



MODULE 13

# Personal Protective Equipment



# Introduction

- Protective equipment = tools to do the job.
- Nearly 2 million disabling work-related injuries expected this year.
- More than  $\frac{1}{4}$  will involve head, eyes, hands, feet





# PPE Statistics from BLS

- Hard hats were worn by only 16% of those workers who sustained head injuries
- Only 1% of approx 770 workers suffering face injuries were wearing face protection
- Only 23% of the workers with foot injuries wore safety shoes or boots
- About 40% of the workers with eye injuries wore eye protection



# 1910.132 General Requirements

(a) Protective equipment, including personal protective equipment for:

- Eyes,
- Face,
- Head, and extremities,
- Protective clothing,
- Respiratory devices, and
- Protective shields and barriers,

Shall be

- provided,
- used, and
- maintained in a sanitary and reliable condition
- wherever it is necessary by reason of **hazards of processes or environment**





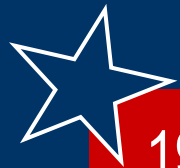
# 1910.132(d) Hazard Assessment

- Assess workplace to determine if hazards are likely to necessitate the use of personal protective equipment (PPE)
- If hazards are present the employer shall:
  - Select and have each affected employee use appropriate PPE for identified hazards
  - Communicate selection decisions
  - Select PPE that fits each employee



# 1910.132(f) Training

1. Employer must train employees before issuing PPE in at least these things:
  - i. When PPE is necessary
  - ii. What PPE is necessary
  - iii. How to properly don, doff, adjust, and wear PPE
  - iv. Limitations of the PPE
  - v. Proper care, maintenance, useful life and disposal of the PPE



1910.133

# Eye and Face Protection



# 1910.133 Eye and face protection

- Employer assures that employee **uses** eye or face protection from hazards:
  - Flying particles
  - Molten metal
  - Liquid chemicals, acids or caustic liquids
  - Chemical gases or vapors
  - Potentially injurious light radiation





# 1910.133 Eye and face protection

- Side protection for flying objects
  - Detachable side shields OK





# 1910.133 Eye and face protection

- Employees with prescription lenses:
  - Incorporate prescription in eye protection or
  - Wear eye protection over prescription lenses
  - Without disturbing proper position of prescription lenses or the protective lenses



# 1910.133 Eye and face protection

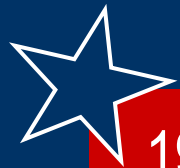
- Each **affected** employee must wear appropriately shaded filter lenses for protection from injurious light radiation
- Tables in (a)(5)



# Protective eye and face devices shall comply with ANSI Z87.1-1989



**Z 87.1-1989**



1910.135

# Head Protection



# 1910.135(a) General requirements

- a. Ensure that each affected employee wears a protective helmet where there is a potential for head injury from falling objects





# Classes and Types of Hard Hats

- Type I hard hats - reduce force of impact from a blow to the top of the head
- Type II hard hats - provide protection against both side impact (lateral) and blows to the top of the head



# Classes and Types of Hard Hats

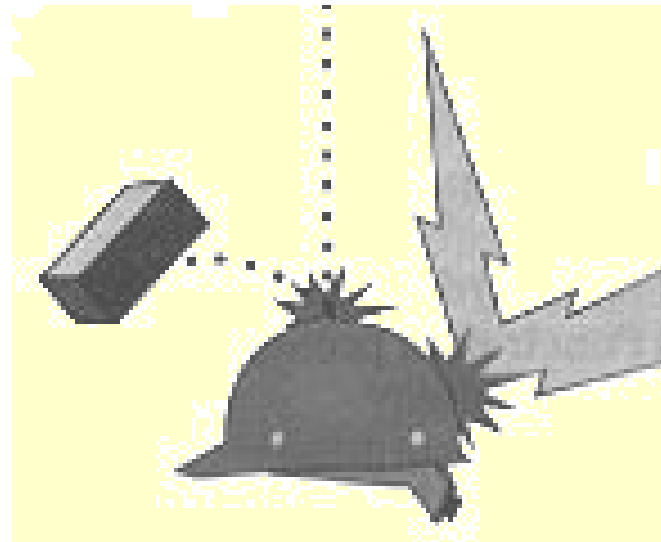
- Class G (old A) – General
  - Tested to withstand 2200 volts
- Class E (old B) – Electrical
  - Tested to withstand 20,000 volts
- Class C (old C) – Conductive
  - No electrical protection





# 1910.135(a) General requirements

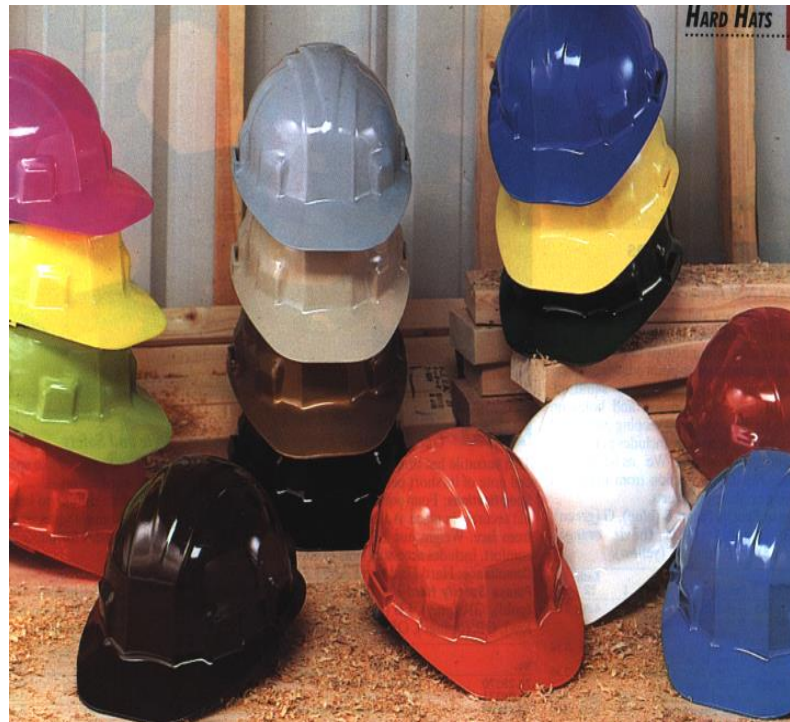
- b. Ensure that each affected employee wears a protective helmet designed to reduce electrical shock hazard when near exposed electrical conductors which could contact the head

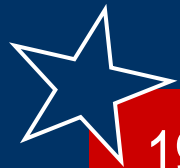




# 1910.135(b) Criteria for protective helmets

- Protective helmets shall comply with ANSI Z89.1-1986





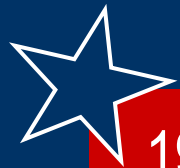
1910.136

# Foot Protection



# 1910.136(a) General requirements

- Each affected employee must use protective footwear where there is danger of:
  - Falling or rolling objects
  - Objects piercing sole
  - Feet exposed to electrical hazards
- Protective footwear shall comply with ANSI Z41-1991



1910.138

# Hand Protection



# 1910.138(a) General requirements

- a. Appropriate hand protection required for employee hand exposure to hazards such as:
  - Skin absorption of harmful substances
  - Severe cuts or lacerations
  - Severe abrasions
  - Punctures
  - Chemical burns
  - Thermal burns
  - Harmful temperature extremes



# 1910.138(b) Selection

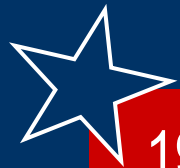
- Employer selects based on:
  - Performance characteristics of the hand protection relative to the task(s) to be performed
  - Conditions present
  - Duration of use
  - Hazards and potential hazards identified



# Common Types of Gloves

- **Disposable:** light-weight plastic; can help guard against mild irritants.
- **Fabric:** cotton or fabric blend; improve grip or insulate from heat or cold.
- **Leather:** guard against injuries from sparks or scraping against rough surfaces. Combine with an insulated liner when working with electricity.
- **Chemical Resistance:** nitrile, neoprene, vinyl, etc; protect hands from chemical exposure
- **Metal Mesh:** protect hands from cuts and scratches; used commonly with sharp instruments.
- **Aluminized Fabric:** insulate hands from intense heat; commonly used with molten materials





1910.95

# Hearing Protection



# 1910.95 Occupational Noise Exposure

- OSHA measures noise in decibels in A scale (dBA) – calculation of one number for multiple frequencies
- TWA calculation, but nonlinear scale
- Permissible TWA: 90 dBA for 8 hours
- Table G-16: higher exposure, shorter time allowable



# 1910.95(c) Hearing conservation program

- Required for any employees exceeding 8-hour TWA of 85 dBA or 50% dose
  - Action level
- Monitoring, employee notification
- Audiometric testing
  - Baseline and annual
  - Evaluated for **standard threshold shift (STS)** (change in hearing sensitivity)



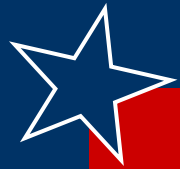
# 1910.95(i) Hearing protectors

- Available to all employees exposed over 85 dBA
- Replaced as necessary
- Must be worn by workers exposed >90 dBA, or before baseline or with STS
- Employees choose from variety
- Training, supervision of correct use
- Proper initial fitting



# 1910.95(j) Hearing protector attenuation

- Calculations in Appendix B
  - Cannot simply subtract Noise Reduction Rating (NRR) from dBA
  - Poor fit decreases attenuation
- Must attenuate to 90 dBA
- If STS has occurred, attenuate to 85 dBA
- Re-evaluate when noise levels increase



# Other Regulations



# Other Regulations

- API RP 54 section 5
  - Includes fall protection
  - Hearing protection includes 12-hour shift
  - No loose or poorly fitted clothing
  - Do not work in clothing saturated in hazardous substance – wash and/or treat skin and change clothes



**CLICK THE LINK BELOW TO COMPLETE THE  
PERSONAL PROTECTIVE EQUIPMENT QUIZ  
AND THEN CLICK SUBMIT.**

**PERSONAL PROTECTIVE  
EQUIPMENT QUIZ**