

# Health Hazards in Construction

# Health Hazards

Potential exposures to health hazards:

- Worker on the job
- Worker's family



Source: OSHA

# Objectives

1. Identify common health hazards.
2. Describe types of common health hazards.
3. Apply health hazard protection methods.
4. Recognize employer requirements to protect workers from health hazards in construction, including hazards communication program.

# Common Health Hazards

## Chemical



Source: OSHA

## Physical



Source: OSHA

## Biological



Source: OSHA

## Ergonomic



Source: Arlosvaldo Gonzáfoles (Flickr.com)

# Common Ways Workers Encounter Chemical Hazards

- Solids
- Liquids
- Gases and vapors
- Aerosols
  - Dust, Mist, Fumes

## Welding Fumes



Source: U.S. Navy

## Asbestos



Source: OSHA

## Spraying Chemicals



Source: OSHA

## Silica



Source: OSHA

## Lead



Source: OSHA

Effects of Chemical Exposure  
May put workers at risk of developing health problems:

Health Problems		
Heart Ailments	Lung Damage	Sterility
CNS Damage	Kidney Damage	Burns
Cancer	Liver Damage	Rashes

May pose risk of fire and explosion hazards:

Fire



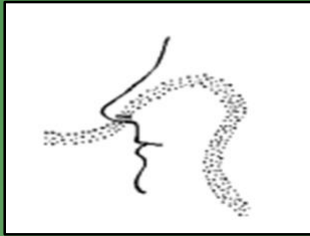
Source: Virginie Moerenhout (Flickr.com)

Explosion



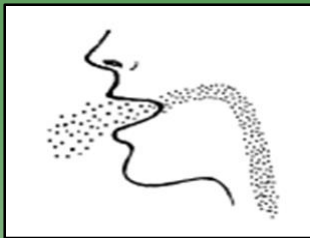
Source: Jonathan Perera (Flickr.com)

# Routes of Entry



Source: OSHA

**Inhalation:** Breathed in (Most common route)



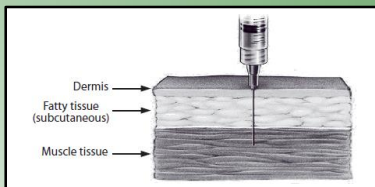
Source: OSHA

**Ingestion:** Swallowing via eating or drinking



Source: OSHA

**Absorption:** Drawn through skin or eye surface



Source: CDC

**Injection:** Punctures through skin

# Health Effects

Exposure Condition		Exposure	Example
<b>ACUTE</b>	Immediate	Short-term, high concentration	H <sub>2</sub> S exposure within a confined space
<b>CHRONIC</b>	Delayed; generally for years	Continuous; for long periods of time	Asbestosis

Acute



Source: U.S. Army Corps of Engineers

Chronic



Source: OSHA



# Chemical Hazard Protection

Eliminate

Substitution

Engineering

Administrative

PPE



# Chemical Hazard Protection

- **Engineering**

- Ventilation (local/general)
- Process and equipment modification
- Isolation/automation

- **Administrative**

- Monitor/measure exposure levels
- Inspections and maintenance
- Develop SOPs

- **PPE**

- Respirators
- Gloves
- Safety glasses
- Protective clothing

Local Exhaust Ventilation



Source: OSHA

# Physical Hazards in Construction

- Noise
- Temperature extremes
- Vibration
- Radiation

## Noise and Vibration



Source: Nick Allen (Flickr.com)

## Temperature



Source: OSHA

## Radiation



Source: Alper Çuğun (Flickr.com)

# Effects of Exposure to Physical Hazards

<b>Temperature</b>	<b>Radiation</b>	<b>Vibration</b>	<b>Noise</b>
Rash; Cramps	Burns	Fatigue	Interferences
Exhaustion	Sickness	Strains	Stress
Stroke	Aging	Carpal tunnel	Tinnitus
Hypothermia	Cancer	HAVS	Headaches
Frostbite	DNA mutations	Raynaud's	Hearing loss

# Noise

<b>Common Construction Noise Sources</b>	
<b>Equipment</b>	<b>Noise (dB)</b>
Backhoe	85
Bulldozer	87
Router	90
Front end loader	90
Chop saw	92
Welding equipment	92
Nail gun	97
Jackhammer	102
Grader/scrapper	107

Source: U.W. Dept. of Environmental & Occupational Health Services – Rick Neitzel July, 2005

**Prolonged exposures to 85 dB can lead to hearing loss**

# Protection Against Physical Hazards

<b>Hazard</b>	<b>Engineering Controls</b>	<b>Administrative Controls</b>	<b>PPE</b>
<b>Temperature</b>	Heaters; AC; windshields; ventilation	<u>Water; Rest; Shade</u>	Hoods; cooling vests; hard hat liners
<b>Vibration</b>	Vibration reduction equipment	Train not to grip too tightly; Job rotation	Anti-vibration gloves
<b>Noise</b>	Silencers; mufflers; enclosures; sound barriers	Increase distance between source and worker	Ear plugs; muffs



**Eliminate or substitute hazard, whenever feasible**

# Biological Hazards in Construction

## Insects



Source: James Jordan (Flickr.com)

## Animals



Source: Jean-Jacques Boujot (Flickr.com)

## Mold



Source: OSHA

## Plants



Source: OSHA

## Water/Sewage



Source: Matt Brown (Flickr.com)

## Blood



Source: Monsieur Gordon (Flickr.com)

# Effects of Exposure to Biological Hazards

- **Mild**

- Allergic reaction

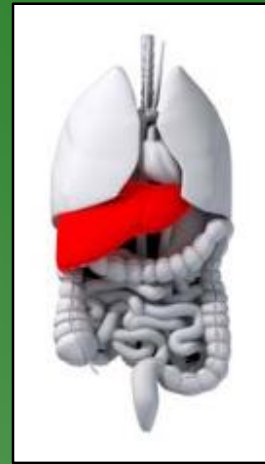
- **Serious**

- Tetanus
- Swine Flu
- SARS
- Avian Flu
- West Nile
- Lyme Disease

- **Chronic/Terminal**

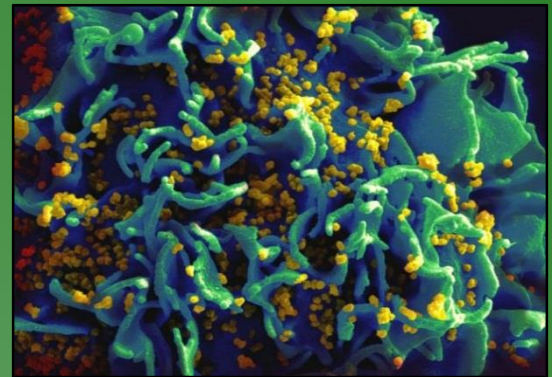
- HIV
- Hepatitis B & C

## Hepatitis C



Source: OSHA

## HIV-infected H9 T cell



Source: NIAID



# Protection Against Biological Hazards

- Practice precaution with:
  - Blood
  - Bodily fluids
  - Animals
  - Insects
- Personal hygiene
- Proper first aid
  - Cuts/Scratches
- Proper PPE
- Vaccinations – schedule



Source: U.S. Army Corps of Engineers

# Ergonomic Hazards in Construction

- Lifting and pushing
  - Heavy
  - Awkward
  - Repetitive
- Awkward grips and postures
- Reaching
- Using wrong tool or using tool improperly
- Using excessive force
  - Overexertion



Source: OSHA

# Effects of Exposure to Ergonomic Hazards

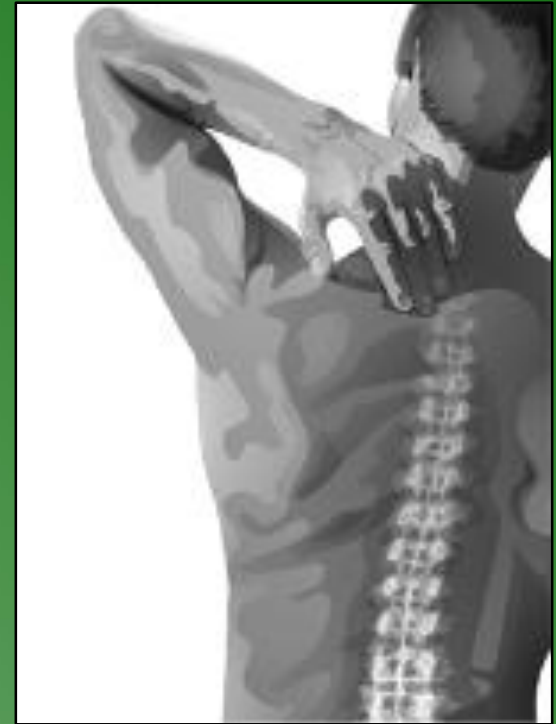
## Musculoskeletal Disorders (MSDs)

### • Mild

- Joint pain
- Swelling
- Sciatica
- Acute lower back pain

### • Serious

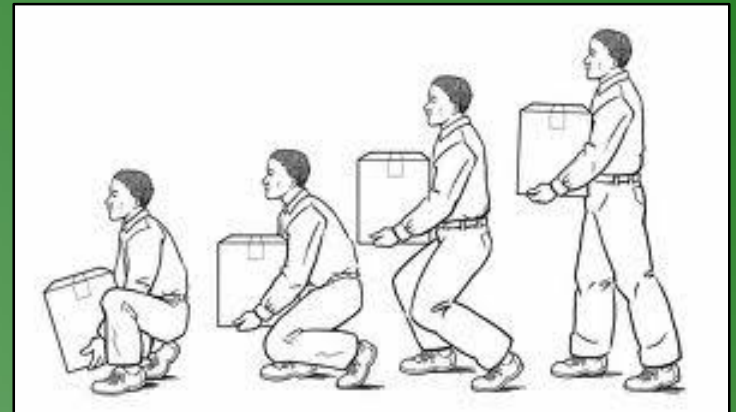
- Epicondylitis (Tennis Elbow)
- Raynaud's Phenomenon (White finger)
- Thoracic Outlet Syndrome
- Carpal Tunnel Syndrome
- Chronic lower back pain
- Tears (Rotator cuff is common)



Source: OSHA

# Protection Against Ergonomic Hazards

- Use ergonomically designed tools
- Use correct work practices
  - Proper lifting techniques
  - Work station setup
- Ask for help when handling:
  - Heavy loads
  - Bulky/Awkward materials
- Proper PPE



Source: Boston University ([bu.edu/wellness/workplace/ergonomic](http://bu.edu/wellness/workplace/ergonomic))

# Employer Requirements

- Abide by OSHA regulations
  - Permissible Exposure Limits (PELs) for all chemicals
  - Monitoring and protection programs
  - Hazard Communication Program (HAZCOM)
    - Worker right to know
    - Hazardous chemical training
    - Written plan (Who, What, Where)
    - Proper chemical labeling
    - SDS



Source: OSHA

# Multiple health hazards

In some cases, workers can be exposed to several health hazards at the same time or on the same worksite over time.



Source: OSHA

This worker is simultaneously exposed to noise, silica dust, vibration, and ergonomic hazards.

# Knowledge Check

1. Which of the following is a common type of health hazard:
  - a. Chemical hazards
  - b. Economic hazards
  - c. Electrical hazards
  - d. Fall hazards

**a. Chemical hazards**

# Knowledge Check

2. Which of the following is an example of a physical health hazard:
- a. Asbestos
  - b. Noise
  - c. Silica
  - d. Lead

**b. Noise**



# Knowledge Check

3. Which is an appropriate engineering control for protection against noise exposures:
  - a. Audiograms
  - b. Earplugs
  - c. Increasing distance between source
  - d. Constructing sound barriers

**d. Constructing sound barriers**

# Knowledge Check

4. Which is a requirement of the employer:
  - a. Determine if workers' exposures exceed OSHA PELs
  - b. Perform medical evaluations on all employees
  - c. Develop silica training programs for all employees
  - d. Provide all workers with safety toe protective footwear

**a. Determine if workers  
exposures exceed OSHA PELs**

# Health Hazards in Construction

Questions?