

PERSONAL PROTECTIVE EQUIPMENT & THEIR IMPORTANCE

BY

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HAZARD CONTROL HIERARCHY

- ELIMINATION
- SUBSTITUTION
- ENGINEERING CONTROL
- ADMINISTRATIVE CONTROL
- PPE'S

Protecting Employees from Workplace Hazards

- ⦿ Employers must protect employees from workplace hazards and dangerous work procedures that can cause injury, illness and fatalities.
- ⦿ Employers must:
 - Use all feasible engineering and work practice controls to eliminate and reduce hazards
 - Then use appropriate PPE if these controls do not eliminate hazards.

Remember: PPE is the last control --

PERSONAL PROTECTIVE EQUIPMENT

- **Personal Protective Equipment (PPE) must be provided when necessary by reason of hazards encountered that are capable of causing injury or impairment**
- **PPE is not a substitute for engineering, work practice, and/or administrative controls**
- **PPE creates barrier between hazard and route of entry**
- **Use of PPE does not eliminate the hazard so if the equipment fails then exposure occurs**

OSHA PPE STANDARD

- **Assess the workplace to determine if hazards are present**
- **Select and provide appropriate PPE that fits each affected employee**
- **Train employees on how to use PPE correctly**

Employer Responsibilities

Assessment

Employers are required to conduct an assessment to determine the various hazards that may be present at the workplace -

Different types of hazards include:

- **Physical**
- **Chemical**
- **Electrical**
- **Mechanical**
- **Biological**
- **Health Hazards**

PPE SELECTION

- Protects each employee from identified hazards
- Is of safe design and construction
- Is sanitary and reliable
- Provides each employee with a good fit
- Meets BIS other applicable approval agency standard

PPE TRAINING REQUIREMENTS

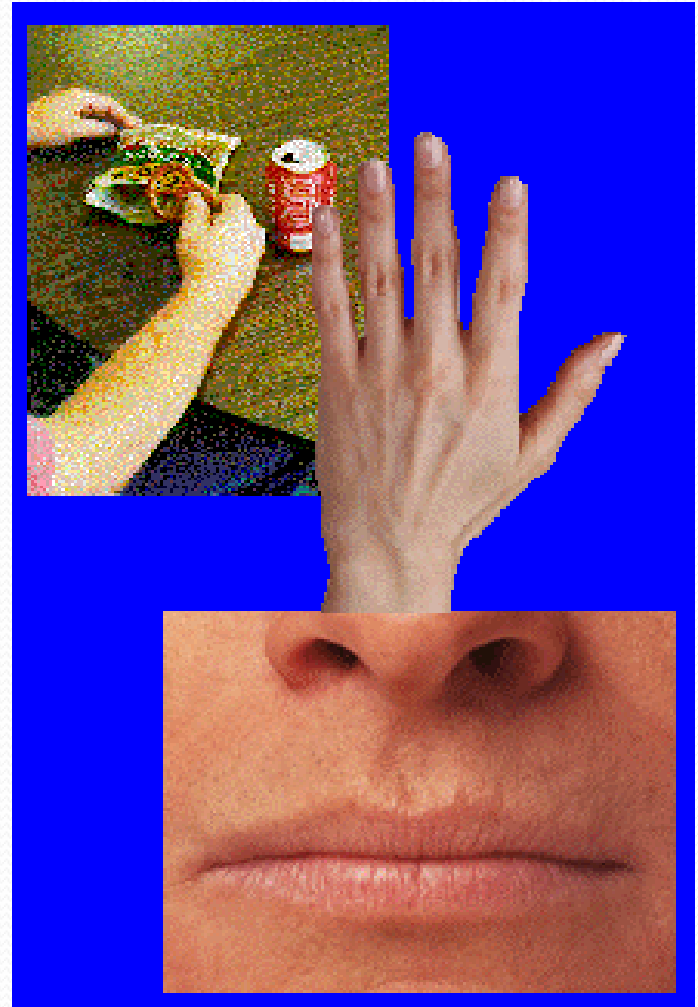
- **When is PPE necessary**
- **What PPE is necessary**
- **How to properly don, adjust and wear PPE**
- **The limitations of PPE**
- **The proper care & maintenance of PPE**

ROUTES OF EXPOSURE

- **Inhalation**
- **Skin Absorption**
- **Ingestion**
- **Injection**

Knowing the hazards and how to protect yourself is the key to your safety

Create a barrier



Employee Responsibilities

- ◎ **To attend all PPE training sessions**
- ◎ **To use appropriate PPE on the job**
- ◎ **Follow ALL Warnings and Precautions**
- ◎ **Listen and Follow Directions**
- ◎ **Maintain assigned PPE in healthy condition**
- ◎ **Report any and ALL unsafe conditions you may find in your work area.**

What is personal protective Equipment?

“Specialized clothing or equipment worn by workers for protection against health and safety hazards.

Personal protective equipment, or PPE, is Designed to protect workers from serious workplace injuries or illnesses resulting from contact with chemical, radiological, physical, electrical, mechanical, or other workplace hazards.

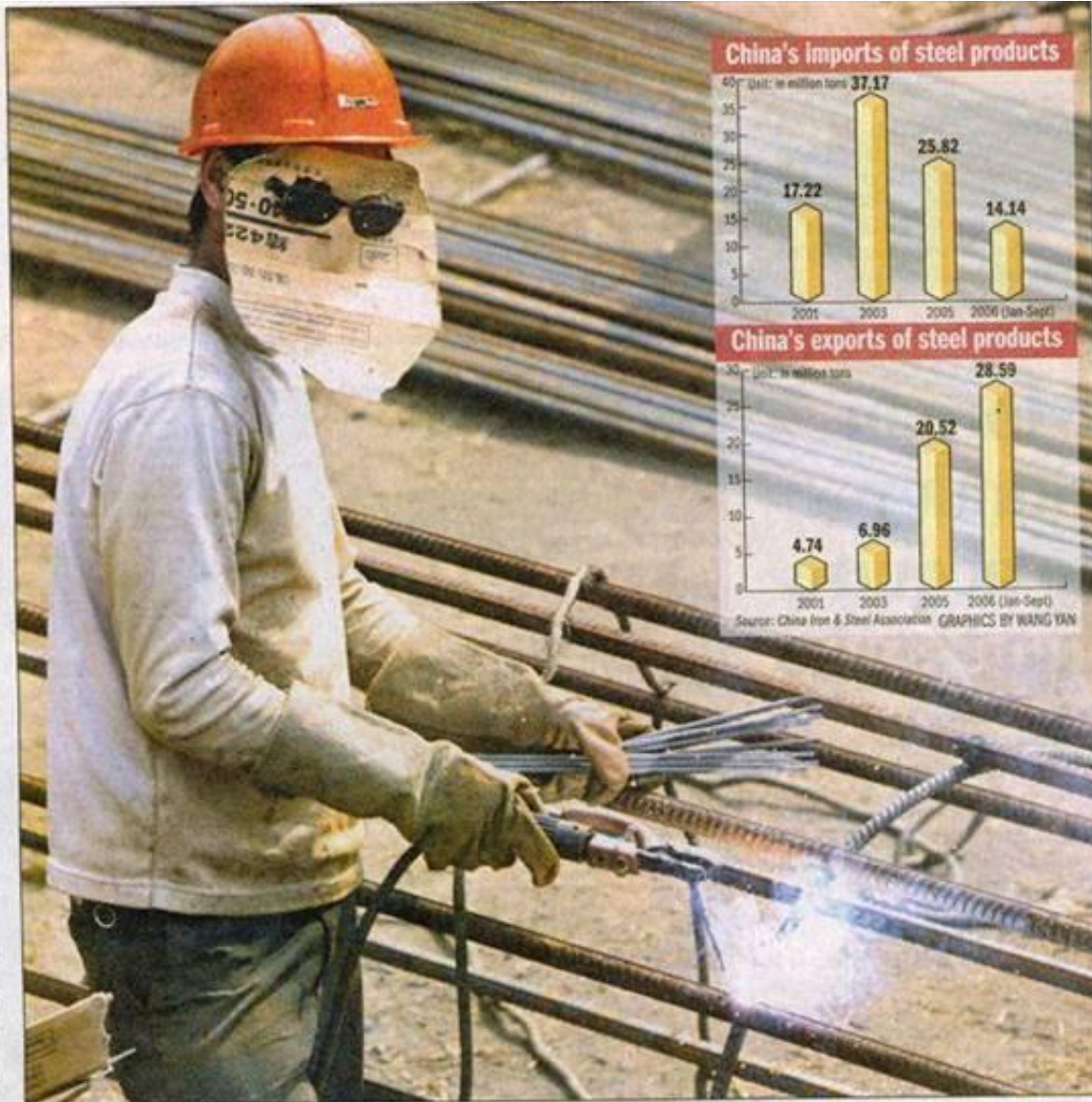
Is This An Appropriate Hard Hat?



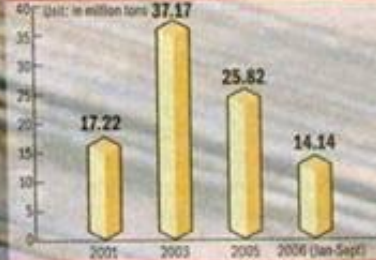
Is This An Appropriate Respirator?



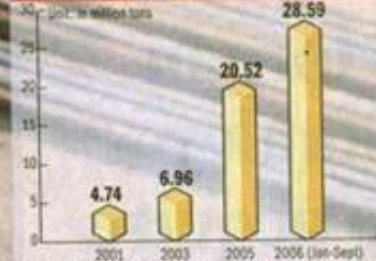
Is This an Appropriate Welder's Mask?



China's imports of steel products



China's exports of steel products



Source: China Iron & Steel Association GRAPHICS BY WANG YAN

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A worker welds at a construction site in Nanjing, the capital of East China's Jiangsu Province.

FILE PHOTO

Is This an Appropriate Scaffolding?



TYPES OF PERSONAL PROTECTIVE EQUIPMENTS

HEAD PROTECTION

EYE PROTECTION

EAR PROTECTION

RESPIRATORY PROTECTION

FACE PROTECTION

HAND PROTECTION

LEG PROTECTION

BODY PROTECTION

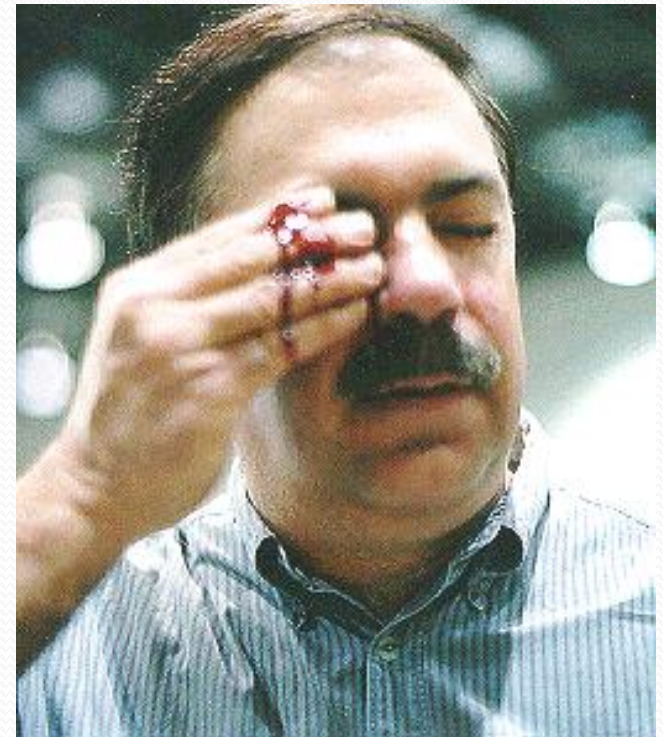
IT MEANS A COMPLETE
HEAD
TO
TOE
PROTECTION



Eye and Face Protection

Why Eye and Face Protection is Important??

Thousands of people are blinded each year from work related eye injuries. Injuries that could have been prevented, if only people would have used eye or face protection.



Eye and Face Protection

Types of eye/face hazards

- Impact
- Heat
- Chemicals
- Dust
- Light and/or Radiation



Eye and Face Protection

Potential Incidences of Eye/Face Hazards

Object Striking Eyes

- **Dusts, Powders, Fumes, and Mists**
 - Operations such as grinding, chiseling, sanding, hammering, and spraying can create small airborne particles

Contact with Chemicals

- **Toxic Gases, Vapors, and Liquids**
 - Toxic chemicals in the form of gases, vapors, and liquids can damage your eyes. Always read the appropriate MSDS before working with any hazardous material.

Eye and Face Protection

Potential Incidences of Eye/Face Hazards

Swinging Objects

- Large objects such as:
 1. swinging chains, cables and ropes;
 2. tools that are thrown or fall;

Thermal and Radiation Hazards

- Operations such as welding, metal cutting, and working around furnaces can expose your eyes to heat, glare, ultraviolet, and infrared radiation

Eye and Face Protection

Types of Eye and Face Personal Protective Equipment



- **Safety Glasses**

- much stronger and more resistant to impact and heat than regular glasses
- equipped with side shields that give you protection from hazards that may not be directly in front of you
- Safety glasses should be approved to meet standards
- Should fit comfortable on face through all job tasks. Ensure that glasses are not too big or too tight
- Limitation
 - Does not seal around eyes, could allow small droplets to come in contact with eyes

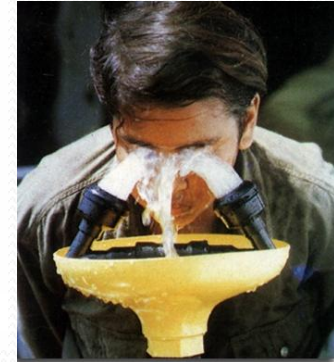
Eye and Face Protection



Regular glasses or sunglasses are not appropriate SAFETY GLASSES



Eye and Face Protection



- **Goggles**

- surround the eye area, they give you more protection in situations where you might encounter splashing liquids, fumes, vapors, powders, dusts, and mists
- must indicate that they are chemical splash goggles to be worn for that purpose
- **Limitation**
 - Uncomfortable to wear with other head gear like helmet, ear muffs or respirator

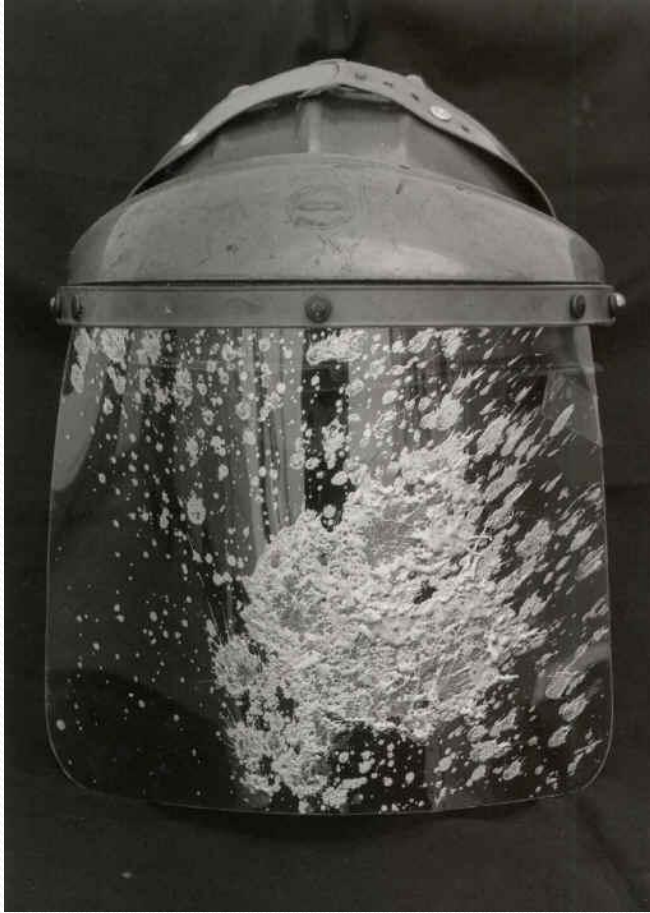
Eye and Face Protection

- **Face Shields**

- full face protection
- used around operations which expose you to molten metal, chemical splashes, or flying particles
- Can be used simultaneously as a hard hat
- Limitations
 - Are not considered eye protection, will need to wear goggles or glasses underneath
 - Can fog up if working in poorly ventilated area



Eye and Face Protection



- Face shield used by an employee working with molten metal
- The molten metal bubbled and burst onto the face shield of the employee
- The employee did not receive any injuries from the incident

Eye and Face Protection

◎ Welding Helmets

provide both face and eye protection
use special absorptive lenses that
filter the intense light and radiant
energy that is produced during
welding operations

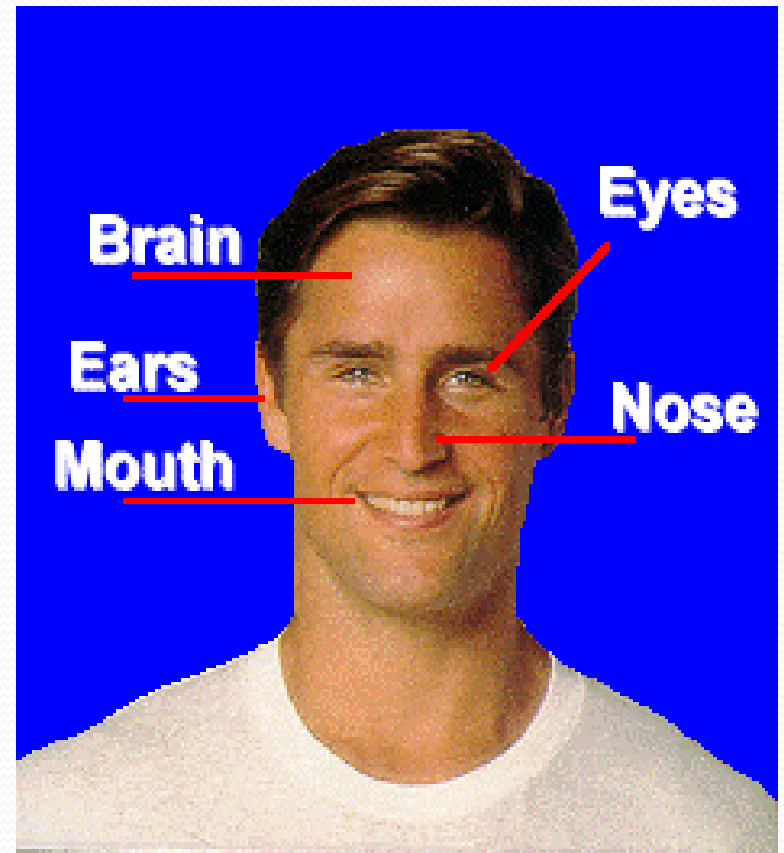


HEAD PROTECTION

Injuries to the head could involve your:

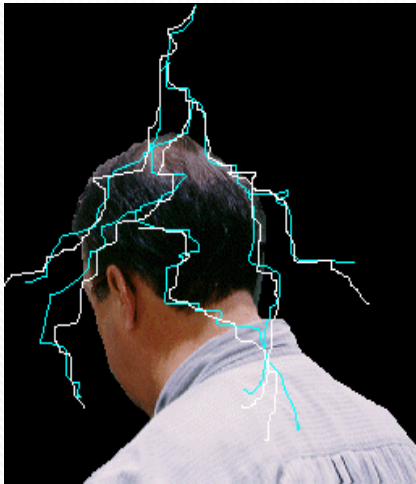
- brain
- eyes
- nose
- mouth

For this reason, head protection and safety are very important



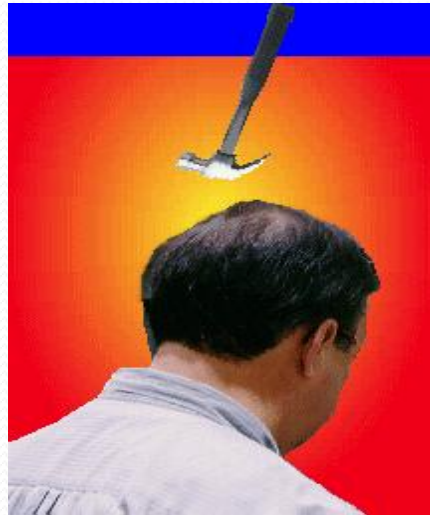
POTENTIAL HAZARDS

Electrical Shocks



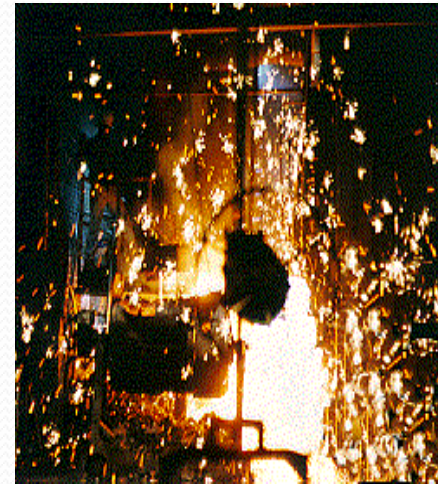
**-accidents result
in shocks and
burns**

Head Impact



**- falling or flying
objects cause
sprains, fractures,
and concussions**

Splashes, Spills & Drips



**-materials can
irritate and burn
eyes and skin**

Head Protection

Types of Head PPE

◎ Hard hats

- A rigid shell that resists and deflects blows to the head
- A suspension system inside the hat that acts as a shock absorber
- Some hats serve as an insulator against electrical shocks
- Some hard hats can be modified so you can add face shields, goggles, hoods, or hearing protection to them



Head Protection



Head Protection

- Hard hats must be worn in areas around or where there is a potential for falling objects.
- Hard hats must also be worn where there are low-hanging obstructions.
- Helmets designed to reduce electrical shock hazards must be worn when your head is exposed to electricity
- Some tasks require both head & face protection.



Hand Protection

Why is Hand Protection Important?

- ◎ It has been estimated that almost 20% of all disabling accidents on the job involve the hands
- ◎ Without your fingers or hands, your ability to work would be greatly reduced



POTENTIAL HAZARDS

Traumatic Injuries



- cuts, punctures, sprains or crushing from equipment

Contact Injuries



- contact with toxic chemicals, biological substances, electrical sources, extreme temperatures

Repetitive Motion



- same hand movement over extended time periods

Hand Protection

Types of Hand PPE

- **Gloves**

- **Metal mesh gloves**

- resist sharp edges and prevent cuts

- **Leather gloves**

- shield your hands from rough surfaces

- **Vinyl and neoprene gloves**

- protect your hands against toxic chemicals

- **Rubber gloves**

- protect you when working around electricity



Hand Protection

Types of Hand PPE

- **Gloves**

- **Padded cloth gloves**

- protect your hands from sharp edges, slivers, dirt, and vibration

- **Heat resistant gloves**

- protect your hands from heat and flames

- **Latex disposable gloves**

- used to protect your hands from germs and bacteria

- **Lead-lined gloves**

- used to protect your hands from radiation sources



Foot Protection

Why is Foot Protection Important?

- The human foot is rigid enough to support the weight of your entire body, and yet flexible enough to allow you to run, dance, play sports, and to take you anywhere you want to go. Without your feet and toes, your ability to work at your job would be greatly reduced.



POTENTIAL HAZARDS



Impact Injuries



Spills & Splashes



Compression Injuries



Electrical Shocks



Slipping



Heat/Cold

Foot Protection

Types of Foot PPE

- **Safety Shoes and Boots**
 - **Steel toe footwear**
 - protects your toes from falling objects and from being crushed
 - **Metatarsal footwear**
 - special guards that run from your ankle to your toes and protect your entire foot
 - **Reinforced sole footwear**
 - metal reinforcement that protects your foot from punctures
 - **Latex/Rubber footwear**
 - resists chemicals and provides extra traction on slippery surfaces



Foot Protection



Type of Foot PPE

- **Safety Shoes and Boots**

- **PVC footwear**

- protects your feet against moisture and improves traction

- **Butyl footwear**

- protects against most ketones, aldehydes, alcohols, acids, salts, and alkalies

- **Vinyl footwear**

- resists solvents, acids, alkalies, salts, water, grease, and blood

- **Nitrile footwear**

- resists animal fats, oils, and chemicals

Foot Protection



Types of Foot PPE

- **Safety Shoes and Boots**
 - **Electrostatic dissipating footwear**
 - conducts static electricity to floors that are grounded
 - **Electrical hazard footwear**
 - insulated with tough rubber to prevent shocks and burns from electricity

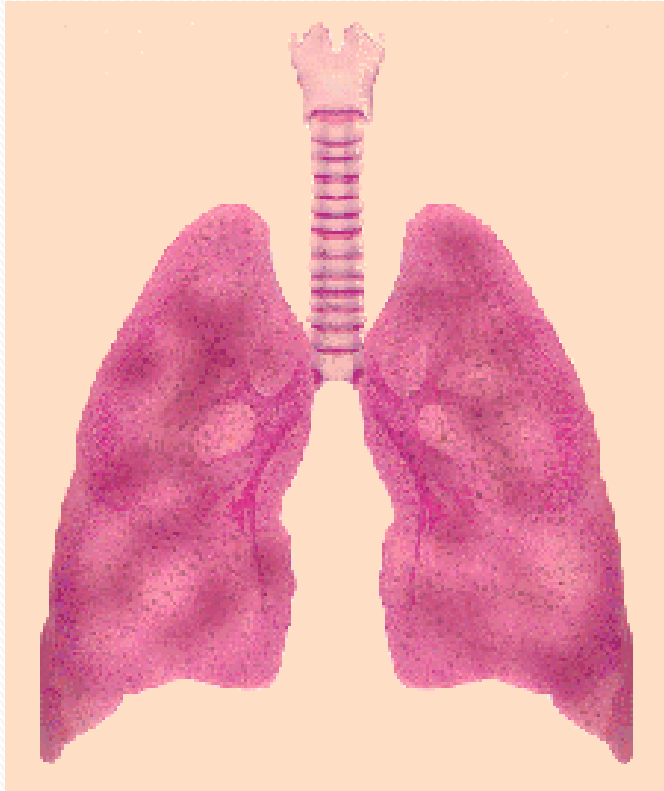


RESPIRATORY PROTECTION

- Required when employees are in areas where effective engineering controls are not feasible to protect the health of the employee from harmful dusts, fogs, fumes, mists, gases, smokes, sprays or vapors
- Must comply with Standards



LUNG DAMAGE



- Inhalation of hazardous materials damages delicate structures of the lung
- Damaged lungs are more susceptible to respiratory disease
- Most direct route to the bloodstream

RESPIRATORY PROTECTION

- **Exposure levels exceed the PEL**
- **During installation of engineering or work practice controls**
- **Maintenance and repair activities that may result in exceeding the PEL**
- **Emergency Response where type and/or concentration of contaminant is unknown**
- **Voluntary Usage**

TYPES OF RESPIRATORS

➤ Air-purifying

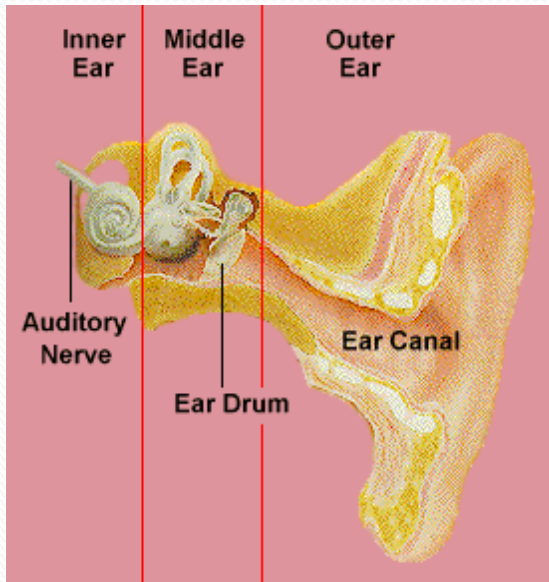


➤ Supplied-air



HEARING PROTECTION

Damage to the delicate structures in your ear can cause one of two types of hearing loss:



- **CONDUCTIVE** - blocks transmission of sound to inner ear - medical/surgical treatment available for most
- **SENSORINEURAL** - involves organ of Corti and auditory nerve - almost always irreversible

Most hearing loss in the workplace is sensorineural.

Exposure Hours per Day	Sound Level in dBA
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
1/2	110
1/4 or less	115

HEARING PROTECTION

- Required when employees are in areas where there is exposure to excessive noise levels (8 hour TWA \geq 90 dbA)
- Recommended for use in high noise areas and for use with high noise operations
- Must have appropriate NR (muffs do not always provide more protection)



Body Protection

Why is Body Protection Important?

- The skin acts as a natural barrier to the elements
- Chemicals can break down the skin barrier and allow secondary infections to manifest



Body Protection

Potential Incidences of Body Hazards

- Temperature stress
 - Exposure to heat (hot metals) or cold (dry ice) which results in burns
- Chemical Contact
 - Chemical splash
 - Contact with potentially infectious materials
- Radiation

Body Protection

Types of Body PPE

- Insulated Coats and Pants
 - Fire resistant
 - Heat resistant
 - Cold resistant
- Sleeves and Aprons
 - Work well when pouring or manipulating chemical to reduce splash
 - Make sure the sleeves and aprons are appropriate for the chemical



Fire Suits



Features :

Designed to protect those who work in high heat industrial situations or in direct contact with fires.

Designed to protect pipeline workers, off shore oilrig crews, plant operators, industrial workers, fireman, etc.

Chemical Suits



Features:

Designed to provide complete protection to the respiratory, sight or skin from hazardous vapors, gases, particulates, sudden splash. Totally encapsulated, vapor tight

- Chemical Suits (Provision for a SCBA set) with hood, face shield, boots & gloves



Thank You.....