

Protecting your home from lightning

NEWARK, DE — Thunderstorms and lightning are common occurrences this time of year. Once lightning strikes it's too late to avoid damage, but the proverbial ounce of prevention is well worth the more expensive pound of cure.

According to University of Delaware extension building specialist Dr. Jim Scarborough, many people experience lightning damage to their homes, appliances and trees that could have been prevented.

Over the entire earth lightning strikes about 100 times a second. The continental United States gets about 90 million strikes a year. "In the Delaware area, our 45 days of thunderstorm activity annually average between 50 and 60 lightning strikes per square mile," says Scarborough.

"It's time to dispel the myth that lightning never strikes the same place twice," Scarborough says. "Just the opposite is true. A tower house once hit by lightning is more likely to be hit again than one that has never been struck."

How can you protect yourself? The expert says, "If you're indoors, stay away from the TV, radio and electrical appliances. Better yet turn them off. Lightning can enter through electrical wiring if an outside line is hit. An outdoor antenna or TV cable gives even better access.

Also stay away from your fireplace, wood stove or chimney. Often the chimney is the highest part of a house and thus the most susceptible to lightning strikes. Soot deposits inside the chimney are good conductors to the inside of a house. Probably the best place to be during a severe lightning storm is the middle of your bedroom."

If you're outside, seek shelter in a large store or building. These are usually metal frame structures with adequate built in protection. One of the safest places to be is inside your car with the windows and doors shut, as long as the car has a metal roof.

If you're caught in an open area such as a field or golf course, lie down in a depression such as a ditch or culvert. On a golf course put your clubs into the bag—don't wave around your own personal lightning rod. Stay off the green and away from isolated trees.

Stay away from pools, lakes and rivers, and get out of the water if you are swimming—lightning is

attracted to water, and you don't have to be in it to be hurt. If lightning doesn't find a ground in the water, it will travel to the closest ground or shore, possibly a beach umbrella.

Lightning protection for a house or farm should be installed by a professional contractor specializing in this type of work and using Underwriter's Laboratories-approved equipment, Scarborough says. This is not a job for a homeowner since specific guidelines for placement must be followed and the cables must be securely bonded together or the installation will be useless.

A protection system consists of the following components:

* **Air Terminals**—These metal tubes or rods are installed at every high point of a building such as roof peaks, dormers, gables, chimneys, ventilators and silo tops. These terminals are 10 to 24 inches long and spaced about 20 feet apart along the roof peak or perimeter of a flat roof. They are clamped directly to the conductor cable. (Avoid ornamentation or weather vanes on terminals or cables as they may weaken the terminal mounting.)

* **Conductors**—These are heavy copper or aluminum wires which connect the air terminals and any antennas (such as for the TV) with the ground. Conductors are fastened to the roof about every 3 feet. If you live close to the shore, use only copper conductors as aluminum reacts with salt air.

* **Grounds**—These provide contact with the earth to dissipate a lightning charge. Usually two are needed for each building, but more are required for larger and more complex structures. Grounds should be deep enough to reach moist earth—about 10 feet in this area. They're usually a copper clad steel rod, but may be a buried metal plate or even a water supply line.

* **Lightning Arresters**—These

guard against damage that might occur via electrical or telephone lines. They're available for the main power line, the telephone and the TV.

* **Bonds**—These are interconnectors for metal parts—usually clamps. If bonds are not installed properly, a high resistance to electricity will occur and a side flash of lightning is possible.

Don't forget the trees around your house, Scarborough says. They can be severely damaged or ruined by lightning, and a tree falling on your house is not the kind of excitement you need during a thunderstorm.

Trees can be protected by securing one or more 10-inch air terminals at the highest stable part of the tree that can be safely reached. Very large or wide trees may need several air terminals. Conductors are mounted with long shank screw fasteners to keep them from contacting the tree and damaging it if lightning should strike.

The ground rod should be sunk beyond the tree's branch line to avoid damage to the root system. This usually means burying the cable. Consider protecting trees close to the house, primary shade

trees or ornamental trees, and the tallest tree in a grove if possible.

How powerful is lightning? "Think of your car's electrical system," says Scarborough. "The current in this system can give you a jolt if you touch it. Multiply this by about one hundred times and you have the current in your entire house, which can kill you. Household current multiplied a thousand times can leap a 12-inch gap. Multiply that by 100,000 and you have the power of a lightning bolt, which can explode a major building.

Scientifically, lightning is the electrical discharge that reunites masses of oppositely charged storm-generated ions. Scarborough gives an example: "All of us have had the experience of walking across a rug and then creating a spark when we touched a doorknob. We've just generated a type of lightning. Your body can build up a charge of up to 7,000 volts; to release it a spark jumps to the metal object with the opposite charge. The jolt you get is from the amperage, which in this case is only in the millionths of an amp range—very small."

Lightning is generated in a somewhat similar matter, the engineer says. Negative ions form in the lower part of storm clouds due to the formation of rain, updrafts and other causes. The earth has positive ions, and as the cloud moves, these tend to follow it on

the ground, over trees, up buildings—always striving to make contact with the cloud charge.

According to the specialist, when a cloud charge is large enough to overcome the insulation from the air—such as when the cloud-to-ground distance is reduced—the cloud sends down a stroke leader which is jagged, since moving air has different insulation values. This stroke is only faintly luminous and generally not visible. When contact is made with the positive ions on the ground, the highly visible return stroke occurs.

To dissipate its electrical energy, a lightning bolt must eventually find an electrical ground such as wet earth, a water pipe or a ground rod. "Lightning will jump long distances, blow holes through concrete walls, travel along electrical wires or fences, even furrow through the earth in order to find a good ground," Scarborough says.



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