Responder Safety & Health

Twisted steel and other debris at World Trade Center site following terrorist attacks of September 11, 2001. Courtesy of OSHA.

Learning Objectives

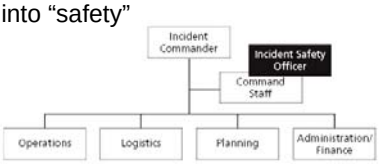
- Identify common hazards you may encounter during a response and how those hazards affect your health and safety
- Describe the health and safety precautions that should be taken during a response to protect yourself

Safety Awareness for Environmental Health Practitioners

PROTECT YOURSELF!

The Safety Officer

- Key role within ICS Command Staff
- Assures personnel safety
- Monitors hazardous/unsafe situations
- Prepares site-specific safety and health plan
- Environmental health must support and provide input into “safety”



Federal Response

- OSHA is responsible for
  - Setting safety and health standards for emergency responders
    - Hazardous Waste Operations and Emergency Response (HAZWOPER) standard of 29 CFR 1910.120 (q)
  - Coordinating federal safety and health assets
- Worker Safety and Health Annex to the National Response Framework (NRF)

Employer Responsibilities

- State and local governments are responsible for worker safety and health including
  - Allocating sufficient resources for safety and health programs
  - Training and educating staff
  - Purchasing personal protective equipment
  - Vaccinations
  - Correcting unsafe or unsanitary conditions

Responder Responsibilities

- Follow all safety and health rules
- Wear/use all required gear or equipment
- Follow safe work practices for your job
- Report hazardous conditions to your team leader, supervisor, Safety Officer, or appropriate authorities
- Correct unsafe or unsanitary conditions
- Protect your family at home from exposures

Physical and Mental Fitness for Duty

- You are responsible for
  - Being prepared to do your job
  - Following good personal health habits
  - Assessing whether you are well enough to work
  - Assessing appropriate work schedule and adequate staffing levels
  - Coping with role ambiguity

Recommended Personal Gear

- Copy of personal records and ID
- Weather-appropriate gear (e.g., rain)
- Changes of clothing
- Toiletries
- Alcohol-based hand sanitizer
- Flashlight with spare batteries
- Prescription/OTC medicines
- Sunscreen and lip balm
- Insect repellant
- Hat or cap
- Sunglasses & extra pair of glasses/contacts
- Cell phone and charger

Example of a Go-Kit

Emergencies in the Field

- Notify your supervisor, Safety Officer, or other appropriate personnel about all injuries sustained at your site
- For minor injuries
  - Apply buddy-care/first aid
  - Seek a first aid station or clinic
- For serious injuries
  - Go to the local hospital
  - Call emergency services/911 (know your exact location)

Potential Hazards

- Stress
- Physical
- Biological
- Chemical
- Thermal
- Radiation
- Violence

Safety and Health Hazards are Dynamic

Hazard Control Response Time Line

Emergency Phase (first 72 hours)	Recovery Phase (first 4 weeks)	Reconstruction Phase (first 2 years)
Structural Instability	Re-entry Decontamination	Re-entry Decontamination
Exposure Assessment (first responders, HCWs, community)	Respiratory, Ingestion, Eye, and Dermal Hazards	Business Resumption Hazards
Human Remains	Hazardous Materials	Solid Waste Disposal
Electrical Hazards	Heavy Equipment Hazards	Ground and Water Pollution
Thermal Stress	Cross Contamination	Demolition Hazards
Fire	Agriculture Hazards	Construction Hazards
Security	Food Hygiene	
Mass Evacuation and Shelter	Communicable Diseases	
Food and Water	Mental Health	
Hazardous Materials	Vector Control	

Fatigue and Stress

- Pace yourself
- Take frequent rest breaks
- Watch out for each other
- Be conscious of those around you
- Stay hydrated
- Attend mental health debriefings

Debris Piles/Unstable Surfaces

- Only walk on surfaces you know are stable
- Watch for sharp edges and points
- Wear protective equipment (e.g., safety shoes with slip-resistant soles, hard hat, leather gloves)
- Beware of trench collapses and cave-ins

Structural Integrity

- Do not enter questionable structures until they are evaluated and rendered safe
- Conduct all necessary activities from outside damaged structures
- Ensure structures are evaluated by a competent person

Heavy Equipment

- Stay aware of all moving machinery and motor vehicles
- Do not walk under or through areas where cranes and other heavy equipment are lifting objects
- Do not climb onto or ride loads being lifted or moved
- Do not ride on equipment or in bucket

Injury from Dust & Flying Debris

- Be alert to the hazards from nearby workers, machinery, and falling/shifting debris
- Wear safety glasses with side shields
- Consider wearing goggles for protection against dust particles or for use over prescription glasses
- Wear hard hats, safety shoes, and work gloves

Utilities Hazards

- Treat all power lines and cables as energized until proven otherwise
- Stay clear of downed electrical lines
- Gas lines, water pipes, sewer lines, and other utilities may also be compromised

Exposure to High Noise Levels

- A worksite is considered noisy if you have to shout to be heard
- High noise levels are generated from gas-powered saws, pneumatic tools, and heavy construction equipment
- Wear appropriate hearing protection in noisy work environments

Hearing Protection Devices

- Foam plugs
- Pre-molded, reusable plugs
- Canal caps
- Earmuffs

Slips, Trips, and Falls

- Can be caused by
  - Wet or slippery surfaces
  - Improper footwear
  - Poor lighting
  - Obstacles in pathway
  - Ladders
  - Changes in elevation or uneven surfaces (curbs, cracks, ramps, single steps, stairs)
  - Personal factors (gait, physical condition, eyesight, perception)
- Take protective or corrective actions

- Avoid back injuries!

Driving in Disaster Areas

- Use a seat belt at all times
- Avoid distractions
- Stay alert to situations requiring quick action
- Watch for emergency vehicles
- Watch for other drivers and flaggers

Confined Spaces

What is a confined space?

- Space with limited access
- Large enough for bodily entry
- Not designed for occupancy
- Examples: sewers, wells, storm drains, tanks, vats, boilers, silos, pits, tunnels

What are the hazards?

- Hazardous atmosphere
- Flammable/explosive gases, vapors, or mists
- Toxic substances
- Oxygen deficiency or surplus
- Entrapment
- Engulfment

AVOID CONFINED SPACES!

Bloodborne Pathogens

- Bloodborne pathogens: microorganisms such as viruses or bacteria that are carried in blood and can cause disease in people
- Infected blood can enter your system through
  - Open sores
  - Cuts
  - Abrasions
  - Acne
  - Any sort of damaged or broken skin such as sunburn or blisters
  - Mucous membranes (eyes, nose, mouth)

Bloodborne Pathogens

- Adopt Universal Precautions
- Assume blood or bodily fluids potentially contaminated with blood are infectious
- Wear gloves
- Wear eye protection such as goggles or faceshield if needed
- Consider receiving the Hepatitis B series vaccination

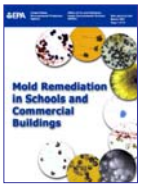
Handling Human Remains

- For personnel exposed to blood and body fluids
  - Use gloves when handling bodies or fluids
  - Use eye protection, gowns, and masks when large quantities or splashes are anticipated
  - Wash hands frequently
  - Properly disinfect/dispose of soiled items

- CDC Interim Health Recommendations for Workers who Handle Human Remains After a Disaster
- Precautions also apply to animal remains

Mold

- Flooded buildings promote mold growth
- Symptoms include sneezing, coughing, nasal/eye/skin irritation, and asthma-like symptoms
- When working with small areas of moldy or damp materials, use
  - NIOSH-approved particulate respirators
  - Gloves
  - Goggles
- Additional protection may be needed for high-contamination areas or when activities generate substantial dust



Foodborne Disease

- Practice hand hygiene before eating
- Assure that your food is from a safe source
- Identify and throw away any food that may not be safe to eat
- Store food safely
- Only drink from potable water sources proven to be safe

Waterborne Disease

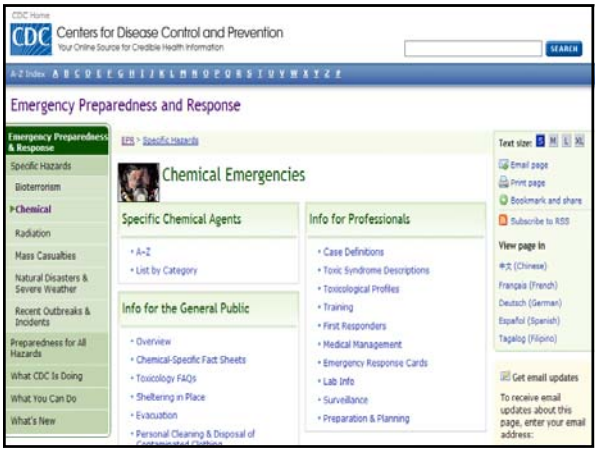
- Remember, it is not just rain water!
  - Failed wastewater treatment plants
  - Backed up, overflowing sewer lines
  - Chemical spillage and wash off
  - Flood water pollution of wells
- Drink from bottled water sources until water supplies are safely treated

Chemical/Hazmat Exposures

- You may be exposed via the following routes:
  - Inhalation
  - Skin absorption
  - Ingestion
  - Injection (e.g., “sharps”)
- Sources
  - Industrial/commercial
  - Households
  - Responder use (e.g., pesticides and disinfectants)

Chemical/Hazmat Exposures

- Follow all safety recommendations issued by appropriate authorities
- Avoid hazardous sites
- Avoid contact with chemicals
- Wear appropriate PPE
- Stay aware of wind directions
- Alert local emergency authorities



Carbon Monoxide Poisoning

- Colorless, odorless, toxic gas
- Combustion fumes from
  - Cars, trucks, heavy machinery
  - Small gasoline-powered engines
  - Burning wood or charcoal
  - Temporary space heaters
  - Gas ranges, stoves & heating systems
- Symptoms vary from headache, dizziness, drowsiness, nausea, and vomiting to loss of consciousness, collapse, coma, or death under prolonged or high exposures

Video Presentation

How Close is Too Close for Portable Generators?

Inhalation of Dust Containing Asbestos, Silica, and Other Particulates

- Dust may contain hazardous materials
- Avoid dust-generating activities
- Follow PPE recommendations by supervisor safety officer, or other appropriate authorities
  - NIOSH-approved respirators may be recommended if potential for exposure to asbestos, silica, or high levels of particulates

N-95 Respirator

Smoke Inhalation

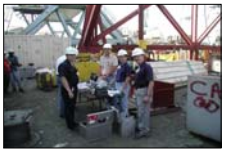
- Hazardous decomposition products
  - Carbon monoxide
  - Particulate matter
  - Chemicals
  - Other compounds
- Avoid smoky areas
- Wear PPE if must work in smoky areas
- Call Emergency Services

Personal Protective Equipment

Level A – Maximum skin, respiratory, and eye protection

Level B – Maximum respiratory, but lower skin protection

Level C – Respiratory protection for known substances



Level D – Lowest protection, classified as work uniform

Respirator Care and Use

- Used in context with OSHA approved program
  - Medical evaluation, fit testing, training, maintenance, and safe storage
- Wear NIOSH-approved respirators
- Replace when filter material is wet or visually soiled

Video Presentation

Use of Facemasks and Respirators

Cold Stress

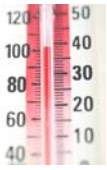
- Contributing conditions
  - Cold air temperatures
  - High velocity air movement
  - Air dampness/humidity
  - Contact with cold water or surfaces
- Cold-related disorders
  - Hypothermia
  - Frostbite
  - Chilblains
  - Immersion/trench foot

Cold Stress Prevention

- Wear appropriate clothing
  - Layers (usually 3)
  - Hats
  - Boots
  - Gloves
- Stay hydrated
- Take frequent breaks in warm areas

Heat Stress

- Contributing conditions
  - High temperature and humidity
  - Direct sun or heat exposure
  - Physical exertion
  - Clothing (e.g., PPE)
  - Poor physical condition
- Heat-related disorders
  - Heat rash
  - Fainting
  - Heat cramps
  - Heat exhaustion
  - Heat stroke



Heat Stress Prevention

- Stay hydrated (1 cup water or sports drink every 20 minutes)
- Watch for signs and symptoms of heat-related illness
- Reduce work load/adjust work schedule
- Take frequent breaks in cool areas
- Wear lightweight, light colored, loose-fitting clothes
- Avoid alcohol, caffeinated drinks, or heavy meals

Sun Exposure

- Prevent overexposing skin and eyes to sunlight and wind in all seasons
- Use sunscreen and lip balm
- Use protective eyewear
- Limit exposure

Radiation Exposure

- Follow time, distance & shielding precautions
- Wear personal dosimeter if entering contaminated areas
- Female workers should declare pregnancies
- Follow PPE, personal hygiene and decontamination precautions

Animal/Insect Bites, Stings, and Aggressive Behavior

- Use insect repellent containing DEET, picaridin, OLE, PMD, or IR3535
- Take other protective measures
  - Avoid peak exposure times/places
  - Wear appropriate clothing
  - Bed nets
  - Treat clothing, bed nets, and gear with permethrin

Animal/Insect Bites, Stings, and Aggressive Behavior

- Be aware of displaced wildlife, pets, and other animals
- Inspect areas before entering
- Be cautious about where you place your hands and feet
- Wear proper foot gear and leather gloves when working in suspect areas

Contact with Poisonous Plants

- Learn to recognize poisonous plants
- Use gloves and wear appropriate clothing (e.g., long pants)
- Wash affected area with soap or detergent
- Rubbing alcohol may remove oily resin causing the reaction

Social Unrest and Violence

- People may be severely stressed under disaster conditions
- Report unlawful activities to appropriate authorities
- Avoid travel into hostile areas without a security escort and means of reliable communication
- When in doubt, do not enter these areas!

Remember

- The hazards are dynamic and require vigilance and flexibility
- The key to a safe response is attention to the health and safety issues of your work environment
  - Physical hazards are similar to any construction or demolition site
  - Health hazards include those associated with the environment (e.g., food, water, chemicals, vectors)
  - Social impacts include the hazards associated with psychological/behavioral stress and violence

How to Approach Worker Safety and Health

- Prevention is the key!
- Prevent exposures, illnesses, and injuries through the occupational health hierarchy of controls:
  - Elimination
  - Substitution
  - Engineering controls
  - Administrative controls
  - Personal protective equipment

NIOSH Emergency Responder Health Monitoring and Surveillance (ERHMS)

- Framework/system for ensuring responder safety and health
- Developed due to concerns after large-scale, complex emergencies and disasters
- Monitoring and surveillance of responder safety and health during pre-deployment, deployment, and post-deployment
- Currently being finalized and will soon be released.

Activity

Scenario:

You are a member of an environmental health strike team in your state following a severe snow/ice storm caused by a nor'easter in January. You have been asked by your team leader to provide a team safety briefing before deploying to assess retail restaurants for possible re-opening.

What types of potential safety and health hazards would you mention in your team briefing?

Optional Video Presentation #1

Worker Safety & Health During the Exxon Valdez Oil Spill

Courtesy of the National Institute of Environmental Health Sciences (NIEHS), Worker Education & Training Program (WETP) and Mark Catlin (Service Employees International Union (SEIU) Education & Support Fund). For more information on this and other worker safety and health videos, contact Mark Catlin at mark.catlin@seiu.org.

Optional Video Presentation #2

Response Worker Health & Safety During the Deepwater Horizon Oil Spill

Courtesy of the official YouTube channel for BP America. Accessible at http://www.youtube.com/watch?v=EkFRbpcX65s. For more information, visit the official YouTube channel for BP American at http://www.youtube.com/bp.

Optional Video Presentation #3

Proper Safety Gear for Working with Dispersants and the Oil Spill (Deepwater Horizon Oil Spill)

Courtesy of the official YouTube channel for Natural Resources Defense Council (NRDC). Accessible at http://www.youtube.com/watch?v=8GMT5QRyjgM. For more information, visit the official YouTube channel for NRDC at http://www.youtube.com/user/NRDCflix.

Questions