Thank you for taking the Personal Protective Equipment training course.

At the end, you'll be given a quiz to see how much you've learned.

We will provide you with a certificate of completion once you have passed the quiz.

Personal Protective Equipment

Oregon OSHA Online Course 1241

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This is a text only version. Some links and content may not be active.

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Hearing Conservation Program

Hearing Protectors

More Employer Responsibilities

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INTRODUCTION

Workers involved in a wide range of occupations are exposed to a significant risk of death or injury from being struck by various objects in the workplace. OSHA's incident data indicate that a significant portion of all work related injuries and fatalities involve workers being struck in the eyes, head, face, hand, and or feet by foreign objects.

Two major factors causing these injuries have been identified:

> Personal protective equipment was not being worn the vast majority of the time; and,
> When some type of protective equipment was worn, it did not fully protect the worker.

For example, one study indicated that 70% of the workers experiencing hand injuries were not wearing gloves. Hand injuries to the remaining 30% of the workers who were wearing gloves were caused by the gloves being either inadequate, damaged, or the wrong type for the type of hazard present.

Hard hats, goggles, face shields, earplugs, steel-toed shoes, respirators. What do all these items have in common? They are all various forms of personal protective equipment.

Yet, data from the Bureau of Labor Statistics show:

> Hard hats were worn by only 16% of those workers who sustained head injuries, although two-fifths were required to wear them for certain tasks at specific locations;
> Only 1% of approximately 770 workers suffering face injuries were wearing face protection;
> Only 23% of the workers with foot injuries wore safety shoes or boots; and
> About 40% of the workers with eye injuries wore eye protective equipment.

A majority of these workers were injured while performing their normal jobs at regular worksites.

Oregon OSHA standards require employers to furnish and require employees to use suitable protective equipment where there is a "reasonable probability" that injury can be prevented by such equipment. The standards also set provisions for specific equipment.

While use of personal protective equipment is important, it is only a supplementary form of protection, necessary where all hazards have not been controlled through other means such as engineering controls. Engineering controls are especially important in hearing and respiratory protection which have specific standards calling for employers to take all feasible steps to control the hazards.

Head Protection

Cuts or bruises to the scalp and forehead occurred in 85% of the cases, concussions in 26%. Over a third of the cases resulted from falling objects striking the head.

Protective hats for head protection against impact blows must be able to withstand penetration and absorb the shock of a blow. In some cases, hats should also protect against electric shock. Recognized standards for hats have been established by the American National Standards Institute (ANSI).

Foot and Leg Protection

Sixty-six percent of injured workers were wearing safety shoes, protective footwear, heavy-duty shoes or boots and 33%, regular street shoes. Of those wearing safety shoes, 85% were injured because the object hit an unprotected part of the shoe or boot.

For protection against falling or rolling objects, sharp objects, molten metal, hot surfaces and wet, slippery surfaces workers should use appropriate footguards, safety shoes or boots and leggings. Safety shoes should be sturdy and have an impact- resistant toe. Shoes must meet ANSI standards.

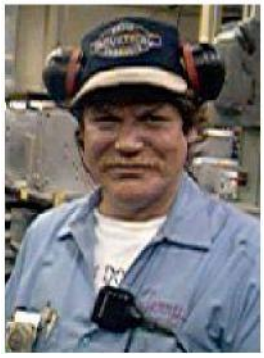
Eye and Face Protection

Injured workers surveyed indicated that eye and face protection was not normally used or practiced in their work areas or it was not required for the type of work performed at the time of the accident.

Almost one-third of face injuries were caused by metal objects, most often blunt and weighing one pound or more. Accidents resulted in cuts, lacerations, or punctures in 48% of the total, and fractures (including broken or lost teeth) in 27%.

Protection should be based on kind and degree of hazard present and should: 1) be reasonably comfortable, 2) fit properly, 3) be durable, 4) be cleanable, 5) be sanitary, and 6) be in good condition.

Hearing Protection



Exposure to high noise levels can cause irreversible hearing loss or impairment. It can also create physical and psychological stress.

Preformed or molded ear plugs should be individually fitted by a professional. Waxed cotton, foam or fiberglass wool earplugs are self-forming. Disposable earplugs should be used once and thrown away; non-disposable ones should be cleaned after each use for proper maintenance.

Arm and Hand Protection

Burns, cuts, electrical shock, amputation and absorption of chemicals are examples of hazards associated with arm and hand injuries. A wide assortment of gloves, hand pads, sleeves and wristlets for protection from these hazards is available.

The devices should be selected to fit the specific task. Rubber is considered the best material for insulating gloves and sleeves and must conform to ANSI standards (copies available from ANSI, https://webstore.ansi.org/).

Torso Protection

Many hazards can threaten the torso: heat, splashes from hot metals and liquids, impacts, cuts, acids, and radiation. A variety of protective clothing is available: vests, jackets, aprons, coveralls, and full body suits.

Fire retardant wool and specially treated cotton clothing items are comfortable, and they adapt well to a variety of workplace temperatures. Other types of protection include leather, rubberized fabrics, and disposable suits.

Respirator Protection

Information on the requirements for respirators to control of occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, and vapors is available in 29 CFR 1910.134. Proper selection of respirators should be made according to the guidance of ANSI Practices for Respiratory Protection.

Remember!!!

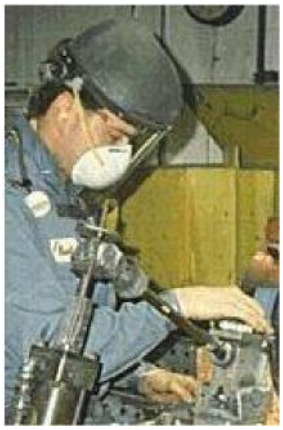
Using personal protective equipment requires hazard awareness and training on the part of the user. Employees must be aware that the equipment alone does not eliminate the hazard. If the equipment fails, exposure will occur.

Why the PPE Program?

The objective of the Personal Protective Equipment (PPE) Program is to protect employees from the risk of injury by creating a barrier against workplace hazards. Personal protective equipment is not a substitute for good engineering or administrative controls or good work practices, but should be used in conjunction with these controls to ensure the safety and health of employees. Personal protective equipment will be provided, used, and maintained when it has been determined that its use is required and that such use will lessen the likelihood of occupational injury and/or illness.

MODULE 1: OAR 437-002-0134 GENERAL REQUIREMENTS

What is required?



An employer has an obligation to provide protective equipment PPE, including personal protective equipment for eyes, face, head, and extremities, and protective clothing and barriers. The employer must also make sure employees use and maintain PPE in a sanitary and reliable condition.

What is proper use?

Personal Protective Equipment must be worn and used in a manner which will make full use of its protective qualities.

Take a look at the photo to the left. If you came upon an employee using PPE improperly in your workplace, what would you recommend? What recommendation would you make to this employee?

Low rates of compliance in wearing PPE usually indicate the safety management system is failing in some way. Any one of the following root causes may result in general non-compliance:

- the employer does not provide quality PPE
- the employer does not properly supervise the use of PPE
- the employer fails to enforce the use of PPE, or
- the employer does not properly train employees on the use of PPE

Paying for PPE

The employer is obligated to provide and to pay for personal protective equipment required by the company for the worker to do his or her job safely and in compliance with OR-OSHA standards. Where equipment is very personal in nature, such as safety shoes, and is usable by workers off the job, the matter of payment may be left to labor-management negotiations. However, items such as safety shoes which are subject to contamination by carcinogens or other toxic or hazardous substances, and which cannot be safely worn off-site, must be paid for by the employer. Here is what Oregon OSHA had to say when about this.

What are the different categories of PPE? PPE includes:

Face and eye protection
Head protection
Foot protection
Hand protection
Protective clothing
Protective ointments
Shields
Barriers
Restraints

Where and when is it required?

PPE is required wherever the following conditions are encountered that are capable of causing injury or impairment by being absorbed, inhaled, or physically contacted:

- hazards of processes
- environment hazards,
- chemical hazards,
- radiological hazards,
- or mechanical irritants

Employee-Owned Equipment

The intent of the PPE standard assigns responsibility to the employer to pay for and provide PPE to the employee when it's required by the employer. Although employers may at times arrange for employees to provide their own protective equipment, it's important to understand that in such circumstances the employer **remains** responsible and accountable to assure its adequacy, including proper maintenance, and sanitation of such equipment.

Design

All personal protective equipment must be of safe design and construction for the work to be performed.

What should not be worn?

The PPE rules require that rings, wristwatches, earrings, bracelets, and other jewelry must not be worn if it's possible for it to come into contact with power driven machinery or electric circuitry.

Why this rule?

Read how this rule might have prevented some serious injuries.

De-gloving of a finger caused by a ring. From Bob F.

The accident occurred when the individual was jumping off the side of an Army tow truck. He placed his hand on the railing of the bed and jumped off. The ring caught on the side of truck bed. Upon reaching the ground, the ring had removed all the skin from the finger, leaving the muscles, bone and fingernail exposed.

The individual was rushed to an emergency room where the finger was inserted into the wall of the stomach area. A pedicle graft was preformed using the skin from the stomach area. After more than eight operations and over a 100 plus days in the hospital the finger is semi useable. The stomach skin on the ring finger is more sensitive than the other finger's skin.

Nothing but air? NOT! From Joan R.

I took care of a man who got his ring caught on a basketball hoop as he made a dunk and pulled his whole finger off---skin, bone, and all at the knuckle. Not a pretty sight.

What about backbelts?

It's important that you understand that back belts should not be considered personal protective equipment in that they physically "protect" you from back injuries.

Devices such as back belts are not recognized by Oregon OSHA as control measures to prevent back injury. While they may be accepted by individual workers because they feel as if they provide additional support, if used improperly, they may restrict the body's range of motion and possibly aggravate other ergonomic stressors in the job. Research indicates that the primary value in back belts, when used properly, is that they "remind" the employee to use proper lifting techniques. As a result, fewer back injuries occur. Thus, Oregon OSHA does not forbid the use of back belts and similar devices, nor does it endorse their use. Several studies have looked at the effectiveness of backbelts.

Work Clothing

Clothing must be worn which is appropriate to the work performed and conditions encountered. Loose sleeves, ties, lapels, cuffs, or other loose clothing must not be worn near moving machinery. Make sure that you immediately remove clothing that becomes saturated or impregnated with flammable liquids, corrosive or toxic substances, irritants, or oxidizing agents. Don't wear it again until it's properly cleaned.

Defective and Damaged Equipment

Of course, defective or damaged personal protective equipment must not be used. It's important to inspect PPE regularly, and before each use to make sure it's capable of adequately protecting an employee from exposure to hazards. Remember, PPE that is defective...is not PPE.

Hazard Assessment and Equipment Selection

A hazard assessment is an important element of a PPE program because it produces the information needed to select the appropriate PPE for any hazards present or likely to be present at particular workplaces. Your employer is then capable of determining and evaluating the hazards of a particular workplace. Paragraph d. (see below) of the PPE standard details hazard assessment requirements. It is a performance-oriented provision that simply requires management to use their awareness of workplace hazards to enable them to select the appropriate PPE for the work being performed. Paragraph (d) clearly indicates that management is accountable both for the quality of the hazard assessment and for the adequacy for the PPE selected.

OAR 437-002-0134 General Requirements

(1) Hazard assessment and equipment selection

(a) The employer must assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE) or other protective equipment. If such hazards are present, or likely to be present, the employer must:

(A) Select, and have each affected employee use, the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment;

(i) All protective equipment must be of safe design and construction for the work to be performed.

(ii) Protective equipment must be worn and used in a manner which will make full use of its protective properties.

(B) Communicate selection decisions to each affected employee; and,

(C) Select PPE that properly fits each affected employee.

Note: Non-mandatory Appendix B contains an example of procedures that would comply with the requirement for a hazard assessment.

(b) The employer must verify that the required workplace hazard assessment has been performed through a written certification that identifies the workplace evaluated; the person certifying that the evaluation has been performed; the date(s) of the hazard assessment; and, which identifies the document as a certification of hazard assessment.

Your employer must verify that the required workplace hazard assessment has been performed through a written certification that identifies the workplace evaluated; the person certifying that the evaluation has been performed; the date(s) of the hazard assessment; and, which identifies the document as a certification of hazard assessment. Take a look at a sample hazard assessment form that would comply with the PPE standard...and more.

Controlling Hazards

PPE devices alone should not be relied on to provide protection against hazards, but should be used in conjunction with engineering controls and other management controls.

Engineering Controls

Workplace hazards may be corrected using engineering controls which may be thought of as replacing or redesigning machinery, equipment, and tools, and/or substituting materials.

Engineering controls are the "first line of defense" against injury/illness, because they have the potential to completely eliminate a hazard, and do not rely on human behavior to be effective.

For instance, rather than require employees to wear respiratory protection which must be monitored, inspected, trained, managed, it's much more effective to install a ventilation system that does not require any of those management activities.

Management Controls

Management controls can be accomplished with the stroke of the pen. It involves changing or redesigning work procedures, rescheduling breaks, changing the number of workers doing a job, and using personal protective equipment to reduce the frequency and duration exposure to the hazards of tasks. Using management controls alone is not as effective as engineering controls because, in most cases, they only reduce exposure - they don't eliminate the hazard. And even more importantly, management controls do rely on human behavior (which introduces many variables in the long run) which must be managed.

If the person conducting the hazard assessment discovers that hazards requiring PPE are present, or likely to be present, then management must:

- Select, and have each affected employee use, the types of PPE that will protect the affected employee from the hazard identified in the hazard assessment;
- Communicate selection decisions to each affected employee; and,
- Select PPE that properly fits each affected employee.

The Six-Step Assessment Process

It is important to consider certain general guidelines to assess foot, head, eye and face, and hand hazard situations that exist in an operation or process, and to match the protective devices to the particular hazard.

Step One: Conduct a survey

The most effective strategy for surveying the work area is to use a team of individuals conduct the assessment. The area supervisor, safety officer and/or experienced employee should conduct a walk-through survey of the areas in question. The purpose of the survey is to identify sources of hazards to workers and co-workers. Consideration should be given to the basic hazard categories:

- Impact
- Penetration
- Compression (roll-over) Chemical
- Temperature extremes

- Hazardous atmospheres
- Radiation - ionizing and non-ionizing Noise

Step Two: Determine sources of hazards

During the walk-through survey the assessment team should determine if any of the following hazard sources exist:

- Sources of motion; i.e., machinery or processes where any movement of tools, machine elements or
- particles could exist, or movement of personnel that could result in collision with stationary objects;
- Sources of high temperatures that could result in burns, eye injury or ignition of protective equipment,
- etc.;
- Chemicals that could contact skin and eyes;
- Sources of hazardous atmospheres;
- Sources of light radiation, i.e., welding, brazing, cutting, furnaces, heat treating, high intensity lights,
- etc.;
- Sources of falling objects or potential for dropping objects;
- Sources of sharp objects which might pierce the feet or cut the hands;
- Sources of rolling or pinching objects which could crush the feet;
- Layout of workplace and location of co-workers; and
- Electrical hazards.

Step Three: Organize the data

Following the walk-through survey, it is necessary to organize the data and information for use in the assessment of hazards. The objective is to prepare for an analysis of the hazards in the environment to enable proper selection of protective equipment. In addition, injury/accident data should be reviewed to help identify problem areas.

Step Four: Analyze the data

Having gathered and organized data on a workplace, an estimate of the potential for injuries should be made. Each of the basic hazards categories should be reviewed to determine the:

- Nature of the hazard,
- Degree of risk.
- Seriousness or severity of potential injury
- Possibility of exposure to several hazards simultaneously

What about "Risk"?

Risk may be thought of in terms of *probability* and *severity*. The higher the probability and/or severity of an injury, the greater the risk. According to the American Society of Safety Professionals *Dictionary of Terms Used in the Safety Profession,* Risk is defined as:

A measure of both the probability and the consequence of all hazards of an activity or condition. A subjective evaluation of relative failure potential.

Risk assessment is defined as:

The amount or degree of potential danger perceived by a given individual when determining of action to accomplish a given task.

The ***probability,*** or likelihood that an accident will occur is determined by Oregon OSHA by analyzing a set of conditions or factors associated with a hazard. They are:

- The number of employees exposed;
- The frequency of exposure;
- The duration of exposure;
- The proximity of employees to the point of danger;
- The adequacy of training;
- The adequacy of supervision;
- The adequacy of workstation design; and
- Other factors which may have significantly affect

Severity is actually a measure of the impact on, or consequence of the injury to the employee. If the injury does not prevent the employee from continuing to work in the same job at the same level of performance, it may be thought to be a minor, or other than serious injury. If, on the other hand, the injury prevents, for whatever reason, the employee from continuing work in the same job, it should be considered a major, or serious injury. The most extreme consequence of an injury is, of course, a fatality.

Step Five: Select the Personal Protective Equipment

After completing the hazard assessment it's time to select the right PPE for the job: To do this most effectively, it's important to:

- Become familiar with the potential hazards and the type of protective equipment that is available, and what it can do, i.e., splash protection, impact protection, etc.;
- Compare the hazards associated with the environment; i.e., impact velocities, masses, projectile shape, radiation intensities, with the capabilities of the available protective equipment;
- Involve employees in the selection process;
- Select the protective equipment which ensures a level of protection greater than the minimum required to protect employees from the hazards; and
- Fit the user with the protective device and give instructions on care and use of the PPE. It is very important that end users be made aware of all warning labels for and limitations of their PPE.

Fitting the device

As you probably know, PPE that fits poorly will not properly protect employees. And, if the PPE is not comfortable, the employee is not likely to wear it long. Protective devices are generally available in a variety of styles and sizes, and care should be taken to make sure that the employee gets the right size for him or her.

Devices with adjustable features

It's important to realize that when it comes to PPE, "one does NOT fit all!" Adjustments should be made on an individual basis for a comfortable fit that will keep the protective device in the proper position. Where manufacturer's instructions are available, they should be followed carefully.

Step Six: Reassess for Hazards

It is the responsibility of management to reassess the workplace hazard situation as necessary, by identifying and evaluating new equipment and processes, reviewing accident records, and reevaluating the suitability of previously selected PPE.

MODULE 2: PPE TRAINING REQUIREMENTS

Introduction

You are told to mix a certain chemical with water to use as a cleaning agent to wash down your company trucks. You check out the chemical. It looks like water, doesn't feel any different than water...so you assume PPE isn't really necessary. So, you go about washing the trucks. Your hands and arms get pretty wet with the solution you've mixed, but, heck...no pain, no sting...must be safe. No worse than water, right? Wrong, very wrong.

You've been using a mixture of hydrofluoric acid and water. By the time you get home your arms are hurting like crazy. You hurry off to the hospital, but by the time you arrive, it's too late. The hydrofluoric acid has penetrated your skin on both of your arms, clear through to the bone. Fluorine ions have replaced calcium ions in the bone, effectively turning it into a sponge-like consistency. But, you're lucky, only one arm must be amputated. The doctors were able to save the other arm. This scenario would not have occurred had you been properly trained in using PPE. The PPE standard mandates that the employer must provide training to each employee who is required to use Personal Protective Equipment. But, what is effective PPE Training. What methods work, and what are the goals of training PPE? We'll try to answer these questions, and others, throughout this module so that you'll be better able to participate in, conduct, or manage PPE training that is beneficial to the employee and cost effective for the employer.

What subjects must be trained?

According to the standard, to meet the minimum training requirements, each employee receiving PPE training must be trained to know at least the following:

1. When PPE is necessary;
2. What PPE is necessary;
3. How to properly don, doff, adjust, and wear PPE;
4. The limitations of the PPE; and,
5. The proper care, maintenance, useful life and disposal of the PPE.

So far, we meet minimum Oregon OSHA requirements... but one very important element is missing:

6. The PPE standard does not specifically require education on "why" PPE is necessary

   So, why is this element so important? Because study after study tells us the most common reason employees don't follow rules in the workplace is because they don't know <u>why</u> the rules are important.

Educate the "why" as well as train the "how"

It's important to understand that whenever we conduct PPE training, educating the "why" <u>and</u> training the "how" must always occur. If we neglect the educational component, we jeopardize the long-term effectiveness of the overall training.

The first five elements in the list describe the ***what, when,*** and ***how*** about PPE use. The goal is to increase both ***knowledge*** and ***skill*** so that the employee is better able to properly use PPE. The methods used to train the employee is primarily discussion and demonstration. To measure knowledge and skill, the instructor usually tests the employee by asking them to do something.

The final "why" element addresses the importance of using PPE and what the consequences of behavior (compliance and failure to comply) will be. The natural consequences include some form of resulting injury or health to the employee. The system consequences describe the nature of the discipline or recognition that will result from performance. The goal of this last element is to increase employee ***motivation*** to use PPE so that the employee is more likely to use PPE properly. The method used to educate is primarily classroom lecture or discussion. To measure motivation, the instructor usually tests the employee by asking them to write or say something.

Demonstration is the key

Before an employee is allowed to do work requiring PPE, the employer must require each affected employee to:

- Demonstrate an understanding of the training elements listed above, and
- Demonstrate the ability to use PPE properly.

Demonstration is really the most common and probably the most efficient method to determine employee knowledge and skills. How does the employee demonstrate an understanding of the six PPE training subjects listed above? Simple, their level of knowledge is measured by asking the employee questions similar to those below:

1. What are the PPE required for your particular job?
2. When is the PPE required to be used in your job?
3. What are the possible defects your PPE might have?
4. How do you properly care for and maintain/store your PPE?
5. What is the useful life of your PPE?
6. From what hazards does the PPE protect you?

The form of the "test" may be either written or oral. In addition to the oral or written test, the standard requires some kind of method that provides an opportunity for the employee to demonstrate adequate skills. Here is a simple training strategy that ensure the student will have an opportunity to demonstrate.

On-The-Job Training Strategy

On-The-Job (OJT) is probably the most common training strategy used in the workplace and for a good reason. It's can be very effective because it tests both knowledge and skills during the training process. Let's take a look at the OJT steps:

Step 1. Introduction. State and discuss the learning objectives and answer any questions the employee may have. Discuss the acceptable standards of knowledge and performance. Tell the trainee what you're going to train. Emphasize the importance of the procedure to the success of the production/service goals. Invite questions. Emphasize the natural and system consequences of their performance. The natural consequences describe the hurt or health that automatically results. The system consequences are those consequences the organization applies as a result of an employee's performance; discipline or positive recognition.

Step 2. Trainer tells and does. In this step the trainee becomes familiar with each work practice and why it is important. Review the initial conditions for the procedure. Demonstrate the process, carefully explaining each step as you go. Answer questions and continue to demonstrate and explain until the employee understands what to do, when and why to do it, and how to do it.

 Trainer: EXPLAINS and PERFORMS each step.

 Learner: OBSERVES each step and QUESTIONS the trainer.

Step 3. Learner tells - Trainer does. This step is necessary when exposure to hazards inherent in the procedure could cause serious harm. It protects the trainee because the trainer performs the procedure. The trainee explains the procedure to the trainer, while the trainer does it. This gives the trainer an opportunity to discover whether there were any misunderstandings in the previous step. The trainee also responds to trainer questions.

 Learner: EXPLAINS each step and RESPONDS to questions.

 Trainer: PERFORMS each step and QUESTIONS the trainee.

Step 4. Learner tells and does. The trainer has the trainee do it. The trainee performs the procedure but remains protected because the trainee explains and gets permission to do the step before proceeding to do it.

 Learner: EXPLAINS, GETS PERMISSION and then PERFORMS each step.

 Trainer: GIVES PERMISSION, OBSERVES each step and QUESTIONS the trainee.

Step 5. Conclusion. Recognize accomplishment - “Good job!” Reemphasize the importance of the procedure and how it fits into the overall process. Tie the training again to accountability by discussing the natural and system consequences of performance.

Step 6. Document. Training documentation should be more than an attendance sheet. Be sure to include the information below to properly document (certify) training in specific safety procedures and practices. Include all of the following even though Oregon OSHA rules tell you all that's required is name, subject, and date.

- Trainee’s and trainer’s name.
- Date of training.
- Subject(s) being trained - procedures, practices, related policies, rules, etc.
- Certification - trainee and trainer signatures.
- Trainee statement of understanding and intent to comply.
- Trainee statement that he/she was provided opportunity to practice.

- Trainer statement that testing of knowledge and skills was conducted.
- Trainer statement that student demonstrated adequate knowledge and skill.

Step 7. Validate. At some point in time after the conclusion of the OJT session, observe and question the employee to validate that the training has been successful and that the employee has developed a proper attitude related to the work.

When is retraining required?

When the employer has reason to believe that any affected employee who has already been trained does not have the understanding and skill required by the PPE standard, the employer must retrain the employee. Circumstances where retraining is required include, but are not limited to, situations where:

- Changes in the workplace render previous training obsolete; or
- Changes in the types of PPE to be used render previous training obsolete; or
- Inadequacies in an affected employee's knowledge or use of assigned PPE indicate that the employee has not retained the requisite understanding or skill.

Who should conduct the training?

This is a very important question. Whoever the person training PPE is, he or she needs to be an expert who not only understands how to use PPE correctly, but has a thorough understanding of the importance of doing so. It's critical that the employee understands the importance of wearing PPE, not only for their safety, but their "continuing employment."

If it isn't in writing...it didn't happen

As with any safety program, it's important to both the employee and employer that PPE training is properly documented. To meet minimum rule requirements, the employer must verify that each affected employee has received and understood the required training through a written certification that contains the name of each employee trained, the date(s) of training, and that identifies the subject of the certification.

However, when it comes to documentation of PPE training, it's a good idea to go beyond the minimum requirements stated in the standard to make sure the employer can demonstrate (prove) they have met or exceeded their legal obligations with respect to safety training.

Solid PPE training documentation will contain the following elements:

- A statement by the employee that they have received training by the employer on the six subjects listed above, and that the trainer has demonstrated proper use of the PPE and answered all employee questions about the PPE satisfactorily.
- A statement by the trainer that, through oral/written test, the employee has satisfactorily demonstrated an understanding of the subjects covered during training, and has, through practice, demonstrated the ability to properly don, use, doff, care for, and maintain the PPE.

Below is one example of training documentation. Your training documentation may look different, but it's very important that both the employee and trainer sign and date the document.

Training Subject _____ Date _____Location

Trainee certification. I have received on-the-job training on those subjects listed (see lesson plan):

This training has provided me adequate opportunity to ask questions and practice procedures to determine and correct skill deficiencies. I understand that performing these procedures/practices safely is a condition of employment. I fully intend to comply with all safety and operational requirements discussed. I understand that failure to comply with these requirements may result in progressive discipline (or corrective actions) up to and including termination.

Employee Name	Signature	Date
_____	_____	_____
_____	_____	_____

Trainer certification. I have conducted orientation/on-the-job training to the employees(s) listed above. I have explained related procedures, practices and policies. Employees were each given opportunity to ask questions and practice procedures taught under my supervision. Based on each student's performance, I have determined that each employee trained has adequate knowledge and skills to safely perform these procedures/practices.

_____	_____	_____
Trainer Name	**Signature**	**Date**

MODULE 3: EYE AND FACE PROTECTION

Introduction

Every day an estimated 1,000 eye injuries occur in American workplaces

The financial cost of these injuries is enormous -- more than $300 million per year in lost production time, medical expenses, and workers compensation. No dollar figure can adequately reflect the personal toll these accidents take on the injured workers.

What contributes to eye injuries at work?

Take a moment to think about possible eye hazards at your workplace. A survey by the Labor Department's Bureau of Labor Statistics (BLS) of about 1,000 minor eye injuries reveals how and why many on-the-job accidents occur.

- **Not wearing eye protection.** BLS reports that nearly three out of every five workers injured were not wearing eye protection at the time of the accident.
- **Wearing the wrong kind of eye protection for the job.** About 40% of the injured workers were wearing some form of eye protection when the accident occurred.

What causes eye injuries?

- **Flying particles**. BLS found that almost 70% of the accidents studied resulted from flying or falling objects or sparks striking the eye. Injured workers estimated that nearly three-fifths of the objects were smaller than a pin head. Most of the particles were said to be traveling faster than a hand-thrown object when the accident occurred.
- **Contact with chemicals** caused one-fifth of the injuries. Other accidents were caused by objects swinging from a fixed or attached position, like tree limbs, ropes, chains, or tools which were pulled into the eye while the worker was using them.

Where do accidents occur most often?

- Craft work; industrial equipment operation. Potential eye hazards can be found in nearly every industry, but BLS reported that more than 40% of injuries occurred among craft workers, like mechanics, repairers, carpenters, and plumbers.
- Over a third of the injured workers were operatives, such as assemblers, sanders, and grinding machine operators. Laborers suffered about one-fifth of the eye injuries. Almost half the injured workers were employed in manufacturing; slightly more than 20% were in construction.

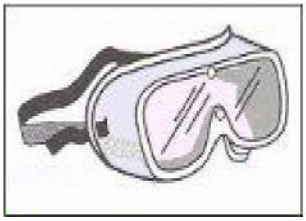
How can eye injuries be prevented?

- **Always wear effective eye protection**. To be effective, eye wear must appropriate for the hazard encountered and properly fitted.
- **Better training and education**. BLS reported that most workers were hurt while doing their regular jobs. Workers injured while not wearing protective eyewear most often said they believed it was not required by the situation. Even though the vast majority of employers furnished eye protection at no cost to employees, about 40% of the workers received no information on where and what kind of eyewear should be used.

- **Maintenance.** Eye protection devices must be properly maintained. Scratched and dirty devices reduce vision, cause glare and may contribute to accidents.

Description and Use of Eye/Face Protectors

Glasses. Protective eyeglasses are made with safety frames, tempered glass or plastic lenses, temples and side shields which provide eye protection from moderate impact and particles encountered in job tasks such as carpentry, woodworking, grinding, scaling, etc. Safety glasses are also available in prescription form for those persons who need corrective lenses.



Goggles. Vinyl framed goggles of soft pliable body design provide adequate eye protection from many hazards. These goggles are available with clear or tinted lenses, perforated, port vented, or non-vented frames. Single lens goggles provide similar protection to spectacles and may be worn in combination with spectacles or corrective lenses to insure protection along with proper vision. Welders goggles provide protection from sparking, scaling, or splashing metals and harmful light rays. Lenses are impact resistant and are available in graduated shades of filtration. Chippers/Grinders goggles provide eye protection from flying particles. The dual protective eye cups house impact resistant clear lenses with individual cover plates.

Face Shields. These normally consist of an adjustable headgear and face shield of tinted/transparent acetate or polycarbonate materials, or wire screen. Face shields are available in various sizes, tensile strength, impact/heat resistance and light ray filtering capacity. Face shields will be used in operations when the entire face needs protection and should be worn to protect eyes and face against flying particles, metal sparks, and chemical/biological splash.

Welding Shields. These shield assemblies consist of vulcanized fiber or glass fiber body, a ratchet/button type adjustable headgear or cap attachment and a filter and cover plate holder. These shields will be provided to protect workers' eyes and face from infrared or radiant light burns, flying sparks, metal spatter and slag chips encountered during welding, brazing, soldering, resistance welding, bare or shielded electric arc welding and oxyacetylene welding and cutting operations.

Let's take a look at the standard

General Requirements

The employer must ensure that each affected employee uses appropriate eye or face protection when exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.

The employer must ensure that each affected employee uses eye protection that provides side protection when there is a hazard from flying objects. Detachable side protectors (e.g. clip-on or slide-on side shields) meeting the pertinent requirements of the PPE standard are acceptable.

The employer must ensure that each affected employee who wears prescription lenses while engaged in operations that involve eye hazards wears eye protection that incorporates the prescription in its design, or wears eye protection that can be worn over the prescription lenses without disturbing the proper position of the prescription lenses or the protective lenses.

The employer must ensure that each affected employee uses equipment with filter lenses that have a shade number appropriate for the work being performed for protection from injurious light radiation.

Criteria for Protective Eye and Face Devices

Protective eye and face devices must comply with ANSI Z87.1-1989, ANSI Z87.1-2003, or ANSI Z87.1-2010.

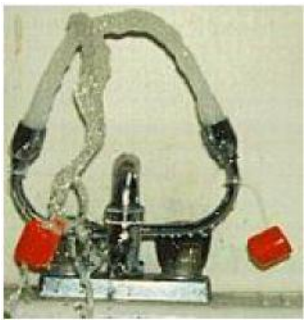
Eye and face protective devices that the employer can demonstrate are at least as effective as those constructed to meet the above standards are acceptable.

Eye and face PPE must be distinctly marked to facilitate identification of the manufacturer.

Lasers

Employees whose occupation or assignment requires exposure to laser beams should be furnished laser safety goggles which will protect for the specific wavelength of the laser and be of optical density adequate for the energy involved.

What about emergencies?



Emergency eyewash facilities meeting the requirements of ANSI Z358.1 must be provided in all areas where the eyes of any employee may be exposed to corrosive materials. All such emergency facilities will be located where they are easily accessible in an emergency.

Selection Chart Guidelines for Eye and Face Protection

Some occupations (not a complete list) for which eye protection should be routinely considered are: carpenters, electricians, machinists, mechanics and repairers, millwrights, plumbers and pipe fitters, sheet metal workers and tinsmiths, assemblers, sanders, grinding machine operators, lathe and milling machine operators, sawyers, welders, laborers, chemical process operators and handlers, and timber cutting and logging workers. The following chart provides general guidance for the proper selection of eye and face protection to protect against hazards associated with the listed hazard "source" operations.

Eye and Face Protection Selection Chart		
Source	**Assessment of Hazard**	**Protection**
IMPACT - Chipping, grinding, machining, drilling, chiseling, riveting, sanding, etc.	Flying fragments, objects, large chips, particles, sand, dirt, etc.	Spectacles with side protection, goggles, face shields. For severe exposure, use face shield over primary eye protection.
HEAT - Furnace operations, pouring, casting, hot dipping, and welding.	Hot sparks	Face shields, goggles, spectacles with side protection. For severe exposure use face shield.
	Splash from molten metals	Face shields, reflective face shields.
	High temperature exposure	Screen face shields, reflective face shields.
CHEMICALS - Acid and chemicals handling	Splash	Goggles, eyecup and cover types. For severe exposure, use face shield over primary eye protection
	Irritating mists	Special-purpose goggles
DUST - Woodworking, buffing, general dusty conditions	Nuisance dust	Goggles, eyecup and cover types.
LIGHT and/or RADIATION		
Welding - electric arc	Optical radiation	Welding helmets or welding shields. Typical shades: 10-14
Welding - gas	Optical radiation	Welding goggles or welding face shield. Typical shades: gas welding 4-8, cutting 3-6, brazing 3-4
Cutting, torch brazing, torch soldering	Optical radiation	Spectacles or welding face shield. Typical shades: 1.5-3
Glare	Poor vision	Spectacles with shaded or special-purpose lenses, as suitable.

Notes to Eye and Face Protection Selection Chart:

(1) Care should be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of each of the hazards should be provided. Protective devices do not provide unlimited protection.

(2) Operations involving heat may also involve light radiation. As required by the standard, protection from both hazards must be provided.

(3) Face shields should only be worn over primary eye protection (spectacles or goggles).

(4) As required by the standard, filter lenses must meet the requirements for shade designations in OAR 437-002-0134 .

(5) As required by the standard, persons whose vision requires the use of prescription (Rx) lenses must wear either protective devices fitted with prescription (Rx) lenses or protective devices designed to be worn over regular prescription (Rx) eyewear.

(6) Wearers of contact lenses must also wear appropriate eye and face protection devices in a hazardous environment. It should be recognized that dusty and/or chemical environments may represent an additional hazard to contact lens wearers.

(7) Caution should be exercised in the use of metal frame protective devices in electrical hazard areas.

(8) Atmospheric conditions and the restricted ventilation of the protector can cause lenses to fog. Frequent cleansing may be necessary.

(9) Welding helmets or face shields should be used only over primary eye protection (spectacles or goggles).

(10) Non-side shield spectacles are available for frontal protection only, but are not acceptable eye protection for the sources and operations listed for "impact."

(11) Ventilation should be adequate, but well protected from splash entry. Eye and face protection should be designed and used so that it provides both adequate ventilation and protects the wearer from splash entry.

(12) Protection from light radiation is directly related to filter lens density. See note (4) . Select the darkest shade that allows task performance.

MODULE 4: RESPIRATORY PROTECTION

Introduction

Your workplace, like most, may contain one or more of the following hazards in the form of harmful:

dusts	**fogs**
fumes	**mists**
gases	**smokes**
sprays	**vapors**

If hazardous atmospheres generated by any of the above, it must be controlled to prevent disease to workers.

First Priority - Engineer it out

Oregon OSHA standards mandate that employers use engineering control measures as far as feasible to control occupational diseases caused by breathing contaminated air in their workplaces. Engineering control strategies attempt to eliminate or reduce workplace hazards by redesigning or substituting machinery, equipment, tools, and materials.

Examples of acceptable engineering controls to eliminate or reduce atmospheric hazards include:

- Enclosure or confinement of the operation,
- General and local ventilation, and
- Substitution of less toxic materials

It's important to know that when effective engineering controls are not feasible, or while they are being instituted, the employer must provide appropriate respirators to protect the health of the employee, and establish and maintain an effective respiratory protective program. And, the employee must use respiratory protection according to their employer's instructions and training.

Respiratory Protection Program Requirements

The employer must develop and implement a written respiratory protection program with required worksite-specific procedures and elements for required respirator use. The program must be administered by a suitably trained program administrator. In addition, certain program elements may be required for voluntary use to prevent potential hazards associated with the use of the respirator. CPL 2-2.54 - Respiratory Protection Program Manual will give you insight into the OSHA inspection protocol for respiratory protection. Design your own audits with these strategies in mind. *Breathe Right* is a guide that will help small business owners and managers develop a basic understanding of workplace respiratory hazards and Oregon OSHA’s requirements

for controlling them. It covers elementary concepts of respiratory protection and offers guidelines for complying with the Respiratory Protection Standard, 29 CFR 1910.134, although it doesn't take the place of the standard. The Respiratory Protection Advisor is an excellent source of information. The purpose of this Advisor is to help you comply with the new OSHA respirator standard. This Advisor will instruct you on the proper selection of respiratory protection and the development of change schedules for gas/vapor cartridges.

You can find links to helpful tools on the A-Z Topics page.

In any workplace where respirators are necessary to protect the health of the employee or whenever respirators are required by the employer, the employer shall establish and implement a written respiratory protection program with worksite-specific procedures. The program shall be updated as necessary to reflect those changes in workplace conditions that affect respirator use. The employer shall include in the program the following provisions of this section, as applicable:

- Procedures for selecting respirators for use in the workplace;
- Medical evaluations of employees required to use respirators;
- Fit testing procedures for tight-fitting respirators;
- Procedures for proper use of respirators in routine and reasonably foreseeable emergency situations;
- Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators;
- Procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators;
- Training of employees in the respiratory hazards to which they are potentially exposed during routine and emergency situations;
- Training of employees in the proper use of respirators, including putting on and removing them, any limitations on their use, and their maintenance; and
- Procedures for regularly evaluating the effectiveness of the program.

The employer must designate a program administrator who is qualified by appropriate training or experience that is commensurate with the complexity of the program to administer or oversee the respiratory protection program and conduct the required evaluations of program effectiveness.

Inspection Requirements

Respiratory protection is no better than the respirator in use, even though it is worn correctly. Frequent random inspections must be conducted by a qualified individual to assure that respirators are properly selected, used, cleaned, and maintained.

Inspecting respirators

Follow these important points when inspecting espirators.

- Inspect respirators that are used routinely during cleaning.
- Replace any worn or deteriorated parts.
- Be sure to thoroughly inspect respirators for emergency use such as self-contained devices at least once a month and after each use.
- Inspect self-contained breathing apparatus monthly.
- Make sure air and oxygen cylinders are fully charged according to the manufacturer's instructions.
- Make sure that the regulator and warning devices function properly.
- Check the tightness of connections and the condition of the facepiece, headbands, valves, connecting tube, and canisters.
- Inspect rubber or elastomer parts for pliability and signs of deterioration.
- Stretch and manipulate rubber or elastomer parts with a massaging action will keep them pliable and flexible and prevent them from taking a set during storage.
- A record must be kept of inspection dates and findings for respirators maintained for emergency use.

Does this work practice raise questions?

Inspecting the work area

Make sure appropriate surveillance of work area conditions and degree of employee exposure or stress is conducted.

Inspecting the program

Regularly inspect and evaluate the program to determine its continued effectiveness.

Training

For an effective respirator program, it's essential that supervisors and workers be properly instructed by a competent person in:

- Selecting appropriate protection
- Donning and doffing
- Using respirators
- Storing and maintaining respirators
- Detecting defects
- Proper fitting
- Testing for proper seal

In your initial and annual respirator training, be sure to include both an educational component and a training component. The educational component increases the learner's understanding of the importance of using respirators. The training component establishes or improves the skills needed to use the respirator. Make sure students wear the respirator in normal air for a long familiarity period, and then in a test atmosphere.

Selecting Respirators

It's important to select and provide an appropriate respirator based on the respiratory hazard(s) to which the worker is exposed and workplace and user factors that affect respirator performance and reliability. The employer must select a NIOSH-certified respirator. The respirator must be used in compliance with the conditions of its certification. The employer must identify and evaluate the respiratory hazard(s) in the workplace; this evaluation must include a reasonable estimate of employee exposures to respiratory hazard(s) and an identification of the contaminant's chemical state and physical form. Where the employer cannot identify or reasonably estimate the employee exposure, the employer must consider the atmosphere to be immediately dangerous to life and health (IDLH). Immediately dangerous to life or health means an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere. The employer must select respirators from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.

Respirators for atmospheres that are (IDLH)

The employer must provide the following respirators for employee use in IDLH atmospheres:

- A full facepiece pressure demand SCBA certified by NIOSH for a minimum service life of thirty minutes, or
- A combination full facepiece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply.

Respirators provided only for escape from IDLH atmospheres must be NIOSH-certified for escape from the atmosphere in which they will be used. All oxygen-deficient atmospheres must be considered IDLH. Exception: If the employer demonstrates that, under all foreseeable conditions, the oxygen concentration can be maintained within the ranges specified in Table II of the standard (i.e., for the altitudes set out in the table), then any atmosphere-supplying respirator may be used.

Respirators for atmospheres that are <u>not IDLH</u>

The employer must provide a respirator that is adequate to protect the health of the employee and ensure compliance with all other Oregon OSHA statutory and regulatory requirements, under routine and reasonably foreseeable emergency situations. The respirator selected must be appropriate for the chemical state and physical form of the contaminant.

For protection against gases and vapors, the employer must provide an atmosphere-supplying respirator, or an air-purifying respirator, provided that:

- The respirator is equipped with an end-of-service-life indicator (ESLI) certified by NIOSH for the contaminant; or
- If there is no ESLI appropriate for conditions in the employer's workplace, the employer implements a change schedule for canisters and cartridges that is based on objective information or data that will ensure that canisters and cartridges are changed before the end of their service life. The employer must describe in the respirator program the information and data relied upon and the basis for the canister and cartridge change schedule and the basis for reliance on the data.

For protection against particulates, the employer must provide:

- An atmosphere-supplying respirator; or
- An air-purifying respirator equipped with a filter certified by NIOSH under 30 CFR part 11 as a high efficiency particulate air (HEPA) filter, or an air-purifying respirator equipped with a filter certified for particulates by NIOSH under 42 CFR part 84; or
- For contaminants consisting primarily of particles with mass median aerodynamic diameters (MMAD) of at least 2 micrometers, an air-purifying respirator equipped with any filter certified for particulates by NIOSH.

Using Respirators

Written procedures

It's important to develop standard procedures for respirator use. These should include all information and guidance necessary for their proper selection, use, and care. Also include possible emergency and routine uses of respirators.

Physical ability to use

Make sure employees are not assigned to tasks requiring respirators unless they are physically able to adequately perform the work and use the equipment. If there is any question or concern about using the respirator, a local physician must determine what health and physical conditions are pertinent. In such cases, periodically review the respirator user's medical status.

Face seal

Do not wear respirators when conditions prevent a good face seal. Such conditions may be a growth of beard, sideburns, a skull cap that projects under the facepiece, or temple pieces on glasses. Also, the absence of one or both dentures can seriously affect the fit of a facepiece. It's important to conduct periodic evaluation of worker compliance with this requirement. To assure proper protection, the facepiece fit must be checked by the wearer, using the manufacturer's facepiece fittings instructions, each time he or she puts on the respirator.

Using corrective lenses

Providing respiratory protection for individuals wearing corrective glasses is a serious problem. A proper seal is impossible if the temple bars of eye glasses extend through the sealing edge of the full facepiece. As a temporary measure, taping glasses with short temple bars or without temple bars to the wearer's head is acceptable. Systems have been developed for mounting corrective lenses inside full facepieces. When a worker must wear corrective lenses as part of the facepiece, the facepiece and lenses must be fitted by qualified individuals to provide good vision, comfort, and a gas-tight seal. If corrective spectacles or goggles are required, they must not affect the fit of the facepiece. Proper selection of equipment is important to avoid this problem.

Maintaining Respirators

Equipment must be properly maintained to retain its original effectiveness. Respirators must be regularly cleaned and disinfected. Those used by more than one worker must be thoroughly cleaned and disinfected after each use. Respirators must be stored in a convenient, clean, and sanitary location. A program for maintenance and care of respirators must be adjusted to the type of plant, working conditions, and hazards involved, and must include the following basic services:

- Inspection for defects (including a leak check),
- Cleaning and disinfecting,
- Repair, Storage

Routinely used respirators must be collected, cleaned, and disinfected as frequently as necessary to insure that proper protection is provided for the wearer. Respirators maintained for emergency use must be cleaned and disinfected after each use. Replacement or repairs must be done only by experienced persons with parts designed for the respirator. No attempt must be made to replace components or to make adjustments or repairs beyond the manufacturer's recommendations. Reducing or admission valves or regulators must be returned to the manufacturer or to a trained technician for adjustment or repair.

Storing Respirators

After inspection, cleaning, and necessary repair, respirators must be stored to protect against dust, sunlight, heat, extreme cold, excessive moisture, or damaging chemicals. Respirators placed at stations and work areas for emergency use should be quickly accessible at all times and should be stored in compartments built for the purpose. The compartments should be clearly marked. Routinely used respirators, such as dust respirators, may be placed in plastic bags. Respirators should not be stored in such places as lockers or tool boxes unless they are in carrying cases or cartons.

Is this respirator properly stored?

Respirators should be packed or stored so that the facepiece and exhalation valve will rest in a normal position and function will not be impaired by the elastomer setting in an abnormal position.

Emergency Procedures

In areas where the wearer, with failure of the respirator, could be overcome by a toxic or oxygen-deficient atmosphere, at least one additional person must be present. Communications (visual, voice, or signal line) must be maintained between both or all individuals present. Planning must be such that one individual will be unaffected by any likely incident and have the proper rescue equipment to be able to assist the other(s) in case of emergency. When self-contained breathing apparatus or hose masks with blowers are used in atmospheres immediately dangerous to life or health, standby persons must be present with suitable rescue equipment. Persons using air line respirators in atmospheres immediately hazardous to life or health must be equipped with safety harnesses and safety lines for lifting or removing persons from hazardous atmospheres or other and equivalent provisions for the rescue of persons from hazardous atmospheres must be used. A standby person or persons with suitable self-contained breathing apparatus must be at the nearest fresh air base for emergency rescue.

Medical Evaluation

Using a respirator may place a physiological burden on employees that varies with the type of respirator worn, the job and workplace conditions in which the respirator is used, and the medical status of the employee. The employer must provide a medical evaluation to determine the employee's ability to use a respirator, before the

employee is fit tested or required to use the respirator in the workplace. The employer may discontinue an employee's medical evaluations when the employee is no longer required to use a respirator.

Medical evaluation procedures

The employer must identify a physician or other licensed health care professional (PLHCP) to perform medical evaluations using a medical questionnaire or an initial medical examination that obtains the same information as the medical questionnaire. The medical evaluation must obtain the information requested by the questionnaire in Sections 1 and 2, Part A of Appendix C of the standard.

Follow-up medical examination

The employer must ensure that a follow-up medical examination is provided for an employee who gives a positive response to any question among questions 1 through 8 in Section 2, Part A of Appendix C of the standard or whose initial medical examination demonstrates the need for a follow-up medical examination. The follow-up medical examination must include any medical tests, consultations, or diagnostic procedures that the PLHCP deems necessary to make a final determination.

Medical determination

In determining the employee's ability to use a respirator, the employer must:

- Obtain a written recommendation regarding the employee's ability to use the respirator from the PLHCP. The recommendation must provide only the following information:
- Any limitations on respirator use related to the medical condition of the employee, or relating to the workplace conditions in which the respirator will be used, including whether or not the employee is medically able to use the respirator;
- The need, if any, for follow-up medical evaluations; and
- A statement that the PLHCP has provided the employee with a copy of the PLHCP's written recommendation.

If the respirator is a negative pressure respirator and the PLHCP finds a medical condition that may place the employee's health at increased risk if the respirator is used, the employer must provide a PAPR if the PLHCP's medical evaluation finds that the employee can use such a respirator; if a subsequent medical evaluation finds that the employee is medically able to use a negative pressure respirator, then the employer is no longer required to provide a PAPR.

Additional medical evaluations

At a minimum, the employer must provide additional medical evaluations that comply with the requirements of this section if:

- An employee reports medical signs or symptoms that are related to ability to use a respirator;
- A PLHCP, supervisor, or the respirator program administrator informs the employer that an employee needs to be reevaluated;
- Information from the respiratory protection program, including observations made during fit testing and program evaluation, indicates a need for employee reevaluation; or
- A change occurs in workplace conditions (e.g., physical work effort, protective clothing, temperature) that may result in a substantial increase in the physiological burden placed on an employee.

Identification of Gas Mask Cartridges and Canisters

1910.134, Respiratory Protection, states that all gas mask cartridges and cartridges must be properly labeled and colored before they are placed in service. Each cartridge or canister must have a label warning that gas masks should be used only in atmospheres containing sufficient oxygen to support life (at least 19.5 percent by volume), since cartridges and canisters are only designed to neutralize or remove contaminants from the air. Each gas mask cartridge or canister must be painted a distinctive color or combination of colors indicated in Table I-1 of the standard.

Where respirator use is not required

An employer may provide respirators at the request of employees or permit employees to use their own respirators, if the employer determines that such respirator use will not in itself create a hazard. If the employer determines that any voluntary respirator use is permissible, the employer must provide the respirator users with the information contained in Appendix D of the standard. In addition, the employer must establish and implement those elements of a written respiratory protection program necessary to ensure that any employee using a respirator voluntarily is medically able to use that respirator, and that the respirator is cleaned, stored, and maintained so that its use does not present a health hazard to the user. Exception: Employers are not required to include in a written respiratory protection program those employees whose only use of respirators involves the voluntary use of filtering facepieces (dust masks).

MODULE 5: HEAD, HAND AND FOOT PROTECTION

Head Protection

There are primarily two situations when employees must wear protective

helmets: **Falling objects**

Wherever there is a potential in the workplace for injury to the head from falling objects, the employer must make sure that each affected employee wears a protective helmet.

Some examples of work that might require helmets to protect from falling objects include:

- Working below other workers who are using tools and materials which could fall;
- Working around or under conveyor belts which are carrying parts or materials; and
- Working below machinery or processes which might cause material or objects to fall.

Some examples of occupations for which head protection should be routinely considered are:

- carpenters,
- electricians,
- linemen,
- mechanics and repairers,
- plumbers and pipe fitters,
- assemblers,
- sawyers,
- welders,
- laborers,
- freight handlers,
- timber cutting and logging,
- stock handlers, and
- warehouse laborers

Electrical hazards

Whenever an employee works near exposed electrical conductors which could contact the head, the employer must make sure that a protective helmet designed to reduce electrical shock hazard is worn by the employee.

The employer should also furnish and make sure all employees and contractors engaged in construction and other miscellaneous work use proper head protection. Engineers, inspectors, and visitors at construction sites must also wear protective helmets when hazards from falling or fixed objects, or electrical shock are present.

Criteria for protective helmets

Head Protection must comply with ANSI Z89.1-1997, ANSI Z89.1-2003, ANSI Z89.1-2009, or must be demonstrated by the employer to be equally effective. Purchasing helmets that meet these standards ensures that appropriate testing has been conducted and that the quality of the materials (webbing and shell)are adequate.

Selection guidelines for head protection

When selecting head protection, knowledge of potential for falling object and electrical hazards is important. When it's determined that these hazards exist, choose the most appropriate helmet from the categories below:

Class A helmets

In addition to impact and penetration resistance, this class of helmet provides electrical protection from low-voltage conductors (they are proof tested to 2,200 volts).

Class B helmets

In addition to impact and penetration resistance, this class of helmet provides electrical protection from high-voltage conductors (they are proof tested to 20,000 volts).

Class C helmets

These helmets provide impact and penetration resistance (they are usually made of aluminum which conducts electricity), and should not be used around electrical hazards. The photo to the left shows what's left of a Class C helmet after an accident. As you can see, the helmet did not provide *much* impact resistance.

Bump caps

Bump caps/skull guards should be issued and worn for protection against scalp lacerations from contact with sharp objects. However, it's very important to understand that they must not be worn as substitutes for safety caps/hats because they do not provide protection from impact forces or penetration by falling objects.

In 1997 ANSI revised the standard for Industrial Head Protection, ANSI Z89.1-1997. The following facts highlight significant points and changes to the new head protection requirements that are found in the standard and should be considered while evaluating appropriate head protection when conducting a personal protective equipment assessment.

Oregon-OSHA's PPE standard (OAR 437-002-0134) specifies that:

(c) Head protection must comply with any of the following consensus standards:

(A) ANSI Z89.1-2009, American National Standard for Industrial Head Protection, which is incorporated by reference in 1910.6;

(B) ANSI Z89.1-2003, American National Standard for Industrial Head Protection, which is incorporated by reference in 1910.6; or

(C) ANSI Z89.1-1997, Americal National Standard for Industrial Head Protection, which is incorporated by reference in 1910.6.

ANSI Z89.1-2009. The new ANSI Z89.1997 standard contains additional criteria for helmets.

Beginning with the ANSI Z89.1-1997 standard, ANSI updated the classification system for protective helmets. Prior revisions used type classifications to distinguish between caps and full brimmed hats. Beginning in 1997, Type I designated helmets designed to reduce the force of impact resulting from a blow only to the top of the head, while Type II designated helmets designed to reduce the force of impact resulting from a blow to the top or sides of the head. Accordingly, if a hazard assessment indicates that lateral impact to the head is foreseeable, employers must select Type II helmets for their employees. To improve comprehension and usefulness, the 1997 revision also redesignated the electrical-protective classifications for helmets as follows: "Class G – General"; helmets designed to reduce the danger of contact with low-voltage conductors; "Class E – Electrical"; helmets designed to reduce the danger of contact with conductors at higher voltage levels; and "Class C – Conductive"; helmets that provide no protection against contact with electrical hazards.

Workers in some occupations who are exposed to falling objects which may hit the helmet off center or on the side may be inadequately protected and at risk of injury since the type 1 hard hat is not designed to take this angle of impact.

Periodic examinations should be made of all protective helmet and, and in particular, those worn or stored in areas exposed to sunlight for long periods. Ultraviolet degradation may first manifest itself in a loss of surface gloss, called chalking or discoloration. Upon further degradation, the surface will craze or flake away, or both. At the first appearance of any of these phenomena, the shell should be replaced.

Hand Protection

Hazards requiring hand protection

Most companies use some type of chemicals in their workplaces. Some of these chemicals are hazardous and require PPE to protect them against toxic effects. More than any other part of the body, our hands are most likely to come in contact with these hazardous chemicals.

Chemical hazards might expose the employee to the following:

- Absorption of harmful substances
- Chemical burns
- Rashes

But, hazardous chemicals are not the only worry. Employees may also be exposed to other hazards that could injure their hands.

These hazards include:

- Cuts or lacerations;
- Abrasions;
- Punctures;
- thermal burns; and
- harmful temperature extremes

Consequently, it's crucial that employers select and require employees to use appropriate hand protection when exposed to any of these hazards.

Selection

It's important that employers work closely with their PPE supplier to select appropriate hand protection based on an evaluation of the performance characteristics of the hand protection. Specifically the employer needs to look at each of the following:

- specific task(s)being performed,
- environmental conditions present,
- duration of hand protection use while performing the task,
- actual hazards, and potential hazards

The work activities of the employee should also be studied to determine:

- the degree of dexterity required,
- the duration the task,
- the frequency of the task,
- degree of exposure of the hazard, and
- the physical stresses that will be applied

Selection guidelines for hand protection

Oregon OSHA is unaware of any gloves that provide protection against all potential hand hazards, and commonly available glove materials provide only limited protection against many chemicals. Therefore, it is important to select the most appropriate glove for a particular application and to determine how long it can be worn, and whether it can be reused.

Chemicals will eventually soak through or "permeate" most glove materials rendering them unsafe. Gloves can be used safely for limited time periods if specific use and other characteristics (i.e., thickness and permeation rate and time) are known. Your PPE supplier can be an excellent expert source to assist in determining the specific type of glove material that should be worn for a particular chemical.

These performance characteristics should be assessed by using standard test procedures. Before purchasing gloves, the employer should request documentation from the manufacturer that the gloves meet the appropriate test standard(s) for the hazard(s) anticipated.

Read instructions and warnings on chemical container labels and MSDSs before working with any chemical. Recommended glove types are often listed in the section for personal protective equipment. However, it's important to check with your PPE supplier to make sure the list is current and accurate.

One more consideration is that as long as the performance characteristics are acceptable, in certain circumstances, it may be more cost effective to regularly replace less expensive gloves than to reuse more expensive types.

When selecting gloves for protection against chemical hazards, consider the following:

- The toxic properties of the chemical(s) must be determined; in particular, the ability of the chemical to cause local effects on the skin and/or to pass through the skin and cause systemic effects;
- Generally, any "chemical resistant" glove can be used for dry powders;
- For mixtures and formulated products (unless specific test data are available), a glove should be selected on the basis of the chemical component with the shortest breakthrough time, since it is possible for solvents to carry active ingredients through polymeric materials; and,
- Employees must be able to remove the gloves in such a manner as to prevent skin contamination.

Skin contact is a potential source of exposure to toxic materials; it is important that the proper steps be taken to prevent such contact. Most accidents involving hands and arms can be classified under four main hazard categories: chemicals, abrasions, cutting, and heat. There are gloves available that can protect workers from any of these individual hazards or any combination thereof.

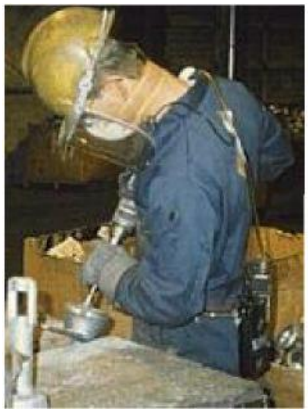
Gloves should be replaced periodically, depending on frequency of use and permeability to the substance(s)handled. Gloves overtly contaminated should be rinsed and then carefully removed after use. With this in mind, there are two important characteristics of gloves to consider:

Permeation rate. The permeation rate measures the length of time it takes a given material (glove) to become saturated by the chemical through absorption.

Breakthrough or Penetration rate. The penetration rate measures the speed with which a given chemical breaks through the layer(s) of the glove to contact the skin.

Gloves should also be worn whenever it is necessary to handle rough or sharp-edged objects, and very hot or very cold materials. The type of glove materials to be used in these situations include leather, welder's gloves, aluminum-backed gloves, and other types of insulated glove materials.

Careful attention must be given to protecting your hands when working with tools and machinery. Power tools and machinery must have guards installed or incorporated into their design that prevent the hands from contacting the point of operation, power train, or other moving parts. To protect hands from injury due to contact with moving parts, it is important to:



- Ensure that guards are always in place and used.
- Always lock-out machines or tools and disconnect the power before making repairs.
- Treat a machine without a guard as inoperative; and
- Do not wear gloves around moving machinery or parts, such as drill presses, mills, lathes, and grinders.

The following is a guide to the most common types of protective work gloves and the types of hazards they can guard against:

a. **Disposable Gloves.** Disposable gloves, usually made of light-weight plastic, can help guard against mild irritants.
b. **Fabric Gloves.** Made of cotton or fabric blends are generally used to improve grip when handling slippery objects. They also help insulate hands from mild heat or cold.
c. **Leather Gloves.** These gloves are used to guard against injuries from sparks or scraping against rough surfaces. They are also used in combination with an insulated liner when working with electricity.
d. **Metal Mesh Gloves.** These gloves are used to protect hands from accidental cuts and scratches. They are used most commonly by persons working with cutting tools or other sharp instruments.
e. **Aluminized Gloves.** Gloves made of aluminized fabric are designed to insulate hands from intense heat. These gloves are most commonly used by persons working molten materials.
f. **Chemical Resistance Gloves.** These gloves may be made of rubber, neoprene, polyvinyl alcohol or vinyl, etc. The gloves protect hands from corrosives, oils, and solvents. The glove chart below may serve as a guide to the different types of glove materials and the chemicals they can be used against. When selecting chemical resistance gloves, be sure to consult the manufacturers' recommendations, especially if the gloved hand will be immersed in the chemical.

Glove Chart

Type	Advantages	Disadvantages	Use Against
Natural rubber	Low cost, good physical properties, dexterity	Poor vs. oils, greases, organics. Frequently imported; may be poor quality	Bases, alcohols, dilute water solutions; fair vs. aldehydes, ketones.
Natural rubber blends	Low cost, dexterity, better chemical resistance than natural rubber vs. some chemicals	Physical properties frequently inferior to natural rubber	Same as natural rubber
Polyvinyl chloride (PVC)	Low cost, very good physical properties, medium cost, medium chemical resistance	Plasticizers can be stripped; frequently imported may be poor quality	Strong acids and bases, salts, other water solutions, alcohols
Neoprene	Medium cost, medium chemical resistance, medium physical properties	NA	Oxidizing acids, anilines, phenol, glycol ethers
Nitrile	Low cost, excellent physical properties, dexterity	Poor vs. benzene, methylene chloride, trichloroethylene, many ketones	Oils, greases, aliphatic chemicals, xylene, perchloroethylene, trichloroethane; fair vs. toluene
Butyl	Specialty glove, polar organics	Expensive, poor vs. hydrocarbons, chlorinated solvents	Glycol ethers, ketones, esters
Polyvinyl alcohol (PVA)	Specialty glove, resists a very broad range of organics, good physical properties	Very expensive, water sensitive, poor vs. light alcohols	Aliphatics, aromatics, chlorinated solvents, ketones (except acetone), esters, ethers
Fluoro- elastomer (Viton)	Specialty glove, organic solvents	Extremely expensive, poor physical properties, poor vs. some ketones, esters, amines	Aromatics, chlorinated solvents, also aliphatics and alcohols
Norfoil (Silver Shield)	Excellent chemical resistance	Poor fit, easily punctures, poor grip, stiff	Use for Hazmat work

***Be sure to consult the manufacturers' specifications.**

Foot Protection

The employer must make sure that each affected employee uses protective footwear when working in areas where there is a danger of foot injuries due to:

- falling or rolling objects
- objects piercing the sole
- where feet are exposed to electrical hazards

Criteria for protective footwear

Protective footwear must comply with ASTM F-2412-2005, ASTM F-2413-2005, ANSI Z41-1991, ANSI Z41-1999, or must be demonstrated by the employer to be equally effective.

Footwear that meets established safety standards will have an American National Standards Institute (ANSI) label inside each shoe.

Steel-Reinforced Safety Shoes

These shoes are designed to protect feet from common machinery hazards such as falling or rolling objects, cuts, and punctures. The entire toe box and insole are reinforced with steel, and the instep is protected by steel, aluminum, or plastic materials. Safety shoes are also designed to insulate against temperature extremes and may be equipped with special soles to guard against slip, chemicals, and/or electrical hazards.

Safety Boots

Safety boots offer more protection when splash or spark hazards (chemicals, molten materials) are present:

- When working with corrosives, caustics, cutting oils, and petroleum products, neoprene or nitrile boots are often required to prevent penetration.
- Foundry or "Gaiter" style boots feature quick-release fasteners or elasticized insets to allow speedy removal should any hazardous substances get into the boot itself.
- When working with electricity, special electrical hazard boots are available and are designed with no conductive materials other than the steel toe (which is properly insulated).

Selection guidelines for foot protection

Safety shoes and boots which meet the ANSI Z41-1991 Standard provide both impact and compression protection.

Safety shoes or boots with impact protection would be required for carrying or handling materials such as packages, objects, parts or heavy tools, which could be dropped; and, for other activities where objects might fall onto the feet.

Safety shoes or boots with compression protection would be required for work activities involving skid trucks (manual material handling carts) around bulk rolls (such as paper rolls) and around heavy pipes, all of which could potentially roll over an employee's feet.

Safety shoes or boots with puncture protection would be required where sharp objects such as nails, wire, tacks, screws, large staples, scrap metal etc., could be stepped on by employees causing a foot injury.

MODULE 6: ELECTRICAL PROTECTIVE EQUIPMENT AND FALL PROTECTION

Care and Use of Electrical Protective Equipment

To prevent injury from exposure to electrical conductors, it's important that all electrical protective equipment be maintained in a safe, reliable condition. Electrical protective equipment includes the following:

- Insulating blankets,
- covers,
- line hose,
- gloves, and
- sleeves made of rubber

All electrical protective equipment made of rubber should meet the established safety standards and specifications discussed below.

Voltages

Maximum use voltages must conform to those listed in Table I-5.

Table I-5. - Rubber Insulating Equipment Voltage Requirements

Class of equipment	Maximum use voltage (1)	Retest voltage (2) a - c - rms	Retest voltage (2) d - c - avg
0	1,000	5,000	20,000
1	7,500	10,000	40,000
2	17,000	20,000	50,000
3	26,500	30,000	60,000
4	36,000	40,000	70,000

Footnote(1) The maximum use voltage is the a-c voltage (rms) classification of the protective equipment that designates the maximum nominal design voltage of the energized system that may be safely worked. The nominal design voltage is equal to the phase-to-phase voltage on multiphase circuits. However, the phase-to-ground potential is considered to be the nominal design voltage:

[1] If there is no multiphase exposure in a system area and if the voltage exposure is limited to the phase-to-ground potential, or

[2] If the electrical equipment and devices are insulated or isolated or both so that the multiphase exposure on a grounded wye circuit is removed.

Footnote(2) The proof-test voltage must be applied continuously for at least 1 minute, but no more than 3 minutes.

Inspecting Equipment

To make sure electrical protective equipment actually performs as designed, it must be inspected for damage before each day's use and immediately following any incident that can reasonably be suspected of having caused damage. Insulating gloves must be given an air test, along with the inspection.

Defects

Insulating equipment must not be used if any of the following defects are detected:

- A hole, tear, puncture, or cut;
- Ozone cutting or ozone checking (the cutting action produced by ozone on rubber under mechanical stress into a series of interlacing cracks);
- An embedded foreign object;
- Any of the following texture changes: swelling, softening, hardening, or becoming sticky or inelastic. Any other defect that damages the insulating properties.

Insulating equipment found to have other defects that might affect its insulating properties must be removed from service and returned for testing. It must be cleaned as needed to remove foreign substances, and stored in such a location and in such a manner as to protect it from light, temperature extremes, excessive humidity, ozone, and other injurious substances and conditions.

Gloves

Protector gloves must be worn over insulating gloves, except when using Class 0 gloves, under limited-use conditions, where small equipment and parts manipulation necessitate unusually high finger dexterity. But it's important to note that extra care must be taken while visually examining the glove. And make sure to avoid handling sharp objects.

Any other class of glove may be used for similar work without protector gloves if the employer can demonstrate that the possibility of physical damage to the gloves is small and if the class of glove is one class higher than that required for the voltage involved. Insulating gloves that have been used without protector gloves may not be used at a higher voltage until they have been tested.

Testing

Electrical protective equipment must be subjected to periodic electrical tests. Test voltages and the maximum intervals between tests must be in accordance with Table I-5.

Table 1-5 - Rubber Insulating Equipment. Test Intervals

Type of equipment	When to test
Rubber insulating line hose	Upon indication that insulating value is suspect and after repair.
Rubber insulating covers	Upon indication that insulating value is suspect and after repair.
Rubber insulating blankets	Before first issue and every 12 months thereafter; [1]upon indication that insulating value is suspect; and after repair.
*Rubber insulating gloves	Before first issue and every 6 months thereafter; [1]upon indication that insulating value is suspect; after repair; and after use without protectors.
*Rubber insulating sleeves	Before first issue and every 12 months thereafter; [1]upon indication that insulating value is suspect; and after repair.
[1]If the insulating equipment has been electrically tested but not issued for service, the insulating equipment may not be placed into service unless it has been electrically tested within the previous 12 months.	

The test method used must reliably indicate whether the insulating equipment can withstand the voltages involved. Repaired insulating equipment must be retested before it may be used by employees.

Note: Standard electrical test methods considered as meeting this requirement are given in the national consensus standards of The American Society for Testing and Materials (ASTM).

If the insulating equipment fails to pass inspections or electrical tests it may not be used by employees, except as follows:

- Rubber insulating line hose may be used in shorter lengths with the defective portion cut off.
- Rubber insulating blankets may be repaired using a compatible patch that results in physical and electrical properties equal to those of the blanket.
- Rubber insulating blankets may be salvaged by severing the defective area from the undamaged portion of the blanket. The resulting undamaged area may not be smaller than 22 inches by 22 inches (560 mm by 560 mm) for Class 1, 2, 3, and 4 blankets.
- Rubber insulating gloves and sleeves with minor physical defects, such as small cuts, tears, or punctures, may be repaired by the application of a compatible patch. Also, rubber insulating gloves and sleeves with minor surface blemishes may be repaired with a compatible liquid compound. The patched area must have electrical and physical properties equal to those of the surrounding material. Repairs to gloves are permitted only in the area between the wrist and the reinforced edge of the opening.

Certification

The employer must certify that equipment has been tested in accordance with the requirements of the standard, and the certification must identify the equipment that passed the test and the date it was tested. Marking equipment and entering the results of the tests and the testing dates onto logs are two acceptable ways to meet this requirement.

Fall Protection Equipment

It's important (and the law in Oregon) that all employees are protected from fall hazards when:

- Working on unguarded surfaces more than 4 feet above a lower level in General Industry workplaces, or 6 feet above a lower level on a Construction worksite, or Working at any height above dangerous equipment.

These requirements do not apply when:

- The work is of limited duration and limited exposure, and
- The hazards involved in rigging and installing the safety devices equal or exceed the hazards involved in the actual activity.

Examples of tasks that might meet this criteria include the activities of grain weigher-samplers on railroad gondola-hopper cars, or railcar inspectors when testing or inspecting car tops.

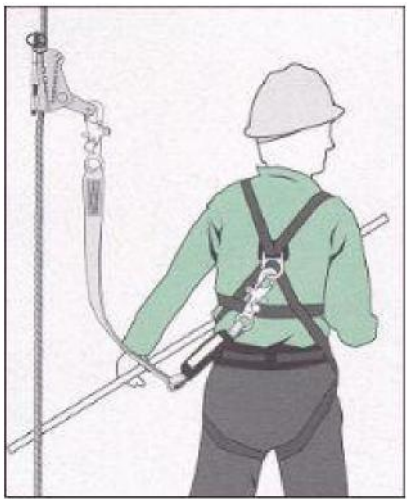
You can find more information on portable ladders at the Oregon OSHA website in the publications

section. **Fall protection systems**

There are a variety of fall protection systems that will protect you from fall hazards. Fall protection may be categorized into two general categories:

Fall restraint systems. These systems are designed to prevent an employee from falling. At a minimum, they must be rigged so that an employee cannot free fall more than two feet. They include:

- Guardrails
- Personal fall restraint systems
- Positioning device
- Warning lines
- Safety monitor
- Controlled access zone



Fall arrest systems. These systems are designed, not to necessarily prevent a fall, but to stop a fall once initiated. At a minimum, they must be rigged so that the employee will not free fall more than six feet, nor contact any lower level. They include:

- Personal fall arrest systems
- Safety nets

These guidelines focus primarily on the requirements of the equipment used as personal fall arrest and fall restraint systems including:

- lifelines,
- body belts (may be used only for fall restraint),
- harnesses, and
- lanyards.

Appropriate Use

Lifelines, body belts/harnesses and lanyards must be used only for employee safeguarding. That's pretty straight forward. Fall protection is to be used ***only*** for fall protection, no other use.

Any lifeline, body belt, harness or lanyard actually subjected to in-service loading, as distinguished from static load testing, must be immediately removed from service and must not be used again for employee safeguarding.

So, if any employee actually falls, and the fall protection equipment prevented injury (it worked!), the equipment must be taken out of service. In fact, frame the equipment and use it for future safety training as the "million-dollar fall protection device"...."this lanyard saved a life."

Remember, the need to remove PPE from service does not necessarily prevent you from using the equipment for some other unrelated use, but it must not be used as fall protection.

Fall protection Equipment Specifications

Lifelines

The point of attachment for lifelines must be capable of supporting a minimum dead weight of 5,000 pounds.

For all other lifeline applications, a minimum of 5/8-inch manila or equivalent with a minimum breaking strength of 5,000 pounds must be used.

Lifelines used on rock-scaling operations, or in areas where the lifeline may be subjected to cutting or abrasion, must be a minimum of 7/8-inch wire core manila rope.

Body belts, harnesses and lanyards

All body belts/harnesses and lanyard hardware must:

- Be drop forged or pressed steel,
- Be cadmium plated in accordance with type 1, Class B plating specified in Federal Specification QQ-P-416.
- Have a smooth surface free of sharp edges (don't want to cut the rope!).
- Be capable of withstanding a tensile loading of 4,000 pounds without cracking, breaking, or taking a permanent deformation. (Exception: rivets)
- Be a minimum of 1/2-inch nylon or equivalent, with a maximum length to provide for a fall of no
- greater than 6 feet.
- The rope must have a nominal breaking strength of 5,000 pounds.

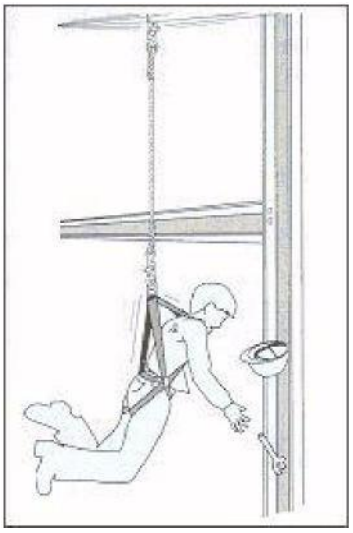
Inspecting Fall Protection Equipment

All lifelines, lanyards, body belts and harnesses must be periodically inspected by the supervisor in charge.

It's mandatory to inspect fall protection equipment daily, prior to each use as an added safety factor. Of course, any defective body belt, harness or lifeline ceases to be fall protection equipment, and must be discarded or repaired before it's used.

Why the full body harness?

Arrest forces are focused on the point of attachment which is usually the lower back. The result is going to be substantial injury to the body. The drawing illustrates the typical arrest position of the body and the point of stress. A worker who falls using the body belt will end up in this position. He or she has likely suffered major internal damage and has only seconds to be rescued. Remember, the body belt is no longer allowed to be used as a fall arrest system.



The full body harness is required for personal fall arrest systems because it is designed to spread the arrest forces throughout the entire upper body. The attachment is at the upper back, with straps attaching at various point in both the upper and lower part of the body. Consequently, arrest forces are spread over a much wider area. Injury is still possible, but the potential severity is lessened greatly, and rescue time lengthened. By the way, an effective rescue plan should be developed by the employer.

Remember, if you are initiating any kind of new construction project at a new worksite or in an existing workplace the requirements of OAR 437, Division 3, Construction, 1501 will apply. If you have questions as to whether your particular work activity might be considered "construction," give our OR-OSHA consultants a call.

Working Over Water: Oregon Rules for Life Jackets and Buoyant Protective Equipment

Employers must provide and make sure employees wear U.S. Coast Guard (or equivalent) approved buoyant protective equipment at all times while working on or over water which is more than five feet in depth while working:

- On floating pontoons, rafts, and floating stages;
- On open decks on floating plants (such as dredges, piledrivers, cranes, pond saws, and similar types of equipment) which are not equipped with bulwarks, guardrails or lifelines;
- Working alone at night where there are potential drowning hazards regardless of other safeguards provided;
- On floating logs, boom sticks or unguarded walkways; and
- On boom boats and other work boats.

Where buoyant protective equipment is provided, it must be designed and worn in a manner that tends to maintain the wearer's face above water. It must be capable of floating a 16 pound weight for 3 hours in fresh water. It must not be dependent on manual or mechanical manipulation or chemical action to secure the buoyant effect.

Buoys and Boats

Employers must provide and make sure ring buoys with at least 90 feet of line are readily available for emergency rescue. The distance between buoys and shoreline must not exceed 200 feet along exposed sides of work areas adjacent to water over five feet in depth.

Rings that are visible must be used at night where a worker might be beyond illuminated areas.

MODULE 7: 1910.95 HEARING PROTECTION

"Yeah, that machine used to be noisy...but it's not so loud any more."

Noise is something all of us have to deal with in the workplace. It is any sound that is unwanted. Noise doesn't necessarily have to be loud to distract us. And, as you know, many accidents occur when we become distracted from our task. Continuous loud noise, however, is insidious. It may not cause pain, and we may eventually learn to ignore it. But, that noise is source of our long-term hearing loss.

Think about it this way: You can walk across a grassy yard a couple of times every day without causing any damage to the grass. However, if you continually walk back and forth, you eventually beat down the grass, forming a path. The grass loses its ability to spring back. It just lays down and eventually dies. In a similar manner, continual loud noise beats down the hair cells in your the cochlea of your inner ear. Eventually, they lose the ability to spring back. The big difference, however, is that while grass can grow back, those hair cells in your ear won't. When you consider that you've only got around 16,000 hair cells in each ear, and they are thinning out from the day you're born, it's important to take good care of them.

Over one hearing loss claim a week in Oregon!

Are Oregon workers suffering from noise? You bet! In 1996 there were 65 hearing loss claims in Oregon. The average medical costs to close the claim was $2,226. Average time loss costs were $712 and the average number of lost days for this category of disease claim is 26 days. Lastly, the average partial permanent disability costs were $7,583. So, the total average direct costs for hearing loss is $10,521. I'm sure you will agree that you can purchase a lot of ear plugs for that! (By the way, these statistics were obtained by the Department of Consumer and Business Services Research and Analysis Section. Use these figures when you make recommendations for improvement in your hearing conservation program.)

Consequently...

As a result of this real and present danger to Oregon employees, all employers are held accountable to protect their employees against the effects of injurious noise exposure at work. When employees are subjected to sound exceeding those listed in the table below, feasible engineering or administrative controls must be used to reduce exposure. If these control efforts fail to sufficiently reduce sound levels personal protective equipment must be provided and used to reduce sound levels within the levels of the table.

TABLE G-16 - PERMISSIBLE NOISE EXPOSURES (1)

Duration per day, hours	Sound level dBA slow response
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
1/2	110
1/4 or less	115

Footnote(1) When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. If the sum of the following fractions: C(1)/T(1) + C(2)/T(2) C(n)/T(n) exceeds unity, then, the mixed exposure should be considered to exceed the limit value. Cn indicates the total time of exposure at a specified noise level, and Tn indicates the total time of exposure permitted at that level. Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level.

Engineering controls are most effective. Basically, all we're talking about is attempting to eliminate or reduce the noise level by redesigning, replacing or enclosing noisy equipment.

Management (Work Practice/Administrative) Controls attempt to limit exposure by reducing the duration of exposure to the noise.

Hearing Conservation Program

I'm not going to talk at length about the hearing conservation program because we're trying to focus in on the actual hearing protection (PPE) itself in this module. It is important to know, however, that the employer must administer a continuing, effective hearing conservation program, as described in paragraphs (c) through (o) of the standard, whenever employee noise exposures equal or exceed an 8-hour time-weighted average sound level (TWA) of 85 decibels measured on the A scale (slow response) or, equivalently, a dose of fifty percent.

If you have questions about administering the hearing conservation program itself, you can attend our workshop on that subject, or call one of our health consultants who can answer your specific questions. Now, let's get to the equipment!

Hearing Protectors

As you're probably well aware, there are basically four types of hearing protectors.

- Molded earplugs
- Custom-molded earplugs
- Self-molded earplugs, and
- Ear muffs

Molded earplugs are usually made of plastic or silicone rubber. They are available in a variety of shapes and sizes and are usually characterized by one or more ribs or contours. They are considered multiple use; therefore, they must be cleaned and properly stored after each use.

Custom molded plugs are generally made of plastic and are designed from a molded wax insert of the wearer's ears. They are considered multiple use but cannot be switched ear to ear.

Self-molded earplugs are generally made of mineral down or plastic foam and are molded or formed by the wearer. Generally one size fits all and they may be either single or multiple use.

Earmuffs are designed to be multiple use and may be designed to be worn with the harness over or behind the head, or below the chin. They are generally more comfortable, but usually provide less noise reduction, thus less protection, than ear plugs.

More Employer Responsibilities

Employers must make sure that hearing protectors are worn:

1. By all employees who are required by the PPE standard to wear personal protective equipment; and
2. By all employees who are exposed to an 8-hour time-weighted average of 85 decibels or greater, and who:
   - Have not yet had a baseline audiogram established pursuant to paragraph
   - Have experienced a standard threshold shift.

The intent of the law is that employers make hearing protectors available to all employees that meet the criteria above at no cost to employees. Also, hearing protectors must be replaced as necessary. And, employees must be given the opportunity to select their hearing protectors from a variety of suitable hearing protectors provided by the employer. The employer must also make sure that hearing protectors fit properly at the initial fitting and then supervise their correct use. One effective way to make sure employees are involved in this process is to ask your PPE supplier account representative to display a range of products to the employees.

Education and Training

The employer must provide training in the use and care of all hearing protectors provided to employees who are exposed to noise at or above an 8-hour time-weighted average of 85 decibels, and must make sure employees participate in the program. Although the standard only requires "training," make sure your PPE training (or any safety training for that matter) includes "educating" the employee as to the importance of the correct use of their PPE. As we talked about in Module 3, education tells employees the "why" which increases understanding. Understanding affects attitude which, in turn, influences behavior. The goal is to get employees to "want to" use their PPE correctly. The educational component of this training includes information on:

- The effects of noise on hearing
- The purpose of hearing protectors
- The advantages, disadvantages
- Attenuation of various types
- The purpose of audiometric testing, and an explanation of the test procedures.

The employer must also make sure that each employee demonstrates the ability to use and care for the PPE they are using.

QUIZ AND CERTIFICATE