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Evidence For the Field Technician, Part One in a Series of Articles

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ABSTRACT: During the course of everyday activities the forensic examiner must deal with evidence on a regular basis. The most common mistake that can occur, which can have drastic effects on the case you are working on, is a mishandling of the evidence. The proper procedures for handling and documentation must be followed painstakingly in each and every case handled. The following article will hopefully give the newcomer to the forensic work world at least an appreciation of the importance of handling evidence in a proper manner.

KEYWORDS: Evidence, chain of custody, documentation, forensic science and spoliation

The following is a good working definition of evidence: "Something (including testimony, documents and tangible objects) that tends to prove or disprove the existence of an alleged fact."1. Using this definition anything can be evidence. Part of the problem with dealing with evidence is the recognition of what is evidence.

Evidence can be easily handled and mastered if you can break down the entire process to separate easily understood stages. The following are stages that help the technician understand and handle evidence properly.

STAGES IN PHYSICAL-EVIDENCE ANALYSIS

RECOGNITION
DOCUMENTATION
COLLECTION & PRESERVATION
ANALYSIS
INTERPRETATION
REPORT
TESTIMONY AND EXPERT WITNESS QUALIFICATIONS

Before we discuss the main topic of evidence I feel it is important to deal with the concept of Spoliation.

Spoliation

Spoliation of evidence can be defined as “*The intentional destruction, mutilation, alteration or concealment of evidence.*”² A second definition is “*Loss, destruction, or material alteration of an object or document that is evidence or potential evidence in a legal proceeding by one who has the responsibility for its preservation.*”³ This concept has come to the forefront of the evidentiary world. Every examiner must be familiar with the issues involved with spoliation and make every effort to avoid the pitfalls associated with it.

The major reason to avoid spoliation of the evidence that is recovered and analyzed is that the evidence may never get in front of the jury or judge if there is spoliation. This holds true with evidence in civil as well as criminal cases. Keep in mind that the evidence may be presented in both the criminal and civil arenas in some cases.

The most common way to avoid problems with spoliation issues is by conducting mutual examinations of the scene and evidence. Documentation of the evidence and adherence to the proper collection process are tools that help to avoid spoliation problems. If the evidence that is collected is to be changed during the analysis process then careful attention to the spoliation issue must be paid. Remember all interested parties need to have the opportunity to be present when the evidence is examined.

The NFPA 921 has a new section in the 2001 edition (pg. 82 section 9.3.6) that deals with spoliation. This discussion of the topic of spoliation is short and to the point and covers spoliation from the fire investigator’s viewpoint but the general principals also would be applicable to other examiners in different fields. I would strongly suggest reading this section of this guide, which can be obtained from the NFPA at 1 Batterymarch Park, PO Box 9101, Quincy, Ma 02269-9101.

Recognition of Evidence

By using the definition supplied above, evidence can take any form. For the purposes of this article we will stick to tangible evidence, which is what most of the technicians reading this article will be handling. Before there is evidence it must be recognized. Depending on what type of case or scene you are dealing with the evidence may be as large as a vehicle or as small as a single fiber or hair. What will become important to the trier of fact is what must be recognized in the midst of useless background material. This is the first step in the evidence handling process.

Evidence, when dealing with fire investigations, can take the form of sections of floors and debris collected to test for the presence of accelerants. When dealing with product liability cases, the evidence can be a small section of faulty wiring or an entire switch panel. With insurance fraud, the evidence may take the shape of fire damaged ignition components. From the

example discussed above, you can see that the only way to recognize evidence is to be aware of the general circumstances of the crime or incident and to have an understanding of the potential evidence that can help in the analysis of the case.

To illustrate the recognition of evidence, we will use a case that involves a reported stolen and burnt vehicle. By using this type of case I hope to indicate the type of evidence that is present in most cases.

There are a number of aspects to this type of case that can be aided by physical evidence. These aspects evolve around the basic questions of: Was the vehicle actually stolen? Was the fire accidental or intentional? Finally, was there any evidence that may support any potential motive?

Some of the evidence that helps in the confirmation of the presence of an ignitable fluid is samples taken from the suspected area of origin. These samples include the carpeting or cushion material for this area.

Some examples of evidence pertain to the condition of the ignition systems of the vehicle and can range from the floor debris from the driver's side front floor to the entire steering column. Which of the types of evidence is important depends on the degree of fire damage and other specific factors of the individual case.

Motive related evidence deals with the condition of the mechanical systems in the vehicle or the presence of evidence of the vehicle having been stripped prior to the fire. The evidence takes the form of engine oil and/or filters and transmission filters or fluid samples. In terms of the vehicle being stripped, the evidence may take the form of photographs.

A more detailed description of the evidence will be discussed in the section on "Collection and Preservation". Keep in mind that paying close attention to details during the scene examination is what allows the examiner to differentiate evidence from background items. Being open minded in terms of what is evidence will help the examiner to recognize evidence that is not classically thought of as evidence.

Documentation of Evidence

The function of documentation of the scene and the evidence is to provide an opportunity for an examination of the scene and evidence after the scene has been released and the evidence analyzed. Moreover, the court should be shown both the scene from which the evidence was removed and the original state of the evidence.

The following progression of steps is one of the recommended processes of documentation of the scene and evidence:

Notes

(Start the moment the case is assigned until the case is finally completed. Case number, identifying information, time and the date are the minimum information needed in beginning the notes on a case.)

Photography

(Should always reflect a true and accurate representation of what you saw at the scene and your observations of the evidence. The three shot sequence will serve you well. The first shot would be an overview of the evidence at the scene. The second shot would be a medium close shot of the evidence in place. The third shot would be a close up, including a scale. The purpose of the scale is to give the viewer of the photo something in the photo by which the relative size of the item can be judged.)

3) Video Taping

The video documentation of the scene and the evidence makes for an easier format for the jury or judge to visualize the placement of the evidence at the scene. The video gives the viewer a different perspective of the scene and evidence than still photography can. It serves the same general function as photographs but in a newer and different format.

Sketches/Diagrams

All measurement should be made prior to any evidence removal. It is key that the diagram or sketches be kept simple and clear yet include the important information. I would strongly suggest that the diagrams and sketches be labeled NOT TO SCALE.

Audio Taping

The use of a tape recorder can be helpful at the scene, especially voice activated recorders. Tape recording is very similar to traditional notes taken at the scene except the notes are dictated into the recorder and not written down on paper. These tapes should be made at the scene and carefully preserved and filed with the completed case.

Following all of these steps is the ideal. However, the most important steps are #1 Notes and #2 Photography. Each of the separate steps has value in terms of the documentation process and each adds to the preservation of the scene as it was found and to the original state of the evidence.

Remember documentation does not stop at the scene. Documentation of the evidence continues whenever anything is done with the evidence.

Collection & Preservation

After the evidence is recognized and documented as it was found, the next step is collection and preservation. Keep in mind that the collection and documentation of the evidence are mutually conducted. Once the collection of the evidence is completed the preservation of the evidence begins.

The packaging chosen for the type of evidence varies greatly. For accelerant samples - clean unlined paint cans are best. For loose floor debris - heavy gauge sealable plastic bags work well. The major consideration in the selection of the proper packaging method is the security of the evidence while being transported and stored. The evidence must be stored in a manner so that none of the collected evidence will be lost and/or deteriorate to the point of negating the tests that may need to be run at a later date.

Whichever packaging method you choose, the most important aspect connected with collection and preservation is the creation of the chain of custody record for each piece of evidence collected. These sheets are carefully filled out and at each step of the evidence progression entries as to who has the evidence must be filled out. There must be no holes in the time line from the time the evidence is collected until the case is finally completed. If there are incomplete chains of custody or improperly filled out sheets then the evidence may be kept out of court.

There are a number of commercially produced chains of custody sheets available. All of these sheets have the following basic information on them:

- The case number

- The location of the scene

- The date and time of collection

- Who collected the evidence

- A brief description of the evidence

- There should also be a series of lines on which there should be a received by line

 - a line for the date

 - a line for the time

It is recommended that copies of the chain of custody sheet be made and kept with the original file on this case. If for some reason the sheet attached to the evidence becomes soiled or damaged, the original must be kept in the file and a copy of the original placed with the evidence. A truly honest effort must be made to maintain an up to date and accurate chain of custody sheet on all evidence you collect. The importance of the chain of custody can not be overstated.

Chain of custody sheets are commercially available from a number of companies. Whether you use your own or purchase them is totally up to the individual examiner. The accuracy and completeness of the sheet is the important aspect, not which form you use.

Analysis

The analysis of the evidence is typically carried out in separate facilities after the scene examination. The testing or analysis can vary from chemical analysis to microscopic examination of the evidence. In most cases, the evidence is either changed or altered and the importance of documenting the analysis process is very important. One of the ways that the

spoliation issue is addressed is by having a mutual examination of the evidence conducted. In some instances, re-examination of the evidence by interested parties can also be conducted when the evidence is not destroyed by the analysis process.

The examination process for ignition related evidence is a simple separating and identification process, followed by a microscopic examination of the components recovered. When debris is the evidence being examined then a washing and sorting process is involved. The washing and sorting is typically done by hand and the important components are separated from the background materials.

The analysis of samples taken in regards to the possible presence of accelerants is normally done in a machine called a gas chromatographic/mass spectrometric (GC/MS). This testing process destroys the evidence and therefore I would strongly suggest that having two samples can save problems. One is for your testing and the second would be available for testing by other interested parties.

Analysis of the engine and transmission filters and fluid samples can take the form of a chemical test process and/or a microscopic examination. Whichever procedure you use, if the evidence is destroyed, a second sample should be made available. If the evidence is not destroyed then it can be re-examined by others.

Interpretation

After all of the available information has been reviewed, it can then be interpreted. The determinations that can be drawn will be as detailed as the evidence and circumstances allow. For example, the determination on the ignition can be intact or physically defeated. The fire can be determined to have been accidental or intentional and the engine and transmission condition can range from normal to excessive wear.

One of the determinations that can be drawn and is legitimate is undetermined or inconclusive. The terms are different but virtually mean the same thing. The inconclusive determination states that the evidence available does not lead to a definite result. It neither points to the ignition being intact or defeated, nor does it point to an intentional or accidental fire in terms of the cause of the fire. *Do not allow your ego to force you into making determinations on cases that do not have the evidence that would back up what you say.*

Report

Most scientists and technicians communicate their results and ideas to each other using the proper terminology and concepts they have common knowledge of. The issues of terminology and understanding of the concepts and processes involved is mutually understood and does not become a problem. When reports and communications take place in the forensic world the terminology and the basic theories can be a major problem. Reports must be written in as simple basic a language as possible. Write your report with the idea that people who have little or no background in your field will be reading and trying to understand your report.

A good approach by which to write your report is one of your taking on the role of a teacher. You are trying to teach the person reading your report what you know and why it is the logical conclusion to be drawn from the evidence and circumstances presented.

The report is the document that is presented to the courts as your work product. It is from your report that you will be questioned and tested in open court. Therefore pay close attention to what you are writing and confine your report and conclusions to only those facts that you can prove to be true or prove to be false. Leave all personal value judgment statements out of any written report. Keep the report confined to the information you have at hand.

Testimony and expert witness qualifications

The final step in the entire evidence examination process is the trial and testimony stage. It is at this point that you may be called upon to testify as an expert witness on your report either in open trial or at a deposition. An expert witness can be defined as “A witness qualified by knowledge, skill, experience, training, or education to provide a scientific, technical or other specialized opinion about the evidence or an issue of fact”⁴.

As you can see from the definition of an expert witness, the major qualifiers are the training, education and experience you have in the field you are professing to have expertise in. If the person on the stand testifying is judged to have the qualifications to deem him or her an expert then and only then can he or she give an opinion based on the evidence on which they are testifying.

The court systems have developed a yardstick by which judges can grant or deny individuals expert witness status in their court. The most widely used test is the *Daubert* standard. The *Daubert v. Merrill-Dow Pharm. Inc., U.S. 579 (1993)* was a U.S. Supreme Court decision that initiated a major change in the manner in which courts decide the admissibility of expert scientific testimony. Basically, the decision stated that the judge is the “gatekeeper” for his court in regards to the admissibility of scientific evidence into his court in regards to its reliability and relevancy. The judge not only must determine that the expert was properly qualified to be judged an expert but also whether the findings were the result of the proper application of that expertise.

In the federal court there arose a controversy over the *Daubert* decision. Did the *Daubert* decision apply to only “scientific experts” or to “technical experts” as well? In 1999 this controversy was settled in the *Kumho Tire Company, LTD., et al., v. Patrick Carmichael, etc., et al., 119 S.Ct. 1167(1999)*. The court decided that the *Daubert* did affect the “technical expert” as well as the “scientific expert”. This decision now puts most of the forensic examiners that were not strictly traditionally trained scientists, such as fire investigators, accident reconstructionists or locksmiths under the same legal qualifying guidelines as the “scientific experts”.

The bottom line to qualifying under the *Daubert* decision guidelines is that the expert must not only have a strong background in regards to their education, training and experience, but also they must be able to convince the judge that they are reliable. The reliability of your

testimony on the conclusions based on the evidence is what the judge is using to make his decision as to whether he allows your testimony or evidence to be shown to the jury.

The judge must weigh the testimony using the following “non-exclusive” factors:

The extent to which the theory has been or can be tested.

The extent to which the technique relies upon the subjective interpretation of the expert

Whether the underlying theory has been subjected to peer review and/or publication

The technique’s potential rate of error

Whether the underlying theory or technique has been generally accepted as valid by the relevant scientific community

The non-judicial uses which have been made of the theory or technique

Some more recent cases have shown that while not all factors apply to all kinds of scientific or technical observations, the courts MUST still apply all the factors they can to a given situation, and carefully scrutinize the quality of the expert’s observations and techniques.

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