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RiskTopics

Personal protective equipment (PPE)

Zurich Resilience Solutions - Risk Engineering

Many hazards in the workplace are not eliminated by engineering aspects, job design, or product substitutions. Therefore, personal protective equipment (PPE) can be used to protect employees against various hazards. PPE alone should not be relied upon to provide protection against hazards but should be used in conjunction with engineering controls and sound manufacturing practices

Introduction

According to OSHA 1910.132, PPE" shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation, or physical contact."

Discussion

A PPE program consists of a hazard assessment, equipment selection, and employee training. Hazard assessment is the identification of those hazards where PPE may be used. Selection is the task of providing the right equipment that is approved for the job. The Occupational Safety and Health Administration (OSHA) requires all employers to perform a written assessment in the workplace for hazards that would require the employees to wear PPE. The standard requires that not only the workplace evaluation be documented in writing but also has provisions for employee training.

This PPE RiskTopic centers attention on hazards to the hand, foot, head, eye, and face. This PPE RiskTopic does not address noise exposure/control or respiratory protection. These issues should be assessed with appropriate hearing conservation programs and respiratory protection programs.

Guidance

Hazard Assessment

All employers should assess the workplace first to identify the hazards and to determine if hazards that would require the use of PPE are present. All assessments should identify the job and area of the plant as well as the exposure. Assess hazards, including exposures to the eyes, face/head, foot, hand, body, falls, noise, and respiratory for the following conditions:

- Impact (struck by or against)
- Penetration/puncture
- Compression or rollover
- Hazardous chemicals
- Heat/cold
- Harmful dust
- Light (optical) radiation
- Electrical Shock

The OSHA standard requires this assessment to be written. The written document should state who completed the assessment, the date it was completed, the hazards identified, as well as potential results of not wearing the equipment. Management should also document the type of PPE required to protect the worker from the hazard. All injury and accident data serves as an excellent source of hazard identification and should be reviewed to identify problem areas.

Equipment Selection

Once the hazards are identified, it is management's responsibility to select the correct PPE to protect the employee. The equipment must provide a level of protection greater than the minimum required to protect the employee (a margin of safety). Where possible, some choice between styles may be offered. Once the selection has been made, management should fit the employee with the equipment and provide training as outlined below. When exposure is encountered, management should then insist on the use of the equipment.

Training

Management should provide training for all employees who are required to wear PPE. Training should show each exposure and PPE required. This documented training should include the following areas:

- When PPE is necessary and why it is necessary
- What type of equipment must be worn
- How to use and adjust the equipment
- How to inspect the equipment
- How to care for and clean the equipment, including instructions to not use defective equipment
- The limitations of the equipment
- Where to obtain the equipment and how to dispose of it

Conduct training for all employees after the assessment has been completed. Employees should sign off that they have been trained in the proper use of the equipment and that they understand the training. Management should ensure that the employees can demonstrate how to use the equipment before performing any task that requires the use of PPE and that they understand the training.

Retraining and reassessment

Retraining and reassessment are required when there is a change in the workplace or job that would warrant a different type of equipment or if the training has become obsolete. Perform retraining when employees do not use PPE appropriately. All reassessment and retraining should be documented.

Recordkeeping

Recordkeeping is needed to document that a hazard assessment has been performed. OSHA guidance indicates records of hazard assessments should include the following:

- Workplace evaluated
- Person certifying that the evaluation has been performed
- Date(s) of the hazard assessment
- Means to identify the document as a certification of hazard assessment

Hazard Assessment Form

The Zurich Services Corporation has developed a form to assist in the hazard assessment process – see Appendix A.

Completing the form

Step 1: Complete the heading – The Reviewed By section could be an evaluation by the supervisor, department head, or safety committee. The Job Classification is the job description or job title. The section on tasks indicates the various duties the specific job classification would entail. Review any previously written job descriptions, job safety analysis, and task analysis to itemize the tasks to be analyzed.

Step 2: Hazard categories – When evaluating the operations, consider the various energy sources or hazardous characteristics that could result in an injury. How could each of the following result in an injury to an employee? Consider that more than one hazardous characteristic may be present. Use existing loss data.

- Motion of machinery or movement of tools or personnel could result in collision with stationary objects. Also, consider stored or kinetic energy, mechanical energy sources, and pressure.
- Temperature – Both high and low temperatures could result in burns, eye injury, or ignition.
- Chemical or biological exposures – from raw materials or combinations of various chemicals or products to create a chemical reaction, explosion, fire, contamination, or toxic products; contamination of a product with another product could also result in a hazardous reaction.
- Dust – created during the process or operation.
- Light or radiation – such as from welding, cutting, furnaces, or high-intensity lights.
- Falling objects or potential for dropping objects.
- Sharp objects that might pierce the skin.
- Rolling or pinching objects, such as stock movement.
- Electrical sources from the machinery or nearby energy sources.
- Layout or design of the workplace and employee position.
- Vibration to the employee from machinery, vehicles, and the working environment.
- Noise exposures and length of time employees are subjected to the noise levels.
- Malfunctions that can result in a change in conditions, such as structural, mechanical, electrical, reactive chemicals, soil, and human influences.
- Environmental influences from temperature, humidity, wind, radiation, contamination, mechanical, electrical, reactive chemicals, soil, and human influences.
- Use and operation, such as unclear instruction, foreseeable misuses, and lack of sufficient warning.
- Lifecycle considerations from aging of product or equipment, process design, procurement, manufacturing, testing, servicing, or disposal.

Step 3: Describe the hazard. Include any appropriate comments as required for the task, i.e., number of employees exposed, hours of a task, and how often the task is performed.

Step 4: Select appropriate PPE and list. It should provide a level of protection greater than the minimum required to protect the employee from the hazard. Consider alternate ways of completing the work that might eliminate the hazard and/or the need for PPE.

Step 5: Once the assessment is completed, provide the user with the appropriate device. Careful consideration should be given to the comfort, fit, and size of the PPE. Proper size and fit are essential; otherwise, it will not afford the necessary protection. This is particularly important when the PPE has adjustable features, such as respirator straps. Continued wearing of the PPE will be more likely if it fits properly. Providing the employee with various choices of appropriate PPE will also help ensure continued wearing.

Step 6: Reassess the hazards of the workplace as necessary by identifying and evaluating new equipment and processes, reviewing accident records, and re-evaluating the suitability of previously selected PPE.

Conclusion

Completing a comprehensive PPE assessment will assist you in protecting employees against a wide variety of hazards and reduce the risk of injuries.

For more information on Zurich's extensive Risk Engineering and Sustainability services, please contact your Risk Engineer or visit us at Risk Engineering and Sustainability Services | Zurich Resilience Solutions.

References

[1] "Personal Protective Equipment - General Requirements." Occupational Safety and Health Administration, Department of Labor, June 1974, www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.132.

"Safety and Health Topics / Personal Protective Equipment." Occupational Safety and Health Administration, UNITED STATES DEPARTMENT OF LABOR, 2015, www.osha.gov/SLTC/personalprotectiveequipment/index.html.

"Personal Protective Equipment." Occupational Safety and Health Administration, UNITED STATES DEPARTMENT OF LABOR, 2023, www.osha.gov/sites/default/files/publications/osha3151.pdf.

Appendices

Appendix A – Personal Protective Equipment (PPE) Hazard Assessment

Check the appropriate boxes		
	☐ Jobsite	Project/Location:
	☐ Location	Job Classification:
	☐ Other	Assessed by:
		Reviewed by:
		Date:

Eye Hazards	Check the appropriate box	Description of hazard (s):	Required PPE
	☐ Dust/Flying Debris (cutting, grinding, etc.)		
	☐ Hazardous chemicals		
	☐ UV/IR radiation		
	☐ High heat/cold		
	☐ Compression or rollover		
	☐ Impact (struck by or against)		
	☐ Other:		

Face/Head	Check the appropriate box	Description of hazard (s):	Required PPE
	☐ Falling/Flying Debris (cutting, grinding, etc.)		
	☐ Hazardous chemicals		
	☐ UV/IR radiation		
	☐ High heat/cold		
	☐ Compression or rollover		
	☐ Impact (struck by or against)		
	☐ Other:		

Foot Hazards	Check the appropriate box	Description of hazard (s):	Required PPE
	☐ Falling/Flying Debris (cutting, grinding, etc.)		
	☐ Hazardous chemicals		
	☐ Slippery/wet surfaces		
	☐ High heat/cold		
	☐ Puncture		
	☐ Impact (struck by or against)		
	☐ Other:		

Hand Hazards	Check the appropriate box	Description of hazard (s):	Required PPE
	☐ Cuts/Flying Debris (cutting, grinding, etc.)		
	☐ Hazardous chemicals		
	☐ UV/IR radiation		
	☐ High heat/cold		
	☐ Electrical Shock		
	☐ Impact (struck by or against)		
	☐ Other:		

Body Hazards (leg, arm, trunk)	Check the appropriate box	Description of hazard (s):	Required PPE
	☐ Falling/Debris (cutting, grinding, etc.)		
	☐ Hazardous chemicals		
	☐ UV/IR radiation		
	☐ High heat/cold		
	☐ Compression or rollover		
	☐ Impact (struck by or against)		
	☐ Other:		

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