PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment

- Personal Protective Equipment or PPE is selected based on the specific job hazards you face.

Job Hazards

- Examples of Job Hazards are:
  - Noise
  - Chemicals
  - Accidental Impact
  - Sharp objects
  - Flying Particles
  - Dust & Mists
  - Bright Light
  - Vibration

About PPE

- You should know
  - Limitations of PPE
  - How to use PPE
  - When to use PPE
  - Inspect before use
  - Replacement
  - Cleaning & Storage

PPE Limitations

- PPE acts as a barrier between you and a hazard
- PPE will not protect you if it is:
  - not designed for the specific hazard
  - damaged or worn
  - not adjusted properly

Inspect before using

- Before you use your PPE, inspect it for:
  - Worn or damaged parts
  - Leaks, cracks or deformities
  - Cleanliness
  - Correct size

Eye & Face Protection

Protecting your eyes

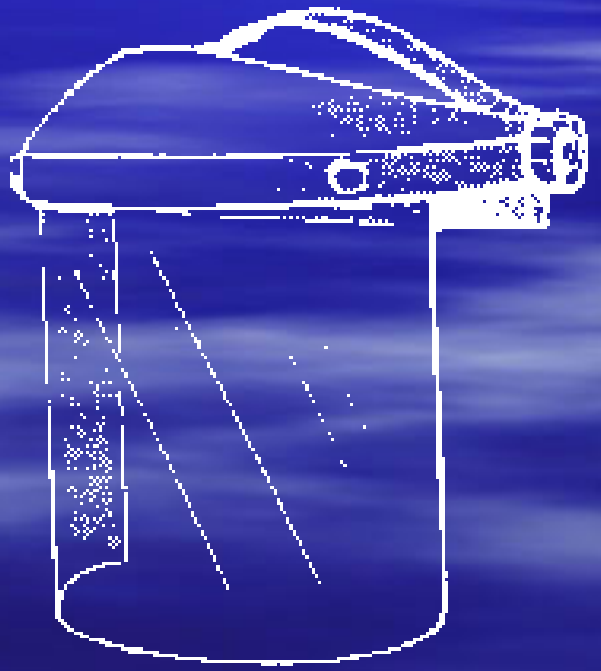
- Your eyes are very sensitive organs and may be easily injured. Eye Hazards include:
  - Chemical Splashes
  - Flying dist, chips, sparks
  - High Heat
  - Intense or UV light

Specific hazards include…

- IMPACT - **Chipping, grinding machining, masonry work, woodworking, sawing, drilling, chiseling, powered fastening, riveting, and sanding.**
- HEAT - **Furnace operations, pouring, casting, hot dipping, welding**
- LIGHT or RADIATION - **Electric arc welding, gas welding, gas cutting**
- IRRITANTS / CORROSIVES - **mists, dusts, sprays, splashes**

Face Protection

- Use a faceshield when any of the following hazards exist:
  - Chemical splashes
  - Liquid spray
  - Flying chips or sparks
  - High Heat
    - **Special faceshield**



This Pipefitter Escaped Serious Facial Injury By Wearing His Personal Protective Equipment

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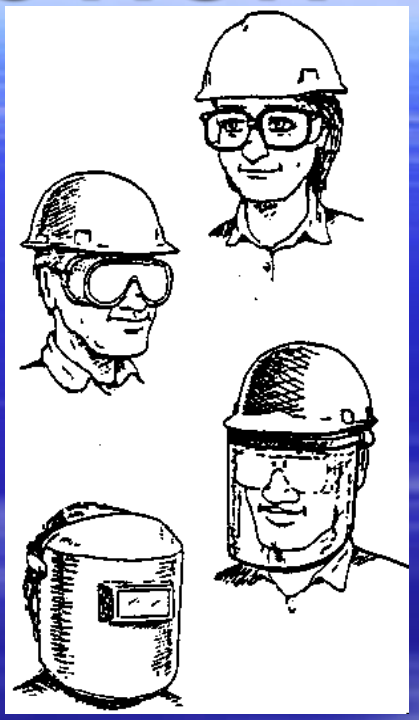
EYE AND FACE PROTECTION



- **ANSI APPROVED Z 87.1**
- **SAFE EYEWEAR**
  - **Safety Glasses/ Side-shields** are the basic form of eye protection.
- Types of eye and face protection include:
  - **Safety glasses**
  - **Goggles**
  - **Direct Vent Goggles**
  - **Indirect Vent Goggles**
  - **Face shields**
  - **Welding helmets**
  - **Full hoods**

EYE AND FACE PROTECTION

- Safety glasses and/or goggles should be worn **under** face shields and welding helmets for added protection.
- **Tinted** or **shaded** lenses may be needed to protect you from glare when working in a bright environment. These can limit your vision when moving from a bright area to a dim area.
- N**umbered** filtering lens to protect your eyes from welding or any other radiant energy

EYE AND FACE PROTECTION

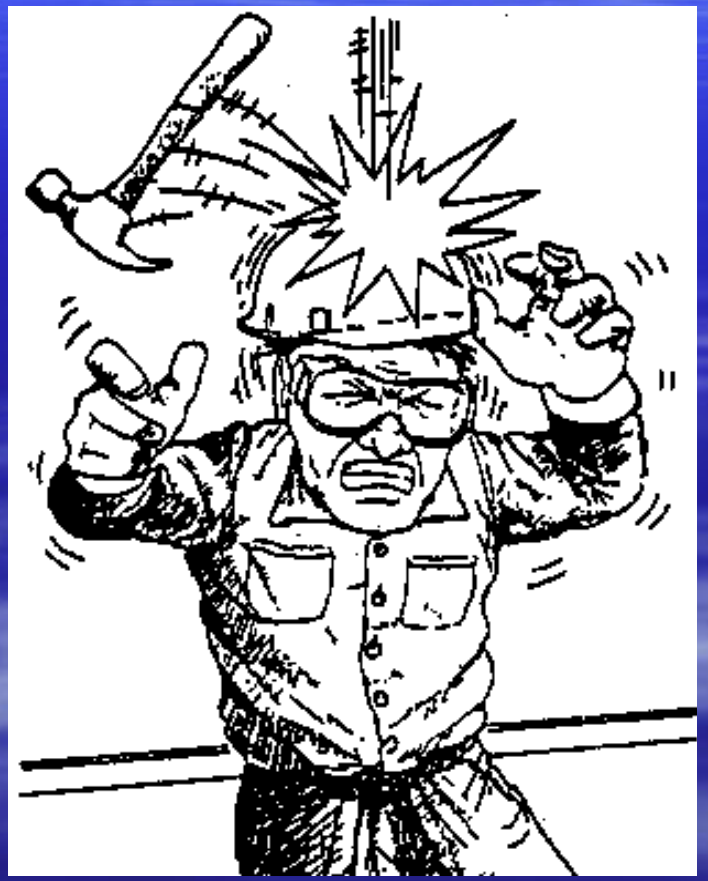
- **CONTACT LENSES**
  - The wearing of contact lenses, may cause you to face additional hazards from **dust** or **chemicals.**

- **Prescription Glasses**
  - Either wear goggles and other protective devices designed **to fit over** your regular prescription glasses, or you must have your protective eyewear **ground to your prescription**.

Head Protection

HEAD PROTECTION

- **ANSI Approved Z 89.1**
  - Head protection is required if you work where there is a risk of injury from **falling objects** or if you work near exposed **electrical** conductors which could contact the head.

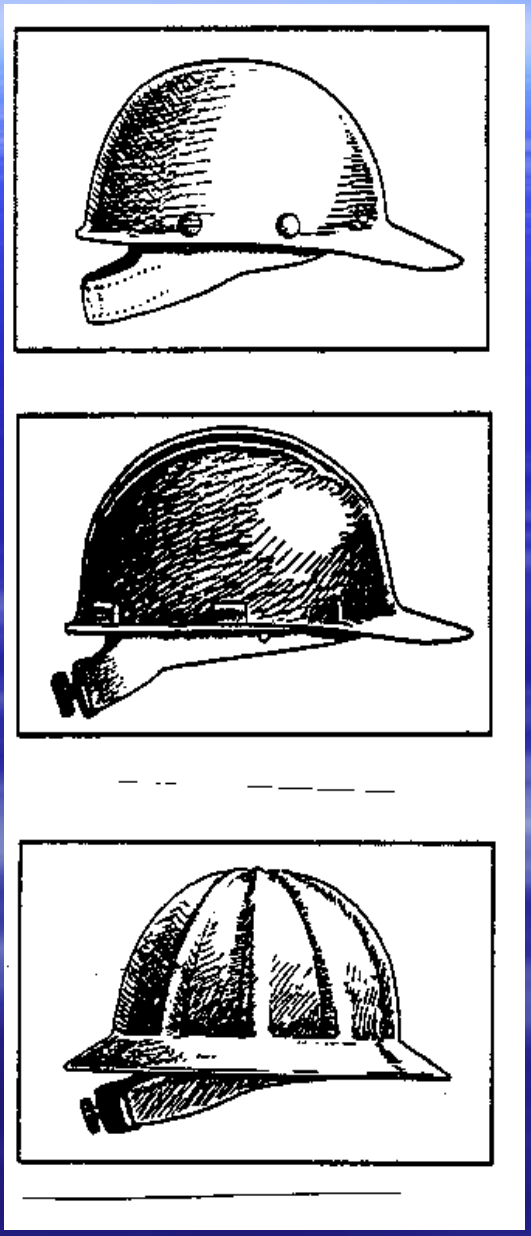


HEAD PROTECTION

- The **shell** of the hat is designed to absorb some of the impact.
- The **suspension**, which consists of the headband and strapping, is even more critical for absorbing impact.
- Hard hats are **tested** to withstand the impact of an **eight-pound weight** dropped **five (5) feet**
- Hard hats must also meet other requirements including **weight, flammability** and **electrical insulation**.

HEAD PROTECTION

- **Class A** up to **2,200 vlts**.
- **Class B** up to **20,000 vlts**.
- **Class C not** designed for use **around live electrical wires** or where **corrosive substances** are present.



Replace your hard hat if…

- The suspension system shows signs of deterioration such as:
  - Cracking,
  - Tearing, or
  - Fraying
- The suspension system no longer holds the shell from 1 inch to 1 1/4 inches away from the head.

Replace your hard hat if…

- The brim or shell is cracked, perforated, or deformed.
- The brim or shell shows signs of exposure to heat, chemicals, ultraviolet light, or other radiation. Signs include:
  - - Loss of surface gloss,
  - -Chalking, or
  - - Flaking

Hand Protection

Hand Hazards

- Cuts & punctures
- Chemical exposure
- Vibration
- Electric shock
- Burns
- Heat & Cold
- Biohazards

HAND PROTECTION

- **Fingers**, **hands,** and **arms** are injured more often than any other parts of the body.

- Gloves are the **most common** protectors for the hands.

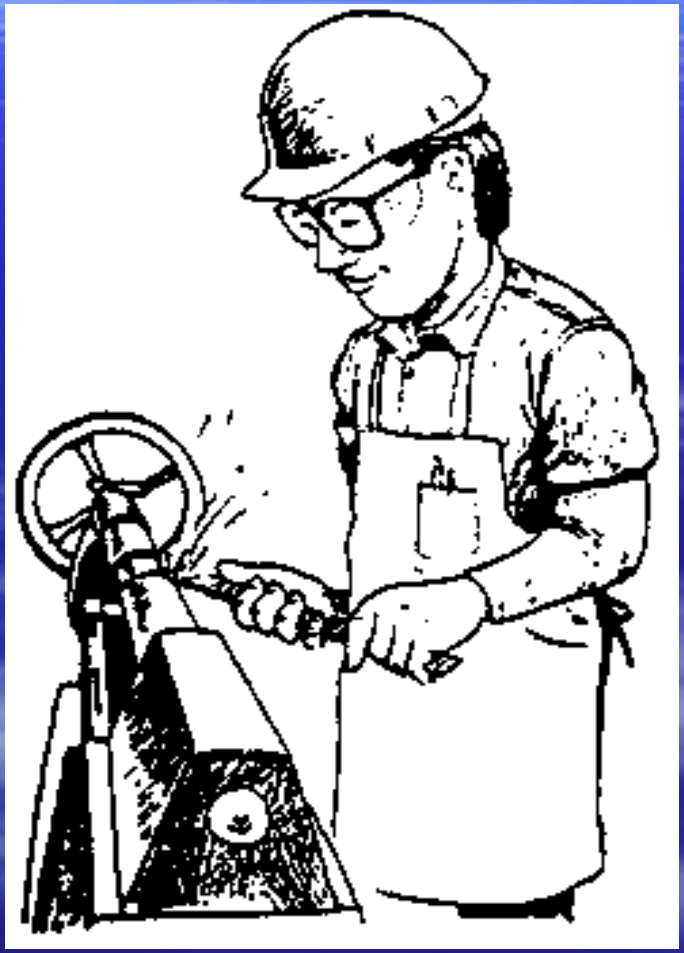
HAND PROTECTION

- When working with chemicals, gloves should be **taped** at the top, or **folded** with a cuff.
- **Vinyl**, **rubber** or **neoprene** are sufficient with most **chemicals**, but, if you work with petroleum-based products, a **synthetic** glove will be needed.
- **Leather** or **cotton** knitted for handling most **abrasive materials.**
- Gloves reinforced with metal staples for protection from sharp objects. **Do not** wear metal-reinforced gloves when working with electrical equipment.

HAND PROTECTION

- It is **dangerous** to wear gloves while working on **moving** machinery. Moving parts can easily pull your glove, hand and arm into the machine.

- Whatever gloves are selected, make sure they **fit**.



Glove selection

- Not all gloves are created equal…. Ensure the glove you use will protect your hands from the specific hazards of the job.

- Chemical gloves do not last forever… understand the chemical and “break-through” characteristics of your specific glove

Before you use…

- Use the proper glove for the task
- Remove rings & bracelets
- Do not wear gloves if they can be caught in machinery
- Check gloves for wear and damage

Foot protection

Foot Hazards

- Heavy objects such as barrels or tools that might roll onto or fall onto your feet.
- Sharp objects such as nails or spikes that might pierce the soles or uppers of ordinary shoes.
- Molten metal that might splash
- Hot, slippery or wet surfaces
- Corrosive Chemicals

Hazardous conditions…

- IMPACT **- Carrying or handling materials such as packages, objects, parts or heavy tools which could be dropped**
- COMPRESSION **- Work activities involving skid trucks (manual material handling carts, around bulk rolls, around heavy pipes**
- PUNCTURE **- Sharp object hazards such as nails, wire, tacks, screws, large staples, scrap metal, etc**
- CHEMICAL **- Check MSDS for protection**

FOOT PROTECTION

- Safety shoes and boots are made with a **steel-reinforced box toe** to protect your foot from being pierced or crushed. Many safety boots are now required to have **puncture resistant soles**.
  - If you work around exposed **electrical wires or connections**, you'll need to wear **metal-free** non-conductive shoes or boots.

FOOT PROTECTION

- If you work in a **static-free** environment, wear a **conductive** shoe designed to **drain** static charges into a mat or the floor.
- Rubber or synthetic footwear may be needed when working around **chemicals**.
- Avoid wearing leather shoes or boots when working with caustic chemicals.
- **Foot guards and heel and ankle shields** may be necessary for your particular work.

Inspect footwear daily…

- Look for
  - Cracked, torn or worn uppers
  - Wear, holes, tears, cracks, loss of tread on bottom
  - Separation between soles and uppers

Hearing Protection

HEARING PROTECTION

- Workers may suffer permanent hearing loss because loud noises can be damaging **without causing pain**. Hearing protection worn incorrectly can be almost as damaging as wearing no hearing protection at all.

HEARING PROTECTION

- You need to protect your ears when:
  - The sounds in your work area are **irritating**.
  - You need to **raise your voice** to be heard by someone closer than two feet away.
  - There are **signs** indicating hearing protection is required.
  - Sound levels reach **85 decibels** or higher for an **8-hour** time period.
  - There are **short bursts** of sound which can cause hearing damage.

HEARING PROTECTION

EARPLUGS

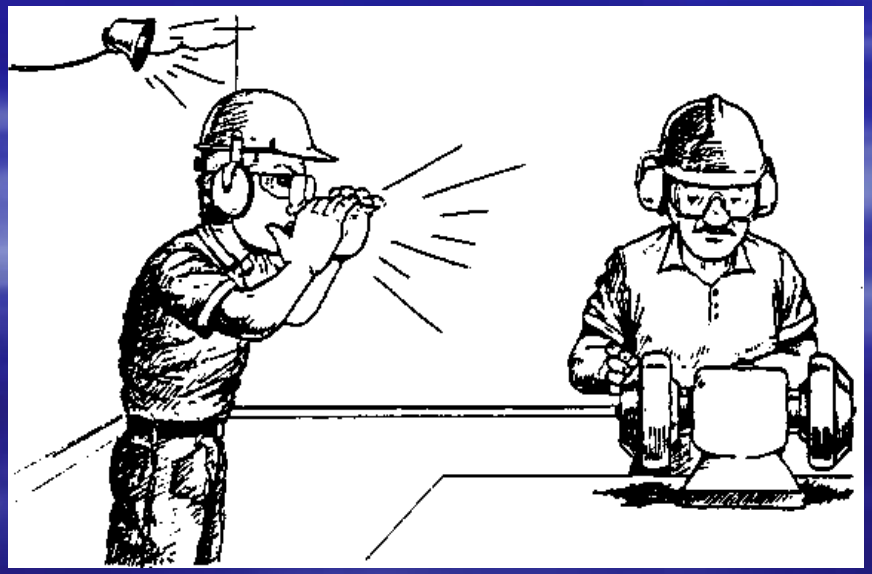
- Earplugs offer the **most protection**. Foam earplugs that fit snugly are the **most effective**.
- To insert properly:
  - Roll the plug into a small diameter.
  - Place it well into the ear canal.
  - You may find it helpful to pull your ear back and up as you insert the plug.
  - After you have inserted it, hold the plug in your ear for a few seconds to ensure a good fit.

HEARING PROTECTION
EARMUFFS

- Though they look like they would provide better protection than ear plugs, their effectiveness is actually **limited by the seal** they form around the ear.
  - **Facial hair** can decrease your protection by breaking the seal.
  - **Wearing earrings and eyeglasses** with earmuffs can pose a similar problem.

HEARING PROTECTION

- **PROPER PROTECTION**
  - To ensure the proper degree of protection, earplugs and earmuffs may have to be worn **together**, especially in an **extremely noisy** work environment.
  - Keep in mind that when using hearing protection to block out damaging noises, you may also be blocking out sounds you hear -- such as **voices and alarms**.



Symptoms of hearing loss

- Ringing in ears
- Difficulty hearing normal conversations
- Noises are "fuzzy" or muffled

Hearing protection must

- Be kept clean
- Fit snugly against the head or in the ear
- Have no gaps or breaks

Respiratory Protection

- When engineering controls cannot reduce to safe levels your exposure to airborne contaminants, respiratory protection must be used.
- When you breathe in oxygen, your respiratory system instantly gets rid of the carbon dioxide. Remember, when you breathe in contaminated air, it enters your respiratory system and is passed into your blood stream immediately, too.

Respiratory Protection

- **There are three types of respiratory hazards: oxygen deficient atmospheres, gases and vapors, and particulate contaminants.**
- **Oxygen Deficient Atmospheres**
  - Normal Air Contains **approximately 21%** oxygen
  - An oxygen deficient atmosphere has less than **19.5%** oxygen

Respiratory Protection

- You may not be aware that you are in an oxygen deficient atmosphere because the lack of enough oxygen affects your judgment and logic.
- An oxygen deficient atmosphere can also affect your muscular coordination and sense of hearing, touch, and location.
- Continued exposure may lead to unconsciousness and even death.

Respiratory Protection

- Respirator Selection: **air purifying** & **air supplying** respirators.
- **Air Purifying Respirators**
  - Works by **filtering** the hazardous air through **color coded cartridges**.
- **Air Supplying Respirators**
  - Provide a continuous supply of clean air to the face piece from either an **airline** or a **self-contained** unit.
  - Are used when there is a high level contamination, an unknown hazard, or the environment is oxygen deficient.

Respiratory Protection

- **Qualitative Fit Test**
  - When exposed to a test agent while you are wearing your respirator, if you can **smell** the odor or if your nose or throat become **irritated**, that particular respirator fails the test.
- **Quantitative Fit Test**
  - The air inside your face piece is sampled by a **probe** attached to the respirator and is analyzed by an **electronic instrument** that is connected to the probe with a tube. This instrument measures the difference between the air outside the face piece and the air inside . Leakage cannot exceed federal regulations or the respirator fails the test.

Respiratory Protection

- **Negative Fit Check**
  - **Cover the inhalation inlets**, inhale slowly and hold your breath for about 10 seconds. The face piece should **collapse inward**. It if does and no leaks are felt outside, the fit should be secure.
- **Positive Fit Check**
  - **Cover the exhalation valve, exhale slowly** for about 10 seconds while checking for air leaks between your face and the seal. The face piece should **expand outward**. If no leaks are detected and the face piece bulges out slightly, the fit should be secure.

Respiratory Protection

- **Care and Storage**
  - Inspect the respirator before each use for signs of wear, stress, cracks, and other distortions.
  - The respirator should be **cleaned, disinfected and properly stored** after each use. Store the respirator in a resealable plastic bag away from direct sunlight, making sure not to distort the face piece

PROTECTIVE CLOTHING

- The amount of protection the clothing provides is determined by three characteristics of the material it is made from:
  - **Penetration** :the ability of a chemical to **seep through pores, stitches**, or other openings.
  - **Permeability**: chemical's ability to enter at a molecular level. This form of contamination is often **not detected immediately**
  - **Degradation**: the material's ability to withstand **deterioration** from chemical and physical exposure.

PROTECTIVE CLOTHING

- Other factors to consider when selecting protective clothing include ...
  - The length of time protective clothing will be worn.
  - Is there a potential for heat stress disorders?
  - Is heat generated by the body allowed to escape?

LIMITATIONS OF P.P.E.

- **INSPECTION**
  - Ear muffs with cracked, cut or missing gaskets reduce your protection.
  - Dirty or scratched eyewear could limit your vision.
  - Periodically, check the suspension of your hard hat. Look for loose or torn cradle straps, loose rivets, broken sewing lines or other defects.
  - Replace your hard hat at least every two to five years, or after a major impact.
  - PPE must fit properly to protect you.

LIMITATIONS OF P.P.E.

- **MAINTENANCE**
  - Learn how to **clean and sanitize** your equipment.
  - Earplugs, for example, may keep your ears safe from damaging noise, but may cause an infection if inserted with dirty hands.
  - Knowing how to **store your equipment** is just as important. For example, rubber boots could easily be punctured if left where they could be stepped on by others.
  - If your equipment is **damaged**, know how to **repair it** or when to **replace it**.

Protect yourself…

- Use the right PPE for the Hazard
- Inspect your PPE before using
- Replace damaged or worn PPE
- Store your PPE properly so it will be ready for the next use
- Keep your PPE clean
- Notify your supervisor if you need new PPE