

**Welcome!**

We would like to introduce you to our newsletter. This is where you will find information about Anderson Engineering of New Prague, Inc. – who we are and what we do.

This is where we'll share with you real case studies with informative facts and conclusive decisions, "hot" topics that will "spark" your interest, and fire safety tips.

We value your opinion and welcome your feedback. If you do not wish to receive our newsletter or have questions or comments, please call us at **1-800-893-4047** or send us an email: [news@andeng.net](mailto:news@andeng.net).

**WE OFFER:**

- Professional engineering & forensic services
- Expert witness testimony
- Rapid response to client requests – available 24 hours a day, 7 days a week
- Updates within 48 hours of assignment
- Experienced cause & origin analysis
- Electrical accident reconstruction
- Product or process failure mode analysis
- ASTM evidence storage
- Seminars on electrical safety & forensic electrical engineering

**MARK YOUR CALENDAR!**

Anderson Engineering will be attending the 2007 Minnesota IAAI Fire Investigation Conference on March 28-30 in St. Cloud, MN. For more info, go to [www.mniaai.org](http://www.mniaai.org). Hope to see you there!

Visit us on the web at  
[www.andeng.net](http://www.andeng.net)

**ENGINEER SPOTLIGHT**

Our own, **Andrew J. Paris, E.I.T.**, is featured in the February 2007 IEEE SPECTRUM magazine. The special 'Dream Jobs' issue, authored by Harry Goldstein, showcases young engineers and what they do best! To read about Drew and learn more about the IEEE organization, go to [www.spectrum.ieee.org/feb07/4894](http://www.spectrum.ieee.org/feb07/4894). For a copy of this issue, please contact us at [news@andeng.net](mailto:news@andeng.net).

**Congratulations, Drew!**

**THE CASE OF THE UNINTENTIONAL PILOT LIGHT**

We've all heard the old maxim: "Every cloud has a silver lining." Most of us wouldn't associate this saying with the devastating effects of a house fire. Coming home to a house filled with smoke is a fear shared by every homeowner. However, as shown in this issue's case study, there are times when even a small fire can prevent a much larger disaster.

For our homeowner, the day couldn't have been more normal. After putting a load of laundry in the dryer, she left her home for an afternoon of shopping with her children and grandchildren. Unfortunately, when she returned home with her family a few hours later, she discovered an unmistakable smoky haze inside. Following the source, she quickly ran downstairs to investigate.

She noticed a faint light flickering through the dark as she passed the basement utility room. Upon entry, she saw an orange glow emanating from behind the gas-powered clothes dryer. She pulled out her cell phone and called 911, at the same time calling to her son who was searching around upstairs. He swiftly ran downstairs with a fire extinguisher and released it all around the dryer to put out the small fire.

The first official to arrive on scene was a local police officer. The insured was showing him where the fire occurred when he began to smell the distinctive odor of natural gas. He had everyone get out of the home and he alerted the local gas utility. The utility arrived and shut off gas at the main valve. The fire department later placed the origin of the fire at the damaged clothes dryer and thereafter released the scene.

We were hired by the homeowner's insurance company to investigate the fire and determine what role, if any, the home's gas system and clothes dryer played in the cause of the fire. As shown in Figures 1 & 2, the fire damage was extremely limited. A small burn pattern on the half-wall behind the dryer was punched in by the fire department during their investigation. The dryer sustained damage near the power cord entrance.



Figure 1

Continued on next page...



Figure 2



Figure 3

The power cord insulation was melted and burned. The hot conductor in the power cord was severed approximately 3 inches from where it entered the dryer housing. Round beads of melted copper, characteristic of electrical arcing, were found on the severed ends.

Electrical arcing occurs when an energized conductor contacts another conductor with very low electrical resistance. All the energy available in the circuit tries to rush through the connection. This rush of energy vaporizes and melts even strong metals such as copper and steel. Arcing commonly occurs within a power cord when the plastic insulation between the conductors wears away and the hot conductor contacts the neutral or ground conductor.

Curiously, in this case, the other two conductors were not damaged; only the hot conductor sustained melting and arcing. So what caused the damage to the power cord? The answer was revealed upon closer inspection of the natural gas line traveling to the dryer. A small irregular-shaped pinhole was found in the wall of the copper pipe, shown in Figure 3.

The copper gas line to the clothes dryer ran up from a local valve in the utility room, ran across the ceiling, and traveled down the opposite wall to the dryer. At this point, the original installer apparently took the extra piping and wrapped it into a three-loop coil. The coiled piping was wedged between the dryer and wall. The location of the electrical receptacle behind and to the left of the dryer required the power cord to stretch tightly along the wall. Measurements of the power cord along with the location of the dryer showed that the cord must have touched or ran through the coils of gas piping.

As the dryer shifted around during operation, or when pulled away from the wall, the power cord eventually became wedged between the coils of gas piping. Over time the cord insulation wore away due to vibration and compression. Eventually the hot conductor contacted and arced to the grounded copper gas line. The arcing produced intense heat that ignited the power cord insulation. It also ignited the gas seeping out of the newly formed pinhole in the gas line. This created a small sustaining flame, much like the pilot light on a water heater.

Eventually, arcing tripped the circuit breaker. However, the fire continued burning gas and plastic insulation until the homeowner returned. The small size of the pinhole limited the height of the flame to only a couple inches. This was lucky, paper bags and plastic containers were on a shelf only a foot or two above and behind the dryer.

After the homeowner's son put out the fire with an extinguisher, he basically put out the unintentional pilot light. Gas began to seep directly into the room until it was noticed by the police officer. If the gas hadn't been ignited, it most likely would have bled into the room for hours before being discovered. The risk of explosion would have been very high if the homeowner had entered and done something as simple as turning on a light switch.

Fortunately for everyone involved, our circumstances were not nearly so dire. As we can see, in this case, a small fire actually prevented a possibly much larger disaster. However, even a small fire may produce damaging smoke that can harm both people and property. As forensic electrical engineers, our firm annually investigates over 190 fires, product failures, and personal injuries. Having been in business for over 40 years, we have a wealth of casework to fall back on for research and comparison. Our engineers are always up to the challenge of new cases, and with our extensive resources you can be assured of a prepared, thorough, and professionally executed investigation.

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