



School Talk

Lightning Protection

Lightning Protection for Buildings

Installing lightning protection on your buildings can improve safety by decreasing the likelihood and intensity of lightning damage. There are two main forms of lightning protection:

- Interception by lightning rods, air terminals (a network of one or more overhead wires).
- Surge protection.

Lightning Rods and Air Terminals

The function of lightning rods/air terminals is to establish a point of contact for lightning that may strike nearby. An intercepted lightning then follows a metal cable to the ground, where it goes in the soil. Lightning rods/air terminal installation is best left to professional contractors or electricians trained and experienced in these devices and the applicable standards.

Lightning protection can help guard against most of the hazardous and damaging electric current from lightning striking the building from entering. However, it provides no protection from lightning striking external conducting paths leading inside, such as telephone wires, power lines, and plumbing. Surge protection is required to help with some of those hazards.

Surge Protection

Surge protection against lightning is extremely challenging, given its very high current and very rapid power rise times. No single device can totally provide lightning surge protection, so a series of devices in the proper sequence is best.

Multilevel surge protection is especially important for delicate electronics, such as computer equipment. Modern electronics are extremely sensitive to electric surges. Don't forget to protect modems, which seem to be especially susceptible to electrical surge damage.

Power companies offer reliable lightning surge protection at a reasonable cost. However, most of these devices provide only the first-line protection for electromechanical devices and improved personnel safety. Further surge protection for delicate electronics will likely be needed. These devices only guard against incoming surges on power lines. They do not guard against surges from other paths, such as telephone wires and plumbing.

As with lightning protection, surge protection works only as well as its grounding systems. Grounding systems must ensure that a common ground is used, to avoid potentially destructive electrical voltages developing in the system. This means all the grounding systems, such as the lightning protection ground, electric power ground, phone and cable grounds, and plumbing must be electrically connected at some point. This is especially important in large facilities, like schools. Unfortunately, many manufacturers market surge protectors as effective against lightning that cannot handle either its power and/or fast rise times. They may cite Underwriters Laboratory approval, but that just means the devices aren't dangerous, not that they are effective. As with lightning interceptor devices, buyers must beware.



The 30-30 Rule

1. When the flash is seen, count the number of seconds to the initial “bang” of its thunder.
2. Divide the number of seconds by 5 to get the strike distance (in miles).
3. Take shelter if the “Flash-to-Bang” delay is 30 seconds or less.
4. Stay undercover until 30 minutes past the last clap of thunder.
5. Limited effect with storms building overhead.

Lightning Detectors and Notification Subscription Services

The Lightning Safety Group recommends the inexpensive handheld detectors not be used, or at most be used as a supplement to the “30-30 Rule.” Professional grade lightning detectors are also available commercially. These devices perform well, but are too expensive for most organizations.

Automatic lightning notification subscription services are a reasonable alternative. The services use the data to automatically notify you when cloud-to-ground lightning is detected.

Lightning Safety Education

Schools can play a vital role in reducing lightning casualties. Most important is to have a lightning safety plan to protect the students and staff during school activities. Next in importance is educating the students and staff in personal lightning safety, so they can maintain their safety when away from school. If all schools were proactive and taught lightning safety to their students, we could drastically reduce lightning casualties by the next generation. Finally, schools can facilitate public lightning safety education by sponsoring outreach events, perhaps in conjunction with the local National Weather Service office or other meteorologists.

Summary

Lightning is an extremely significant weather hazard, but far too often underrated. The vast majority of the lightning casualties are easily preventable by following simple guidelines. Since the most frequent impact of lightning is lifelong severe injuries, it is especially important to protect children. Schools can serve an essential lightning safety role by practicing good lightning safety for their students, faculty, coaches, and staff. This is especially true for K–12 schools, since adults must take responsibility for the safety of children and youth in their care. Schools can also serve a second role in lightning safety by educating their local communities.

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