



The I-ENG-A Report

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Steps Leading to a Successful Fire Investigation

Fire Investigations have been going on for centuries and we all recall historical references from Nero's burning of Rome to Ms. O'Leary's cow. Over those years the art and craft of the fire investigator developed many techniques and applications.

In 1992, NFPA 921 – Guidelines for Fire Investigations – was published. The publication's intent was to define standards of competence related to fire investigations, which it generally has. It is doubtful however that the intent was to stir up controversy, which it also has.

Much of the controversy has revolved around the ultimate purpose. Although titled and labelled as a guideline, several courts have ruled that it is a standard. This distinction changes the outlook from a "should" to a "must" document and many expert opinions have been overturned because the guideline was not rigorously followed. Another issue is that several long lasting beliefs concerning the appearance of fire scenes are challenged as scientifically uncertain, which then opens the door to challenges to any finding that can't be produced in the lab. Since 1992 many court cases have occurred and the 2004 edition of NFPA 921 has added information to aid fire investigators.

Although only a small percentage of fire investigations will ever arrive in the courtroom we must treat each one as the

next famous case. With that in mind, the proper application of NFPA 921 becomes paramount.

The proper application starts with complete familiarity with the content, as well as acceptance of it as an authoritative document. Lip service will not do. The scientific method must be applied to the investigation including:

- Define the problem
- Collect data
- Formulate a hypothesis
- Test the hypothesis
- Revise the hypothesis and finalize
- Report the final conclusion

The investigator must also be prepared to justify all steps taken, as well as the reasons that some steps were not taken.

So how does a fire investigator proceed?

Let's look at the flow of a case suspected to be electrical. The steps will be familiar for mechanical and other causes.

The first step is to determine the area of origin by examining the exterior, interior and then locating the area of most damage.

The second step is to determine the point of origin by examining micro burn

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patterns, determining if there is an electrical source in the area such as outlets, TV jacks or wiring. Are there remains of outlet boxes, yokes, or screws, and has the power been disconnected?

The third step is to observe the point of origin and evidence in detail, for example by looking at what parts were destroyed by heat, or if there is pitting in the underside of the binding screws or base plate. At this point, rule out other causes in the area and points of origin.

The fourth step is to examine the system including the meter and masthead, overhead wires, the circuit panel and breakers. Now, trace the point of origin to the panel. For example, if the point of origin was at outlet #8 in the dining room, trace it to the panel to determine if the breaker tripped. Next, obtain the best history by talking to the owner about any problems or recent work done.

The last step is to determine the cause and test the hypothesis.

Key points throughout the investigation are:

- Do not touch – major cause of spoliation
- Use common sense
- Take photos and measurements; get product data, meter readings, etc.
- If needed, get other experts
- Tag the evidence and do not tamper
- If possible, secure the scene
- Make sure all other parties are notified (electrical contractor, general contractor, product manufacturer, etc.)

The conduct of sound fire investigations in accordance with NFPA 921 will provide the objective evidence needed for legally sound decisions.

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