

**Virginia Defense Force  
Pamphlet 385-3**

**Safety**  
**Severe Weather Safety Guidelines**

**Headquarters  
Virginia Defense Force  
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## Safety

### SEVERE WEATHER SAFETY GUIDELINES

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**Summary.** This document is an adaptation of ATA Safety Guidelines SG 906 (Revision 2010.1, “Severe Weather Safety Guidelines for Ramp Operations”) published by the Air Transport Association of America. Although the referenced document was designed for aircraft ramp operations at airports, most of the information is useful for ground units.

**Applicability.** This pamphlet applies to units of the VDF. During mobilization for state active duty, procedures in this publication can be modified to support policy changes as necessary.

**Suggested Improvements.** Users are invited to send comments and suggested improvements directly to Headquarters, Virginia Defense Force, George Washington Division, Division Safety Office, 5001 Waller Road, Richmond, Virginia 23230.

**Distribution.** Distribution is intended for all VDF units down to, and including, company-level.

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JOHN D. TAYLOR  
Major General, Virginia Defense Force

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## Chapter 1 Introduction

### 1-1. Purpose

Severe weather, generally defined as high winds and lightning (see Definitions below), is a constant danger to all industries that have outdoor activities.

This document outlines some industry practices that can minimize the dangers associated with severe weather and the aviation workplace, as well as other ground unit activities.

### 1-2. Definitions

- **High Winds** – Sustained winds in excess of 40 MPH (34.8 knots, 65 km/hr.) or gusts over 50 MPH (43.5 knots, 81 km/hr.).
- **Lightning** – Flashes of light seen in the sky when there is a discharge of atmospheric electricity in the clouds or between the clouds and ground, usually occurring during a thunderstorm. Cloud to ground lightning presents the biggest hazard to ground operations.
- **Initial Alert** – Lightning is within ten (10) miles (16 km). Primary alert is within five miles.
- **Operational Suspension** – Lightning is within three (3) miles (5 km) and moving in the direction of your operation.
- **All Clear** – Lightning has moved beyond five miles (8 km) and is moving away.

Note: Heavy rain or snow is not considered in this document because the adverse effect is less sudden and less likely to cause sudden damage or injury.

## Chapter 2 Severe Weather Forecasting

### 2-1. Sources of Information

Knowing when severe weather will impact your work site or location is a key element in prevention of injuries or damage. The following are possible sources of timely information regarding approaching severe weather:

- (1) Internal weather forecasting.
- (2) Local TV and radio reports.
- (3) Pilot reports and Federal Aviation Administration (FAA) airport tower observations.
- (4) Airfield ramp and tower observations.
- (5) Local detection devices:
  - (a) Automatic detection systems that track storms, count and locate lightning strike, and determine the potential for lightning strikes based on atmospheric conditions are available. These systems can be purchased and most are portable and battery operated. These systems require manual monitoring and interpretation.
- (6) Weather service providers
  - (a) National Weather Service (U.S.)
    - 1) The National Weather Service provides bulletins about severe weather using a standard definition of severe weather. These bulletins should be monitored and the information from them communicated to your operations group.

- 2) The Airport Weather Warning (AWW) (See Appendix A for further information) is a specialized bulleting available from the National Weather Service in hub cities for the U.S. The AWW can be tailored to the specific needs of an aviation operation. Contact the local office of the National Oceanic and Atmospheric Administration (NOAA) or the U.S. Weather Service for more information.
- 3) NOAA United States weather radio.

(7) Internet Sources

Examples of internet sources include the following: (Note: Use caution when getting weather information from Internet sites. The information may be unreliable or dated.)

- (a) [www.Intellicast.com](http://www.Intellicast.com)
- (b) [www.Weather.com](http://www.Weather.com)
- (c) [www.weather.gov](http://www.weather.gov) (National Weather Service)
- (d) Weather Underground or [www.wunderground.com](http://www.wunderground.com)

(8) County Paging Systems

Some counties have paging systems for Emergency Management personnel. You can become a part of the notification group by contacting your local Emergency Management authority.

## Chapter 3

### Severe Weather Notification: Developing Your Plan

#### 3–1. Means of Notification

Notifying personnel that severe weather is approaching or imminent is a challenge. Regardless of the size of the airport or work site, all activities must be actively engaged in whatever notification process is considered the most suitable. The following are some recommended means of notification:

- **Radio** – Good for small areas where personnel perform their duties together and team leaders with radios can notify everyone.
- **Visual Signals** – Lights on structures that indicate “Take Shelter Indoors” may be useful, but must be distinctive so they don’t blend into the background or become confused with other lights. How these lights are active and by whom is also a serious consideration.
  - Some airports and other facilities use several different color lights: green for “all clear”; yellow for warning; red for take shelter.
  - Some experts recommend a blue flashing light as best for single light systems because it is less likely to be confused with other lights.
- **Audible** – Horns or sirens may be used, must be able to be heard above the background noise (i.e., above engines and equipment noise).

#### 3–2. Being Prepared

*a. Have a plan.* Create a plan for daily operations and a plan for when severe weather is imminent. Work with other organizations / units so plans complement one another. Make certain that all units are included in and are aware of each plan.

*b.* There are several actions that can be taken on a day-to-day basis to assure minimal damage during a severe weather event. These can result in lesser amounts of damage when advance notification of approaching severe weather is provided or when a severe weather event occurs without warning. The following procedural suggestions have proven effective over time:

- (1) Always set and check brakes and/or wheel chocks on all parked equipment.
- (2) Clear loose debris from all work areas.
- (3) Remove non-essential equipment from operational areas.
- (4) Lower any ladders and store as close to buildings as possible.
- (5) Close and secure all doors / hatches on vehicles.
- (6) For aircraft:
  - (a) Set parking brakes.
  - (b) Chock all aircraft gear.
  - (c) If large aircraft, connect tow bar, attach pushback equipment, and install bypass pin.
  - (d) Close and secure all windows, doors, and access panels.

## Chapter 4 Recommended Procedures: Using Your Plan

### 4-1. When a Severe Weather Watch is Issued

a. At the start of day, beginning of shift, or upon initial notification:

- (1) Meet with operations and unit staff to outline the forecast and review resources.
- (2) Communicate to all personnel that the “Severe Weather Plan for (high winds, lightning, hail, or tornados) is in effect (or will be put into effect at a certain time).”
- (3) Notify units / activities to expect irregular operations.
- (4) Ensure a specific individual is monitoring the forecasts.
- (5) For airports / airfields, communicate with the airport authority about possible airport or runway closures.
- (6) Coordinate severe weather plan with other units / organizations.

### 4-2. When a Severe Weather Warning is Issued

a. Notify all personnel of impending severe weather event.

b. Actions to take:

(1) Secure aircraft / vehicles:

- (a) Chock aircraft gear of all aircraft and vehicles / trailers.
- (b) Set parking brakes on aircraft and vehicles.
- (c) Secure all loose equipment.
- (d) Close all aircraft / vehicle door, windows, and access panels.
- (e) For aircraft, lock control surfaces in accordance with aircraft maintenance manuals.
- (f) Follow manufacturer’s procedures to add or transfer fuel on aircraft as a high winds condition precaution (on aircraft that incorporate this manufacturer’s recommendation).
- (g) If available, move aircraft into hangars or relocate to remote parking spots.

(2) Secure Ground Equipment

- (a) If possible, secure / stow loose equipment not in use indoors or in trailers.
- (b) For loose ground equipment that must remain outside:
- (c) On an airfield, park or store away from aircraft and as close to the building as possible. If portable / mobile equipment, with brakes set.
- (d) Ensure that containers are locked on dollies or transports.
  - 4) Remove all empty, loose containers from area around aircraft and/or vehicles.

(3) Cargo

- (a) Ensure that notification of the severe weather alert has been conveyed to personnel involved with moving cargo.
- (b) Cargo personnel must:
  1. Secure all loose cargo and cargo handling equipment (as mentioned above).
  2. Be prepared to stop all deliveries and receipt of cargo when severe weather is approaching and within five (5) miles (5 km).



3. Be prepared to return loose cargo to an indoor facility if severe weather is approaching and within five (5) miles (8 km).

(4) Aircraft / Vehicle Cleaning

- (a) Stow all supplies and equipment.
- (b) Stow water hoses in their cabinets.

(5) Maintenance

- If possible, stow all ladders, stands, and other loose equipment inside buildings, or secure in place.
- Park vehicles as described as describe above.

(6) Facilities

- Ensure that local building facilities personnel have been notified of the impending severe weather alert.

(7) Flight Crews

- Ensure that aircraft flight crews have been notified of the impending severe weather.

(8) Shift Change

- Ensure all personnel coming on duty know that the severe weather plan is in effect.

(9) When a Severe Weather Forecast includes lightning:

- Ensure that all personnel have been notified.
- Be prepared to stop fueling operations when storm is within five (5) miles (8 km) and is moving toward the operation.
- Be prepared to stop all outdoor activities and seek shelter when storm is within three (3) miles (5 km). Ensure all personnel discontinue communications using headsets.
- Ensure that no one plans on using aircraft or small vehicles / trailers for cover.

#### **4-3. When Severe Weather is Imminent**

*a.* Actions to take when lightning / high winds are approaching:

(1) When storm is within five (5) miles or eight (8) km:

- (a) **Stop** all fueling operations.

(2) When storm is within three (3) miles or five (5) km:

- (a) Personnel Safety
  1. Stop all headset communications.
  2. Evacuate the aircraft parking ramp and other open areas.
  3. Ensure that no one seeks shelter under any part of an aircraft, vehicle, or trailer or near conductors such as light pole and fences.

## **Appendix A**

### **Airport Weather Warning (AWW)**

#### **A–1. Overview**

The Airport Weather Warning (AWW) is a U.S. National Weather Service (NWS) product designed to address weather phenomena that may adversely affect ground operations at airports. This information has proven useful to airport managers, fixed-base operators, airline ground personnel, and others responsible for the safety of ground operations.

Ground decisions based on an AWW may include those associated with fueling delays during thunderstorms, de-icing operations, and other similar ground operations. AWW's are **not** intended for use by in-flight operations.

#### **A–2. Procedures**

An AWW is issued based on airport-specific weather criteria and/or the issuance of any NWS warning product that will affect the airport (within a five (5) mile [8 km] radius of the center of the airport complex), as agreed upon between a local airport management and the supporting National Weather Service Forecast Office (WFO). A Letter of Agreement (LOA) determines the weather elements, dissemination mechanisms, and points of contact.

An AWW complements existing NWS warnings and forecasts. Airport officials are encouraged to refer to other NWS warning and forecast products, such as Terminal Forecasts (TAF), Short Term Forecasts (NOW), Zone Forecasts (ZFP), and other public watches and warnings. These also contain information about conditions that may impact ground operations. Use of National Oceanic and Atmospheric Administration (NOAA) weather radio should be encouraged.

An AWW is written in a plain language, free text format. It typically includes the triggering phenomenon, location, start time (end time as needed), and may include additional remarks.

#### **A–3. Issuance Criteria**

Emergency Alert Issuance criteria are established according to local airport requirements, and should be reviewed on an annual basis. They include:

- (1) Surface wind gusts of 40 knots (46 MPH) or greater.
- (2) Onset of freezing rain.
- (3) Cloud to ground lightning within five (5) miles (8 km) and approaching the airport.
- (4) Thunderstorms with hail of ½ inch (1.2 cm) or greater.
- (5) Onset of heavy snow.

## **Appendix B**

### **Lightning Safety**

#### **B–1. General Information Regarding Lightning Hazards**

Lightning is an electrical discharge between differently charged regions within the cloud or between charged clouds to earth. A complete ground flash consists of one or more high-amplitude, short-duration impulses called strokes. Sometimes this is followed by a long-duration, low-amplitude currents.

Lightning flashes generated within one isolated thunderstorm cloud can hit any point on the ground beneath the cloud. The distance between two successive flashes varies in the order of miles.

The principal effects of a direct lightning strike to a person or on object are electrical, thermal, and mechanical. A lightning strike to a remote object linked by conductive parts (e.g., power or communication cables) can cause electrical effects that are hazardous to sensitive electronic equipment or trigger an electric spark that is dangerous in high flammable areas: fuel farms, and fueling areas.

**Note:** This method of ranging has severe limitations due to the difficulty of associating the proper thunder to the corresponding flash.

As general guidelines, anyone who can see lightning and/or hear thunder 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 (thunder) is less than 15 seconds, you should seek a lightning safe area.

High winds, rainfall, and cloud cover often are precursors to actual cloud-to-ground strikes, providing advance warning to take action. Many lightning casualties occur as storms approach 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 15 minutes. Then 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.

Remember that lightning is always generated and connected to a thundercloud, but may strike many miles from the edge of the thunderstorm cell. Acceptable downtime in ramp or other open-area operations must be balanced with the risk posed by lightning.

## **B-2. Principles of Lightning Protection**

The purpose of lightning protection is to protect people, vehicles / aircraft, buildings and their contents, or structures in general, from the effects of lightning to a certain acceptable level. There is no 100 percent protection level given technical and economical constraints.

Lightning protection is not aimed at preventing the formation of the lightning discharge. It is intended to prevent an object from being directly hit or affected by a remote lightning discharge. Therefore, lightning protection systems typically contain four components:

- (1) Air terminations – To achieve interception-lightning protection.
- (2) Down conductors – To convey lightning current to earth.
- (3) Earth termination network – Delivers lightning current into earth.
- (4) Over voltage protection – To prevent hazardous potential differences while allowing normal operating potentials to exist.

## **B-3. Lightning Unsafe Areas**

Unsafe areas during lightning include, *but not limited to*:

- (1) Area near high poles.
- (2) Area near grounded metallic stands.
- (3) Area near or under aircraft or vehicles / trailers.

## **B-4. Lightning “Safe” Areas**

No place is absolutely safe from lightning threat; however, inside a building with doors closed will provide the greatest reduction of risk.

### B-5. Lightning and Wind Hazard Checklist

The following checklist was designed for use on airfields to assist site management in developing a lightning and wind hazard action plan. The items on the list includes recommendations and current best practices within the airline industry. The additional spaces can be used for location specific items.

Lightning and Wind - Forecasted		Date/Time
Item	Items	Assessment
1	Communicate to all personnel the possibility if lightning or high winds.	Signature
2	Assign a specific person to monitor the forecast.	
3	Conduct GSE readiness checks for functioning parking brakes.	
4	Conduct GSE readiness checks for chocks.	
5	Conduct GSE readiness checks for FOD sources.	
6	Ensure equipment not being used is stored properly.	
7	Ensure chocks for all sets of MLGs and NLG are available.	
8	Ensure there is a proper method for grounding the aircraft.	
9	If high winds are forecasted after the end of the day's operations, complete all checklists and protect aircraft from FOD damage.	
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## B-6. High Winds Activity Matrix

The following actions should be taken when wind gusts are expected to reach or exceed 25 kts or 28 MPH.

	25-30 KTS (28-33 MPH)	35 KTS (39 MPH)	40 KTS (44 MPH)	45 KTS (50 MPH)	55 KTS (60 MPH)
Advise all stations and personnel of forecasted wind conditions.	X	X	X	X	X
Secure bags / freight carts, and transporters and place near or against the building.	X	X	X	X	X
Ensure parking brakes are engaged on all ground equipment.	X	X	X	X	X
Ensure empty containers stored on the ground have been secured.	X	X	X	X	X
Clear gates of FOD and return pallets, loose cargo containers, mail pouches, etc., to cargo or mail facility or remote location.	X	X	X	X	X
Ensure pallets and cargo containers are locked onto transporters and secured.	X	X	X	X	X
Secure curtains on all cargo containers.	X	X	X	X	X
Lower all stands / ladders when not in use.	X	X	X	X	X
Chock all landing gear.		X	X	X	X
Provide 20-ft wingtip clearance, if possible.		X	X	X	X
Close all access panels, doors and windows.		X	X	X	X
Set aircraft and vehicle parking brakes.			X	X	X
Clear ground support equipment from aircraft.			X	X	X
Chock wheels (aircraft, vehicles, and support equipment).					X

## **References**

ATA Safety Guidelines, SG 906, Severe Weather Safety Guidelines for Ramp Operations, Revisions 2010.1.  
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Washington, DC 20004-1707.