

Personal Protective Equipment

objectives

- Determine the different types of PPE
- Distinguish the appropriate and approved types of PPE needed in a workplace
- Know the limitations of PPE

Personal Protective Equipment

Personal protective equipment are variety of devices and garments designed to serve as a barrier between workers and workplace hazards.

Guidelines in Selecting PPE

- 1. Identify the hazard**
- 2. Understand the effect**
- 3. Recommend the proper equipment**
- 4. Train workers on proper usage and maintenance**

Personal Protective Equipment

Head Protection

Eye & Face Protection

Hearing Protection

Respiratory Protection

Hand & Arm Protection

Foot Protection

Torso Protection

Fall Protection

Occupational Head Hazards & Effects

HAZARDS

- ← Impact from falling objects
- ← Bump against rigid stationary objects
- ← Penetration by sharp objects
- ← Contact with live electrical conductors
- ← Fire hazards

EFFECTS

- Perforation/fracture of the skull
- Electrical shock
- Burns

HEAD PROTECTION

Hard Hat or Safety Helmet

A rigid device that is worn to provide protection for the head and which is held in place by a suitable suspension.

Parts of a Hard Hat

1. The suspension system includes the headband and straps on the inside of the hat. This system absorbs and distributes the force of impact.
2. The hard outer shell protects the head from sharp objects, such as falling tool. It also absorbs part of the force of impact, since it's somewhat flexible.
3. The chin strap secure the hard hat to the wearer's head.
4. The brim redirects the direction of the falling object.

Characteristics of a Good Quality Hard Hat

HARD HAT must be able to absorb the shock of the blow from falling objects, be able to resist penetration from sharp objects and must be a good insulator against electrical hazards.

Additional characteristics of a hard hat is its ability for low water absorption and slow flammability rate of the shell.

Classes of Safety Helmets (ANSI Z89.1 – 1986)

- Class "A" - general service, limited voltage protection
- Class "B" – utility service, high voltage protection
- Class "C" – special service, no voltage protection

Eye & Face Protection

Protective eye and face equipment shall be required where there is a reasonable probability of injury that can be prevented by such equipment.

Occupational Eye and Face Hazards

1. Large flying particles and fragments from operations such as caulking, chiseling, coarse grinding, hammering, metal working and riveting.
2. Dust, fumes, mists, and small particles from woodworking, light grinding, sanding, metal working, spot welding, scaling, and paint spraying.
3. Vapors and liquids from solvents and paints.
4. Intense heat and radiation from furnace tending, electric welding, and oxyacetylene welding and cutting.

Effects of Occupational Eye and Face Hazards

EFFECTS

1. Permanent loss of vision
2. Temporary loss of vision
3. Inflamed eyes
4. Skin Burns
5. Lacerations
6. Fractures
7. Broken Teeth

Eye and Face Protection (ANSI Z87.1 – 1989)

1. Safety Spectacles
2. Eye Goggles
3. Face Shields

Safety Spectacles or Glasses are primary protective devices intended to shield the wearer's eyes from flying and striking objects, glare and injurious radiation hazards.

Goggles are primary protective devices intended to fit the face immediately surrounding the eyes.

Face Shield is a protective device intended to shield the wearer's face, or portions thereof from striking objects or chemical, heat and glare hazards.

Use of Eye and Face Protections

"A a general rule, face shields should be worn over suitable basic eye protection."

- National Safety Council

Hearing Protection



When Should You Wear a Hearing Protection Device?

You should wear a hearing protection device whenever you are exposed to noise that is 90 decibels or greater for an 8-hour period of time.

A hearing protection device is anything that can be worn to reduce the level of sound entering the ear.

Permissible Noise Exposures

Duration per day, hours	Sound level dB slow response
8	90
6	92
4	95
3	97
2	100
1 ½	102
1	105
½	110
¼ or less	115

Approximate Decibel Level

Decibels (dB)	Examples
0	The quietest sound you can hear
30	Whisper, quiet library
60	Normal conversation, sewing machine, typewriter
70-80	Television, city street noise, police whistle
90	Lawnmower, shop tools, truck traffic, an electric motor, Car horn at 5 meters distance (8 hours per day is the maximum exposure)
100-110	Chainsaw, pneumatic drill, close to a moving train, spray painting
115	Sandblasting, loud rock concert, auto horn at close distance
140	Gun muzzle blast, jet engine (causes pain)

ARM'S LENGTH RULE

- “If two people (with no hearing impairment) have to raise their voices or shout to be heard in a distance of less than an arm's length from each other, the sound level is potentially hazardous.”

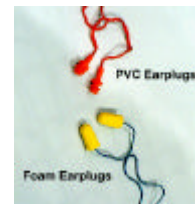


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Types of Hearing Protectors

Earplugs

Hearing protectors placed inside the ear to block out noise. To work effectively, they should fit snugly into the ear canal.



Earmuffs

A device composed of a headband with two cushioned ear cups that form a seal around the outer ear, covering it completely and blocking out the noise.



RESPIRATORY HAZARDS

- Acids/Mists
- Solvents/Vapors
- Gases / Smoke
- Dusts/Particulates
- Heavy Metals/Fumes

FILTRATION RESPIRATORS or Mechanical Respirators screen out dust and some form of mist. Such Filters need to be replaced at frequent intervals.



CHEMICAL CARTRIDGE DEVICES remove contaminants by passing the tainted air through material that traps the harmful portions. There are specific cartridges for specific contaminants.

Self-Contained Breathing Apparatus (SCBA)

Supply air from an air tank is strapped at the person's back.

Hand and Arm Hazards

- 1. Temperature extremes
- 2. Chemical exposures and splashes
- 3. Sharp objects
- 4. Fire
- 5. Abrasive materials
- 6. Live Electrical Conductors

Common Hand & Arm Injury

- Burns
- Bruises
- Abrasions
- Cuts
- Punctures
- Fractures
- Amputations
- Electrocution

Different kinds of gloves

Metal-meshed gloves resist sharp edges and prevent cuts

Leather gloves shield your hands from rough surfaces and heat

Vinyl & neoprene gloves protect your hands against toxic chemicals

Rubber gloves protect you when working around electricity.

Welder's gloves protect your hands from heat and flames

Latex disposable gloves are used to protect your hands from germs and bacteria

Lead-lined gloves are used to protect your hands from radiation sources.

Cotton gloves help grasp slippery objects and protect against slivers, dirt,, moderate heat or cold.

Foot and Leg Protection

Hazards:

- ← Falling or rolling objects
- ← Sharp objects
- ← Live Electrical conductors
- ← Hot surfaces
- ← Wet, slippery surfaces

Common Foot and Leg Injury

- Fractures
- Punctures
- Burns
- Cuts
- Amputations
- Electrocution

Safety Shoes Classification

(ANSI Z41 – 1999)

Heavy Duty or Class 75

Medium Duty or Class 50

Light Duty or Class 30

Electrical Properties of Safety Shoes

ELECTROSTATIC DISSIPATING footwear conducts static electricity to floors that are grounded.

ELECTRICAL RESISTANCE footwear are insulated with tough rubber to prevent shocks and burns from electricity.

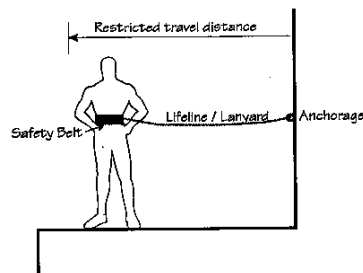
FALL PROTECTION EQUIPMENT

Fall Restraint Systems

Fall Arrest System

Fall Restraint Systems

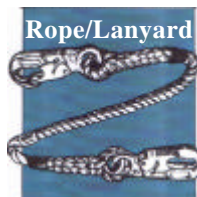
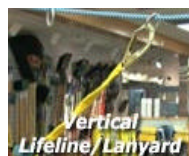
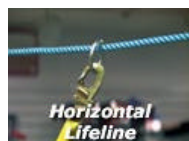
Travel Restraint System – is an assembly composed of body belt and proper accessories that prevent a worker from traveling to an edge where the occurrence of a fall may happen.



Fall Arrest System

Fall arrest system are designed to minimize stress forces on an employee's body in the event of a fall, while providing sufficient freedom of movement to allow work to be performed.

components of the personal fall arrest system



Full-Body Harness



It consists of straps passed over the shoulders, across the chest, and around the legs. In a fall, a full body harness protects you more than a safety belt, because it distributes the force of impact over a greater area of your body.



Resistance of employees to PPE

- Discomfort
- Inaccurate risk perception
- Lack of education and training

LIMITATIONS OF PPE

1. The hazard still exists.
2. A defective PPE offers no protection
3. The PPE may introduce additional hazard.
4. Most PPE are not for continuous use.
5. Improper wearing may not give maximum protection.
6. It may transfer hazard to another location.

OSHS RULE 1080:

PERSONAL PROTECTIVE EQUIPMENT & DEVICES

1081 General Provisions:

1081.01 Every Employer:

- 1) Shall at his own expense furnish his workers with protective equipment for the eyes, face, hands and feet, protective shields and barriers whenever necessary by reason of the hazardous nature of the process or environment, chemical or radiological or other mechanical irritants or hazards capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact.

1081.02

All protective equipment shall be of approved design and construction appropriate for the exposure and the work to be performed.

1081.03

The employer shall be responsible for the adequacy and proper maintenance of personal protective equipment used in his workplace.

1081.04

No person shall be subjected or exposed to hazardous environmental condition without protection.

Summary

- Assess the workplace for hazards
- Use engineering and work practice controls to eliminate or reduce hazards before using PPE
- Select appropriate and approved PPE to protect employees from hazards that cannot be eliminated
- Inform employees why the PPE is necessary, how and when it must be worn
- Train employees how to use and care for their PPE, including how to recognize deterioration and failure
- Require employees to wear selected PPE

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