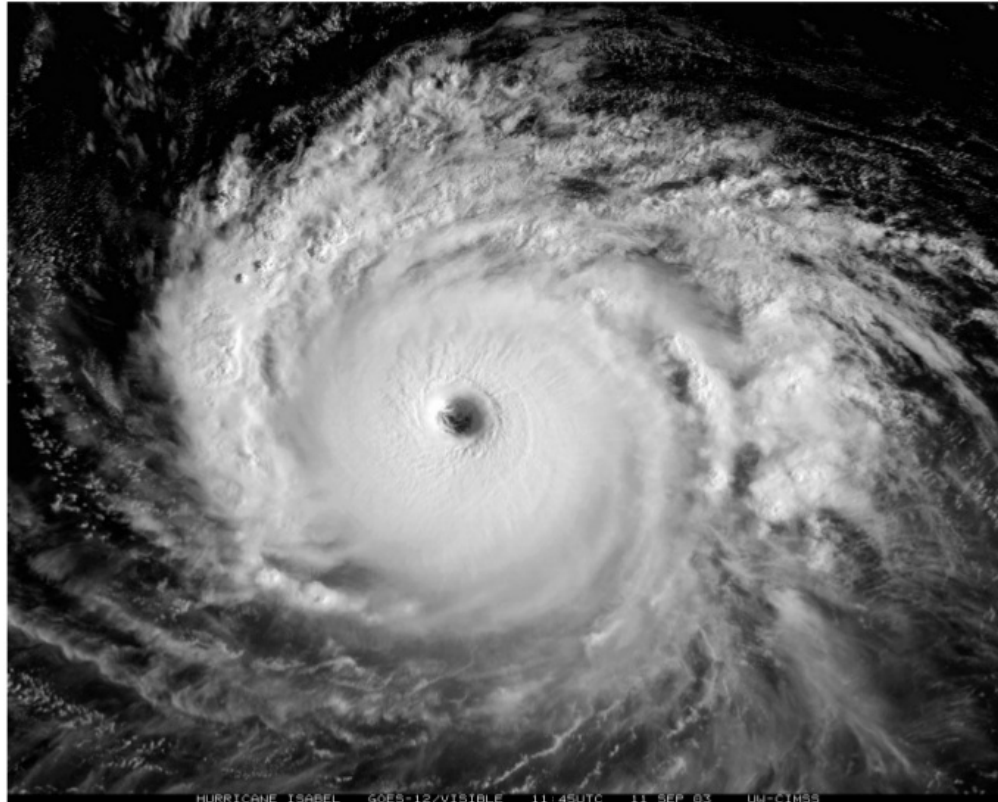
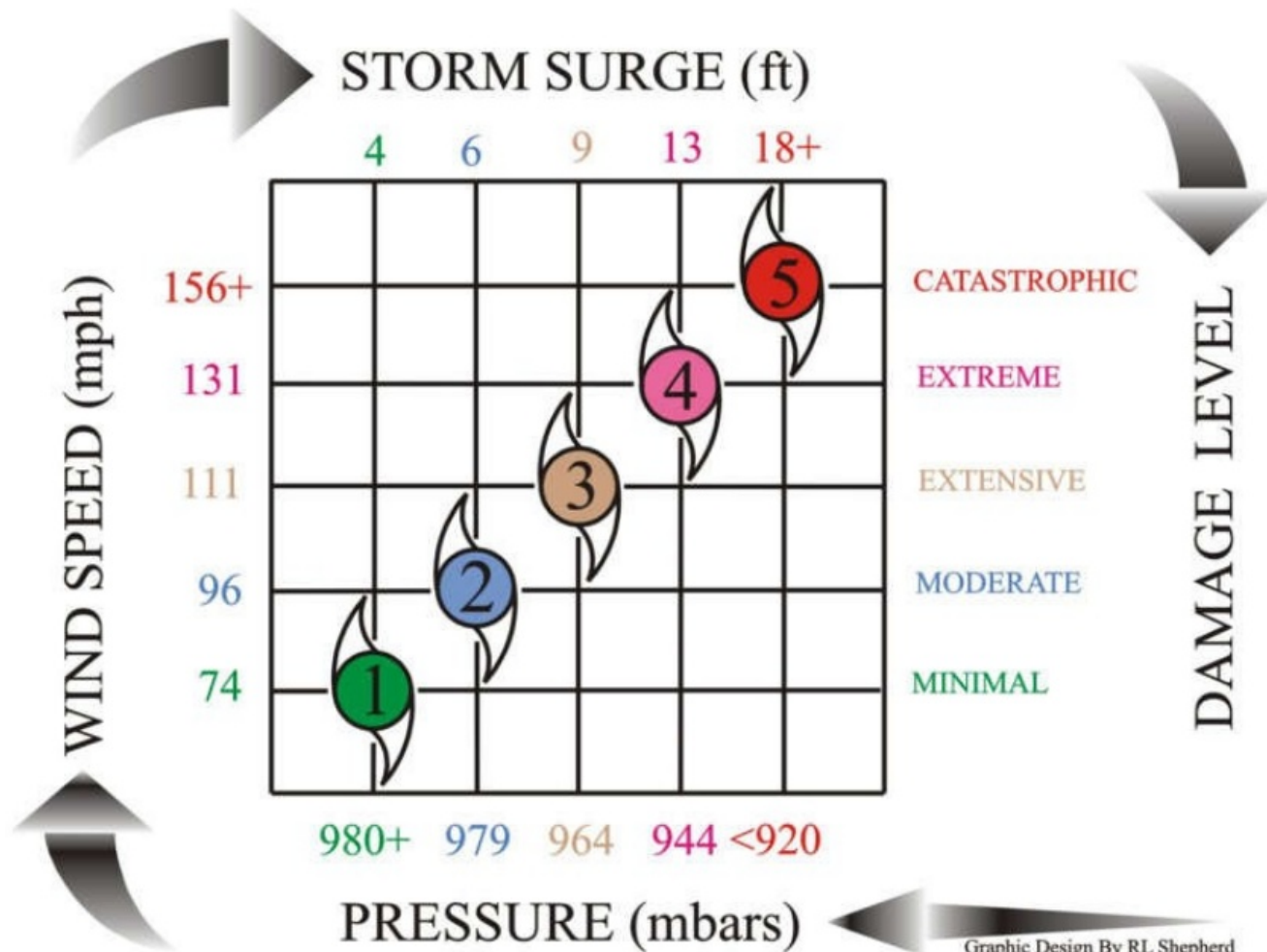


**Mike Kassman**  
**OSHA and Disaster**  
**Response Training Director**

# HURRICANES



# SAFFIR-SIMPSON HURRICANE SCALE





## Saffir-Simpson Hurricane Scale

Category	Winds (MPH)	Damage	Storm Surge
1	74 - 95	<b>Minimal:</b> Damage to unanchored mobile homes, vegetation & signs. Coastal road flooding. Some shallow flooding of susceptible homes.	4 - 5 feet
2	96 - 110	<b>Moderate:</b> Significant damage to mobile homes & trees. Significant flooding of roads near the coast & bay.	6 - 8 feet
3	111 - 130	<b>Extensive:</b> Structural damage to small buildings. Large trees down. Mobile homes largely destroyed. Widespread flooding near the coast & bay.	9 - 12 feet
4	131 - 155	<b>Extreme:</b> Most trees blown down. Structural damage to many buildings. Roof failure on small structures. Flooding extends far inland. Major damage to structures near shore.	13 - 18 feet
5	More than 155	<b>Catastrophic:</b> All trees blown down. Some complete building failures. Widespread roof failures. Flood damage to lower floors less than 15 feet above sea level.	Greater than 18 feet



















































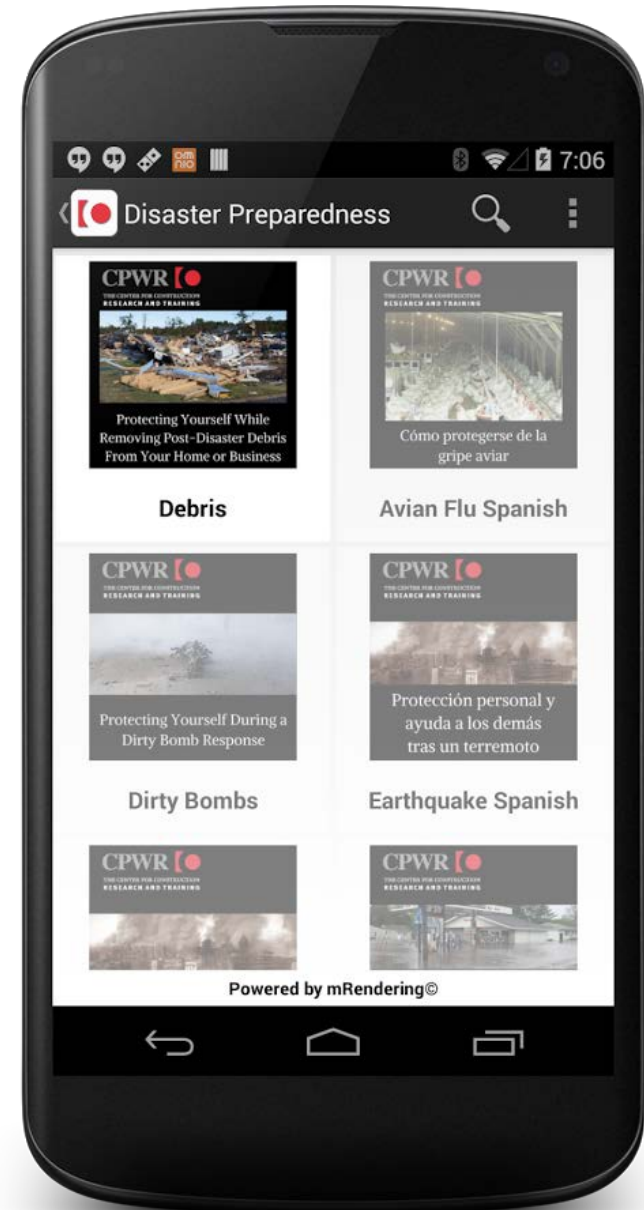






In collaboration with the National Institute of Environmental Health Sciences (NIEHS) National Clearinghouse, CPWR created a **Disaster Preparedness App**

- Available on [Google](#) and [Apple](#)
- Provides easy access to training tools and health and safety guidance for those involved in disaster response and cleanup activities following a variety of catastrophic events.



# Overview

- Introduction
- Hazards
- Other Protective Measures
- Summary





# Workers' Rights

## What are employers' responsibilities?

- The Occupational Safety and Health Act requires employers to provide a safe and healthful workplace free of recognized hazards and to follow OSHA standards. Employers' responsibilities also include providing training, medical examinations and recordkeeping.

For more information about OSHA, go to <http://www.osha.gov> or call 1-800-321-OSHA (6742)

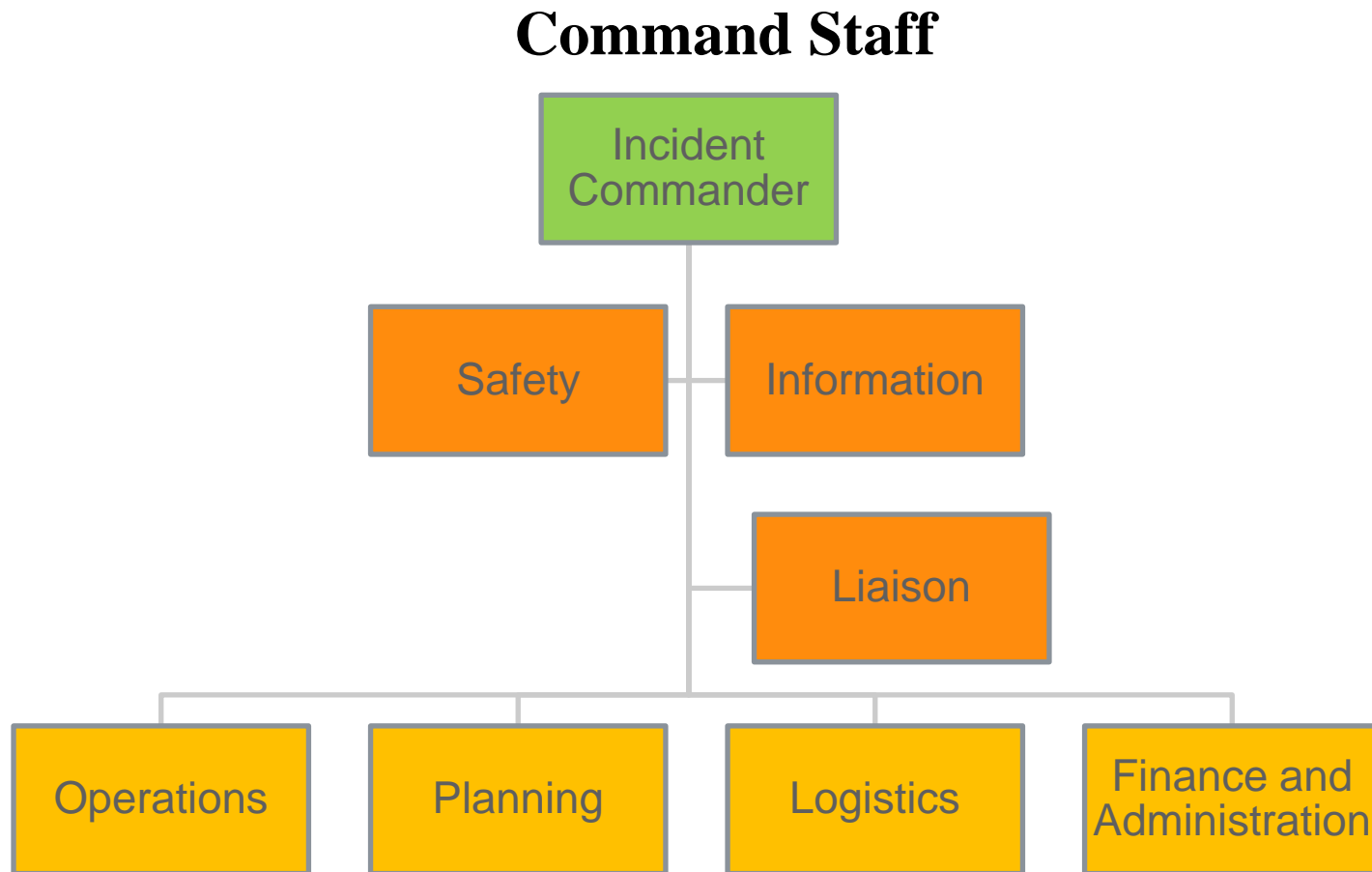
# Incident Command

Incident Command provides a structure to promote effective coordination among responders.

- Allows for an integrated organizational structure not hindered by jurisdictional boundaries.
- Has 5 organizational functions to allow for a manageable span of control:
  - Command
  - Operations
  - Planning
  - Logistics
  - Finance and Administration
- Safety is part of the Command function.



# Incident Command System Structure



# Potential Chemical Exposures

**Symptoms:** Eye, nose, throat, upper respiratory tract, and skin irritation; flu like symptoms; central nervous system depression, fatigue, loss of coordination, memory difficulties, sleeplessness, mental confusion. Chronic effects depend on the extent and the duration of exposure.

## **Jobs affected**

- Debris removal
- Site clean-up

## **Protection**

- Hazard specific as identified by supervisor or safety officer





## Hazard: Mold

After hurricanes and floods, the water creates the perfect environment for mold to grow in homes and other buildings. Exposure to mold can cause wheezing and severe nasal, eye and skin irritation.



## Hazard: Trench Foot (Immersion Foot)

- Trench foot, also known as immersion foot, occurs when the feet are wet for long periods of time. It can be quite painful.
- Symptoms include a tingling and/or itching sensation, pain, swelling, cold and blotchy skin, numbness, and a prickly or heavy feeling in the foot. The foot may be red, dry, and painful after it becomes warm. Blisters may form, followed by skin and tissue dying and falling off. Obtain medical assistance as soon as possible.
- To prevent trench foot, when possible, air-dry and elevate your feet, and exchange wet shoes and socks for dry ones.



## Hazard: Blood-borne Disease

- Use impervious gloves when handling human remains
- Replace gloves if punctured or torn
- Protect yourself from injured persons' blood and bodily fluids
- Do not handle human remains if you have skin cuts or punctures



## Hazard: Handling Bodies of Victims

- There is no direct risk of infectious disease from being near human remains for people who are not directly handling dead bodies.
- Human remains may contain blood-borne viruses such as hepatitis viruses and HIV, and bacteria that cause diarrheal diseases, such as shigella and salmonella.
- For personnel exposed to blood and body fluids:
  - Use gloves when handling bodies or body fluids
  - Use eye protection, gowns, and masks when large quantities or splashes of blood are anticipated
  - Wash hands frequently
  - Use body bags to reduce the risk of contamination



# Hazard: Animals and Insects

- **Beware of wild or stray animals:**
  - Avoid wild or stray animals. Call local authorities to handle animals
  - Get rid of dead animals according to local guidelines
  - Wear and clean proper protective clothing when handling carcasses
- **Spiders** (black widow and brown recluse spiders)
- **Fire ants**



# Hazard: Animals and Insects

## Protect yourself from mosquitoes:

- Use screens on dwellings
- Wear long pants, socks, and long-sleeved shirts
- Use insect repellents that contain DEET or Picaridin





## Hazard: Snakes and other reptiles

- Be on the alert for snakes that may be hiding in unusual places after flooding
- Wear snake chaps
- If you are bitten, seek immediate medical attention



# Other Protective Measures

## Key items to have:

- Personal floatation device
- Earplugs
- Bottled water
- Sun screen
- Rain Gear
- Pocket Knife
- Insect repellent with Deet or Picaridin
- PPE – For additional information on what equipment you need for protection, contact your local OSHA office or NIOSH



# OSHA Resources

Occupational Safety and Health Administration

[English](#) | [Español](#)

[OSHA](#) ▾ [WORKER](#) ▾ [EMPLOYER](#) ▾ [STANDARDS](#) ▾ [ENFORCEMENT](#) ▾ [CONSTRUCTION](#) ▾ [TOPIC](#) ▾ [NEWS/RESOURCES](#) ▾ [DATA](#) ▾ [TRAINING](#) ▾



## Hurricane Preparedness and Response

[Introduction](#)

[Preparedness](#)

[Response/Recovery](#)

[OSHA Resources](#)

[Additional Resources](#)

[Emergency Preparedness and Response](#) ▾

### Response/Recovery

OSHA's [Hurricane eMatrix](#) outlines the activities most commonly performed during hurricane response and recovery work and provides detailed information about the hazards associated with those activities. The eMatrix is designed to help employers make decisions to protect workers and offers recommendations for personal protective equipment, safe work practices, and precautions for each activity.

#### Additional Information:

- [Hurricanes](#). Environmental Protection Agency (EPA)
- [Hurricanes](#). Ready.gov - Federal Emergency Management Agency (FEMA)



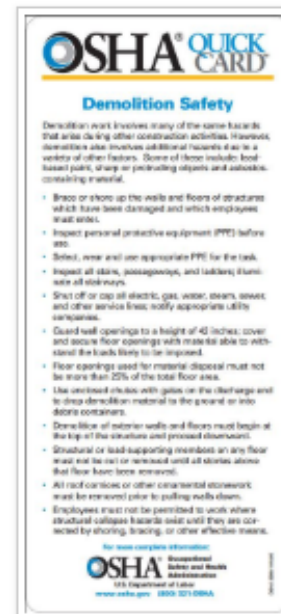
## Hurricane Preparedness and Response

Introduction Preparedness Response/Recovery **OSHA Resources** Additional

### OSHA Resources

#### OSHA QuickCards™

- Aerial Lifts | Spanish
- Carbon Monoxide Poisoning | Spanish
- Chain Saws | Spanish | Portuguese
- Chipper Machine Safety | Spanish | Portuguese
- Construction Hazards (Top Four)
- Construction PPE | Spanish
- General Decontamination | Spanish | Portuguese
- Demolition Safety | Spanish | Portuguese
- Electrical Safety | Spanish
- Filling, Moving and Placing Sandbags
- Hand Hygiene and Gloves | Spanish | Portuguese
- Heat | [More...]
- Sun | Spanish
- Hydrogen Sulfide | Spanish
- Lead in Construction | Spanish
- Mold | Spanish | [More...]
- Permit-Required Confined Spaces | Spanish
- Portable Generator Safety | Spanish
- Portable Ladder Safety
- Rescue of Animals (Dogs)
- Respirators | Spanish | Portuguese
- Rodents, Snakes and Insects | Spanish | Vietnamese
- Tree Trimming and Removal Safety | Spanish | Vietnamese | Portuguese
- West Nile Virus | Spanish
- Work Zone Traffic Safety | Spanish





## OSHA Fact Sheets

- Aerial Lifts
- Atmospheric Testing in Confined Spaces
- Black Widow Spider
- Brown Recluse Spider
- Chain Saw Safety | Spanish
- Cleanup Hazards | Spanish | Portuguese
- General Decontamination
- Demolition and Cleanup
- Downed Electrical Wires
- Working Safely with Electricity | Spanish
- Falls
- Filling, Moving and Placing Sandbags
- Fire Ants
- Flood Cleanup
- Fungi Hazards | Spanish | [More...]
- Grounding Portable Generators
- Hand Hygiene and Gloves
- Handling Human Remains
- Heat Safety | Spanish | [More...]
- Disaster Cleanup and Recovery PPE Matrix | Spanish
- Keeping Workers Safe during Disaster Cleanup and Recovery | Spanish
- Hydrogen Sulfide
- Lead Hazards
- Lead in Construction
- Lockout/Tagout | Spanish
- Mass Care Shelter Occupational Hazards
- Mold Hazards during Disaster Cleanup
- Portable Generator Safety
- Safety and Health Checklist
- Search and Rescue
- Tree Trimming Safety | Spanish
- Trenching and Excavation Safety
- West Nile Virus
- Working Outdoors
- Work Zone Traffic Safety

### OSHA FactSheet

#### Cleanup Hazards

*Clean-up work of one kind or another, but flood conditions make it even more so. Following the procedures listed below will help to keep you safe and healthy while cleaning up after natural disasters that involve flooding.*

**Health Tips**

- Take frequent rest breaks when lifting heavy, water-soaked objects. Avoid overexertion and practice good lifting technique. To help prevent injury, use teams of two or more to move bulky objects; avoid lifting any materials that weigh more than 50 pounds per person, and use proper automated lifting assistance devices if practical.
- When working in hot environments, have plenty of drinking water available, use sunscreen, and take frequent rest breaks. Wear light-colored, loose-fitting clothing. Be sure that a first aid kit is available to deal with any cuts or abrasions. Protect open cuts and abrasions with waterproof gloves or dressings.
- Wash your hands often during the day, especially before eating, drinking, or applying cosmetics.

**General Precautions**

- Use a wooden stick or pole to check flood ed areas for pits, holes, and protruding objects before entering.
- Ensure that all ladders and scaffolds are properly secured prior to use.
- Conduct a preliminary structural inspection to verify stability before entering a flooded or formerly flooded building or before operating vehicles over runways or surfaces. Don't work in or around any flood-damaged building until it has been examined and certified as safe for work by a registered professional engineer or architect.
- Wetlands, trenches, excavations, and gullies must be supported or their stability verified prior to worker entry. All trenches should be supported (e.g., with a trench box) if no support is available, the trench must be shored at no less than a 1:1 (60%) angle for cohesive soil and angular gravel and a 1:1 (24) angle for granular soils including gravel, sand, and loamy sand or submerged soil or soil from which water is being seeping.
- Establish a plan for contacting medical personnel in the event of an emergency.
- Report any obvious hazards (downed power lines, frayed electric wires, gas leaks or leaks to appropriate authorities).
- Use fuel-powered generators outdoors. Do not bring them indoors, as they may pose a carbon monoxide (CO) hazard.
- Use life vests when engaged in activities that could result in deep water exposure.
- Use extreme caution when handling unknown building unknown substances or toxic liquid substances (for example, floating containers of household or industrial chemicals). Contact the EPA (Environmental Protection Agency) for information on disposal at the National Response Center (800) 424-9303.
- Do NOT use improvised surfaces (e.g., refrigerator mats) for walking/standing or for boiling water to avoid exposure to heavy metals.

**Clothing and Personal Protective Equipment**

- Always wear water-tight boots with a steel toe and shank, gloves, long pants, and safety glasses during cleanup operations; workers should NOT be worn because they will not prevent punctures, lacerations or crush injuries. Wear a hardhat if there is any danger of falling debris.
- Wear a NIOSH approved dust respirator if working with moldy building materials or

[Aerial Lifts](#)

[Atmospheric Testing in Confined Spaces](#)

[Black Widow Spider](#)

[Brown Recluse Spider](#)

[Chain Saw Safety](#) | [Spanish](#)

[Cleanup Hazards](#) | [Spanish](#) | [Portuguese](#)

[General Decontamination](#)

[Demolition and Cleanup](#)

[Downed Electrical Wires](#)

[Working Safely with Electricity](#) | [Spanish](#)

[Falls](#)

[Filling, Moving and Placing Sandbags](#)

[Fire Ants](#)

[Flood Cleanup](#)

[Fungi Hazards](#) | [Spanish](#)

## OSHA FactSheet

### Cleanup Hazards

Cleanup work of any kind is hazardous, but flood conditions make it even more so. Following the procedures listed below will help to keep you safe and healthy while cleaning up after natural disasters that involve flooding.

#### Health Tips

- Take frequent rest breaks when lifting heavy, water-laden objects. Avoid overexertion and practice good lifting techniques. To help prevent injury, use teams of two or more to move bulky objects; avoid lifting any materials that weigh more than 50 pounds per person, and use proper automated lifting assistance devices if practical.
- When working in hot environments, have plenty of drinking water available, use sunscreens, and take frequent rest breaks. Wear light-colored, loose-fitting clothing.
- Be sure that a first aid kit is available to disinfect any cuts or abrasions. Protect open cuts and abrasions with waterproof gloves or dressings.
- Wash your hands often during the day, especially before eating, drinking, or applying cosmetics.

#### General Precautions

- Use a wooden stick or pole to check flooded areas for pits, holes, and protruding objects before entering.
- Ensure that all ladders and scaffolds are properly secured prior to use.
- Conduct a preliminary worksite inspection to verify stability before entering a flooded or formerly flooded building or before operating vehicles over roadways or surfaces. Don't work in or around any flood-damaged building until it has been examined and certified as safe for work by a registered professional engineer or architect.
- Walkways, trenches, excavations, and gullies must be supported or their stability verified prior to worker entry. All trenches should be supported (e.g., with a trench

box) if no support is available, the trench must be sloped at no less than a 1:1 (45°) angle for cohesive soil and angular gravel and a 1 1/2:1 (34°) angle for granular soils including gravel, sand, and loamy sand or submerged soil or soil from which water is freely seeping.

- Establish a plan for contacting medical personnel in the event of an emergency.
- Report any obvious hazards (downed power lines, frayed electric wires, gas leaks or valves) to appropriate authorities.
- Use fuel-powered generators outdoors. Do not bring them indoors, as they may pose a carbon monoxide (CO) hazard.
- Use life-vents when engaged in activities that could result in deep water exposure.
- Use extreme caution when handling containers holding unknown substances or known toxic substances (for example, floating containers of household or industrial chemicals). Contact the EPA (Environmental Protection Agency) for information on disposal at the National Response Center (800) 424-8802.
- Do NOT use improvised surfaces (e.g., refrigerator racks) for cooking food or for boiling water to avoid exposure to heavy metals.

#### Clothing and Personal Protective Equipment

- Always wear watertight boots with a steel toe and insole, gloves, long pants, and safety glasses during cleanup operations; sneakers should NOT be worn because they will not prevent punctures, bites or crush injuries. Wear a hardhat if there is any danger of falling debris.
- Wear a NIOSH-approved dust respirator if working with moldy building materials or

# CPWR Resources

## Toolbox Talks, Hazard Alert Cards & Other Resources on:

- Aerial Lifts
- Biohazard Safety
- Confined Spaces
- Falls
- Fatigue
- Histoplasmosis
- Lightning
- Lockout/Tagout
- Roof Collapse
- Trench Safety
- Working with Electricity
- Working in Cold/Hot Weather





# Other Resources

## Hurricane Preparedness and Response

[Introduction](#)

[Preparedness](#)

[Response/Recovery](#)

[OSHA Resources](#)

[Additional Resources](#)

[Emergency Preparedness and Response ▾](#)

### Additional Resources

- [National Hurricane Center](#)
- [Hurricanes & Floods](#). The National Institute of Environmental Health Sciences (NIEHS)
- [Hurricanes](#). Ready.gov - Federal Emergency Management Agency (FEMA)
- [Hurricanes and Other Tropical Storms](#). Centers for Disease Control and Prevention (CDC)
- [Hurricanes](#). Environmental Protection Agency (EPA)
- [Disasters and Emergencies](#). USA.gov
- [Hurricane Safety](#). American Red Cross
- [Hurricane Safety Checklist](#). American Red Cross
- [Power Outage Safety](#). American Red Cross
- [Slips, Trips, and Falls in the Office](#). Texas State Office of Risk Management
- [Protecting Yourself While Removing Post-Disaster Debris From Your Home or Business](#). National Institute of Environmental Health Sciences (NIEHS)
- [Occupational Safety and Health and Climate](#). National Institute for Occupational Safety and Health (NIOSH) Workplace Safety and Health Topic

### Indoor Environmental Pollutants

An interagency indoor environmental pollutant workgroup developed guidance for employers and workers engaged in disaster recovery operations, focusing on demolition, clean-up, and rebuilding of damaged homes. Disaster recovery workers may encounter asbestos, lead, mold and radon at their work sites. The guidance from the U.S. Department of Housing and Urban Development (HUD), the U.S. Department of Health and Human Services (HHS), the Environmental Protection Agency (EPA), and OSHA provides information about these types of hazards and how to protect workers from exposure.

- [Asbestos: Worker and Employer Guide to Hazards and Recommended Controls](#)
- [Lead: Worker and Employer Guide to Hazards and Recommended Controls](#)
- [Mold: Worker and Employer Guide to Hazards and Recommended Controls](#)
- [Radon: Worker and Employer Guide to Hazards and Recommended Controls](#)



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Text GETEMERGENCY to 90999 or search "Red Cross Emergency" in the [Apple App Store](#) or [Google Play Store](#).



Aplicación Emergencia - ahora disponible en español también!



Red Cross Ready Rating™ Program

Check out this free [preparedness program](#) to help businesses, schools and organizations evaluate and improve emergency preparedness.



## Psychological Resilience During an Emergency Response

- [Tips for Supervisors of Disaster Responders: Helping Staff Manage Stress When Returning To Work](#). Substance Abuse and Mental Health Services Administration (SAMHSA)
- [A Guide to Managing Stress in Crisis Response Professions \(2005\)](#). Substance Abuse and Mental Health Services Administration (SAMHSA). This SAMHSA pocket guide provides first responders with information on signs and symptoms of stress and offers simple, practical techniques for minimizing stress responses prior to and during a disaster response.
- [Field Manual for Mental Health and Human Service Workers in Major Disasters](#). Substance Abuse and Mental Health Services Administration (SAMHSA)
- [Disaster Responders-SAMHSA Disaster Behavioral Health Information Series Installment](#). Substance Abuse and Mental Health Services Administration (SAMHSA)
- [Psychological First Aid for First Responders](#). Substance Abuse and Mental Health Services Administration (SAMHSA)
- [Tips for Disaster Responders: Understanding Compassion Fatigue](#). Substance Abuse and Mental Health Services Administration (SAMHSA)
- [A Post-Deployment Guide for Supervisors of Deployed Personnel](#). Substance Abuse and Mental Health Services Administration (SAMHSA)
- [Introduction to Disaster Behavioral Health Webinar](#). Substance Abuse and Mental Health Services Administration (SAMHSA)
- [Health, Safety, and Resilience for Disaster Responders](#). Centers for Disease Control and Prevention (CDC)
- [Surviving Field Stress For First Responders](#). Centers for Disease Control and Prevention (CDC)
- [Traumatic Incident Stress: Information for Response Workers](#). National Institute for Occupational Health (NIOSH), CDC
- [Psychological First Aid Manual](#). U.S. Department of Veteran Affairs
- [SAMHSA's Efforts for Disaster Preparedness, Response, and Recovery Website](#). SAMHSA coordinates behavioral health resources to help responders and communities prepare, respond, and recover from disasters.
- [Coping with a Disaster or Traumatic Event](#). Centers for Disease Control and Prevention (CDC). Provides general strategies for promoting mental health and resilience that were developed by various organizations based on experiences in prior disasters.

The SAMHSA Disaster Distress Helpline is a national hotline dedicated to providing year-round immediate crisis counseling for people who are experiencing emotional distress related to any natural or human-caused disaster. This toll-free, multilingual, and confidential crisis support service is available to all residents in the United States and its territories. Stress, anxiety, and other depression-like symptoms are common reactions after a disaster. Call 1-800-985-5990 or text TalkWithUs to 66746 to connect with a trained crisis counselor.





### FEMA App

The [FEMA App](#) is a great resource of information. Features of FEMA's app include: Alerts and safety messages from the National Weather Service (for up to five locations across the U.S.); upload and share photos of damage and recovery efforts; maps of disaster resources; apply for assistance; save custom emergency safety information such as custom list of items in your family's emergency kit, as well as the places you will meet in case of an emergency, and receive safety and preparedness reminders and learn how to stay safe before, during, and after over 20 types of hazards, including floods, hurricanes, tornadoes and earthquakes. All features of the app are available in English or Spanish.



# Summary

- The hazards and issues are dynamic and require vigilance and flexibility
- The key to a safe response is attention to the safety issues of your work environment
- The physical hazards are similar to any construction or demolition site
- The health hazards include the hazards associated with the environment