

# N91-32735

## GUIDELINES FOR A PROPOSED LIGHTNING PROTECTION POLICY OF A GOLF ASSOCIATION OR TOURNAMENT SPONSOR.

by Dr. Charles C. Hillyer

### WHY SHOULD A LIGHTNING PROTECTION POLICY BE FORMULATED?

Lightning causes many deaths and injuries on golf courses every year. Players, contestants, caddies, spectators, officials and sponsors of golf events need to take every precaution for the protection of persons against lightning.

Recently, a decision by an Appeals Court in the State of Tennessee awarded a large damage claim to the survivors of three men killed by lightning while playing golf on a course owned by the State of Tennessee. This decision has drawn the focus of widespread attention to the role of Management Risk Responsibility regarding Lightning Protection and Safety.

The Decision was based on four points of Failure to Provide:

1. A Lightning Protection Policy.
2. Lightning Protection Information.
3. Lightning Warning.
4. Lightning Shelters.

The following guidelines and comments will attempt to address these items of "Failure to Provide." Individual critique and comments are solicited and will be welcomed.

Golf Associations have supported several programs of research on the early detection and warning of lightning. While many significant improvements have been made in this area, we are convinced, in recognition of the unpredictable nature of lightning, there is no equipment, instrumentation or other known method that can guarantee completely failsafe advance warning for lightning strikes.

During 1991, several Golf Associations will continue to conduct on site evaluation of various detection devices. One of these devices is relatively simple to operate and is very affordable, the M-10 Lightning Detector, developed by Airborne Research Associates of Weston, Mass. This new instrument is being appraised by the Southern Golf Assn, the USGA, PGA, the TPC tour events and others.

It must be understood by all persons associated with golf tournaments, and other outdoor applications, that these instruments are operated on an experimental basis. They can detect lightning, but do not pinpoint its location. Distance from the observer to the lightning strike must be calculated by timing the interval between an audible signal from the instrument to the sound of its thunder as received by the observer. This is called TOFTI. (Time-Of-Flash-Thunder-Interval.) Approximately five seconds between flash and thunder indicates one mile, etc.

This technique will work in the early stages of a storm when lightning is not too frequent, because it is necessary to be able to identify the specific thunder sound with the lightning which caused it. When lightning is quite frequent, this can not be done. However, at such a stage it is obvious that a storm exists. The early first detection stage is important.

These instruments have capability to detect lightning under adverse visibility conditions and may prove to be a valuable adjunct, even if in this area alone. They can also provide on site data supplemental to that obtainable from NOAA/NWS, the FAA and other reliable sources of severe weather information.

Contestants, officials and spectators, should be encouraged to learn, practice and apply the principles of TOFTI in order to assist in the pursuit of their personal responsibility for evaluation of lightning proximity.

Diligent effort will be made by the Tournament Committee to provide weather and lightning information and warning, to the greatest extent of their ability. However, due to the unpredictable nature of individual lightning strokes, the Sponsor and/or the Host Club must not be expected to assume responsibility for property or physical loss or damage from lightning or other adverse weather factors. (This paragraph, in particular, may need editing with a fine tooth comb by the Sponsor and Host Club legal advisors.)

**THE ULTIMATE RESPONSIBILITY FOR AN INDIVIDUAL'S PROTECTION AND SAFETY, IS THE RESPONSIBILITY OF THE INDIVIDUAL.**

A LIGHTNING ALERT: Will be instituted when weather forecasts and local observations indicate Thunderstorms in the area.

A LIGHTNING WATCH: Will be instituted when Lightning has been detected and determined to be within approximately (15 miles ??? ) of the golf course. The Lightning Watch will be issued by radio to all Committee personnel. Under this condition, all personnel will be alerted to seek visual detection of any lightning, its azimuth from the individual observer and calculation of its distance by use of TOFTI, and report this information to the Tournament Chairman immediately.

DISCONTINUING PLAY: IMPORTANT! IT SHOULD BE MADE CLEAR AND UNDERSTOOD, THAT: THE COMMITTEE CAN NOT AND DOES NOT IMPLY, TO ANY DEGREE, THAT THERE IS ANY ASSURANCE OF SAFETY FROM LIGHTNING PRIOR TO SOUNDING THE DISCONTINUE PLAY SIREN.

THE SIREN IS SOUNDED TO ADVISE THAT PLAY IS NO LONGER PERMITTED after that time, and procedure is then in accordance with provisions under the Rules of Golf.

REMINDER: The USGA Rules of Golf, page 105, under Protection of Persons Against Lightning: "Attention is called to Rules 6-8 and 33-2d." "The USGA suggests that players be informed that they have the right to stop play if they think lightning threatens them, even though the Committee may not have specifically authorized it by signal."

DISCONTINUE PLAY: When lightning is determined to have struck within varying distances of the course, depending on the speed of approaching storm, and numerous other factors, the Discontinue Play Sirens will be sounded as three successive wails and may be repeated. At that time, it is mandatory that play be suspended. The contestant must then elect, at his/her own discretion; to either mark and lift the ball at that time, or, he/she may complete the hole being played. The contestant must then seek shelter without delay; the nearest, safest shelter available.

(See TAKING SHELTER, USGA Poster reprint on page 4.)

WHEN SHOULD THE DISCONTINUE PLAY SIREN BE SOUNDED? ? ? ? ?

This question involves such a high degree of sensitivity and disagreement that it has been practically impossible to elicit definite answers.

Much of this disagreement may be attributed to widespread lack of adequate information and insufficient comprehension of the behaviour of lightning. There is also grave concern, on the part of many sponsors, over the possibility of their increasing their liability and litigational factors through the use of what they consider, overly precise terms for decision on safety parameters when stated in miles or minutes. The decision to "blow the siren" is usually dismissed as a "judgement call". A judgement based on WHAT?

In considering the "Failure to provide information", as stated in the Tennessee Decision, one might well consider that by withholding information on the basis for the "judgment call" it could backfire. Thereby, the sponsor would be at greater fault and would have increased the factor of liability and litigation. In my opinion, that information should not be withheld, since denial of its use could diminish the ability for the individual's judgement to determine his danger and need to seek safety measures for protection from lightning.

It is the author's further opinion that in general, when lightning is within approximately 5 miles of the playing area, the course should be clear of personnel. This parameter is, of course, subject to many variables, including speed of the approaching storm, evacuation time to available shelter, etc. However, there are some who feel that the 5 mile parameter is far too conservative, while from the standpoint of others, it would be considered much too liberal. Thereupon lies a wide range of disagreement.

NOTE: Lightning does not necessarily travel to earth beneath the apparent thundercloud; indeed, a high percentage of ground discharges occur at the edges of the clouds or from wispy clouds near the main convective cloud. Another example of this is that lightning can come to earth from the high cirrus anvil "blow-off" cloud at the top of thunderstorms and may travel many miles or tens of miles downwind from the central portion of the storm. "Residue clouds" at the middle altitudes formed at the latter stages of thunderstorms also cause lightning many miles away from the original storm clouds. Note that regions downwind of thunderclouds are subject to such lightning approaching. Clouds can be hazardous when they are 5, 10 or more miles away, depending on conditions. Therefore, the official upon whose judgement rests the decision to discontinue play must be keenly aware that a lightning stroke may reach ground at a widely variable distance from the ground vertically below its cloud source. Thus, some general considerations for discontinuing play when the last calculated lightning strike is within 6-10 miles.

**RESUMING PLAY:** Play should NOT be resumed until there has been substantial evidence that the trailing edge of the thunderstorm has passed no less than several, perhaps 5 - 6 miles distant and its forward progress has been determined to be in a direction downwind and away from the playing area.

Play MAY NOT be resumed until the Committe has issued the Resume Pay Siren. One long wail of the siren. This signal may be repeated.

**WARNING POSTERS:** The Lightning Posters published by the USGA are readily available. Recommendation is made that these posters should be required, with distribution to include: The Clubhouse, Pro Shops, Locker Rooms, Practice Range, Starters Tents, Rangers, Tennis Facilities, Swimming Pool Area, Snack Buildings, Maintainance Barn, Cart Barn and in each on Course Shelter.

**SHELTERS:** The USGA Lightning Safety Posters provide this information clearly. The Host Club can provide supplemental information of locations of specific shelters and the maximum capacity for each shelter. Evacuation ZONES may be provided, to insure access to the assigned shelters within minimum time/distance availability and to avoid overcrowding of the facilities. Golf carts must NOT occupy space within these shelters if access for human occupancy is jeopardized, diminished or excluded. This information may be published, provided to each contestant and displayed with each USGA poster.

**TEMPORARY SHELTER FACILITIES:** (During tournaments and other special events. Upon long range advisory of anticipated thunderstorms, a Host Club may arrange for several large School Buses, or the like, to be placed at strategic locations about the golf course, to provide supplementary emergency shelter for contestants, caddies and equipment.

**AUDIBLE WARNING SYSTEM:** Every effort should be made to provide a permanent siren or horn warning system that is audible at every point of the golf course. The Host Club should be advised of the new necessity for such a system and the advantages a permanent system would afford its members.

**THE ULTIMATE RESPONSIBILITY FOR AN INDIVIDUAL'S PROTECTION AND SAFETY, IS THE RESPONSIBILITY OF THE INDIVIDUAL.**

Page 6.

Supplementary Note: A four or five page lightning protection policy would admittedly be quite a bit to expect a contestant to read. However, with the increased significance of liability for sponsors it may be worthwhile to consider:

a. At the time of contestant Registration, distribute a copy of the full content of the Lightning Protection Policy to each contestant. In that manner, the contestant will have been provided with the policy information. In addition, this would provide an updated source of some much needed general information on lightning behaviour, and procedures employed to help protect the individual and for the general public. Then, of course, we must leave the burden of responsibility of assimilating and applying the information up to the judgement of the individual.

THE ULTIMATE RESPONSIBILITY FOR AN INDIVIDUAL'S PROTECTION AND SAFETY, IS THE RESPONSIBILITY OF THE INDIVIDUAL.

(or),

b. The full content of the Lightning Protection Policy may be provided to the Officers and Directors of the Sponsoring Organization, and the Host Club Committee. The contestants could then be provided with an abridged edition of the Policy, to the extent considered necessary (???) for their individual information assimilation and protection and for the liability protection for the Sponsors.

(and)

c. That a Committee be appointed and charged with the responsibility of final formulation and management of the ultimately adopted Lightning Protection Policy.

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Prepared by Dr. Charles C. Hillyer, President, Communications And Weather Research Foundation and Director of Research and Development, Southern Golf Association, March 1991. This paper/proposal is submitted in the Form of presentation of some Guidelines for the purposes of study and refinement by those who may realize the need of establishing a Lightning Protection Policy.

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SEE ADDENDUM NEXT PAGE:

Page 7.

**ADDENDUM:**

On April 22, 1991, after this paper had been presented, the author received supplemental legal information. On April 8, 1991, a release for publication was issued, advising that a new decision has been made on the rulings in the litigation referenced in the paper. The earlier Appeals Court decision has been reversed by the Supreme Court of Tennessee.

Accordingly, further appraisal on this aspect of the paper will be necessary. The results of additional study will be presented at a later date.