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INSIDE FIRE



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Heat Recovery Ventilators— Analysis of a Recurring Product Failure

By Jay Goetz, P.E. & Daniel J. Choudek, P.E., OnSite Engineering & Forensic Services

Did you Know?

- HRV units recover about 75% of the energy otherwise wasted in air exhausted to the outside.
- Homes built after 1999 contain HRV units.
- HRV Recalls are in force at this time.

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Definition—”An HRV is an air-to-air exchanger in which outgoing exhaust air pre-heats or pre-cools incoming fresh air. They recover about 75% of the energy that would otherwise be wasted in air exhausted to the outside. (1)”

When purchasing a home that was built after 1999, many homeowners are unaware of the rectangular metal box that may be hanging in the utility room next to the furnace. The metal box with all the tubes and ducts is a *Heat Recovery Ventilator (HRV)*.

Most of the time, the HRV operates without the homeowner knowing that it is running. The fans continually move air through the household air ducts at a low volume, so that the air movement is not noticeable or detectable.

The HRV is unlike a furnace or water heater in which the homeowner has “direct feedback.” By virtue that the house temperature is comfortable and there is hot water at the faucet, the homeowner has an indication that the appliances are operating

properly. Conversely, the homeowner again would have direct feedback, i.e., a cold house or cold water if the appliances were malfunctioning. Because the HRV runs quietly in the background, it does not allow the homeowner this type of direct feedback to indicate that its working properly or malfunctioning.

The basic principal operation of the HRV is for the expelled stale, warm air to heat the incoming fresh, colder air before it is distributed throughout the house. This process occurs within the heat exchanger or core of the device. The result is continuous fresh air within the house while maintaining air quality and controlling excess humidity. The prevailing HRV design has these important characteristics:

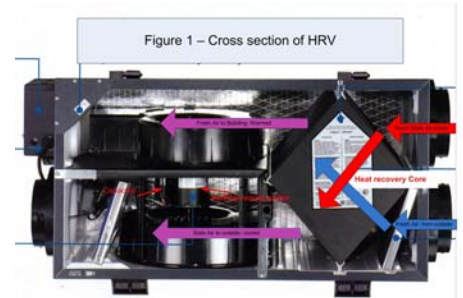
- A heat transfer chamber, called a “core” which allows one stream to heat the other as they flow through it.
- Low power (and low cost) blower motors that can

run continuously.

- All components are contained in a well insulated box.
- Electronic control to sequence the unit properly.
- Dampers and filters are used in the air-flow path.

The diagram in *Figure 1* depicts the interior of the HRV and the airflow path through the core.

Over the past several



years, numerous fires have been attributed to HRV’s and we have been involved in at least 7 residential and commercial fires in which the HRV was located within the area of origin of the fire and has subsequently been the cause of the fire.

WHAT'S HOT IN FIRE LITIGATION

10th Annual Seminar Held at Legend's Golf Course



On May 1, 2009, Whitmore Fire Consultants, Inc. hosted its 10th annual seminar at the Legend's Golf Course in Prior Lake, Minnesota, What's **HOT** in Fire Litigation. A special thank you to our speakers, Jon Hanson, of Hanson, Lulic & Krall, Jeff Baill, Larry Baill and Dave Taylor of Yost & Baill, Brad Ayers of Flynn & Gaskins, Russ Melton of Meagher Geer, Dave Reddan of Arthur Chapman and Bob Terhaar of Terhaar, Archibald, Pfefferle & Griebel.

We hope all that had the opportunity to attend felt the presentations were relevant and informative.

Congratulations to our drawing winners:

Ron Weich, Cunningham Lindsay—4 Twins Tickets

Mike Huttner, EMC Insurance—Legends Golf for Two,

Mike Hanek, Allied Insurance—4 Twins Tickets

Jeff Brinkman, Brinkman Claims—Wilds Tickets

Randy Baake, Smith, Bakke & Oppegard—\$50 gift card to Palomino's Restaurant

Shawna Bloomquist, Cincinnati Insurance—I-Pod

Dan Lueth, Horrace Mann—\$100 gift card to Red Stag Restaurant

Jon Pals, Secura Insurance—\$200 gift card to Oceaniare

Seafood Room

Rob Hoffman, National Farmers Union Insurance—\$50 gift card to Red Stag Restaurant

Nathan Lampi, Hanson, Lulic & Krall—4 Twins Tickets

Also, congratulations to Jon Pals for winning the \$50 gift card from Target for returning his post-seminar questionnaire.

Over the next several editions of *Inside Fire*, reprints of the presentations provided by our speakers will be provided. In this edition, Jon Hanson, Attorney with Hanson, Lulic & Krall presentation, Experts, Who and When to Retain is highlighted.

FOX Channel 9 Presents—Economic Arsons Reprint from KMSP, Channel 9 & Trish Van Pilsum, Investigative Reporter

"Ignited by job loss, fueled by months of missed payments, a person gets desperate."

Some say the end of the recession's in sight. Financial experts say they're encouraged by some small positive signs of recovery. But as hopeful as some people are, there are others feeling hopeless. And that's forcing them to go to extreme measures to cut their losses.

It's called economic arson. People who resort to it think they have nothing left to lose, until they realize just how much the crime can cost.

Ignited by job loss, maybe fueled by months of missed payments, a person gets desperate.

Scared by the thought of losing a house, car or boat, the owner might figure a fire is the easiest way out from under a big bank note. But, before striking a match, take a look at how fast the flames can work and what the risks could be.

Jerry Lee Pilsnar owed \$500,000 on a farmhouse outside Belle Plaine. In January 2008, it burned to the ground. Many of his belongings conveniently placed in the far end of the garage, were not badly damaged. The house, it turned out, was worth more dead than alive.

Scott County prosecutors allege Pilsnar owed \$450,000 on the property but had insured it for \$850,000. It

burned one week before it was set to be foreclosed on and just two days before the insurance would have expired. And then the fire itself left tracks right back to the spot it started. Investigators concluded a mattress in the basement had been set on fire. Scott County prosecutors allege Pilsnar hired someone to strike the match.

Whitmore Fire Consultants provided the origin & cause investigation on behalf of Jerry Pilsnar's insurance carrier and provided assistance to the State Fire Marshal and Scott County prosecutors in the investigation of this case.

Reprinted with the permission of Trish Van Pilsum, KMSP Investigative Reporter.



Heat Recovery Ventilators— Analysis of a Recurring Product Failure (continued)

The typical scenario is one in which the HRV had been in-service between 5-10 years and, without notice, the unit fails catastrophically. The result of the failure is usually a fire that starts within the unit



and extends through the duct-work into the rest of the home.

In some cases, the fires self-extinguish and were confined to the interior of the metal housing as reflected in the above photograph. However, in other cases, the fire spread throughout the structure and caused million's of dollars in damages.

Why does this happen? Some clues were identified during lab inspections. Microscopic examination, electrical and metallurgical testing of recovered artifacts showed that the motors in these fire-damaged units had overheated repeatedly. Often to the point that the internal thermal protection device had cycled 1000's of times, ultimately failing and causing additional heating and fire.

To further understand how this can occur, testing on exemplar HRV's and several motor/capacitor configurations was performed.

The construction of the HRV is relatively simple, as shown in *Figure 1*. The main component of the electro-

mechanical system is the motor driven, dual squirrel cage fan assembly. The motor drives two separate fan assemblies that move air through the two separate air streams of the HRV.

The motor does contain a protective device that will de-energize the motor if it overheats. The device

that was utilized was an automatic reset thermal protector. This device was embedded within the motor winding and sensed the temperature within the interior of the motor. The thermal protector is an electric switch, that when heated, opens the switch contacts. When the motor cools down, the switch contacts close and the power to the motor is restored.

What was learned during the testing and analysis of the fire-damaged HRV motors is that, under some conditions, it is possible for the motor to "lock up" and not start, or to run inefficiently. As it heats, the motor's thermal protection device cycles (opens-then closes after the motor cools). This process can continue to occur until the thermal protector reaches its end of life and fails to open. When this occurs, the motor heats to the point where the motor winding insulation fails and a short circuit and arcing occur within the motor. This results in a catastrophic failure of the motor/capacitor and ultimately a fire.

Some manufacturers

will actually test products to failure using accelerated life techniques to simulate years of use in only months of testing. Such testing is done in reliability demo chambers here in Minneapolis at facilities like Honeywell and Emerson (Rosemount).

In 2007 and again in 2008, the US Consumer Product Safety Commission and the Canadian equivalent agency, both issued recall notices for certain years of product production encompassing 1991–2001. The manufacturer provides an option to install an in-line fuse with these recalls, which will open if the HRV consumption current exceeds a certain elevated amount, which still is lower than the required circuit breaker rating.

It should be noted that some of the current models of HRV's contain "one shot" thermal protectors. This style of thermal protector disconnects power to the motor permanently when it senses an overheat condition in the motor and will not allow the motor to cycle like the auto reset style.

- (1) [Heat Recovery Ventilators - \(HRV\)http://www.socalgas.com/construction/builders/Builders%20Resource%20Guide/Heat%20Recovery%20Ventilators.htm](http://www.socalgas.com/construction/builders/Builders%20Resource%20Guide/Heat%20Recovery%20Ventilators.htm)
- (2) Common Questions about Heat and Energy Recovery Ventilators – University of Minnesota Extension. <http://www.extension.umn.edu/distribution/housingandclothing/DK7284.html> - [Copy-right](#) © 2009 Regents of the University of Minnesota

Jay Goetz, P.E. and Daniel J. Choudek, P.E. of OnSite Engineering & Forensic Services, Inc. of Prior Lake, Minnesota are contributing editors to *Inside Fire*. The views reflected in this article may not necessarily reflect the views of *Whitemore Fire Consultants, Inc.*

... During testing, it was learned that these units had overheated repeatedly.

Experts, When & Who to Retain

By Jon Hanson, Attorney at Law, Contributing Editor



No aspect of litigation has created more controversy in recent years than that of expert testi-

mony. The whole *Daubert* controversy is based on questions of foundation for expert testimony. The whole spoliation controversy is based on questions of fairness and access to evidence that forms the foundation for expert testimony.

Historically, court decisions and legal treatises have recognized the impact of expert testimony on the legal process and need to regulate expert testimony to maintain fairness in the process.

In *Albers v. Church of the Nazarene*, 698 Fed. 2nd 852 (7th Cir. 1983), the court commented that:

“The professional expert witness who testifies with scant regard for truth is an old problem in tort as in other areas of litigation. Experts are nowadays often the mere paid advocates or partisans for those who employ and pay them as much so as the attorneys who conduct the suit. There is hardly anything, not palpably absurd on its face, that cannot be proved by some so-called experts.”

The Treatise, Federal Practice and Procedure, (1997) in § 6262 referenced the danger to the judicial system from unreliable expert testimony by commenting:

“There is a significant danger that a jury may review the expert as surrounded by an “aura of infallibility.” Thus, even were the trier of fact has some basis for questioning of expert’s reliability, it may be disinclined to do so. In an era where the opinions of professional witnesses are available for purchase in virtually every field of science and technology, a jury’s unquestioning difference to expert opinion may seriously jeopardize accurate fact finding.”

Finally, in *Daubert v. Merrill Dow Pharms., Inc.*, U.S. 579 (1993), the court recognized the power of expert testimony when it stated:

“Expert evidence can be both powerful and quite misleading because of its difficulty in evaluating it.”

As a result of the turmoil that expert testimony has created, courts have attempted to regulate expert testimony by issuing Scheduling Orders specifying expert disclosures, by adopting Rules of Civil Procedure defining expert discovery, by enacting Rules of Evidence that limit expert testimony, and, as in the case of the *Daubert* decision, establish courts as gatekeepers.

The result is that from court decisions, the Rules of Civil Procedure and Rules of Evidence, the inclusion of expert opinions in the decision making process has become regulated. Although everyone recognizes that expert opinions are essential to the decision making process, the admissibility of those opinions must be controlled to in effect prevent

the introduction of “junk science.”

We all recognize that litigation most always involves some form of specialized knowledge. However, the dependence on experts has resulted in an atmosphere where the courts, lawyers and litigants in general are uncomfortable. To overcome this atmosphere and apprehension, it is essential that an understanding be reached as to when an expert is retained and, if the decision is made to retain an expert, who should be retained.

When to Retain?

There are “4-C’s” to investigation: Cooperate, Communicate, Concentrate on Details, and Common Sense. Simply put, by cooperation, you should coordinate the investigation with interested parties. Second, by communicating with other interested parties, you will avoid claims of spoliation, estoppels and waiver. Third, by concentrating on the details, you will develop a foundation for a final decision. Finally, by following common sense, you will keep not only the details but the broad picture in perspective.

However, the “4-C’s” of the investigation will inevitably lead to crossroads in the investigation. In other words, you will reach points in the investigation where you must choose a specific direction.

It is at these crossroads where the decision to retain experts is made in order to provide early and accurate information in the investigation. In other words, when you reach a crossroad and fail

“We all recognize that litigation most always involves some form of specialized knowledge”

Experts, When & Who to Retain

By Jon Hanson, Attorney at Law, Contributing Editor (continued)

to retain the proper expert, you may have a lost opportunity and direction for a proper conclusion in the investigation.

Simply put, early and accurate information is fundamental to the successful completion and conclusion of any investigation. The decision to retain experts at a crossroad is made for essentially three reasons:

- First, to educate the expert as to existing facts for future expert opinions or recommendations.
- Second, to enforce a right or obligation that requires expert involvement.
- Third, to elicit an expert opinion on a material fact.

Although every file or claim will have a different referral point and, as a result there is no hard or fast rule, the safest benchmark is referring at the crossroad or at a point where a decision must be made.

When deciding if an expert should be retained, the most educated approach is to follow the basic state or federal rule of evidence which provides as follows:

“If scientific, technical or other specialized knowledge will assist the trier of fact to understand the evidence or determine a fact at issue, a witness qualified as an expert by knowledge, skill, experience, training or education, may testify thereto in the form of an opinion (Minnesota Rules of Evidence, Rule 702, *Testimony by Experts*).

The fundamentals of this Rule for the admissibility of expert opinion includes 1) that there must be scientific, technical, or other specialized

knowledge; 2) which will assist the trier of fact to understand the evidence or to determine an issue; 3) that the witness must be qualified as an expert by knowledge, skill, experience, or training; and 4) must be able to give an opinion as to the interpretation of the evidence.

Under those circumstances, if the testimony is based upon sufficient facts or data and if the testimony is a product of reliable principles and methods, and if the witness has applied the principles and methods reliably to the facts of the case, the witness, qualified as an expert, may testify in an expert capacity.

In the final analysis, there must be a reliable basis for the opinion both as to qualifications for the expert, the method applied to the analysis, and to the conclusion reached.

What Discipline to Retain?

Once the decision has been reached to retain an expert, the question as to what discipline to retain must be addressed. In order to reach that decision, you must define why the referral is being made. Simply put, you must decide why you are retaining an expert, what you want the expert to do, what you want the expert not to do, and what does the expert need to complete the assignment?

Because the retainer of an expert is a part of the investigation, the answer to these questions must be made without any preconceived notions or preconceived conclusions as to the outcome of the investigation. In other words, this is an “investigation” intended to reach certain conclusions opposed to a “retainer”

to articulate certain conclusions.

If preconceived notions or conclusions are involved, the scope of the investigation will reflect, the tone of the investigation will reflect, and the timing of the investigation will reflect. In other words, the decision to retain the expert must be based upon facts, not upon concepts. This will avoid ignoring or losing valuable evidence.

Whether approaching from a defense, or subrogation standpoint, there must be a clear understanding as to the scope of the defenses or claims being explored. Only then, can you through common sense, determine the expertise or disciplines that should be considered in retaining the expert.

In the end, it is important that you will willing to “think outside the box” in order to obtain the most qualified experts to testify in the narrow area of expertise needed to assist the fact finder in reaching its conclusion.

What To Look For When Retaining an Expert?

As previously indicated, the decision as to who to retain is largely dependent upon the scope of the retainer. Are you retaining strictly for consulting, strictly for testing, strictly for design, strictly for rebuttal, or to be your primary witness as to a particular fact?

The fundamentals of retainers include that the individual must be qualified to perform the scope of the retainer, must have the ability to complete within the timelines necessary, must be able to communicate to explain foundation for opinions, must have

“ . . . Early and accurate information is fundamental to the successful investigation ”

Experts, When to Retain & Who to Retain

By Jon Hanson, Attorney at Law, Continued from Page 6

“... it is important to retain someone that is both licensed and qualified ...”

the demeanor to handle cross-examination, must have the courage to admit weaknesses, and last and most significantly must be truthful.

With that background, it is important to retain someone that is both licensed and qualified to complete the tasks within the retainer and to be able to render an opinion requested.

Minnesota §326.338 defines Private Detective: “Persons who for a fee, reward, or other consideration, undertake any of the following acts for the purpose of obtaining information for others are considered to be engaged in the business of private detective:

- (5) investigating the origin of an responsibility for libels, losses, accidents, or damage or injuries to persons or property.

Minnesota §326.3381 states:

Prohibition. No person shall engage in the business of private detective or protective agent, or advertise or indicate in any verbal statement or in written material that the person is so engaged or available to supply those services, without having first obtained a licensed as provided in statute.

Overview

In summary, retain an expert when your investigation requires input from someone with specialized training, experience or knowledge on a

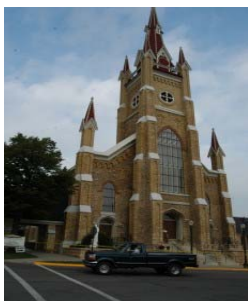
fact material to the decision making processing. Second, retain an expert in the discipline that addresses the material fact to decisions to be made. Third, retain an expert in the discipline that he/she is qualified in and understands the limitations of that discipline and of the evidence available to offer the opinions on the material fact.

Jon Hanson is the Managing Partner at the law firm of Hanson, Lulic & Krall located in Minneapolis, Minnesota.

The views reflected in this article do not necessarily reflect the views of Whitmore Fire Consultants, Inc.

St. Mark's Catholic Church Fire Update

Update!



St. Mark's Catholic Church

On August 24, 2005, just as St. Mark's Catholic Church in Shakopee, Minnesota was nearing the completion of a year-long renovation project, a devastating fire occurred resulting in extensive damage to the sanctuary and adjacent parish administrative building.

Catholic Mutual

Group, the administrator for the self-insurance program of the Archdiocese of St. Paul and Minneapolis, retained the services of Whitmore Fire Consultants, Inc. to head the investigation in conjunction with the Minnesota State Fire Marshal's Office.

Because the church was built in 1865 and involved an intricate system of tunnels below the sanctuary, the investigation required a methodical approach to identify not only which of the many renovation contractors to place on notice, but also to identify the cause of the fire. Ultimately, Robert Whitmore and Ron Rahman of the State Fire Marshal's Office determined the fire was

ignited by oily rags left overnight in the church by the painting contractor hired to refurbish the pews.

Joel Muscoplat of Gislason, Martin, Varpness & Janes was retained to represent St. Mark's Church and with the assistance of Robert Whitmore, recently settled the action against the painting contractor under quite favorable terms.



Sanctuary Floor

The U.S. Consumer Product Safety Commission and the **General Electric Company (GE)** have announced a recall of certain GE Profile 30" freestanding dual fuel ranges. These units have an electric oven and gas cook-top burners.



There has been a reported 47 incidents of overheated wiring, including 33 that have caught fire causing damage to homes.

Digital Clamp Meters Recalled by Fluke Due to Shock Hazard

The U.S. Consumer Product Safety Commission in cooperation with Fluke Corporation announced a voluntary recall of

the Fluke Digital Clamp Meters. Approximately 52,000 units were sold through industrial, electrical and hardware store distributors nationwide from January 2008 to February 2009. The meters can fail to give an appropriate voltage reading, resulting in the operator falsely believing the electrical power is "off", posing a shock, electrocution, or thermal burn hazard.

Three reports have been received of the clamps displaying incorrect voltage readings. No injuries have been received.

Consumers should stop using the recalled Digital Clamp Meters immediately and contact Fluke for a free replacement



clamp meter. For additional information contact Fluke toll-free (888)983-5853.

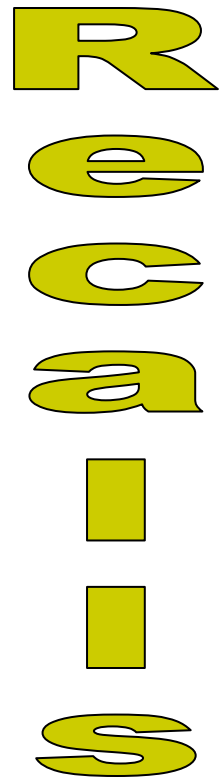
Lumetique has announced the voluntary recall of the Dayna Becker 16 oz. Botanika candle. The glass surrounding the candle has been reported to have broken during use, posing a fire hazard. There has been 10 reports of glass breaking during use resulting in fires



causing property damage to household items and carpet. The recalled candles were sold under the DayNa Decker "Botanika" brand in 16 oz. green vessels and sold by re-sorts, spas and gift shops.

For more information regarding these recalls as well as others, please visit the Whitmore Fire Consultants website:

www.whitmorefire.com



State Farm Prevails in South Dakota Fraud Case



Recently State Farm Insurance Company successfully defended a lawsuit pertaining to their denial of a fire loss claim in South Dakota. The case stems from a fire that occurred to a single family residence in Spencer, SD in 2006. The claim was denied based upon fraud/misrepresentation on the proof of loss submitted by the insured.

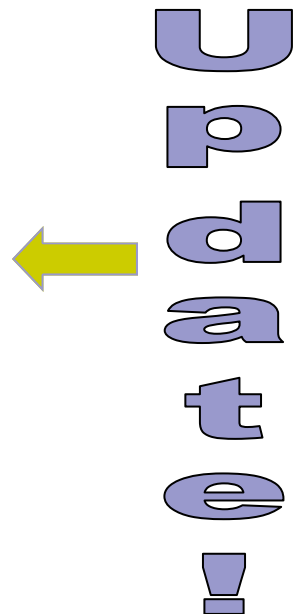
Robert Whitmore, CFI, Dan Choudek, P.E. of OnSite Engineering and Stacy Niemann, SIU Investigator for State Farm Insurance conducted the investigation into the circumstances surrounding the fire and documentation of the contents within the home following the fire.

The insured alleged there were over 1000 VHS tapes, 300 CD's/DVD's, 60 pairs of jeans, 70 pairs of nightwear and an extensive horse/doll collection contained within a 9' x 10' room valued in excess of \$96,000.

Documentation of the room of origin revealed during scene processing sparse contents and the fire debris did not corroborate the proof of loss statement.

Following testimony by Mr. Niemann and Mr. Whitmore, State Farm rested their case. The United States District Court in Sioux Falls, South Dakota jury returned a verdict in 20-minutes in favor of State Farm.

Congratulations to everyone involved in the preparation and litigation of this case.



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Our Services

Our investigators have the education, experience and professionalism to provide our clients with results they have come to expect in determining the origin and cause of their fire and explosion losses. Our investigations are completed in a timely manner with a comprehensive final report package which includes a detailed analysis of the loss scene and diagrams. We offer a full time administrative staff to meet your needs and a 24/7 afterhours telephone number for those times when an immediate response is required.

Our Mission Statement

. . . To provide the highest quality fire and explosion investigations from the scene to the courtroom. It's not a slogan, it's our commitment!

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