



10th Symposium on Education
(Albuquerque, NM 14-19 Jan 01)

Lightning Safety *For Schools*

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Purpose

Encourage Schools To Implement A Lightning Safety Plan!





Overview

- **LIGHTNING -- SIGNIFICANT HAZARD!**
- **SCHOOL LIGHTNING HAZARDS**
- **LIGHTNING SAFETY GROUP RECOMMENDATIONS**
- **CALL TO ACTION**



More Education
Needed!



Lightning -- Significant Hazard

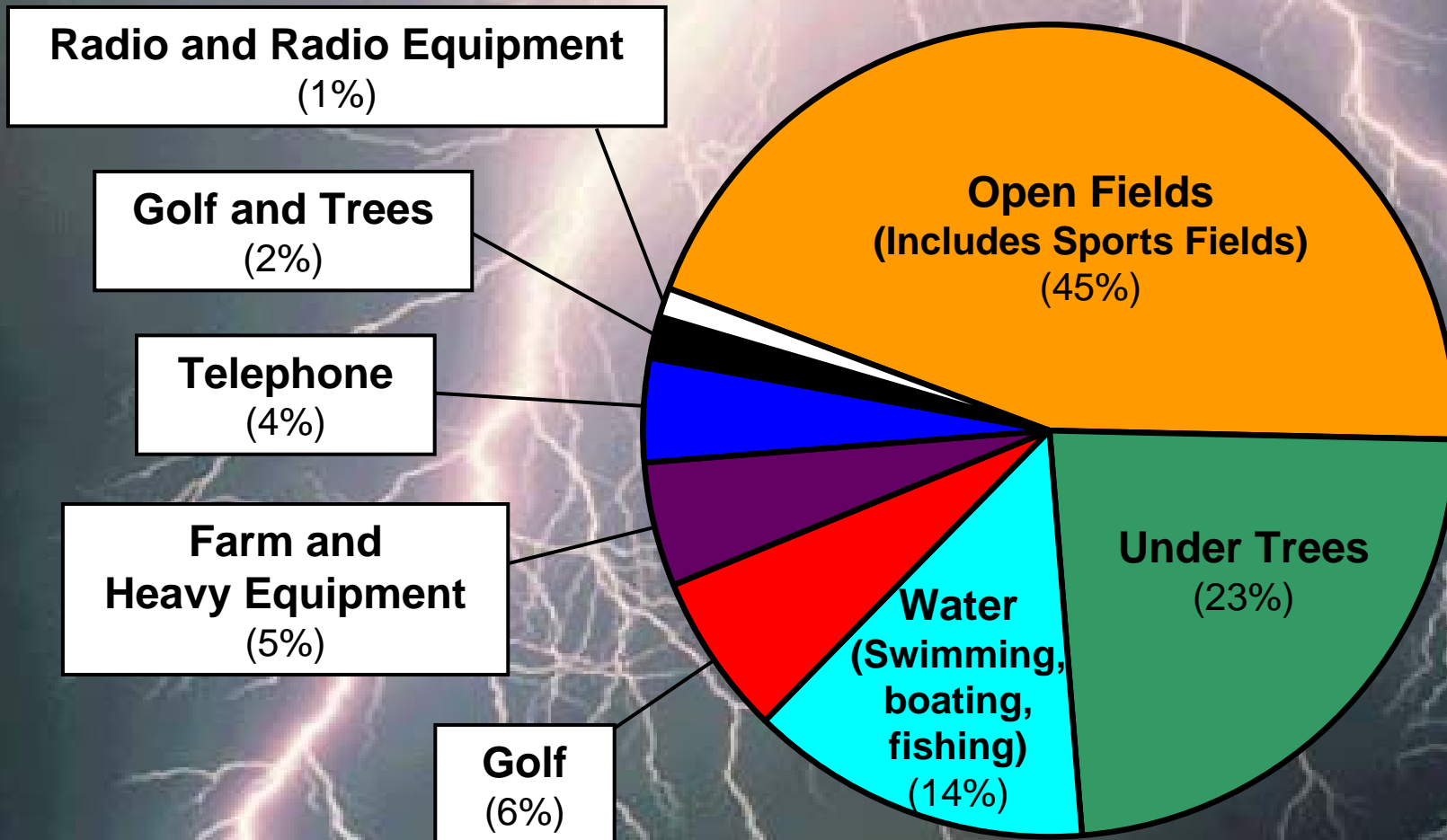
- **LIGHTNING: The Underrated Weather Hazard!**
 - **#2 Storm Killer In U.S.**
 - **More Than Tornadoes And Hurricanes Combined**
 - **Life-Long Debilitating Injury On Many More Than It Kills**
 - **Kills ~100 / Year And Injures ~ 1,000 / Year In U.S.**
 - **\$5 Billion Economic Impact Each Year In U.S.**
 - **Yet Lightning Safety Receives Surprisingly Little Attention!**





School Lightning Hazards

School Activities Put Students At High Risk!



Lightning Casualties In U.S. (1959-1994)
(National Severe Storms Laboratory)



School Lightning Hazards (con't.)

Schools Activities Put Students At High Risk!

- **Open Fields (45%)**
 - **Sports Fields**
 - **Playgrounds**
 - **Recess Outdoors**
 - **Marching Band**
 - **Extra Concerns:**
 - **Metal Bleachers!**
 - **Long Metal Fences!**
 - **Playground Equipment**





School Lightning Hazards (con't.)

Schools Activities Put Students At High Risk!

- **Under Trees (23%)**
 - **Potentially Any Outdoor Activity**





School Lightning Hazards (con't.)

Schools Activities Put Students At High Risk!

- **Water Related (14%)**
 - **Swimming**
 - **Indoor Pools Too!**
 - **Boating**





School Lightning Hazards (con't.)

Schools Activities Put Students At High Risk!



- **Golf (6%)**
 - **Golf Teams**
 - **Heavy Equipment (5%)**
 - **Grounds Keepers**
 - **Telephone (4%)**
 - **Everyone!**





School Lightning Hazards (con't.)

Schools Activities Put Students At High Risk!

- **Sports Have Fastest Rising Lightning Casualty Rate**



- **Don't "Tough It Out"!**
- **Do Postpone Or Cancel Event**
- **Children's Lives And Life-Long Crippling Injuries More Important Than A Game!**



School Lightning Hazards (con't.)

- Highest Lightning Rate In SE U.S. And Mid-West
- But All Places Have Some Lightning Risk!

1989 - 98 mean annual flash density (flashes km⁻² yr⁻¹)



Dr. Richard Orville, Texas A&M University



'LSG' Recommendations

- **LIGHTNING SAFETY GROUP**

- **16 Lightning Experts From Diverse Disciplines (Jan 98)**

- **Universities**
- **National Labs**
- **Operational Meteorology**
- **Medicine**
- **Industry**
- **Safety**
- **Insurance**
- **Education**
- **Athletics**



- **Goal: Standardize Lightning Safety Advice**

- **Much Of Previous Advice Contradictory, Incomplete, Incorrect, Or Even Unsafe!**



'LSG' Recommendations (con't.)

- **Safety Guidelines For . . .**
 - **Safer And Unsafe Locations Near Thunderstorms**
 - **Individuals**
 - **Small Groups**
 - **Large Groups**
 - **Important Components Of An Action Plan**
 - **First Aid For Lightning Victims**
- **NCAA Adopted Guidelines (1998)**
- **Brevard School District, FL (2001)**





'LSG' Recommendations (con't.)

**No Place Outside Is Safe
Near A Thunderstorm!**





'LSG' Recommendations (con't.)

Most Important Points For Schools



- Use **'30-30 Rule'** To Determine If Lightning Is A Threat
 - If 30 Secs Or Less "Flash To Bang", Seek Proper Shelter
 - Back-Up Rule (if you can't see the lightning):
If You Can Hear Thunder, Seek Proper Shelter
 - Wait 30 Min Or More After Last Thunder, Before Leaving Proper Shelter
 - Most Casualties Occur Before, And Especially After, Thunderstorms
 - 30-30 Rule May Seem Too Conservative -- It's Not!



'LSG' Recommendations (con't.)

Most Important Points For Schools

- **People Don't Realize The Long Distances Lightning Can Strike**
 - **Average 3 NM Between Strikes**
 - **'Bolt From The Blue' ~15 NM Not Uncommon**
 - **Ground Strike ~60 NM Documented From Anvil (Rare Distance)**
- **People Don't Realize The Long Times Lightning Can Strike After The Thunderstorm Has Decayed**
 - **Ground Strike ~75 Min Documented From Debris Cloud**





'LSG' Recommendations (con't.)

Most Important Points For Schools

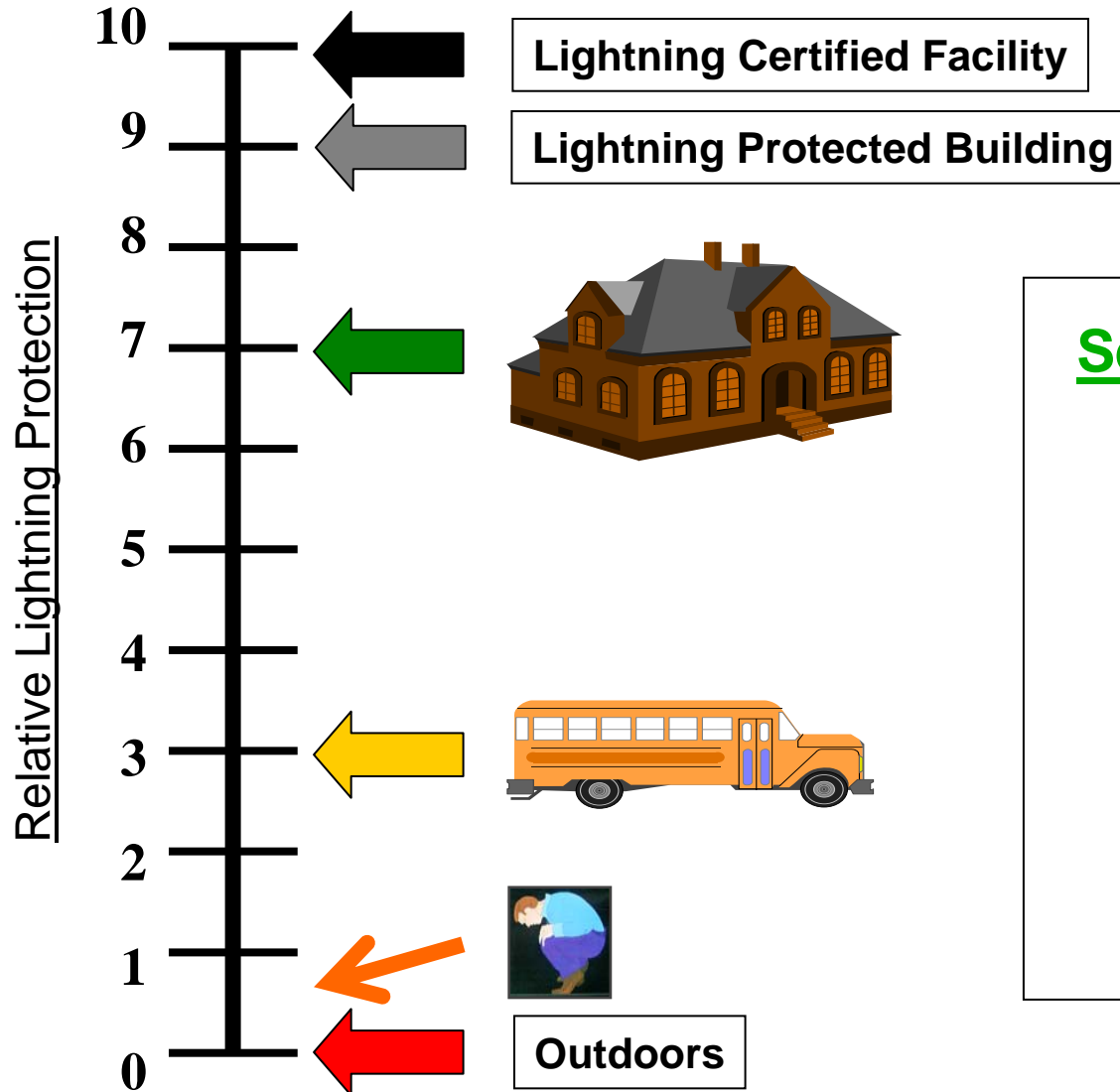


- **Lightning Notification Services Are Better**
 - **Uses National Lightning Detection Network Data**
 - **Proven Performance**
 - **Automatic Notification When Lightning Within Various Distances Of Event Site / Time**
 - **Automatic Notification When 'All Clear'**
 - **Notification Via Pager, Cell-Phone, E-mail, Or Fax**
 - **~\$10 Per Event, Or ~\$40 Per Monthly Coverage, Or . . .**
 - **Completely Objective -- Good For Lightning Safety Plans**
 - **Doesn't Warn Against Locally Developing Thunderstorms**
 - **Need To Watch The Skies And React Appropriately**



'LSG' Recommendations (con't.)

Most Important Points For Schools



Seek Proper Shelter

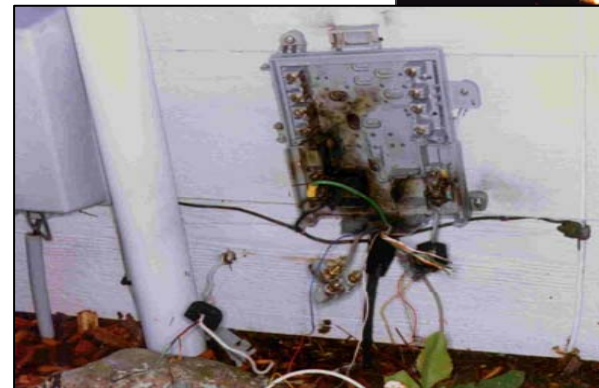
- Buildings Much Better Than Vehicles
- Vehicles Offer Some Safety
- No Place Outside Is Safe Near A Thunderstorm
 - Near \equiv 6 Miles



'LSG' Recommendations (con't.)

Most Important Points For Schools

- **Once In Proper Shelter, Avoid Conducting Paths To Outside**
 - **Telephone (corded)**
 - **Electrical Appliances / Wiring**
 - TVs, VCRs, And TV Cables
 - Computers
 - Light Switches
 - Electrical Outlets
 - **Plumbing**
 - Showers
 - Sinks
 - Rest Rooms
 - Pools (indoors too)
 - **Don't Watch Lightning From Windows / Doorways**
 - **Inner Rooms Are Better**





‘LSG’ Recommendations (con’t.)

Most Important Points For Schools

- **Pragmatic Concerns For Schools**
 - **Lining-Up For School Buses Outside**
 - **School Building Available As Shelter During Events?**
 - **School Buses As Shelter At More Remote Events?**
 - **Communicating Lightning Alerts To Noisy Crowds Of Kids**
 - **Can They Hear It?**
 - **Are They Trained On Required Actions?**





'LSG' Recommendations (con't.)

No Guidance 100% Guaranteed Against Lightning,

But These Recommendations Can Avoid Most Casualties!



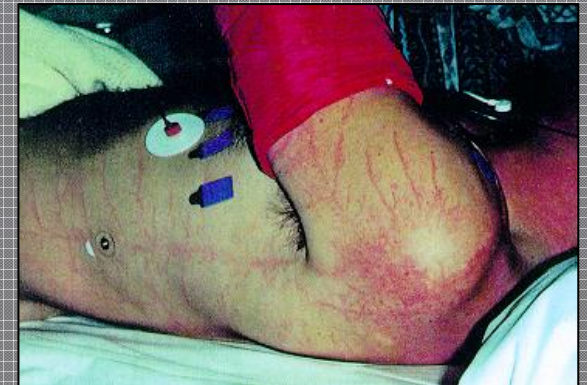
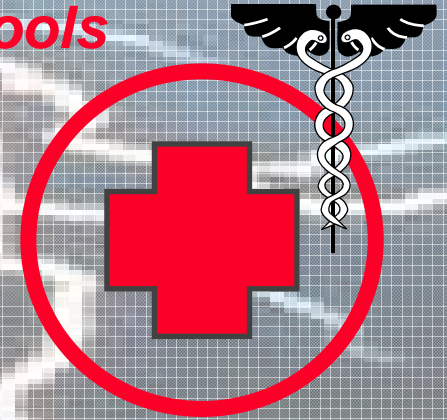
SOAP



'LSG' Recommendations (con't.)

Most Important Points For Schools

- **First Aid For Lightning**
 - **Call 911**
 - **Apply CPR / Mouth To Mouth Resuscitation**
 - **All Deaths From Cardiac Arrest / Stopped Breathing**
 - **Myth: Lightning Victim Can Electrocute You**
 - **90% Survive -- Give The First Aid!**
 - **Beware Downed Live Wires!**



Courtesy of National Lightning Safety Institute



Call To Action

SCHOOLS CAN HELP!

- 1) **Develop & Enforce A Lightning Safety Plan**
 - **Protect Students And Staff Under Your Care**
 - 2) **In-School Education**
 - **Help Your Students And Staff Protect Themselves Outside Of School**
 - 3) **Public Education**
 - **Help Your Community Protect Itself**
 - **Generate Support For School Plan**
- **Lightning Safety Group Recommendations Can Help With All Three Steps**

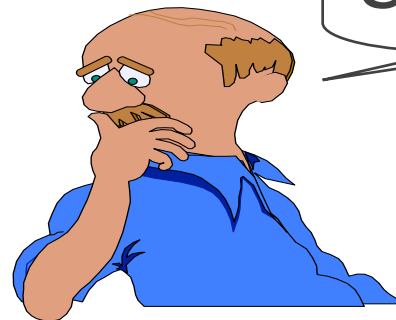




Call To Action (con't.)

SOME CAVEATS

- **Management Support Vital**
- **Involve Coaches, Referees, Other Outdoor Leaders From The Start**
- **Integrated Plan -- Span Many Activities Uniformly**
- **Have Support Materials Already Prepared**
- **Be Prepared For Slowdowns**
 - **Persistence, Persistence, Persistence!**
- **Education, Education, Education!**



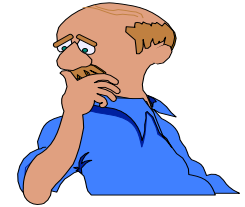
So Why Should We?



Call To Action (con't.)

SOME CAVEATS

So Why Should We?



- **Common Objections**
 - **Lightning Not An Important Hazard**
 - **#2 Storm Killer. You Have Plans For Tornadoes & Hurricanes, But Lightning Is A Bigger Hazard**
 - **Nothing You Can Do About It -- 'Random Act Of God'**
 - **Almost All Casualties Preventable**
 - **I Don't Understand Lightning -- Pass The Buck Upward**
 - **Be Well Prepared -- Any Error/Delay Used As Excuse**
 - **'LSG' Recommendations From Top Experts**
 - **Litigation Fears -- Better To Do Nothing, Than Do Something And Fail**
 - **New Trend: Failure To Take Prudent Actions Is Chargeable Negligence**



Call To Action (con't.)

- **45 WS Lightning Safety Web-Page:**
 - <https://www.patrick.af.mil/45og/45ws/LightningSafety/index.htm>
- **National Weather Service:**
 - www.lightningsafety.noaa.gov
- **National Severe Storms Laboratory:**
 - www.nssl.noaa.gov/researchitems/lightning.html
 - **Downloadable Coloring Books** On Weather Safety Topics
 - www.nssl.noaa.gov/edu/bm/bm_main.html
- **Lightning Safety For Children:** (aka Sabrina's Lightning Page)
 - www.azstarnet.com/anubis/zaphome.htm
- **Lightning Games:**
 - www.lrccable.com/lightning_games/index.html
- **National Lightning Safety Institute:**
 - www.lightningsafety.com/index.html
- **Lightning Injury Research:**
 - www.uic.edu/labs/lightninginjury
- **Lightning Strike & Electric Shock Survivors International:**
 - www.mindspring.com/~lightningstrike/





Call To Action (con't.)

- **Participate In 2nd Annual National Lightning Safety Week**
 - **28 Apr - 4 May 02**
 - **Sponsored By National Weather Service**





Summary

- **Lightning Is Extremely Significant Hazard, But Far Too Often Underrated**
- **Lightning Safety Group Recommendations Can Help Schools Improve Their Lightning Safety**
- **Schools Must Play A Vital Role!**
 - **Lightning Safety Plan**
 - **In-School Education**
 - **Public Education**



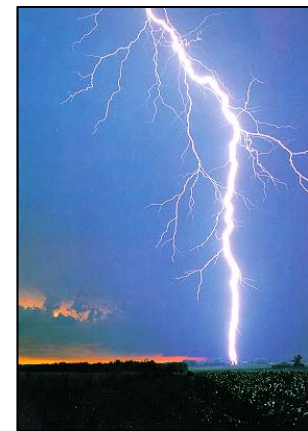


Lightning Safety

- Questions?
- Want To Do Lightning Safety?

HANDOUTS!

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PESSIMISM

EVERY DARK CLOUD HAS A SILVER LINING,
BUT LIGHTNING KILLS HUNDREDS OF PEOPLE EACH YEAR WHO ARE TRYING TO FIND IT.