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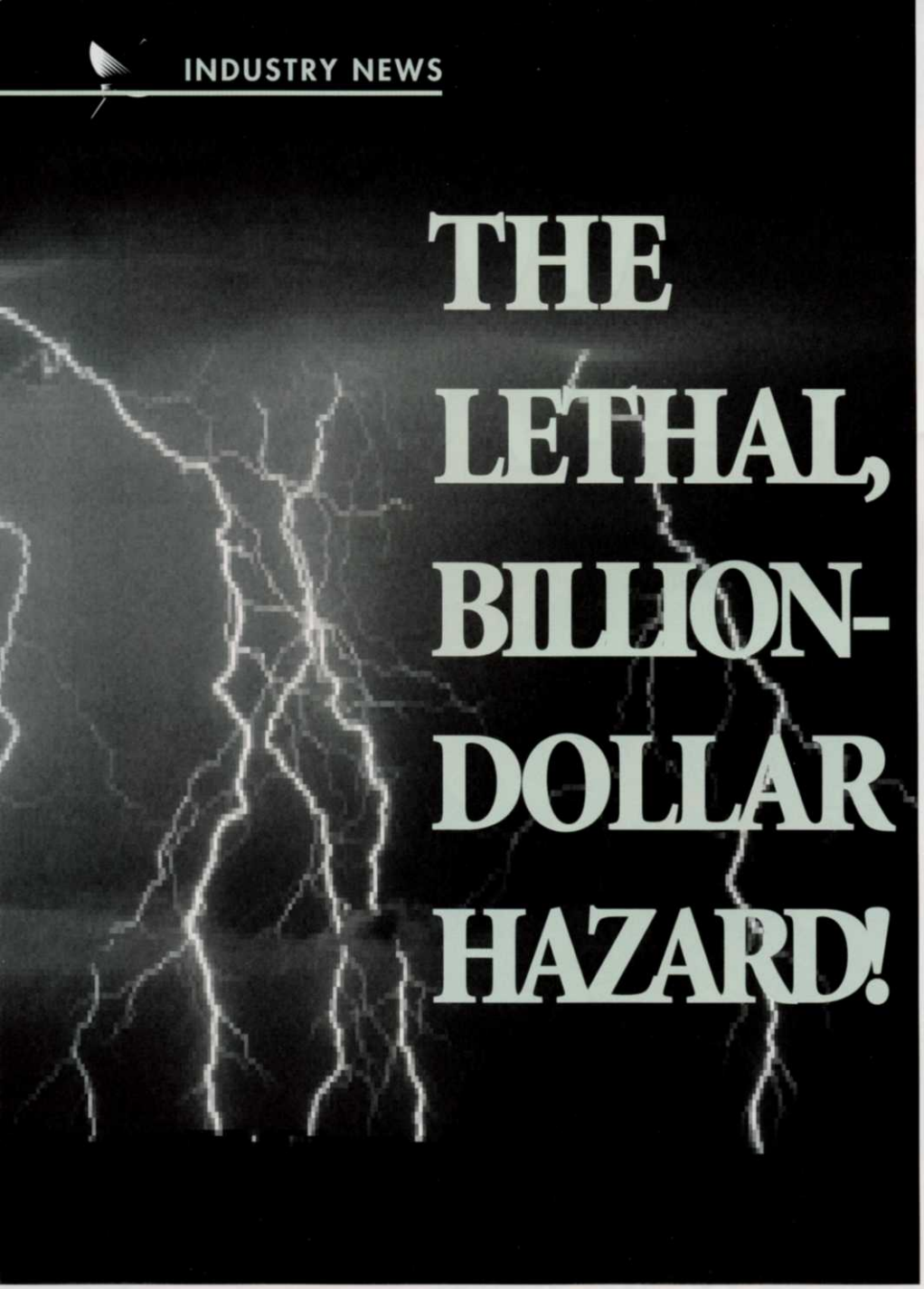

THE LETHAL, BILLION-DOLLAR HAZARD!

Lightning is the most dangerous and frequently encountered weather hazard that most people experience each year. According to the National Severe Storms Laboratory, lightning kills roughly 100 individuals per year on average and seriously injures another 500. Additionally, billions of dollars in property damage is attributed to lightning.

Many lightning casualties can be prevented by taking appropriate action when a thunderstorm threatens. Awareness about lightning is the key to public safety. Educating the public about the myths and reality of lightning strikes was recently identified by the Lightning Safety Group to be instrumental in reducing the number of lightning victims. The LSG is a group of experts, including members who were instrumental in developing lightning policies for the military and NASA, who collectively have developed standardized procedures for the public during thunderstorm activity.

Beyond educating the public, the LSG recommends that recreational facilities formalize a lightning-warning policy with certain basic requirements. First, all persons involved need to be warned of the lightning danger; and second, they need to be provided with adequate shelter. Seeking the lone tree on the fairway during lightning activity should be regarded as suicidal behavior.

Meeting the first requirement — that people need to be warned — means that some form of lightning detection should be implemented. Relying on visual signs of thunderstorm development can be hazardous, according to the National Weather Service, due to limitations of human observation. Lightning has been detected as far as 10 miles from the edge of a thunderstorm cell and at locations with blue skies overhead. Often these types of lightning strikes are falsely referred to as "bolts out of the blue." In fact, a lightning strike is always connected to a thundercloud and cannot be generated in clear skies. It is critical to remember that this long arching lightning is a rare event, one which cannot be predicted or foreseen. The thunderstorm that generates a so-called "bolt out of the blue" can be detected by lightning sensors in time to issue a warning that lightning is nearby.

When determining the conditions to trigger a warning, golf courses have to balance acceptable down time (time of alert state) against the risk posed by lightning. The closer the lightning activity, the greater the chance of being struck. The LSG determined that current instrumentation — including lightning sensors — can enhance warning time during the initial stages of the storm by detecting lightning events, determining the storm's proximity to the golf course and forecasting the storm's arrival.

Advance notification of the storm provides additional time to seek safety. Detectors are also a valuable tool in determining when to give the "All Clear," letting people know when it is safe to resume activities. However, even the best equipment cannot guarantee safety and certainly nothing can provide 100 percent protection. The experts also agree that lightning, as an event, cannot be predicted.

Because of the wide-open terrain, a golf course is a dangerous place to be during thunderstorms. Not only are the players, superintendents and staff at risk

First, all persons involved need to be warned of the lightning danger; and second, they need to be provided with adequate shelter. Seeking the lone tree on the fairway during lightning activity should be regarded as suicidal behavior.

for death or injury, but also the irrigation system and pump stations are highly susceptible to lightning-caused damage. A random survey of 140 lightning claims submitted by golf courses to their insurance carrier revealed the average loss to the irrigation system or pump station to total $4250. Even though protection schemes and surge protectors can be effective, the best means of protecting electrical equipment is to physically isolate it from the main power grid. Technology is available which will automatically isolate equipment from the power grid when lightning is detected.

Establishing a formalized lightning-warning policy and educating the golfers and staff about the danger of lightning should be a growing concern among golf course managers in today's legal climate. If a lightning incident occurs at a facility, chances are a lawsuit will be filed. Golf course operators will be in a better position with a proven, formalized lightning policy that meets these safety recommendations than if they assert that lightning was not deemed a threat. A previously common defense — to say that facility management is not responsible for lightning casualties because lightning is an "act of God," — is currently being challenged in U.S. courts. The outcome is bound to change the responsibility of golf course management in regard to lightning warning. The time to act is now.

For help and to obtain a copy of the Lightning Safety Group recommendations, please contact Global Atmospherics, Inc. (800-777-2838).

Lightning Safety Group Recommendations

Abstract

On average, lightning causes more casualties annually in the U.S. than any other storm-related phenomena except floods. Many people incur injuries or are killed due to misinformation and inappropriate behavior during thunderstorms. A few simple precautions can reduce many of the dangers posed by lightning. In order to standardize recommended actions during thunderstorms, a group of qualified experts from various backgrounds collectively have addressed personal safety in regard to lightning, based on recently improved understanding of thunderstorm behavior. This "Lightning Safety Group" first convened during the 1998 American Meteorological Society Conference in Phoenix, Arizona to outline appropriate actions under various circumstances when lightning threatens.

Key Conclusions

The seemingly random nature of thunderstorms cannot guarantee the individual or group absolute protection from lightning strikes, however, being aware of and following proven lightning safety guidelines can greatly reduce the risk of injury or death.

The individual is ultimately responsible for his or her personal safety and has the right to take appropriate action when threatened by lightning. Adults must take responsibility for the safety of children in their care during thunderstorm activity.

Areas Addressed by the LSG

1. Identifying safe and not-so-safe locations during thunderstorm activity.
2. Safety guidelines for individuals.
3. Safety guidelines for small groups and/or when the evacuation time is less than 10 minutes.
4. Safety guidelines for large groups and/or when the evacuation time is more than 10 minutes.
5. Important components of an action plan.
6. First aid recommendations for lightning victims.

Safer Locations During Thunderstorms And Locations To Avoid

No place is absolutely safe from the lightning threat. However, some places are safer than others.

Large enclosed structures (substantially constructed buildings) tend to be much safer than smaller or open structures. The risk for lightning injury depends on whether the structure incorporates lightning protection, construction materials used and the size of the structure (see NFPA 780, Appendix E & H).

In general, fully enclosed metal vehicles such as cars, trucks, buses, vans, fully enclosed farm vehicles, etc. with the windows rolled up provide good shelter from lightning. Avoid contact with metal or conducting surfaces outside or *inside* the vehicle.

AVOID being in or near:

High places and open fields, isolated trees, unprotected gazebos, rain or picnic shelters, baseball dugouts, communications towers, flagpoles, light poles, bleachers (metal or wood), metal fences, convertibles, golf carts, water (ocean, lakes, swimming pools, rivers, etc.).

When inside a building AVOID:

Use of the telephone, taking a shower, washing your hands, doing dishes, or any contact with conductive surfaces with exposure to the outside such as metal door or window frames, electrical wiring, telephone wiring, cable TV wiring, plumbing, etc.

Safety Guidelines for Individuals

Generally speaking, if an individual can see lightning and/or hear thunder, he/she is already at risk. Louder or more frequent thunder indicates that lightning activity is approaching, increasing the risk for lightning injury or death. If the time delay between seeing the flash (lightning) and hearing the bang is less than 30 seconds, the individual should be in, or seek a safer location. Be aware that this method has severe limitations in part due to the difficulty of associating the proper thunder to the corresponding flash.

High winds, rainfall and cloud cover often act as precursors to actual cloud-to-ground strikes, notifying individuals to take action. Many lightning casualties occur in the beginning, as the storm approaches, because people ignore these precursors. Also, many lightning casualties occur after the perceived threat has passed. Generally, the lightning threat diminishes with time after the last sound of thunder, but may persist for more than 30 minutes. When thunderstorms are in the area but not overhead, the lightning threat can exist even when it is sunny, not raining, or when clear sky is visible.

When available, pay attention to weather warning devices such as NOAA weather radio and/or credible lightning detection systems. However, do not let this information override good common sense.

Considerations For Small Groups or When the Evacuation Time Is Less Than 10 Minutes

An action plan must be known in advance by all persons. School teachers, camp counselors, lifeguards and other adults must take responsibility for the safety of children in their care.

Local weather forecasts, NOAA weather radio, or the Weather Channel should be monitored prior to the outdoor event to ascertain if thunderstorms are in the forecast. Designate a responsible person to monitor forecast weather as well as to observe on-site developments to keep everyone informed when potential threats develop.

Recognize that personal observation of lightning may not be sufficient; additional information such as a lightning detection system or additional weather information may be required to ensure

LIGHTNING SAFETY GROUP

American Meteorological Society Conference

Phoenix, Arizona, 1998

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consistency, accuracy and adequate advance warning.

Even though technology and instrumentation have proven to be effective, they cannot guarantee safety. Instrumentation can be used to enhance warning during the initial stages of the storm by detecting lightning in relation to the area of concern. Advance notification of the storm's arrival should be used to provide additional time to seek safety. Detectors are also a valuable tool to determine the "All Clear" (last occurrence of lightning within a specified range), providing a time reference for safe resumption of activities.

Safety Guidelines For Large Groups or When the Evacuation Time Is More Than 10 Minutes

An action plan must be known in advance by all persons involved. Adults must take responsibility for the safety of children in their care.

Local weather forecasts, NOAA weather radio, or the Weather Channel should be monitored prior to the outdoor event to ascertain if thunderstorms are in the forecast. During the event, a designated responsible person should monitor site relative weather condition changes.

Personal observation of the lightning threat is not adequate; additional information including detecting actual lightning strikes and monitoring the range at which they are occurring relative to the activity is required to ensure consistency, accuracy and adequate advance warning.

Even though technology and instrumentation have proven to be effective, they cannot guarantee safety. Instrumentation can be used to enhance warning during the initial stages of the storm by detecting lightning in relation to the area of concern. Advance notification of the storm's arrival should be used to provide additional time to seek safety. Detectors are also a valuable tool to determine the "All Clear" (last occurrence of lightning within a specified range), providing a time reference for safe resumption of activities.

When larger groups are involved, the time needed to properly evacuate an area increases. As time requirements change, the distance at which lightning is noted and considered a threat to move into the area must be increased. Extending the range used to determine threat potential also increases the chance that a localized cell or thunderstorm may not reach the area giving the impression of a "false alarm."

Remember, lightning is always generated and connected to a thundercloud but may strike many miles from the edge of the thunderstorm cell. Acceptable downtime (time of alert state) has to be

balanced with the risk posed by lightning. Accepting responsibility for larger groups of people requires more sophistication and diligence to assure that all possibilities are considered.

Important Components of an Action Plan

Management, event coordinators, organizations and groups should designate a responsible, person(s) to monitor the weather to initiate the evacuation process when appropriate. Monitoring should begin days and even hours ahead of an event.

A protocol needs to be in place to notify all persons at risk from the lightning threat.

Depending on the number of individuals involved, a team of people may be needed to coordinate the evacuation plan. Adults must take responsibility for the safety of children in their care.

Safer sites must be identified beforehand, along with a means to route the people to those locations. School buses are an excellent lightning shelter that can be provided (strategically placed around various locations) by organizers of outdoor events, with larger groups of people and larger areas, such as golf tournaments, summer day camps, swim meets, military training, scout groups, etc.

The "All Clear" signal must be identified and should be considerably different than the "Warning" signal.

The Action Plan must be periodically reviewed by all personnel and drills conducted.

Consider placing lightning safety tips and/or the action plan in game programs, flyers, score cards, etc. and placing lightning safety placards around the area. Lightning warning signs are effective means of communicating the lightning threat to the general public and raise awareness.

First Aid Recommendations for Lightning Victims

Most lightning victims can actually survive their encounter with lightning, especially with timely medical treatment. Individuals struck by lightning do not carry a charge and it is safe to touch them to render medical treatment. Follow these steps to try to save the life of a lightning victim:

First: Call 911 to provide directions and information about the likely number of victims.

Response: The first tenet of emergency care is "make no more casualties." If the area where the victim is located is a high risk area (mountain top, isolated tree, open field, etc.) with a continuing thunderstorm, the rescuers may be placing themselves in significant danger.

Evacuation: It is relatively unusual for victims who survive a lightning strike to have major fractures that would cause paralysis or major bleeding complications unless they have suffered a fall or been thrown a distance. As a result, in an active thunderstorm, the rescuer needs to choose whether evacuation from very high risk areas to an area of lesser risk is warranted and should not be afraid to move the victim rapidly if necessary. Rescuers are cautioned to minimize their exposure to lightning as much as possible.

Resuscitation: If the victim is not breathing, start mouth-to-mouth resuscitation. If it is decided to move the victim, give a few quick breaths prior to moving them. Determine if the victim has a pulse by checking the pulse at the carotid artery (side of the neck) or femoral artery (groin) for at least 20-30 seconds. If no pulse is detected, start cardiac compressions as well. In situations that are cold and wet, putting a protective layer between the victim and the ground may decrease the hypothermia that the victim suffers which can further complicate the resuscitation. In wilderness areas and those far from medical care, prolonged basic CPR is of little use: the victim is unlikely to recover if they do not respond within the first few minutes. If the pulse returns, the rescuer should continue ventilation with rescue breathing if needed for as long as practical in a wilderness situation. However, if a pulse does not return after 20 to 30 minutes of good effort, the rescuer should not feel guilty about stopping resuscitation.

Conclusion

Avoid unnecessary exposure to the lightning threat during thunderstorm activity. Follow these safety recommendations to reduce the overall number of lightning casualties. An individual ultimately must take responsibility for his or her own safety and should take appropriate action when threatened by lightning. School teachers, camp counselors, coaches, lifeguards and other adults must take responsibility for the safety of children in their care. A weather radio and the use of lightning detection data in conjunction with an action plan are prudent components of a lightning warning policy, especially when larger groups and/or longer evacuation times are involved.

Christoph Zimmermann
Safety Management
Global Atmospherics, Inc.

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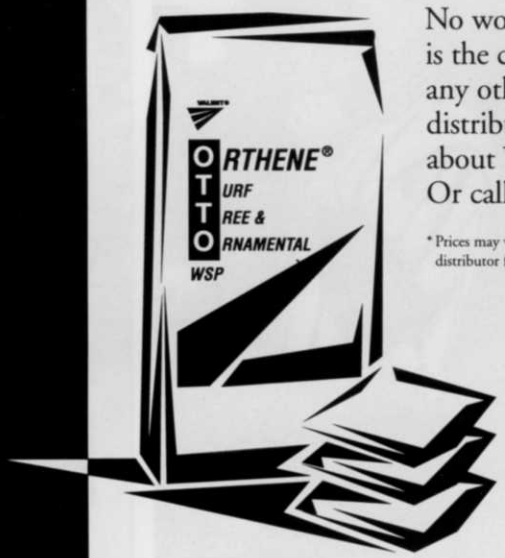

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And That's Where Our Money Goes!

Research Foundation needs help in projecting budget

It's budget-building time for the Florida GCSA. Research projects, staff salaries, travel and expenses, membership services, surveys, endowment funds, scholarships, government relations, media relations and the list goes on. When the time comes to put pencil to paper and write in a number, people sometimes forget what the funds are needed for or what they have accomplished.

Last month all renewing members of the Florida Turfgrass Association received a booklet titled, "1997 A Year in Review." Its wealth of information including a report on the research funded by the FTGA. Since the FTGA Research Foundation is the vehicle through which the Florida GCSA awards money for research in Florida, this report essentially tells us where the association's money went in 1997. A Florida GCSA member sits as cochairman of the FTGA Awards Committee to help decide where the money will be allocated, so our interests are always well represented.

The FGCSA leadership is looking to each local chapter to project what it will be able to donate to the total operating budget to meet the financial obligations of the statewide research effort. Each chapter was given a worksheet listing all the obligations and was asked to fill amounts that they could afford to allocate to the various accounts. These worksheets will be used to prepare the budget that will be presented for adoption at the annual board meeting and election of officers in August.

"Don't give us a worksheet to fill in; tell us what you need!" said one member. "You guys are on top of this stuff!"

It is not practical to divide the financial needs equally among the chapter, however. Larger chapters have more courses, bigger treasuries and traditionally raise more money, but each chapter can contribute and participate according to its ability. The important thing is that each chapter helps to share the costs.

The FTGA's Year in Review is a com-

Attendees at the 1998 Mini Field Day at the University of Florida got to rate the overseeding field trial plots and compare notes with Dr. Anderson and Dr. Dudeck. Photo by Joel Jackson.

Dr. Jerry Sartain explains the three-year fertility study which will compare the soil and turf tissue analysis correlation. Dr. Grady Miller will support this project using Near Infrared Reflectance Spectroscopy (NIRS - pronounced "nears'). Photo by Joel Jackson.

UF graduate student Ian Rodriquez (in cap) explains the phosphorus retention experiments he is conducting at the Envirotron. Ian, who lives in the Turfgrass Envirotron apartment is also involved in learning the NIRS technology under Dr. Grady Miller's direction. Photo by Joel Jackson.

In light of the ever shrinking inventory of effective chemical controls, Dr. Robert Dunn discusses his biological nematode control studies on the Envirogreen. He will study the efficacy of products currently being sold on the market as well as a potentially promising strain of bacteria called Pasteuria. Photo by Joel Jackson.

In addition to overseeing the work at the Envirotron and partnering with Dr. Sartain on the fertility study, Dr. Grady Miller will be doing a Special Evaluation of Athletic Field Surface Hardness for the Sports Turf Managers. Hey, Doc! That's a wicked-looking Stimpmeter! Photo by Joel Jackson.

prehensive report of where the research contributions went. As far as other projects or expenditures, each external vice president gets the minutes of every board meeting and should be reporting the information back to his local chapter.

Other sources of information include the *Green Sheet*, the *Florida Green* and the FTGA's *Florida Turf Digest*.

If a picture is worth a thousand words, then there are a five thousand words accompanying this article to let you know some of the things IFAS has been doing lately with your research dollars. The pictures were taken at the IFAS Mini Field Day and Overseeding Trials in Gainesville this March.

Joel Jackson, CGCS
Director of Communications

Notes from Dr. John Cisar IFAS Turf Coordinator,

- I was very pleased to hear from **Ray Carruthers** that the **Sod Growers Cooperative** will be handing over a check to **R. Nagata** at the Belle Glade Research Station for turf breeding research.
- *Florida Turf Digest* articles are having an impact. For example, **L. Datnoff** recently received a note of thanks from Zeneca for his article on fairy rings. Data from that report was used by Zeneca to pursue a 2-E registration label for their product Heritage for fairy ring control in Florida.
- At the April 8 meeting, the **Seven Rivers Chapter** Committee expressed an interest in **shade research with an Envirotron connection**. If you have an interest/expertise in conducting research in this area, please contact me. I'd like to set up a team who could develop a project to meet the needs of the Seven Rivers Chapter ASAP.
- **The Turf Coordinator made 12 visits** in the month of April including meetings with FGCSA chapters, individual golf courses, Envirotron Classic, USGA Regional Seminar, sports turf managers and master gardeners.

Last Call for the 4th Annual Florida Green Photo Contest

Category 1 - Wildlife on the Course: includes mammals, birds, reptiles, amphibians.

Category 2 - Course Landscape: Formal Plantings: includes annuals, shrubs, trees, entrance and tee signs

Category 3 - Course Landscape: Native Plantings: includes aquatic vegetation, grasses, shrubs, trees and wildflowers.

Category 4 - Scenic Hole Layout Shots: includes sunrises, sunsets, frosts, storms and any other golf hole view.

Prizes

- 1st Place ($100) and 2nd Place ($50) in each category
- Editor's Choice-Best Overall Photo - $100.
- All winning entries published in the Fall 1998 issue.

Easy Rules

1. Color prints or slides. Only one entry per category.
2. Photo must be taken on an FGCSA member's course. Photo must be taken by an FGCSA member or a member of his staff.
3. Attach a label to the back of the print or slide which identifies the category, course and photographer. DO NOT WRITE DIRECTLY ON THE BACK OF THE PRINT. Each photo shall be attached to a sheet of 8.5 x 11 lined paper. Line up the photo with the vertical and horizontal lines to square the photo on the page. Attach the print to the paper using a loop of masking tape on the back of the photo. Slides must be easily removable for viewing.
4. A caption identifying the category, course and photographer should be typed or printed on the sheet of paper below the print or slide.
5. Judging will be done by a panel of FGCSA members not participating in the contest.
6. Mail entries in a bend proof package to: Joel D. Jackson, 6780 Tamarind Circle, Orlando 32819. No entries accepted postmarked after August 15, 1998.