THE FIRE SCENE MAGAZINE

NEW YORK STATE CHAPTER OF THE IAAI

FALL 2024

2024 OFFICERS

PRESIDENT
M. Dixon Robin
president@nyfireinvestigators.org

VICE PRESIDENT-CENTRAL
Joseph Galloway
centralvice@nyfireinvestigators.org

VICE PRESIDENT-EASTERN
Vacant
eastvice@nyfireinvestigators.org

VICE PRESIDENT-WESTERN
Scott A. Shear
westvice@nyfireinvestigators.org

VICE PRESIDENT-SOUTHERN
Karl Vollmer
southvice@nyfireinvestigators.org

VICE PRESIDENT-SOUTHEASTERN
James Cuffe
southeastvice@nyfireinvestigators.org

SECRETARY-TREASURER
Ric Giampaolo
secretary@nyfireinvestigators.org

SERGEANT-AT-ARMS
Ron Ryan
sergeant@nyfireinvestigators.org

NYS IAAI
PO Box 451
Cornwall on Hudson, NY 12520
315-681-4057
nyfireinvestigators.org
info@nyfireinvestigators.org

President's Message

by M. Dixon Robin, IAAI-CFI

We continue serving our membership on multiple fronts and fulfilling our training and networking mission! Recently, we hosted one of our best-attended Spring Seminars (which once again included hands-on training), we concluded several IAAI ECT offerings, and we are now hosting an IAAI Expert Witness and Courtroom Testimony course in Rochester, NY (to help those seeking their IAAI CFI), and, for the first time, standing up electronic voting for our Board of Director elections.

Importantly, NFPA 1321 has just been published, and it will impact many of your teams and units. To help you meet the new requirements, NYS IAAI has developed a presentation, free of charge, for teams engaging in in-service training. Our Board members are traveling to all corners of the State to provide this critical training and ensure your organization meets the challenges created by this new standard. Please let your Zone Vice President know if you are interested in having someone from our Board present to your team on the changes and potential impact.

Recently, Vice President Bill McGovern stepped down from his Board position. Bill has been a fixture in the New York fire investigation community and served on the NYS IAAI Board for many years. He has helped NYS OFPC and NYS IAAI transform the profession and continue raising the standards. He worked hard for this organization and guided some of our most important decisions and debates. He brought wisdom and a healthy perspective to our meetings and kept his committees running. I want to thank him for his many years of service and friendship. We are looking forward to working with Bill and OFPC down the road.

Stay safe (and informed) out there!

On The Cover . . . .

Credit: Ira Trow, T.J. Russo Consultants

Background: A fire occurred in July at a 2.5-story non-fireproof wood-frame building in Sound Beach, New York (Suffolk County). The fire originated inside the kitchen, on top of an electrically operated cooking appliance (free-standing stove). The homeowners had a custom-made decorative wood stove top cover placed over the heating elements (coils – rapid boil).

Probable Cause: Occupant/s inadvertently turned on or neglected to shut off the rapid boil control knob after placing the wooden cover on top of the stove. The fire was discovered when the owners detected an odor of burning wood inside the house.

Cause: Accidental.

IN THIS ISSUE:

A Cold Fire Scene is a Safe Scene, Right?

Jeff Pauley MS, IAAI-CFI, MIFireE
IAAI Health & Safety Committee Member and Past Chairman

One of the biggest reasons that some fire investigators think that a cold scene is a safe scene (it is not!), and the biggest problem when we go out and teach about fire investigator health and safety, is that they cannot see the health hazards at a cold scene. When we arrive at a working fire, we see the smoke and the flames, and we feel the heat. These tell our brains that there is a hazard present and that we should stay away or protect ourselves. However, when we go to a cold scene (when the fire has been out for at least 72 hours and there is no visible smoke, etc.) where the roof is burned off and some exterior walls, for example, are gone so that air is freely moving throughout the structure, and the sky is blue, and the temperature is pleasant, there isn't anything to tell our brain that there are still health hazards present.

According to the work of Professor John M. Cimbala at Penn State University's College of Engineering, the average human can see particles in the air down to about 70 microns in size. If the particles are light-scattering, in the air where a ray of light is coming through a window, then down to about 10 microns. Now remember, a micron is one-millionth of a meter or 39 millionths of an inch. That is REALLY small. For comparison, the average human hair is about 75 microns thick, and a grain of table salt is about 125 microns. What's my point?

A 2010 UL study found that soot particles in the air during overhaul were mostly smaller than one micron. This was confirmed by the 2022 paper published by UL's Fire Safety Research Institute, which showed that submicron particles of soot persisted five days after a fire was extinguished (Horn et al., 2021). No, the particulates didn't magically disappear; this was just how long they monitored and measured each of the eighteen different post-fire scenes.

It is hard for our brains to comprehend a health hazard when we can't see it. Unfortunately, when you go into a post-fire scene, you immediately stir up these microscopic particles of soot in addition to what might already be in the air. And because you're not wearing a respirator, you are breathing in these very tiny soot particles. The smaller they are, the further they go into your lungs, and this can cause health problems, including cancer, later in your life.

A recently published study by the University of Miami (Bakali et al., 2024) described the results of the analysis of silicone wristbands worn by sixteen public and private fire investigators in North Carolina at 46 different fires between January 2020 and September 2022. The average investigation duration was two hours and twenty-eight minutes, with the shortest being nine minutes and the longest being seven hours. On average, the investigations were performed 3.7 days after the fire was reported, with one being sixty-one days after. Half were on the same day as the fire. The wristbands were then analyzed for the presence of sixteen EPA priority poly(cyclic) aromatic hydrocarbons (PAHs).

PAHs come in two varieties. Lower molecular weight (LMW) PAHs are more volatile than their counterparts and are in gas form, whereas the higher molecular weight (HMW) PAHs are bound to the soot particulates and are a solid. Many of the PAH levels were found to be above the OSHA permissible exposure limit. Of these sixteen, one (benzo[a]pyrene) is classified by the International Agency for Research on Cancer as carcinogenic to humans, and the others are classified as probably or possibly carcinogenic to humans. (Jameson, 2019)

Additionally, this study found a positive correlation between the length of time an investigator spent in the scene and the wristband PAH levels. There was also a correlation between PAH levels and the time since the fire was extinguished, with higher levels found at younger scenes and lower readings at older scenes. Even the one sixty-one days after extinguishment had some very high levels. These results should not be

a surprise to anyone! Investigating soon after the fires are extinguished puts the investigator into an atmosphere where off-gassing is still in progress, and there is a greater amount of particulates suspended in the air.

This study was significant because it is the first to examine PAH exposure in fire investigators. Its results validate the need for fire investigators to wear adequate and appropriate PPE, including respiratory protection, during all phases of the investigation, regardless of how long the fire has been extinguished.

So, we have looked at some of the health-related issues associated with cold fire scenes; now, let's examine their safety aspects. We all know that fire suppression is an intense, get the wet stuff on the red stuff quickly type of activity. On the other hand, a fire investigation should be a slow, methodical process. One of the first things you should do when you arrive at a fire investigation scene is to conduct an exterior and then interior site safety assessment while wearing appropriate and adequate PPE, including respiratory protection. This assessment, by the way, is required in Section 4.1.3 of NFPA 1033. It is also addressed in NFPA 921 in Section 13.2.3 regarding hazard identification and all of the subsections in Section 13.3.

As we learn more about the health and safety issues in the post-fire scene, it is essential to take this research into account and adapt our policies and practices accordingly. The fire investigation profession, public and private, often does not have the safety focus that it should have and needs to have. While only a few fire investigators have been killed on the job in safety-related incidents, the bigger problem is those who have died years later from occupational illnesses that were very likely contracted on the job. And we don't know how many have been injured because those statistics are not captured specifically for the fire investigation profession.

Unlike a fire or other emergency scene where time may be of the essence and safety must be balanced with completing other objectives, a post-fire investigation scene should not be rushed into but instead handled in an orderly and systematic process. This includes developing a work plan (incident action plan), conducting a site safety assessment, briefing all workers, which includes a safety component, having defined and explained roles and responsibilities, and continually monitoring the scene for safety hazards that could appear. This is the basic premise of the incident command system (ICS) from a safety perspective. Using the ICS as a foundation is relevant because conducting a post-fire investigation, especially one of a large or complex nature, involves many moving parts, which is no different from any other public safety incident. It provides a roadmap for all workers to understand the work to be done (Incident Action Planning Guide, 2015).

In addition to the health hazards present at almost every cold fire scene, the safety hazards can be huge, too. Without conducting the site safety assessment before you do anything else, you don't know what hazards are present at your scene and what mitigation efforts are necessary to deal with them. They can be different in each scene. This increases the risk of you or someone else being hurt. And you need to be wearing full PPE when you do this!

Mike Rowe (Off The Wall: The Origin of Safety Third, 2022) from the Dirty Jobs TV show says, "I'd put the desire to be safe after 'the need to make money' and 'the willingness to assume risk.' In other words, 'Safety Third.'" Mike coined the Safety Third term and concept almost twenty years ago. Businesses, including fire investigation companies, exist to make money, first and foremost, so safety is not first. What about the government agencies, you ask? They exist to provide a service, and in the public safety world, that certainly doesn't always equate to safety first. How many times at a working fire scene have you done a risk versus reward calculation in your head before taking action? There is a safety component to that calculation whenever you determine how much risk you are willing to take. And, in that situation and many others, we are typically willing to assume some level of risk.

The problem is that while we make this risk

versus reward calculation many times a day based on various factors, accidents happen when we become complacent and don't take the basic steps that we should take into consideration during the calculation process. And that brings us back to where we started. When you arrive at a post-fire scene, where there is no emergency in progress, and you can take as long as necessary to do your job, the failure to take basic safety precautions because you have done this hundreds of times before and nothing bad happened so you will do it (whatever IT may be) again and will expect the same outcome. This is complacency.

I was told many years ago in a leadership class that you can do things right, or you can do the right thing. I have remembered it and shared it many times over the intervening years because the words are so true. In the fire investigation world, that means that you can do the investigation as expediently as possible, checking off the boxes of the basic steps, OR you can follow the best practice safety procedures, including a site safety assessment and wearing PPE every time while you conduct a thorough scene examination. It's your choice. However, by doing the right thing, you can minimize your exposure to the many toxicants and safety hazards that can be present in the post-fire environment, which will more than likely increase your likelihood of having a long retirement. And that should be everyone's goal.

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Southeastern Zone

by Jim Cuffe

Greetings from the Southeastern Zone

By the time you read this, summer will be over, and we'll be well into the fall weather. As we gear up for the Chapter's Annual Meeting in November, we are preparing everything for our first online/electronic vote. This change came about via By-Law amendments put into place last November. The Board anticipates that it will allow our members to better express their wishes in elections and other Chapter matters. The voting period is 0001 hours, 11/12/24 through 2359 hours, 11/18/24. It's a significant change, but hopefully, it will be a better process for our group.

We continue to offer many training events, and we encourage you to stay tuned to the announcements from our excellent Training and Education Committee. We are also holding an IAAI Expert Witness Courtroom Testimony class in Irondequoit from November 1st to 3rd. This class involves a lot of pre-course work in addition to the approximately 20-24 hours of class time. Our hope is to run at least one of these classes annually in various regions of the state to assist members seeking to attain their IAAI-CFI status.

I hope to see many of you at the annual meeting and the OFPC Seminar. As always, please remember that the Chapter is here to support you. If you have questions or are looking for help, please don't hesitate to contact me.

Keep up the professionalism, and continue to support your fellow fire investigators.

Stay Safe,

Jim
southeastvice@nyfireinvestigators.org

NEW YORK STATE

Homeland Security and Emergency Services
Office of Fire Prevention and Control

50TH ANNUAL ARSON SEMINAR

NOVEMBER 19-21, 2024

Watkins Glen Community Center
155 S Clute Dr. • Watkins Glen, NY

November 19th Opening Presentation
NFPA 921, NFPA 1033 and NFPA 1321 updates
M. Dixon Robin, President of IAAI NYS Chapter 23

November 20th Workshops:
CV and the Courtroom
Patricia Dziuba, Chief ADA Jefferson County
Joseph Galloway, VP IAAI NYS Chapter 23

Building Sciences
Stephen Spell, FDNY Battalion Chief

Lunch

An Examination of Wi-Fi (Smart) Plugs for their Recognition Potential and Associated Data
Daniel M. Giblin, Special Agent / Certified Fire Investigator ATF

Evidence from the Scene to the Lab
Charles Morse, NYS OFPC Investigator
Dennis Brown, NYSP Evidence Technician
NYSP Lab

November 21st Closing Presentation:
Case Study Serial Arsonist Oneida County
Nick Fletcher, ADA Oneida County
New Hartford PD
Christopher Taylor, NYS OFPC Investigator

Register Today

NYS Division of Homeland Security and Emergency Services (DHSES) Learning Management System

Electronic Voting to be used for the November 2024 Elections

For the first time, our November 2024 elections will utilize an online electronic voting process. We are utilizing ElectionBuddy for this purpose. To be eligible to vote, you must be an Active or Lifetime member of NYS IAAI Chapter 23 and in good standing. Voting will begin on November 12th at midnight and continue until November 18th at 2359 hours.

The voting process in ElectionBuddy is as follows:

- ✔ You will receive an email from the Chapter with a link to the voting platform.
- ✔ Clicking on this link will bring you to ElectionBuddy, where you will vote for all officer positions noted. Proposed By-Law amendments, if any, will also be listed on the ballot.
- ✔ You can select from the candidates listed or enter a write-in candidate.
- ✔ You are only allowed one vote per open position.
- ✔ Write-in candidates will be vetted by the Nominating Committee prior to being declared the winner.

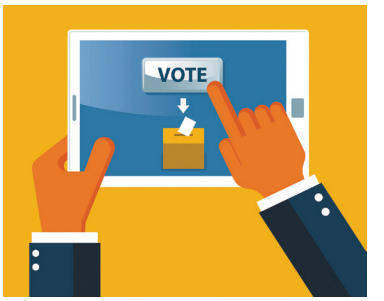
Nominees for Offices Up for Election in 2024

Two-year term:

- Sergeant at Arms: Ron Ryan **OR** Gary Laskowsky (there is only one position)
- Vice President Western Zone: Scott Shear
- Vice President Eastern Zone: Phil Brousseau
- Vice President Southeastern Zone: Jim Cuffe

Three-year term:

- Secretary/Treasurer: Ric Giampaolo
- Director Eastern Zone: Stu Morrison
- Director at Large: Kavin Winton
- Director at Large: Nick Fletcher



Arc Characterization as a Means of Identifying Fire Conditions

Stuart S. Morrison, PE, CFI, CFEI
Aaron C. Bailey, SUNY Polytechnic Institute
Morrison Engineering, PC, USA

ABSTRACT

This paper presents the findings of a research project to identify and document if the fire conditions to which wiring is exposed influences the type of physical arc characteristics remaining after the fire. The ability to identify fire conditions at the time of arc formation from remaining physical evidence would assist investigators through a scientific basis for documenting the fire growth and progression through the room or space. Characteristics such as size, shape, welding, surface condition, and porosity will attempt to be correlated to type of fuel, level of smoke, and protection level of wires.

FUNDAMENTAL GAP IN KNOWLEDGE

The most recent edition of NFPA 921 Guide to Fire Origin and Cause Determination (2017 Edition) identifies arc mapping as one of four fundamental tools that a fire investigator should utilize in the determination of the cause of a fire loss. While arcing may be the root cause of a fire as shown by Babrauska (1), it is more often the effect of fire on energized electrical conductors. Significant research has shown the basic differences between true arc damage from fire insult versus thermal damage from fire that causes melting of the copper conductors (2,3,4,5). Little research, however, has been done to characterize any variables within the arc formation.

Ablenas and Bodzay did preliminary studies (6) showing the effects of some variables on arc formation, but their research was done within a controlled environment and with heat damage external to the arc formation. Their paper indicates the need for further study, specifically in terms of "carbonizing the insulation while a potential is supplied to the wire" and "induced in the presence and absence of simulated fire effluents."

FUNDAMENTAL PROCEDURE

To find the effect of different fire conditions on the wires, a rig was built to hold wires above different fire fuel sources. As the burns took place, observations and data of the fire were recorded. The wires were then analyzed and searched for any possible patterns.

Setup

The experiment setup was made up of two layers of wires of various gauges strung across a square frame. The bottom layer consisted of six wires exposed directly to the flames of the fire. The top layer of six wires was shielded by a layer of sheetrock and a square piece of sheet metal. This top layer was capped by another piece of sheetrock, allowing heat to build up within the upper layer, but not exposing it to direct flame.

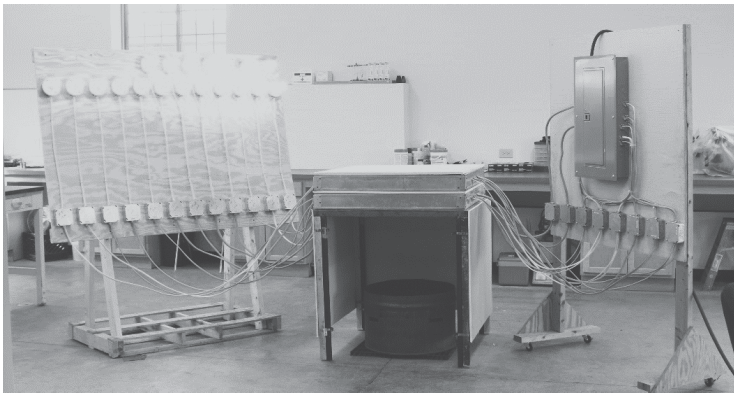


Figure 1. Experiment Setup

Each wire was energized before the fire was ignited. Each wire was on a separate circuit with appropriate circuit breaker protection. One end of each wire was attached to individual breakers that would trip once the wire arced and the other end of the wire went to a lightbulb for load purposes. The light bulb was also used as an indicator to show when the circuit was interrupted. As the experiment went on, the light bulbs de-energizing indicated when the wires arced or severed.

Procedure

For each experiment, the test fire was centered underneath the two layers of wires. As the fire was ignited, the experiment timer was started. Each fire burned until either all breakers were tripped, or in the case of slow burns, until half of the top layer tripped. At that point the fire would then be extinguished. For the solid and liquid fuels, the final fuel weight would be taken and compared to the initial weight before the test started. For the gas fuel, flow rate was found instead. These values would later be used to estimate the heat release rate.

After the burn, the racks of wires would then be taken to a separate table where each wire was analyzed for arc characteristics. Photographs were taken, and observations recorded for each location of arc damage. The photographs were later reviewed, and notes were made of beading, splits, welds, porosity, and other possible arc characteristics. Arcs were marked with tape to help see any noticeable patterns in the locations of the arcs along the wires.

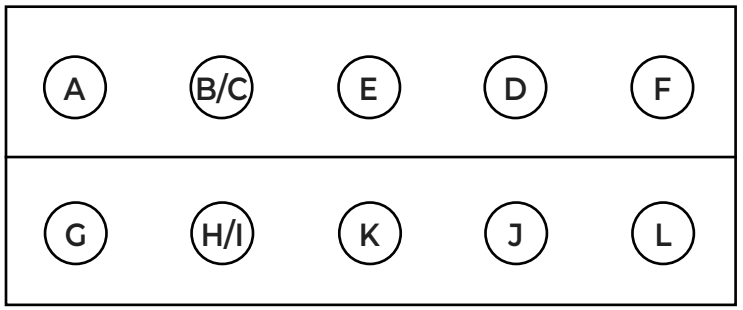


Figure 2. Wire Designations, Breaker Box Side

The heat output of each burn was also found to help characterize each fire. For the solid and liquid fuels, a known heat/weight value was found and multiplied by the weight loss to find the heat generated by the fire. This value was then divided by the length of the burn to estimate steady state heat release rate of each fuel. The rate of change in HRR was ignored for each calculation. For the gas fueled fires, the flow rate was found and then multiplied by the length of the experiment to find the heat released. All heat release rates were recorded in Table 1.

Fuels

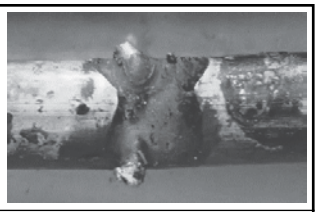
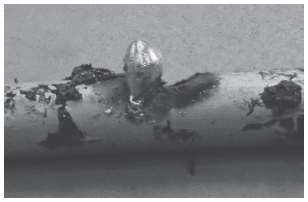
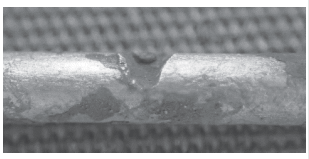
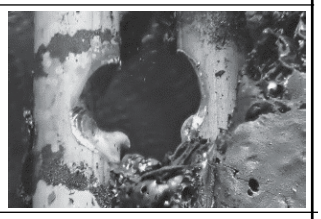
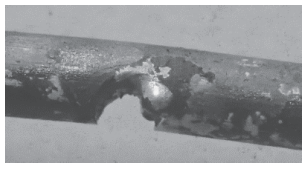
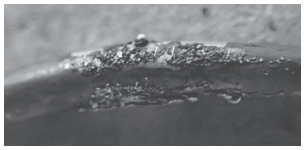
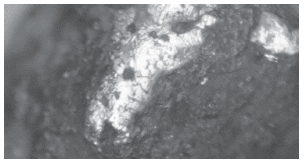
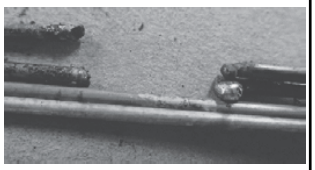
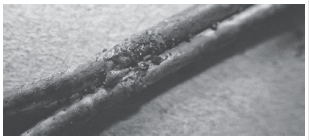
Test 1-2: The first two burns were wood crib fires. The first one being stacked 2x4's, and the second one being stacked 2x2's for increased surface area and a higher HRR. Each of these two burns took place in a wide burn barrel. The initial and final weights were taken to determine how much fuel was consumed. Both tests yielded large amounts of heat and moderate amounts of smoke.

Tests 3-5: The next three experiments were methane being burnt through a horseshoe shaped furnace burner. For each of the three trials, the flow rate of the methane was changed to affect the intensity of the fire. The burner was raised so that the tops of the flames were just touching the bottom row of wires. The flow rate was found for these tests that could be used to find out how much methane was burnt during the experiment. Bottled methane was used, and the vaporization rate resulted in freezing of the regulator, making the alteration of flow rates unpredictable. These fires produced moderate heat and almost all the smoke from this burn was from the burning of the wires and testing apparatus.

Table 1. Heat Release Rates of Each Test

Test #	Fuel Type	(kW-hr)/kg	Weight Burnt (kg)	Heat (kW-hr)	Time (min)	kW
1	Wood (2x4)	5.71	8.16	36.4	33:00	84.6
2	Wood (2x2)	5.71	3.18	14.2	8:10	132.9
3	Methane (2 psi)	15.40	0.68	10.5	18:40	34.9
4	Methane (1-5 psi)	15.40	0.09	1.4	2:20	35.0
5	Methane (1 psi)	15.40	0.72	11.1	20:00	33.6
6	Garbage (bin)	2.55	0.37	0.7	22:00	2.6
7	Garbage (bags)	2.55	1.74	3.5	16:00	16.7
8	Diesel (can)	11.83	0.78	7.2	60:00	9.2
9	Diesel (tank)	11.83	0.91	8.4	4:40	148.5
10	Foam	7.53	1.60	9.4	5.10	140.0

Table 2. Characteristics of Wire Arcs

Sharp Demarcation Around Damaged Area	Clear border between the area of damage and the undamaged area.	
Round, Smooth Shape of Artifact	Distinct round beads caused by the surface tension of melted copper.	
Localized Point of Contact	Wire damaged concentrated around a small point on the wire.	
Identifiable Corresponding Area of Damage	Two wires showing damage of corresponding areas, presenting both sides of the arc.	
Localized, Round Depression	A smooth round depression often with a bead in the middle or hanging off the edge.	
Small Beads and Divots Over a Limited Area	A field of small features usually on the surface of the wire	
High Internal Porosity	Visually present voids caused by arcing.	
Separated Wires	Pairs of wires where a middle section of the wire was missing.	
Welded Wires	Two or more wires or wire ends connected by melted or arced copper.	

Tests 6-7: The garbage trials used two different containers to see how it would affect the burn rate. For the first of the two burns, the garbage mixture was contained in a small plastic garbage bin. The second burn took place in two full garbage bags. Both burns took place in a burn barrel as to contain the remains of the fuel at the end of the burn. An initial and final weight was taken for this burn also. The burning of the garbage bin generated less heat than any other burn performed during this experiment. It burned very hot, however, due to its small size there was not a lot of energy released. The garbage bags produced far more heat than the garbage in the bin due to the far larger fuel amount. Both tests created black smoke from the plastic and foam materials being burned in the garbage.

Tests 8-9: The diesel fuel was burned out of two containers of different cross-sectional areas. The first burn was out of a gallon can with an area of 214cm^2. The second burn allowed for a larger, hotter flame. The burn was out of a propane tank cut in half with an area of 730cm^2. The total fuel consumed was found after taking the difference in weight after the burn. The smaller can was one of the smallest heat release rates due to its small size. It created such a small amount of heat that the test was ended after an hour before any wires in the top level could arc. The second diesel burn had a higher heat release rate than any other test. Both diesel tests generated a dark grey/black smoke.

Test 10: The final test burn was the polyurethane foam material. Several blocks and chunks of foam were stacked in the burn barrel. A weight differential was also recorded for this test. The foam was the second hottest burning fuel that caused an arc in every single wire within the first six minutes. The foam burned with a thick black smoke.

RESULTS AND OBSERVATIONS

The testing portion of the experiment was mainly successful. Most of the burns yielded predictable arcing patterns. Appropriate results were found for the heat release rates based on the known values, fuel consumption, and time. There was little differentiation of the characteristics of arcs from different fuel sources.

Arc Characteristics

The wires were examined for some of the arc characteristics as listed in section 9.11.1.1 of the 2017 NFPA 921 guide, and for a few other characteristics that were observed. These characteristics were charted in individual tables like Table 3. While definitive characteristics were found on each arc, no major arc patterns were found from different types of fires. An arc type found on a wire from a slow burning test could also be found on a fast burning test in the same quantity.

Arc Occurrences

Many tests showed a relationship between the heat of the fire and the number of wires that arced. The hotter fires tended to cause more arcs. Cooler fires took far longer to cause arcing. Some of the cooler, slower fires had a harder time heating the upper layer to a point where the wires would even arc. The rate at which the arcs occur can be seen in Tests 1 and 2. Where Test 2 had a fire that released heat approximately 57% faster than Test 1 and caused a similar number of arcs in a third of the time.

Smoke Relation

There was a noticeable connection between the amount of smoke being generated from the fire and the activity of the wires above. Smokier fires including the garbage bags, the foam, the 2x2 pieces of wood, and the larger diesel container, all caused more arcing than the less smoky fires. There was also a higher occurrence of mul-

Table 3. Example of Data Gathered from Experiment

Test 1 - Wood Crib 2x4	A	B	C	D	E	F	G	H	I	J	K	L
Number of Arcs	0	0	1	1	1	1	1	1	1	1	1	2
Sharp demarcation around damaged area					X	X	X	X	X	X		
Round, smooth shape of artifact					X	X	X			X		X
Localized point of contact						X	X	X	X	X		
Identifiable corresponding area of damage			X	X	X	X	X	X	X	X	X	X
Localized, round depression					X	X	X	X	X			
Small beads and divots over a limited area			X	X					X	X	X	X
High internal porosity										X		X
Split wires						X				X		X
Welded Wires											X	

tiple locations of arc damage on the same circuit. Relation between smoke and number of arcs is shown in Table 4.

Arc Patterns

In Test 3, the arcs on the lower level wires mapped out the shape of the horseshoe shaped gas burner below (Figure 3 and 4). This showed that the arcs occurred exactly where the fire was the hottest directly above the shape of the burner. In comparison, most other tests had a majority of the heat hitting the center of the wires, resulting in a larger concentration of arcs around the center. This is consistent with arc mapping as a verifiable scientific principle of fire investigation.

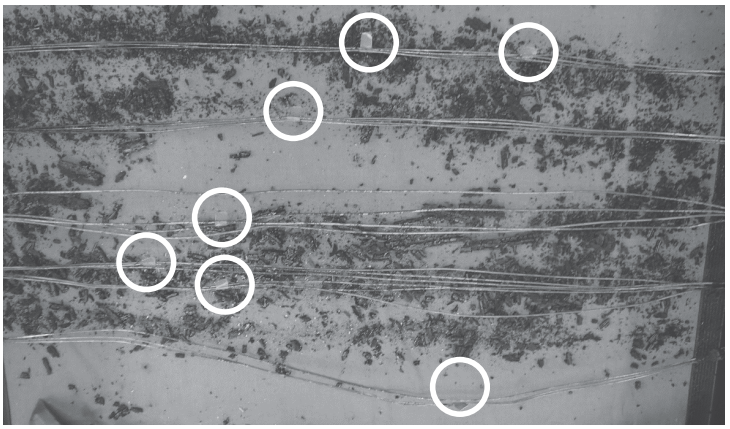


Figure 3. Horseshoe Shape of Arcs

Figure 4. Horseshoe Shaped Gas Burner

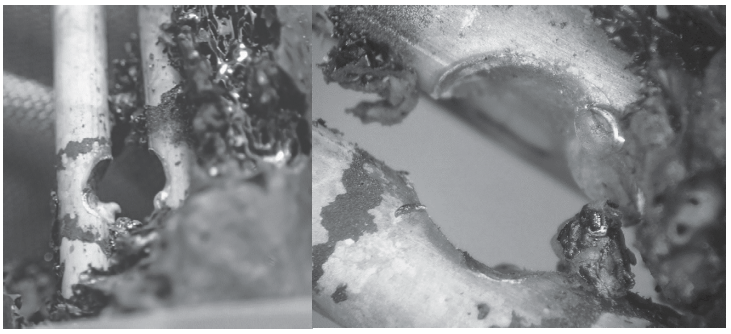


Figure 5. Arc Through Char (Microscope Photo on Right Shows Line of Demarcation)

Table 4. Smoke Densities

Test #	Smoke Color	Smoke Density	# of arcs / # of arced wires
1	White	2	11/10
2	White/Gray	4	11/9
3	White/Gray	4	11/9
4	Gray	3	7/5
5	Gray	5	11/9
6	Dark Gray	5	7/6
7	White/Gray	4	8/8
8	White/Gray	2	7/6
9	Dark Gray	6	11/9
10	Dark Gray	8	15/12

Arcing Through Charred Insulation

There were several incidents throughout the experiment of arcs occurring through charred insulation. Wires such as 1K show obvious evidence of the wires arcing through the insulation even though they never came in contact with each other (Figure 5). These arcs occurred more in wires that were exposed to a lower heat that allowed for extensive charring before wires could make direct contact with each other.

Effect of Wire Gauge

The tests also showed a connection between wire gauge and how the fire effects it. The smaller 14-gauge wire tended to separate more often than the large wires. Wire L, which was a three conductor 14-gauge wire, separated in all but one of the tests. Separations were also observed frequently in wires G and F, both also 14-gauge wires.

FINAL REMARKS

The experiment resulted in many interesting results and patterns throughout the many arcs caused. Most patterns showed a relationship between heat release rates and the number and intensity of arcs. There were also some correlations found, such as how a smokier fire would often result in more arcs present on the same circuit. No correlation between the fuel and the smoke level was verified in this experiment.

Tests 3-5 also represented the usefulness of arc mapping in showing the shape or size of the fire that occurred. The arcing pattern on the exposed wiring mimicked the shape of the gas burner. The patterns identified reinforce the scientific theory of arc mapping as an important tool in the investigation into the origin and cause of fires when used properly.

The only fire conditions that could be correlated to the arc characteristics in this experiment were fire size and intensity. The fuel involved was not found to have a significant effect on the resultant arc formation, but the increased presence of particulate matter in the environment, in the form of visible smoke, did appear to result in increased arc formation and energy.

ABOUT THE AUTHORS

Stuart Morrison, PE, CFI (IAAI), CFEI (NAFI) has a Bachelor of Science in Mechanical Engineering from the University of Rochester and a Graduate Certificate in Fire Protection Engineering from Worcester Polytechnic Institute. Mr. Morrison has over 30 years of experience in forensic failure analysis related to the origin and cause of fires.

Aaron Bailey is a graduate of SUNY Polytechnic Institute with a degree in Mechanical Engineering Technology.

END NOTES

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Western Zone

by Vice President Scott A. Shear

Greetings from the Western Zone

The state of the Chapter is good, with over 700 members and growing. This growth is due to many things, but the value members receive is high. Your annual membership gets you instant access to peers to discuss emerging trends in Fire Investigation, a bi-annual magazine with numerous articles specific to topics you want to know about, and incredible training events for members only, to name a few. We constantly search for new and relevant topics and papers from experts in fire investigation and related subjects. We appreciate our sponsors who support our efforts to provide you with all of this at a low cost. This magazine you receive has been internationally recognized as one of the best and has received publication of the year awards from the International Association of Arson Investigators many times. Please let us know if you have an article or research paper you would like to have published. NFPA 1033 Standard for Professional Qualifications for Fire Investigator Section 4.1.7.2 states that a fire investigator shall remain current by attending formal education courses, workshops, in-person or online seminars, and/or through professional publications, journals, and treatises. The New York Chapter is committed to providing you with all of the above to meet this requirement.

Some of you may be aware of the new NFPA standard, NFPA 1321, which was published and came into effect on August 5th, 2024. This publication is available on their website at NFPA.org/products. The New York Chapter Board of Directors has prepared a comprehensive presentation on how to implement and comply with this new standard for you and your Fire Investigation Units. We have already shared this presentation with some FIUs in the State and are ready to visit your County or Region to discuss the document and its potential impact on your FIU. Please reach out to me to schedule a meeting.

Scott
Training & Education Chairman
westvice@nyfireinvestigators.org

Training and Education

The 2024 Annual Seminar at Saratoga Springs in May was a huge success. This year's seminar was held at the Embassy Suites, which provided a good facility for instruction inside and an area outside to conduct our hands-on and practical stations.

Topics covered this year included:

Combining Spherical and Traditional Photography to Document Fire Scenes by Andrew McNeill

Case Study of the Jay Street Fire, Schenectady by Mark Meeks and Dixon Robin

Fuel/Air Explosion Dynamics by Scott Davis

Material Ignitability and Understanding the First Fuel Ignited by Michael Stoddard and Jeremiah Pratt with Genesis Forensics

Post Flashover Fire Pattern Persistence by Chad Campanell

With so many incredible topics, we changed our typical format of starting our conference at 1 pm on Wednesday. Instead, we started at 8 am to provide an additional 4 hours of training at no extra cost to the student. This was well received and will continue as our new Seminar format.

New this year was a collaboration with Insurance industry professionals. The Chapter provided a separate, simultaneous training block on these topics:

Investigating and Litigating Fire Loss Claims – Avoiding Preventable Errors Proving Liability When Litigating Fire Losses, both by Chris Konzelmann

Fire Investigation Methodology for the Insurance Professional Knowing Your Expert, both by Dixon Robin and Scott Shear

We appreciate Chris Konzelmann's assistance in making this new endeavor a reality. This insurance industry training day was well received, and we are planning to enhance this portion of our conference by including a separate training day next year. The Training and Education committee wants to thank all those who attended and helped make the seminar successful.

During my time participating at the IAAI spring seminar, I was given the great opportunity to not only meet and network with people from a variety of different careers but I was also given the opportunity to sit through lectures that were taught by some of these great individuals who have also come to participate in this conference. These lectures taught me many different lessons that further extended my understanding as a Fire Science Student. Some of these lessons taught include the importance of ventilation in fire progression, the different properties of plastics and their unique flammability properties, the properties of air/fuel mixtures, and the rising technology designed to aid in fire investigations. There was also a day dedicated to a hands-on portion where I and fellow members were given the opportunity to not only see many of the lessons taught to us with our own eyes but were able to physically test the knowledge gained and experiment for ourselves. It is truly amazing that within a short weekend I spent in Saratoga Springs for this seminar, I was able to learn so many different lessons that prove to be imperative components in fire investigation. Overall, the IAAI spring seminar is the type of event that I would recommend to anyone interested in the Fire Investigations field to take part in, as regardless of experience in this field, there is always something new to learn.

- Jack Stichweh

On the 22nd-24th of May, I had the privilege to attend the NYS IAAI Spring Seminar in Saratoga Springs. During this training, I was provided with ample knowledge of topics relevant to fire investigations. On the 23rd, the training allowed learning about the ignitability of different materials, and during the afternoon block, we had a hands-on opportunity to learn more. It was a great experience to go through the various stations as they each demonstrated different topics on which I could gain more knowledge. It was insightful to see the difference between arcing and melting on different wires, and I could test various combinations to see if the materials would ignite. Overall, I gained an incredible amount of knowledge from attending this seminar.

- Madeline Orenstein

Save the Date

The 2025 NYS IAAI Spring Seminar will be held May 7-9, 2025, with May 6 dedicated to Insurance/Private Fire investigation topics. Due to the increasing size of our seminars, we will be at the Saratoga Springs Hilton on Broadway next year.

Participating in the NYS IAAI Spring Seminar was a great opportunity as a student. I met fantastic people from a wide range of career paths. Being able to meet and talk to people in different careers but with the same love for fire investigation opened my eyes to different possibilities. The mix of lectures and hands-on training were great learning opportunities as well. I got to experience the benefits of combining spherical photography with regular photography. I also learned how important it is to understand fuel/air explosion dynamics and their different effects within the environment in which they occur. I even got to experience and learn about post-flashover fire patterns and how important it is to take your time when investigating flashover occurrences because it may be deceiving when looking at the overall scene. A huge benefit of going to the seminar was all the hands-on training. I got to see the differences between arcs and melting in wires. Another benefit of the hands-on training was the ability to test different ignition sources with different fuels to see if they were competent ignition sources. The seminars are a great training experience taught by the best of New York's investigators. The knowledge I gained and the networking opportunities made it worthwhile for anyone in this field.

- John Coffinger

The Chapter has scheduled and sponsored an IAAI-Expert Witness Courtroom Testimony class in Rochester, NY, on November 1, 2, and 3, 2024. This is the second offering of this class this year. The course is in high demand and always is full, with a maximum of 8 students per class. Our Southeastern VP, James Cuffe, has been authorized to facilitate this class. Our Board of Directors member, Nick Fletcher, with the Oneida County District Attorney's Office, prepares the students and administers part of the courtroom portion. We will continue to make this course available to our members annually.

The IAAI Evidence Collection Technician practicum was offered in the Western Zone in April and the Southeastern Zone in May. I want to thank all the proctors and facilitators who also made those events a success. Once again, Past T & E Chairman Gene Pietzak handles all the logistics for our events on Long Island. Chapter VP Cuffe and our Secretary, Ric Giampaolo, handled the Western Zone event. Thank you to all who helped make these practicums available to our members and the members attending.

The T & E Committee is working hard on new topics and presentations for next year. Keep looking for announcements about the seminar and other one-day training opportunities.

Scott Shear and the T & E Committee

Central Zone

by Vice President Joseph Galloway

Notes from the Central Region

As we transition from summer into fall, we find ourselves eight months into the new 2024 edition of NFPA 921 and a new standard being released, NFPA 1321 Standard for Fire Investigation Units — bringing a total of two standards and one guide dealing with fire investigation. I will touch on both briefly below.

2024 edition of NFPA 921, Guide for Fire and Explosion Investigations. 29 Chapters

- Chapter 3, Definitions: several new definitions were added, including a new section specifically for wildfire investigations.
- Chapter 4, Methodology 4.1, Identification of fire investigation as a forensic science discipline.
- Chapter 6, Fire Effects and Fire Patterns contains new and updated information, along with the addition of 6.6 Fire Effects on Electrical Systems and Components.
- Chapter 9, Electricity and Fire, has a new section on electrical system examination and lithium batteries and updates throughout the chapter.
- Chapter 13, Fire Investigation Safety, Health, and Wellness, has been completely rewritten.
- Chapter 19 Fire Cause Determination, fire incident, and cause classification are added back with most of the information referenced in the Annex.
- Chapter 26, Motor Vehicle, has new and updated information.
- Chapter 27, Wildfire Investigations, has been completely rewritten with many new sections.
- Chapter 29, Marine, has several updates and some additions.

2024 edition of NFPA 1321, Standard for Fire Investigation Units. 8 Chapters

- Chapter 1, Administration
- Chapter 2, Referenced Publications
- Chapter 3, Definitions
- Chapter 4, Management System requirements
- Chapter 5, Outside Resources Facilities and Equipment
- Chapter 6, Health and Safety
- Chapter 7, Education Training and Certification
- Chapter 8, Documentation and Reports
- Annex A, Explanatory Material
- Annex B, Template SOP's and SOG's

Chapter Vice Presidents will be available after September 1st to meet with County and investigation teams to review the new NFPA 1321 standard, its requirements, and information to assist your team with an outline for fire investigation units to meet this new standard.

This is a reminder for anyone looking to complete the required hours for maintaining their Fire Investigation certification: The New York State Office of Fire Prevention and Control's annual Arson seminar is scheduled for Tuesday, November 19, through Thursday, November 21, at the Watkins Glen Community Center.

The NYS IAAI Chapter 23 annual meeting and awards presentation will take place Tuesday evening, November 19, upon completion of day one of the NYS Arson Seminar. The meeting and awards will be held in the ballroom of the Harbor Hotel in Watkins Glen.

Please don't hesitate to contact me to schedule a 1321 presentation. I'm always available to attend your county or team meeting to discuss the Chapter, answer any questions, or bring any of our training programs to your team. I can be reached at centralvice@nyfireinvestigators.org to discuss or set up a time.

Spherical Photography for Small Spaces

Andrew McNeill, MFS, CSCSA (L-Tron Corporation)

Spherical photography has gained popularity in forensic investigations over the past several years due to its ability to show the scene exactly as found and establish visual context for items of evidence. When we think of spherical photography, we typically think of large panoramas or whole rooms, but this technology is also ideal for imaging small spaces that are difficult to document with a traditional DSLR camera.

Such small spaces may include crawlspaces, attics, half-bathrooms, and vehicle interiors and undercarriages. In addition to the access challenges accompanying these spaces, we frequently have to move items of evidence found within them to make such items visible for photography. This can create uncertainty as to where evidence was located prior to collection.

Small spherical cameras can "extend your eyes" into the above spaces. Cameras such as Ricoh's Theta series are ideal for this. The Theta Z1, for example, has a resolution of 23 megapixels, a high dynamic range (HDR) setting, a tilt sensor, and the ability to be controlled remotely. It has two hemispherical lenses that allow the camera to produce a stitched spherical photograph without rotation or other movement. These features allow the camera to be introduced into a small space at any angle. The tilt sensor ensures that the image is displayed right-side-up for viewing.

To control the Theta Z1, the user connects it to a mobile device via an encrypted Wi-Fi signal generated by the camera. Ricoh has a free mobile app to control the camera and display the images. L-Tron Corporation bundles the Theta Z1 into its OSCR360 system. This system seamlessly integrates spherical photos and all other digital files (DSLR photos, videos, documents, etc.) on a single software platform. The output from OSCR360 can be shared with opposing counsel and insurance companies via a free read-only version of the software.

Once the camera is connected to the app, the user can either shoot in auto or manually adjust aperture, shutter speed, ISO, and white balance. The user can generate preview images to ensure camera placement and exposure settings are acceptable. The preview image is not saved; it is merely displayed as feedback. Settings can be readjusted, and the preview image refreshed as many times as needed to achieve the desired exposure. The user can then save this image. Here are two examples of spherical photos being used to document small spaces. I used OSCR360 to obtain these images, although other systems can achieve similar results. It should be noted that it is impossible to show a full 360-degree image on a static, printed page; the images displayed are relevant slices of the original spherical photographs.

In the first example, the basement area was not readily accessible, but fire investigators wanted to know what was down there. Using the small hole they cut in the living room floor to drain water from the ground level, I introduced the camera into the basement space upside-down, attached to a five-foot extendable monopod. The tilt sensor in the camera automatically caused the resulting image to be rectified right side up when viewed. In addition to showing the overall condition of the basement, this allowed the fire marshal to determine if any hazards were present before sending in any personnel.

Figure 1: OSCR360 image of living room with drain hole indicated by yellow arrow. ©Andrew McNeill, L-Tron Corporation.

Figure 2: OSCR360 image of basement obtained by upside-down camera. ©Andrew McNeill, L-Tron Corporation.

The second example shows a quick way to document the interior space of a burned car. I attached the camera to a tripod with legs fully extended but collapsed inward to form a pole. The camera was introduced sideways through the front passenger window until its lenses were roughly centered over the front center armrest area. The spherical image provides visual context for later close-up photos of areas of interest and evidence found. This is also a non-invasive way to document the interior space instead of climbing inside and dividing the space visually.

Figure 3: OSCR360 image of front passenger area of vehicle. ©Andrew McNeill, L-Tron Corporation.

Combining spherical and traditional photography ensures complete scene documentation. All angles can be covered, with no particular emphasis on a specific point of view. Adding a small spherical camera to your toolkit will let you cover all spaces, big and small.

NEW IAAI CERTIFICATIONS

NYS IAAI Would like to congratulate the following on their new certifications

Fire Investigation Technician

Michael Urban
Vernon Zuch

Evidence Collection Technician

Jack Alvarez
Liam Keating
Shane Sharkey
James Spencer
John Tighe
Ryan White
Jeffery Wilson
Matthew Wilson

Southern Zone

by Vice President Karl Vollmer

Greetings from the Southern Zone

I hope everyone enjoyed their hot summer, although it seemed relatively short. We have been somewhat busy with investigations in the Southern Zone. One I want to share involves lithium-ion batteries, once again. This is just another example of where these batteries are used.

We conducted an investigation on a single-family home that had a fire on the exterior front of the house. The weather that entire week was extremely hot and humid, with "real feel" temperatures reaching 115 degrees. The homeowners were away on vacation and could not be immediately reached, so we had no information whatsoever regarding the structure. We noticed several solar-powered lights around the property on trees and flower beds. The fire destroyed the front of the structure and completely burned off the small front porch of the house. Fire intrusion into the house was minimal. Witnesses across the street stated they observed the fire early in the event, and it quickly spread across the front of the house. Upon excavating the front of the house, we began to look for competent ignition sources and quickly ruled out any involvement of the structure's electrical system. We then excavated the area closer to the front of the destroyed front porch. As we were excavating, we heard a sizzling sound that grew louder as we dug deeper. We then uncovered several pieces of a small solar panel and two lithium-ion batteries. One was compromised, and the other was still intact. The intact cell was sizzling but was not yet compromised. Another compromised cell was found on the lawn approximately fifteen feet from the porch.

After a day or so, we interviewed the homeowner and learned that he had solar-powered motion-activated spotlights attached to each front porch pillar. Although the front porch was completely destroyed, there was visibly more damage to the right side of the front porch and pillar where we found the sizzling cell. Our determination was that the solar-powered motion-activated spotlight with lithium-ion batteries had failed and that extreme temperatures had contributed to that failure. Not surprisingly, the units the homeowner purchased were from Amazon.

This was just another example of where lithium-ion battery cells are being used, so please stay aware and informed.

God Bless and stay safe. Enjoy the Fall.

SUSTAINING MEMBERSHIP

New York State Chapter of the IAAI is very proud to recognize our sustaining members

WHAT IS A SUSTAINING MEMBER? Individuals, organizations, businesses, firms, corporations, and other parties interested in carrying out the Association's purposes may be granted a sustaining membership.

WHAT DOES A SUSTAINING MEMBER RECEIVE? A sustaining member receives a handsome handcrafted solid oak plaque, with a raised mahogany inlay of the State of New York topped off with the New York State Chapter of the IAAI seal. A bronze ribbon indicating "Sustaining Member, New York State IAAI" tops a field of yearly donation ribbons for ten years. This work of fine craftsmanship can be proudly displayed in your home or office and serves as a testament of support for the New York State Chapter of the International Association of Arson Investigators.

Additionally, each sustaining member will have their name, organization, business, firm, or corporate name prominently identified in each issue of The Fire Scene Magazine for as long as they are a sustaining member. Each issue reaches over 700 members of the New York State Chapter of the IAAI and many other friends and organizations throughout North America. It's without question a unique method of advertising your firm, corporation, or business.

WHAT DOES IT COST? Membership cost is an annual contribution of $200. Sustaining membership allows the Chapter to keep our membership costs to a minimum, helps us assist local host site committees in bringing in topic speakers from outside New York, as well as many other worthwhile projects.

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2. The advertiser must be prepared to validate any claims or statements made in the advertisement.

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4. An advertisement must not display a picture or artwork 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 published material must be accompanied by written authorization from the publisher.

6. An advertisement must not contain news matter for "The Fire Scene Magazine."

7. It is understood that an advertisement in the NYS IAAI publication does not constitute, and shall not be interpreted as an endorsement of the advertiser or the advertiser's product, equipment, publication, system or service by the NYS IAAI.

8. It is understood that an advertiser shall not use the NYS IAAI name or image in its commercial activities in any matter that would directly or indirectly indicate endorsement of the advertiser or advertiser's product, equipment, publication, system, or services.

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