



**Best Practice**

# Lightning

October 2020

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## Overview

Summer Temperature and humidity conditions can result in weather patterns that may produce hazardous conditions for employees working on the mine site.

Early recognition and awareness of potential severe weather development is critical to minimizing the safety risks to employees and equipment associated with severe weather.

## FLASH TO BANG TECHNIQUE (F/B)

At the first sign of an impending storm, towering thunderheads, darkening skies, increasing wind, the responsible person (Superintendent or Senior Supervisor) for workers on site will use the **Flash Bang** (F/B) Technique adopted from the National Lightning Safety Institute to help measure storm proximity.

The F/B technique states that for every count of three (3) from the time of seeing the lightning flash to hearing the associated thunder, lightning is ONE KILOMETRE away.

### Flash to Bang Method:

When storm clouds are observed in the area and thunder is heard in the distance:

1. Look for and visually confirm lightning “flash.”
2. Start counting the number of “Mississippi” seconds: continue counting until an audible “bang” – confirmation of thunder is heard.
3. Divide the total number of “Mississippi” seconds by three (3). The resulting number equals the kilometer distance you could be from a lightning storm and the corresponding risk of lightning strikes in the area.

FLASH TO BANG TECHNIQUE (F/B) Table

| F/B Count (Seconds) | Distance                           | ACTION REQUIRED for Superintendents or Senior Supervisors   |
|---------------------|------------------------------------|---|
| 3                   | 1 km                               | <p>Weather EMERGENCY.</p> <p>Ensure vehicles are pulled off the road in a safe location and 4-way flashers are to be activated and windows rolled up.</p> <p>Instruct all operators to remain in their cab until an “All Clear” is given. (Under NO CIRCUMSTANCE during close-in lightning should an operator attempt to step off their equipment to the ground in an attempt to find another shelter.) Dangerous step voltage and touch voltage situations are created in which a “dual pathway to ground” is created. Lightning voltages will attempt to equalize themselves and may go through a person in order to do so.</p> |
| >30                 | Storm Activity <10 km              | <p>Suspend all outdoor work**</p> <ul style="list-style-type: none"> <li>• <b>Once work has been suspended, it cannot be resumed until 30 minutes has passed since the previous sound of thunder or lightning is observed.</b></li> </ul> <p><i>Suspend all outdoor work examples:</i></p> <ul style="list-style-type: none"> <li>• <i>Working in open, unprotected environments/area; remote locations such as tailings pipelines, reclamation corridors.</i></li> <li>• <i>Working outside of the protection of buildings, covered structures, vehicles.</i></li> <li>•</li> </ul>  |
| 30 - 45             | Storm Activity between 10 to 15 km | <p>Suspend all work performed at elevations</p> <p>This includes the use of cranes, aerial work platforms, other lifting devices, etc.</p>  |
| 45 or greater       | Storm Activity is 15 km or greater | <p>Monitor closely and prepare for possible suspension of all elevated work activities.</p>   |

## EMERGENCY RESPONSE

### **First Aid Response – Injury to Personnel**

Initiate emergency response procedures. A high percentage of lightning victims can be revived especially if timely medical attention is given. If breathing is absent, then begin CPR. Others may be stunned or otherwise injured and also need attention.

Check for burns primarily at entry and exit points such as fingers and toes. Attention needs to be given to persons wearing conductive items such as buckles and body metal (jewelry, watches).

Provide first aid for shock and don't let the victim walk around – stay with them until help arrives.

Although individuals struck by lightning do not carry a charge and are safe to touch, you must ensure by entering an area during a storm that you are not presenting a risk to your own personal safety.

### **Electrification of Equipment**

The safest place to be during a lightning storm is in a large insulated building or a hard-top metallic vehicle.

The safety from a hard-top metallic vehicle comes from the fact that when lightning strikes it, the charge will stay on the outside of the metal structure and find a path to the ground.

As long as the occupant remains in the vehicle and refrains from contact with the outer metallic structures or earth, they can remain safe.

- DO NOT leave the vehicle during a thunderstorm.
- Ensure windows are rolled up completely.
- DO NOT use two-way radios during a thunderstorm as it is connected to an outside antenna.

### **Tire Hazards**

Lightning strikes can be a high hazard associated with the electrification or fire of equipment tires.

Tire electrification and fires pose a very serious risk to the safety of all employees and equipment on a mine site due to the large amount of potential energy contained within a tire.

The potential energy of a tire is further amplified by a tire fire or electrification, firstly by the increase in internal pressure due to the increase in temperature; and secondly by the production of gases from the heated or burning rubber that can cause pressures of up to 1000 psi in a very short period of time.

Tire explosions can occur if the tire is exposed to high voltage electricity. Pyrolysis occurs at varying rates and is the process of decomposition of rubber due to heat. It is possible for tire fires or explosions to occur instantaneously or several hours after the ignition source is introduced.

### **Equipment Operator Responsibilities:**

- Contact your Supervisor immediately

- Pull over and park as safely and quickly as possible. Consider facing clear ground so you can get away safely and allow access by emergency. Consider exposure to personnel, equipment, and facilities. The operator may have to continue driving for some distance in order to reach a safe location.
- Notify Supervisor of final equipment location.
- Shut down the equipment.
- If a fire occurs, deploy the fire suppression system in order to safely egress the equipment.
- Vacate the equipment while minimizing your exposure to the sidewalls of the tires. Move to a safe distance of at least 200 meters.
- **DO NOT** approach affected tires.

### **Supervisor Responsibilities:**

- Ensure the safety of operator.
- Contact emergency response personnel.
- Establish an area of 200 meters from the affected equipment and ensure all personnel vacate the area. Only emergency personnel are permitted access to the secured area.
- Ensure a period of 24 hours passes after electrification or outage of fire before allowing any personnel to approach the equipment.

## SAFETY CONSIDERATIONS

If the daily weather forecast suggests that the potential exists for severe weather activity in the work site area, supervisory personnel will watch for signs of approaching storms throughout the work day.

### **If Caught Outdoors**

- Keep a safe distance from tall objects such as trees, hilltops, and utility poles.
- If in an open field, avoid projecting above the surrounding landscape by seeking shelter in low-lying areas. Crouch down, put feet together and place hands over ears.
- Avoid isolated sheds or other small structures in open areas.
- Stay away from anything metal: metal pipes, rails, and other metallic paths that could carry lightning to you from a distance away.
- Feeling your hair stand on end is an indicator that lightning is about to strike. You must try to make yourself the smallest target possible and minimize your contact with the ground. Squat low to the ground on the balls of your feet. Place hands over ears and put head between knees. **DO NOT** lie flat on the ground.
- Concrete is highly conductive. Avoid concrete roofs, bridges, roads, sidewalks, and buildings.
- Avoid all refueling activities as well as fueling stations.
- Stay away from water.

### **In-Doors**

- Stay away from doors and windows.
- **DO NOT** use a corded telephone (except in emergency). Cordless and cellular telephones are safer to use.
- Take off headsets.
- Turn off, unplug, and stay away from appliances, computers, and power tools.
- Stay away from water – plumbing and bathroom fixtures can conduct electricity.