Lightning Protection for Trees

The Nature of Lightning

Lightning is electricity that has both high amperage (rate of flow) and high voltage (pressure). High voltage enables lightning to travel great distances through the air. High amperage is the main reason for lightning's destructive power.

Experiments have proved that a charge of electricity must have a thousand times the voltage of household current to travel, or jump just 1 foot through the air. Lightning, therefore, which usually travels over 2,000 feet between cloud and earth, must have extremely high voltage. But high voltage without large amperage is relatively harmless. The amperage of lighning discharges between clouds and earth sometimes reaches 200,000 amperes or more.

Lightning follows the line of least resistance. The air through which lightning must pass between clouds and the earth is an insulating material of high resistance. Materials used in building construction have less electrical resistance than air. When such materials lie between the clouds and the earth, lightning naturally goes along the line of low resistance that they provide.

Lightning protection systems for building give lightning readymade lines of low resistance. They do this by providing unbroken bodies of material that have lower resistance than any other in the immediate neighborhood. A protection system routes lightning along a known, controlled course between the air and the moist earth. Well installed and maintained, a lightning protection system will route lightning with over 90 percent effectiveness.

Protection for Trees

Trees are often ruined or severly damaged by lightning. This is hazardous because the lightning discharge is transmitted to nearby areas. Also, if the tree is sufficiently damaged it may fall on a building or green.

Trees that especially need protection are those that are higher than nearby buildings. Other trees that should be protected are those that are individually valuable, such as your accent trees on the course or those which are positioned to govern the play of a particular golf hole.

Protect a tree by installing one or more 10 inch air terminals at the highest secure part of the tree and grounding them through conductors. Very large trees may need two conductors and several air terminals.

Where there is a small group of trees, only a few of the tallest need to be protected.

Mount the conductors with long shanked screw fasteners to keep the conductors from contact with the tree when a lightning discharge is being carried in the system.

To make a ground connection, dig a trench and bury the unraveled end of the conductor cable in the ground. Make the trench shallow near the tree to prevent damage to the roots. Make it slant downward away from the base of the tree so as to reach moist soil.

Installation

Generally, it will be necessary to have an expert plan and install a lighning protection system. Few persons have the equipment and skill to install and to test their own lightning protection system. You should know, however, what the proper materials are and the methods used in the installation.

Follow the work carefully, especially the ground connection installation. All ground connections should be tested with special equipment to make sure that they are adequate for lightning protection requirements. Use materials approved by Underwriter's Laboratories, Inc. All such materials are clearly labeled.

Inspection and Maintenance

Make a periodic inspection of your lightning protection system to be sure it is in working order. Look for bent, loose, or missing air terminals, broken conductor cables, and loose connecting clamps.

Air Terminals –
Rods or tubes of copper, 10 to 24 inches in length.
Conductors –
Conductors –
Connect air terminals with ground, made of any good electricity-conducting material that will stand exposure to weather. usually aluminum or copper.

One acre of grass has a cooling effect equal to a 70 ton air conditioner, and gives off about 2,400 gallons of water on a warm summer day. Dr. H. J. Carew, Michigan State.