Session Four Objectives (1 of 2)

When trainees have completed this session, they should be able to do the following:

5. Identify and describe the proper use of personal protective equipment (PPE).
   a. Identify and describe the basic use of PPE used to protect workers from bodily injury.
   b. Identify potential respiratory hazards and the basic respirators used to protect workers against those hazards.
Session Four Objectives (2 of 2)

When trainees have completed this session, they should be able to do the following:

6. Identify and describe other specific job-site safety hazards.
   a. Identify various exposure hazards commonly found on job sites.
   b. Identify hazards associated with environmental extremes.
   c. Identify hazards associated with hot work.
   d. Identify fire hazards and describe basic firefighting procedures.
   e. Identify confined spaces and describe the related safety considerations.
Performance Tasks

Properly don, fit, and remove the following PPE items:

- Eye protection
- Hearing protection
- Hard hat
- Gloves
- Fall arrest harness

Inspect a typical power cord and GFCI to ensure their serviceability.
5.1.0 – PPE (1 of 2)

THE MOST COMMON PPE

• Hard hats
• Eye protection
• Gloves
• Safety footwear
• Hearing protection
• Respiratory protection
• High-visibility clothing
• EVERY WORKER IS RESPONSIBLE FOR WEARING APPROPRIATE PPE. WHEN WORKERS ARE INJURED ON THE JOB, IT IS OFTEN BECAUSE THEY ARE NOT USING REQUIRED PPE.
WARNING!

Do not wear clothing or jewelry that could get caught in machinery or otherwise cause an incident, such as loose clothing, baggy shirts, or dragging pants. You must wear a shirt at all times; some tasks will require long-sleeved shirts. Your shirt should always be tucked in unless you are performing welding.
5.1.1 – PPE

**WARNING!**
No articles should be worn under the hard hat that interferes with fit and visibility. That includes ball caps or hoodies that obscure peripheral vision. Only employer-approved gear is to be worn under the hard hat.

HARD HATS ARE NOW MADE OF **REINFORCED PLASTIC** OR FIBERGLASS.
5.1.2 – PPE (1 of 2)

Some sort of eye protection is required at all times on a job site, regardless of the activity.

(A) SAFETY GLASSES  
(B) TINTED SAFETY GLASSES  
(C) SAFETY GOGGLES
The American National Standards Institute (ANSI) aims to make that an easier and safer process. Its standard for eye protection, ANSI Z87.1-2015, establishes the criteria for using, testing, marking, choosing, and maintaining eye protection to prevent or minimize injuries from eye hazards.

ANSI Z87.1 requires markings on eye protection that relate directly to the device’s ability to defend against specific hazards. Eye protection that’s Z87.1-compliant is marked with "Z87."

Additional markings fall into three categories:
• Impact vs. Non-Impact
• Splash and Dust Protection
• Optical Radiation Protection
5.1.2 – PPE (2 of 2)

Face shields are required for grinding, chipping, sand blasting, and similar operations involving flying particles. They are normally required when working with chemicals as well.
5.1.3 – PPE

Today’s fitted work gloves provide more dexterity than ever before. Gloves with Kevlar® are excellent choices when using sharp tools.
5.1.4 – PPE

FOOTWEAR RULES

- Never wear canvas shoes or sandals on the job.
- Wear boots that are suited to the site conditions.
- Inspect boots often and replace them when worn or damaged.
Exposure to intense sound over time can result in severe hearing loss.

(A) EAR PLUGS

(B) EAR MUFFS
• LOUD NOISE OVER A LONG PERIOD OF TIME CAN CAUSE HEARING LOSS, EVEN IF THE NOISE IS NOT LOUD ENOUGH TO CAUSE PAIN. IF THE NOISE LEVEL IS SO GREAT THAT YOU HAVE TO RAISE YOUR VOICE TO BE HEARD BY SOMEONE WHO IS LESS THAN 2 FEET (61 CM) AWAY, YOU NEED TO WEAR HEARING PROTECTION.
## 5.1.5 – PPE (2 of 2)

<table>
<thead>
<tr>
<th>Sound Level (decibels)</th>
<th>Maximum Hours of Continuous Exposure per Day</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>8</td>
<td>Power lawn mower</td>
</tr>
<tr>
<td>92</td>
<td>6</td>
<td>Belt sander</td>
</tr>
<tr>
<td>95</td>
<td>4</td>
<td>Tractor</td>
</tr>
<tr>
<td>97</td>
<td>3</td>
<td>Hand drill</td>
</tr>
<tr>
<td>100</td>
<td>2</td>
<td>Chain saw</td>
</tr>
<tr>
<td>102</td>
<td>1.5</td>
<td>Impact wrench</td>
</tr>
<tr>
<td>105</td>
<td>1</td>
<td>Spray painter</td>
</tr>
<tr>
<td>110</td>
<td>0.5</td>
<td>Power shovel</td>
</tr>
<tr>
<td>115</td>
<td>0.25 or less</td>
<td>Hammer drill</td>
</tr>
</tbody>
</table>
5.2.0 – PPE (1 of 2)

RESPIRATORY HAZARDS

- Dust from metal grinding
- Toxic fumes from welding or flame cutting of some metals
- Working with cleaning solvents
- Working in low-oxygen environments such as confined spaces
- Spray painting
- Sand blasting
- Drilling concrete
- Working with chemicals such as chlorine or ammonia
5.2.0 – PPE (2 of 2)

WARNING!

Silica dust from concrete, masonry, and rock are severe respiratory hazards that can result in a lung disease known as silicosis.

Asbestos must not be disturbed. It must be dealt with by specially trained and properly equipped workers.
• ASBESTOS IS ANOTHER HAZARDOUS MATERIAL THAT CAN BE HARMFUL TO YOUR LUNGS. (CANCER) ASBESTOS CAN BE FOUND ON OLDER INSULATION, BUILDING MATERIALS SUCH AS, FLOOR TILES, PIPE INSULATION, DRYWALL COMPOUNDS, REINFORCED PLASTER, ROOFING AND SIDING MATERIALS. IF ASBESTOS IS ENCOUNTERED OR SUSPECTED ON THE JOB SITE, A SUPERVISOR MUST BE NOTIFIED AND ALL WORK MUST STOP UNTIL THE ASBESTOS IS EITHER SEALED OFF OR REMOVED BY LICENSED PROFESSIONALS.
5.2.1 to 5.2.3 – PPE  4 general types

**USING A RESPIRATOR**

- Workers must be medically evaluated before using a respirator.
- Respirators must be properly fitted and fit checks must be performed before each use.
• A FULL-FACEPIECE MASK WITH CHEMICAL CANISTERS IS USED TO PROTECT AGAINST BRIEF EXPOSURE TO DANGEROUS GASES OR FUMES. A HALF MASK OR MOUTHPiece WITH MECHANICAL FILTER IS USED IN AREAS WHERE YOU MIGHT INHALE DUST OR OTHER SOLID PARTICLES.
Laboratory – PPE

INSPECTING AND APPLYING PPE

PERFORMANCE TASKS 2 AND 3
6.0.0 JOB SITE HAZARDS

• THERE ARE VARIOUS TYPES OF HAZARDOUS MATERIALS YOU MAY COME IN CONTACT DURING VARIOUS TYPES OF CONSTRUCTION WORK, INCLUDING THE FOLLOWING: LEAD, BLOODBORNE PATHOGENS, AND CHEMICALS. YOU MAY ENCOUNTER LEAD-BASE PAINTS DURING DEMOLITION OR RENOVATION OF STRUCTURES BUILT BEFORE 1978. ALSO THERE ARE DISEASES THAT CAN BE TRANSMITTED BY CONTACT WITH AN INFECTIOUS PERSON’S BLOOD FOR EXAMPLE, HEPATITIS B OR C.
6.1.0 – Site Hazards

SOME SIGNIFICANT HAZARDS

Lead
Bloodborne pathogens
Chemicals

Be sure you are familiar with exposure hazards on the job site, recognize the warning signs, and take the required precautions against exposure.
6.1.1-6.1.2 – Site Hazards (1 of 2)

**LEAD**

Used in piping, batteries, and casting metals. Commonly found in paint before 1978. Sanding dust from lead-based paint is very hazardous.
BLOODBORNE PATHOGENS

Bloodborne infectious diseases include HIV, Hepatitis B, and Hepatitis C.

Transmitted through contact with blood and other bodily fluids.

Use gloves, eye protection, and masks as needed.

Report any known contact.
6.1.3 – Site Hazards

CHEMICAL HAZARDS

• Acids, solvents, and other chemicals can produce toxic vapors or may be flammable.

• Some adhesives, paints, and other chemicals can be poisonous. Contact may cause skin irritation, breathing problems, or allergic reaction.

• Compressed gases in cylinders such as acetylene and oxygen represent an explosion hazard.
6.1.4 – Site Hazards (1 of 2)

Flammable, Combustible, or Explosive Material Identification

- FLAMMABLES
- PYROPHORICS
- SELF-HEATING
- EMITS FLAMMABLE GAS
- SELF-REACTIVES
- ORGANIC PEROXIDES

- OXIDIZERS

- EXPLOSIVES
- SELF-REACTIVES
- ORGANIC PEROXIDES
6.1.4 – Site Hazards (2 of 2)

**HEALTH HAZARD**
- CARCINOGEN
- MUTAGENICITY
- REPRODUCTIVE TOXICITY
- RESPIRATORY SENSitizer
- TARGET ORGAN TOXICITY
- ASPIRATION TOXICITY

**EXCLAMATION MARK**
- IRRITANT (SKIN AND EYE)
- SKIN SENSITIZER
- ACUTE TOXICITY (HARMFUL)
- NARCOTIC EFFECTS
- RESPIRATORY TRACT IRRITANT
- HAZARDOUS TO OZONE LAYER (NON-MANDATORY)

**GAS CYLINDER**
- GASES UNDER PRESSURE

**CORROSION**
- SKIN CORROSION/ BURNS
- EYE DAMAGE
- CORROSIVE TO METALS

**ENVIRONMENT (NON-MANDATORY)**
- AQUATIC TOXICITY

**SKULL AND CROSSBONES**
- ACUTE TOXICITY (FATAL OR TOXIC)
6.1.5 and 6.1.6 – Site Hazards

WARNING!

Learn to recognize the symbols for radiation and biohazards. Stay away unless you are properly trained and equipped.
HEAT-RELATED HEALTH CONCERNS

- Heat stress
- Heat cramps
- Heat exhaustion
- Heat stroke

Learn to recognize the symptoms of heat exhaustion and heat stroke and know when to seek medical attention.
• **HEAT EXHAUSTION** typically occurs when people exercise heavily or work in a warm, humid place where body fluids are lost through heavy sweating. When is humid, sweat does not evaporate fast enough to cool the body properly, so the **body temperature rises slightly**.

• **HEAT STROKE** is life threatening. The body’s temperature-control system, which produces sweat to cool the body, stops working. Body temperatures can rise so high that brain damage and death may result if the body is not cooled quickly.
AVOIDANCE

• Drink plenty of water.
• Wear lightweight clothing if possible.
• Keep your head covered and your face shielded.
• Take short breaks in the shade if possible.
FROSTBITE

- Frostbite damages tissue, commonly fingers, toes, and nose
- Symptoms include pale, waxy-white skin or hard, numb skin
- Never rub the affected area
- Move to a warm area and apply warm (not hot) water
6.2.5 to 6.2.7 – Site Hazards (2 of 3)

HYPOTHERMIA

• Loss of body heat and reduced body temperature
• Look for shivering, slurred speech, drowsiness, confusion, and weakness
• Move to a warm, dry area and replace wet clothing
• Provide warm drinks, but avoid caffeine and alcohol
AVOIDING COLD-RELATED INJURY

- Dress in layers
- Wear waterproof, wind-resistant fabrics and waterproof boots when working outdoors
- Wear a hat or cap to reduce heat loss
- Carry extra clothing in case of rain
6.3.1 – Site Hazards

ARC WELDING SAFETY

• Exposure to the welding arc can result in flash burns to the eyes.

• **Welding curtains** must be used to shield nearby workers from the welding arc.

• Anyone in the vicinity must wear shaded lenses as required.
6.3.2 – Site Hazards (1 of 2)

Oxygen and fuel gases should be physically separated by a partition on a cart...
6.3.2 – Site Hazards (2 of 2)

... and when in storage.
6.3.3 – Gas Cylinders

Never attempt to lift a cylinder using the holes in a safety cap; use an approved lifting cage.
6.4.0 to 6.4.2 – Fire

All three components are necessary to start a fire. However, these three things are readily available more often than you may think.
6.4.3 – Fire

FIRE PREVENTION

• Always work in a well-ventilated area.
• Never smoke or light matches when working with or near flammable materials.
• Keep oily rags in approved, self-closing metal containers.
• Store combustible materials only in approved containers.
6.4.4 – Fire (1 of 3)

It is crucial to select the right extinguisher and to use it correctly.
YOU NEED TO KNOW THE LOCATION OF FIREFIGHTING EQUIPMENT ON YOUR JOB SITE AS WELL AS WHICH EQUIPMENT TO USE ON DIFFERENT TYPES OF FIRE. AS AN ELECTRICIAN THE CLASS “C” EXTINGUISHER MUST BE USED IF AN ELECTRIC MOTOR HAS OVERHEATED AND CAUGHT FIRE.

### Extiguisher Type

<table>
<thead>
<tr>
<th>Type of Fire</th>
<th>Extiguisher Type</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordinary Combustibles</td>
<td>Dry Chemical</td>
<td><img src="example1.png" alt="Image" /></td>
</tr>
<tr>
<td>Fires in paper, cloth, wood, rubber, and many plastics require a water-type extinguisher labeled A.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flammable Liquids</td>
<td>CO₂ or Dry Chemical</td>
<td><img src="example2.png" alt="Image" /></td>
</tr>
<tr>
<td>Fires in oils, gasoline, some paints, lacquers, grease, solvents, and other flammable liquids require an extinguisher labeled B.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical Equipment</td>
<td><img src="example3.png" alt="Image" /></td>
<td></td>
</tr>
<tr>
<td>Fires in liquids, fuse boxes, energized electrical equipment, computers, and other electrical sources require an extinguisher labeled C.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ordinary Combustibles, Flammable Liquids, or Electrical Equipment</td>
<td><img src="example4.png" alt="Image" /></td>
<td></td>
</tr>
<tr>
<td>Multi purpose dry chemical extinguishers are suitable for use on Class A, B, and C fires.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metals</td>
<td><img src="example5.png" alt="Image" /></td>
<td></td>
</tr>
<tr>
<td>Combustible metals such as magnesium and sodium require special extinguishers labeled D.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6.4.4 – Fire (3 of 3)

**WARNING!**

Do not use a CO$_2$ extinguisher on a Class D fire, as it can cause the fire to spread. Also note that CO$_2$ is heavier than air, so it will concentrate in low areas, displacing oxygen. For that reason, a CO$_2$ extinguisher must never be taken into, or used in, a confined space.
6.4.5 – Fire

THE PASS METHOD

PULL
AIM
SQUEEZE
SWEEP
Think about the space where you need to work. Does it fit the description of a confined space, requiring special preparations?
• A CONFINED SPACE IS A SPACE THAT IS LARGE ENOUGH TO WORK IN BUT HAS LIMITED MEANS OF ENTRY OR EXIT. A CONFINE SPACE IS NOT DESIGNED FOR HUMAN OCCUPANCY AND IT HAS LIMITED VENTILATION. WRITTEN AUTHORIZATION, COMMONLY KNOWN AS AN ENTRY PERMIT, IS REQUIRED IN ORDER TO ENTER A PERMIT-REQUIRED CONFINED SPACE.
WARNING!

Without the proper training, no employee is allowed to enter a permit-required or non-permit-required confined space. Employers are required to have programs to control entry into, and hazards in, both types of confined spaces.
Wrap Up – Trade Terms (1 of 3)

Arc welding
The joining of metal parts by fusion, in which the necessary heat is produced by means of an electric arc.

Brazing
A process using heat in excess of 800°F (427°C) to melt a filler metal that is drawn into a connection. Brazing is commonly used to join copper pipe.

Flash burn
The damage that can be done to eyes after even brief exposure to ultraviolet light from arc welding. A flash burn requires medical attention.
Wrap Up – Trade Terms (2 of 3)

Flash point
The temperature at which fuel gives off enough gases (vapors) to burn.

Permit-required confined space
A confined space that has been evaluated and found to have actual or potential hazards, such as a toxic atmosphere or other serious safety or health hazard. Workers need written authorization to enter a permit-required confined space. Also see confined space.
Wrap Up – Trade Terms (3 of 3)

Qualified person

A person who, by possession of a recognized degree, certificate, or professional standing, or by extensive knowledge, training, and experience, has demonstrated the ability to solve or prevent problems relating to a certain subject, work, or project.

Welding curtain

A protective screen set up around a welding operation designed to safeguard workers not directly involved in that operation.

Wind sock

A cloth cone open at both ends mounted in a high place to show which direction the wind is blowing.
Review the complete module to prepare for the upcoming laboratory session and module exam.