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## Lightning Protection for Golf Courses

by Jeffrey A. Hager

Golf course lightning protection, a topic that interests most of us. What really can we do about it? While the golf course may seem to be a special problem for the lightning protection installer the real headaches are with the Superintendents who are charged with the duty of finding an answer to all the questions the grounds committee asks.

What can we do about it, who can install it, why does it cost so much, what liability do we have, does lightning protection really work, and if it does work, how does it work?

To start at the beginning, the first thing that must be done is find a reputable installer who has experience working on a course. After working all year on your fairways, you don't want some guy driving his four wheel drive pick up all over the place. This is probably a priority for you but the real qualifications are whether or not he is a listed contractor with Underwriters Laboratories, Inc. (UL). UL is located in Northbrook and by calling 708-272-8800 you can verify the listing status of a contractor.

By using a UL listed contractor, you can obtain the Master Label for any structural installations you have done. This label is your guarantee that the installation was made in accordance with current UL standards and practices. If the contractor can't or won't deliver the Master Label, then he probably is not worth having on the course. Don't be fooled by any other certifications, the Master Label is the only disinterested third party "certification" process.

### SHELTER PROTECTION

Shelter protection is really quite simple. However, with all lightning protection work, if improperly done, you may create a greater hazard than if you did nothing at all.

Most shelters are either a straight gable or a pyramid or hipped roof. Basically, air terminals or lightning rods must be spaced no further than twenty feet apart and be installed within two feet of the end of the ridge. With this in mind, if you have a 10' long shelter, you need two air terminals. If you have a hipped roof shelter, only one terminal is required. Flat roofed shelters require air terminals around the perimeter, all being within two feet of the roof edge and outside corners. In all cases there must always be at least two paths to ground. If you have a shelter with only one cable leading to the ground, it has not been installed correctly. The down conductor cables should be covered with a PVC cable guard. This not only done for safety, but also to help minimize damage to the system.

Grounding for the systems should consist of 5/8" copper clad ground rods, driven vertically into the ground for a minimum depth of 10 feet. If the shelter has a dirt or open floor, a ground loop conductor should be installed around the perimeter of the structure connecting the ground rods. This will help reduce the risk of injury from dangerous ground currents from near by strikes to anyone standing on the bare ground.

Ideally, consideration should be given to the installation of a raised or non conductive floor.

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(Lightning Protection cont'd.)

Lastly, if the shelter has any water service, electric service or telephone service, these systems must be tied to the lightning protection system. By equalizing the ground potential between all of these systems you will help reduce the risk of damage or injury. A lightning arrestor or transient voltage surge suppressor should be installed on the electric panel if one exists. These devices will help to prevent damage from surges or lightning induced over voltages through the electric service.

### TREE PROTECTION

Tree lightning protection is a practice that has been done for a number of years to help protect that special tree which if hit and destroyed will change the play of a hole. In recent years courses have been protecting other valuable or beautiful trees just for aesthetic reasons. It should be noted that a protected tree should never be a place of refuge during a storm. If the protected tree is struck and the golfers are standing underneath or leaning against the tree, serious injury could result from side flashing or ground currents.

Tree protection is actually very similar to structural protection. If the tree is tall and slender, such as a tall pine, only one air terminal is usually needed. If the tree is larger and spread out over a large area, such as an oak or maple, more protection is necessary.

In every case an air terminal is installed at the highest point practical. This traditionally longer rod (24"-36") is designed to take the strike at the highest point of the tree. Secondary branch air terminals are installed on lower major branches. It

is not unusual to have one main and four or five secondary branch points. Unlike building protection, two down conductors are required only if the diameter of the tree is greater than 3'-0".

While there are no code requirements for tree installations, there are code recommendations. Recommendations include excluding the use of aluminum in tree protection. Due to the amount of moisture held in trees, aluminum materials will tend to deteriorate when exposed to constant moisture. Air terminals are required. Many systems are installed and the installer will fray or unwind the cable strands at the top of the tree. This typically is done by people who may know how to climb a tree, but know nothing about lightning protection.

A common myth about tree protection is that unless the cable is installed using a three inch stand-off fastener, the bark will burn if the tree is struck. Lightning protection systems are installed inside wall spaces in buildings every day. The problem is not with the cable fastened to the stud wall or tree bark, the problem is if the grounding system is poor creating the cable to heat up. A properly installed system will not generate enough heat to start a fire. Use the standoff if you want to allow for tree growth and movement, but if you are not concerned about this, regular fasteners are easier to install and are less obtrusive.

If you are considering lightning protection work for trees, and you would be more comfortable having your tree surgeon install the work, consider using a lightning protection professional to at least supervise the installation and provide the proper materials for the job.

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(Lightning Protection cont'd.)

The last area of protection out on the course is for the protection of your deep well pumps or wells. If you have the misfortune of losing a pump, check with the pump manufacturer, many times surge suppression can be installed on the pump prior to the installation. Consideration should be given to providing protection at the top of the well or at the controls for the well. If a UL listed transient voltage surge suppressor is installed at the top of well, you can help minimize damage that might occur due to line born surges.

Due to the number of golfers and spectators killed or injured every year on golf courses, this industry has been plagued with gizmos and gadgets that claim to prevent lightning, expand protection zones and even see lightning on a clear day. Unless a lightning protection system complies with the Underwriters Laboratories Safety Standard (UL 96A) or the Lightning Protection Code of the National Fire Protection Association (NFPA 780) it is not a nationally recognized or approved system.

Consideration for Lightning Protection off of the course should be given to the clubhouse, maintenance buildings, cart barns and other recreational structures such as a pool house. These types of structures are usually where the bulk of the people will run to when a storm blows up. Similar UL and NFPA guidelines as mentioned above should be followed.

The cart barn is one structure that is usually overlooked until a problem occurs. Two months ago in Lexington, Kentucky, 36 brand new golf carts were severely damaged when a nearby lightning strike destroyed the charging systems. Several cases have also been reported of superintendents losing entire fleets

of equipment when the maintenance barn was struck and leveled.

Storm warning systems only work as good as the person monitoring them. Warning systems that work automatically and take the human decision element away from clearing the course are the best solution. These systems cost several thousands of dollars if properly installed and maintained. If you don't go this route, be leery of any new ideas on the market. Your best bet is to watch the weather and maintain strict safety policies on clearing the course.

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## Florida GCSA sets up hurricane relief fund

LAWRENCE, Kan., August 31, 1992 — A relief fund for south Florida-area golf course maintenance employees, whose homes were destroyed or damaged by Hurricane Andrew last week, has been established by the statewide Florida Golf Course Superintendents Association (FGCSA).

The fund was started with a \$1,000 donation from the Palm Beach GCSA, and offers of help have also been received from the Carolinas GCSA and Georgia GCSA.

The South Florida GCSA is responsible for locating those employees hardest hit by the storm.

Checks earmarked for the relief fund may be made payable to the FGCSA and mailed to their association office at 1760 Northwest Pine Lake Drive, Stuart, FL 34994. For further information, please contact Marie Roberts, Executive Secretary, FGCSA, (407) 692-9349.

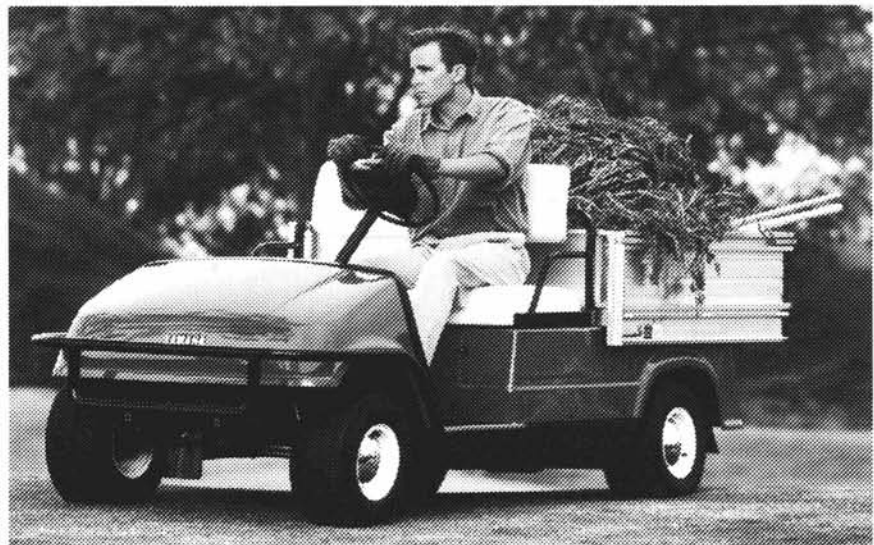
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