

From the Fire Into the Frying Pan

Fire science metallurgy proves turning point of case

On a hot July night in rural Mt. Airy, Md., three adults and one child were asleep on the upper floor of their early 1900s farm home. Shortly after midnight, a thunderous rumble followed by a loud crack awakened them all. They rushed from their rooms to find the smoke alarm blaring and a fire downstairs. Everyone made it safely outside except one man who mistakenly thought his wife was trapped indoors and bolted back in the house to find her.

Fourteen months later, conjecturing the fire was caused by a malfunction of a propane-fueled stove, the family's attorney filed a \$650 million lawsuit against a propane company and its parent company, later naming additional third-party defendants. Crane

Engineering and Forensic Services was brought in on behalf of the defense to determine the fire's cause. Fire science metallurgy indeed provided the clues to help find the probable truth about what happened that tragic summer night.

Little to Go On

When Crane Engineering came on the scene, the site had already been bulldozed and grass was growing again. Four propane tanks from the site had inadvertently been disposed of months earlier. It seemed the odds were against being able to assist in the case – until investigators located the home's stove just to the left of a shed on the property. It was badly

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Photo by John E. Brynildson, P.E.

The cast-iron skillet's partially melted handle shows the variation in melting temperatures and patterns that can occur during a fire. The melting is the result of intense heat blasted onto the handle when the oven door opened partially during the fire.



CRANE

ENGINEERING AND
FORENSIC SERVICES

PROPER

3905 Annapolis Lane North
Plymouth, Minnesota 55447

(763) 557-9090
(24 Hours)

Fax
(763) 557-0710

1-800-538-2797

www.craneengineering.com

SEM, More SEM

*More and
more, even
better than
before*

Companies have been turning to SEM/EDS technology for answers to vital questions for a number of years. For example, Scanning Electron Microscopy (SEM)/Energy Dispersive Spectroscopy (EDS) has enabled companies to

- test special staples and examine the efficacy of the seal between the lung and the bovine pericardium tissue used for repair,
- find out why a stent began failing during fatigue testing,
- differentiate mold from soot in fire incidents,
- analyze why a newly designed polymer catheter had consistent failures in the same area, time after time, and
- much, much more.

In particular, using low-vacuum SEM/EDS has meant even wet samples of evidence or tissue, for example, can be analyzed – an option that hasn't always been available.

But technology marches on, and SEM/EDS is reaching even greater heights. Thermo Noran – a worldwide leader in x-ray detection technology, imaging and elemental analysis – recently introduced the VANTAGE Digital X-Ray Microanalysis System. VANTAGE is a state-of-the-art EDS analyzer used to identify elements – copper, zinc, titanium, etc. – in samples being examined in the SEM. Crane Engineering is pleased to announce it has upgraded its own EDS equipment to the new VANTAGE system and is ready to put the system's advantages to work for its clients.

The VANTAGE system software can interact with the SEM-sample stage controller to actually move the SEM stage at programmed intervals. The pre-programmed moving allows automated repetitive analysis and enables even greater project efficiencies.

Other significantly enhanced features

include high-definition electron images and x-ray maps, as well as improved quantitative analysis (background correction, overlapped peak separation and low count peaks for beam-sensitive samples.) Now it is possible to add graphics to the images – for instance, an arrow pointing to a specific area of note, or a customer logo or other graphic images as provided.

One of the upgrade's most important features is the ability to provide clients with a copy of their analytical data in several formats, including the traditional printed EDS spectra with conventional SEM photos, or both the EDS spectra and photos in digital format on either ZIP disks or a CD-ROM. The analytical data can also be transmitted to the client via e-mail by converting the information to PDF format. To meet a client's specific needs, the report format can be customized, such as the inclusion of both the SEM image and the EDS spectrum on a single page, with quantitative analytical data if desired.

Crane Engineering is eager to share with you the many benefits of the new VANTAGE system and how they may be applied to one of your upcoming projects. ■

- Jean L. Schlosser
Electron Microscope Lab Manager

Valued Vendors

Setting the pace for excellence

Providing responsive, quality service is integral to Crane Engineering's success. Crane Engineering sets high expectations for itself and its vendors – from testing labs to animators. The firm values its quality vendors and in upcoming issues of the Probe – as it has in the past – Crane Engineering will share stories with you about valued vendors, such as the company below,

who help set the pace for excellence.

The courtroom has come a long way since the black-and-white days of Perry Mason. Virtually all courts are allowing qualified computer animation as litigation support. One company, Forensic Video Inc., has been in the forefront of this movement and has worked on cases with Crane Engineering for more than 10 years.

Founder Richard Diercks explains that it all started when he was in the television production business and was



Richard Diercks, founder of Forensic Video Inc., has been providing video and computer animation and graphics as litigation support on cases for Crane Engineering for more than 10 years.

Valued Vendors *continued from previous page*

approached by an expert at the University of Minnesota to produce a video for a nuclear power plant case in Texas. It became clear that video could increasingly be used as litigation support, and Richard formed Forensic Video to meet that growing need.

Video soon evolved to computer animation, which he first used to communicate how the Northwestern National Bank Building in downtown Minneapolis was destroyed by fire in 1982. Since then, the company has grown and stayed on the cutting edge of visual technology. Forensic Video can demonstrate a wide range of concepts, events and ideas using two- and three-dimensional animation, often using DVD.

“We may be the visual experts,” says Richard, “but we rely solely on technical expert witnesses like Tom Crane to explain the science of an incident. Our job is to interpret and create a visual story of what the expert’s opinion is. That’s how this material is admitted into evidence.”

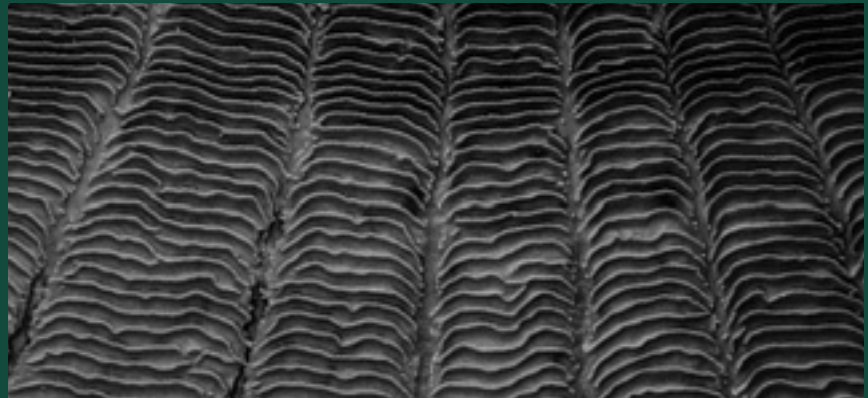
Forensic Video has worked on sev-

eral hundred cases in more than 24 states and most federal jurisdictions. It is well-known for its keen ability to reflect human vision as it relates to point of view. The company creates animation and graphics that interpret for the jury what might have been the “point of view” of the victim or the plaintiff or the witness – what they

might have or would have seen in that particular situation.

Crane Engineering is pleased with its long-term working relationship with Richard and his staff and looks forward to continuing its mutually rewarding collaboration. Forensic Video’s URL is <www.fvi.com>. ■

SEM MYSTERY IMAGE



Something weighing on you? This item certainly isn’t to blame, as it’s lighter than a feather. Plus, it’s more likely to be found in the water than in the air. See page 4 for the answer to this issue’s mystery image.

Norm’s Corner



Unless you’ve visited Crane Engineering’s offices in the past few months, it will probably be hard for you to understand why I’m so upset. Crane Engineering’s office has been undergoing some intense renovation – and I’m glad it’s nearly over. I’ve heard some of the engineers complaining about how the renovation has affected their work, threatening to cause irksome delays for their projects.

Well, that may be true, but the real problems caused by the many contractors aren’t losses in time or money. No sir. What everyone should really be concerned about is how the construction is affecting *me*.

If access to the kitchen is blocked, no one can get me a treat. If the hallways are cluttered, I can’t get through to collect my daily pettings from the resident humans. With the inspection area filled to the brim with furniture – instead of with people as usual – my usual clients can’t come in to give me the attention I deserve. This is inexcusable. And don’t they realize the health hazards involved?

Petting me is a proven way of reducing stress and lowering blood pressure. By inhibiting this, people leave themselves open to a myriad of maladies such as heart disease, depression, migraines, fatigue, insomnia,

impotence, ulcers, palpitations, panic attacks, strokes, and irritable bowel and bladder disorders. And we don’t want that, do we?

I guess it is safe to say the people here have “risked” their health for a renovated office – and it does look quite nice. So stop on over and pet me – once, twice or even more times – we wouldn’t want you to endanger your health too! ■

-Norman Crane
CEO (Canine Executive Officer),
Author

Frying Pan *continued from page 1*

damaged and rusted. Inside was the stove's oven rack and, just below it, a cast-iron skillet, which was deformed but hadn't completely melted.

Melting and Oxidation Yield Clues

Study of this skillet's melting temperature and patterns and oxidation disproved the propane-fire theory. For one thing, with melting temperatures between 2,100 degrees F and 2,600 degrees F, the cast-iron skillet's condition indicated that such temperatures were not achieved during the fire – a sign the fire temperatures were not intense in the oven, as was claimed by plaintiffs. A full exposure to the fire would also have destroyed the chrome-plated carbon-steel oven rack, which survived. Examining the oxide formation on the skillet, Crane's engineers concluded that the fire in question burned no hotter than 1,800 degrees F.

Although the rest of the cast-iron skillet survived largely intact, its handle

had begun to melt. Such localized melting suggests that the stove's ambient temperature was not at cast iron's melting point; this melt pattern would have occurred when the oven door partially opened during the fire, causing a "blowtorch" effect directing intense heat on portions of the handle.

Fortunately, there was just enough evidence left to allow Crane's engineers to uncover what really happened in this case. The conclusion – with which the jury concurred – was that the fire was most probably electrical in origin, initiated by an electrical fault.

All parties involved in accidents or natural disasters are encouraged to support the preservation of all evidence at the scene. As this Maryland case shows, it may make all the difference in investigators' ability to arrive at concrete conclusions. ■

- *John E. Brynildson, P.E.*
Metallurgical Engineer



Jerome Jasmer of Victory Motorcycles USA, Polaris Ind. Inc., was the lucky winner of a Wishmaster Big Bait lure at Crane Engineering's booth at the Society of Manufacturing Engineers APEX show this past May. Congratulations! Crane Engineering participates in numerous trade shows year-round in a variety of industries ranging from metallurgical engineering to manufacturing to product liability and more. We wish Jerome well as he heads off to northern waters to catch the big one!

NOTES

Charge It. You may now use your VISA®, MasterCard® or American Express® accounts to charge your services at Crane Engineering. Please contact our office, (763) 557-9090, for more information.

Office Update. As Norm mentioned in his column, we've done some major renovation of our office space. We're pleased with what some fresh paint, new carpet and more can do! Stop by for a cup of coffee, and we'll show you around. (It's a great site conducive for your testing, depositions and client consultations – just let us know if you'd like to use our space!)

In the Know. Crane Engineering holds quarterly staff development meetings to help keep its employees informed on issues which affect their clients and the company. Topics have included customer service, Rule 26 of the Civil Rules of Procedure for Expert Disclosure, confidentiality issues, marketing and communications and more.

Fire Takes No Holiday. National Fire Prevention Week is October 7-13, 2001. We encourage you to log onto <fire.safety.buffnet.net> to learn more about fire prevention and share it with your colleagues. Fire safety and education need to be practiced all year long! ■

The answer to "Something weighing on you?" Taken using Crane's SEM/EDS, the mystery image in this issue is a fish scale. Even though we all wanted to immerse ourselves in the lakes during our summer hot spells, fish scales still are more likely to be under water than we are! Be sure to look for another mystery image in our next Probe newsletter.

SEM MYSTERY IMAGE

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