



What to expect in the 2007

# NFPA 780

Standard for the Installation of Lightning  
Protection Systems

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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.

[www.despair.com](http://www.despair.com)

# Objective

Familiarize with major revisions for 2007 NFPA 780.

The topics presented are the final actions for the new standard, due out after the June NFPA meeting.

Look on [www.nfpa.org](http://www.nfpa.org) for the ROC text.

# Status

- Completed 'Report on Comments' (ROC) phase.
- Committee Balloted on Proposals
- 43 Comments
  - 9 Rejected.
  - 1 on 'hold.' (Risk Assessment.)
  - Remainder accepted in some fashion.
- Next step is NFPA Annual Meeting

# Editorial Changes

Many revisions editorial in nature, for example:

- No more ground 'terminals,' now electrodes.
- Conversions to metric (w/ SAE units.)
- 'Persons' vice 'Personnel.'
- Communications as a generality.
- Preserved unique (and added) definitions.

# Use of Aluminum

Several revised articles:

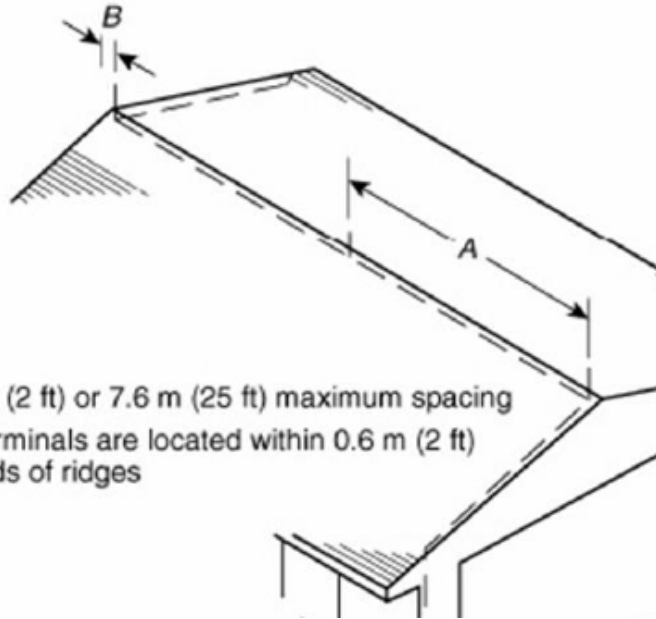
- Clarified intent to separate copper/aluminum LP and structural materials. (4.2.3, 4.2.4, 4.5.1)
- Clarified intent not to use close to earth.  
(4.5.2) Permits use in structure interior below grade.

# Strike Terminations

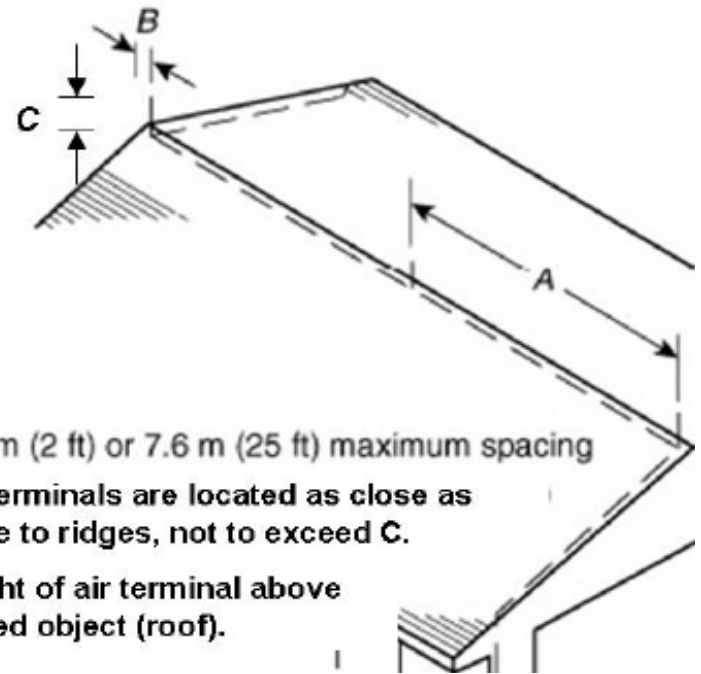
- Clarified permitting combination strike terminations (4.6.1.5).
- Permits combination of methods to determine strike termination placement. (4.7)
- Clarification of Zone of Protection (4.7.2.2 & 4.7.3.1)
- Protection of Roof Top Units (HVAC, etc.) (4.8.8.5)

# Strike Terminations

Proposal to decrease termination to edge interval revisited. (Accepted in Principle.)



- A: 0.6 m (2 ft) or 7.6 m (25 ft) maximum spacing
- B: Air terminals are located within 0.6 m (2 ft) of ends of ridges



- A: 0.6 m (2 ft) or 7.6 m (25 ft) maximum spacing
- B: Air terminals are located as close as possible to ridges, not to exceed C.
- C: Height of air terminal above protected object (roof).



# Strike Terminations

## **Committee Meeting Action: Accept in Principle**

Change 4.8.2 to read as follows:

4.8.2\* Location of Devices. As shown in Figure 4.8.2, the distance between strike termination devices and ridge ends on pitched roofs or edges and outside corners of flat or gently sloping roofs shall not exceed 0.6 m (2 ft).

Add annex A.4.8.2 to read as follows:

A.4.8.2 Strike termination devices should be placed as close as practicable to roof edges and outside corners.

# Handrails as Conductors

4.9.3.2 Permanent exterior metal handrails and ladders that are subject to direct lightning strikes (e.g., on roofs or between roofs) and are electrically continuous shall be permitted to be used as main conductors where the minimum thickness is 1.63 mm (0.064 in).

# Handrails as Conductors

- Concern over decreased human safety.
- Rationale is that it is impossible to keep current off of this type of handrail and permitting it's use as a conductor simplifies implementation.

# Bonding

General provision to strengthen bonding requirements.

- Metallic piping. (4.20.1.1)
- Ground electrodes of different systems. (4.14.1)
- Prohibition of piping use as electrode. (4.13.1.3)

Intent is to prevent lightning damage observed on metallic piping systems in the past few years.

# Grounding

- No more terminals! Electrodes instead!
- Clarifies ground rod depth vs. separation effects. (4.13.2.4)
- Complete rewrite of 4.13.8.1 (Shallow Topsoil)
  - Clarifies requirements for electrode depth.
  - Permits ring, radial or plate electrode and combinations thereof.

# Strike Terminations on Roofs

“4.8.7.1 Wind Turbines. Zones of Protection for Wind Turbines will consider their blade diameter and have no part outside of a zone of protection afforded by the blades.

See Annex for additional information.”

# Surge Protection

- New Definitions/Figure of Merit
  - Nominal Discharge Current (In)
  - Voltage Protection Level VPL
  - Broadens category of SPD (previously covered under TVSS).
- Also clarification of requirements.

Changes coordinate with upcoming UL 1449 3<sup>rd</sup> ed. to facilitate selection and inspection.

# Stacks

- Clarified definition of heavy-duty stack. (6.1)
- Permits materials other than lead coatings. (6.4.1.1)
- Clarifies air terminal placement. (6.4.2.2)
- Clarifies electrode requirement (6.10.2)



# Watercraft

- Entirely rewritten Chapter 8, Protection for Watercraft.

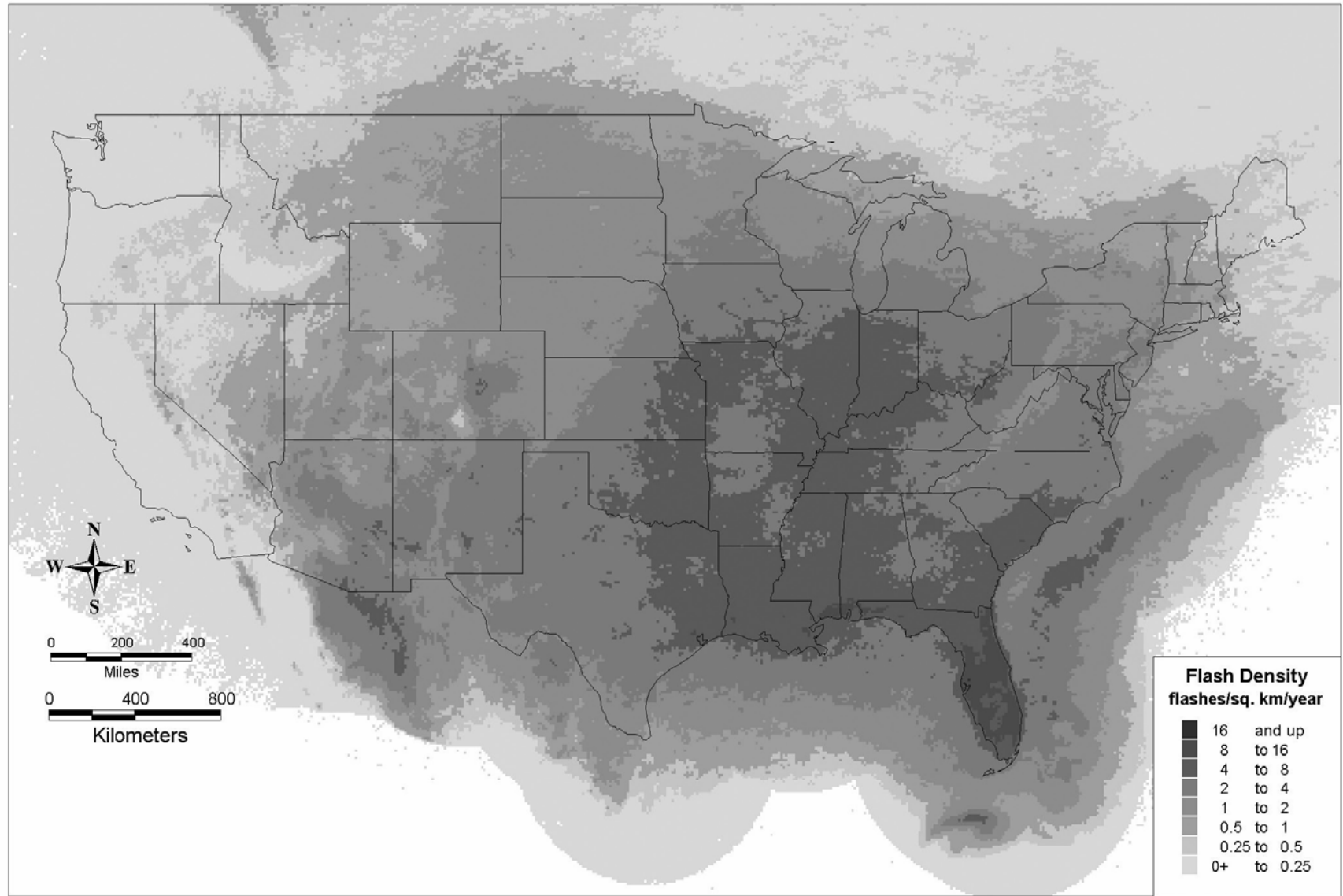
Dr. Ewen Thomson, with 15+ years of experience designing shipboard lightning protection and damage investigation was contributor to committee.

# Annexes

- Significant addition to Annex A for surge protection.
- Revised Annex B (Principles of Lightning Protection)
- Revisions to Tree Protection, Annex F.
- New Annex O – Protection for Wind Turbines.

# Annexes

- Held major revisions to Annex L – Risk Assessment for next cycle.
- Added new flash density map to provide better statistical average (and retained old map for clarity.)



Lightning data source: U.S. National  
Lightning Detection Network®  
This report generated using  
Vaisala FALLS® software

## 1990 - 2004 Flash Density Map

10 kilometer grid

Jan 1, 1990 00:00:00 GMT  
To  
Dec 31, 2004 23:59:59 GMT

# Equipotential Bonding

Problem: AHJs in several locations not permitting the bonding of metal piping systems to LP components.

Cause(s): Bonding practices permitted in the 2005 NEC (Art. 250.104(B))

Wording in other standards that prohibit use of metal piping systems for ground electrodes.

AHJs not understanding the difference between grounding and bonding. (Despite good example in the 2005 NEC Handbook.)

# Equipotential Bonding

Standards affected:

- NFPA 13 Installation of Sprinkler Systems,
- NFPA 24 Installation of Private Service Fire Mains etc.,
- NFPA 54 National Fuel Gas Code

# Equipotential Bonding

Root cause?

A change to NEC (between 1999 & 2002) put 'gas piping' into the section of 'other metal piping.'

This change permits bonding only through appliance grounding conductor.

# Equipotential Bonding

Actions of the 780 Committee:

- Submitted proposals to NFPA 24

(Subsequently rejected.)

- Filed Notice of Intent: Successfully protested rejection at NFPA annual meeting. (13 & 24)

- Submitted comment to NFPA 70.

- Began dialog with NFPA 54, intend to set up joint working group.



## Initiatives for Next Cycle

- Complete risk assessment proposal.
- Incorporate new grounding findings.
- Renew efforts for strike modeling & air terminal placement / tall structures.
- Examine new surge protection findings.
- Explosives / Flammables integrated (normative) chapter.

# Conclusion

- NFPA 780 undergoing several changes, affecting installation requirements.
- Addressing emerging industries, like wind turbines.
- Addressing new findings in lightning related research.
- Beginning planning for next cycle.

NFPA 780 is your standard.

Participate!



National Geographic  
Photo



