

## Lightning and Power Surge Protection

**Line of Business:** Property

**Risk Control Strategy/Key Issues:** To identify existing lightning and power surge hazards, and methods to protect property

### Suggested Program Elements:

- 1. Identify possible lightning hazards on your property.** High objects are generally targets or sources of lightning strikes. Special protection is needed for these structures, as well as for some other facilities, e.g., pre-stressed concrete buildings; structures built on bare, solid rock; and non-pressurized tanks holding combustible or flammable liquids or gases. A lightning protection system provides a means by which an electrical discharge may enter or leave the earth, without passing through and damaging non-conducting parts of a structure such as wood, brick, tile or concrete. Lightning protection systems don't prevent a lightning strike. They provide a means of channeling it and preventing damage, by providing a low resistance path for the discharge of electrical energy. Typical examples of common targets are:
  - Roof peaks, metal gutters & downspouts, chimneys and cupolas
  - Radio antennas and receivers, roof mounted HVAC units, weather vanes
  - Inappropriately secured electrical fixtures
  - Standpipes and tanks
  - Tall flagpoles near the building
- 2. Identify power surge hazards within your structures.** Large spikes in voltage and current are referred-to as 'power surges'. These surges travel along power lines and/or communication lines, and may be caused by a lightning strike or by utility company switching. They may also be caused by your own equipment – heavy pumps, refrigeration compressors, and air conditioning equipment – switching on. Surge suppression devices divert high-current surges to ground, through low-resistance conductors. They are commonly referred to as TVSS (Transient Voltage Surge Suppression) devices. Some especially vulnerable devices are computers, modems and other high value electrical/electronic equipment with solid state circuitry.
- 3. Structural lightning strike protection measures:**
  - Lightning rods (referred-to technically as 'air terminals') installed 20 feet apart, along roof ridges, and within 2 feet of the ridge ends
  - Air terminals located within 2 feet of outside corners of each chimney
  - Down conductors connecting the terminals to the grounding system
  - Minimum of 2 groundings (metal rods) at least 10 feet deep into the earth
  - Other metal roof projections connected to the grounding system
  - Flagpoles within 20 feet of the building should be relocated. A tall flagpole is a target for lightning, especially if it is the highest object in the area.

**4. Power surge protection measures:**

- Install TVSS's at the main electrical service entrance – the point where power enters the building. This is a relatively inexpensive way to keep power surges from entering the building from utility power lines
- Install internal surge suppressors at the circuit breaker or distribution panel, and at the point-of-use for specific, vulnerable electrical/electronic equipment, in order to limit the voltage to 1.5 times the normal voltage (the maximum for solid state devices)
- Provide surge protection for critical equipment connected to the outside by data or communication lines, including metal-sheathed, fiber optic cable
- Use continuous, grounded shielding around cables and other circuits, where necessary

**5. Electrical and power surge hazard controls.** Only lightning and surge suppression protection systems that are certified by a nationally recognized testing laboratory should be used. Systems should always be designed, installed, tested, and maintained in accordance with local building codes, national standards, and the manufacturers' instructions. Use only qualified and licensed personnel. Consult with your local or state building permitting authority for requirements, and a list of qualified and licensed electrical system installers.

**Program Activities Calendar:**

- Surge suppression systems should be tested periodically, according to the manufacturers specifications or every two months. After a strong power surge, or a thunderstorm, it may be necessary to replace the system's fuses or arrestors.

**Web Site Links:**

- The Lightning Protection Institute  
<http://www.lightning.org>
- National Fire Protection Association  
<http://www.nfpa.org>
- Hartford Steam Boiler  
<http://www.hsb.com/thelocomotive/>

*Trident Insurance Services provides the above program information in order to reduce the risk of insurance loss and claims. The information provided is not intended to include all potential controls or address any insured specifically. Trident also does not warrant that all loss and/or claims will be avoided if the program information is followed. By providing this information, Trident in no way intends to relieve the insured of its own duties and obligations, nor is Trident undertaking, on behalf of or for the benefit of the insured or others, that the insured's property or operations are safe, healthful, or in compliance with any law, rule or regulation. Insureds remain responsible for their own efforts to reduce risks and should consult their own legal counsel for appropriate guidance.*