

# LOSS CONTROL BULLETIN

Property Owners & Commercial Operations Safety

## *Lightning Protection*

**Fact:** Although it doesn't get the publicity that tornadoes and hurricanes receive, lightning is the second leading cause of storm related deaths, trailing only flood. Each year in the United States, more than 400 people are struck by lightning.<sup>1</sup> In addition to causing loss of life, lightning also causes loss of property in the form of total fires, damaged electronics and equipment, loss of livestock and more.

Consider the following lightning protection ideas for your property:

### **Lightning Rod Protection System**

The fundamental purpose of a lightning rod system is not to attract lightning but to provide a low resistance path for electrical currents to travel to the ground. With a properly working system, an electrical current is less likely to pass directly through your home or structure causing damage to electronics and increasing the risk of fire.

This system will include properly sized and placed lightning rods affixed to the highest point of the building. The lightning rods are connected to down conductors designed to carry the charge to the grounding rods. A properly installed ground rod should be driven in to the earth a minimum depth of 10 feet. Major buildings with perimeters of over 250 feet should have one additional rod for each additional 100 feet of perimeter.<sup>2</sup>

Due to the significance of proper installation, it is recommended that only a qualified contractor install the system. One improperly installed component of the system can cause the entire system to fail or be ineffective.

According to the Lightning Protection Institute, there are **five elements** that need to be in place to provide an effective lightning protection system. **Strike termination devices** must be suitably attached to accept direct lightning and patterned to accept strikes before they reach insulated building materials. **Cable conductors** route lightning currents over and through the construction, without damage, between strike terminations at the top and the **grounding electrode system** at the bottom. The below grade grounding electrode system must efficiently move the lightning to its final destination

*(over)*

<sup>1</sup>National Oceanic and Atmospheric Administration (2009). Lightning Safety for You and Your Family. Retrieved from <http://www.weather.gov/os/lightning/pdfs/lightning-safety.pdf>.

<sup>2</sup>VanSickle, Bud. (2009). *Lightning Protection Overview*. Retrieved August 26, 2009 from Lightning Protection Institute at [http://www.lightning.org/documents/Chapter\\_on\\_LP\\_Feb.\\_2009-Titled.pdf](http://www.lightning.org/documents/Chapter_on_LP_Feb._2009-Titled.pdf).

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away from the structure and its contents. **Bonding** or the interconnection of the lightning protection system to other internal grounded metallic systems must be accommodated to eliminate the opportunity for lightning to sideflash internally. Finally, **surge protection devices** must be installed at every service entrance to stop the intrusion of lightning from utility lines, and further equalize potential between grounded systems during lightning events. When these elements are identified properly in the design stage, incorporated into a neat workmanlike installation, and no changes to the building occur, the system will protect against lightning damage. Elements of this passive grounding system always serve a similar function, but the total design is specific for each particular structure.<sup>3</sup>

Certain codes and standards should be followed when lightning protection systems are installed. Standards and sources are listed below:

**LPI-175:** Standard of Practice for the Design - Installation- Inspection of Lightning Protection Systems (2008 Ed.), by Lightning Protection Institute.

**NFPA 780:** Standard for the Installation of Lightning Protection Systems (2008 Ed.) by National Fire Protection Association.

**ASAE EP381:** American Society of Agricultural Engineers, Engineering Practice.

**UL 96 & 96A:** Standard for Lightning Protection Components (5th Ed.) and Standard for Installation Requirements for Lightning Protection Systems (12th Ed.), by Underwriters Laboratories®<sup>4</sup>

### Surge Protection

Even in a building equipped with a properly functioning lightning rod protection system, electronic equipment and appliances are still susceptible to damage. Lightning can strike a nearby power line causing an excessive amount of power to travel through the line and directly into your home. In these instances any items connected to the power system are exposed to the power surge. Use of Surge Protection Devices can provide a more complete lightning protection system to protect structure, people, and equipment within.



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<sup>3</sup> VanSickle, Bud. (2009). *Lightning Protection Overview*. Retrieved August 26, 2009 from Lightning Protection Institute at [http://www.lightning.org/documents/Chapter\\_on\\_LP\\_Feb\\_2009-Titled.pdf](http://www.lightning.org/documents/Chapter_on_LP_Feb_2009-Titled.pdf).

<sup>4</sup> Information gathered in part from: Chamberlain, Dian & Hallman, Eric. *Lightning Protection for Farms*. Retrieved from National Ag Safety Database: [http://nasdonline.org/static\\_content/documents/1892/d001825.pdf](http://nasdonline.org/static_content/documents/1892/d001825.pdf).