NCSG Innovation 2008 Photo Recap

Preventing Lightning Losses

Don’t Leave Money in the Dryer
Preventing Lightning Losses

Hurricanes and tornados receive the news coverage, but according to Underwriters Laboratories (UL), lightning accounts for more than one billion dollars annually in structural damage to buildings in the U.S. Each year, thousands of homes are damaged or destroyed by lightning. A single bolt of lightning can generate heat in excess of 50,000 degrees F which can spark fires or cause surging through electrical circuitry. The average cost of a homeowner insurance claim from a lightning strike has more than doubled since 2000, rising to $5,446 in 2006, according to insurance industry statistics. The good news is that lightning losses can be prevented.

"Home and business owners needn't take their chances with lightning," says Bud VanSickle, executive director of the Lightning Protection Institute (LPI), "a professionally-installed lightning protection system which meets U.S. Safety Standards will prevent lightning damage by providing a safe electrical path into the earth for lightning's destructive energy."

The Role of a Lightning Protection System

Lightning is electricity. When electricity is confined to a properly designed conductive path, damage can be minimized. Destruction results when electricity encounters resistance, similar to the resistance used in arc welding. When electrical current runs through an arc welder, the resistance it encounters when arcing through air generates the heat necessary to melt steel. The highly conductive copper and aluminum materials used in a lightning protection system provide a low resistance path for lightning to travel without resistance.

When the lightning protection network is in place, a lightning strike is intercepted and directed to ground without impact to a structure or its contents. Without the presence of the low resistance path provided by a lightning protection system, the lightning will fight its way through non-conductive building materials like wood, brick, rubber membranes, glass plastic, etc., on its way to earth ground. The resistance lightning encounters will produce heat, fires and even explosions.

According to the National Weather Service, there are three main ways that lightning enters buildings: 1) a direct strike, 2) through wire or pipes that extend outside the structure, and 3) through the ground. Regardless of the method of entrance, once inside the structure, the lightning can travel through the electrical, communication, or data wiring, along with plumbing, gas or process piping systems. Lightning can also travel through structural steel framing and reinforcing rods in concrete walls or flooring.

On the outside of the structure, lightning can travel along the outer shell and may follow conductive metal vents, roof drainage elements and external supports as it seeks a path to ground. The U.S. Fire Administration says two-thirds of lightning fires happen from June through August, with 55 percent of these fires occurring outdoors and 41 percent occurring in structures. Among the structure fires, lightning most often ignited roofs, sidewalls, framing and electrical wires. Packing up to 100 million volts of electricity, a lightning strike to an unprotected structure can be disastrous.

Standards Govern Installation

While the concept behind lightning protection is relatively simple, the requirements for proper installation are specific and often complex. Specifications, technical information and installation methods should comply with these three nationally recognized authorities that publish safety standards for lightning protection installation:

- Lightning Protection Institute (LPI); Standard of Practice, LPI-175
- National Fire Protection Association (NFPA); Standard for the Installation of Lightning Protection Systems, NFPA 780
- Underwriters Laboratories (UL); Installation Requirements for Lightning Protection Systems, UL 96A; and UL 96, Standard for Lightning Protection Components.

Of the above, LPI is the only organization founded specifically to study lightning protection. The LPI was established in 1955 to promote lightning safety, awareness and protection education. The organization provides certification and education programing for lightning protection installation, design and inspection. The LPI’s “Master Installer” program qualifies competence and quality control in the lightning protection industry.

Dispelling Myths

LPI stresses that understanding lightning is a good first step for homeowners to take when considering protection. Considering lightning inspires awe and wonder, and also fear, it is important to separate fact and fiction when it comes to lightning safety.
Lightning is not deterred by surge arresters, suppressors and "whole-house protectors." Contrary to popular belief, surge protection devices cannot protect a structure against direct lightning strikes. While these devices are important components of a complete system to protect incoming utility lines against infiltration, on their own they do little to protect a home from lightning. However, when combined with a structural lightning rod system, (air terminals, bonding and grounding) they can prove a valuable and effective means of protection.

**Lightning rods do not attract lightning.** Another myth commonly associated with lightning is that lightning rods attract lightning. In fact, a lightning protection system acts more as an interceptor of lightning, rerouting a strike and providing a safe path to ground for discharging the dangerous electricity.

**Tall trees do not protect homes from lightning strikes.** The problem with a home nestled under a group of trees is where the best ground path for the lightning might be. Common metallic grounded systems within a home (electric, phone, gas, water) may provide a preferable grounding medium for the lightning. Therefore, lightning can actually "side-flash" from a tree and enter a home as it seeks a more conductive path to ground.

**Lightning likes technology.** As the world becomes more and more tech-savvy, the losses from lightning strikes are increasing.

Today's homes and businesses have more electronic equipment than ever before, and metal building components are on the rise as well. Internal systems lead lightning toward more valuable, often irreplaceable items and people in close proximity.

**A lightning rod on a chimney will not provide adequate protection.** A single rod or single air terminal is not adequate to protect a structure against lightning. A complete system which complies with safety standards is needed to provide safe and effective lightning protection performance. Improper installation can lead to serious and dangerous consequences for the homeowner.

**Lightning rods are not unsightly on chimneys and roofs.** An experienced lightning protection contractor will ensure the lightning protection system will not detract from the structure and will blend aesthetically with the roof and chimney composition.

**Importance of System Quality Control**
Lightning protection technology is a specialty discipline and expertise is required for system design and installation. Systems for homes and businesses should be installed by trained and experienced LPI-certified and UL-listed specialists. LPI offers these safeguards for property owners seeking a qualified lightning protection specialist:

- Make sure materials and methods comply with nationally-
recognized safety standards of the LPI, NFPA and UL.

- Only experienced and reputable UL-listed, LPI-certified lightning protection contractors are qualified to install lightning protection systems.
- Check references. A qualified specialist should provide a list of references and affiliation with industry groups such as NFPA, ULPI, LSA and LPI.
- Ask about surge protection. Lightning-induced surges can damage electronics and appliances. A qualified lightning protection contractor can provide options for service entrance arresters and surge protection devices.
- Experience counts. Be wary of start-up companies or contractors offering a “price deal” to install, fix or repair your lightning protection.
- When in doubt, contact www.bbb.org to locate your local Better Business Bureau to obtain reliability report information on a contractor before you hire.

The decision to purchase a lightning protection system is a lot like buying an insurance policy. Homeowners may purchase a system knowing that they will not use it every day, but it will be there to protect them when needed. The NFPA 780 Standard provides a “Risk Assessment Guide” to assist building owners, architects and engineers in determining the risk of damage due to lightning. While the Risk Assessment Guide is a good rule of thumb for measuring the potential for a strike and damage, sometimes the presence of a single risk or consequence factors is enough to render a structure a potential lightning target or significant risk worth protecting. Often the cost of installing lightning protection is considered minimal as compared to the potential for loss.

For more information on lightning protection or to obtain a list of certified contractors, visit the LPI web-site at www.lightning.org.

About the Author: Kim Loehr, a communications consultant for LPI, is a member of the NOAA Lightning Safety Awareness Team and NFPA’s Building Fire Safety Systems Section. She is also a registered course provider with the Lightning Safety Alliance (LSA) and its National Continuing Education Service (CES). She can be contacted at LLpcso@aol.com