

## Vision and Eye Health Assurance and Protection in the Workplace

Eye injuries and suboptimal eye and vision health in the workplace are very common. The National Institute for Occupational Safety and Health (NIOSH) reports that every day about 2,000 U.S. workers sustain job-related eye injuries that require medical treatment.<sup>i</sup> Suboptimal eye and vision health in the workplace can lead to poor performance and increased potential for injury. Even minor eye injuries can cause life-long vision problems and suffering—a simple scratch can cause corneal erosion that is recurrently painful.<sup>ii</sup>

The Centers for Disease Control and Prevention (CDC) reports 61 million adults in the United States as being classified at high risk for serious vision loss, and that only half visited an eye doctor in the past 12 months.<sup>iii</sup> Most individuals surveyed by the CDC indicate “*no reason to go*” as the most common reason for not obtaining recommended regular vision and eye health care.<sup>iv</sup> Safety experts and doctors of optometry believe the right combination of eye protection and yearly comprehensive eye examination can reduce the severity of workplace injuries and prevent 90% of eye injuries.

### **Epidemiology of Work-Related Injuries**

In 2008, injuries to the eyes accounted for 37% of all head injuries involving days away from work and 62% of all face injuries involving days away from work. Men experienced four times as many eye injuries as women, and men age 25 to 44 suffered more eye injuries than men in other age groups. Workers who were most at risk of incurring an eye injury included those in the manufacturing, construction, and wholesale and retail trade industries, and educational and health services.<sup>v</sup>

In 2008, there were 27,450 nonfatal occupational injuries or illnesses involving at least one eye that resulted in days away from work. The typical eye injury resulted from the eye being rubbed or abraded by foreign matter, such as metal chips, dirt particles and splinters, or by these types of items striking the eye. These injury events resulted commonly in abrasions, scratches and embedded foreign bodies (splinters and chips).<sup>vi</sup>

The economic burden (medical and work-loss costs) of all non-fatal injuries treated in emergency departments in 2013 was \$456.9 billion.<sup>vii</sup> Workers experience eye injuries on the job for three major reasons:

- They were not wearing eye protection.
- They were wearing the wrong kind of protection for the job.
- They had an unknown vision disorder which contributed to the injury (compromise to visual fields or vision-associated balance disorder).

## **Employer and Employee Injury Prevention Compliance**

According to the Occupational Safety and Health (OSH) Act of 1970, personal protective equipment (PPE), such as goggles, face shields, safety glasses or full-face respirators must be used when an eye hazard exists. The necessary eye protection depends upon the type of hazard, the circumstances of exposure, other protective equipment used and individual vision needs.

Additionally, the employer must provide training to each employee who is required to use PPE. Each such employee shall be trained to know at least the following:

- When PPE is necessary.
- What PPE is necessary.
- How to properly don, doff, adjust and wear PPE.
- Limitations of the PPE.
- Proper care, maintenance, useful life and disposal of the PPE.

PPEs are to be provided by the employer at no cost to employees. The employer must pay for replacement PPE, except when the employee has lost or intentionally damaged the PPE.

Employers must also comply with the General Duty Clause of the OSH Act, which requires keeping the workplace free of serious recognized hazards.

A Bureau of Labor Statistics survey of workers who suffered eye injuries revealed that nearly three out of five were not wearing eye protection at the time of the accident.<sup>viii</sup> “Eye and Face Protection” was among the top 10 most frequently cited violations in 2018.<sup>ix</sup> Workers often reported that they believed protection was not required for the situation.

### **Assessing potential eye hazards**

Many workers are unaware of the potential hazards in their work environments, making them vulnerable to injury. Employers must recognize the existence of eye hazards. A hazard analysis should begin with an on-site tour and an analysis of all work areas. First-hand information must be obtained about each work area, with input from foremen/supervisors and individual workers. The doctor of optometry can consult or assist with this analysis.

Company safety records should be reviewed to identify areas where past eye injuries have occurred. Attention should be paid to:

- Sources of motion that can create projectiles.
- Employee movement patterns that could result in impact with stationary objects.
- Sources of heat that could cause injury or exposure to infrared radiation (IR).
- Chemical exposures (splashes and fumes).
- Sources of dust.
- Sources of radiation (especially visible light, ultraviolet radiation, heat or IR, and lasers).
- Pathogens from blood and body fluids (i.e. Hepatitis, HIV, SARS-CoV-2/COVID-19)<sup>x xi</sup>.

- Layout of the workplace.
- Electrical hazards.

Some working conditions include multiple eye hazards, so the proper eye protection should take all hazards into account. In addition, light levels should be evaluated to determine whether lighting fulfills Illuminating Engineering Society (IES) recommendations for each task.<sup>xii</sup>

Once a hazard analysis has been completed and proper protective devices have been selected, re-evaluation at appropriate intervals is necessary. The doctor of optometry and plant occupational health safety officer should evaluate new equipment, review accident records, and assess the suitability of previously selected eye protection for every specific task.

### **Selection of protective eyewear**

Safety glasses are designed to provide significantly more eye protection than regular eyeglasses. They must meet standards of the American National Standards Institute (ANSI). Look for the Z87 mark on prescription lenses and frame, as well as on non-prescription goggles and face shields.

Contact lenses cannot provide significant protection from eye hazards in the workplace. Nonetheless, there is no evidence that wearing contact lenses increases the risk of eye injury. On the contrary, contact lenses actually can increase worker safety and productivity by providing improved vision in the workplace. Individuals who wear contact lenses usually have a wider field of vision than with eyeglasses. Contact lenses also often cause less visual distortion than eyeglasses, especially with higher power lens prescriptions. In addition, wearing contact lenses instead of eyeglasses can improve the fit and comfort of non-prescription eye safety equipment, such as goggles and full-face respirators.

Workers should therefore be permitted to wear contact lenses in most eye-hazardous environments.<sup>xiii</sup> However, workers must wear eye protection over contact lenses according to the requirements for all workers performing the same job.

In some cases, such as when hazardous chemical fumes are present, the safety of contact lens use should be determined on a case-by-case basis.

### **The maintenance of employees' working ability and promotion of employee health**

Between 8.2 and 15.9 million people in the U.S. live with undiagnosed or untreated refractive errors.<sup>xiv</sup> Millions more suffer uncorrected and undiagnosed ocular diseases and systemic diseases with ocular complications. According to the National Eye Health Education Program, more than 70% of individuals consider that loss of their eyesight would have the greatest impact on their day-to-day life.<sup>xv</sup> Optometry's integration with occupational health aids the prevention of work-related eye diseases, injuries and vision and eye health disorders, provides critical enhancements to performance of workers on the job, and promotes overall employee health. Vision and eye health safety and care that occur within the employment sector often transfer to the family and for activities outside work, at home and during recreation.

The public generally recognizes its reliance on sight and fears its loss. But emphasis on eye and vision health has not been integrated into daily life to the same extent as other health promotion activities.

Accordingly, to give people “*a reason to go*” have their eyes examined, a more comprehensive approach to promote eye and vision health and safety is needed.

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<sup>i</sup> <https://apha.confex.com/apha/137am/webprogram/Paper213155.html>

<sup>ii</sup> <https://www.cdc.gov/niosh/topics/eye/toolbox-eye.html>

<sup>iii</sup> Zhang, X. et al. Arch Ophthalmol 2007;125:411-418.

<sup>iv</sup> MMWR: December 15, 2006 / 55(49);1321-1325

<https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5549a1.htm>

<sup>v</sup> <https://www.bls.gov/opub/mlr/cwc/workplace-injuries-involving-the-eyes-2008.pdf>

<sup>vi</sup> <https://www.bls.gov/opub/mlr/cwc/workplace-injuries-involving-the-eyes-2008.pdf>

<sup>vii</sup> MMWR Morb Mortal Wkly Rep. 2015 Oct 2;64(38):1078-82: <https://www.ncbi.nlm.nih.gov/pubmed/26421663>

<sup>viii</sup> US Department of Labor, Bureau of Labor Statistics, Report 597, April 1980.

<sup>ix</sup> <https://www.msdsolnline.com/2018/10/23/oshas-top-10-most-cited-violations-of-2018/>

<sup>x</sup> <https://www.cdc.gov/coronavirus/2019-nCoV/hcp/infection-control.html>

<sup>xi</sup> <https://www.aoa.org/documents/HPI/HPI%20CoronaVirus%20Statement%201-30-20.pdf>

<sup>xii</sup> <https://www.ies.org/product/the-lighting-handbook-10th-edition/>

<sup>xiii</sup> <https://www.aoa.org/patients-and-public/caring-for-your-vision/protecting-your-vision/guidelines-for-the-use-of-contact-lenses-in-industrial-environments>

<sup>xiv</sup> <http://www.nationalacademies.org/hmd/Reports/2016/making-eye-health-a-population-health-imperative-vision-for-tomorrow.aspx>

<sup>xv</sup> <https://nei.nih.gov/sites/default/files/nei-pdfs/2005KAPFinalRpt.pdf>