

OPNAV INSTRUCTION 3140.24E

From: Chief of Naval Operations
To: All Ships and Stations

Subj: WARNINGS AND CONDITIONS OF
READINESS CONCERNING
HAZARDOUS OR DESTRUCTIVE
WEATHER PHENOMENA

Encl: (1) Common Weather Warning
Terminology
(2) Conditions of Readiness

1. Purpose. To issue information concerning hazardous and destructive weather phenomena and to establish conditions of readiness in anticipation of hazardous or destructive winds.

2. Cancellation. OPNAVINST 3140.24D.

3. Discussion

a. Destructive weather poses a significant threat to personnel, ships, aircraft, installations and other resources. Adequate and timely weather warnings, coupled with prompt and effective action by commanders concerned, will minimize loss and damage from destructive weather.

b. Extensive damage may be caused by flying debris, such as rocks, lumber, fuel drums, sheet metal and loose gear of any type which can be picked up by the wind and hurled with great force. These flying missiles can cause major damage to property and serious injury to personnel. Additionally, damage can be produced by flooding; storm surges; sudden wind shifts, gusts and squalls; lightning and hail; and ice storms.

4. Types of Storms

a. Thunderstorms. Thunderstorms are small-scale storms, invariably produced by a cumulonimbus cloud and always accompanied by lightning and thunder. They may develop within sight of a ship or station and not have a threatening appearance until shortly before arrival. They may be part of a squall line or embedded in and hidden by other clouds.

Hail is often associated with thunderstorms and may inflict major damage. Hailstone size varies from smaller than a pea to larger than a grapefruit. Thunderstorms may be accompanied by extremely strong winds. Gusts occasionally exceed 100 knots. These strong winds are usually of short duration, and their direction may be radically different from the prevailing winds before the storm. Severe downbursts (microbursts/macrobusts), sudden wind shifts, extreme turbulence, and wind shear are often associated with thunderstorm activity. Heavy rainfall and visibilities near zero may also occur. Lightning strikes are common. Strike locations are virtually unpredictable. Yet, direct or nearby hits can cause serious or fatal injuries to personnel; detonation of munitions, fuel and other combustibles; severe damage to electrical/electronic systems; and power failures.

b. Tornadoes. A tornado is a violently rotating column of air usually in the form of a funnel, extending from a thunderstorm cloud and touching the ground. A tornado is one of the most destructive types of storms known. Its winds have not been measured directly, but are estimated at 100 to more than 250 knots. The updraft within the tornado may attain speeds of 75 to 175 knots. Tornadoes move at speeds of approximately 20 to 35 knots and have an average lifetime of 20 minutes. However, it is not uncommon for several tornadoes to develop, either in families or in succession, from the same parent thunderstorm or line of thunderstorms which may last for several hours. A waterspout, usually less violent than a tornado, has a funnel that touches water. (A pendant which does not touch the ground or water is referred to simply as a funnel cloud.) Warnings of tornadic activity imply that severe thunderstorms will probably exist.

c. Tropical Cyclones. Tropical cyclones are systems of cyclonically rotating winds characterized by a rapid decrease in pressure and increase in winds toward the center of the storm. Their dimensions can vary from 60 nautical miles for a small cyclone, to over 1000 nautical miles for larger systems. Three stages of intensity are associated with tropical cyclones: tropical depression (winds 33 knots or less), tropical storm (34-63 knots) and hurricane/typhoon (greater than 63 knots). Most tropical cyclones are seasonal phenomena, forming during the warmer seasons over warm tropical waters, and often

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moving into mid-latitudes. Mature tropical cyclones are normally composed of several distinct features: the eye, or center, which is an area of light winds and the lowest pressure; the eye wall, a circular ring of towering cumulonimbus clouds, extremely strong winds and heavy rains surrounding the eye; and bands of squall lines or cumulus and cumulonimbus clouds which spiral into the eye wall. Damage from tropical cyclones is caused by strong winds, flooding from heavy rains, thunderstorm-induced tornadoes, and high storm surge along coastal regions.

d. Extra-tropical Storms. Storms of this type generally affect a wide area and have a life span of several days. Examples include subtropical storms and mid-latitude and polar low pressure systems. The most severe extra-tropical cyclones occur in winter.

e. Other Windstorms. Winds of significant force can also be generated by other meteorological conditions. Windstorms may be associated with frontal passages, squall lines, seasonal monsoons and strong gradients around high pressure centers. Other windstorms, often bearing unique regional names such as the Santa Ana, Bora and Mistral, are the result of orographic funneling or the strong downslope flow off mountain ranges. The onset of strong winds from some of these events can be very sudden and treacherous. The duration may be several days or even months, with periods of brief and deceptive lulls.

5. Action Required

a. Commanders and commanding officers shall use all available weather information to avoid or minimize loss and damage due to destructive weather phenomena.

b. Routine operating procedures shall provide for the safety of personnel, property and equipment by incorporating planned responses to all hazardous weather phenomena that may be expected.

c. To ensure the proper safeguard of personnel and property, local regulations shall include a list of precautionary measures to be taken when destructive weather warnings are received.

d. All available weather resources should be used to keep commanders informed. If feasible, available radar facilities shall be employed to detect and track local storms. Cooperative arrangements for establishing or joining weather warning networks

should be made with local civil or military agencies whenever practical. In areas where Naval Oceanography Command or Marine Corps weather forecasts are not available, full use should be made of storm warning information disseminated by other agencies (e.g., the National Weather Service, the Air Force, or local foreign meteorological services.)

e. Naval Oceanography Command and Marine Corps weather activities are responsible for the timely dissemination of hazardous or destructive weather warnings via designated area commands and activities as directed by the local area commander. In addition to internally prepared warnings, they shall apprise the commands and activities they support of National Weather Service Severe Weather Bulletins affecting local interests. Because National Weather Service Bulletins are often heard first over television or radio, prior familiarity with their terminology will enhance their value and avoid confusion when Conditions of Readiness are set. Enclosure (1) contains a list of common Department of Defense and National Weather Service weather warning terminology.

f. Conditions of Readiness. Conditions of Readiness (following enclosure (2) criteria) shall be used at all Navy and Marine Corps activities and commands, and may be modified to reflect localized readiness criteria.

(1) Conditions of Readiness are set using the applicable term indicating wind force (e.g., Set Gale Condition II) and/or a specified range of wind speeds (e.g., Destructive Winds of 35 to 40 knots). Unless specifically stated otherwise, Conditions of Readiness are based on sustained winds. Tropical cyclone conditions are set only for warm core (or developing warm core) cyclonic systems of tropical or subtropical origin. Gale and storm conditions are used for windstorms other than tropical cyclones, and for winds outside a tropical cyclone's general circulation.

(2) Further amplification of the basic conditions prescribed in enclosure (2) is authorized to facilitate implementing conditions of readiness within commands. Establishing additional weather-related Conditions of Readiness, warnings or advisories to fulfill area or local requirements is also authorized.

(3) The previous setting of a lower condition of readiness is not a prerequisite for setting any of the conditions. Local area commanders, at their discretion, may set a higher condition of readiness

for their activities but may not lower any condition of readiness below that established by the Regional Planning Agent for natural disasters, or their delegated representative.

6. Concurrence. This instruction has the concurrence of the Commandant of the Marine Corps. Marine Corps activities shall take those actions prescribed in this instruction which are not contradictory to specifically expressed policies of the Commandant of the Marine Corps.

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Oceanographer of the Navy

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Common Weather Warning TerminologyDepartment of Defense

Warning areas are defined by the local area commander or designated representative.

1. Wind Warnings:

a. Small Craft Warning - harbor and inland waters warning for winds (33 knots or less) of concern to small craft. The lower threshold for issuing such warnings is set by local area authority.

b. Gale Warning - warning for harbor, inland waters, and ocean areas for winds 34 to 47 knots. Note: For the purpose of graphical display of warnings, gale warnings are issued for winds equal to or greater than 35 knots.

c. Storm Warning - warning for harbor, inland waters, and ocean areas for winds 48 knots or greater. Note: For the purpose of graphical display of warnings, storm warnings are issued for winds equal to or greater than 50 knots.

2. Tropical Cyclone Warnings:

a. Tropical Depression - warning for land, harbor, inland waters, and ocean areas for winds 33 knots or less.

b. Tropical Storm - warning for land, harbor, inland waters, and ocean areas for winds 34 to 63 knots.

c. Hurricane/Typhoon - warning for land, harbor, inland waters, and ocean areas for winds 64 knots or greater.

3. Thunderstorm/Tornado Warnings:

a. Thunderstorm Warning - thunderstorms are forecast to impact the warning area.

b. Severe Thunderstorm Warning - severe thunderstorms (with wind gusts to 50 knots or greater and/or hail of 3/4 inch diameter or greater) are forecast to impact the warning area.

c. Tornado Warning - tornadoes have been sighted or detected by RADAR in or adjacent to the warning area, or have a strong potential to develop in the warning area.

Enclosure (1)

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4. **Special Weather Advisory/Warnings:** These advisories or warnings include any of the above warnings for U.S. military activities outside the U.S. They may also encompass any additional weather phenomenon which may impact operations in the designated area. These warnings may be issued for land, harbor, inland waters, or ocean areas as appropriate. They include, but are not limited to:

a. Winter Storm/Snow Warnings - warning may be issued for snow, mixed or freezing precipitation, wind chill, or anything that could impact operations. The parameters under which a winter storm warning will be issued are determined by local area commanders.

b. Storm Surge Warning - warning issued for coastal areas, harbor, and inland waters when abnormally high tides are forecast to impact operations. The specific height above normal tide will be determined by local area commanders.

National Weather Service

Watch/Warning area boundaries are determined by the National Weather Service.

1. Wind Warnings:

a. Small Craft Warning - winds of 18 to 33 knots are forecast for harbor and inland waters, as well as adjacent coastal areas.

b. Gale Warning - winds of 34 knots to 47 knots are forecast for harbor and inland waters, as well as adjacent coastal areas.

c. Storm Warning - winds of 48 knots or greater are forecast for harbor and inland waters, as well as adjacent coastal areas.

2. Tropical Cyclone Watch/Warning:

a. Tropical Storm Watch - a tropical storm or incipient tropical storm poses a possible threat to a specified coastal area within 36 hours.

b. Tropical Storm Warning - tropical storm force winds are expected in a specified coastal area within 24 hours.

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c. Hurricane Watch - a hurricane or incipient hurricane poses a possible threat to a specified coastal area within 36 hours.

d. Hurricane Warning - hurricane force winds are expected in a specified coastal area within 24 hours or less.

3. Severe Thunderstorm/Tornado Watch/Warning:

a. Tornado Watch - conditions are conducive for tornadic activity and severe thunderstorms within and close to the Watch area.

b. Tornado Warning - a tornado has actually been sighted, or indicated by weather radar.

c. Severe Thunderstorm Watch - severe thunderstorm (wind gusts of 50 knots or greater or hail of 3/4-inch diameter or greater at the surface) development is possible within or adjacent to the Watch area.

d. Severe Thunderstorm Warning - the occurrence of a severe thunderstorm has been confirmed by observation or weather radar.

4. Special Advisories/Watches/Warnings:

a. Flash Flood Watch/Warning - heavy rainfall may result in, or has produced, flash flooding.

b. Coastal Flood Watch/Warning - strong on-shore, winds, potentially combines with heavy rainfall, may result in, or has produced, coastal flooding.

c. Winter Storm Advisory - event specific advisories used to describe conditions which may pose a threat to specified users, but are not serious enough to warrant a warning for the general public. Conditions include snow (less than 4 inches), blowing snow, wind chill, freezing rain, dense fog, etc.

d. Winter Storm Watch - issued when the risk of a hazardous weather event has increased significantly, but its occurrence, location, and/or timing is still uncertain. Such weather events include blizzards, heavy snow, freezing rain or drizzle, and sleet.

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e. Winter Storm Warning - issued when the risk of a hazardous weather event is imminent or occurring. The winter storm warning covers the same conditions included under winter storm watch.

CONDITIONS OF READINESS

TROPICAL CYCLONE, SUBTROPICAL, OR EXTRA-TROPICAL WIND STORMS (Issue using gale, storm, tropical storm or hurricane/typhoon to indicate force of destructive winds.)	
CONDITION IV	Trend indicates a possible threat of destructive winds of the force indicated within 72 hours . Review hazardous and destructive weather implementation plans, as established by local regulations.
CONDITION III	Destructive winds of the force indicated are possible within 48 hours . Take preliminary precautions.
CONDITION II	Destructive winds of the force indicated are anticipated within 24 hours . Take precautions that will permit establishment of an appropriate state of readiness on short notice.
CONDITION I	Destructive winds of the force indicated are occurring or anticipated within 12 hours . Take final precautions as prescribed.

SMALL AREA STORMS	THUNDERSTORM OR TORNADO CONDITIONS
CONDITION II	Destructive winds accompanying the phenomena indicated are expected in the general area within 6 hours . Associated lightning/thunder, torrential rain, hail, severe downbursts, and sudden wind shifts are possible. Take precautions that will permit establishment of an appropriate state of readiness on short notice.
CONDITION I	Destructive winds accompanying the phenomena indicated are imminent or are occurring . Associated lightning/thunder, torrential rain, hail, severe downbursts, and sudden wind shifts are possible. Take immediate safety precautions and shelter.

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Statements setting Conditions of Readiness may be amplified by additional information. The forecast wind values may be different than the threshold values in enclosure (1) to reflect best possible forecast information. Examples:

"Set Gale Condition II. Destructive winds of 35 to 40 knots are anticipated within 24 hours."

"Set Tropical Storm Condition III. Destructive winds of 50 knots or greater are possible within 48 hours."

"Set Hurricane Condition I. Destructive winds of 80 knots or greater are anticipated within 12 hours."