THE DEATH OF NEGATIVE CORPUS
(Abridged Version)

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ABSTRACT
The Negative Corpus Methodology [NCM], the belief that the elimination of known potential fire causes (ignition sources), proves some unknown fire cause for which no evidence exists, has long standing in the fire investigation community. The 2011 edition of NFPA 921, Guide for Fire and Explosion Investigations finally repudiated and firmly rejected the NCM, although in some segments of the fire investigation community there is still deep-rooted use and reliance on this improper and unethical process.

This program is a follow-up to the 2006 presentation at ISFI (International Symposium on Fire Investigation Science & Technology) “The Pitfalls, Perils and Reasoning Fallacies of Determining the Fire Cause in the Absence of Proof: The Negative Corpus Methodology.” That article made the case that the NCM relied on unsupported and faulty reasoning such as the appeal to ignorance and a disjunctive form of reasoning, often in the form of the disjunctive syllogism. Relying on these fallacies ultimately resulted in opinions that were neither valid nor reliable.

In addition to revisiting some of the fundamental logical reasoning fallacies relied upon using the NCM, this program will provide real-world examples of the application of the NCM; and, explore new studies that further demonstrate the procedural failings and shortcomings of the NCM to further expose it as an invalid and unreliable method for purposes of determining the cause of a fire. Lastly, the article will demonstrate how the NCM fails to meet the Daubert criteria concerning the reliability of expert opinion.

WHAT IS THE NEGATIVE CORPUS METHODOLOGY?

The Negative Corpus Methodology that allows for the “determination” of the ignition source, or as it is routinely applied, “the fire cause,” without physical evidence or proof. The 2011 edition of NFPA 921, Guide for Fire and Explosion Investigations has adequately described the NCM. This description can be found in §18.7.5 “Inappropriate Use of the Process of Elimination” which states in part:

“The process of determining the ignition source for the fire by eliminating known or found in the area of origin claiming such methodology is proof of an ignition source for which there was no physical evidence exists is referred to as “negative corpus.”

Practical Examples
The following examples illustrate the application of the NCM and the faulty reasoning used in supporting the opinions drawn therefrom.

Example 1.
Consider the opinions of an investigator as described in this written report:

The origin was examined. The charred remains of a sofa and an ash tray upside down on end of sofa were observed. The removal and inspection of debris found no remains of a cigarette. No accidental or natural ignition sources were observed in the debris. Therefore, it is my opinion that an open flame ignited ordinary combustible materials with human involvement was most likely ignition source.
Example 2.
Next, consider the testimony of an investigator who conducted the investigation into the fire that occurred in the dwelling depicted in Figure 1.

Q: Your conclusion is that the fire started at floor level, at the hole in the floor, in the living room, on the west wall beneath the picture window?
A: Yes.
Q: You're concluding that the area of origin is the area where you believe the heaviest burn is, correct?
A: Correct.
Q: Did you consider that the fire originated at the ceiling?
A: Yes.
Q: How did you eliminate it?
A: I found no ignition source.
Q: Did you consider that the fire could have started outside the west wall on the deck?
A: Yes.
Q: What did you do to eliminate that as the point of origin?
A: In that area, there was no ignition source.
Q: Which was also true for the inside, correct? You never found an ignition source...
A: Correct.
Q: In your opinion, you never located an ignition source inside, correct?
A: Correct.
Q: And now you're saying you didn't locate an ignition source on the outside, correct?
A: Correct.
Q: You ultimately concluded that this was an incendiary fire, correct?
A: Yes.
Q: Your conclusion was the ignition source was open flame?
A: Human involvement, yes.
Q: You have no physical evidence of the open flame, correct?
A: Correct.
Q: You have no physical evidence that you can reasonably determine of the material first ignited, correct?
A: Correct.
Q: Your conclusion that this was a humanly and intentionally set fire was arrived at through the process of elimination?
A: Correct.
Q: And your conclusion is based not on physical evidence of the cause of the fire, correct?
A: Could you say that one more time?
Q: Your determination of the fire cause is based on the absence of evidence, correct?
A: The absence of evidence?
Q: Yeah, the absence of the ignition source, the absence of....
A: Yes.
Q: ... of the material first ignited?
A: Yes.
Example 3. Lastly, consider the demand letter an attorney representing an insurance company (Figure 2):

“I trust you have had the opportunity to consult with Mr. (Investigator) regarding his inspection of the scene on (date). Our investigation indicates that the fire originated in the northwest corner of Mr. (Insured’s) bedroom where the candle was located. Mr. (Investigator) should be able to confirm for you the area of the fire’s origin, and that no electrical systems were found in the area. Further, there was no evidence of smoking materials or other devices being the source for the fire. Mr. (Insured) confirms that the candle was an (unnamed) product, purchased at (unnamed) store in (unnamed city). Given Mr. (Insured’s) account and the physical evidence, there can be but one conclusion, that the (unnamed) candle was the source for the fire.

(Insurance company) has paid sums for the repair and restoration on the premises as is, of course, looking to your client for reimbursement. I look forward to hearing from you.”

Each of these examples represents the outcome regarding the origin and cause of a fire utilizing on the NCM. The all also illustrate the subjective nature and inherent logical reasoning fallacies which occur in applying the NCM to the proffered fire causes.

In Example 1, the investigator eliminated a cigarette as a potential ignition source because he found no evidence of one. Yet, the investigator then opines the ignition source is an “open flame” despite finding no evidence of an open-flame producing device.

In Example 2, the investigator applied the NCM to eliminate alternate potential origins as well as other potential ignition sources. First, he eliminated alternate potential origins because he found no ignition source at those locations. (What’s interesting was that this is exactly the correct hypothesis testing recommended in NFPA 921-11, §17.6.1.1.) But then, he selected his origin based on fire patterns and damage, and not on finding the presence of a competent ignition source. Next, he determined the ignition source had been an open flame, not on evidence, but on the absence of evidence and the elimination of any other heat sources at his proffered origin.

Example 3 illustrates the classic Negative Corpus argument as presented in the demand letter. What makes this example different from the first two is that the proffered cause was attributed to a candle rather than an intentional cause. What the letter forgot to mention, however, was that no evidence of the jar candle had been found in the fire debris. The only facts relied upon to indicate that a candle had been in the room at the time of the fire was the witness statement of the apartment’s occupant. From that perspective, this example is like the first two in that, one, alternative ignition sources were eliminated because there had been no physical evidence of them; and two, there had been no evidence of the proffered ignition source.

These examples all illustrate the subjective, speculative and arbitrary nature of conclusions derived from the NCM. All exemplify the twisted logic relied upon where the exact same evidence, or absence thereof, exists for the proffered ignition source and those potential ignition source(s) considered and eliminated. The application of a logical and rational reasoning methodology would provide that either both hypotheses must be true, or both must be false. The application of a methodology which supports contradictory conclusions would not be possible unless the methodology were fallacious. By following the appropriate methodology dictated by the Scientific Method, the result of hypothesis testing with two opposing hypotheses supported by the same data could only result in conclusions considered “undetermined.”
Determining an “Open Flame” as an Ignition Source

As provided in Examples 1 and 2, a common description for the fire cause by the investigator who utilizes the NCM is an “open flame” to “ordinary combustible materials” (unless of course the cause du jour is an appliance). There are several other issues concerning the “determination” that the ignition source was an “open flame.”

- An “open flame” is not an ignition source, but is itself combustion.2, 3
- Open flame combustion is the result of an ignition source raising the temperature of a combustible material above its ignition temperature.
- An ordinary combustible material is simply any material that will burn.

The determination of an “open flame” as an ignition source improper and unacceptable, and is only supported by the subjective and arbitrary belief of the investigator.

WHY NEGATIVE CORPUS?

Because, the NCM has been regarded as a process necessary to determine fire causes specifically in circumstances in which the ignition source has not been identified. The NCM is process that has been permissible when ignition source had allegedly been removed from the scene at the time the fire had been initiated. Unfortunately, the use of the NCM has been expanded by some to include fires where the ignition source is simply unrecognizable, cannot be found (often due to the degree and extent of damage, both by the fire and fire suppression activities such as overhaul), or when too much damage is present (e.g. with appliances where there is “too much damage” to identify the cause (sic)). While the NCM is a process mostly utilized to determine intentional fires, the NCM is utilized for fires classified “accidental,” such as equipment, appliances, candles and cigarettes as well.

APPLICATION OF THE NEGATIVE CORPUS METHODOLOGY

There are two aspects to the application of the NCM, the procedural methodology and the reasoning methodology.

I. PROCEDURAL METHODOLOGY

The application of the NCM first depends on the investigators ability to accurately and positively identify the origin. Previous editions of NFPA 921 (1998, 2001, 2004 2008), reiterated the importance of identifying the origin and advised that the NCM could only be used when the origin was “clearly defined.” This had been discussed in §18.2.1 of the 2008 ed., which started in part: “The positive identification of the origin is the most significant factor in determining whether the process of elimination is appropriate. If the origin cannot be positively identified to the exclusion of all other potential origins, no inferences regarding the ignition source should be made.” “Whenever the origin is not clearly defined, this process is inappropriate and cannot be used.”

A parallel discussion, Kirks’ Fire Investigation, 6th ed. provided similar guidance for the application of the Negative Corpus Methodology, where it emphasized that the NCM would be applicable when the point of origin was known.4 “Even in the absence of an incendiary device, the crime of arson can be proven in the absence of all logically possible accidental and natural causes at the point of origin.”5, 6 (Emphasis original)

Critical Question One

“The origin of a fire is one of the most important hypotheses that an investigator develops and tests during the investigation. (Emphasis added) Generally, if the origin cannot be determined, the cause cannot be determined, and generally, if the correct origin is not identified, the subsequent cause determination will also be incorrect.”
The first question to be answered based on the definitions of the fire origin, is, “How can an investigator determine the (point of) origin without physical evidence of the ignition source, when the identification of the ignition source defines the origin?” The simple answer is, “You can’t.” The question is itself a conundrum, a puzzle, a riddle with no satisfactory answer. In logic, this is referred to as a “Causality Dilemma.” The classic “chicken or the egg” riddle is an example. The origin cannot be identified without the ignition source; and, the ignition source cannot be identified without identifying the origin.

Critical Question Two

The second critical question to be answered is essential to testing the origin hypothesis and is found in §NFPA 921-11, §17.6.1.1, (Testing the Origin Hypothesis) which asks: “Is there a competent ignition source at the hypothetical origin?”

Obviously, the NCM answer to the question is, “no.” The very reason for using the NCM is to reach opinions regarding the cause of a fire when evidence of the ignition source is not found. As a result, the most basic method of hypothesis testing for the origin cannot occur resulting in the determination for the origin being untested and simply opinion.

What also should not be missed here is that the testing of the origin hypothesis requires a second, but interrelated test to determine the “competency” of the heat source found at the origin. NFPA 921-11, §18.4.2 “Ignition Source Analysis,” like §17.6.1.1 testing the origin hypothesis, requires testing for the ignition source hypothesis as well. Because the ignition source is being inferred and not identified by physical evidence utilizing the NCM the investigator simply assumes the ignition source is competent.

“How Reliable is the Methodology Utilized to Determine the Origin?”

This is a particularly valid question considering the determination of the origin utilizing the NCM is the absence of an ignition source. As discussed previously, it is the presence of the ignition source that defines the origin. However, in cases using the NCM the origin determination obviously does not rely on finding an ignition source. Instead, utilizing the NCM the origin for the fire is determined always determined in the absence of a physical ignition source.

If the investigators are unable to test the origin hypothesis, to prove or conform they were at the origin, as recommended in NFPA 921-11, §17.6.1.1 (Testing the Origin Hypothesis), the investigators obviously are utilizing some other methodology for supporting opinions regarding the origin.

NCM is Inherent Unreliability

Whenever a methodology warns that it can only be used only in certain circumstances and conditions, but where those conditions and circumstances do not exist, “this process is inappropriate and cannot be used.” This is a warning of the methods’ potential misuse and its unreliability, resulting in erroneous conclusions. Where the “guidance” warns that the methodology can be regarded as both “appropriate” (i.e. reliable) and “inappropriate” (i.e. unreliable) depending on the circumstances, this is a warning of potential misuse and its unreliability. Where the guidance provides that, “… it should be relied upon only in the most special circumstances,” that should alert everyone that the proffered methodology can lead to erroneous conclusions and speaks directly to its unreliability.

Lentini recognized the misuse of the “clearly defined origin” concept limiting the applicability of the POE, vis-a-vis NCM, provided in NFPA 921, so much so he was compelled to provide a detailed description of and a photograph in his textbook as an example of his interpretation of a “clearly defined origin.”

Lentini also recognized the problems encountered with the liberal interpretations employed by some investigators in their individual interpretations of “clearly defined” noting, “the ambiguity has been
exploited by some investigators to allow them to state that “clearly defined” means whatever they want it to mean (*ipse dixit*)."12

**Experimental Testing of the Origin Hypothesis Methodology**

The article by Special Agent Steve Carmen, ATF (Ret.), “Improving the Understanding of Post-Flashover Fire Behavior,”13 describes the results of experiments conducted during a 2005 training seminar for fire investigators, with a focus on teaching fire dynamics and the effect of ventilation on the different origins in post-flashover compartments.14

Two test room-cells were built and both had been furnished as a bedroom. The fire in the test cells burned for 7 minutes, until after flashover had occurred. Fifty-three participant-investigators, with varying degrees of experience were asked to briefly examine the cells and decide in what quadrant of each cell they thought the fire had originated.15

Of the fifty-three participants only three correctly identified the quadrant of origin for the first test cell. Only three participants correctly identified the correct quadrant in the second test cell. The three participants getting the quadrant correct were different for each cell. No participant got the quadrant of origin correct for the two cells. The number getting the quadrant of origin correct corresponded to an accuracy rate of only 5.7%. However, more importantly the ratio getting the quadrant incorrect was an abysmal 94.3%. Those participants who had incorrectly identified the origin reported that they had been misled in their analyses (and origin determination) by the extensive, post-flashover generated burn patterns.16 The conditions present in Carmen’s experiments are not any different than those found in the actual fire scenes. Investigators routinely rely on the NCM in post-flashover conditions, as the examples earlier in this article illustrate.

Carmen reported anecdotal evidence from instructors from the Federal Law Enforcement Training Center, in Brunswick, Georgia, who indicated that since early 1990’s only 8 – 10% of the participant-investigators there correctly identified the origin during the pre-test. This is only slightly better than the ratio reported in Carmen’s research, but is still dismal. Carmen acknowledged as much where he stated, “A success rate of less than 10% of investigators to accurately determining the origin of one or two-room fires even after short periods of post-flashover exposure is of concern.”17

The process of determining the origin found in the Carmen report is the same methodology utilized by proponents of the NCM. After determining the origin, the next step is to determine the cause. Based on the conclusions reported by Carmen regarding investigators origin determination, the NCM would have resulted in an incorrect cause with an error rate of 94.3%, the same as the error rate for incorrectly identifying the origin. Knowing a potential error rate in the expert’s methodology is one element of the Daubert criteria.

**How Reliable is the Origin Determination Methodology?**

What does Carmen’s research say about investigators reliability of investigators to correctly identify the origin of a fire? While Carmen noted, a “success rate of less than 10% of investigators accurately determining the origin... is of concern” it is far more than just concerning.

The utilization of the NCM depends on the accurate, positive and conclusive identification of the origin. Simply, the origin must be known to a certainty, to the exclusion of all other potential origins or the methodology is unreliable for purposes of identifying the fire cause. The origin and cause determination of a fire is a classic example of “chain reasoning”, where successive conclusions are also reasons for the next conclusion.18 A consequence of the origin being incorrect is compounded with the utilization of the NCM, because the cause determination is based the conclusions origin. The inability to correctly and conclusively identify the origin lead directly to the ability to correctly identify a fire cause utilizing the
If the correct origin is not identified, the subsequent cause determination will generally be incorrect.\textsuperscript{19} Considering that investigators utilizing the NCM base their determination of fire cause on their ability to correctly identify the origin, and the methodology used to determine the origin according to Carmen’s research has a success rate of merely 5.7%. The resulting opinions regarding the cause would be not only unacceptable, they would also be unreliable. For the reasons herein noted, the NCM must be rejected as a methodology that is unreliable. Knowing and demonstrating the Reliability of a particular methodology, theory or technique is one of the Daubert factors.

II. REASONING METHODOLOGY

The second phase in the application of the NCM involves the reasoning methodology employed, to reach and support the conclusions. The “arson by default”\textsuperscript{20} methodology employed by the NCM is fraught with assumptions, speculation and logical reasoning fallacies. These errors in reasoning had been discussed in detail in the author’s 2006 article, “The Perils, Pitfalls and Reasoning Fallacies of Determining the Fire Cause in the Absence of Proof: The Negative Corpus Methodology.”

All the resonating fallacies will not be discussed here; however, there are several fallacies which dominate the NCM reasoning that should be noted. The primary fallacies which form the basis of the NCM are:

- Disjunctive Reasoning
- Appeal to Ignorance
- Shifting Burden of Proof

Reliance on the Disjunctive Reasoning\textsuperscript{21}

The NCM utilizes a variety of disjunctive forms of reasoning in an attempt to validate any conclusions drawn therefrom, including the false dilemma, the either-or fallacy, the false alternatives fallacy, or the black & white fallacy. The similarity between these fallacies is the faulty premise, in which they all assert there are only two alternatives to considering the cause of a fire. But this argument works only if there really are two alternatives.\textsuperscript{22} The author has also encountered a form of disjunctive reasoning referred to as the “theory of competing hypotheses. One of the key problems with this “theory” is the assumption that one of the hypotheses was correct.

The most frequent application of disjunctive reasoning for the NCM proponent is that a fire cause is either “accidental” or “incendiary.” The premise that a fire cause is either “accidental” or “incendiary” itself a faulty premise. “Accidental” and “incendiary” refer to the classifications of a “fire cause” and not the elements of a fire cause.

This disjunctive form of reasoning is expressed as:

If not A, Then B
Not A, Therefore B

Disjunctive reasoning is most easily recognized as expressed in the form of the Disjunctive Syllogism. A number of different sources are available that explain both the fallacy and the outcomes of improperly relying on the disjunctive form of reasoning upon which the NCM relies.\textsuperscript{23,24}

Example Disjunctive Reasoning: Evidence Examination

Consider for a moment that you are a proponent of the NCM. An evidence exam is taking place in which potential ignition sources preserved from a fire scene are to be examined. The purpose of the examination is to find and determine the ignition source for the fire.
Throughout the examination, potential ignition sources are examined and “eliminated” as the ignition source until all but two potential ignition sources remain. As a proponent of the NCM, the decision is clear, one of the two remaining pieces of evidence must be the ignition source (“if not A, then B”). The first of the last two items is examined and “eliminated.” The question now is, “Do you have to examine the last piece of evidence before determining it to be the ignition source?” For the NCM proponent, the answer would be, “No.” Why? Because, relying on the NCM, this last must be the ignition source. Why? Because all the other potential ignition sources have been eliminated. Many investigators have had the experience of going to an evidence examination and not finding evidence of an ignition source. This is the classic NCM form of reasoning demonstrating the reliance on the disjunctive form of reasoning.

While the evidence examination is only a hypothetical example, the author has attended evidence exams and observed experts who have applied the NCM reasoning, whereas “the cause must be one of the two items remaining.” It is not uncommon for evidence examination protocols or an expert(s) to recommend starting with the item least likely to be the fire ignition source and work to towards the more probable. This methodology alone leads to the “if not A, then B” reasoning. The result is that the very order in which the evidence was examined can play a role in the final determination of the cause. A good method to avoid this dilemma and remain objective throughout the examination is to examine the more probable ignition source first, knowing that there are additional items to examine.

The Appeal to Ignorance Fallacy

Besides disjunctive reasoning, the other primary fallacy relied upon by proponents of the NCM is the belief that the elimination of one thing proves something else. This is fallacy is referred to as the appeal to ignorance. The fallacy, appeal to ignorance, is cited by a number of different sources. Among the best and most straightforward are these:

- “The problem here is that a lack of evidence is supposed to prove something but it can't. A lack of evidence alone can neither prove nor disprove a proposition. A lack of evidence simply reveals our ignorance about something.”
- “If the absence of proof against a claim could be regarded as proof for it, then even the most bizarre of claims could allegedly be proved.”
- “You could also show how one could be led to logically contradictory conclusions if the pattern of thinking in question were not fallacious.”

The last point here is well worth noting because, that is exactly what will happen. When an investigator eliminates a heat source, e.g. a cigarette, because he fails to find evidence of one, but then uses the same methodology to allege the ignition source had been an “open flame” when no evidence of the device producing the open flame is found, that illustrates fallacious reasoning.

Shifting Burden of Proof

“Appeals to ignorance involve the notion of burden of proof. Burden of proof is the weight of evidence or argument required by one side in a debate or disagreement (in the critical thinking sense). Problems arise when the burden of proof is placed on the wrong side.”

When one commits this fallacy, one is attempting to shift the obligation of proof to another person, usually to someone unconvinced by or skeptical of the claim. This is typically done by insisting that the critic has the responsibility to disprove the claim or provide support for the contradictory claim.

The allegation for which there is no evidence creates an untestable hypothesis, both for the person making the allegation and for someone challenging the claim. An untestable hypothesis is an invalid hypothesis. “Claims that cannot be tested, assertions immune from proof are veridically worthless.” “The burden of proof lies with the person making the allegation or claim, and then requires that evidence and proof be
presented. Lastly, no claim for responsibility can be made without evidence or proof. No claim can be supported by the absence of evidence.”

NFPA 921, 2011 EDITION – REPUDIATING THE NEGATIVE CORPUS METHODOLOGY

The first attempt by NFPA 921 to address the NCM had first been introduced in the 1998 edition, in a discussion euphemistically referred to as the “Process of Elimination” [POE]. The POE discussion had attempted to place a restriction on the use of the NCM, by defining the conditions and circumstances where the cause could be “determined” is the absence of physical evidence. Essentially, the POE discussion permitted the use of the NCM when there existed a “clearly defined origin.”

The POE discussion itself provided guidance for the investigator to follow the scientific method right up to the point where it then permitted the investigator to determine the ignition source by “inference.” In this regard, inference is tantamount to speculation or guessing as to the determination of cause. The recommended process was clearly inconsistent with the Scientific Method.

With the adoption of the 2011 ed. of NFPA 921 the majority of the committee had come to recognize the inherent conflict and irreconcilable differences between the Scientific Method and the NCM. The result was a reversal of the committees’ previous position with a direct and straightforward rejection and repudiation of the NCM, a decision long overdue. The new discussion is found in §18.6.5 Inappropriate Use of the Process of Elimination.

NEGATIVE CORPUS METHODOLOGY AND THE DAUBERT CRITERIA

The Supreme Court in Daubert v. Merrell Dow (509 U.S. 579, 113 S.Ct. 2786) set forth factors a court may use in evaluating whether or not an expert’s opinion is sufficiently reliable to be admissible. Subsequent Supreme Court decisions make it clear that the test of reliability is flexible and that this list of specific factors neither necessarily nor exclusively applies to all experts or in every case.

These factors established by the Supreme Court to evaluate the reliability of expert opinion are as follows:

1. Whether a theory or technique can be (and has been) tested.
2. Whether a theory or technique has been subjected to peer review and publication (although publication, or the lack thereof, is not a dispositive consideration)
3. The known or potential rate of error of a particular scientific technique and the existence and maintenance of standards controlling the technique’s operation
4. That a “reliability assessment” does not require, although it does permit, explicit identification of a relevant scientific community and an express determination of a particular degree of acceptance of a theory or technique within that community

Analyzing the NCM by Daubert

The issues discussed in this article can be used to provide the framework by which the expert opinions utilizing the NCM principles can be analyzed by the Daubert reliability criteria. Each will be analyzed here, in order:

1. Whether a theory or technique can be (and has been) tested.

The first and most important aspect whether the NCM can be applied is whether the point of origin is known, and the origin is known to a certainty, with no other potential origins. Carmen’s research tested the procedural methodology of investigators to determine the origin of a fire and found that reliability was only 6%. This is unacceptable. On this basis alone the Negative Corpus Methodology cannot be relied upon to yield accurate results.
(2) **Whether a theory or technique has been subjected to peer review and publication.**

The NCM has been subjected to peer review by its publication in NFPA 921, which is considered a peer reviewed document. NFPA 921-11, §18.6.5 “Inappropriate Use of the Process of Elimination” rejected the NCM where it states:

- The NCM is inconsistent with the Scientific Method
- The NCM is inappropriate and should not be used
- The NCM yields untestable hypotheses

In a related rejection, NFPA 921-11, §4.3.6.1 states: Hypotheses that cannot be tested are invalid.

(3) **The known or potential rate of error of a particular scientific technique and the existence and maintenance of standards controlling the technique’s operation.**

Carmen’s research provided an error rate for accurately determining the origin of a fire, which is the first and primary process for using the NCM. The results or Carmen’s research and the anecdotal data demonstrate an error rate in accurately identifying the origin at 94%. This is unacceptable. The logical conclusion from this research if the determination of cause had followed the incorrect determination of the origin, the cause would have equally been incorrect, with an error rate of 94%.

As for the second part of the test, the “standards” which reference the technique (e.g. Kirk’s, Scientific Protocols for Fire Investigation, Forensic Fire Scene Reconstruction, and even NFPA 921-08 ed.) acknowledged that inappropriate use of the (NCM) method would lead to erroneous results. The guidance provided in these documents had difficulty conveying the limiting conditions and circumstances for the appropriate use for the NCM. Ultimately, the "appropriate" application of the method was left to the investigator to be applied as the investigator saw fit.

(4) **That a “reliability assessment” does not require, although it does permit, explicit identification of a relevant scientific community and an express determination of a particular degree of acceptance of a theory or technique within that community.**

As stated previously in Daubert criteria (3) for peer review, with the adoption of the 2011 ed. the relevant community, via NFPA 921-11 ed., in §18.6.5 “Inappropriate Use of the Process of Elimination” has resoundingly rejected the NCM as not acceptable.

**CONCLUSIONS REGARDING THE NEGATIVE CORPUS METHODOLOGY**

The NCM is inherently flawed and unreliable. Through a detailed critical analysis, the undeniable truths concerning the NCM are quite evident:

1. The origin must be known to a certainty, to the exclusion of all other potential origins otherwise the methodology is unreliable.
2. The methods utilizes by investigators to determine the origin is itself unreliable.
3. It was not possible for authors to convey by description or example their idea of when the NCM would be appropriate (e.g. reliable) or inappropriate (e.g. unreliable).
4. That the NCM when used inappropriately it could lead to erroneous conclusions.
5. That the NCM proposed untestable hypothesis.
6. That the NCM could not be supported by the Scientific Method.
7. The NCM is not reliable.
8. That the NCM cannot be relied upon to yield reliable expert opinion and thus fails the Daubert criteria for reliable expert opinion.
Epilogue

The first edition of NFPA 921 in 1992 was reviled by many in the fire investigation community for its addressing “misconceptions” in fire investigation as being erroneous and not scientifically reliable. These misconceptions had been labeled as such because of their wide spread acceptance and use. Misconceptions about char, (alligator char; the shape, size and color of the char blister), low burn, annealed furniture springs, crazing of window glass, spalling were all found to be unreliable and not supported by scientific research. The proponents of these misconceptions complained that 921 was “taking away” of tools used by an investigators to determine a fire cause. Today, these misconceptions are virtually nonexistent. They are little more than historical footnotes in the evolution of fire investigation science and technology. In later years NFPA 921 addressed the misconceptions and unreliability of the visual interpretations of burn patterns attributed to ignited liquids. Most recently, it has been the repudiation of the NCM.

The fallout from the change in the 2011 ed. 921 is much like that in the past. The proponents of the NCM now blame NFPA 921 (and the Technical Committee for Fire Investigations) for taking away another of their methods for determining a fire cause. What they have yet to realize is that 921 did not take anything away. Their anger is misplaced. The NCM is not wrong and unacceptable because it’s now written in NFPA 921. Simply, the NCM has always been wrong. The NCM has never provided conclusions that were valid or reliable. Instead, it was a false methodology and a “tool” that the investigator never really had. In 2011, NFPA 921 finally acknowledged and addressed the ever present but not widely recognized failings, inconsistencies and fallacious reasoning the NCM had relied upon to support conclusions. As reported in 2006, “Basically, the Negative Corpus Methodology exists only because the procedure is acceptable to the fire investigation and legal communities.” It’s good to report that in 2012 that’s no longer the case. The Negative Corpus Methodology is dead.

For some proponents of the NCM their ideology is simply misdirected. Some see the repudiation, and “death of negative corpus,” as a means that will allow arsonists “get away with setting a fire.” Instead of realizing the undeniable truth that the NCM and any finding based on the absence of proof is unreliable; that following the NCM will guarantee incorrect conclusions regarding the origin, cause and responsibility of a fire; and, that innocent victims of fire will be incorrectly identified as the being responsible for the fire in the absence of evidence. Fundamentally, they fail to recognize that we don’t accuse the innocent to get the guilty. “It’s more important to protect the innocent that convict the guilty” is a fundamental tenant for conducting ethical investigations.

The “death of negative corpus” will mean individuals and product manufacturer’s will not be falsely accused as being responsible for a fire in the absence of evidence. It will mean that the victims of fire will not have their financial lives threatened by the withholding of their insurance proceeds based on the absence of evidence. It will mean that those incorrectly accused will not be denied their liberty in the absence of evidence. It will also mean that those incorrectly accused cannot be put to death in the absence of evidence.

ABOUT THE AUTHOR

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END NOTES

1 NFPA 1033, Standard for Professional Qualifications for Fire Investigator, National Fire Protection Association, Quincy, MA, 2009 ed., §4.1.2
2 NFPA 921-11, §3.3.69 Definitions, Flame
3 NFPA 921-11, §3.3.1 Definitions, Combustion
5 DeHaan, p.748 Definitions: Point of Origin
6 NFPA 921-11, 3.1.127 Definitions: Point of Origin
8 http://en.wikipedia.org/wiki/Chicken_or_the_egg
10 DeHaan, p.322
12 Lentini, p.124
14 Carmen, p.221
15 Carmen, p.221-222
16 Carmen, p.221
17 Carmen, p.223
19 NFPA 921-11, §17.1 Origin Determination: Introduction
22 Vaughn, p.189
23 Vaughn, p.189
24 Damer, p.115
26 Vaughn, p.181
27 Damer, p.135-138
28 Damer, p.138
29 Vaughn, p.183
32 Damer, p.136
33 NFPA 921-11, §11.5.2.3.6
34 DeHaan, p.322
35 NFPA 921-08, §18.2.1 Fire Cause Determination, Process of Elimination
37 International Association of Arson Investigators (IAAI) Code of Ethics