INDUSTRY WIDE LABOR-MANAGEMENT SAFETY COMMITTEE

SAFETY BULLETIN #38

GUIDELINES FOR INCLEMENT OR SEVERE WEATHER

"ADDENDUM A" – LIGHTNING SAFETY

This Addendum is designed to help reduce the risk of lightning-related threats through increased awareness and improved preparedness by Production Management, cast, and crew. Production Management should check the local weather forecast at least one day before the scheduled work for possible thunderstorms that may develop at the location. Television news coverage, mobile weather apps, commercial weather services, National Oceanic and Atmospheric Administration (NOAA) weather radio, and National Weather Service (NWS) are all tools that can be used.

Thunderstorms and severe weather forecasts are also online at https://www.spc.noaa.gov/.

According to NOAA, a thunderstorm is a rain shower during which you hear thunder. Since thunder is a by-product of lightning, all thunderstorms contain lightning.

If thunderstorms are forecast, Production Management will designate a person who is responsible for monitoring potential lightning activity and should notify Production Management, according to the action plan, of the status of any thunderstorm that may threaten the safety of the cast and crew. Again, production should have a reliable means of receiving weather forecasts, watches, advisories, and warnings such as NOAA weather radio or app.

Causes:
Lightning results from the buildup and discharge of electrical energy in clouds. Lightning is unpredictable and can strike outside the heaviest rainfall areas several miles from an associated thunderstorm even when no clouds or rain are present.

Potential Hazards:
- Electrocution
- Burns
- Falling debris
- Concussion
- Fire
- Equipment damage/destruction

Lightning Safety:
Prior to beginning work, Production Management and supervisors should check NOAA weather reports and radio forecasts for potential lightning at the working location. When working outdoors, Production Management, supervisors, and workers should be aware of the weather conditions. Watch for darkening clouds and increasing wind speeds, which can indicate developing thunderstorms.

Preparation:

- Develop an action plan as referenced in Safety Bulletin #38 that would require an outdoor evacuation.
- Identify areas of safe shelter in advance.
- Avoid places with little or no protection from lightning, such as sheds, unprotected tents, and temporary shelters.
- Seek shelter in substantial buildings that are enclosed and grounded with wiring and plumbing. This includes enclosed, grounded, metal buildings or tents with an installed lightning protection system.
- If a substantial building or structure is unavailable, seek shelter in a hardtop automobile, bus, truck, or trailer with the windows rolled up. If the trailer has a generator, please see below for safety instructions.
- If signs of approaching thunderstorms occur, prepare to activate the action plan. Employees working outdoors should not begin any task that they cannot quickly stop and seek shelter.
- **Consideration should be given to the production schedule and the potential impact of lightning delays to the start, break, and wrap/strike times. For instance, if an upcoming lightning delay is forecast to extend into the projected wrap time, it may be advisable to call wrap early to ensure the timely departure of cast and crew.**
- If there is a potential for a lightning delay to extend into wrap, provisions should be made in advance for the shelter to be available past the wrap time.
- Consideration should be made for the safe transportation of cast & crew to crew parking, public transportation, etc.
- Activate the **action plan** when there is a potential for lightning.

Monitoring:

- When working in lightning-prone areas, use weather monitoring tools such as a mobile smartphone application, lightning detector/meter, and/or subscribe to a commercial notification system.
- It is also possible to estimate the distance of lightning by timing the sound of thunder using the Flash to Bang method. When lightning is seen, count the seconds until thunder is heard and then divide the seconds counted by five to obtain the approximate distance in miles.

Action Plan:

- Considerations for an action plan should include items such as size of cast & crew (e.g., large background days) available shelter(s) and distance from set, types of equipment being utilized and time needed to lower lifts, planned continued use of generators for indoor work, communication method(s), transportation, etc.
- When lightning is reported to be 20 miles away, the action plan should be implemented by Production Management. Inform the cast and crew of a potential weather interruption, especially those involved with the use of scaffolding, aerial lifts, (MEWPs), overhead frameworks, camera jibs/cranes, and construction cranes.
- When lightning is reported to be 10 to 15 miles away, consider the option to secure equipment and prepare to evacuate outdoor locations.
- When lightning is reported within the trigger distance specified by the production's action plan (typically between 6 to 10 miles), cease all outdoor operations and evacuate to safe location(s).

Generators:

- Unless alternative means of protection are used, when appropriate and if safe for the production to do so, shut down generators in accordance with the action plan and manufacturer procedures.
- If alternative means of protection are available, it may be possible to continue the use of outdoor generators to power equipment to allow for indoor work and/or shelter in place. **Using alternative means of protection should only be considered in certain circumstances and will require advanced planning, specific qualifications, and additional training.**
- Alternative Means of Protection include any of the following:
    - Generators placed in a "Zone of Protection" (*See "Glossary" below for further information*).
    - Generators with a lightning protection system or Catenary Ground System installed as defined in National Fire Protection Association (NFPA) 780 *"Lightning Protection Systems"*. **Any lightning protection system should follow the national safety standards and requirements of the Lightning Protection Institute, NFPA, and Underwriters Laboratories (UL) and must be installed by qualified person(s).** (*See "Glossary" below for further information)*.
    - Generators placed in a well-ventilated, sheltered area (e.g., parking garage, carport).
    - Protection of portable feeders. Adequate surge protection devices installed when supplying equipment inside a building, stage, or structure. These portable feeders should also have a main disconnecting means located indoors that is readily accessible.
- Do not go outdoors to service any portable generators, air conditioning units, or other equipment left running outdoors while sheltering from lightning. You should only go outside to service and/or restart the equipment when the "all clear" signal has been given by Production Management.
- Check with the local Authority Having Jurisdiction (AHJ), when necessary, to determine any additional requirements.

If the building or structure does not have an installed lightning protection system with surge protective devices and lightning activity is between 6 to 10 miles away (depending on the action plan), instruct all employees to:

- Avoid contact with equipment connected to the building's utilities that can conduct electricity (e.g., electrical equipment or cables, plumbing fixtures, production lighting). Do not touch metal building frames, beams, or lean against the building's perimeter walls when there is the likelihood of a direct lightning strike on the building or structure.
- Avoid using a corded telephone. Wireless microphones, cordless phones, or cellular phones may be used safely.
- Avoid contact with electrical equipment or appliances connected to an unprotected exterior portable generator electrical distribution system during potential lightning strikes. Electrical equipment supplied by a portable indoor battery energy storage system may be used safely.

If caught in a lightning storm outdoors with no shelter available:

- Seek depressed areas – avoid mountaintops, hilltops, peaks, ridges, and other high places.

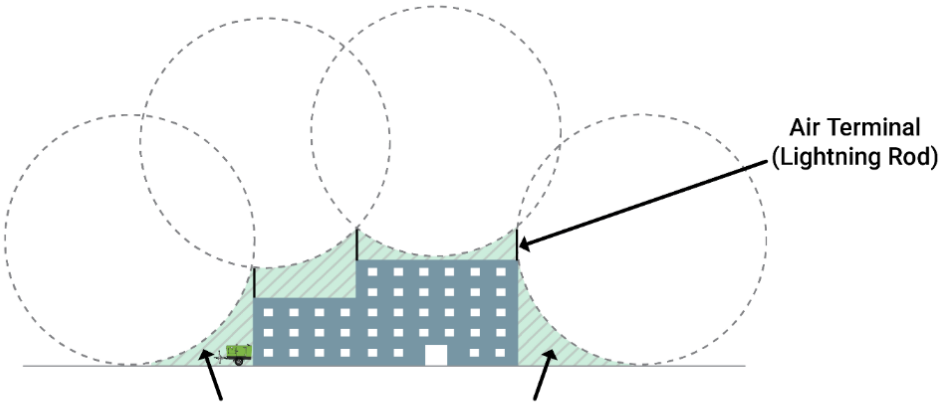
- Seek shelter in wooded areas with thick small trees. Avoid isolated trees.
- Avoid high ground and keep clear of tall objects, towers, aerial lifts, camera booms scaffolding, fences, or other metal equipment.
- Avoid contact with any body of water.
- If caught in an exposed area, make yourself as low and compact as possible to minimize the risk of a direct strike. Squat low on the ground, place your hands over your ears, keep your feet together, and do not place your hands in contact with the earth. **Do not lie flat**.
- If required to leave the location, only move to the pre-determined evacuation area when instructed.
- Individuals who may have been struck by lightning do not carry an electrical charge and are safe to assist. Get emergency help immediately. If you are qualified, administer first aid and/or CPR.

Post Lightning Activity:

- Do not attempt to return to the evacuated area until an "all clear" signal has been effectively communicated by production, which is usually **30 minutes after there are no detected lightning strikes within the trigger distance of the site as specified by the action plan using appropriate weather monitoring tools.**

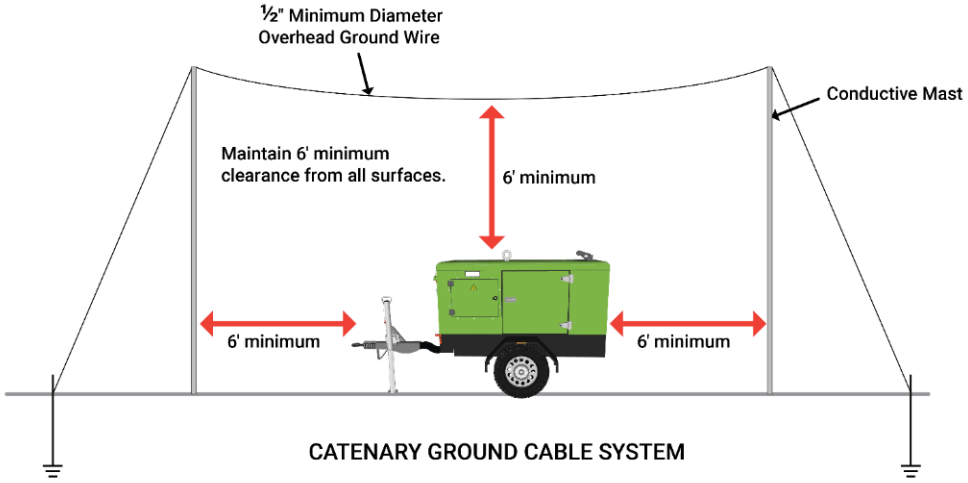
Glossary:

"Zone of Protection": Buildings that have lightning protection systems installed on the highest, most prominent elements provide a level of protection in the lower areas around the building, known as the "zone of protection". Zone of protection is described in NFPA 780 as using a 150-foot radius sphere model to identify items under the protection of higher system elements. This is equivalent to rolling a 300-foot diameter ball from grade up against and then over a building to the opposite grade level in every conceivable direction. A generator located in the area created by the sphere between a strike terminal and grade would be protected. A Zone of Protection can also be provided by a single metal mast, or multiple metal masts surrounding equipment, which are grounded per NFPA 780.



ZONES OF PROTECTION USING
THE "ROLLING SPHERE" METHOD

"Catenary Ground System": A ½" minimum diameter overhead ground wire supported by two or more conductive masts, and connected to ground rods at each end, provides protection for equipment located underneath it. The ground wire and masts must be at least 6' from any surface of the equipment. Materials and components used should be listed for lightning protection and installed by qualified person(s).

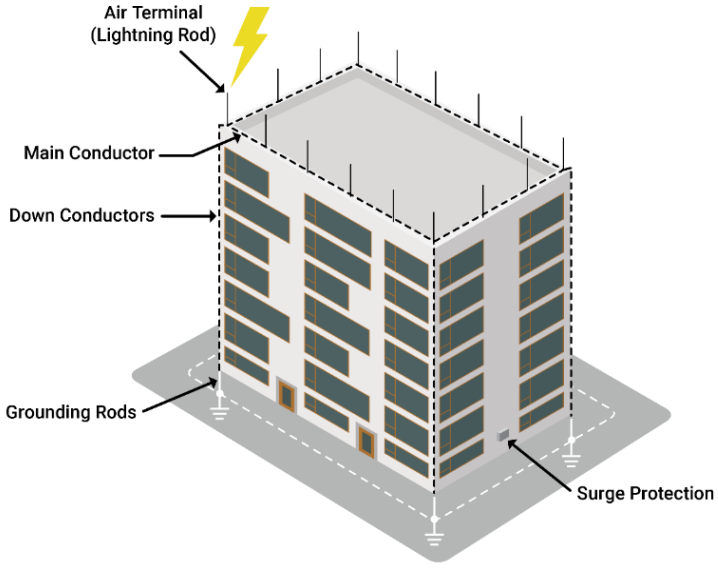


CATENARY GROUND CABLE SYSTEM

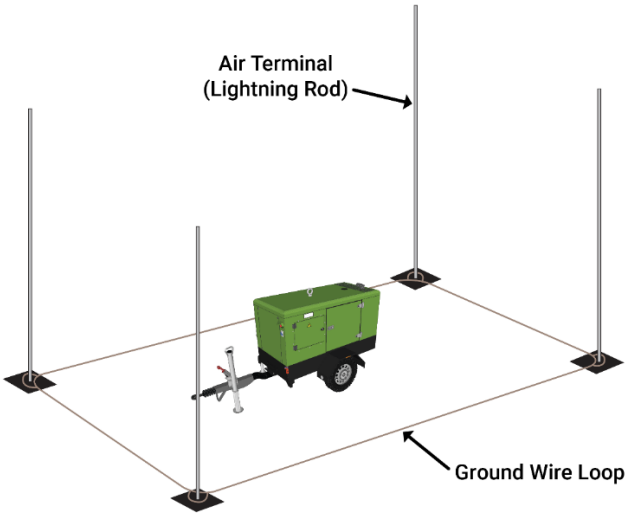
"**Surge Protective Device":** A surge protective device (SPD) is a protective device for limiting transient voltages caused by lightning strikes by diverting or limiting surge current and is capable of repeating these functions as specified by the manufacturer. Surge protective devices should be installed on all conductive feeders and cables originating outside a building and run into the interior of the building and connected to equipment used by productions. Here are some examples:

Images Courtesy of Lightning Eliminators and Consultants Inc. (LEC Inc.)

"Lightning Protection System": A complete system of strike termination devices (e.g. lightning rods), conductors (which could include conductive structural members) providing a conductive path from the strike termination devices to ground, grounding electrodes, interconnecting conductors, surge protection, and other connectors and fittings required to complete the system.



LIGHTNING PROTECTION SYSTEM



PORTABLE LIGHTNING PROTECTION SYSTEM

"Substantial Building": A well-constructed building that is fully enclosed with a roof, walls and floor with plumbing and electrical wiring, such as a sound stage, private residence, shopping centers, schools, office buildings, and hospitals.

REMINDER: Using alternative means of protection should only be considered in certain circumstances and will require advanced planning, specific qualifications, and additional training.