Texas Department of Insurance
Division of Workers' Compensation
Workplace & Medical Services, Outreach & Education

Eye Protection

HS93-006E(11-06)

Goal

The goal of this program is to provide information on the causes of eye injuries, different types of eye protection, and first aid procedures for various kinds of eye injuries.

Objective

Workers will be given information on how to identify the hazards present in their work areas. Eye injury prevention measures will give workers the knowledge to avoid the potential for eye injuries while at work. A review of first aid treatment methods will enable workers to respond to an eye injury in their work place.

Background

Every day an estimated 1,000 eye injuries occur in American workplaces. The Bureau of Labor Statistics (BLS) reports that eye injuries in the workplace cost over $467 million annually. Ninety percent of these eye injuries are preventable if workers use proper safety guidelines and proper eye protection. A recent BLS survey found that three out of five injured workers were not wearing eye protection and 40% of those wearing eye protection were not wearing the proper protection for the job being performed.

Standards

There are many different types of eye protection available. The design, construction, testing, and use of protective eyewear must comply with American National Standards Institute (ANSI) Z87.1-1989. This standard requires the manufacturer's monogram to appear on each lens and a "Z87" to appear on all component parts. The main difference between safety glasses and regular glasses is impact resistance. The ANSI standard for safety glasses requires them to withstand the impact of a quarter inch steel ball traveling 150 feet per second. Your prescription glasses will not provide this kind of protection.

Types of Injuries

Appropriate eye protection will depend on the potential eye hazards present in the workplace. Eye injures are separated into three categories:

- Physical
- Chemical
- Thermal

Physical

According to BLS, almost 70% of high impact physical eye injuries are a result of flying or falling objects, or sparks striking the eye. Other injuries were caused by objects swinging from a fixed or attached position (tree limbs, ropes, chains, or tools). Protection from high impact hazards requires safety glasses or goggles with polycarbonate lenses, which are the most impact resistant. While goggles offer greater overall protection, safety glasses fitted with clear side shields may be the best choice if the job requires extensive side vision. Workers who need vision correction can purchase prescription glasses with polycarbonate lenses.

Small, fast-moving particles, like debris from sanding, grinding, chipping, or similar operations, are the most common cause of eye injuries. A fast-moving particle, smaller than a grain of sand, can cause a great deal of damage to an unprotected eye. Even relatively fine slow-moving particles, like dust can scratch the eye's surface. Plastic and polycarbonate lenses are highly impact-resistant but less scratch-resistant than glass lenses. While high-speed particle hazards require safety glasses or goggles, resistance to scratches must also be considered. Glass lenses will shatter on high impact but resist scratching from dust and grit better than other lenses. Some polycarbonate lenses have a scratch-resistant coating to protect against both high-impact and fine-particle hazards. The specific conditions of the work environment will determine the appropriate eye protection.

Chemical

Chemical exposures account for one-fifth of all eye injuries (BLS). Eye damage from alkalis or caustic acids can be extremely serious. Sodium hydroxide (caustic soda, lye) begins destroying eye tissue within a 10^{th} of one second of contact. Chemical "irritants" are less severe. Working with chemicals exposes the eyes to splashes, vapors, and fumes. The best eye protection for working with chemicals is safety goggles with direct ventilation. Safety goggles provide a secure shield around the eyes to protect against hazards coming from many directions. Extremely dangerous environments require goggles with indirect ventilation and a coating with an anti-fogging agent.

Thermal

A face shield is the best protection against heat. Acetate shields or other flexible plastic visor-type shields that cover the face and neck are preferred. Always wear safety glasses or goggles under a face shield. A welding helmet may be required in extreme heat or concentrated light environments.

Prevention

To prevent eye injuries in the workplace, a thorough analysis of plant operations should be conducted. Work areas, access routes and equipment should be inspected with emphasis on eye injury hazards. Identify operations and areas that present potential eye hazards by examining eye accident and injury records. Once the hazards are identified, eye injuries can be prevented by:

- Training; and
- Equipment maintenance

Training

Training in the selection and use of eye protection will reduce injuries. Workers must recognize which protection is appropriate for the different environments that exist in their workplace. Eye protection is required for all workers working in:

- Dust, concrete, and metal particles
- Falling or shifting debris, building materials, glass
- Smoke, noxious/poisonous gases
- Chemicals (acids, bases, fuels, solvents, lime, wet or dry cement powder)
- Welding light and electrical arc
- Thermal hazards and fires
- Bloodborne pathogens (hepatitis or HIV) from blood, body fluids, human remains

Any workers or visitors entering or passing through work areas requiring eye protection must comply by wearing protective eyewear.

Equipment Maintenance

Scheduled and daily maintenance of protective eyewear is mandatory. To reduce the risk of eye injuries proper maintenance should include the following:

- Adjust eyewear for a snug fit and reasonable comfort
- Secure loose parts
- Replace scratched, cracked, pitted, and/or faded lenses
- Clean eyewear after each shift or as needed
- Clean following manufacturer's directions
- Clean shared eyewear by washing with warm, soapy water, and rinsing thoroughly
- Use a disinfectant and hang eyewear to dry in a clean place
- Store eyewear in a case to prevent scratching
- Use an anti-fogging product to reduce or eliminate fogging
- Label each person's eyewear with their name
- Require each worker to be responsible for inspecting his/her eyewear

First Aid

First aid procedures for eye injuries should be established. Employers are required to provide approved emergency eyewash equipment where there is risk of eye injury from hazardous chemical substances. In the event of any eye injury do not rub the eye, since this will increase the damage to delicate eye tissues. Follow these recommendations for the treatment of eye injuries:

Chemical Burns

- Immediately flush eye with water for 15 - 20 minutes
- Flush away from unaffected eye
- Flush eye by holding head under faucet or by pouring water from clean container
- Open eye as wide as possible while flushing
- Check the Material Safety Data Sheet (MSDS) for special instructions
- Get immediate medical attention
- Cover both eyes with sterile dressings but do not bandage eye or use eye cup

Specks

- Do not rub eye
- Use eye wash, flush thoroughly
- See doctor if speck does not wash out, or pain or redness continues

Cuts, Punctures, Objects Stuck in the Eye

- Do not flush eye

- Do not try to remove object stuck in eye
- Cover both eyes. Stabilize injured eye with a small paper cup taped in place and the uninjured eye with a sterile dressing
- See doctor at once

Blows

- Apply cold compress without pressure
- Crushed ice in plastic bag can be taped to forehead to rest gently on injured eye
- See doctor at once in cases of continued pain, reduced vision, blood in eye, or discoloration which can mean internal eye damage

Eye injuries are the most common preventable cause of blindness. Workers can guard against eye injuries by wearing the appropriate protective eyewear and following company safety guidelines.

Review

1. What does ANSI Z87.1-1989 require of safety lens manufacturers?

   a. Manufacturer's monogram on each lens

   b. Date of manufacture

   c. "Z87" to appear on all component parts

   d. Both a and c

2. What first aid treatment is given for chemical burns to the eye?

   a. Flush eye with water 15 minutes

   b. Get medical help

   c. Refer to MSDS for specific instructions

   d. All of the above

3. What type of eye protection is best when working with chemicals?

   a. Safety glasses without side shields

   b. Regular glasses

   c. Welding helmet

   d. Safety goggles that fit snug around the eyes

4. How does a company determine the potential eye hazards in the work area?

   a. Analysis of plant operations

   b. Ask the boss

   c. Contact OSHA

   d. All of the above

Answers

1(d), 2(d), 3(d), 4(a)

Resources

The Texas Department of Insurance (TDI), Division of Workers' Compensation (DWC) Resource Center offers a workers' health and safety video tape library. Call (512) 804-4620 for more information or visit our web site at www.tdi.state.tx.us.

Disclaimer: Information contained in this training program is considered accurate at time of publication.

The Texas Department of Insurance (TDI),
Division of Workers' Compensation(DWC)
E-mail **resourcecenter@tdi.state.tx.us**
or call 1-800-687-7080 for more information.

Safety Violations Hotline
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