

Personal Protective Equipment

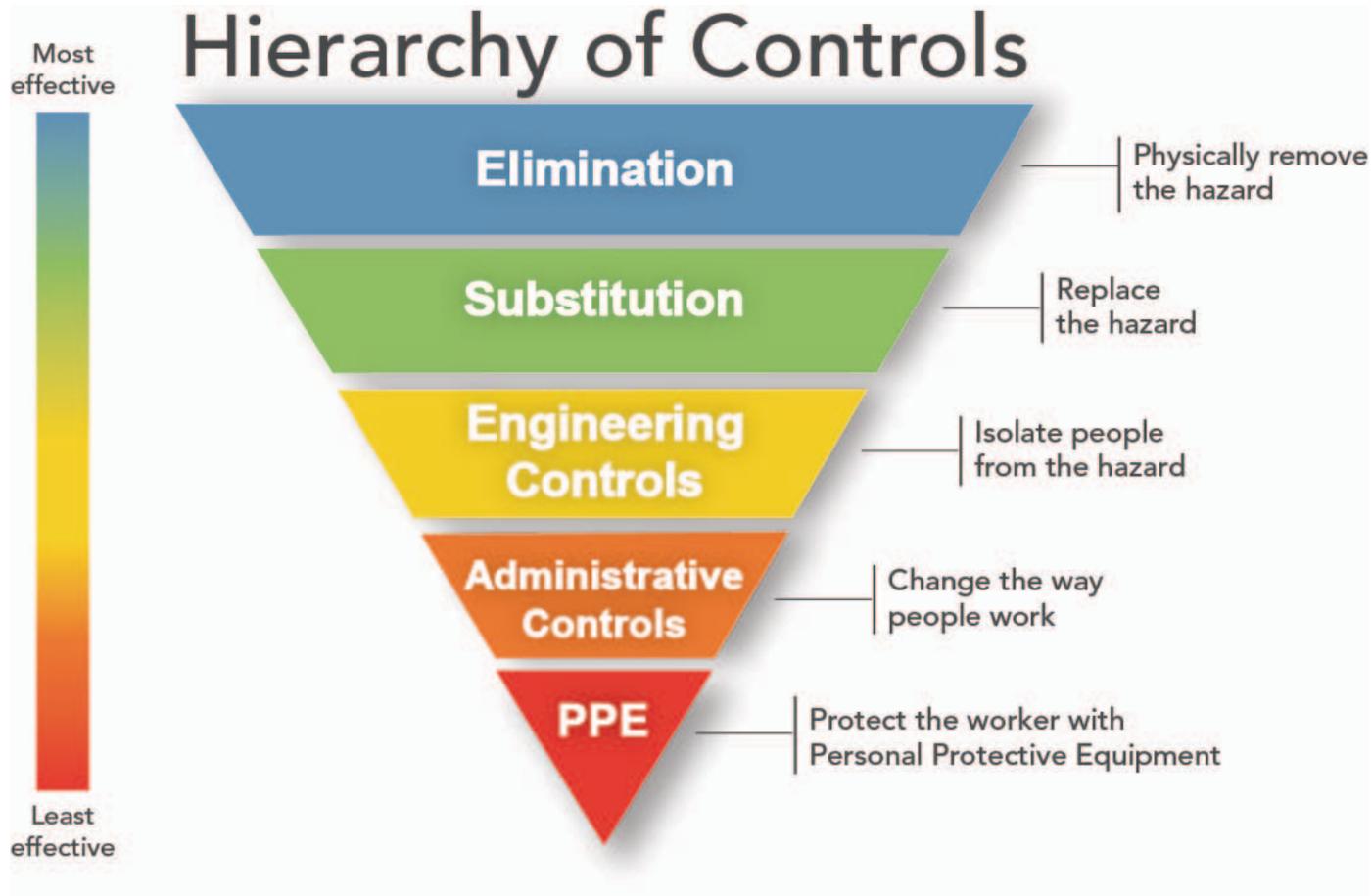


Employee Protection

Protecting employees from workplace hazards:

- Workplace hazards such as sharp edges, falling objects, flying particles, chemicals, noise and many other potentially dangerous situations can cause injuries.
- Employees must:
 - Use all feasible engineering controls and workplace safety practices to eliminate and reduce hazards
 - Then use appropriate personal protective equipment (PPE) if other controls do not eliminate the hazards

Employee Protection



PPE is the last level of control!

Engineering Controls

If...

- The machine or workplace can be physically changed to prevent employee exposure to the potential hazards

Then...

- The hazard can be eliminated with an engineering control

Examples

- Initial design
- Applying methods:
 - Minimization
 - Isolation
 - Ventilation
- Change process
- Enclose process

Administrative Controls

If...

- Employees can be removed from exposure to the potential hazard by changing the way they do their jobs,

Then...

- The hazard can be eliminated with a work practice control

Examples

- Safe work practices
- Information and training
- Policies and procedures
- Planning
- Housekeeping
- Preventative maintenance

PPE Program

Establishing a PPE Program

- Establish procedures for selecting, providing and using PPE as part of an employees routine function
 1. *Job Hazard Assessment* - Assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of PPE
 2. Review established controls and procedures, then select PPE based on the job hazard assessment
 3. Once the proper PPE has been selected, provide training to employees who are required to use PPE

Job Hazard Assessment

- A job hazard assessment is an evaluation of the workplace, or work situations, as to the potential for hazards that an employee may encounter while performing the job.
- If hazards or the likelihood of hazards are found:
 - ▣ Review past injury and incident documentation
 - ▣ Review process, procedures, equipment, work environment and, if necessary, make changes
 - ▣ Select PPE suitable to protect from these hazard

Job Hazard Assessment

Identifying Hazards (Common Hazards)

- Impact
 - ▣ Forceful contact (*flying objects/particles, falling objects, etc.*)
- Penetration
 - ▣ Piercing or going thru the skin (*sharp objects/material, etc.*)
- Compression
 - ▣ To press or squeeze with the potential to crush (*objects, material or equipment with rolling or pinching hazards, etc.*)
- Chemical Exposure
 - ▣ Absorption, inhalation or ingestion of harmful chemicals (*acids, corrosives, carcinogens, etc.*)

Job Hazard Assessment

Identifying Hazards (Common Hazards)

- Extreme Heat or Cold
 - ▣ Exposure to extreme temperatures (*air temperature, radiant sources, direct contact, etc.*)
- Burns
 - ▣ Damage to body tissue by heat, chemical, electricity, sunlight or radiation (*flames, electrical shock, arc flash, etc.*)
- Harmful Dusts and Fumes
 - ▣ Dust, vapor, gas, etc. which are irritating, strong, harmful, or potentially dangerous (*welding fume, paint fumes, combustible dust, etc.*)

Job Hazard Assessment

Select PPE based on identified hazards

- Head
- Eyes
- Face
- Hands
- Feet
- Body
- Hearing
- Respiratory



*Personal Protective Equipment

*Employer Responsibilities

- With few exceptions, OSHA requires employers to pay for PPE used to comply with OSHA standards.
- When employees provide their own PPE, employers must ensure that the equipment is adequate to protect the worker from workplace hazards

Payment Exceptions:

- Non-specialty safety-toe protection and prescription safety eyewear provided they are allowed to be worn off-site.
- Everyday clothing, normal work boots, hair nets and lifting belts.
- Lost or intentionally damaged PPE that needs replaced.

Personal Protective Equipment

Employee Responsibilities

- Use PPE when necessary/required
- Use PPE according to manufacturers instructions and training
- Inspect PPE and maintain in a clean and reliable condition
- Properly store PPE
- Replace any damaged PPE
- If there are any unsafe conditions or if you have any questions report to your supervisor

Personal Protective Equipment?



Head Protection

What are some causes of head injuries?

- ❑ Flying or falling objects (*tools, materials, etc.*)
- ❑ Overhead clearance (*structures, equipment, materials, etc.*)
- ❑ Overhead machine and equipment operations
- ❑ Overhead energized conductors

Over 1/3 of all head injuries result from falling objects striking the head



Wear head protection

Head Protection

Hard Hats

- Type I
 - ▣ Protects strictly the top of the head
- Type II
 - ▣ Protects both the top and sides of the head



- Class G (*General*)
 - ▣ Impact and low voltage electrical protection
 - Up to 2,200 volts
- Class E (*Electrical*)
 - ▣ Impact and high voltage electrical protection
 - Up to 20,000 volts
- Class C (*Conductive*)
 - ▣ Impact protection only

Eye and Face Protection

What are some causes of eye and face injuries?

- ❑ Projectiles (*dust, wood, metal shavings, other flying particles*)
- ❑ Chemicals (*liquids, fumes, vapors, etc.*)
- ❑ Burns (*slag, sparks, etc.*)
- ❑ Radiation (*visible light, ultraviolet radiation, heat, etc.*)
- ❑ Electrical (*arc flash, etc.*)
- ❑ Biological (*potentially infectious body fluids*)

It's estimated that 90% of eye injuries can be prevented through use of proper eye protection.



**Wear eye
protection**

Eye and Face Protection

Selecting the right eye and face protection

Side Shields

- Added to regular glasses to provide side protection
- Frames & lenses of regular glasses must meet established standards
- General work conditions



Safety Glasses

- Stronger frames & lenses than normal glasses: moderate impact
- Side protection with side shields and wrap-style
- General work conditions



Eye and Face Protection

Selecting the right eye and face protection

Goggles

- Flying particles, chemical splash & impact protection
- Protect against hazards from any direction
- Some can fit over glasses



Face Shield

- Flying particles & chemical splash protection
- Heat, arc flash & impact protection depend on visor
- Wear in combination with safety glasses or goggles



Eye and Face Protection

Selecting the right eye and face protection

Full-face Respirator

- Flying particles, chemical splash, harmful fumes/ dusts & impact protection
- Provides breathing, eye & skin protection



Tinted Eye Protection

- Add infrared & intense radiant light protection
- Welding helmets, shields, glasses, & goggles
- Tinted face shields & safety glasses



Hand Protection

What are some causes of hand injuries?

- ❑ Sharp objects/materials (*cuts, lacerations, punctures, etc.*)
- ❑ Impact or struck by (*bruises, fractures, etc.*)
- ❑ Chemicals (*skin irritation and absorption, chemical burns, etc.*)
- ❑ Extreme temperatures (*weather, radiant heat, etc.*)
- ❑ Burns (*slag, molten metal, sparks, etc.*)
- ❑ Electrical (*shock, burns, etc.*)
- ❑ Rough surfaces (*abrasions, etc.*)
- ❑ Pinching or caught in between



**Wear
hand
protection**

Hand Protection

Selecting the right hand protection

Leather Gloves

- Provide protection against cuts, abrasions, punctures and lacerations
- Hot work gloves also provide heat protection



Latex Gloves

- Protection from chemicals
- Barrier protection
- Slightly better comfort and dexterity than nitrile gloves



Hand Protection

Selecting the right hand protection

Nitrile Gloves

- Protection from chemicals
- More puncture resistant
- Often referred to as “medical grade”
- Latex-free (allergy concerns)



Rubber Gloves (Electrical)

- Dielectric material with strength and durability
- 00-4 rating classifications
- Liners and leather covers give added protection



Hand Protection

Selecting the right hand protection

Rubber Coated Gloves

- ❑ Rubber coated work glove gives an additional barrier
- ❑ Provides strong grip, dexterity, and resistance to cuts, punctures and abrasions



Kevlar & Stainless Mesh

- ❑ Provides protection from cuts, slashes, abrasions and lacerations
- ❑ Used for metal & glass handling and food service



Foot Protection

What are some causes of foot injuries?

- ❑ Falling or rolling objects
- ❑ Objects piercing the sole of the shoes
- ❑ Extreme temperatures (*weather, radiant heat, etc.*)
- ❑ Burns (*sparks, molten metal, slag, etc.*)
- ❑ Electrical (*shock, burns, etc.*)
- ❑ Chemicals (*corrosives, etc.*)

Slip and fall accidents are the most frequently reported work accidents at 25%



**Wear foot
protection**

Foot Protection

Selecting the right foot protection

Falling & Rolling Objects

- ❑ Steel toe
- ❑ Composite caps
- ❑ Metatarsal guards
- ❑ Steel shanks (heel & sides)



Puncture Protection

- ❑ Prevent penetration
- ❑ Have a hard, dense sole
- ❑ Some have a steel shank in the sole or insole



Foot Protection

Selecting the right foot protection

Electrical Hazards

- Non-conductive footwear often classified with “EH” rating
- Insulated to help ground electrical current



Anti-Static Footwear

- Reduce static electricity often classified with “ESD” or “SD” rating
- Wear around sensitive electronics & flammable and explosive materials



Foot Protection

Selecting the right foot protection

Slip Protection

- ❑ Soles have tread with channels
- ❑ Textured, soft rubber soles
- ❑ Anti-slip grippers/cleats



Chemical Resistant

- ❑ Exposure to liquid acids, corrosives and other caustic chemicals
- ❑ Made from rubber, PVC, neoprene or vinyl



Body Protection

What are some causes of bodily injuries?

- ❑ Impact or struck by
- ❑ Sharp objects/material (*cuts, punctures, etc.*)
- ❑ Chemicals (*splashes, etc.*)
- ❑ Extreme temperatures (*weather, radiant heat, etc.*)
- ❑ Burns (*sparks, molten metal, slag, etc.*)
- ❑ Electrical (*shock, burns, etc.*)

In the past 5 years, 350 workers were injured when their clothing, gloves, jewelry or hair was caught by moving equipment or machinery parts.



**Wear protective
clothing**

Body Protection

Selecting the right body protection

Uniform/General Clothing

- ❑ Select clothing that is comfortable, fits properly, and is durable for work
- ❑ Meets company policy
- ❑ Weather conscious



Hot Work - Leathers

- ❑ Heat resistant and heavy-duty protection from sparks and splatters
 - ▣ Jackets, sleeves, aprons, chaps, leggings, etc.



Body Protection

Selecting the right body protection

Flame Resistant Clothing

- Apparel made of flame resistant material
 - ▣ Jackets, pants, hoods, overalls, sleeves, etc.
- Performance ratings vary



Extreme Heat Conditions

- Protection against contact with flames, molten metals, convective heat and high radiant heat
 - ▣ Hoods, jackets, pants, leggings, aprons, etc.



Body Protection

Selecting the right body protection

Chemical/Health Hazards

- Apparel that provides a barrier from chemicals and other hazardous materials/substances
 - ▣ Suits, overalls, aprons, coats, sleeves, etc.



High Visibility

- Bright apparel that can be easily spotted
- Tape and stripes on clothing that reflects light (headlights, flashlights, etc.)
 - ▣ Vests, jackets, suits, etc.



Hearing Protection

What are some causes of hearing injuries?

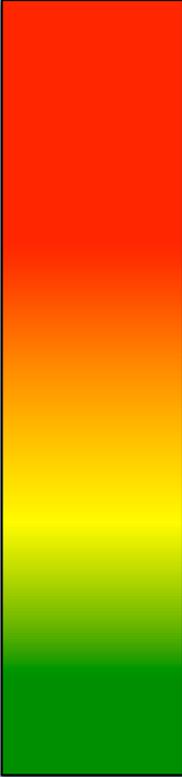
- Needed when the average (over an 8 hour period) noise level of an area reaches 90 decibels
- Must be made available when the average (over an 8 hour period) noise level reaches 85 decibels
- Examples of high noise areas:
 - Running engines
 - Mechanical rooms
 - Heavy machine shops
 - Pneumatic and other power tools



**Wear ear
protection**

Hearing Protection

How much noise is too much noise?

	Decibel – dB(A)		Noise Source
<i>Double protection recommended above 105 dB</i>	140 dB		Gunshot
	120 dB		Sandblasting/Rock Concert
	110 dB		Impact Wrench/Pneumatic Tools
	100 dB		Chainsaw/Diesel Engine
	95 dB		Circular Saw/Hammering
<i>Hearing protection recommended above 85 dB</i>	90 dB		Lawn Mower/Power Tools
	85 dB		Grinder/Welding Machine
	80 dB		Vacuum Cleaner
	70 dB		Busy Traffic
	60 dB		Speaking Voice

Hearing Protection

Selecting the right hearing protection

Types of Protection

- Reduces decibel levels
 - Ear plugs
 - Ear Muffs
 - Canal Caps



Hearing Protection

- Effectiveness varies according to type and if wearing correctly
- Most reduce noise at the ear about 15 – 20 dB
- Take over-protection into consideration: warnings may not be audible

Respiratory Protection

What are some causes of respiratory illnesses?

- When work presents an inhalation hazard
 - ▣ Gases, vapors, particles & other atmospheric hazards

- Examples of air borne hazards:
 - ▣ Welding
 - ▣ Painting
 - ▣ Working with highly toxic chemicals
 - ▣ Working in dusty environments
 - ▣ Oxygen deficient areas



Respiratory Protection

Selecting the right respiratory protection

Disposable Filtering Facepiece Respirators

- Air filtering respirator intended to protect against particles
 - ▣ Dust masks



Air Purifying Respirators

- Air is purified when it passes through a filter and into the facepiece
 - ▣ Half-mask and full-face



Respiratory Protection

Selecting the right respiratory protection

Powered Air Purifying Respirators (PAPR)

- Uses a blower to pass contaminated air through a filter and supply purified air to the facepiece
 - Cannot be used in IDLH atmospheres



Atmosphere Supplying Respirators

- Used in atmospheres where the hazard is unknown or IDLH
 - Supplied Air Respirators
 - Self Contained Breathing Apparatus (SCBA)



Respiratory Protection

Medical Questionnaire and/or Evaluations

- Prior to fit testing and required use of a tight fitting respirator an employee should complete the medical questionnaire contained in Appendix A or be examined by a primary care physician

Donning and Doffing PPE

Head Protection

- Hard hat protection is only effective if adjusted properly and sitting squarely on head
- Hard hat suspension must be worn as normally oriented
- Do not wear another hat under a hard hat

Eye and Face Protection

- Wear safety glasses/goggles with face shield
- Once glasses/goggles are in place, position face shield and secure headband
- Doff face shield to prevent debris from falling into eyes

Donning and Doffing PPE

Hand Protection

- Use the glove-on-glove and skin-on-skin method when removing rubber/latex gloves



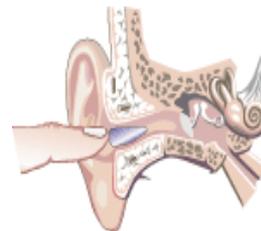
Hearing Protection



Roll the earplug up into a small, thin “snake” with your fingers.



Pull the top of your ear up and back with your opposite hand to straighten out your ear canal. Slide earplug in.



Hold the earplug in with your finger. Wait for the earplug to expand and fill the ear canal.

Donning and Doffing PPE

Respiratory Protection

- ❑ Conduct fit testing prior to use
- ❑ Conduct seal check prior to use
- ❑ Wear to prevent leakage for the duration of use.
- ❑ Facial hair that comes between the sealing surface of the face piece and the face, or that interferes with the valve is not acceptable.

Seal Checks



Positive Pressure Check



Negative Pressure Check

PPE Availability, Care and Maintenance

PPE Availability

- If PPE is not available for a specific task, employees are not to perform that task until a supervisor is notified and the required PPE is made available.

PPE Care

- Inspect PPE as it's issued
- Inspect PPE before and after each use
- Periodically inspect stored PPE

PPE Maintenance

- If PPE is damaged, the employee is responsible for notifying their supervisor
- Damaged and defective PPE is not to be used

PPE Storage and Replacement

PPE Storage

- PPE must be kept clean and sanitary
- PPE should be stored in a manner that prevents damage or malfunction
 - ▣ Exposure to moisture, dust, sunlight, chemicals, extreme temperatures, impact, etc.

PPE Replacement

- Replace PPE that is damaged or no longer effective
- Damaged PPE must be disposed of properly so that others don't use it
- Notify supervisor when damaged PPE is replaced so that new PPE can be supplied

Discussion

- Questions or comments

