



THE CONSULTANTS PERSPECTIVE

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PROPERTY/CASUALTY EDITION



Providing Forensic Consulting and Technical Services

PRESERVING EVIDENCE

Over the years FORCON has been called upon on numerous occasions to determine the cause of failure of various products, construction or vehicular components, and the like. Very often by the time that FORCON receives the assignment the evidence has already been removed from the loss site by the field adjuster and it is sent to FORCON for examination and/or testing.

Since the preservation of evidence is critical to our ability to determine the cause of failure as well as to the admissibility of that evidence in court, we wanted to share with our readers some of what we know about preserving evidence.

First you should be aware that the American Society for Testing and Materials (ASTM) has a Standard entitled "Standard Practice for Collection and Preservation of Information and Physical Items by a Technical Investigator." The ASTM designation is E1188-95 and it is available from ASTM through their Website - ASTM.org. This Standard is applicable to the collection and preservation of any kind of evidence that can be reasonably expected to be the subject of litigation. Any claims person who might find themselves in a situation where they have to remove evidence from a loss site should follow the guidelines in this Standard.

To expand somewhat on the guidelines in this Standard and to specifically address the preservation of evidence requiring material failure analysis, we asked Walt Laird, the new Manager of Engineering Services for our Richmond office to prepare an Evidence Preservation Checklist based on his metallurgical expertise and his experience as a forensic engineer. You can also refer back to our Spring, 1996 newsletter and the article entitled "Investigation of Metallurgical Failures" written by Dr. John Ambrose. In that article Dr. Ambrose also addressed the preservation of evidence for material failure analysis. If you don't have this back issue and would like a copy, you can E-Mail our Atlanta Office at FICATL@aol.com.

EVIDENCE PRESERVATION CHECKLIST

LOTS OF PICTURES: Preserving evidence on film should always be the first step. Ask on scene personnel to run out and buy several disposable cameras and snap away if possible. Take with you a camera, flash, and (don't forget) several rolls of ASI 200 film. The more pictures, the better. Evidence should be photographed **in place** prior to being touched in any way. Start far away to get the "big" picture and component relationships and move in for close ups of the failed part in increments. Try to get different angles. If practical, take pictures of the overall scene.

PROTECT THE FRACTURE SURFACES: Resist the temptation to put the pieces back together to see if they fit. This can crush and deform the finer features of the fracture surface. If the part is metal, corrosion is a concern. In the very least, ensure it is as dry as possible and cover the area of interest with grease you find oozing out of something close by. Vaseline Petroleum Jelly from the local drug store can be used. You can also coat the surface with generic hair spray (no designer stuff here), but be careful because it contains butane and propane as a propellant. The hair spray will also help blow away and displace moisture if applied thickly and forcefully. Finally, wrap thickly with any kind of tape you can find.

REMOVE THE PARTS: Now that the fracture surfaces have been protected, the parts can be removed. If possible have the investigating engineer supervise removal of the components in question. If this is impractical, try to have a mechanic unbolt the next larger section. Explain to the mechanic very carefully that you are trying to preserve the fracture surface. If cutting must be done, do so as far away from the fracture surface as possible. Support the parts so they do not fall onto the ground. If the failure occurred in a component or part of some larger piece of equipment that is expected to be discarded and that is not so large to preclude its removal and storage then the entire piece of equipment should be preserved.

LABEL THE PARTS: Label the parts to the best of your ability. Don't worry about terminology or technical jargon. Just do whatever works for you so you can assist the engineer in identifying the evidence. Write on the tape with a pen. Write on the part with a laundry marker. What ever works.

PAD THE PARTS: Wrap them in anything you can find. Old rags, newspaper, paper towels, cardboard to name a few items. Either tie or tape the padding around the parts for transporting or place in a box of some sort. At the very least, pad the fracture surface. When shipping, take care to find a container which is strong enough and, again, liberally pad the parts.

STORE THE PARTS: If the parts are not to be shipped to another party right away they should be stored in a secure location with very restricted access control.

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DID YOU KNOW?

In addition to providing us with the Evidence Preservation Checklist, Walt Laird has also provided the following tid-bits of knowledge from his prior forensic engineering work. We thought you would find them informative.

Bird Nest Fire?

Simple simulation techniques can be cost effective ways to find elusive answers. A fire originated in the area of an exterior light fixture. There was a dispute regarding whether it was caused by a bird's nest on top of the fixture being ignited by the heat from the light bulb or an electrical fault within the fixture. Using photogrammetry techniques, measurements were taken from a photograph of the house before the fire. A representative wall and eaves configuration was constructed using an exemplar light fixture from the same manufacturer. Bird nests were collected from the local area and placed in the fixture the same way as seen in the photograph. Thermocouples were used to measure the temperatures to which the bird nest was exposed when the light was left on for long periods of time. It was concluded that the light fixtures and bulbs did not produce the required temperatures to ignite the bird's nest in this case.

Sugar in Gasoline

A simple test for unknown substances and deposits is Fourier Transform Infrared Spectroscopy (FTIR). During FTIR, an infrared laser is focused on the substance. Depending on the chemical bonding, individual materials will absorb, transmit, or reflect infrared light of various wavelengths. Thus, each material has a unique infrared signature or spectrum.

Sugar will not dissolve in pure gasoline, but it is hydrophilic and will attract and dissolve in any water contained in the fuel tank. It is this liquid "sugar water" that is able to make it through the in-line fuel filters to reach and gum up other components of the fuel system and engine. FTIR was used to determine that a black sludge found in an automobile's fuel injectors was sugar and that the car had been sabotaged.

Toilet Tank Tablets

Those tablets people drop into the toilet tank to keep the bowl clean and fresh can lead to major flooding. The main ingredient of many of these tablets is organic chlorine bleach, which is highly oxidizing. The plastic valve components in today's toilets can fail prematurely in the presence of high levels of chlorine. A typical manufacturer's instruction says, "**WARNING:** Fluidmaster shall not be responsible or liable for any failure of, or damage to, this plumbing product caused by its use in toilet tanks containing high concentrations of chlorine or chlorine related products." We have seen several of these valves which failed while the homeowners are on vacation causing flooding and tens of thousands of dollars worth of damage. When was the last time you read the warrantee on your toilet?

ON THE LIGHTER SIDE

For those among us who understand that the obvious is not always the solution, and that the facts, no matter how implausible, are still the facts....

A complaint was received by the Pontiac Division of General Motors: "This is the second time I have written you, and I don't blame you for not answering me, because I kind of sounded crazy, but it is a fact that we have a tradition in our family of ice cream for dessert after dinner each night. But the kind of ice cream varies so, every night, after we've eaten, the whole family votes on which kind of ice cream we should have and I drive down to the store to get it. It's also a fact that I recently purchased a new Pontiac and since then my trips to the store have created a problem. You see, every time I buy vanilla ice cream, when I start back from the store my car won't start. If I get any other kind of ice cream, the car starts just fine. I want you to know I'm serious about this question, no matter how silly it sounds: What is there about a Pontiac that makes it not start when I get vanilla ice cream, and easy to start whenever I get any other kind?" The Pontiac President was understandably skeptical about the letter, but sent an engineer to check it out anyway. The latter was surprised to be greeted by a successful, obviously well-educated man in a fine neighborhood. He had arranged to meet the man just after dinner time, so the two hopped into the car and drove to the ice cream store. It was vanilla ice cream that night and, sure enough, after they came back to the car, it wouldn't start. The engineer returned for three more nights. The first night, the man got chocolate. The car started. The second night, he got strawberry. The car started. The third night he ordered vanilla. The car failed to start. Now the engineer, being a logical man, refused to believe that this man's car was, allergic to vanilla ice cream. He arranged, therefore, to continue his visits for as long as it took to solve the problem. And toward this end he began to take notes: he jotted down all sorts of data, time of day, type of gas used, time to drive back and forth, etc.

In a short time, he had a clue: the man took less time to buy vanilla than any other flavor. Why? The answer was in the layout of the store. Vanilla, being the most popular flavor, was in a separate case at the front of the store for quick pickup. All the other flavors were kept in the back of the store at a different counter where it took considerably longer to find the flavor and get checked out.

Now the question for the engineer was why the car wouldn't start when it took less time. Once time became the problem, not the vanilla ice cream, the engineer quickly came up with the answer: vapor lock. It was happening every night but the extra time taken to get the other flavors allowed the engine to cool down sufficiently to start. When the man got vanilla, the engine was still too hot for the vapor lock to dissipate.

Moral of the story: even insane-looking problems are sometimes real.

FORCON EXPANDS SERVICES IN RICHMOND OFFICE

With the hiring of Walt Laird as Manager of Engineering Services for the Richmond office FORCON is now able to offer engineering services to clients served by that office. Previously only traffic accident reconstruction services were provided out of the Richmond

office by Steve Chewning and his team of ACTAR certified reconstructionists.

Walt has two engineering degrees from the Massachusetts Institute of Technology and a degree in Materials Science from the Johns Hopkins University. He is a registered Professional Mechanical Engineer. Walt served in the Nuclear Power Program of the United States Navy for ten years and is a certified naval nuclear engineer. He has taught engineering courses at the U. S. Naval Academy and was a Department of Defense Science and Engineering Fellow at the Johns Hopkins University for three years. Since his active service, he has practiced engineering in the heavy equipment field and remains an officer in the U. S. Naval Reserve.

His forensic investigation experience includes:

- Product liability
- Failures of plastic and metallic plumbing components
- Vehicle materials and parts failures
- Aircraft component failure analysis
- Aircraft windshield failure analysis
- Heavy equipment accident reconstruction and analysis
- Marine vessel and equipment surveys
- Welding failures and analysis
- Corrosion failure analysis

Walt will be the primary contact person for our Richmond office clients who need our engineering expertise and he will be responsible for developing and managing FORCON's Richmond team of independent engineering consultants.

**ACCIDENT RECONSTRUCTION SEMINARS
PLANNED FOR NORTH CAROLINA**

FORCON Accident Reconstruction Coordinator Steve Chewning plans to conduct our training seminar entitled "Accident

Reconstruction - A Primer for the Insurance Claims Professional" in Raleigh and Charlotte, North Carolina early next year. This seminar has been approved by the North Carolina Department of Insurance for 4.0 Continuing Education Credits - Course Number 11081.

Anyone interested in attending one of these seminars should contact our Raleigh office to make sure that they are on the mailing list to receive further information once specific dates and locations are chosen.

CONSULTANT PROFILE

George I. Meyer - Fire/Arson/Explosion Investigator

George is another new member of our Richmond office team. He brings with him over 40 years of fire investigation experience including such notable fires as the Beverly Hills Supper Club fire in Southgate, Kentucky that resulted in 165 deaths and the MGM Grand Hotel fire in Las Vegas, Nevada.

George has testified as an expert witness in numerous district, circuit, and criminal courts throughout the mid-Atlantic states and he has been retained as an expert by the U.S. Government and the States of Maryland and Pennsylvania. He has extensive professional training in fire/arson/explosion investigation and he is a member of numerous professional organizations including the International Association of Arson Investigators, the National Association of Fire Investigators, and The American Board of Forensic Examiners.

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FORCON INTERNATIONAL CORPORATION

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