAL SHORTS

By Cameron J. Novak, P.E., ATF – FRL

Cameron Novak, Electrical/Fire Research Engineer with the ATF's Fire Research Laboratory. He is a licensed electrical and fire protection engineer and holds the IAAI's Certified Fire Investigator and Certified Instructor certifications.

Electrical Shorts #5:

Static Electricity

We've all experienced it. You've walked across your carpeted floor and touched a doorknob, only to receive a little shock. What you've just experienced is a static electric discharge. But how and why does that happen?

Electrons, the fundamental driver of electricity, can transfer between two objects merely through contact. An object that gives up electrons becomes positively charged and an object that receives electrons becomes negatively charged. These electrons can accumulate over time, leading to a stored charge. A static electric discharge is the flow of electrons between objects with different levels of stored charge [1]. The discharge generally returns those objects back to a neutral state and can sometimes create an arc. When you walk across your carpeted floor, your body picks up extra electrons, making you negatively charged compared to your surroundings. The shock you feel when you touch a doorknob is the discharge of those electrons, returning your body to an electrically neutral state. If you were to stop moving and not touch anything, eventually those charges would dissipate, and you would become neutral again.

You've also seen pictures of a person whose hair stands up because of a static charge (Figure 1). That happens because like-charges repel each other and try to get as far away from each other as possible. In this case, those charges do that by making the individual strands of hair stand up to create as much space between the charges on the hair.

Static charges can build up not just in solid objects but liquids as well. The rate of charge buildup is dependent on several factors including the material and/or fluid types, the volume of fluid transferred, and the rate at which that fluid is transferred. Filling a portable gasoline container can generate charges. When you fill that container in the back of a car, the container is electrically insulated, and those charges have nowhere to go. By placing the container on the ground before filling, those induced charges have a place to go so no appreciable buildup ever occurs.

Another form of static electricity we often see is lightning [2]. The warm air in a cloud contains water droplets and the cold air has ice crystals. Because the warm air is less dense, it rises to the top of the cloud bumping

Figure 1 – In this photograph from the Library of Congress, one of these girls has been charged by a Van de Graaff generator, causing her hair to stand on end [1].

into the cold air along the way and accumulating a charge at the same time. The negative charges collect at the bottom of the cloud. When enough charge builds up, lightning can occur. That lightning can travel from the cloud to the ground or between clouds.

The danger of static electricity is when that stored energy is released. Static electricity has ignited many fires at gas filling stations when people get in their vehicles while waiting for the pump. This was addressed by the Mythbusters years ago while testing the myth that cell phones cause fires at the pump [3]. Static discharges can also wreak havoc on sensitive electronics. Can you imagine being on the International Space Station and having an electronic system stop working because of a static discharge? This particular issue can be prevented by wearing special bracelets that bond the worker to prevent a buildup of charges that could do any damage.

Which brings us to our next topic – how do we prevent static discharges? The answer to that is bonding and grounding. According to the National Electrical Code (NEC), bonding is the process of connecting two or more objects so that there is electrical continuity and conductivity between them [4]. The NEC describes grounding as "connecting something to the ground or another conductive object that extends the ground connection." By bonding two objects together, you minimize or eliminate the possibility of a charge differential developing between them. An example from my own personal experience comes from my days in the fire service as a hazardous materials technician. After trucks crashed on the highway, our crew was tasked with emptying the truck's fuel tanks. This would involve connecting the fuel tank to a drum (bonding) and then connecting the drum to the earth (grounding). This was done to ensure that the objects remained electrically neutral, eliminating the possibility of a charge differential between the truck's fuel tanks and the drum and the earth.

It can be important to think about static electricity and static electric discharges because these discharges can have enough energy for ignition under the right circumstances. The arc from a discharge can ignite a flammable gas or vapor mixture if the right concentration is present. A discharge could even serve as an ignition source for a dust suspended in air. Keep that in mind at your next explosion investigation.

Static electricity is present in our everyday lives, even if we don't realize it. We've developed methods such as grounding and bonding to minimize or eliminate its dangers, but if we are not careful, it can still have a dramatic and dangerous outcome. So, the next time you shock yourself touching a metal object, think about how that arc occurred and be happy you still have all your fingers!

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Ignition of walls (Part I)

Abstract

In the investigation of fires, questions sometime arise concerning the potential ignition of wall surfaces. Often, the question is whether a certain fuel package, burning by itself, has the potential to ignite a given wall type. Two ancillary questions are also likely to arise: How does the distance of the fuel package from the wall affect the outcome, and how would changing the wall material affect the outcome? This paper examines the research on the topic, and the available data. The question is relevant to both interior and exterior exposures, but at the level of detail analyzed, distinctions do not need to be made. It is shown that research is surprisingly scant and incomplete. But some guidance can be taken from existing studies. Furthermore, specific experiments may be needed if the desired questions cannot be answered based on available research. Some guidance is offered on conducting needed laboratory tests and also on interpreting existing test data. The scope of the study is small or medium burning fuel packages, and the paper does not explore ignition of walls from large, remote flames, such as emanating from a nearby burning building.

Introduction

With regards to understanding the ignition of building components in a fire, walls likely rank foremost in importance. The primary components of a building can be considered to be walls, floors, ceilings, roofs, doors, and windows. Combustible floors may readily be ignited by locally burning fuel packages sitting on the floor, but sustained, long distance flame propagation along floors is unlikely unless the compartment reaches flashover conditions and a fully-developed fire ensues. This is due to two reasons: (1) air inflow is such that flame spread is 'against the wind,' the least favorable condition for flame spread[1]; and (2) the radiation view factor is likely to be low. This is because buoyancy makes flames rise upwards, that is, away from the vicinity of the floor. Flame spread along floors was documented extensively in the dissertation of Van Hees[2,3], while NIST reported some early experimental studies[4]. Flame spread on ceilings can progress rapidly, since it constitutes 'wind-aided' flame spread. However, unless the ignition takes place at ceiling level, large flames are likely to be required for flaming to reach the ceiling and ignite a combustible ceiling cladding[5]. Ignition of roofs is exceedingly common in wildland fires, due to lofted firebrands[6], but is less common for fires originating inside buildings, since ignition sources are only occasionally likely to be present at the roof location.

Ignition of windows and doors is also of only infrequent interest, apart from wildfire exposures. Understanding the behavior of windows and doors can be important for developing a fire spread scenario, but the role of these components is not primarily as ignition targets. Windows may readily transmit a fire through the glazing by radiant heat transfer[7], even if window flames and glazing are of noncombustible materials. Plastic window frames may also abruptly fail and fall out, leaving an opening[8]. The role of doors can be important in many fire scenarios, since (1) doors may be open and thus nullify any fire resistance properties of the wall in which they are located; or (2) flimsy doors may easily burn through, transmitting fire bodily into the adjoining space. A residential hollow-core or paneltype wood door may not survive much more than about 5 min in a fully-developed room fire[9,10,11]. Thus walls are the components where ignition behavior may play the greatest role in the contribution of building components to fire development. Walls are quite likely to have potential ignition sources located in their vicinity and, once ignited, are likely to show upward flame spread (wind-aided), which can be rapid. As a result, it is important to understand the factors which influence the propensity of combustible wall claddings to ignite and, consequently, to be able to propagate a fire. This is the first study which endeavors to review what is known on this topic and to develop some guidance for analysis of fire incidents.

Characterization of ignition sources

The fire safety profession has not come to terms yet with regards to adequately describing and quantifying the effects of ignition sources. Prior to the 1980s, the profession would describe ignition sources in constructional terms. For example, wood cribs might be described in terms of stick length, sectional size, number of layers, number of sticks per layer, etc. Gas burners would be described in terms of fuel type, flow rate, and design

type, etc. With the acceptance of the oxygen consumption principle of measuring heat release rate (HRR) in the 1980s[12], ignition sources came to be characterized primarily by their output in terms of HRR. This properly focused on the single most important variable in the quantification of fires[13], but it was not enough. An output of 100 kW delivered from a small-diameter jet nozzle, versus a large-area slot burner may provide the same HRR but clearly will not affect target objects in the vicinity in an identical manner. Also, releasing 100 kW of hydrogen versus ethylene from an identical burner will likewise not provide the same effect on target objects. Hydrogen, due to its absence of soot and low emissivity of flames, is obviously an unusual fuel, and sometimes fuels can be interchanged with only a modest effect on targets. For example changing from propane to butane fuel is generally considered to be insignificant. So clearly HRR and—in some cases—fuel type, are important variables. Jets of gas streaming from pipes are a very specialized form of ignition and will not be considered further in this paper. Instead, attention will be focused on initial fuel packages which are modest-sized, solid combustibles. However, much of the understanding of fire dynamics of solid-fuel combustion comes from research studies based on gas burners. These burners are very different from the flames seen coming from a broken gas pipe. Researchers have often used 'diffusion-flame' burners where a fuel gas is emitted from a large-face, square or rectangular burner (Figure 1) and the flow is distributed fairly evenly over the face by use of a sand bed or ceramic fiber packing. Experiments with such burners do indeed simulate reasonably well the burning behavior of solid-fuel combustibles[14].

Figure 1 Flames from a free-burning fire, away from walls or ceiling. A 0.3×0.3 m (1×1 ft) propane burner is producing 500 kW/m^2 of HRR per unit area *(Photo: Oskar Lind and Per Troedson)*

With regards to burner experiments, specifying HRR and fuel type is obviously not enough. The heat flux to the wall is additionally strongly dependent on the spacing between the burner edge and the wall, i.e., the *gap distance*, *standoff distance, or offset distance*), which of course may be zero for a fuel package directly against the wall. [It is implicitly assumed that one side of the burner, or of the fuel package in the real fire, is parallel to the wall. Fire sources may, of course, be located at oblique angles, but no specific research exists on such arrangements.}

As an example, Figure 1[15] shows flames from a propane burner in the open, fired at a medium-high rate (500 kW). Note that, apart from the turbulence, the sides of the flame are roughly a vertical extension of the burner outline. However, there is a little bit of 'blooming' outwards, beyond the burner outline. Figure 2 shows the same burner placed in a corner, with zero gap distance (burner is flush against the wall); there is no ceiling. It can be seen that the flames are substantially taller, but also important to observe that the flames are largely *attached* to the wall.

Figure 2 Flames in a corner, from a burner providing 5555 kW/m^2 *(Photo: Oskar Lind and Per Troedson)*

The fires illustrated above had a very high HRR *per unit area*, namely, 5555 kW/m^2. Such high values of HRR per unit area can easily be created with gas burners, but are unlikely to be found in real fires where *small* fuel packages are involved. Figure 3[16] shows flames from a fire with a much smaller HRR/unit area, 880 kW/m^2. Note that flames are sucked in towards the center and, apart from occasional turbulence packets, do not extend towards an imaginary parallelepiped extended above the burner face. Note that there are corner angles at each corner of this particular burner which help visualize the parallelepiped (this is an unusual laboratory feature and is not commonly encountered).

Figure 3 Flames from a burner providing 317 kW from a 0.6×0.6 m (2×2 ft) face area, which is equivalent to 880 kW/m^{-2}. *(Photo: Jason Huczek; copyright 2016 Interscience Communications Ltd)*

continued on page 16

It might be intuitively thought that the peak heat flux to a wall will be proportional to the peak HRR of the burning fuel package. However, an examination[17] of data from diverse, small fuel packages of 5 W to 50 kW (ranging from cigarettes to small trash baskets) showed that the results are scattered, but that it is most appropriate to assume that the peak heat flux is roughly constant, and is around 35 kW/m^2. For higher HRR fuel packages, the peak heat flux does increase with HRR, but slowly, according to the data of Back et al.[19]. By combining the results of references 17, 19, and 24, the following data fit can be produced:

HRR < 50 kW $\quad \dot{q}'' = 35$

HRR > 50 kW $\quad \dot{q}'' = 100\left(1 - \exp\left(-0.0086\dot{Q}\right)\right)$

where $\dot{q}''$ = heat flux to wall (kW m-2), and $\dot{Q}$ = HRR (kW); the relationship is shown in Figure 4. There is significant data scatter over the whole HRR range, but the selected representation appears to be the best that can be done in view of this. It may also be noted that the assumption that the heat flux from low HRR fuel packages is roughly 35 kW/m^2 has been widely used for various fire testing applications[18].

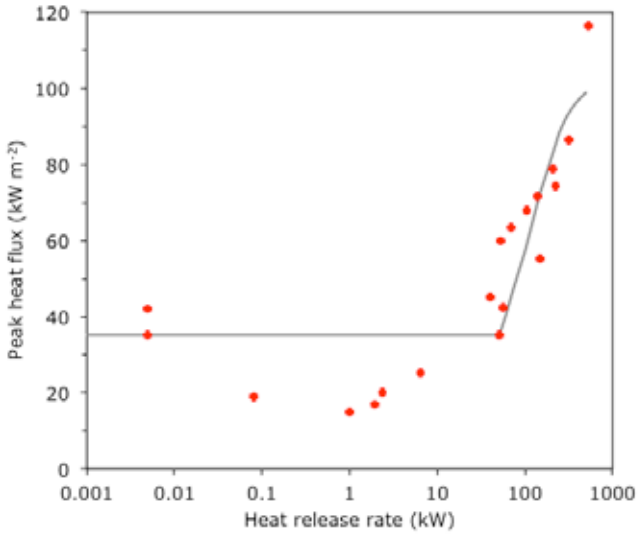
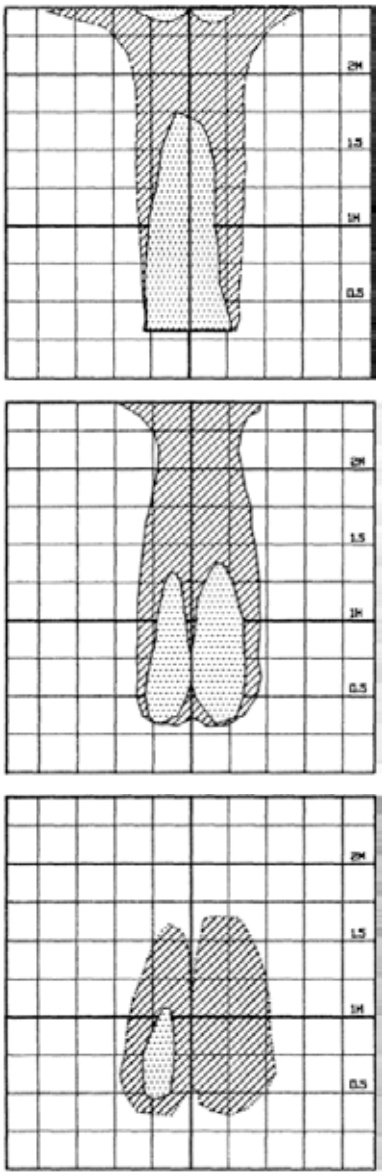


Figure 4 Peak heat flux to wall (no gap), as a function of fuel package HRR

The role of a gap at the edge of the fuel package

Most measurements made for heat fluxes from fire plumes to a lateral target have involved a burner placed directly against the wall[19,20,21,22,23]. But an initial burning fuel package may be located not directly against but, rather, with a gap between the edge of the fuel package and the wall. No systematic studies are available for this arrangement, but Williamson et al.[24,25], in conducting the first study on the issue, obtained some indicative data. They used a propane-fueled burner with a 300×300 mm face area, placed in a corner, with 0, 50, and 100 mm gap distances from the walls. The burner was run at HRR outputs of 40 and 150 kW in a corner constructed of paper-faced gypsum wallboard (GWB) walls. Figure 5 shows significant burn damage for 0 and 50 mm gap distances, but very mild exposure to the wall at 100 mm. Note that burn damage reached the ceiling at the 0 and 50 mm gap distances, but that damage was localized and fire did not propagate to the ceiling for the 100 mm gap. They also reported the heat fluxes registered along the wall surfaces, as recorded with water-cooled total heat flux gauges (Table 1). Additional data were given in a study by Williamson and Fisher[26] using plywood-lined walls where a 25 mm (1 in) gap between a 115 kW gas burner and the wall caused the flame to not attach, while an arrangement with the burner flush against the wall exhibited that the flame did attach to the wall. The 25 mm gap delayed ignition of the wall by about 15 s, but otherwise caused little difference in the progress of the fire. Williamson et al.[27] also described some fluid dynamical features (vortex formation and turbulence) of flame development along the room surface claddings.



(a) Gap distance 0 mm

(b) Gap distance 50 mm

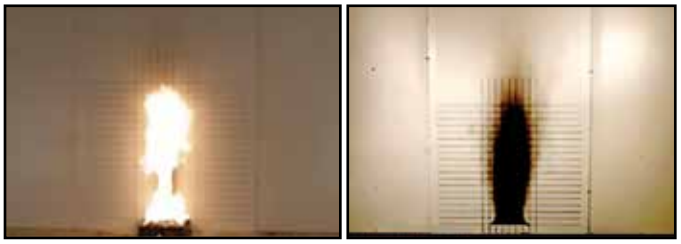
(c) Gap distance 100 mm

Figure 5 Char damage patterns to the paper facing of GWB from a 150 kW burner placed in the corner at various horizontal standoff distances from the walls[24]. Centerline of diagram denotes the corner, left and right sides correspond to the left and right wall areas; ceiling height = 2.4 m. Dotted markings: charred after 1 min exposure. Striped markings: charred area after 10 min exposure. Lack of symmetry for the patterns at the 100 mm gap distance was attributed to ventilation nonuniformities in the test laboratory.

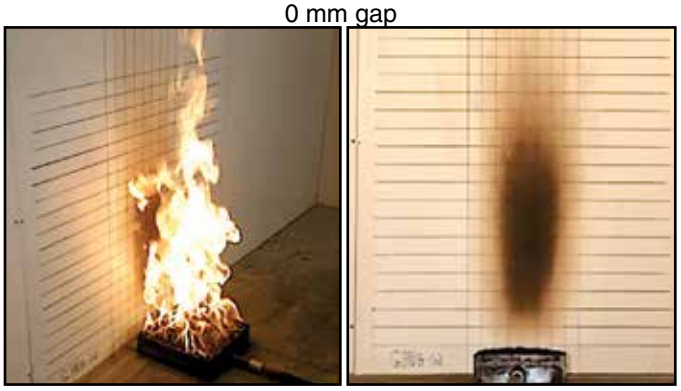
Gap distance (mm)	40 kW burner output		150 kW burner output	
	Heat flux (kW m^{-2})	Flame attachment	Heat flux (kW m^{-2})	Flame attachment
0	40 – 50	yes	50 – 60	yes
50	20 – 30	no	25 – 35	yes
100	5	no	20 – 22	yes

Table 1 Heat flux to walls in a corner arrangement at different gap distances for a 300×300 mm burner (measured at 0.5 m height)[24]. The table gives data only for a corner geometry which is more severe than a flat-wall geometry; thus, the results should be viewed as a conservative upper bound for the flat-wall condition.

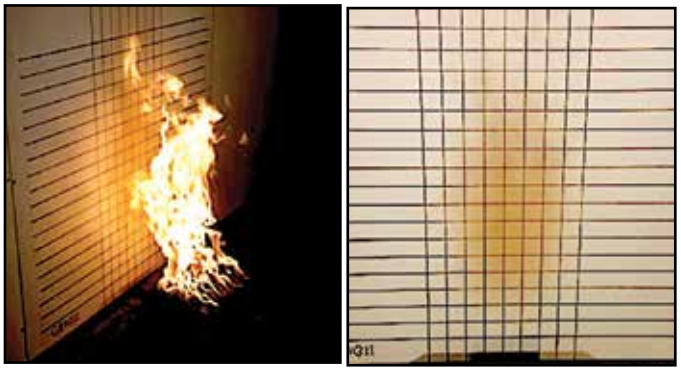
Madrzykowski[28,29] obtained some similar results with an 80 kW, 300×300 mm face burner placed at various distances from a GWB wall (Figure 6). Unlike the Williamson et al. study, the burner was placed at a flat wall, not at a room corner. There is evidently little difference between the 0 mm and the 80 mm gap results, with significant flame attachment occurring in both cases. But with a 150 mm gap, there is clearly no ignition potential, since no flame attachment occurred and the GWB paper facing only received some light discoloration.



0 mm gap



80 mm gap



150 mm gap

Figure 6 Char damage to a GWB wall from an 80 kW natural gas burner flame at various gap distances *(Photos: Daniel Madrzykowski)*

It is clear from the above data that, with a 40 kW heat source, and a 100 mm burner standoff distance, no ignition would be expected. At the same HRR with a 50 mm standoff distance, since flame attachment does not occur, only fuels ignitable (with no pilot) at a heat flux of 20 – 30 kW/m^2 might be ignited. Such fuels are uncommon. With a zero standoff distance, most combustible fuels can be expected to be locally ignited, but only a few are likely to show sustained upward flame spread, since the vertical distance of flame attachment is limited.

At sufficiently large offset distance, even massive fuel packages are unlikely to cause wall ignition, if the room is not driven to flashover[30]. For example, Madrzykowski and Kerber[31] burned a king-size mattress assembly showing a peak HRR of 3.5 MW. Yet, the heat flux measured laterally at 1.0 m from the edge of the fuel showed a peak value of only about 20 kW/m^2, sustained for 200 s. Since this represents unpiloted ignition conditions, there is roughly a 50% likelihood for the ignition of wood materials under this exposure (see below). Another fuel package, with peak HRR of 5 MW, gave a peak heat flux of 35 kW/m^2, sustained for 100 s. This would readily ignite most wood materials.

Conversely, for very low HRR fuel packages, even small gaps may serve to prevent ignition. Daikoku and Saito[32] measured the heat flux to a wall using a 150×150 mm burner placed various distances away from the walls; Table 2 shows their results. From the authors' iso-flux plots, it can be noted that the height of the peak heat flux at the wall varied greatly with the standoff distance, but no specific relation was obtained to describe trends. The authors also noted that the presence of the corner significantly enhances the heat flux that would otherwise be found to a flat wall, but did not undertake to quantify this effect.

Standoff distance (mm)	Peak heat flux (kW/m^2)
0	80
25	20
50	10
100	4
150	3

Table 2 Heat fluxes measured from a 13.5 kW burner (150×150 mm face area) with various standoff distances from a room corner

Dietenberger[33] measured the heat fluxes from a 150×150 mm wood crib producing a peak HRR of 10 kW. (This is the Class B wood brand used in the ASTM E108 roof test[34]). At a standoff distance of 45 mm, he found a peak heat flux of 7 kW/m^2. This is a very low value and would not ignite target surfaces. Parenthetically, it may be noted that he measured a peak heat flux of 80 kW/m^2 received at the floor surface from the burning wood crib. It might be asked, then, how roof assemblies having combustible components can pass the E108 Class B burning brand test? It would appear that the answer may be that the area of exposure under the brand is fairly small, and the test is a burnthrough and flame propagation test, rather than being based on ignition criteria. A more detailed explanation cannot be presented, however, since, despite the fact that the test is over 100 years old, no scientific analysis or modeling of its behavior has ever been undertaken.

continued on page 20

For completeness, we also cite the tests of McGrattan et al.[35,36] who studied the effect of gap distance with a gas burner run at 200, 300, and 400 kW. But, apart from tests with zero gap distance, they chose a series of very large gap distances (100, 300, 500, 1000, and 1600 mm). They documented the effect of gap distance on the room hot-gas layer temperature, but not on the wall heat fluxes, which is the issue of interest here.

Flames which attach to the wall can be equivalently viewed as being tilted. The *flame tilt angle* was specifically studied by Ji et al.[37], who used a combination of theory and experimental correlations. This did not produce guidance for evaluating wall ignition potential, but offers some basis for future development of geometric analyses (no wall heat fluxes were measured). ■

To be continued in Part II

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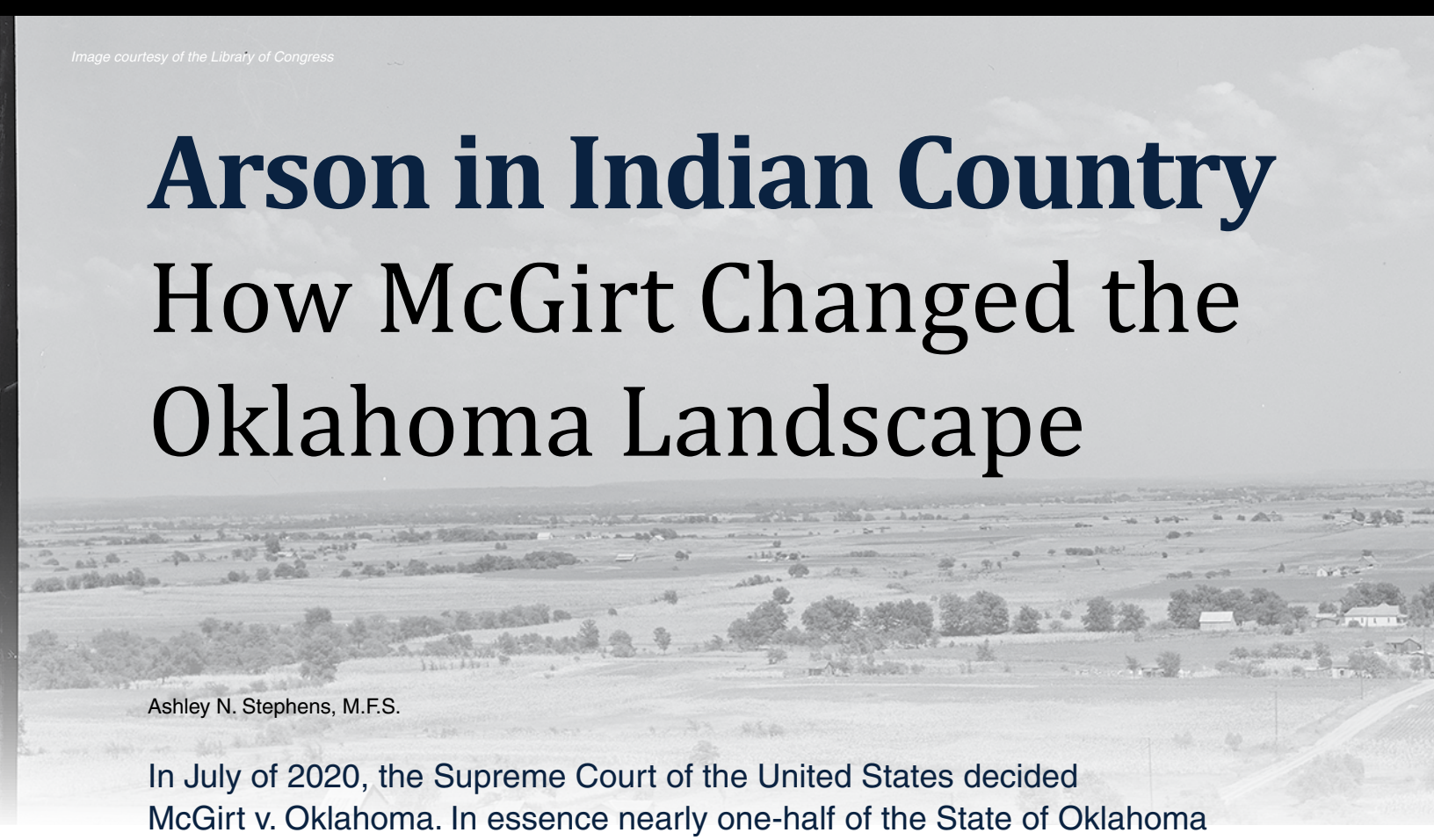

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Arson in Indian Country
How McGirt Changed the Oklahoma Landscape

Ashley N. Stephens, M.F.S.

In July of 2020, the Supreme Court of the United States decided McGirt v. Oklahoma. In essence nearly one-half of the State of Oklahoma reverted back to Indian Country. As a result the criminal jurisdiction, to include arson investigations, have drastically changed. Resources and manpower are now stressed to breaking points. Thousands of cases are now being retried due to this monumental ruling.

On July 9, 2020, the Supreme Court of the United States (SCOTUS) issued its ruling in *McGirt v. Oklahoma*. 140 S.Ct. 2452 (2020). The ruling drastically changed the criminal jurisdictional landscape of Oklahoma. It is a ruling that made very few headlines elsewhere, but the long-term ramifications will substantially affect Oklahoma as well as federal prosecutions of arson cases.

In McGirt, Jimcy McGirt, who is a member of the Seminole Nation, had been convicted of three serious sexual crimes by the State of Oklahoma. McGirt was serving a life sentence in the Oklahoma Department of Corrections. McGirt appealed his conviction arguing that he was a member of a federally recognized tribe. He further argued that the crimes occurred within the reservation of the Muscogee Creek Nation and as a result, the State of Oklahoma did not have the requisite jurisdiction to prosecute him.

The primary issue on appeal was whether the Muscogee Creek Nation Reservation was disestablished or did it remain "Indian Country." McGirt argued that the United States Congress (Congress) created a reservation for the Muscogee Creek Nation and according to a treaty signed in 1833 between the United States and the Muscogee Creek Nation, it created a "permanent home to the whole Creek Nation of Indians." The treaty also promised that the United States would "grant a patent, in fee simple, to the Creek Nation of Indians for the [assigned] land" to continue "so long as they shall exist as a nation and continue to occupy the country hereby assigned to them." The State of Oklahoma argued, unsuccessfully, that the reservation had been disestablished. The Supreme Court held that the Creek Nation still exists to this very day and once a federal reservation is created, only the United States Congress can disestablish it.[1] As such, the state of Oklahoma lacked jurisdiction to prosecute McGirt; he could only be prosecuted by the authorities in "Indian Country" or by the federal government. Based on the *McGirt* ruling, a state is now limited in its prosecution of certain cases by or against Indians in "Indian Country." It is important to note that states are otherwise free to apply their criminal laws in cases of non-Indian victims and defendants, including within "Indian Country."

The Major Crimes Act (MCA) is defined in 18 U.S.C. §1153 – *Offenses committed within Indian Country.* It allows the federal government to prosecute certain crimes, even when committed on tribal lands. The enumerated offenses are: Murder, Manslaughter, Kidnapping, Maiming, a felony under chapter 109A, Incest, Felony Assaults, Felony Child Abuse or Neglect, **Arson**, Burglary, Robbery and a Felony Under Section 661. There are other laws not expressly

Image courtesy of the Library of Congress

> "Based on the *McGirt* ruling, a state is now limited in its prosecution of certain cases by or against Indians in "Indian Country.""

mentioned in the Major Crimes Acts, which are covered in the General Crimes as defined in 18 U.S.C. §1152. It states that "the general laws of the United States as to the punishment of offenses committed in any place within the sole and exclusive jurisdiction of the United States…shall extend to Indian Country."

The MCA lists arson as one of the enumerated offenses that the federal government can prosecute in "Indian Country." Further, the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) has jurisdiction to investigate any case of arson on tribal lands pursuant to 18 U.S.C. §3051 (Powers of Special Agents of Bureau of Alcohol, Tobacco, Firearms, and Explosives).

Because of the *McGirt* decision, crimes previously prosecuted by the state of Oklahoma, now must be prosecuted by the federal government and the tribal government. For example, if an arson of a privately owned residence occurred in "Indian Country" and the victim or suspect was Indian, this case would normally have been prosecuted by the State authorities. However, due to the *McGirt* ruling and because arson is an enumerated major crime, the federal government now has exclusive jurisdiction to prosecute the arson under 18 U.S.C. §§1151 and 1153, 18 U.S.C. §81, and 18 U.S.C. §3051. The state, by contrast, no longer has any jurisdiction to investigate or prosecute the arson in "Indian Country" involving Native American suspects or victims.

The impact of *McGirt* is far-reaching. Numerous defendants began filing "*McGirt motions*" challenging the State of Oklahoma's jurisdiction to prosecute them. One such example of a "*McGirt* motion" is *Bosse v. Oklahoma*, 2021 WL 958372, which restored the Chickasaw Nation's jurisdictional boundaries. Shaun Bosse murdered Katrina Griffin, along with her eight-year-old son Christian and six-year-old daughter Chasity. Afterwards, Bosse set the home ablaze. After a lengthy trial, in which ATF Certified Fire Investigators, along with ATF Fire Protection Engineers and others from the ATF Fire Research Laboratory testified, Bosse was convicted and ultimately sentenced to death. Due to the *McGirt* ruling, Bosse filed a Successive Application for Post-Conviction Relief arguing that his victims were members of the Chickasaw Nation, and that the crime occurred within "Indian Country," therefore the State of Oklahoma lacked jurisdiction to prosecute him for his alleged crimes. On March 11, 2021, the court agreed with Bosse. As a result, Bosse would need to be charged in federal court under the MCA. Bosse will be given the opportunity for a new trial. Unfortunately, the judicial process will start over and the victims' families will once again have to relive the agonizing pain and heartbreak to seek justice for the murder of their loved ones. In regard to sentencing, Bosse can no longer be sentenced, if convicted, to death, as was the original sentence Bosse received. For Bosse to receive the death penalty, the tribe must "opt in" to capital punishment. The Chickasaw Nation has not "opted in" for capital punishment; therefore, the maximum punishment Bosse could receive is life without parole in federal prison.

Also because of the *McGirt* ruling, the State of Oklahoma has been dismissing large numbers of cases, such as *State of Oklahoma v. Harris* (*Tulsa County CF-2020-3114), State of Oklahoma v. McClain (Pontotoc County CF-2021-00068) and State of Oklahoma v. Moore (Sequoyah County CF-2020-00484).* These are all arson cases that have been dismissed due to the decision in *McGirt*. The federal government and the tribal government have had to act quickly to ensure that these defendants are not being released without their cases being reviewed for federal prosecution. In response to the rapid need for resources, the Bureau of Indian Affairs has begun to cross-deputize law enforcement officers across the State of Oklahoma. The Federal Bureau of Investigation has increased their Safe Trails Task Force by adding new task force officers. The Bureau of Alcohol, Tobacco, Firearms and Explosives also are increasing their amount of task force officers to assist with the increased caseload.

For decades, the tribes and the state have worked together. Now more than ever, the tribes and the federal government will have to foster and continue to build relationships with each other to ensure that justice is served because of the *McGirt* decision.

The Oklahoma landscape may have changed, but the resiliency and determination of her people has not. ᏓᏏᏩ ᎫᏟᎯ ᏚᏳᎪᏛᎢ or Daphnia Ditlihi Duyukdv'I, means "Warrior of Justice" in the Cherokee language. Law enforcement, along with fire investigators, have stepped into the role of being a "Warrior of Justice." They are stepping up to ensure that those who cannot speak for themselves still have a voice and that though the days seem dark, the light of truth and justice are upon the horizon for the people of Oklahoma. ■

1 As of the date of this writing, there are other cases pending before the Oklahoma Court of Appeals on the same issue. Legal scholars believe that the court will rule in favor of the Native American tribes.

REFERENCES

McGirt v. Oklahoma, 140 S.Ct. 2452 (2020).

Bosse v. Oklahoma, Oklahoma Court of Criminal Appeals, 2021 WL 958372

State of Oklahoma v. Harris, Tulsa County District Court CF-2020-3114

State of Oklahoma v. McClain, Pontotoc County District Court CF-2021-00068

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The Fire Investigator and Explosions

Author: Joseph M. Ellington, B.S.

NFPA 921 Guide for Fire & Explosion Investigations (2021 ed.), and the IAAI-CFI® certification program, have evolved as standards to identify and establish guidelines and recommendations for the safe and systematic investigation and analysis of fires and explosions and to verify the fire investigator's knowledge, training, experience, and expertise in both.

Chapter 22 of NFPA 921 is dedicated to the investigation of explosions. As is true with the entire guide, however, it is not intended as a comprehensive scientific or engineering text, and users are cautioned that additional technical resources, training, and education may often need to be utilized in an investigation. This cautionary declaration is particularly true concerning explosion investigations that many investigators approach with less confidence than fires.

Figure 1 – Explosion in Progress

Fundamental to explosion investigation is the concept of what an explosion is. Explosions can occur before, during, and after fires and can be either their cause or result. Although the underlying chemical nature of fires and explosions is similar, their physical processes and effects are quite different. Although the rate at which their underlying chemical reactions occur (e.g., rapid vs sudden) is often cited as their primary difference, this simplification ignores more important differences in their physical aspects.

NFPA 921 defines an explosion as" the sudden conversion of potential energy (chemical or mechanical) into kinetic energy with the production and release of gas(es) under pressure. These gases then do mechanical work, such as damaging the confining vessel, moving, or shattering materials (See Figure 1), and injuring occupants or those nearby." [1]

Explosions may occur before, during, or after a fire and be their cause or a result. Fundamental to explosion investigation is the concept of what an explosion is. Although the underlying chemical nature of fires and explosions is similar, their physical processes and effects are quite different.

NFPA 921 Guide for Fire & Explosion Investigation includes explosions within the scope of its coverage and further elaborates its purpose is to establish guidelines and recommendations for the safe and systematic investigation or analysis of fire and explosion incidents. Chapter 22 of the 21st. Ed. of NFPA 921 is dedicated to their investigation of explosions.

Concurrently, the IAAI-CFI® certification program evolved as a standard to establish and verify the fire investigator's knowledge, training, experience, and expertise. Although implicit, the word 'explosion' is absent from the CFI designation. Whether this omission is by design or oversight, many fire investigators approach the investigation of explosions with less confidence than a fire and often lack the knowledge, training, and experience to investigate and document them.

NFPA 921 is not intended as a comprehensive scientific or engineering text and additional technical resources, training, and education may often need to be utilized in an investigation. In no other area is this need more apparent than the investigation of explosions.

Evidence that indicates an explosion has occurred includes mechanical damage or change brought about by overpressure as an integral element, producing physical effects on structures, equipment, other objects, including humans. Although almost always accompanied by the production of a loud noise, noise itself is not an essential element in the definition of an explosion.

NFPA 921 identifies two major types of explosions, mechanical and chemical, with which fire investigators are routinely involved that are differentiated by the source or mechanism by which the blast overpressure is produced. Mechanical explosions are characterized by the rupture of a closed vessel, cylinder, tank, or boiler resulting in the release of pressurized gas or vapor. The pressure within the confining vessel is generally not due to a chemical reaction or change in the chemical composition of the materials in the container.

Chemical explosions are characterized by the generation of overpressure as the result of exothermic reactions wherein the fundamental nature of the fuel changes. Combustion explosions involving utility

gases (e.g., natural gas, propane) or vapors of ignitable liquids used and stored in residences (e.g., gasoline, diesel, paints, solvents, etc.) are probably the most common type of chemical explosions encountered by fire investigators. These explosions are caused by the burning of combustible hydrocarbon fuels, characterized by the presence of a fuel (e.g., gases, vapors) mixed with air as an oxidizer. Similar in nature but encountered less frequently and not covered in this article, are dust explosions involving finely divided solid material disbursed in air.

Combustion explosions are characterized as propagation reactions because they progress in air through the reactant (involved fuel), with a definable wavefront or reaction zone (See Figure 2) separating the reacted and unreacted fuel.

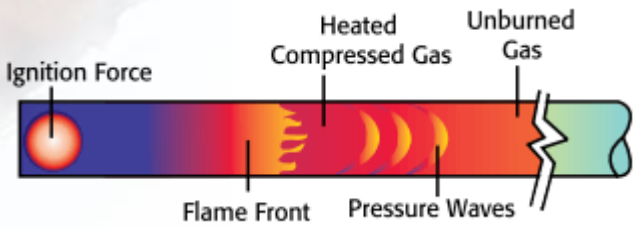

Figure 2 – Dynamics of an Explosion

While both fires and explosions involve similar mechanisms of heat transfer (e.g., conduction, convection, and radiation), the propagation of a fire does not involve a flame front, rate of pressure rise, or damaging pressures primarily responsible for the damage and injuries associated with explosions. Explosions, however, cannot be explained simply as progressing at a faster rate than explosions nor as a fire on steroids.

Depending on the presence and velocity of the flame front through a fuel-air mixture, combustion reactions may be characterized as flash fires, deflagrations, or detonations described in greater detail below.

The commonly accepted textbook definition of fire is an exothermic chemical reaction resulting in the evolution

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of light and heat in varying intensities. A fire [2] spreads through conduction, convection, and radiation (i.e., primary mechanisms of heat transfer), not through a flame front, and without damaging pressure. The pressures developed during building fires .002 - .004 psi (13.7 - 27.5 pascals) generally are not sufficient either to break glass windows or to force them from their frames.[3]

A *flash fire* is a fire that spreads through a flame front of a diffuse fuel, such as dust, gas, or the vapors of an ignitable liquid, without the production of damaging pressure.

Deflagrations involve the propagation of an unconfined combustion zone at a velocity that is less than the speed of sound in the unreacted medium accompanied by damaging overpressures. The unconfined release of gas, vapor, or mist into the atmosphere, for example, may form a vapor-air cloud within the fuel's flammable limits, ignite, and result in a flame front that produces a blast wave. In effect, the air itself becomes the restraining vessel.

Detonations involve the propagation of a combustion zone at a velocity that is greater than the speed of sound in the unreacted medium accompanied by damaging overpressure. Detonations are self-sustaining processes and do not require other sustaining reactions. Typically, though not always, detonations involve explosives.[4]

A fundamental understanding of the basic relationship between volume, pressure, and temperature as it relates to confined and unconfined gases is crucial to understanding explosions. The state of a given amount of gas is determined by its pressure, volume, and temperature and the effects of its confinement can be predicted by considering the Ideal Gas Equation [5], whose application is beyond the scope of this article.

Distilled to its simplest description, an ignition that is unconfined will result in an expanding volume of combustion products and generate a pressure wave that will expand at a pressure only marginally greater than the atmosphere. If, however, the ignition occurs within a fixed volume container (i.e., is restrained), the pressure increase will be greater and directly proportional to the increase in absolute temperature.

If the pressure exceeds the ability of the container or vessel (e.g., residential dwelling) that confined the event, it will rupture, releasing both the pressure and combustion products into the surrounding atmosphere. Combustion explosions also release quantities of energy that heat combustion gases and ambient air to high temperatures that can ignite nearby thermally thin and low thermal inertia combustible fuels and cause burn injuries to those involved.

It is helpful to view an explosion as a gas dynamic phenomenon that, under ideal circumstances, is an expanding spherical heat and pressure wavefront. The shape of the blast front from an idealized explosion would be perfectly spherical and would expand evenly in all directions from the epicenter where its ignition occurred. In the real world, confinement, obstruction, ignition position, cloud shape, or concentration distribution at the source of the blast pressure wave changes and modifies the direction, shape, and force of the front.

Turbulence generated by the geometry of the confining vessel, or high congestion within the structure can also magnify and increase pressures during deflagrations. Specialized Computational Fluid Dynamics (CFD) tools can be used to analyze and visualize these effects.

While peak overpressure, fragment effects, and thermal effects account for the damage sustained in most explosions, dynamic drag loads [6] and seismic effects (e.g. ground shock) may also occur in larger, more powerful, explosions involving more energetic fuels (e.g., explosives.)The type and extent of damage caused by the blast pressure front of an explosion are dependent not only on the total amount of energy generated but also, and often to a larger degree, on the rate of energy release and the resulting rate of pressure rise.

In commonly encountered situations such as fugitive gas explosions in residential or commercial buildings, the maximum pressure rise will be limited to a level slightly higher than the pressure that major elements of the building enclosure (walls, roof, and large windows) can sustain without rupture. In a well-built residence. This pressure will seldom exceed 3 psi (20.6 kPa) and building failures will typically occur at pressures as low as 1 psi (6.8 kPa).

Investigating the Explosion Scene

The objectives of explosion scene investigation are no different from those of a fire investigation and include:

- Identifying the Origin of the Explosion.
- Identifying the Fuel involved.
- Identifying the Ignition source.
- Identifying the Ignition sequence.
- Determining the Cause.
- Establishing Responsibility.

Explosion scenes, however, are frequently larger, involve more damage, are disturbed, and are frequently more complex in their interpretation than a fire scene. Consequently, a systematic and team approach (See Figure 3) to the scene examination is even more important in an explosion investigation than in a fire investigation. Without a preplanned, systematic approach, explosion investigations can easily become difficult to manage effectively and conduct.

Figure 3 – Team Approach

Identifying the Origin of the Explosion

An initial assessment of an explosion incident should include a safety and hazard assessment to determine what immediate actions are needed to restrict access to the scene to prevent additional injuries or unauthorized persons who may attempt to enter an unsafe area. Investigative activities should not commence until hazards are identified, rendered safe, and the level of personal protective equipment has been established.

The boundaries of the explosion scene should be established [7], securing it from further entry, and preventing further alteration than what may have already occurred. The presence and location of potential evidence should be identified, photographed, and documented for later collection, evaluation, and testing.

As much background information and documentation as possible should be obtained from the occupants, owners, representatives, and witnesses including a description of the site, systems, operations involved, and conditions and events leading up to the incident. The development and completion of a *timeline* [8] should be undertaken to reflect the sequence of relevant or benchmark events that occurred before and during the explosion. Witness accounts of conditions and actions immediately before and at the time of the explosion should be identified and documented.

Often, the investigator is confronted with determining whether the incident was a fire, an explosion, or, if both, which occurred first. The nature and extent of heat damage to the structure, its components, and contents will provide clues concerning whether that damage resulted from fire alone or a propagating flame front associated with the explosion.

To identify the origin of the explosion the investigator should make a detailed examination and analysis of the specific explosion or overpressure damage employing the use of explosion dynamics and a debris field diagram to document the epicenter of the explosion.

While a fugitive gas may occupy an area or volume, the concentration of the spreading gas is not uniform but highest closest to its source decreasing with distance from a leak. The problem for the investigator is to identify the location of the leak and the location of the ignition source within the area or volume of the fugitive gas. The origin of an explosion is the location where a fugitive gas within its flammable range coincides with a competent ignition source.

The size, shape, migration, and concentration within the structure, over time, maybe important in determining not only the origin of the explosion but also why it occurred when it did. It is also necessary to understand how a fugitive gas accumulated within the structure from a suspected leak to identify both the fuel and its source. Complicating the problem is the uncertainty of the location, nature, and size of the leak, the geometry of the compartment in which it occurs, and the presence or absence of passive and active ventilation.

A simple approach sometimes used by fire investigators is to presume uniform mixing of a leak at a static and unchanging rate over time but does not consider the physical characteristics of the gas nor represent real-world physics. A single-zone model, based on the perfect mixing equation incorporated into a spreadsheet, can also be used to predict gas concentrations as a function of time and considers air exchange rate that incrementally dilutes the gas concentration as the fugitive gas mixes with the air.

Neither of the methods above considers several important variables that affect the volume, distribution, and concentration solutions needed in such analyses including the specific physical characteristics of a fugitive gas, whether it is lighter or heavier than air, the effects of entrainment, turbulence, diffusion, stratification, and natural and forced convection. These methods are, however, within the skill set of the average fire investigator, provide useful data, and allow the investigator to 'frame the problem'.

More accurate methods of evaluating different gas leak scenarios require the application of CFD models that divide the computational domain being studied into a mesh of smaller volumes that consider these variables and provide spatially and temporally resolved quantitative information on the size, concentration, and location of the flammable gas cloud from the occurrence of the leak to the ignition event.

The characterization of explosion damage as either low order or high order damage is frequently used for descriptive and investigative purposes and may help identify the fuel(s) involved, their distribution within the structure, and relative concentration within their flammable range at the time of ignition. Though not always apparent or obvious, an explosion scene may contain evidence spanning both categories.

The physical and thermal damage sustained by a structure during an explosion involving a fugitive gas is largely dependent on the volume of gas and its concentration at the time of its ignition. For natural gas, mixtures having a gas concentration above 4.5 % and below 9.5% are lean mixtures with excess air. A sizable portion of the energy released during combustion of such mixtures goes into raising the temperature of the excess air, energy which does not go into raising the pressure of the products of combustion. As a result, the closer the concentration is to the lower flammable limit, the weaker the explosive force will be.

Relatively slow rates of pressure rise will produce pushing and bulging damage effects seen in low-order damage produced when the blast load is sufficient to fail structural connections of large surfaces, such as walls or roof, but insufficient to break up larger surfaces and accelerate debris to significant velocities. The weakest parts of the confining structure or vessels (windows, door, structural seams) will rupture first, venting the blast pressure wave and reducing the total damage effects of the explosion. A fire may, or may not, follow.

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Low-order damage (See Figure 4) is characterized by walls bulged out or laid down, virtually intact, next to the structure. Roofs may be lifted slightly and returned to their approximate original position. Windows may be dislodged, sometimes without the glass being broken. Debris produced is generally large and is moved short distances.

Figure 4 – Low Order Explosion Damage

High-order damage (See Figure 5) may occur when the rate of pressure rise is rapid and faster than the structure can respond to it. There will be more shattering of the confining vessel or structure. Debris will be thrown greater distances with more force, as the venting effects are not allowed sufficient time to develop.

Figure 5 – High Order Explosion Damage

The ideal fuel-air mixture, where there is no excess fuel and no excess air, is referred to as its *stoichiometric mixture*.[9] For natural gas that concentration is 9.5% gas in air. The stoichiometric level is where the pressure developed by the ignition of the mixture is a maximum and the destructive force of a gas explosion is the greatest and where buildings show the greatest damage. Stoichiometric explosions frequently show minimal to no fire damage to the building because much of the gaseous fuel is consumed in the explosion. Such explosions result in short-term, high-heat release rates, too short in duration to ignite structural components.

For natural gas, mixtures with a gas concentration above 9.5% and below 14.5% are rich mixtures with excess fuel and a sizable portion of the energy that is released during their combustion goes into raising the temperature of the excess fuel but not the pressure of the products of combustion. As a result, the closer the concentration is to the upper flammable limit the weaker the explosive force will be. However, because the excess fuel is still that is mixed and diluted by the surrounding atmosphere due to the turbulence, some of this fuel mixing with air will be brought down into the flammable range where it will burn, not as another explosion but as a fireball that will burn until the excess fuel has been consumed. Available combustible materials comprising the structure and its contents may also be ignited and a fire may follow the explosion.

Identifying the Fuel Involved.

Even if the fuel involved in the explosion seems apparent, the investigator should confirm and identify what fuels were potentially available. As described previously, this process involves estimating, for each possible source, the volume, time development, and spatial distribution of the resulting flammable cloud within the structure and reconciling its extent with the location of potential ignition sources and resultant damage. The investigator should evaluate all available fuel sources for their possible contribution to the incident. In particular, the location and condition of utility services and the presence of commonly stored combustible and flammable liquids (See Figure 6), should be carefully documented.

Such analyses should identify the nature of damage in comparison to typical damage patterns anticipated from the fuel that is suspected and should take into consideration important thermophysical properties of each fuel relevant to the issue(s) being examined. The most important of these are Specific Gravity, Ignition Temperature, Flammable Range, and if the vapor of a flammable liquid, its Flash Point.

Figure 6 – Thermophysical Properties of Common Gases and Vapors

Fuel	Chemical Formula	Specific Gravity Air = 1	Ignition Temp	Lower Explosive Limit %	Upper Explosive Limit %
Natural Gas	CH_4	.65	950-1,200 deg F (510-649 deg C)	4.5	14.5
Propane	C3H8	1.56	993-1,101 deg F (533–594 deg C)	2.2	9.5
Gasoline	Blend	3-4.0	632 deg F (333 deg C)	1.4	7.6

Identifying the Ignition Source

Explosions often present a 'target-rich environment' of ignition sources (See Figure 7) and establishing a competent ignition source is a critical part of any explosion investigation. In the real world of explosions, there is seldom a shortage of ignition sources to choose from in proximity to the fuels involved. The question generally is which was the most probable, and whether it constituted a competent ignition source at the time the ignition occurred.

Common ignition sources involving explosions include:

- Piloted (open flame)
- Electrical (Static, switches, motors)
- Lightning
- Friction
- Hot Surfaces
- Welding
- Spontaneous Heating
- Chemical Reactions

Figure 7 – Ignition Sources of Explosions

Although smoking is sometimes identified as an ignition source for an explosion, it is generally recognized that cigarettes are unlikely ignition sources for the vapors of common ignitable liquids or fugitive gases while being smoked. The use of an open flame device such as a match or disposable lighter to light a cigarette, however, can be a competent ignition source for an explosion, and dropped and improperly discarded smoking materials can also cause a fire that, in turn, results in an explosion.

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The simultaneous presence of fuel in the vicinity of a *competent ignition source* [10], although a requirement, does not guarantee an explosion will occur because not all the vapor or air-gas mixture associated with a leak is homogeneous or within its flammable range. In the case of a diffuse fuel explosion, the origin of the explosion will be the location where an air/gas mixture within its flammable range coincides with a competent ignition source at the time of its ignition, not the location of the leak.

A natural gas or propane leak, for example, that occurs from a pipe surrounded by soil and under pressure can migrate downward through the soil as well as upward and laterally and may be trapped in areas that contain explosive concentrations, including migration through the surrounding soil or below and inside a building to which piping is connected.

The concept of Minimum Ignition Energy (MIE) (See Figure 8) is frequently used regarding the threshold activation energy needed to ignite vapors, gases, and dust.

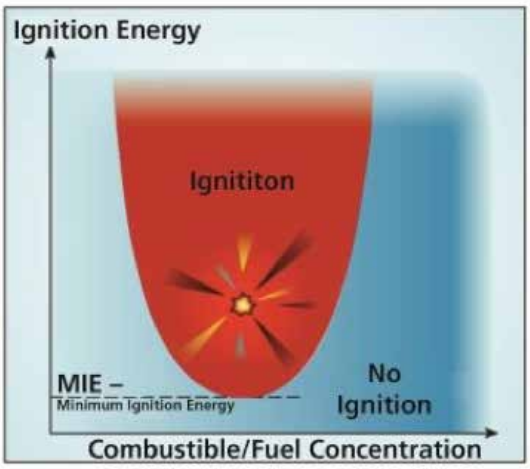

Figure 8 – Minimum Ignition Energy

This threshold is lower for vapors and gases than solids because no additional energy is needed to convert them from a solid or liquid to a gas or vapor.

Factors to be considered when evaluating ignition sources include:

- Location of the ignition source in relation to the fuel.
- MIE
- Flash Point, Fire Point, and Auto-Ignition Temperature of the fuel.
- Ignition energy and temperature of the ignition source.

Identifying the Ignition Scenario

The sequence of events that allowed the source of ignition, the fuel, and the oxidant to interact in the appropriate quantities and circumstances for combustion to occur, is understood as the ignition scenario and is essential in establishing the cause of the explosion. Identifying the fuel and ignition source involved in an explosion may imply but does not explain why the explosion happened nor identify its cause.

For example, a fire investigator has determined that when a homeowner attempted to ignite a grill (electronic igniter) installed in an outdoor kitchen, fugitive propane (fuel) vapors, mixed with an oxidant (air) ignited resulting in an explosion that destroyed the grill and severely burned and injured the homeowner. An ensuing fire spread to and destroyed a portion of the residence before being extinguished by the fire department. The *cause* [11] of the explosion (i.e., why it occurred) is a different and, arguably, equally important issue.

Identifying the Cause (See Figure 9)

The cause of an explosion may be in the form of either an act or omission. As with fire, there are many reasons why explosions occur:

- Human Error
- Non-compliance with codes or standards
- Intentional acts
- Production vs Safety issues
- Improper or inadequate training
- Natural Disasters
- Component or equipment failures
- Defective design of equipment or systems
- Improper installation, inspection, maintenance, or repair.

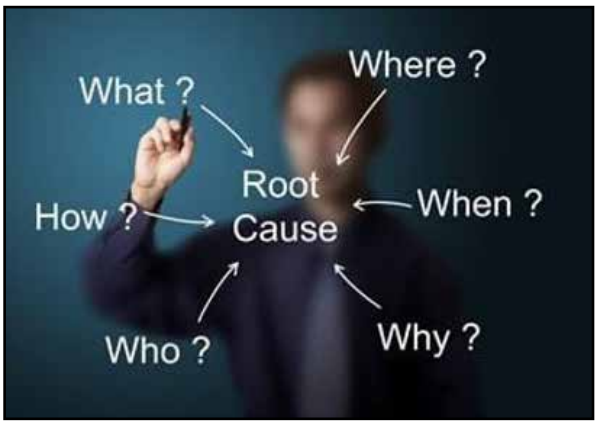

Figure 9 – Cause Analysis

The determination, or confirmation, of the cause of an explosion, frequently involves activities beyond the explosion scene itself and requires a multi-disciplinary approach involving other experts with specialized experience, training, and expertise and on whose opinions the investigator must rely.

Common post scene analyses of explosions to establish their cause may include leak location and pressure testing, laboratory analysis of debris, odorant analysis, metallurgical examination of damaged piping and components, X-Ray, CT Scanning, SEM Analysis, Component testing, failure analysis, and CFD Simulation and Modeling.

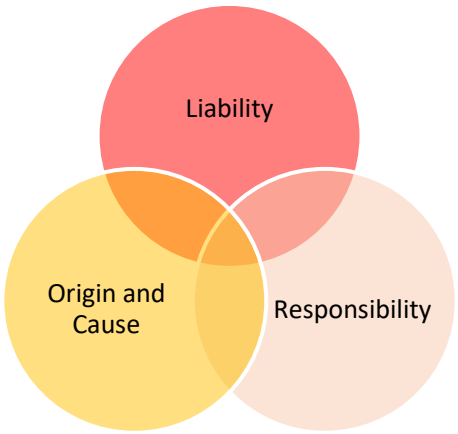

Figure 10 – Relationship of Cause and Responsibility

Identification of Responsibility

Responsibility is defined as "The accountability of a person or other entity for the event or sequence of events that caused the fire or explosion, spread of the fire, bodily injuries, loss of life, or property damage frequently arises from investigations." [12] While the responsibility for an explosion may be implied by the investigator's determination of its origin and cause (See Figure 10), the determination of liability is a legal one that ultimately resides in the hands of a judge or jury.

When investigators are asked to express opinions regarding the responsibility for an explosion, they should meet the threshold of certainty required to support them and withstand the reasonable examination of others in a legal setting. [13] The investigator should be informed regarding all relevant legal restrictions, requirements, obligations, standards, and duties related to establishing civil liability or criminal culpability and, importantly, be qualified to express those opinions based on their background, knowledge, training, and experience.

Summary

While infrequent, explosions are not uncommon and may happen before, during, or after a fire and be either their cause or a result. Although the goals and purposes of explosion investigation are the same, scenes involving explosions are more complex than fires and must be approached with greater knowledge and training, additional attention paid to detail and documentation, and specialized resources and tools employed to identify their origin, cause, and responsibility for their occurrence. ■

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[1] NFPA 921 Section 3.3.58 Explosion - The sudden conversion of potential energy (chemical or mechanical) into kinetic energy with the production and release of gas(es) under pressure. These gases then do mechanical work, such as damaging the confining vessel, moving, or shattering materials, and injuring occupants or those nearby.

[2] NFPA 921 – Section 3.3.68 Fire - A rapid oxidation process, which is an exothermic chemical reaction, resulting in the evolution of light and heat in varying intensities.

[3] NFPA 921 Section 6.3.17.2.3 - Glass fragments broken by pressures (.3 – 1 psi) found some distance from the windows of a building during fires may result from deflagrations or backdrafts.

[4] NFPA 921 Section 22.12 Explosives - A chemical compound, mixture, or device, whose primary purpose is to function by explosion. Common uses of explosives are in the military, mining, pyrotechnics, and oilfield.

[5] The Ideal Gas Equation is the equation of the state of a hypothetical ideal gas and approximates the behavior of gases during explosions.

[6] Dynamic drag load - The force on an object or structure due to transient winds accompanying the passage of a blast wave.

[7] NFPA 921 Section 22.14.2.1 Establishing the Scene - The outer perimeter of the incident scene should be established at 1 ½ time the distance of the farthest piece of debris evidence found. Search patterns may be spiral, circular, or grid-shaped, should overlap, and be searched more than once by different searchers to ensure evidence is not overlooked.

[8] Timeline analysis – An investigative tool that identifies relationships between events and conditions associated with a fire or explosion in a chronological fashion.

[9] NFPA 921 Section 5.1.5.2.2 - Stoichiometric mixture – Every fuel-air mixture has an optimum ratio at which point the combustion will be most efficient. When the amount of air is in balance with the amount of fuel (i.e., after burning this is either no unused fuel or unused air), the burning is referred to as stoichiometric.

[10] NFPA 921 Section 3.3.37 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.

[11] NFPA 921 Section 3.3.71 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.

[12] NFPA 921 Section 3.163 Responsibility. The accountability of a person or other entity for the event or sequence of events that caused the fire or explosion, spread of the fire, bodily injuries, loss of life, or property damage.

[13] NFPA 921 Sections 4.4.6 - Conclusions. Conclusions should be drawn according to the principles expressed in this guide and reported appropriately.

by Terry-Dawn Hewitt, Esq., Chair
and Wayne J. McKenna, Esq.

Editor's Note
Due to its length, this article is published in two parts. Below is the article outline showing which sections are published in each the Winter2022 edition (Vol. 72, Issue 3) and the Spring 2022 edition (Vol. 72, Issue 4) of the Fire & Arson Investigator Journal. Both parts are available to IAAI members at the IAAI website (sign-on required). Go to the IAAI website at https://www.firearson.com/; click the "Publications" tab; and then scroll down and click the "Fire & Arson Investigator Journal" link. Scroll down to 2022 Journals section and download Vol. 72, Issues 3 and 4.

Quality Assurance in Fire Investigations: The New NFPA 1321

Standard for Fire Investigation Units Part 2

CONTENTS

1. Introduction to Part II

This is the second Part of an article that discusses the initial draft of a proposed new standard: NFPA 1321 *Standard for Fire Investigation Units* (FIUs). To better understand the material that follows, readers are encouraged to first read Part I, where we explain quality assurance in fire investigations. We summarize the origins of NFPA 1321, introduce the NFPA 1321 technical committee, and outline the content of the NFPA 1321 draft.

In this Part, we begin by addressing NFPA 1321's role quality assurance. Next, we consider how NFPA 1321 relates to the recommendations by the OSAC Fire and Explosion Investigation Subcommittee in its report, *Strengthening Fire and Explosion Investigation in the United States: A Strategic Vision for Moving Forward (the Strategic Vision Report). We conclude with some areas to track in the development of NFPA 1321, and important dates in the NFPA 1321 revision cycle.*

2. *NFPA 1321's* Role in Quality Assurance

Having summarized *NFPA 1321*'s contents, we return to where this article began —quality assurance in fire investigations. "Quality Assurance" has been defined as, "a program for the systematic monitoring and evaluation of the various aspects of a project, service, or facility to ensure that standards of quality are being met." *NFPA 1321* meets every aspect of this definition. It addresses each facet of FIUs: the fire investigation services it delivers, the facilities and equipment it utilizes, and the knowledge, training, and education of its investigators.

For example, there is an overarching obligation to have policies "addressing integrity, accountability, independence and impartiality, respect, professional commitment. and professional conduct." *NFPA 1321* also obliges FIUs to evaluate the performance and competency of investigators, the evidence they collect, and their need for additional resources. It requires sufficient facilities, equipment, and vehicles for investigators to perform their duties. It also addresses every aspect of employee health and safety: at incident scenes, at the workplace, and wherever else they may be exposed to risks or hazards.

Earlier we looked at the four components of quality assurance. We observed that *NFPA 921* provides standardization of investigators' procedures and practices and that *NFPA 1033* forms a baseline for their certification. Now *NFPA 1321* is emerging. It has the potential to facilitate accreditation of FIUs, accreditation being one element of quality assurance. However, it also integrates the elements of standardization and certification. Here is how *NFPA 1321* deals with its companion documents, *NFPA 921* and NFPA 1033:

> **A.1.2** This [NFPA 1321] standard is not intended to replace or conflict with existing guidance such as NFPA 921 and NFPA 1033. Instead, these

documents should be utilized to support the FIU framework established by NFPA 1321. For instance, this standard requires the use of fire investigators trained and qualified to the job performance requirements (JPRs) established in NFPA 1033. Similarly, it identities that practices based on scientific methodology, such as those found in NFPA 921, are necessary for accurate and reliable origin and cause determination. Hence all three NFPA documents should be used in conjunction with one another to support the establishment, operation, and management of FIUs.

Therefore, from the quality assurance perspective, *NFPA 1321* can reinforce the principles of *NFPA 921* and *NFPA 1033*, all in the context of improving FIUs and the fire investigation services they deliver. It will take careful study together with discussion among members of the fire investigation community to fully appreciate *NFPA 1321's* full potential.

3. Relating *NFPA 1321* to OSAC's *Strategic Vision Report*

To understand some of the implications of *NFPA 1321*, it is useful to consider it in the context of the OSAC *Strategic Vision Report. While the OSAC subcommittee is a different entity from the NFPA 1321 TC, it is interesting to compare how each one deals with some of the same topics. (Remember that the NFPA 1321 TC had been working on NFPA 1321 for a year-and-a-half before OSAC published the Strategic Vision Report in mid-2021.) All of the recommendations listed below in italics are quoted directly from the report.*

Accreditation: *NFPA 1321's* purpose is to "specify the minimum elements necessary to support FIUs" (both public and private) (s. 1.2). It does not make accreditation mandatory, only making one mention of accreditation (in Annex A), suggesting an FIU may become accredited if it "so desires." (s. A.8.1). For those desiring to have their FIUs accredited, *NFPA 1321* will serve as a baseline for accreditation.

OSAC Recommendation: *Require accreditation of fire investigation units by third parties based on an applicable consensus standard.*

Quality Assurance: *NFPA 1321* requires the FIU to have, "a written quality manual detailing how the unit complies with the organizational goals and responsibilities as outlined in the unit's policies and procedures." (s. 4.1.3)

OSAC Recommendation: *Require fire investigation units to adopt a quality assurance system.*

Technical Review: *NFPA 1321* requires FIUs have a policy for administrative reviews, and for technical reviews to ensure reports reflect the scientific method. It also requires a policy of retrospective reviews to ensure these policies are implemented. (s. 8.4)

OSAC Recommendation: *Require all fire investigation reports to be subject to technical and administrative reviews. Require that case documentation supports the opinions within the report.*

OSAC Recommendation*: Fire investigation units should establish a formal process for fire investigators' work to be subjected to challenging technical review. This system should include both a review of written investigation records and reports as well as a verbal review that simulates testimony in depositions and trials. Investigators should be required to submit their work to this process routinely.*

Ethics: *NFPA 1321* provides that, "The FIU shall have policies addressing integrity, accountability, independence and impartiality, respect, professional commitment. and professional conduct." (s. 4.1.1.3)

OSAC Recommendation: *Require fire investigation units to adopt a Code of Ethics.*

Multiunit Investigations: *NFPA 1321*: Requires policies for coordinating investigations by more than one FIU. (Sec. 4.2)

OSAC Recommendation*: Fire and explosion investigation units should operate using a team approach. Cooperative investigation task force arrangements with neighboring jurisdictions, with state-level agencies, and with ATF should be organized and supported*.

Education, Training, and Certification: *NFPA 1321* requires competency of its investigators and obliges the FIU to periodically evaluate investigators' competency. There is no mention of proficiency testing.

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OSAC Recommendation: *Require competency and proficiency testing for fire investigation units both in their training and their continued monitoring of their work product.*

Compliance with *NFPA 1033's* JPRs: *NFPA 1321* requires the FIU to ensure the investigators have the education and training to remain current on the requirements listed in *NFPA 1033*. (s. 7.1)

OSAC Recommendation*: Fire Investigation Units should be required to establish a program that provides sufficient training and continuing education for fire investigators to meet the knowledge and Job Performance Requirements of NFPA 1033.*

OSAC Recommendation*: Fire investigators should complete college-level coursework in algebra, chemistry, and physics, and understand how these subjects relate to the behavior of fire.*

Certification to the *NFPA 1033* Standard: *NFPA 1321* states that the FIU investigators shall be certified according to *NFPA 1033* requirements. (s. 7.2)

The OSAC *Strategic Vision Report* does not make a formal "recommendation" that all fire investigators should become certified. However, The OSAC Fire and Explosion Investigation Subcommittee repeatedly states in its report that fire investigators should become certified to the requirements of *NFPA 1033*.

It appears that although the NFPA 1321 draft and the OSAC *Strategic Vision Report* have come from two different entities, both appear to be aligned concerning progress that FIUs need to make for quality assurance purposes. As with any other person or organization, the OSAC Fire and Explosion Investigation Subcommittee and its members have the opportunity to participate in the NFPA process, beginning with providing public input to the draft standard. It will be interesting to review any such submissions and see how the *NFPA 1321* TC responds.

4. Some Areas to Track:

Doubtless Public Inputs will be submitted for *NFPA 1321*. In considering areas to track, below are three that FISC members identified:

- ❑ Readers might wonder why the body of *NFPA 1321* is silent on accreditation, when it will serve to assist FIUs wanting to become accredited. The TC may not have wanted to impose accreditation on FIUs as mandatory. NFPA regulations require that the main text of an "NFPA Standard" contain "only mandatory provisions using the word "shall" to indicate requirements." Nonmandatory provisions are to be in an annex or other informational note. Hopefully the Public Input process will clarify the relationship of *NFPA 1321* to accreditation, presumably through Annex A material.

- ❑ Read the draft standard with a view to FIUs that want to comply with *NFPA 1321*. Consider those FIUs that rely on third parties (other agencies) for evidence storage, or other facilities, equipment, or services. It may be challenging to develop and enforce policies that govern the third party(ies), so that the FIU can maintain compliance with *NFPA 1321*. For example, some fire departments rely on the police department to collect or store evidence. The police personnel may not have sufficient training for collection or transportation of some types of evidence from fire scenes. Their storage facilities may not meet *NFPA 1321* requirements. Risk management and other inter-agency issues will need to be addressed.

- ❑ The definition of FIU in the *NFPA 1321* draft standard is, "An entity within a public, or private-sector agency with the responsibility for fire or explosion investigation." Two questions arise: 1) Will *NFPA 1321* apply to a fire investigation company that is not an "entity within" a larger organization? In other words, what if the fire investigation unit is a stand-alone organization. 2) Will *NFPA 1321* apply to fire investigation organizations (public or private) that consist of a single person who is the investigator. We assume that to comply with *NFPA 1321*, that this person would have to obtain and maintain certification, as well as complying with the standard's other requirements. That could be onerous for a one-person operation. This is a topic that will need clarification.

At the time of writing this article, with just days to go in the Public Input period, about 170 Public Inputs have been submitted. We look forward to reviewing the First Draft Report when it is published next year to see the matters that are raised in the Public Inputs and the TC's actions on and responses to each one.

5. *NFPA 1321* Revision Cycle: Key Dates

NFPA 1321 is in a Fall 2023 Revision Cycle for a 2024 first edition. The Public Input Closing Date was January 5, 2022. The First Draft will be posted by October 26, 2022, and **the Public Comment closing date is scheduled for January 4, 2023**. *Anyone may submit a Public Comment, which can be completed online through the link provided under the "Next Edition" tab of NFPA 1321's Document Information Page.*

6. Conclusion

We began this article by contemplating the changes that have occurred in the fire investigations discipline with the advent of standardization. Instrumental in this pursuit is the NFPA standards development process that has been facilitated through its Technical Committees. *NFPA 1321* will be another historic benchmark in the evolution of the fire investigations discipline once it is finally promulgated and embraced by the fire investigation community.

While change is often difficult, *NFPA 1321* is still in its early stages of development. This allows members of the fire investigation community time to participate in its development, and to adapt to and prepare for the transformation and challenges that the new standard will bring. We are confident that the growing pains will be worthwhile, and the new standard will represent another step in the continued improvement of our discipline.

Acknowledgements

The authors extend their thanks to the FISC members and other leaders in the fire investigation community who contributed to or reviewed this article:

NFPA 1321 TC Members: Charles "Randy" WATSON, IAAI-CFI®, IAAI-CI, CFEI, CVFI, SEA, Ltd., 1st Vice President IAAI, Chair NFPA 1321 TC, & OSAC Fire & Explosion Investigation SC Member; Robert K. TOTH, IAAI-CFI, President IAAI, Mark A. BEAVERS, IAAI-CFI®, Certification and Accreditation Manager, Travelers Forensic Fire Investigation Unit, Member FISC.

OSAC Fire & Explosion Investigation Subcommittee Members: Philip CROMBIE, Jr., Assistant Vice President, Travelers Forensic Laboratory, Chair OSAC Fire & Explosion Investigation Subcommittee; Craig L. BEYLER, Ph.D., Technical Director Emeritus, Jensen Hughes, Member OSAC Forensic Science Standards Board, Past Chair OSAC Fire & Explosion Investigation Subcommittee; John LENTINI, CFI, D-ABC, President Scientific Fire Analysis LL.C.

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ENDNOTES

1 **Disclaimer:** To the extent that this article contains opinions, they are the opinions of the authors and not of the International Ass'n of Arson Investigators (IAAI), the IAAI Fire Investigation Standards Committee (FISC), or the National Fire Protection Association.

2 Nat'l Fire Prot. Ass'n Technical Comm. on Fire Investigation Units, NFPA 1321 Standard for Fire Investigation Units, Proposed Edition (2021) [hereinafter NFPA 1321 Draft for Public Input, 2021], available through a link on the "Next Edition" tab of the NFPA 1321 Document Information Page, https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1321&tab=nextedition. It is necessary to have (or create) a free NFPA account to access the draft standard.

3 "OSAC" is the acronym for "Organization of Scientific Area Committees for Forensic Science," administered by NIST. More information is available on the NIST-OSAC webpages, available at https://www.nist.gov/osac.

4 Org. of Sci. Area Comm. for Forensic Sci., Fire & Explosion Investigation Subcomm., *OSAC Technical Guidance Document 0005—Strengthening Fire and Explosion Investigation in the United States: A Strategic Vision for Moving Forward* (2021), https://doi.org/10.29325/OSAC.TG.0005 (last visited Dec. 12, 2021) [hereinafter OSAC Strategic Vision Report].

5 *Quality Assurance*, *Merriam-Webster*, https://www.merriam-webster.com/dictionary (last visited Dec. 20, 2021).

6 NFPA 1321 Draft for Public Input, 2021, *supra.* note 2, s. 4.1.1.3.1.

7 NFPA 1321 Draft for Public Input, 2021, *supra.* note 2, s. 4.2.1.3 & 7.1.4.2.

8 NFPA 1321 Draft for Public Input, 2021, *supra.* note 2, s. 5.2 & A.5.2.1.

9 NFPA 1321 Draft for Public Input, 2021, *supra.* note 2, s. 5.1.4.

10 NFPA 1321 Draft for Public Input, 2021, *supra.* note 2, s. A.1.2

11 OSAC Strategic Vision Report, *supra* note 4.

12 OSAC Strategic Vision Report, *supra* note 4, at xxv to xxviii. This section of the front matter pulls together all of the formal recommendations that appear at the end of various chapters in the report.

13 OSAC Strategic Vision Report, *supra* note 4, at pp. xx, 25, and 117 (*citing* National Commission on Forensic Science-Views of the Commission, Certification of Forensic Science Practitioners (September 12, 2016)).

14 *See* the official NFPA definition of the word "Standard," which provides:

> An NFPA Standard, the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and that is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational note, or other means as permitted in the NFPA Manuals of Style. When used in a generic sense, such as in the phrase "standards development process" or "standards development activities," the term "standards" includes all NFPA Standards, including Codes, Standards, Recommended Practices, and Guides.

Definition of *Standard,* NFPA 1321 Draft for Public Input, 2021, *supra.* note 2, s. 3.2.5.

15 *Id.*

16 NFPA 1321 Document Information Page, "Next Edition" tab, https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1321&tab=nextedition.

By Margot Liechti, BSc, BEd, LLB, LLM
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A Voir Dire on the Admissibility of Expert Evidence in a Fire Case

A *voir dire* is a separate hearing within a trial in which the judge (the trier of law) determines whether evidence is admissible to be entered into evidence in the trial. The judge hears submissions regarding the admissibility of the evidence from counsel, and then renders a decision on admissibility. The evidence heard in a voir dire does not form part of the evidence in the trial proper unless and until that evidence has been ruled admissible by the judge. If the evidence is ruled admissible, the party has to adduce that evidence in the trial.[1] If the trier of fact is the judge, and the judge has ruled the evidence inadmissible, then the judge must disregard the evidence brought forth in the *voir dire*. If the trier of fact is a jury, then the *voir dire* will have been held in the absence of the jury, meaning that the jury will not have heard the impugned evidence.

The judge's findings from a *voir dire*, if published, can provide a useful guide to experts, and the legal counsel who instruct them, into what the Court considers key factors for determining whether an expert's opinion evidence is admissible at trial. Such an opportunity arose in the case of *656621 B.C. Ltd. v. David Moerman Painting Ltd.* 2022 BCSC 318, a proceeding in which the British Columbia Supreme Court published its ruling on a voir dire on the admissibility of a fire investigator's expert opinion evidence.

In this case, a log building (the "Lodge") was completely destroyed in a fire. The plaintiffs retained a certified fire investigator (the "Expert") to determine the cause and origin of the fire. The defendants objected to the Expert's opinion evidence, alleging bias and unreliability, amongst other objections.

The factual background behind their objections was that the expert conducted two investigations, each resulting in different opinions on the cause of the fire, but with inadequate documentation and explanation for the change in opinion.

Summary of the Fire Investigations & Reporting

The Expert conducted a scene investigation in the immediate aftermath of the fire and, after eliminating possible failures in the mechanical, propane or electrical systems at the Lodge, as well as arson, concluded that the cause of the fire was undetermined. Subsequent information came to light that revealed that a staining crew had been staining the day before the fire, and had stored stain infused rags and brushes at the end of the workday in an area near where the Expert had determined was the origin of the fire. The Expert re-opened his investigation and, ultimately concluded, that the cause of the fire was the "spontaneous combustion event brought on by the careless handling of products and materials used in the staining process."[2] During his re-investigation, the Expert ran some tests, trying to re-create the conditions of the room in the Lodge where the fire originated, as well the staining crew's placement of the materials at the end of the workday. The results of his testing did not yield evidence of combustion in the time frame as suggested by the witnesses. The Expert ultimately did not report on his testing in his report, as he was unable to re-create the pre-fire conditions with sufficient similarity.

The Objections to the Admissibility of the Expert Evidence

In Canada, there is a two stage inquiry into the admissibility of expert opinion evidence. The first step, called the "threshold inquiry", is an inquiry into the whether the proposed expert opinion evidence is (a) relevant, (b) a necessity in assisting the trier of fact, (c) not subject to an exclusionary rule of evidence, and (d) from a properly qualified expert. The second step, called the "gatekeeping inquiry", is a discretionary inquiry wherein the trial judge must balance the potential risk (or costs) and benefits of admitting the evidence, and decide whether the potential benefits justify the risks.

In this case, the defendants' "threshold" objection to the Expert was (d), his qualifications. However, they were not challenging Expert's general qualification as an expert in the field of fire investigation qualified to provide opinion on the origin and cause of fires. Rather, they were challenging his qualification as an expert in the particular circumstances of the case; that is, the Expert was unable to provide the Court with sufficiently "independent, impartial and objective" opinion evidence because he had been subjected to, through no fault of his own, inappropriate procedures and influences by the plaintiffs. As such, the Expert, they alleged, acted as a biased advocate for the plaintiffs.

The defendants' "gatekeeping" objection was that, if the Court finds that the Expert is properly qualified, his evidence can still be excluded if, "as a result of his alleged advocacy, bias (unconscious or otherwise) and unreliability, his evidence is not sufficiently beneficial to warrant its admission, in light of the potential harm to the trial process that may flow from its admittance into evidence."

Step 1: Threshold Inquiry

The first step in the Court's analysis of whether expert opinion is admissible is to determine whether the expert is able to fulfill his duty to the Court to provide independent, objective and impartial evidence.

The defendants "threshold" objection was that the Expert was not "a properly qualified independent, impartial and objective expert, as a result of his alleged bias and advocacy on behalf of the plaintiffs". The factual specifics of the allegation that the Expert could not meet his duty to the court were:

- The plaintiffs had failed to define a set of factual assumptions for which the Expert to rely upon in forming his opinion, which created the situation where he was able to choose his own factual assumptions, resulting in biased and unreliable opinion evidence. In particular, the Expert did not re-interview the staining crew and everyone else in attendance at the Lodge on the day of the fire after the security footage came to light after his initial scene investigation. Further, he did not review the examination for discovery transcripts of the defendants and other witnesses, even though he received these transcripts. As a result, the Expert overlooked evidence potentially related to the cause of the fire.
- The plaintiffs' late disclosure of the security footage resulted in the need for the Expert to conduct a second on-site investigation. It was after this second

on-site investigation that the Expert conducted his testing, and revised his opinion that spontaneous combustion being the cause of the fire. The defendants objected to this second opinion because they said that the Expert was exposed to incorrect information about what the security footage depicted and to the plaintiffs' personal opinions as to the cause of the fire.
- The Expert's testing failed to yield reliable results as to whether spontaneous combustion was a potential cause of the subject fire, and this test results should have been included in his second report.
- The Expert committed various additional "missteps", the sum total of which caused the Expert to develop unconscious biases that that prevented him from keeping an open mind during his second investigation.[3] The core allegations of bias alleged by the defendants were breaches of NFPA 921, chapters 4.3.9 and 4.3.10, with respect to expectation and confirmation bias. [4]

The Court ultimately rejected each of the allegations of bias, noting in particular that during cross-examination the Expert:

- "did not hesitate to agree (on more than one occasion) that should the facts underlying his assumption prove to be different than he stated, he would likely have to change his opinion. By way of example only, he confirmed that if the staining materials were stored under the west side balcony, as opposed to on the north side of the Lodge, he would likely change his opinion back to an indeterminate cause," [5] and;
- "was consistent in his evidence on cross-examination that in his field of expertise, he is frequently subjected to attempts to sway his opinion, and that he is not influenced by others." [6]

Step 2: Gatekeeping Inquiry

The second step in the Court's analysis of whether expert opinion is admissible is to consider and balance the potential costs (risks) and benefits of admitting the expert opinion evidence, in order to determine whether the potential benefits of the evidence justify the risks.

With regard to the benefit of the Expert's evidence, as the opinion was related to the central issue of the case – **the cause of the fire** – the Expert's opinion was essential to the Court's determination on causation and, as such, was a significant benefit.

On the other hand, the potential costs of the Expert's evidence were:

- **Bias in identifying the underlying facts and assumptions:** the Court accepted that the Expert was in a difficult, but not impossible, position of having to determine the underlying facts and assumptions of his opinion on his own. However, the Court found that the Expert had made his facts and assumptions clear in his report, including those that allowed him to eliminate mechanical, propane and electrical systems as the cause of the fire.
- **Advocacy on the behalf of the plaintiffs:** the Court disagreed that the Expert had engaged in advocacy when he interpreted various security stills from the night of the fire as showing a source of light that he concluded was likely from the subject fire. The Court found that the Expert was reasonably drawing on his experience as a fire investigator when he made this inference. Moreover, the Expert undertook a significant analysis to identify the origin of the fire, beyond merely looking at the security stills.
- **Lack of disclosure to the prejudice of the defendants:** the Court accepted that the Expert should have included in his expert report a reference to his rejected testing results and, his failure to do so, gave rise to the situation where the defendants did not learn of his testing until the deadline for the disclosure of an expert's file,[7] which, in British Columbia, is much later than the deadline for the service of the expert reports.[8] This omission raises issues of potential prejudice and unreliability in the evidence. The Court explained why as follows:

> As a matter of best practice, it would have been wise for [the Expert] to include in his Expert Report a concise reference to the Testing and the results, and his reasons for not finding the results to be reliable nor relevant to the formation of his opinion. That standard would not require experts to disclose irrelevant or unreliable material that they did not use, nor would it open a Pandora's Box of useless and distracting material littering expert reports, as argued by the plaintiffs. Rather, when he set out to do further testing to "confirm the vulnerability of the Cetol to spontaneous combustion" (as set out in the email forwarding his Reclassification Report) it would have been preferable for him to advise the Court of the results of that testing when he finalized his Reclassification Report and wrote his Expert Report. [The Expert's] failure to advise of the Testing occurrence and results raises the issue of potential prejudice to the defendants in answering the case against them, as well as issues of reliability in relation to the alleged confirmation bias. These costs are factored in the weighing conducted below.[9]

The final step in the gatekeeping inquiry is a weighing of these potential costs and benefits to both the plaintiffs and the defendants:

- **Plaintiffs:** without the Expert's evidence, the plaintiffs would be significantly prejudiced in their ability to provide any evidence by which to potentially prove their case.
- **Defendants:** with the Expert's evidence, the defendants are prejudiced in their ability to effectively respond to the Expert's evidence, which had been challenged as being potentially unreliable.

Ultimately, the Court found that, given the importance of the having an opinion on the critical issues of origin and cause, the Expert's report should not be excluded at the gatekeeping stage of the inquiry, despite the potential reliability issues of the evidence.

That being said, the Court explained that, while these issues were insufficient to allow the Court to exclude the report outright, these issues would go to the weight that the Court could give to the Expert's evidence:

> I am satisfied that the defendants' arguments as to the potential unreliability of his evidence do not eliminate its probative value. Those arguments will be addressed when I consider the weight I am able to put on [the Expert's] evidence, after hearing all of the evidence. … [A]ny issues arising out of alleged unconscious bias, or lack of disclosure of the Testing, can properly be addressed as matters of weight at the conclusion of the proceeding. The extent to which I can rely upon [the Expert's] opinion will include the extent to which his underlying facts are supported by admissible evidence. [10]

Conclusion

As of yet, the Court has not released the judgement from the trial proper, so we will have to wait to find out the ultimate weight the Court placed on the Expert's opinion evidence given the significant issues with the investigation, testing and disclosure. The takeaway for our readers is that best practice is to review all the materials provided, explaining why or why not those materials were relied upon, as well as reporting on any testing or research conducted, even if ultimately those efforts were rejected as being relevant or material to the expert opinion formed.

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1. Unless there is an agreement by the parties that the evidence, if ruled admissible, will become evidence in the trial proper without the necessity of repetition.
2. *656621 B.C. Ltd. v. David Moerman Painting Ltd.* 2022 BCSC 318, at 26, 35.
3. *656621 B.C. Ltd. v. David Moerman Painting Ltd.* 2022 BCSC 318, at 51-52, 55.
4. *656621 B.C. Ltd. v. David Moerman Painting Ltd.* 2022 BCSC 318, at 49-50, 54.
5. *656621 B.C. Ltd. v. David Moerman Painting Ltd.* 2022 BCSC 318, at 60.
6. *656621 B.C. Ltd. v. David Moerman Painting Ltd.* 2022 BCSC 318, at 62.
7. 14 days before trial. See BCSC Rule 11-8(b).
8. 84 days before trial. See BCSC Rule 11-6(3).
9. *656621 B.C. Ltd. v. David Moerman Painting Ltd.* 2022 BCSC 318, at 89.
10. *656621 B.C. Ltd. v. David Moerman Painting Ltd.* 2022 BCSC 318, at 91-92.

Seen on Scene

I'm Seeing the Light

By Robert K. Toth, IAAI-CFI®

This edition of Seen on Scene is probably better said to be "Not Seen on Scene…. YET!"

We have all seen or used scene marking tools such as evidence tents, labels, paint sticks, etc., in identifying key pieces of artifacts at fire scenes. Some of you may also be familiar with (soon to be a future article) the evidence labels I carry on my smartphone and use for marking items on a fire scene.

Expanding on the ways to document evidence, IAAI member Dávid Petrétei emailed me from Budapest, Hungary, with information on "Markjector." Markjector is a contactless crime scene marking system. It is a hand-held projector tool attached to a commercial flashlight or torch. It can project a wide range of crime scene marking tools, especially arrows and evidence numbers.

Capture 1
Indoors, outdoors, or at a distance, the projected images can still be captured on a digital image.

Projected light as a marking tool has many advantages. The marking can be done without contact and contamination. It can be done in hard-to-reach places, at a distance, and on challenging surfaces. The tool is straightforward to change the angles or size of the marks, place them in different positions, and aid in the review of the photographs where these projections are captured. István Havas, a crime scene investigator from the Budapest Police Department, is the inventor of the Markjector.

Knowing that most of us work in darkened environments, I asked about the effectiveness of using flash photography. Mr. Petrétei sent me photographs taken in darkened rooms with the Markjector, and the projections were easily observable. From a distance, zooming in, or close up, the projected marker was easily observed in all the photos.

I have seen the light!... and predict this becoming a useful tool for the investigative community in the future. According to Dávid, production of the tool has just started. More information and example photos can be found at the following website: http://markjector.hu/

I always encourage you who have ideas or techniques to share them with the membership. I have received a few and hope to highlight them in the future. You do not have to write an entire article but drop me an email with the idea or technique at irisfire.robert@gmail.com. So that my email program does not immediately toss you in the "junk mailbox" because it does not recognize your name, please place "Seen on Scene" in the Subject line of your email. After reviewing the email and your idea, I will contact you if I need additional information for the article.

Capture 2
In a darkened room, with flash photography, the projected image is still easily captured on the digital image.

Capture 3
With the image captured from a distance with flash photography, the same projection still shows the evidence marker projected on the wall.

chapters corner

By Chris Ward, IAAI-CFI, MIAAI

Dear Fellow IAAI Members,

What an amazing week at the IAAI ITC in Jacksonville, FL! After two long years, it was great reconnecting with our IAAI family from around the world. I hope you and your families are all doing well.

During the ITC, we held our well-attended Chapter Officers Lunch. Many great ideas and discussions took place on how we could better serve our members. We have held quarterly meetings with the Chapter Presidents only in the past. We would like to open this up for all Chapter Officers to participate in these quarterly Zoom meetings. The Zoom invite for these meetings will be sent directly to the Chapter President on file, and we ask our Chapter Officers to reach out to your Chapter Presidents to get the notifications of these meetings. During these meetings, the IAAI Executives, IAAI Directors, and Committee Chairs will be available to address and update our Chapters. We encourage all of our Chapter Officers to attend these quarterly meetings to keep the lines of communication open.

Upcoming Chapter Officers Quarterly Meetings: (Please mark your calendars!)

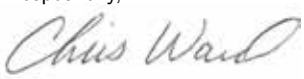
May 10, 2022	**3:00 pm EDT**
August 9, 2022	**3:00 pm EDT**
November 8, 2022	**3:00 pm EST**

During our IAAI Annual General Meeting, I was happy to report the formal formation of the Chile Chapter 82 and Gulf Association of Fire Investigators Chapter 83. With the addition of these two new Chapters, we have added close to 100 members to our association.

I will personally reach out to our Chapters behind in submitting the required documentation. We must have the most up-to-date information to stay in contact with our Chapters. I want to remind our Chapters and their Presidents that the Annual reports and updated Chapter Officer change forms are due 30 days after completing your Annual General Meeting. Our most important asset as an organization is our membership, and we need to keep the lines of communication open, so please make sure your Chapter contact information is updated.

I hope to see you all soon! If you have any questions, comments, concerns, or if we can assist our Chapters in any way, please feel free to contact me.

Respectfully,



Chris Ward IAAI-CFI(V), IAAI-ECT
IAAI Director
Chapters Committee Chair
chris.ward@firearson.com
815-405-5491

CHAPTERS COMMITTEE/LIAISONS

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Mike Presson Co-Chair	michael.presson@libertymutual.com	MO, IA, AR
David Brining	cfidavidb@comcast.net	MD/DC, VA, WV
Justin Pape	jpape82@gmail.com	MN, ND, SD
Cory Dennert	cdennert@idahofallsidaho.gov	ID, WY, MT, UT
Eric Emmanuele	eemmanuele@comcast.net	AK, HI
Ryan Fields	rfields@orcafire.com	OR, WA
Keith Paffrath	keith@forensicfire.com	AZ, NM, NV, CA
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Jerome Duet	jduet@figfire.net	LA, OK, TX
Tommy Sipsy	tsipsy@southernco.com	GA, KY, TN
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Jim Pioth	jpioth@aol.com	IL, IN
Wes Pullen	cfis.rwp@gmail.com	AL, FL, MS
Bill Rieger	billriegerjr@gmail.com	DE, PA, MA, NJ, RI
Rose Rozmiarek	Rrozmiarek@nefco.net	NE, KS, CO
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John McDermott	john.mcdermott@slavelake.ca	QC, ON, AB, BC
Scott Tebo	scott.tebo@thehartford.com	MI, OH, WI
Ric Torres	ricdtorres@aol.com	Latin America Chapters

health & safety *Committee Update*

Providing the latest in fire investigator health and safety information to our members

Jeff Pauley
M.S., IAAI-CFI, and CI, MIFire, Chair, Health & Safety Committee

The IAAI's International Training Conference recently concluded. While there will be detailed information in a future issue, I would like to thank the Training & Education Committee for the opportunity to present an entire day's worth of important health and safety information. All four sessions were very well attended.

We also announced the release of the third edition of Fire Investigator Health and Safety Best Practices during this special day. This edition contains the latest research and best practice information. Download your copy today at www.iaaiwhitepaper.com

Health & Safety In-depth: Extending the clean cab concept to fire investigator vehicles

Many fire investigators are at more fires than the average firefighter and for a much longer time. This means that regardless of the PPE worn and the field/gross decontamination procedures followed at the scene, the inside of our vehicle is likely contaminated with particulate matter that we cannot see. Therefore, vehicles used by fire investigators should support the clean cab concept and be able to store and transport tools and materials separately, with contaminated items physically separated from the passenger area.

Clean cab examples. Credit: Palm (FL) Beach Fire Rescue

Containers of collected evidence and soiled/dirty tools and clothing should be stored in areas other than the vehicle's passenger compartment or trunk to prevent off-gassing and airborne particulate exposure. If this is not possible, all items used and worn at the scene should be placed in tight-sealing tubs/containers or sealed in sturdy plastic bags.

Except in an emergency, do not enter or allow others to enter your vehicle's passenger compartment unless ALL potentially contaminated clothing has been removed and all exposed and transition/interface skin areas have been cleaned.

To help minimize the particulate contamination to your vehicle, it is the best practice to park upwind of the scene, not have the HVAC running, so you don't pull in contaminated outside air (using the recirculate function is better if needed), and to keep the windows and doors closed as much as possible.

The vehicle's interior should be cleaned frequently, regardless of contamination potential, because of the unseen health hazards that could be present. If you share a vehicle with other investigators, it would be good to thoroughly wipe down the interior at the beginning of your shift.

See Section 2 of Fire Investigator Health and Safety Best Practices, 3rd Edition for additional information regarding the clean cab concept and fire investigator vehicles. If you are working on configuring a new fire investigation vehicle, this section also has important information for you.

TRAINING COMMITTEE NEWS

GLOBAL LEADERS IN FIRE INVESTIGATIONS®

Trace Lawless
IAAI T&E Committee
Chairman

David Bridges
IAAI T&E Committee
Co-Chairman

Vickie Clancy
International Training
Manager

ADVANCED
Technical Photography

COMPLEX ARSON
for the Insurance Industry

ELECTRICAL ASPECTS
of Fire Investigation

ELECTRICAL FUNDAMENTALS

EVIDENCE COLLECTION
Technician Practicum

EXPERT REPORT WRITING

EXPERT WITNESS
Courtroom Testimony

FIRE DYNAMICS

40-HOUR
Fundamentals of Fire Investigation

GIVING BETTER
Deposition and Trial Testimony

INVESTIGATING AND LITIGATING
Fire Losses for Subrogation Insurance Carriers

INVESTIGATING YOUTH SET FIRES

MOTOR VEHICLE FIRE INVESTIGATION

NFPA 921 UPDATE

ORIGIN AND CAUSE

TRAINING & EDUCATION

Happy Spring!

Trace Lawless, T&E Chair, David Bridges, T&E Co-Chair, and Ashley Gelzer, Training Coordinator, along with the Training & Education Committee, have been busy working to provide our members with updated course curriculums, new classes, and our own website. For the latest news on classes, please visit www.IAAITraining.com

Presented by Forensic Anthropologist Elayne Pope, PhD, the Fire Fatality Investigation training is an in-depth look at burn patterns on soft and skeletal tissues as surviving evidence in arson investigations. First up is Fire Fatalities Investigation class with Dr. Pope on July 26, 2022, in Wichita, KS. Subsequent classes are on August 9, 2022, in Buffalo, NY, October 4, 2022, in New Orleans, LA, and November 8, 2022, in Richardson, TX.

September 13 -14, 2022, IAAI will be hosting Investigating Youth Set Fires in Louisville, KY. This one-and-a-half-day class provides 12 hours of tested training. It reinforces a multi-disciplinary team approach consisting of a fire investigator, a police/arson investigator, a juvenile justice professional and a district or prosecuting attorney. It models the kind of cooperation needed to successfully investigate and intervene with a juvenile who is misusing fire or explosives.

October 23 – 28, 2022, IAAI and ATF will be conducting COMPLEX at NCETR in Huntsville, AL. This week-long program embraces the best of adult-based, interactive learning. Students worldwide leave with new tools and skills that they can immediately apply to their work environment. A key highlight is a practical exercise that takes small groups of students inside a real investigation to drive through the skill development of subject matter experts.

If you are considering hosting a class or would like to inquire about upcoming offerings, please contact me at your convenience - Vickie.clancy@firearson.com.

I look forward to hearing from you.

Regards,

Vickie Clancy

IAAI International Training Manager

IAAI-CFI®

(Certified Fire Investigator) Program

In 1986, the IAAI resolved a national concern by developing the *Certified Fire Investigator (IAAI-CFI®) Program*. The IAAI-CFI® program is an established process for identifying and recognizing a fire investigator's expertise. This program is accredited by the *National Board of Fire Service Professional Qualifications (Pro Board)* www.theProBoard.org. You do not have to belong to IAAI to become certified.

Certification is based on attainment of at least 150 points through education, training and experience, as well as a passing grade on a comprehensive examination. Before you are permitted to sit for the examination, your application must be approved by a review committee. You must be able to document every point claimed on your application. Certificates, diplomas, testament letters and transcripts are examples of acceptable documentation. Once your application is approved, you will be sent the name of a proctor in your area.

COMPREHENSIVE PROCTORED EXAMINATION:
A "closed book" examination that is based upon every duty area within NFPA 1033. A score of 70 percent or above must be achieved to successfully pass the exam.

Note: *Minimum experience requirements include at least four years full-time or five years of part-time fire investigation and two instances of Expert Witness Courtroom Testimony (origin & cause) or proof that you have successfully completed an IAAI, NFA or ATF Expert Witness Courtroom Testimony Course.*

APPLICATION FEES:

IAAI Members: $195.00USD

Non-Members: $570.00USD

Renewal every five years.

IAAI-FIT®

(Fire Investigation Technician) Program

The Fire Investigation Technician Program is designed to verify an applicant's fundamental knowledge as measured against core job performance requirements of established professional qualification standards for fire investigators defined in NFPA 1021, NFPA 1033 and NFPA 1037.

The applicant must provide documentation of meeting minimum requirements including experience, training and education. Upon approval, they must successfully pass a comprehensive examination.

APPLICANT MUST COMPLETE TRACK A OR B

Track A
MANDATORY CLASSES FROM CFITrainer.Net®:

- Ethics and the Fire Investigator (3 hours)
- NFPA 1033 and Your Career (2 hours)
- The Practical Application of the Relationship Between NFPA 1033 and NFPA 921(2 hours)

Approved Comprehensive Fundamental Fire Investigations Course (40 hours)

Track B
MANDATORY CLASSES FROM CFITrainer.Net®:

- Documenting the Event (4 hours)
- Ethics and the Fire Investigator (3 hours)
- NFPA 1033 and Your Career (2 hours)
- The Practical Application of the Relationship Between NFPA 1033 and NFPA 921(2 hours)
- The Scientific Method for Fire and Explosion Investigation (3 hours)

General Tested Training (30 hours)

REQUIREMENTS

EXPERIENCE: A minimum of 18 months of general experience in a fire investigation related agency or industry.

TRAINING EDUCATION: Minimum of 44 hours of tested training.

COMPREHENSIVE EXAMINATION: An examination that is based upon core job performance requirements. A score of 75 percent or above must be achieved to successfully pass the exam. Required for both tracks.

APPLICATION FEES:

IAAI Members: $90.00USD

Non-Members: $325.00USD

Renewal every three years.

MOTOR VEHICLE FIRE

Credential Endorsement Program

The Motor Vehicle Fire Credential Endorsement program encompasses the sub category of passenger motor vehicle fire investigation. The credential attaches to the highest level IAAI Certification of the applicant. All applicants must possess either the IAAI Fire Investigation Technician designation (IAAI-FIT®) or the IAAI Certified Fire Investigator designation (IAAI-CFI®). The IAAI-FIT and IAAI-CFI are administered by the IAAI and are designed to verify an applicant's level of fundamental knowledge as measured against various core job performance requirement (JPR) of NFPA 1033 Standard for Professional Qualifications for Fire Investigator and other guidelines related to fire investigation. This standard lays the foundation for measuring the holder's fundamental understanding of how to perform specific tasks related to fire scene investigation at an acceptable level and their ability to properly perform specific tasks related to the specialized motor vehicle fire investigation category.

REQUIREMENTS

EXPERIENCE: The applicant for the Motor Vehicle Fire Credential Endorsement must currently possess the IAAI-FIT or IAAI-CFI credential or apply at the same time as applying for IAAI-FIT(V) or IAAI-CFI(V) credentials. The applicant must have a minimum of three (3) years of specific experience of fire investigation, which shall be directly involved with the investigation and documentation of motor vehicle fire events. The applicant must have participated in the investigation

Member rates apply to International members only. IAAI chapter members must belong to the International Association of Arson Investigators to receive the member rate.

IAAI-ECT®

(Evidence Collection Technician) Program

The Evidence Collection Technician Program is designed to verify an applicant's fundamental knowledge as measured against core job performance requirements of established professional qualifications standards and standard industry practices related to evidence collection on fire scenes. This measurement is not all inclusive of the incorporated professional standards sited, but lays the foundation for measuring the holder's fundamental ability to perform specific evidence collection tasks related to fire scene investigation at an acceptable level as measured against published acceptable practices.

The applicant must provide documentation of meeting minimum requirements including experience, training, and education. Upon approval they must successfully pass a comprehensive examination.

TRAINING EDUCATION:

• Minimum of 29 hours of tested training.

MANDATORY CLASSES FROM CFITrainer.Net®:

- DNA (3 hours)
- Documenting the Event (4 hours)
- Ethics and the Fire Investigator (3 hours)
- The Scientific Method for Fire and Explosion Investigation (3 hours)
- Evidence Examination: What Happens at the Lab? (4 hours)
- Introduction to Evidence (4 hours)
- NFPA 1033 and Your Career (2 hours)
- Physical Evidence at the Fire Scene (4 hours)
- The Practical Application of the Relationship Between NFPA 1033 and NFPA 921 (2 hours)

COMPREHENSIVE PRACTICAL EXAMINATION:

- Applicants must pass all critical elements and achieve a minimum score of 70% on each of the 10 components of the practical testing to be deemed to have successfully challenged the exam.

REQUIREMENTS

EXPERIENCE:

- A minimum of 18 months of general experience in a fire investigation related industry.
- A minimum of 12 items of forensic evidence was collected. The applicant is responsible for submitting general supporting documents that include the location of the examination, the date of the examination, and the particular type(s) of evidence collected.

APPLICATION FEES:

IAAI Members: $280.00USD

Non-Members: $490.00 USD

Renewal every three years.

IAAI-CI®

(Certified Instructor) Program

The International Association of Arson Investigators Certified Instructor program (IAAI-CI) verifies an applicant's level of fundamental knowledge as measured against various core job performance requirements of established professional qualifications standards related to Fire Service Instructors.

Applicants for this instructor certification program must provide documentation of meeting the minimum program requirements of 150 points including minimum point threshold in education and work experience; training (required and elective), and practical teaching/facilitation experience. With the exception of education, work experience and instructor training courses, all materials submitted for credit should be for teaching/training completed within the five-year period immediately proceeding the application.

Additionally, applicants must achieve a passing score of 75% on the comprehensive examination as established by the IAAI. An applicant does not have to be a member of the IAAI or any chapter to apply for this professional certification.

APPLICATION FEES:

IAAI Members: $150.00USD

Non-Members: $395.00 USD

Renewal every three years.

and documentation of a minimum of fifteen (15) motor vehicle fire investigations with no less than three (3) investigations per year in the three (3) years preceding application for the Motor Vehicle Fire Credential Endorsement; or completed a minimum of forty (40) motor vehicle fire investigations in the ten (10) years preceding application for the Motor Vehicle Fire Credential Endorsement.

REQUIRED TRAINING:

CFITrainer.Net® Modules:

- Investigation of Motor Vehicle Fires (4 hours)
- Motor Vehicles: The Engine and the Ignition, Electrical Fuel Systems (3 Hours)
- Motor Vehicles: Transmission, Exhaust, Brake and Accessory Systems (3 Hours)

IAAI Knowledge 1: Motor Vehicle Fires (8 hours)

SPECIALIZED TRAINING: 16 Hours of tested training specifically related to the investigation of motor vehicle fires.

Training specifically related to the investigation of motor vehicle fires which has been submitted as part of the master certification application or recertification process can be used to support the completion of this requirement.

APPLICATION FEES:

IAAI Members: $90.00USD Non-Members: $325.00 USD

To obtain the member discount rate, a non-member may choose to join IAAI prior to filing the application. If the application is not approved, you will be advised of the appeals process. For detailed information on the full process of the program, please read the International Association of Arson Investigators Motor Vehicle Fire Credential Endorsement Program Manual.

For Renewal information please visit firearson.com.

For application, manual and study references go to applicable certification pages under training on www.firearson.com

New IAAI-FITs
as of **03/31/2022**

Martin "Taylor" Bryant ..... AL
Robert E. Powell ..... AL
Kelly Ewings ..... AZ
Steven D. Faraclas ..... AZ
Justin J. Saint-Amour ..... AZ
Mike Afshar ..... CA
Eric S. Baron ..... CA
John A. Cartagena ..... CA
Laura E. Martello ..... CA
Dolores C. Orozco Cruz ..... CA
Sergio Patino ..... CA
Alan Anderson ..... CO
Daniel J. Breyer ..... CO
Rio J. Burgess ..... CO
Anthony J. Calabrese ..... CO
Jeff L. Cogburn ..... CO
Richard D. Conroy, Jr. ..... CO
Raina F. Eshleman ..... CO
Greg S. Frakes ..... CO
Sandy D. Garber ..... CO
Travis J. Knezel ..... CO
Kyla G. Nies ..... CO
Kimber C. Skidmore ..... CO
Jesse E. Stocking ..... CO
Heidi C. Vinduska ..... CO
Jeffrey J. Waltz ..... CO
Sydney C. Kern ..... CT
Kathryn M. Haddaway ..... DE
Eddy K. Song ..... HI
Luke J. Taeger ..... IA
Brian D. Owens ..... ID
Michael Ditello IL
Jacob K. Maxedon IL
Spencer G. Spathis IL
Ronald G. Swidler IL
Mark A. Hart ..... IN
Jeffrey J. Kinnett ..... IN
Levi P. Sims ..... IN
Ronnie R. Yoder ..... IN
Daniel E. Zwaan ..... IN
Brian M. Roberts ..... KY
Nicholas A. Russell ..... KY
Justin E. Saner ..... KY
David M. Weghorn ..... KY
Jason T. Weghorn ..... KY
Trevor M. Santos ..... LA
Miles J. Watts, Jr. ..... LA
Mark A. Dunnigan ..... MA
Mark C. Parr ..... MA
Adam G. Rounds ..... MD
Michael G. Selvage ..... MD
Craig S. Tewell ..... MD
Brian E. Crater ..... ME
Jason D. Ebenhoeh ..... ME
Edward H. Hastings ..... ME
Matthew J. Redding ..... ME
Aaron M. Boxey ..... MI
Marvin Davis ..... MI
Robert D. Jennison ..... MI
Nicholas W. Siewert ..... MI
Travis G. Wendt ..... MI
Eric J. Kubat ..... MN
Todd W. Messer ..... MN
Matthew P. Montain ..... MN
Ryan J. Sathre ..... MN
Michael K. Yavarow ..... MN
Kelton K. Hays ..... MO
Joseph M. Somers ..... MO
Jake A. Zlomie ..... MT
Cody L. Bennett ..... NC
Dustin R. Burkett ..... NC
Patrick H. Dilday ..... NC
Scott R. Justus ..... NC
Jeremy L. Shelton ..... NC
Christopher E. Smith ..... NC
Emmett Ray Stroud, II ..... NC
Delliven K. Sprecher ..... ND
Dana W. Summers ..... ND
Joseph E. Svir ..... ND
Kenneth A. Kiehl ..... NH
Matthew J. Newton ..... NH
Samuel T. Antoshak ..... NJ
James W. Arpino ..... NJ
Michael W. DeMartini ..... NJ
James Donahue ..... NJ
James E. Fenn ..... NJ
Craig J. Flannigan ..... NJ
Joshua A. Kamen ..... NJ
Taylor N. Kenny ..... NJ
Stephen O. Kynik ..... NJ
Yevgeny Perelman ..... NJ
Robert C. Policht ..... NJ
Joseph B. Szebenyi ..... NJ
Craig R. Taureck ..... NJ
David E. Wiersma ..... NJ
Casey F. Willms ..... NJ
John P. Beck ..... NV
Joseph Garganese ..... NV
Casey S. Jackson ..... NY
Tim L. Dicke ..... OH
Shad M. Gilbert ..... OH
Joseph A. Harder ..... OH
Bryce E. Kuhn ..... OH
Robert T. Liston ..... OH
Christofer L. McKay ..... OH
Edward A. Miller ..... OH
Matthew F. Powers ..... OH
Michael Vazquez ..... OH
Joshua B. Davis ..... OK
Aaron D. Garrett ..... OK
Nicholas H. Kelley ..... OK
Rodney A. Mullinax ..... OK
Emilie A. Anderson ..... OR
Tyler J. Estes ..... OR
Matthew Lawson ..... OR
Steven L. Lehman ..... OR
Gregory T. Loveall ..... OR
Tiffany L. Peterson ..... OR
Eric M. Pineda ..... OR
Justin D. Walker ..... OR
Patrick M. Wetherford ..... OR
Arman J. Force ..... PA
Jason H. Heider ..... PA
Stephen J. Motil ..... PA
Rebecca R. Parsons ..... PA
Juan C. Rosado-Marin ..... PR
Keith A. Medeiros ..... RI
Joseph J. Nadro ..... RI
James S. Woyciechowski ..... RI
Rafael Bruns ..... SC
Michael J. Clarke ..... SC
Randy M. Dahlman ..... SC
Edward B. Filyaw ..... SC
Sean P. Harshaw ..... SC
Danny E. Hunter, Jr. ..... SC
Jonathan D. Moseley ..... SC
Joshua A. Newton ..... SC
Todd O. Pruitt ..... SC
James D. Asbury ..... TN
Michael S. Henry ..... TN
Sean M. McCune ..... TN
Nathan T. Ramos ..... TN
Chase Edison Wall ..... TN
Andrew G. Barr ..... TX
DeAnna M. Flores ..... TX
Jonathan K. Haynes ..... TX
Jonathan L. Heath ..... TX
Stephen Chris Hoelscher ..... TX
Robert L. Jones ..... TX
Michael S. Keene ..... TX
Ricardo R. Martinez ..... TX
Daniel P. McGettrick ..... TX
Carlos Medina ..... TX
Jerry R. Miller ..... TX
Joshua A. Mohler ..... TX
Allan Keeling Neves ..... TX
Jesus I. Ortega ..... TX
Andres Ortega, Jr. ..... TX
Adrian Robles ..... TX
Matthew P. Dyer ..... UT
Steven P. Harrington ..... UT
Chris Nicoll ..... UT
Kurt G. Nielsen ..... UT
Aaron K. Cook ..... VT
Christopher S. Cahan ..... WA
Paul R. Conan ..... WA
Ryan T. McAllister ..... WA
Joshua D. Taylor ..... WA
Scott A. White ..... WA
Steven G. Carlson ..... WI
Michael J. Havey ..... WI
Timothy O. Knudsen ..... WI
Jeremy J. Pings ..... WI
Garth E. Schumacher ..... WI
Jason R. Stalnaker ..... WV
Gabriel Ronsoni Woinarski Texiera ..... Brazil
Ryan Burke Kowalski ..... Canada
Yudistira Raynaldo ..... Indonesia
Ler Lien Jia ..... Malaysia
Alex Daw ..... United Kingdom
Peter Morgan ..... United Kingdom

New IAAI-CFIs
as of **03/31/2022**

Ryan Michael Bain ..... CA
Arnold Van Lingen ..... CA
Scott Michael Plumer ..... CO
Kenneth Charles McCann ..... FL
Jack J. Barba IL
Corey Leber IL
Scott W. Waszak IL
Jonathan Jacob Kempler ..... IN
Charles Edward Bryson ..... NC
William Micah Gammon ..... NC
Daniel J. Pacewicz, Jr. ..... NJ
Steven Brian Poe ..... NV
Michael Patrick Gillissie ..... OH
Johnnie Dwayne Sawyer, Jr. ..... OK
Todd Andrew Erickson ..... PA
Charles Edward Williamson, IV SC
Charles Richard Gibson ..... TN
Scott Michael Allen ..... TX
Christopher Allen Bowden ..... TX
Kevin G. Briggs ..... TX
Robert S. Creed ..... TX
Ernest Cuellar, Jr. ..... TX
Paul Bernard Hayes, IV ..... TX
Todd Raymond Johnson ..... TX
David Wayne Jones ..... TX
Michael Dayton Lugo ..... TX
Michael Christopher O'Neil ..... TX
Brian E. Taylor ..... TX
Justin Michael Finan ..... VA
Craig A. Ford ..... WI
Lasse Kristengaard ..... Norway

New IAAI-ECTs as of 03/31/2022

Mark Plumer ..... MD
Christina Rzepecki ..... MD
Aaron Tyler ..... MD
Marcus Wallace ..... MD
Oliver Alkire ..... MD
Brandon Beall ..... MD
Nicholas Bingham ..... MD
Christopher Clearly ..... MD
Zachary Dell ..... MD
Theodore Forbes ..... VA
Frizzell Kevin ..... MD
Michael Halpern ..... MD
Kenneth Hubbard ..... MD
Dreama Jester ..... MD
Neil Kinnier ..... PA
Craig Matthews ..... MD
Bradley Morrissey ..... MD
Matthew Winchell ..... MD
Liese Williams ..... MD
Colin Orsini ..... MD
Brian Mayers ..... MD
Shea Justin ..... MD
Chrisopher Byron ..... MA
Theodore Copley ..... MI
Daniel Harlamert ..... KY
Michael Lehnowsky ..... OH
Laroy Martin ..... IN

New IAAI-CIs as of 03/31/2022

Brian Eberle ..... CO
Joseph Clark ..... FL
Todd Danen ..... WI

Motor Vehicle Fire as of 03/31/2022

Jarrod W. Gray, IAAI-CFI(V) ..... AR
Jorge H. Loya, IAAI-CFI(V) ..... AZ
Jose A. Garcia, IAAI-FIT(V) ..... CA
Richard Dowden, IAAI-CFI(V) ..... IN
Christopher W. Burke, IAAI-FIT(V) ..... KY
Ryan H. Sheppard, IAAI-FIT(V) ..... NJ
Jarod R. Zuniga, IAAI-FIT(V) ..... NM
Shawn A. Hilbert, IAAI-CFI(V) ..... PA
Kirk E. Litzenberger, IAAI-FIT(V) ..... PA
Aaron R. Zeamer, IAAI-CFI(V) ..... TX
Richard L. Forte, IAAI-FIT(V) ..... VA
Richard D. Gundert, IAAI-CFI(V) ..... VA
Nathanael E. Perkins, IAAI-FIT(V) ..... VA
James L. Walker, Jr., IAAI-CFI(V) ..... VA

IAAI Foundation Training Scholarship Program

The IAAI Foundation Training Scholarship provides financial assistance to selected applicants to enhance their education in the fire/explosion investigation profession by attending the IAAI International Training Conference or other select IAAI training events. The scholarship is supported by the IAAI Foundation and its benefactor partners. The IAAI Foundation may award up to five individual scholarships annually.

Successful applicants receive a $1,000 scholarship to assist with their registration and lodging costs to attend the ITC or other approved IAAI training events. The scholarship program is not designed to cover all of the costs of attendance, but rather to offset specific costs, which would afford applicants a greater opportunity to attend an IAAI training event.

To be eligible, applicants must be a current IAAI member or current IAAI Chapter member. Applicants must submit an application, along with a short narrative on why they are applying for the scholarship.

The deadline to submit a scholarship application is August 1. Successful applicants will be notified by October 1 of that year for attendance at the following year's ITC or IAAI training event. Please submit completed applications via email to iaaifoundation@firearson.com.

Address all questions to iaaifoundation@firearson.com or by phone 410-451-3473.

APPLICATION

Name		Telephone Number	Email Address	
Address	City	State	Zip	Country
Member of IAAI Yes No Member #	IAAI Chapter Member Yes No Chapter:	IAAI Certifications		
Employer		Position		Years in position
Address		Full / Part-Time / Volunteer		

Required Attachments

1. A typed brief explanation of why you are applying for this scholarship and how it will benefit your career in the field of Fire & Arson Investigation.

Signature_____ Date _____

International Association of Arson Investigators, Inc.
Application for Membership

I hereby make application for ☐ Active ($100), ☐ Associate ($100), ☐ Student ($50), or ☐ Retired ($25) membership in the International Association of Arson Investigators in accordance with its Constitution and By-Laws, and agree to be bound therewith. I am transmitting annual membership dues (USD) with this application. I affirm that all information given by me is true and accurate. (Descriptions of membership types can be found at www.firearson.com.)

Prefix: ___ **First:**_____ **M.I.:**___ **Last:**_____ **Suffix:** ___ **Date of Birth:**_____

Home Address_____

City_____ **State/Province**_____ **Zip/Postal Code**_____ **Country**_____

Home # ( )_____ **E-mail Address:**_____

Employer _____ **Supervisor**_____

Title_____

Business Address_____

City_____ **State/Province**_____ **Zip/Postal Code**_____ **Country**_____

Work # ( )_____ **Fax # ( )**_____ **Cell # ( )**_____

Occupational Affiliation (Select One)

☐ **Fire Investigator-Fire Department-Local/County** ☐ **Fire Investigator-Police/Peace Officer-Local/County**
☐ **Fire Investigator-State/County** ☐ **Fire Investigator-Federal** ☐ **Fire Investigator-Private**
☐ **Firefighter/Officer** ☐ **Police Officer/Detective** ☐ **Insurance Claims Adjuster** ☐ **Insurance SIU**
☐ **Engineer PE, EE, Etc.** ☐ **Attorney-Prosecutor** ☐ **Attorney-Private Sector** ☐ **Forensic Laboratory**
☐ **Forensic accountant** ☐ **Instructor** ☐ **Retired** ☐ **Student**

Type of Fire Department: ☐**Career** ☐ **Volunteer** ☐ **Combination** ☐ **Not Applicable**

Have you ever been convicted of a crime, felony or misdemeanor? Note: A yes answer to this question may affect your acceptance as a member of the International Association of Arson Investigators. ☐**No** ☐ **Yes If yes, explain offense and date/location of conviction.**

_____

_____

Have you ever been denied membership in, or had your membership suspended, or revoked by the IAAI, any affiliate Chapter, or any other fire service/law enforcement or other organization? Note: A yes answer to this question may affect your acceptance as a member of the IAAI. ☐**No** ☐ **Yes If yes, please explain.**

_____

_____

Are you interested in serving on an IAAI Committee ☐ **Yes** ☐ **No**
Are you interested in delivering IAAI training ☐ **Yes** ☐ **No**
Are you a member of an IAAI Chapter ☐ **Yes** ☐ **No**
If yes, please list_____ **#**_____

Charge my membership dues ☐ **Amex** ☐ **Visa** ☐ **Master Card** **Account #**_____
Name on card_____ **Expiration date**_____
Billing Address_____
Applicant's signature_____ **Date:**_____

Mail correspondence to: ☐ **Home** ☐ **Business**

Mail to:
IAAI, 16901 Melford Boulevard, Suite 101, Bowie, Maryland 20715 or Membership@firearson.com

09/2020

Nomination of IAAI & IAAI Foundation Officers and Board of Directors

The Nominating Committee requests the assistance of the membership in the selection of active members to serve on the Board of Directors of the Association. Each member selected will be carefully considered by the Committee. A final slate of candidates, to fill vacancies by the advancement of officers or the expiration of terms of office held by Directors, will be nominated by the Committee at the Annual Seminar/Meeting. Article III, Section 2 of the Constitution and By-laws of the Association, provides that the Board of Directors consists of the officers and members of the Association duly elected as Directors. Selections should include a 2nd Vice President (IAAI only) and Board Members set out separately on the form provided on this notice. Incumbent Directors seeking re-election must be nominated in accordance with these Guidelines.

Each nominee will be contacted by the Committee Chairperson or Co-Chairperson to ascertain his/her qualifications and interest to serve in the office of which he/she has been selected. In addition to qualifications, experience and activity in the Association, along with a willingness to actively participate in the government of the Association and to devote time and effort in pursuing its goals and objectives, should be of primary importance when considering nominees. This will greatly assist the Nominating Committee in presenting a slate of officers. Qualifications can be found on the website www.firearson.com.

Please submit nominees at any time, but no later than September 1, 2022 for the 2023 Election year.

Nominating Committee

Bob Toth, Chair (CO)
Ross Shier, Co-Chair (AB)
David Brining (WV)
Jim Caton (AR)
Jerome Duet (LA)
Tom Fee (CA)
Jim Kuticka (MO)
Chris Porecca (GA)
Dennis Rath (AZ)
Chad Stepan (MN)
Chuck Strader (OH)

NOMINATION

I hereby submit the name of the following active member(s) of the IAAI and/or IAAI Foundation for the position of:

IAAI 2nd Vice President:

Name of Nominee		Telephone Number (Include Area Code)
City	State	Zip/Postal Code

IAAI Board of Directors:

Name of Nominee		Telephone Number (Include Area Code)
City	State	Zip/Postal Code

IAAI FOUNDATION Board of Directors:

Name of Nominee		Telephone Number (Include Area Code)
City	State	Zip/Postal Code

Signature of Nominator & Member No.		Telephone Number (Include Area Code)
City	State	Email:

Return Nomination Application via email to: AMG@firearson.com
Questions? Call Gloria Ryan 410-451-3473

For Office Use Only
1. Is the nominator an active member with dues current? ☐ Yes ☐ No
2. Is the nominee an active member with dues current? ☐ Yes ☐ No
3. Has the nominee ever served as a Board Member? ☐ Yes ☐ No
If yes, please supply the dates. _____

AWARDS

LIFE MEMBERSHIP AWARD

A Life Membership Award may be conferred upon an active member in good standing for a period of 10 years, and who has rendered distinctive service to the IAAI and its purposes for a minimum of 5 years. It is limited to two recipients annually.

DISTINGUISHED SERVICE AWARD

(George H. Parker Award)

The Distinguished Service Award is given to the individuals who have shown outstanding service, effort and direction to the purpose and objectives of the IAAI. It is limited to one recipient annually.

OUTSTANDING CHAPTER AWARD

(James L. Smith Award)

This award will be chosen by the committee after a thorough review of each chapter which has been nominated. This review shall include goals suggested by the President of the IAAI. In addition, the annual report for each chapter nominated shall be provided by the chairperson of the chapter committee to the awards committee for review. This award is limited to one recipient annually. A recipient will not be eligible for nomination for two years proceeding award.

OUTSTANDING CHAPTER PUBLICATION

The Outstanding Chapter Publication award will be chosen by the Committee after a review of nominees from the chapters or members. The award shall be for outstanding electronic media, newsletter, or magazine publications which disseminates knowledge, education and information to the chapter/ International members and others. This award is limited to one recipient annually. A recipient will not be eligible for nomination for two years proceeding award.

OUTSTANDING ACCOMPLISHMENT AWARD

(Guy E. "Sandy" Burnette Award)

The Outstanding Accomplishment Award is presented to municipalities, agencies (law enforcement or private) and companies which have developed successful programs which help to reduce the incidence of arson by implementing and achieving a progressive, innovative and successful program. This award is limited to one recipient annually.

AWARD OF RECOGNITION

The Award of Recognition may be given to any individual or organization for service rendered to the IAAI and its purposes. No more than two (2) such awards may be given in any year. The recipient may or may not be a member of the IAAI.

INVESTIGATOR OF THE YEAR AWARD

Investigator of the Year is given to the individual(s) who has shown outstanding achievement, through the use of professional expertise, in both the criminal and civil fields of arson control. The recipient shall not be a current Officer or member of the Board of Directors, or a member the Awards Committee. There shall be one annual Investigator of the Year. The recipient of this award shall be a member of the IAAI.

Photo award info on www.firearson.com

Send submissions to:

iaai-photos@firearson.com

HALL OF FLAME:

For recognition of individual(s) who has shown outstanding and significant achievements to the IAAI and the field of fire investigations in general, through the use of professional expertise that advances the global mission of the IAAI. The recipient shall display one or more of the following attributes:

1. Character and contributions that display exemplary professionalism to the IAAI and the field of fire investigations in general. The nominee will be vetted based on their personal character, their professionalism, their positive influences on advancements within the field of fire investigations.

2. A history of managerial or executive contributions through a leadership role in the IAAI which generated a significant contribution to the advancement of the Global mission of the IAAI, or another significant contribution to the IAAI outside of a leadership role.

3. Any person who provides a significant contribution in furtherance of the goals and objectives of the IAAI

The nominator must submit an approximate 2000-word essay which provides a historical retrospective of the nominee's contribution to the industry and mission of the IAAI / fire investigative profession and to include a biography of the nominee.

All nominees accepted by the award committee will remain on the list, for future induction consideration, for 5 years.

The award committee may submit names for posthumously induction without restriction through the 2022 International Training Conference, ITC. Thereafter, the committee may select 2 individuals (past or present member), from the active nominations, for induction.

The IAAI Board of Director may, at their discretion posthumously induct past members without restriction, through the 2022 ITC. Thereafter, the IAAI Board of Director may select, at their discretion, select one past member, for posthumously induction into the Hall of Flame.

The recipient shall not be a current Officer or member of the Board of Directors, or a member the Awards Committee. The recipient(s) of this award shall be a member of the IAAI for a minimum of 15 years (past or present).

In addition to the aforementioned awards, the Association presents Certificates of Appreciation and/or Awards of Appreciation, annually to selected individuals who have provided or performed services considered to be in the best interest of the Association.

Deadline: **February 15th of each year.**

Deadline for submitting nominations is February 15 of each year.

Email to: Gloria.Ryan@firearson.com
Mail to: Awards Committee, IAAI Office,
16901 Melford Boulevard, Suite 101, Bowie, Maryland 20715

IAAI Awards Nomination Form

Name of Nominee (Recipient)	Department/Company		Phone
Address	City	State	Zip Code

Award Category (*check one*)

1. Life Membership Award ☐
2. Distinguished Service Award ☐
3. Outstanding Chapter Award ☐
4. Outstanding Chapter Publication ☐
5. Outstanding Accomplishment Award ☐
6. Award of Recognition ☐
7. Investigator of the Year Award ☐
8. Photography Award* ☐ *(details on firearson.com)*
9. Hall of Flame ☐

Name of Nominator	Department/ Company		Phone
Address	City	State	Zip Code

Comments/ Other Supporting Information *(Attach additional 'Hall of Flame' requirements and documentations needed)*

PLEASE ATTACH ALL SUPPORTING DOCUMENTS

ad index

VOLUME 72 ISSUE 4
SPRING2022

2022 Ad submission deadlines:

2022 Summer Issue ..... May 15, 2022
2022 Fall Issue ..... Aug. 15, 2022

We invite you to connect with us!
International Association of Arson Investigators

IAAIhq

IAAI Disciplinary Action

Heriberto Luis Moreira Cornejo, IAAI-FIT, CI
Case# 20-02

Mr. Moreira's misconduct occurred between April 2016 and February 2020.

The complaint alleged; misuse and misrepresentation of IAAI professional designations, certifications, or accreditation; use of slanderous terminology; offensive comments; verbal attacks against IAAI members; accusations of CFI certifications being gifted by the association and several violations of the IAAI Code of Ethics. Additionally, a letter was drafted by officials familiar with Mr. Moreira stating "multiple offenses and humiliations to the members of various Ecuadorian Fire Departments, their Officers, Class personnel, Chiefs and Commanders" and members of IAAI Chapter 79.

The letter was sent to Chapter 79. In response, Chapter 79 described that Heriberto Luis Moreira Cornejo was removed from the organization(s) and declared "a non-welcome person for the fire departments of the III fire zone of Ecuador."

A lack of professional and unethical conduct violates paragraphs II, A, 5, 6 of the IAAI Ethical Practices and Grievance Committee SOPs. Upon review of the complaint by the Board of Directors of the IAAI, it was determined that the complaint was founded. The IAAI Board of Directors revoked Mr. Moreira's IAAI membership and IAAI-FIT and IAAI-CI certifications.

CAUTION! There are over 10,000 members of the IAAI. Many members have the same or similar names. All discipline reports should be read carefully for names and addresses.

F&AI

Editorial Content

Submitting Articles for Publication
Fire & Arson Investigator (FAI), is the journal of the International Association of Arson Investigators (IAAI) which is published quarterly – Winter, Spring, Summer and Fall. FAI welcomes well-researched and well-documented submissions on all aspects of fire investigation. FAI reserves the right to accept or reject any article submitted for publication.

http://www.edmgr.com/iaai-fai/default.aspx

The online portal, hosted by PeerTrack, enables authors to track the progress of their articles through the editorial process, as well as provide a double-blind review process to avoid bias.

FAI accepts four general types of submissions for publication:

Scientific-Engineering // Practitioner // Legal // Insurance

Please review the FAI Author Guidelines on www.firearson.com to assist you in the electronic submission.

Submit an Article: If you have any questions or comments regarding the new submission process, please feel free to send us an email: FAI@firearson.com

Advertisement Content
Acceptance of advertisements in the Fire & Arson Investigator journal is based on the following criteria and conditions. The IAAI reserves the right to reject any advertising for any reason.

1. The advertisement must pertain to a product, item equipment, publication, system or service that relates directly to fire or arson.
2. The advertiser must be prepared to validate any claims or statements made in the advertisement.
3. The advertiser must not mention a competitor or make or imply comparison with other than the advertiser's product, equipment, publication, system or service.
4. An advertisement must not display a picture or art work that is not a true and accurate representation of the product, equipment, publication, system or service being advertised.
5. An advertisement that contains a reproduction of news matter must be accompanied by written authorization from the publisher.
6. An advertisement must not contain news matter from the Fire & Arson Investigator journal.
7. It is understood that an advertisement in the IAAI publication does not constitute, and shall not be interpreted as, an endorsement of the advertiser, or advertiser's product, equipment, publication, system or service by the IAAI.
8. It is understood that an advertiser shall not use the IAAI or image in its commercial activities in any manner that would directly or indirectly indicate endorsement of the advertiser or the advertiser's product, equipment, publication, system or service.
9. It is understood that an advertiser will not use the fact that a product, item of equipment, publication, system or service had been advertised in the Fire & Arson Investigator journal to promote or market the product, equipment, publication, system or service.
10. The editor will be the responsible party for making the final decision in the printing of the advertisements in the journal.

All advertisements should be submitted to iaai-ads@firearson.com
Formats: High Rez PDF, Photoshop, Illustrator, or InDesign.
Ad design services available upon request, additional charges will apply.

If you have any questions, or would like advertising rates, contact khall@allenpress.com

Call for Presentation Proposals

2023 ITC

Harrah's Cherokee Casino Resort

April 23 – 28, 2023

In preparation for the IAAI's 2023 International Training Conference (ITC), the ITC Training Committee is issuing a call for presentation proposals. The 2023 IAAI-ITC will be held April 23 – 28, 2023 in Cherokee, North Carolina.

Any individual who is interested in sharing their knowledge with other professionals in the field of fire investigation is encouraged to submit a presentation proposal for this training conference. To have your proposal considered, submissions should include the following:

- Presentation title
- Presentation length (4-hour blocks are offered)
- Typed presentation abstract (between 150-200 words)
- Target audience (crossover emphasis articulated)
- Instructor resume or curriculum vitae, to include any public speaking or training experience; and
- Prior presentation offerings
- Please make sure that you provide us with contact information, to include mailing address, phone number and e-mail address.

The ITC Training Committee will evaluate all submissions and select presentations based on quality, relevance, application, timeliness, and presenter experience and credentials relative to the subject matter proposed.

Email presentation proposals to:
ITC-Training@firearson.com

The submission deadline is July 30, 2022.

The ITC Training Committee intends to finalize the presentation schedule shortly thereafter.

Trace L. Lawless
IAAI-T&E Committee Chair
(513) 817-8321

David E. Bridges
IAAI-T&E Committee Co-Chair
(336) 736-6435

Fire & Arson Investigator
International Association of Arson Investigators
16901 Melford Boulevard, Suite 101,
Bowie, Maryland 20715