SECTION 3:
OCCUPATIONAL SAFETY

References

1. Departmental Manual (DM), Part 485, Chapter 14.

Requirements

The Departmental Manual, Chapter 14 states:

1. "Each bureau will develop and manage a system by which major activities and individual jobs are analyzed as to:

    a. The sequence of work.
    b. The hazards associated with the sequence (actions).
    c. The methods or safeguards to prevent, reduce and/or control the identified hazard(s)."

2. "Each bureau will require that JHAs are properly used to prevent unnecessary exposure to job-related hazards."

3. "When work is performed by others, such as contractors, the contracting officer will determine that the person in charge of the work develops appropriate JHAs for the work to be performed. This information will be provided to the contracting officer or contracting officer representative as part of the accident prevention plan. It will be approved/accepted by the contracting officer/contracting officer representative prior to permitting the contractor to proceed with the work."

Procedures

1. Job Hazard Analysis (JHA) is a multi-step process designed to study and analyze a job. It breaks down a job into steps, which provide a means of eliminating associated hazards. JHAs result in a detailed written procedure for safely completing a particular job.

2. A successful JHA program will have several critical components.

    a. Management Support. Support means that time will be allocated for training to explain the program and for employees and supervisors to complete and record the form.

    b. Supervisor and Employee Training. JHAs require detailed training of supervisors and employees. Employees will be asked to provide feedback and on-the-job information relating to tasks they perform regularly.

    c. Written Program. The written program should define the methods and forms to be used. It should include basic JHA information, benefits, assignments,

necessary forms and guidance on how to use them, recommended job selections, and management control and monitoring.

d. Management Review. One individual needs to be assigned to oversee the program. This person should track the process and review rough drafts and completed JHAs for accuracy and quality.

3. Selecting the Job. Management should use a priority system to select jobs for analysis. This process should be based on past injury reports and employee feedback as well as factors such as:

   a. Jobs that have frequently produced injuries or illnesses.
   b. Jobs that are “high risk” and have the potential to cause injuries or illnesses.
   c. Jobs that involve new equipment or procedures.
   d. Jobs that have produced “near misses” among workers.

4. Identifying High-Risk Jobs. The following system can help supervisors and employees identify “high-risk” jobs. To do, this we need to understand the “probability” of an accident and what the “severity” of the injury or illness might be.

   a. Probability is defined as: the chance that a given event will occur. The probability rating is:

      - Low – If the factors considered indicate it would be unlikely that an accident could occur;
      - Medium – If the factors considered indicate it would be likely that an accident could occur; or
      - High – If the factors considered indicate it would be very likely that an accident could occur.

   b. Severity is defined as: the degree of injury or illness, which is reasonably predictable.

      The severity rating is: first-aid case, serious injury/illness or fatality.

Probability and Severity factors can be evaluated based on a simple “decisionmaking matrix” (Example 1). A matrix lets you chart a value for two factors, such as probability and severity, and rate the combined relationship. The higher the number, the greater is the risk.

EXAMPLE 1			
	First aid	Serious injury/ illness	Fatality
Low	1	2	3
Medium	2	4	6
High	3	6	9

5. Methods to complete a JHA.
   Three methods are commonly used to develop a JHA.

   a. One-on-one observation. A supervisor selects a worker who has a good knowledge of the job and is cooperative in answering questions to participate. The worker is observed completing the job, and both the worker(s) and the supervisor participate in the analysis process. This is the best method to use in developing a JHA, but it is not always possible.

   b. Group discussion method. Instead of actually watching the job, a group of supervisors and employees collectively analyze a job in a classroom setting. All involved must be familiar with the selected job in order to offer comments and agree with the established procedure. This is the second-best method to use in developing JHA.

   c. Recall and check process. Here, a supervisor or employee recalls job steps and hazards and then asks others familiar with the job if the steps and procedures are correct.

6. Completing the JHA form.
   The JHA form to be used (see JHA Form 1) has three columns: Sequence of Job Steps, Potential Hazards/Injury Sources and Safe Action or Procedure. These columns should be completed in the following order:

   a. Sequence of Job Steps. The supervisor should ask the question, "What is the first thing you do when you start the job?" The next question should be, "What do you do next?" and so on until the job is completed. Each step can combine a variety of actions that are necessary to complete that step. Most JHAs contain 6 to 10 steps, and the information in this section is deliberately kept brief. Identify each step with a number that will be carried across the form to the other columns (see JHA Form 2, page 1).

   b. Identifying potential hazards. For each step, two types of information need to be recorded in the middle column – the actual hazard itself and the injury source. Remember, the hazard alone does not cause the injury. The injury source helps to identify the action that causes the injury. Keep words to a minimum. Identify the injury source by the two initials, and then identify the hazard (see JHA Form 2).

   c. Injury Sources.

      - ***Struck-by*** (SB): A person is forcefully struck by an object. The force of contact is provided by the object.

      - ***Struck-against*** (SA): A person forcefully strikes an object. The person provides the force or energy.

- ***Contact-by*** (CBY): Contact by a substance or material that, by its very nature, is harmful and causes injury.

- ***Contact-with*** (CW): A person comes in contact with a harmful substance or material. The person initiates the contact.

- ***Caught-on*** (CO): A person or part of his/her clothing or equipment is caught on an object that is either moving or stationary. This may cause the person to lose his/her balance and fall, be pulled into a machine or suffer some other harm.

- ***Caught-in*** (CI): A person or part of him/her is trapped or otherwise caught in an opening or enclosure.

- ***Caught-between*** (CB): A person is crushed, pinched or otherwise caught between a moving and a stationary object or between two moving objects.

- ***Fall-to-surface*** (FS): A person slips or trips and falls to the surface he/she is standing or walking on.

- ***Fall-to-below*** (FB): A person slips or trips and falls to a level below the one he/she was walking or standing on.

- ***Overexertion*** (O): A person overextends or strains himself/herself while performing work.

- ***Bodily reaction*** (BR): Caused solely from stress imposed by free movement of the body or assumption of a strained or unnatural body position.

- ***Overexposure*** (E): Over a period of time, a person is exposed to harmful energy (noise, heat), lack of energy (cold) or substances (toxic chemicals/atmospheres).

d. Safe Actions or Procedures. The Safe Action or Procedure column combines the basic steps and potential hazards into a correct safe working procedure. The entire correct job procedure and the method to avoid injury must always be included (see JHA Form 2). Once a rough-draft JHA has been completed, the JHA should be reviewed by someone who understands the quality needed in completed JHAs. In the early stages of a JHA program, many documents will likely be returned. However, the more one works with JHA, the better the quality of the finished product.

7. The full and correct use of the JHA program will likely lead to the discovery of many additional unsafe conditions and behaviors in the workplace. Management needs to expect this and be prepared to take the following actions.

a. Anticipate an increase in requests for maintenance actions to correct unsafe conditions.

b. Correct any condition that could cause injury or may violate a regulation or standard as soon as it is discovered.

c. Provide additional training for supervisors and/or workers so they may perform the job as required in the JHA.

8. JHAs should be modified as needed. These documents should be regularly reviewed, corrected and updated by the supervisor, workers and/or management.

9. If an accident or injury occurs on a specific job, the JHA should be reviewed immediately to determine whether changes are needed in the job procedure. If the accident results from failure to follow JHA procedures, the facts should be discussed with all those who perform the job.

JOB HAZARD ANALYSIS – FORM 1.1			
JOB HAZARD ANALYSIS (JHA)		Date:	New JHA/Revised JHA
Park Unit:	Division:	Branch:	Location:
JOB TITLE:		JHA Number:	Page _____of _____
Job Performed By:	Analysis By:	Supervisor:	Approved By:

Required Standards and General Notes:	
Required Personal Protective Equipment:	
Tools and Equipment:	

Sequence of Job Steps	Potential Hazards/Injury Sources	Safe Action or Procedure

Injury Source for the middle column: SB= Struck-By, SA = Struck-Against, CBY = Contacted-By, CI = Caught-In, CB = Caught-Between, CO = Caught On, FB = Fall-to-Below, CW = Contacted-With, O = Overexertion or Repetitive Motion, FS = Fall-to-Surface, BR = Bodily reaction, E = Exposure to Chemical, Noise, etc.

JOB HAZARD ANALYSIS – FORM 1.2		
JHA – CONTINUATION SHEET	JHA Number:	Page _____of _____

Sequence of Job Steps	Potential Hazards/Injury Sources	Safe Action or Procedure

Injury Source for the middle column: SB= Struck-By, SA = Struck-Against, CBY = Contacted-By, CI = Caught-In, CB = Caught-Between, CO = Caught-On, FB = Fall-to-Below, CW = Contacted-With, O = Overexertion or Repetitive Motion, FS = Fall-to-Surface, BR = Bodily reaction, E = Exposure to Chemical, Noise, etc.

JOB HAZARD ANALYSIS – FORM 2.1			
JOB HAZARD ANALYSIS (JHA)		Date: February 28, 2003	New JHA Revised JHA
Park Unit: Best National Park	Division: Maintenance Division	Branch: Auto Shop	Location: Headquarters area
JOB TITLE: Changing flat tire on 2000 Dodge Durango		JHA Number: 1	Page ___1___of ___2___
Job Performed By: Motor Vehicle Operator	Analysis By: Safety Committee	Supervisor: Auto Shop Foreman	Approved By: Auto Shop Foreman

Required Standards and General Notes:	Read the owners manual pages 166 to 172. Study diagram and instructions on the bottom of the cover for the jack and tool storage area showing proper jack placement and the way to use the jack extension and handle.
Required Personal Protective Equipment:	(Summer conditions) Gloves and coveralls
Tools and Equipment:	(Summer conditions) Spare tire, jack, jack handle and extension, lug wrench, emergency markers

Sequence of Job Steps	Potential Hazards/Injury Sources	Safe Action or Procedure
1. Parking car	1. SB – worker struck by passing car	1. Park car as far from the edge of roadway as possible. Park vehicle on a firm level surface. Turn on flashers. Set the parking brake and place the gear selector in PARK. Set out emergency markers. Chock both the front and rear of the tire diagonally opposite the jacking position.
2. Getting equipment	2. none	2. The jack and the tire changing tools are stowed in the floor compartment behind the rear seat, just forward of the lift gate opening. Jack usage instructions are shown on a label mounted on the underside of the cover. Put on gloves and coveralls.
3. Getting the spare tire	3. CI – fingers caught between car body & winch knob. O – while operating winch	3. Use the jack wrench extension on the winch nut to lower the spare tire. Turn the wrench in a counterclockwise direction to lower the tire. Continue to turn the wrench until the spare tire is on the ground and can be pulled out from under the car.
4. Properly place jack and remove wheel cover	4. CB – fingers can be caught between the wheel and the spade end of the wheel wrench O – force needed to loosen wheel nuts	4. Keep the fingers and hands clear of the pinch points between the tire and the spade end of the wheel wrench when prying off the wheel cover. Using the wheel wrench, loosen, but do not remove, the wheel nuts by turning them counterclockwise one turn while the wheel is still on the ground. Always place jack on a firm level surface. When changing a front tire, place the jack under the frame rail as close as possible behind the tire. When changing a rear tire, place the jack under the axle as close as possible to the shock bracket.

Injury Source for the middle column: SB= Struck-By, SA = Struck-Against, CBY = Contacted-By, CI = Caught-In, CB = Caught-Between, CO = Caught-On, FB = Fall-to-Below, CW = Contacted-With, O = Overexertion or Repetitive Motion, FS = Fall-to-Surface, BR = Bodily reaction, E = Exposure to Chemical, Noise, etc.

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National Park Service Personal Protective Equipment Policy

Engineering controls shall be the primary methods used to eliminate or minimize hazard exposure in the workplace. When such controls are not practical or applicable, personal protective equipment (PPE) shall be employed to reduce or eliminate personnel exposure to hazards. 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 injuries and/or illnesses.

Scope

The NPS provides all employees with required PPE to suit the task and known hazards. This program covers the requirements for PPE with the exception of PPE used for hearing conservation and respiratory protection or PPE required for hazardous material response to spills or releases, which are covered under separate programs. This program applies to all employees and volunteers of the National Park Service that use PPE in the course of their duties.

References

1. 29 CFR, Part 1910, OSHA General Industry Standards, Subpart I.

    - 1910.132, General Requirements
    - 1910.133, Eye and Face Protection
    - 1910.135, Head Protection
    - 1910.136, Occupational Foot Protection
    - 1910.137, Electrical Protective Equipment
    - 1910.138, Hand Protection

2. OSHA Publication 3151, Assessing the Need for Personal Protective Equipment

3. ANSI Z87.1-2003, Eye and Face Protection
   ANSI Z89.1-1997, Head Protection
   ANSI Z41-1991, Foot Protection
   ANSI 105-2000, Hand Protection Selection Criteria

Program Elements

1. *Design*. All personal protective equipment shall be of safe design and construction for the work to be performed. Only those items of protective clothing and equipment that meet National Institute of Occupational Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards will be procured or accepted for use.

2. *Hazard assessment and equipment selection.*

   Hazard analysis procedures shall be used to assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of PPE. If such hazards are present, or likely to be present, the following actions will be taken:

   - Select, and have each affected employee use, the proper PPE.
   - Communicate selection decisions to each affected employee.
   - Select PPE that properly fits each affected employee.

3. *Defective and damaged equipment.*

   Defective or damaged personal protective equipment shall not be used.

4. *Training.*

   All employees who are required to use PPE shall be trained to know at least the following:

   - When PPE is necessary.
   - What PPE is necessary.
   - How to properly don, remove, adjust and wear PPE.
   - The limitations of the PPE.
   - The proper care, maintenance, useful life and disposal of the PPE.

   Each affected employee shall demonstrate an understanding of the training and the ability to use PPE properly before being allowed to perform work requiring the use of PPE.

Personal Protective Equipment Program
Implementation Action Items

Step 1 ❑ Assess the workplace to identify equipment, operations, chemicals and other workplace components that could harm your employees. This includes:

- Eye and face injury.
- Cuts, punctures and laceration.
- Foot and hand injury.
- Head impact.
- Chemical exposure.
- Air contamination.
- Excessive temperatures.

Step 2 ❑ Implement engineering controls and work practices to control or eliminate these hazards to the extent feasible.

Step 3 ❑ Select the appropriate types of PPE to protect your employees from hazards that cannot be eliminated or controlled through engineering controls and work practices.

Step 4 ❑ Inform your employees why the PPE is necessary and when it must be worn. This includes:

- When PPE is necessary.
- What PPE is necessary.
- How to properly don, remove, adjust and wear PPE.
- The limitations of the PPE.

Step 5 ❑ Train your employees how to use, store and care for the selected PPE and how to recognize PPE deterioration and failure. This includes the proper care, maintenance, useful life and disposal of the PPE.

Step 6 ❑ Identify how you will enforce proper PPE use.

Technical Appendices

Appendix A: Written Personal Protective Equipment Program Appendix B: PPE Certification of Hazard Assessment Appendix C: General Guidelines for Choosing Personal Protective Equipment

Appendix A: Written Personal Protective Equipment Program

Written Program Requirements

A written Personal Protective Equipment (PPE) program must be prepared that covers all workplaces where employees use PPE. The written plan must describe how the program elements will be implemented at the park. It must be maintained at each work site. The written program must include the following:

1. Design.
2. Hazard assessment and equipment selection.
3. Defective and damaged equipment.
4. Training.

Sample Personal Protective Equipment Program

Caution: Although such general guidance may be helpful, you must remember that the written program must reflect what you are doing in your workplace. Therefore, if you use a generic program, it must be adapted to address the facility it covers. For example, the written plan must list the PPE hazard assessments at the site, indicate who is to be responsible for the various aspects of the program in your facility and indicate where written materials will be made available to employees.

PERSONAL PROTECTIVE EQUIPMENT PROGRAM

Your National Park

I. PURPOSE

Personal protective equipment (PPE or equipment, herein) includes all clothing and other equipment designed to create a barrier against workplace hazards. PPE should not be used as a substitute for safety-oriented engineering, guards, work practices and/or administrative controls, but should be used in conjunction with these controls to provide for employee safety and health in the workplace. The basic element of any management program for PPE should be an in-depth evaluation of the equipment needed to protect against all hazards in the work site.

Proper use of PPE requires hazard awareness training by the user. Employees must be aware that the PPE does not eliminate the hazard. Additionally, if the equipment fails, exposure may occur. To reduce the possibility of failure, PPE must be properly fitted and maintained in a clean and serviceable condition.

Selection of the proper PPE for a job is important. Park management and employees must understand the equipment's purpose and its limitations. The equipment must not be altered or removed even though an employee may find it uncomfortable simply because it does not fit properly.

This program will address head, eye and face, torso, and foot and leg protection. Separate programs exist for respiratory, fall and hearing protection. For more information on these programs, refer to the policies for Respiratory, Fall Protection and Noise Exposure Programs.

A. Policy

It is the policy of the park to provide, without cost to the employee, required and approved personal protective equipment to protect park employees from occupational hazards. PPE must be available to employees when it is needed, and it must be properly fitted. Supervisors must survey and document all operations and, using the health and safety hazard analysis process, evaluate and identify types of PPE required to minimize risk to their employees. Only approved equipment will be used.

It is the supervisor's responsibility to ensure that PPE is appropriate for the assigned duties, that it is worn, and that it meets the appropriate standards. Employees will be trained in how to properly select, inspect, use, maintain, store and dispose of PPE. Supervisors shall routinely evaluate employees on their performance of these tasks.

B. *Scope and Applicability*

This program applies to all park activities involving employees and volunteers. It is the goal of this program to identify and provide appropriate PPE for all jobs or tasks within the park.

II. OBJECTIVES

The primary goal of the Personal Protective Equipment Policy is to ensure that park personnel are adequately protected from hazards associated with tasks that require the proper use of PPE. In order to achieve this goal, the following is required:

- Identification of all operations requiring the use of PPE.
- Use of approved PPE at appropriate times.
- Development and implementation of viable procedures for selection, issuance, use, maintenance and storage of PPE.

III. PROCESS/PROGRAM

A. Controlling Hazards

PPE devices alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls and sound manufacturing practices.

B. Assessment and Selection

It is necessary to consider certain general guidelines for assessing the foot, head, eye and face, and hand hazard situations that exist in an occupational or educational operation or process. Protective devices should then be matched to the particular hazard. OSHA requires employers to conduct inspections of all workplaces to determine the need for personal protective equipment and to help in its selection.

For each work site, a certificate must be completed (Appendix B) that lists the findings of the inspection and specific protective equipment needed. These duties will be distributed between the First Line Supervisors (FLS) in accordance with the park's Workplace Review and Health and Safety Hazard Analysis Policies, as well as industry standards and best work practices.

C. Assessment Guidelines

In order to assess the need for PPE, the following steps should be taken:

1. Survey

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.
- Heat.
- Harmful dust.
- Light (optical) radiation.

2. Sources

During the walk-through survey, the FLS should observe:

- 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.

- Types of chemical exposures.

- Sources of harmful dust.

- 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.

- Any electrical hazards. In addition, injury/accident data should be reviewed to help identify problem areas.

3. *Organize data*

   Following the walk-through survey, it is necessary to organize the data and information for use in the assessment of hazards. Once the hazards of a workplace have been identified, the Safety Office and FLS will determine the suitability of PPE available. They will make recommendations for additional equipment and specify the minimum requirements for PPE to ensure a level of protection greater than the minimum required for employee protection. The objective is to prepare for an analysis of the hazards in the environment to enable proper selection of protective equipment.

4. *Analyze data*

   Having gathered and organized data on a workplace, an estimate of the potential for injuries should be made. Each of the basic hazards should be reviewed and a determination made as to the type, level of risk and seriousness of potential injury from each of the hazards found in the area. The possibility of exposure to several hazards simultaneously should be considered.

   First Line Supervisors, in conjunction with their employees, will select specific types of required equipment that meet the requirements. The FLS will be responsible for evaluating the use of PPE in the workplace and make changes as needed to ensure all PPE is appropriately used.

D. <u>Equipment Selection Guidelines</u>

The general procedure for selection of protective equipment is to:

1. Become familiar with the potential hazards, the type of protective equipment that is available and what the equipment can do (i.e., splash protection, impact protection, etc.).

2. Compare the hazards associated with the environment (i.e., impact velocities, masses, projectile shape, radiation intensities) with the capabilities of the available protective equipment.

3. Select the equipment that ensures a level of protection greater than the minimum required to protect employees from the hazards.

4. 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.

E. Fitting the Device

Careful consideration must be given to comfort and fit. PPE that fits poorly will not afford the necessary protection. Continued wearing of the device is more likely if it fits the wearer comfortably. Protective devices are generally available in a variety of sizes. Care should be taken to ensure that the right size is selected.

F. Devices with Adjustable Features

Adjustments should be made on an individual basis for a comfortable fit that will maintain the protective device in the proper position. Particular care should be taken in fitting devices for eye protection against dust and chemical splash to ensure that the devices are sealed to the face. In addition, proper fitting of helmets is important to ensure that they will not fall off during work operations. In some cases, a chin strap may be necessary to keep the helmet on an employee's head. (Chin straps should break at a reasonably low force, however, so as to prevent a strangulation hazard). Where manufacturer's instructions are available, they should be followed carefully.

G. Reassessment of Hazards

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

H. Requirements From the Construction Standards (1926.28)

The park is responsible for requiring employees to wear appropriate PPE in all operations where there is an exposure to hazardous conditions, or where it is indicated by this part, that using such equipment is needed to reduce hazards.

I. Protective Devices

All PPE will be of safe design, constructed for the work to be performed and maintained in a sanitary and ready-to-use condition. Only items that meet National Institute of Occupational Safety and Health (NIOSH) and American National Standards Institute (ANSI) standards will be procured and accepted for use. Selection of new PPE will conform to the most recent NIOSH and/or ANSI standards (see References for a list of applicable standards).

Careful consideration will be given to comfort and fit of PPE in order to increase its use. Protective devices are generally available in a variety of sizes, and care should be taken to select the correct size.

1. *Head Protection*

Head protection is required when there is a possibility of head injuries from a falling or flying object, by bumping the head against a fixed object or from exposed electrical connections (electrical shock). See Appendix C for details about head protection.

There are two types and three classes of head protection. Type 1 helmets are full brim, which is not less than 1-_ inches wide, and provide protection from impact to the top of the head. Type 2 helmets are brimless, with a peak extending forward from the crown, and provide protection from side and top impact.

Bump caps do not protect against impact or blows to the top or the sides of the head.

The three classes of helmets are as follows: Class G – General: designed for general purpose with 2,200-voltage protection, providing protection against impact hazards. Class E – Electrical: designed for utility workers, providing protection from impact and penetration by falling or flying objects and up to 20,000 volts of electricity. Class C – Conductive: designed for general purposes, but provide no voltage protection, are lightweight and provide impact protection.

The fitting of head protectors is very important. Headbands are adjustable and should be fitted to provide a minimum of 1-_ inches of clearance between the shell and the headband. During operations that involve climbing or search-and-rescue events, a chin strap must be worn to keep the head protector in place. Manufacturer's recommendations should be followed in cleaning shells and components. Certain paints and thinners may damage or reduce the protective features of the hat. They should not be painted or have holes drilled in them for any reason. Decals should not be placed on hard hats (except for the small NPS emblem), as they could cover over possible areas of damage.

Employees are responsible for visually inspecting all of the components for any sign of dents, cracks, penetration or damage that might reduce the degree of safety originally intended.

2. *Eye and Face Protection*

Eye injury prevention requires that all persons who are in areas where eye injuries might occur wear protective eyewear. Suitable protectors shall be used when employees are exposed to hazard from flying particles, acids or caustics, molten metal, chemical liquids, gases, vapors, bio-aerosols or injurious light radiation. See Appendix C for details about eye and face protection.

Pesticide applicators shall wear chemical splash goggles or a full face shield while mixing and/or applying any liquid pesticide.

Supervisors shall determine if there is a need for face shield protection to be used by tree trimmers or staff who operate brush chippers to prevent or reduce safety hazards directed at the employee's face.

Over-the-glasses goggles or safety glasses shall be provided to employees who wear eyeglasses and work in conditions that may be hazardous to the eye. At the discretion of the supervisor, prescription safety glasses or goggles that incorporate corrective lenses may be purchased for park employees who work in hazardous areas that require protective glasses. Prescription safety glasses are preferable to goggles or over-the-glasses safety glasses, since they are more comfortable.

If prescription lenses are required, the lens prescription must be furnished at the employee's expense, but the park will pay a portion of the cost for the frames, lenses and fitting. If the employee wishes to purchase safety glasses that are in excess of the allotment, that employee will have to pay the difference.

This policy should be reviewed annually to verify that the allotment is sufficient to purchase safety eyeglasses.

3. Torso Protection

Torso protection is required where there is a risk of injury from heat, splashes from hazardous liquids, impact, cuts, acids and radiation. Types of protection include vests, coveralls, jackets, aprons and full-body suits. Night workers, traffic control personnel and maintenance crews who might be struck by moving vehicles (day or night) must wear suits or vests designed to increase visibility and reflect light. See Appendix C for details about full body protection.

The employee, to ensure proper fit and function, must routinely inspect any torso protection.

Different types of materials are used for torso protection. Specific examples of materials and their benefits and use are:

- Wool and specially treated cotton are fire-resistant, comfortable and adaptable to changing workplace temperatures.

- Duck, a closely woven cotton fabric, is good for light-duty protective clothing. It can protect against cuts and bruises on jobs where employees handle heavy, sharp or rough materials.

- Heat-resistant clothing, such as leather, guards against dry heat and flame.

- Rubber and rubberized fabrics, neoprene and plastics protect against some acids and chemicals.

- Disposable suits of paper-like material protect against dusty materials or materials that can splash.

- Completely enclosed suits protect from extremely toxic materials.

- Limited-use suits made of materials such as polyethylene and saranex for protection from bio-hazards, certain low-toxic pesticides, poison oak and some hazardous materials.

4. *Foot and Leg Protection*

Foot and leg protection is required when there is a risk of injury from falling, rolling or sharp objects; molten metal; hot surfaces; and wet slippery surfaces. This policy recognizes that the park will provide protective footwear to employees who work in jobs in which protective footwear is required and ensure that it is worn.

Types of protection include safety shoes, boots, leggings and chaps. Features that may be obtained in a shoe or boot include heat-resistant soles, metal insoles, steel shanks and arch and metatarsal protection. See Appendix C for details about foot and leg protection.

Rubber boots purchased for pesticide applications shall be marked on the inside with the following: “Caution – contaminated with pesticides – these boots shall only be used for pesticide mixing and application.”

OSHA defers to the American National Standards Institute (ANSI) for determining what constitutes “protective footwear” defined in ANSI Z41-1991,

American National Standard for the Personal Protection Protective Footwear. The standard outlines requirements for performance measurements for impact and compression protection for the toes, metatarsal and sole; and protection against electrical, conductive and puncture hazards.

The ANSI standard does not allow for add-on type devices (such as strap-on foot, toe or metatarsal guards) as a substitute for protective footwear. According to part 4.1.1 of the standard, “the toe box shall be incorporated into the footwear during the construction and shall be an integral part of the footwear.” Add-on devices would be suitable only for visitors or employees who are visiting a workplace or assigned for short-term, temporary periods in areas where protective footwear is required.

The park will pay up to an allocated dollar amount for employees to purchase protective footwear. If employees wish to purchase safety footwear that is in excess of the allotment, the employees will have to pay the difference.

This policy should be reviewed annually to verify that the allotment is sufficient to purchase protective footwear.

Employees shall be counseled to care for their protective footwear as they should care for all government property, since protective footwear is purchased totally or partially with government funds.

It is the supervisor's responsibility to ensure that the protective footwear and leg wear is appropriate for the assigned duties and that it meets the appropriate standards.

5. Arm and Hand Protection

   Whenever there is a risk of injury from burns, cuts, electrical shock, amputation and absorption of chemicals, workers are required to protect their hands and arms. Gloves that provide insulation from burns and cuts are usually made from wire mesh, leather or canvas. Electricians require special rubber gloves for protection from shocks and burns. Animal control technicians and others handling wildlife or other sick or injured animals have special gloving requirements also. The Materials Safety Data Sheet for each specific chemical may provide the type of glove required or the specifications should be reviewed for chemical compatibility. See Appendix C for details about hand and arm protection.

Operating Record/Records Management

The FLS will ensure that adequate workplace and task analyses have been performed that shall identify required PPE. In addition, the FLS will perform necessary training on all required PPE. Training will include PPE selection, use and care. The record shall include the names of the people trained, the type of training received, topics discussed and the dates that training occurred. The FLS shall maintain their employees' training records for at least three (3) years. The Safety Office will periodically review these records for accuracy and completeness.

IV. ROLES AND RESPONSIBILITIES

Superintendent

The Superintendent shall:

- Provide the necessary budget to procure the required PPE through the annual budget process.

- Ensure that supervisors are evaluated on PPE used in the workplace.

- Provide leadership to instill in supervisors and employees that doing a job right includes effective use of PPE.

Safety Office

The Safety Office shall:

- Monitor to ensure employees have been instructed on selection, use, care and maintenance of PPE for their job or activity.

- Ensure that employees and FLS know that if the proper PPE is not available, the job is not to progress.

- Provide technical assistance to supervisors in developing hazard analyses and selection of PPE.

- Document workplace assessments.

Supervisors

Supervisors shall:

- Develop hazard analyses for activities they are responsible for which specifically identify PPE requirements.

- Train employees on the selection, proper use, limitations and care of PPE.

- Evaluate and enforce required PPE use.

- Ensure that PPE is appropriate for the assigned duties and meets the appropriate standards.

- Ensure that wearing of prescribed PPE is in keeping with the intent of Uniform Program Guidelines.

Employees

Employees shall:

- Use and care for required PPE properly.

- Notify their supervisor of any factors or practices that may require any changes relating to PPE.

- Be involved in the PPE selection.

V. LEGAL REQUIREMENTS AND AUTHORITY

OSHA

General requirements for PPE are outlined by the Occupational Safety and Health Administration (OSHA) in the Code of Federal Regulations (CFR) Title 29, Part 1910, Subpart I- Personal Protective Equipment. Section 1910.132- General Requirements, paragraph (a) states that, “Protective equipment, including personal protective equipment for the eyes, face, head and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be provided, used and maintained in a sanitary and reliable condition whenever it is necessary.” In addition, the park is required to certify in writing that workplace hazard assessments have been performed.

In a Standard Interpretation Letter, dated October 18, 1994, OSHA addressed the issues relating to who is required to pay for such equipment. It states, “OSHA has interpreted its general PPE standard, as well as specific standards, to require employers to provide and pay for personal protective equipment required by the company for the worker to do his or her job safely and in compliance with OSHA standards.”

NPS Policy

Reference/Authority: RM 50B, National Park Service Occupational Safety and Health Program, requires parks to provide volunteers and employees protection from harmful substances in the workplace; 29 CFR 1910.160, Basic Program Elements for Federal Employee Occupational Safety and Health Programs, prescribes federal agency responsibility for adherence to occupational safety and health standards promulgated under OSHA; 29 CFR 1910.132-138, Personal Protective Equipment, prescribes the minimum requirements for a Personal Protective Equipment Program.

VI. REFERENCES

1. 29 CFR, Part 1910, OSHA General Industry Standards, Subpart I.

    - 1910.132, General Requirements
    - 1910.133, Eye and Face Protection
    - 1910.135, Head Protection
    - 1910.136, Occupational Foot Protection
    - 1910.137, Electrical Protective Equipment
    - 1910.138, Hand Protection

2. OSHA Publication 3151, Assessing the Need for Personal Protective Equipment

3. ANSI Z87.1-2003, Eye and Face Protection
   ANSI Z89.1-1997, Head Protection
   ANSI Z41-1991, Foot Protection
   ANSI 105-2000, Hand Protection Selection Criteria

Approved:

_____ _____

Name, Superintendent Date

Appendix B: PPE Certification of Hazard Assessment

Work Area _____
Assessment Conducted By _____ Date _____

Personal Protective Equipment – Hazard Analysis – By Task

Task	Hazard	PPE	Notes	Departments

PPE Certificate Example

PPE Certification of Hazard Assessment

Work Area _____
Assessment Conducted By _____ Date _____

Personal Protective Equipment - Hazard Analysis - By Task

Task	***Hazard***	***PPE Required***	***Notes***	***Departments***
Entering high noise area	Hearing loss	Foam, cap or earmuff type hearing protection	Both ears, all production areas, prior to plant entry	All persons
Chemical mixing	Caustic burns	Chemical gloves, apron, goggles and face shield, rubber boots, sleeves	Only authorized employees are to mix chemicals	Authorized employees
Grinding, sanding, chipping, abrading	Eye hazard	Safety glasses/ goggles, face shield		Maintenance
Grinding, sanding, chipping, abrading	Hand lacerations, impingement	Leather or thick cloth work gloves	When using powered tools	Maintenance
Welding, brazing	Eye hazard, burns	Welder helmet, apron, gloves, chaps	See selection chart for proper lens shade	Maintenance
Work on live electrical circuits	Electric shock	Electrical rated gloves, non-conductive wrapped tools, rubber mats, face shield, dielectric footwear, rubber sleeves	Area must be isolated, inspected and attendant must be on scene.	Maintenance

Appendix C: General Guidelines for Choosing Personal Protective Equipment

Eye and Face Protection

When must I provide eye protection for employees?

How do I select the proper protective eyewear for employees?

If employees wear eyeglasses with prescription lenses, may I consider these eye protections?

What kinds of eye and face protectors are there? What are they for?

Can face shields protect employees instead of goggles or protective spectacles?

How do I choose the correct eye protection from among all the different types?

How dark do lenses on welding helmets and goggles need to be?

Once I have selected the appropriate protective eye equipment, how do I make sure employees use it properly?

My workplace gets pretty dirty. How will my employees keep their protective eyewear clean and effective?

My employees work in shifts. Could I provide one pair of protective eyewear for each position instead of each employee?

Head Protection

When do my employees need head protection?

What should I look for in head protection?

What types of head protection are available?

How do I choose the correct protective helmets from among the different types?

I have purchased new hard hats for my employees that meet the ANSI requirements. Have I fulfilled my responsibility to protect my employees' heads?

Could employees wearing hard hats and working at elevations create a potential hazard for the employees working below?

Can I require employees to cut their hair if it is long enough to get tangled in machinery?

Once I have selected helmets to protect my employees' heads, how do I make sure they use them properly?

How do I make sure that the hard hats I provide will be kept in good condition?

Foot and Leg Protection

When must I provide foot and leg protection?

What are the types of protection and where do I use them?

What should I look for when choosing safety shoes for my employees? Conductive Shoes; Electrical Hazard, Safety-Toe Shoes; Foundry Shoes

Once I have selected equipment to protect my employees' feet and legs, how do I make sure they use it properly?

Hand and Arm Protection

When must I provide hand and arm protection?

What kind of equipment is necessary to protect hands and arms?

Is there one kind of glove that will protect against all workplace hazards?

What kinds of protective gloves are available? Metal Mesh, Leather or Canvas Gloves; Fabric and Coated Fabric Gloves; Chemical- and Liquid-Resistant Gloves

How do I make sure my employees properly use the equipment I have selected?

Body Protection

When must I provide my employees with full body protection?

If only part of the body faces potential injury, must I provide my employees with full body protection?

From what material should protective clothing be made?

How do I make sure employees properly use the body protection I provide?

Summary

List of Checklists, Tables and Figures

Checklist C: Use and Care of Eye and Face Protection
Checklist D: Use and Care of Head Protection
Checklist E: Use and Care of Foot and Leg Protection
Checklist F: Use and Care of Hand and Arm Protection
Checklist G: Use and Care of Body Protection

Table 1. Eye and Face Protector Selection Guide
Table 2. Filter Lenses for Protection Against Radiant Energy
Table 4. Glove Chemical Resistance Selection Chart

Figure 1. Recommended Eye and Face Protectors
Figure 2. Hard Hat
Figure 3. Safety Shoes

Eye and Face Protection

When must I provide eye protection for employees?

You must provide eye protection for employees whenever they are exposed to potential eye injuries during their work if work practice or engineering controls do not eliminate the risk of injury. Some of the things that might cause eye injuries include the following:

- Dust and other flying particles, such as metal shavings or wool fibers.
- Molten metal that might splash.
- Acids and other caustic liquid chemicals that might splash.
- Blood and other potentially infectious body fluids that might splash, spray or splatter.
- Intense light such as that created by welding arcs and lasers.

How do I select the proper protective eyewear for employees?

Begin with the following criteria:

- Eye protection must protect against the specific hazard(s) encountered in the workplace.
- It must be reasonably comfortable to wear.
- Eye protection must not restrict vision or movement.
- Eye protection must be durable and easy to clean and disinfect.
- Eye protection must not interfere with the function of other required PPE.

In addition, the American National Standards Institute, Inc. (ANSI) has issued standard requirements for the design, construction, testing and use of protective devices for eyes and face.

All protective eyewear you purchase for your employees must meet the requirements of ANSI Z87.1-2003 for devices purchased after August 2003, and ANSI Z87.1-1989 for devices purchased before that date.

If employees wear eyeglasses with prescription lenses, may I consider these eye protection?

No. Eyeglasses designed for ordinary wear do not provide the level of protection necessary to protect against workplace hazards. Special care must be taken when choosing eye protectors for employees who wear eyeglasses with corrective lenses such as the following:

- Prescription spectacles, with side shields and protective lenses meeting the requirements of ANSI Z87.1, that also correct the individual employee's vision.
- Goggles that can fit comfortably over corrective eyeglasses without disturbing the alignment of the eyeglasses.
- Goggles that incorporate corrective lenses mounted behind protective lenses.

You also must provide protective eyewear to employees who wear contact lenses and are exposed to potential eye injury. Eye protection provided to these employees may also incorporate corrective eyeglasses. Thus, if an employee must don eyeglasses in the event of contact lens failure or loss, he or she will still be able to use the same protective eyewear.

What kind of eye and face protectors are there? What are they for?

- *Safety spectacles*. These protective eyeglasses are made with safety frames constructed of metal and/or plastic and are fitted with either corrective or plain impact-resistant lenses. They come with and without side shields, but most workplace operations will require side shields.

- *Impact-resistant spectacles*. This eyewear can be used for moderate impact from particles produced by such jobs as carpentry, woodworking, grinding and scaling.

- *Side shields*. These protect against particles that might enter the eyes from the side. Side shields are made of wire mesh or plastic. Eye-cup-type side shields provide the best protection.

- *Goggles*. You may choose from many different types of goggles, each designed for specific hazards. Generally, goggles protect eyes, eye sockets and the facial area immediately surrounding the eyes from impact, dust and splashes. Some goggles fit over corrective lenses. There are other goggles specifically designed and required for use with chemicals and pesticides.

- *Welding shields*. Constructed of vulcanized fiber or fiberglass and fitted with a filtered lens, these protective devices are designed for the specific hazards associated with welding. Welding shields protect your employees' eyes from burns caused by infrared or intense radiant light, and they protect face and eyes from flying sparks, metal spatter and slag chips produced during welding, brazing, soldering and cutting. See Table 1 for assistance in choosing the appropriate filter for your employees' tasks.

- *Laser safety goggles*. Laser safety goggles provide a range of protection against the intense concentrations of light produced by lasers. The type of laser safety goggles you choose will depend upon the equipment and operating conditions in your workplace. Chapter III:6, "Laser Hazards," in the OSHA Technical Manual(5) will help you select the appropriate protection for your employees.

- *Face shields*.These transparent sheets of plastic extend from the brow to below the chin across the entire width of the employee's head. Some are polarized for glare protection. Choose face shields to protect your employees' faces from nuisance dusts and potential splashes or sprays of hazardous liquids. There are special versions that use screening instead of plastic for use by tree trimmers and brush operations.

- *Sunglasses*. It is important to protect eyes from excessive exposure to sunlight.

- *Ultraviolet (UV)* radiation from sunlight can damage the lens and retina of the eye, causing cataracts, macular degeneration and other conditions that could affect the ability to see clearly. To protect the eyes well, sunglasses must absorb at least 98% of UV radiation. Lifeguards require sunglasses as essential PPE.

- *CPR/Pocket Masks*. Face Protection is needed when performing CPR. Masks and face shields prevent backflow of air and/or contaminants from patient to rescuer. Masks/shields vary in style and are both reusable and disposable. This should be standard equipment for anyone who is CPR qualified.

- *Nuisance Dust Masks*. These types of masks are covered in the Respiratory Protection Program. Please refer to the SOP for that program.

Can face shields protect employees instead of goggles or protective spectacles?

Face shields do not protect employees from impact hazards. You may, however, use face shields in combination with goggles or safety spectacles to protect against impact hazards, even in the absence of dust or potential splashes, for additional protection beyond that offered by goggles or spectacles alone.

How do I choose the correct eye protection from among all the different types?

Each kind of protective eyewear is designed to protect against specific hazards. By completing the hazard assessment of your workplace outlined in the previous section, you will identify the specific workplace hazards that pose a threat to your employees' eyes and faces. Tables 1, 2 and 4 and Figure 1 will help you find the protective devices most suited for your employees and your workplace. Locate the operations and hazards most similar to those in your workplace in Table 1 and match the number to the corresponding drawing in Figure 1. Welding operations require lenses to be tinted to a degree sufficient to protect against the specific intensity of light present during the tasks your employees perform (see Tables 1 and 2).

table 1.

How dark do lenses on welding helmets and goggles need to be?

Intensity of light or radiant energy produced by welding, cutting or brazing operations varies according to a number of factors including the task producing the light, the electrode size and the arc current.

Table 2 shows the minimum protective shade for a variety of welding, cutting and brazing operations. To protect employees who are exposed to intense radiant energy, begin by selecting a shade too dark to see the welding zone. Then try lighter shades until you find one that allows a sufficient view of the welding zone without going below the minimum protective shade.

table 2.

figure 1.

Once I have selected the appropriate eye protection equipment, how do I make sure employees use it properly?

Train your employees to use the protective eyewear. Checklist C will help you prepare your employees to use and care for the eye protection you provide.

checklist C.

My workplace gets pretty dirty. How will my employees keep their protective eyewear clean and effective?

Show your employees how to clean the eye protectors. Allow them time at the end of their shifts to do the following:

- Disassemble goggles or spectacles.
- Thoroughly clean all parts with soap and warm water.
- Carefully rinse off all traces of soap.
- Replace all defective parts.

Occasionally, you must disinfect the protective eyewear. To do so, after cleaning you can do the following:

- Immerse and swab all parts for 10 minutes in a germicidal solution.
- Remove all parts from the solution and hang in a clean place to air-dry at room temperature or with heated air.
- Do not rinse the parts after submerging them in the disinfectant. Rinsing will remove the germicidal residue that remains after drying.
- Ultraviolet disinfecting and spray-type disinfecting solutions also may be used after washing.

My employees work in shifts. Could I provide one pair of protective eyewear for each position instead of each employee?

Yes. If you do this, however, you must disinfect shared protective eyewear after each use. If the goggles or spectacles do not have to be individually designed to incorporate an employee's corrective lenses and you disinfect the eyewear between uses by different employees, more than one employee may use the same set of protective eyewear.

If a Wood Chip Chips.

Head Protection

When do my employees need head protection?

You must provide head protection for your employees if:

- Objects might fall from above and strike them on the head.
- They ride bicycles and may fall off a bike.
- They participate in land/cliff rescues.
- They might bump their heads against fixed objects, such as exposed pipes or beams.
- They work near exposed electrical conductors.
- They need head protection from hazardous chemicals.

What should I look for in head protection?

In general, protective helmets or hard hats should:

- Resist penetration by objects.
- Absorb the shock of a blow.
- Be water-resistant and slow-burning.
- Come with instructions explaining proper adjustment and replacement of the suspension and headband.

Hard hats require a hard outer shell and a shock-absorbing lining. The lining should incorporate a headband and straps that suspend the shell from 1 to 1-1/4 inches (2.54 cm to 3.18 cm) away from the user's head. This design provides shock absorption during impact and ventilation during wear.

As with devices designed to protect eyes, the design, construction, testing and use of protective helmets must meet standards established by ANSI.

What types of head protection are available?

Hard hats are divided into three industrial classes:

- Class A (now Class G under new ANSI standard Z89.1-1997). These helmets are for general service. They provide good impact protection, but limited voltage protection (2,200 volts). They are used mainly in mining, building construction, shipbuilding, lumbering and manufacturing.

- Class B (now Class E). Choose Class B helmets if your employees are engaged in electrical work. They protect against falling objects and high-voltage (20,000 volts) shock and burns.

- Class C Designed for comfort, these lightweight helmets offer limited protection. They protect workers from bumping against fixed objects, but do not protect against falling objects or electric shock.

Look at the inside of any protective helmet you are considering for your employees, and you should see a label showing the manufacturer's name, the ANSI standard it meets and its class. Figure 2 shows the basic design of hard hats. The label should also have the manufacturer's suggested date of replacement.

How do I choose the correct protective helmets from among the different types?

Each kind of protective helmet is designed to protect against specific hazards. By completing the hazard assessment outlined above, you will identify the specific workplace hazards that pose a threat to your employees' heads.

I have purchased new hard hats that meet the ANSI requirements. Have I fulfilled my responsibility to protect my employees' heads?

No. Issuing appropriate head protection to employees is a major first step, but you must make sure that the hard hats continue to provide sufficient protection to your employees. Do this by training your employees in the proper use and maintenance of hard hats, including daily inspection. If your employees identify any of the following defects, remove the hard hats from service:

- The suspension system shows signs of deterioration such as:

  - Cracking.
  - Tearing.
  - Fraying.

- The suspension system no longer holds the shell from 1 inch to 1-1/4 inches (2.54cm - 3.18cm) away from the employee's head.

- The brim or shell is cracked, perforated or deformed.

- The brim or shell shows signs of exposure to heat, chemicals, ultraviolet light or other radiation. Such signs include:

  - Loss of surface gloss.
  - Chalking.
  - Flaking (a sign of advanced deterioration).

Could employees wearing hard hats and working at elevations create a potential hazard for the employees working below?

Figure 2.

To protect employees working below, you must provide chin straps for the protective helmets worn by employees working at higher elevations, whether in an aerial lift or at the edge of a pit. The chin straps should be designed to prevent the hard hats from being bumped off the employees' heads.

Can I require employees to cut their hair if it is long enough to get tangled in machinery?

Long hair (longer than four inches) can be drawn into machine parts such as chains, belts, rotating devices, suction devices and blowers. Hair may even be drawn into machines otherwise guarded with mesh. Although you need not require your employees to cut their hair, you must require them to cover and protect their hair with bandannas, hairnets, turbans, soft caps or the like. These items, however, must not themselves present a hazard.

Once I have selected helmets to protect my employees' heads, how do I make sure they use them properly?

Train your employees to use the hard hats. Checklist D will help you instruct your employees to use and care for the head protection you provide.

How do I make sure that the hard hats I provide will be kept in good condition?

You must train your employees to maintain and care for the head protection. Your training communicates the importance of wearing head protection and its proper care. Important information you will want to consider when training employees on how to care for their hard hats includes the following:

- Paints, paint thinners and some cleaning agents can weaken the shell of the hard hat and may eliminate electrical resistance. Consult the helmet manufacturer for information on the effects of paint and cleaning materials on their hard hats. Keep in mind that paint and stickers can also hide signs of deterioration in the hard-hat shell. Limit their use.

- Ultraviolet light and extreme heat, such as that generated by sunlight, can reduce the strength of the hard hats. Therefore, employees should not store or transport hard hats on the rear-window shelves of automobiles or otherwise in direct sunlight.

Also, instruct employees to clean the protective helmets periodically by:

- Immersing for one minute in hot (approximately 140ºF, or 60ºC) water and detergent.

- Scrubbing.

- Rinsing in clear hot water.

Checklist D.

Foot and Leg Protection

When must I provide foot and leg protection?

You must provide foot and leg protection if your workplace hazard assessment reveals potential dangers to these parts of the body. Some of the potential hazards you might identify include the following:

- Heavy objects such as barrels or tools that might roll onto or fall on employees' feet.
- Sharp objects such as nails or spikes that might pierce the soles or uppers of ordinary shoes.
- Molten metal that might splash on feet or legs.
- Hot or wet surfaces.
- Slippery surfaces.

What are the types of protection and where do I use them?

The type of foot and leg protection you provide your employees will depend upon the specific workplace hazards you identify and the specific parts of the feet or legs exposed to potential injury. Safety footwear must meet minimum compression and impact performance standards and testing requirements established by ANSI.

- Leggings. Use these to protect the lower legs and feet from heat hazards, like molten metal or welding sparks. Safety snaps allow leggings to be removed quickly.
- Metatarsal guards. Made of aluminum, steel, fiber or plastic, these guards may be strapped to the outside of shoes to protect the instep area from impact and compression.
- Toe guards. Toe guards may be made of steel, aluminum or plastic. They fit over the toes of regular shoes. These guards protect only the toes from impact and compression hazards.
- Combination foot and shinguards. These guards may be used in combination with toe guards when greater protection is needed.

- Safety shoes. These sturdy shoes have impact-resistant toes and heat-resistant soles that protect against hot work surfaces common in roofing, paving and hot-metal industries. The metal insoles of some safety shoes protect against puncture wounds. Safety shoes may also be designed to be electrically conductive (to prevent the buildup of static electricity in areas with the potential for explosive atmospheres) or nonconductive (to protect workers from workplace electrical hazards).

A Shoe Thing...

What should I look for when choosing safety shoes for my employees?

Generally, safety shoes must be sturdy and must have impact-resistant safety toes, instep protection and heat-resistant soles (see Figure 3). All safety shoes must comply with the ANSI standard mentioned above. In addition, depending on the types of worker exposures, you may need to provide specially designed safety shoes such as conductive or electrical-hazard safety shoes.

Conductive Shoes

Electrically conductive shoes protect against the buildup of static electricity. Essentially, these shoes ground the employees who wear them. Employees working in explosive and hazardous locations such as explosives manufacturing facilities or grain elevators must wear conductive shoes to reduce the risk of static electricity buildup on an employee's body that could produce a spark and cause an explosion or fire. During training, employees must be instructed not to use foot powder or wear socks made of silk, wool or nylon with conductive shoes. Foot powder insulates and retards the conductive ability of the shoes. Silk, wool and nylon produce static electricity.

Conductive shoes are not general-purpose shoes and must be removed upon completion of the tasks for which they are required. Employees exposed to electrical hazards must never wear conductive shoes.

Figure 3.

Electrical Hazard, Safety-Toe Shoes

Electrical hazard, safety-toe shoes are nonconductive and will prevent your employees' feet from completing an electrical circuit to the ground. They can protect employees against open circuits of up to 600 volts in dry conditions. Electrical hazard, safety-toe shoes should be used in conjunction with other insulating equipment and precautions to reduce or eliminate the potential for your employees' bodies or parts of their bodies to provide a path for hazardous electrical energy. Note: **Nonconductive** footwear must not be used in explosive or hazardous locations; in such locations, **electrically conductive** shoes are required.

Train your employees to recognize that the insulating protection of electrical hazard, safety-toe shoes may be compromised if:

- The shoe is wet.
- The rubber sole is worn through.
- Metal particles become embedded in the sole or heel.
- Other parts of the employees' bodies come into contact with conductive, grounded items.

Foundry Shoes

In addition to insulating your employees' feet from the extreme heat of molten metal, foundry shoes prohibit hot metal from lodging in shoe eyelets, tongues or other parts. These snug-fitting leather or leather-substitute shoes have leather or rubber soles and rubber heels. In addition, all foundry shoes must have built-in safety toes.

Once I have selected equipment to protect my employees' feet and legs, how do I make sure they use it properly?

Train your employees to use the protective footwear. Checklist E will help you instruct your employees to use and care for the foot and leg protection you provide.

Checklist E.

Hand and Arm Protection

When must I provide hand and arm protection?

If your workplace hazard assessment reveals that your employees risk injury to their hands and arms, and engineering and work practice controls do not eliminate the hazards, you must provide your employees with appropriate protection. The injuries you may need to guard against in your workplace include the following:

- Burns (including sunburn).
- Bruises.
- Abrasions.
- Cuts.
- Punctures.
- Poison Oak.
- Fractures.
- Amputations.
- Chemical exposures.

What kind of equipment is necessary to protect the hands and arms?

For many workplace operations, machine guards such as point-of-operation guards will be sufficient. For example, install a barrier that makes it impossible for employees to put their hands at the point where a table saw blade makes contact with the wood it cuts. For other hazardous operations, you may be able to institute work procedures that eliminate the risk of injury to your employees' hands or arms. When such measures fail to eliminate the hazard, however, protective gloves will be the primary means of protecting employees' hands. When the risk of injury includes the arm, protective sleeves (often attached to the gloves) may be appropriate. When employees are working in or around poison oak, a barrier cream or lotion, such as Ivy Block®, Armor® or Tecnu® should be provided to the employee. If an employee is severely allergic, contact should be avoided whenever possible – if contact cannot be avoided, the employee should be provided with disposable gloves and disposable coveralls (such as Tyvek®) as well as barrier creams. Sunscreen (at least 20 SPF) is also needed if employees are frequently exposed to the sun.

Is there one kind of glove that will protect against all workplace hazards?

No. The nature of the hazard(s) and the operation to be performed will determine your selection of gloves. The variety of potential occupational hand injuries may make selecting the appropriate pair of gloves more difficult than choosing other protective equipment. Take care to choose gloves designed for the particular circumstances of your workplace.

What kinds of protective gloves are available?

Gloves made from a wide variety of materials are designed for virtually every workplace hazard. In general, however, they may be divided into four groups:

- Durable work gloves made of metal mesh, leather or canvas.
- Fabric and coated fabric gloves.
- Chemical- and liquid-resistant gloves.
- Insulating rubber gloves.

Metal Mesh, Leather or Canvas Gloves

Sturdy gloves made from metal mesh, leather or canvas provide protection against cuts, burns and sustained heat.

- *Leather gloves*. Leather gloves protect against sparks, moderate heat, blows, chips and rough objects. Welders in particular need the durability of higher-quality leather gloves.

- *Aluminized gloves*.These gloves usually are used for welding, furnace and foundry work because they provide reflective and insulating protection against heat. Aluminized gloves require an insert made of synthetic materials that protect against heat and cold.

- *Aramid fiber gloves*. Aramid is a synthetic material that protects against heat and cold. Many glove manufacturers use aramid fiber to make gloves that are cut- and abrasive-resistant and wear well.

- *Other synthetic materials*. Several manufacturers make gloves with other synthetic fabrics that offer protection against heat and cold. In addition to protection against temperature extremes, gloves made with other synthetic materials are cut- and abrasive-resistant and may withstand some diluted acids. These materials do not stand up against alkalis and solvents.

Fabric and Coated Fabric Gloves

These gloves are made of cotton or other fabrics to provide varying degrees of protection.

- Fabric gloves. Can protect against dirt, slivers, chafing and abrasion. These gloves do not provide sufficient protection, however, to be used with rough, sharp or heavy materials.

- Adding a plastic coating to some fabric gloves strengthens them and makes them effective protection for a variety of tasks.

- Coated fabric gloves. Manufacturers normally make these gloves from cotton flannel with napping on one side. By coating the unnapped side with plastic, fabric gloves are transformed into general-purpose hand protection offering slip-resistant qualities. These gloves are used for tasks ranging from handling bricks and wire rope to handling chemical containers in laboratory operations. When selecting gloves to protect against chemical exposure hazards, always check with the manufacturer (or review the manufacturer's product literature) to determine the gloves' effectiveness against the specific chemicals and conditions in the workplace.

Helping Hands...

Chemical- and Liquid-Resistant Gloves

Gloves made of rubber (latex, nitrile or butyl), plastic or synthetic rubber-like material such as neoprene, protect workers from burns, irritation and dermatitis caused by contact with oils, greases, solvents and other chemicals. The use of rubber gloves also reduces the risk of exposure to blood and other potentially infectious substances. Some common gloves used for chemical protection are described below. In addition, Table 4 rates various gloves as protectors against specific chemicals and will help you select the most appropriate gloves to protect your employees.

- *Butyl rubber gloves*. These gloves protect against nitric acid, sulfuric acid, hydrofluoric acid, red fuming nitric acid, rocket fuels and peroxide. Highly impermeable to gases, chemicals and water vapor, butyl rubber gloves also resist oxidation and ozone corrosion. In addition, they resist abrasion and remain flexible at low temperatures.

- *Natural latex or rubber gloves*.The comfortable wear and pliability of latex gloves, as well as their protective qualities, make them popular general-purpose gloves. In addition to resisting abrasions caused by sandblasting, grinding and polishing, these gloves protect workers' hands from most water solutions of acids, alkalis, salts and ketones. When selecting hand protection, you should be aware that latex gloves have caused allergic reactions in some individuals and thus may not be appropriate for all of your employees. Hypoallergenic gloves, glove liners and powderless gloves are possible alternatives for individuals who are allergic to latex gloves.

- Neoprene gloves.These gloves have good pliability, finger dexterity, high density and tear resistance, which protect against hydraulic fluids, gasoline, alcohols, organic acids and alkalis.

- *Nitrile rubber gloves*. These sturdy gloves provide protection from chlorinated solvents such as trichloroethylene and perchloroethylene. Although intended for jobs requiring dexterity and sensitivity, nitrile gloves stand up to heavy use even after prolonged exposure to substances that cause other gloves to deteriorate. In addition, nitrile gloves resist abrasions, punctures, snags and tears.

Table 4.

Table 4.

Table 4.

How do I make sure my employees properly use the equipment I have selected?

Train your employees to use the protective gloves and sleeves. Checklist F will help you teach your employees how to use and care for the equipment.

Checklist F.

Body Protection

When must I provide my employees with full body protection?

You must provide body protection for employees if they are threatened with bodily injury of one kind or another while performing their jobs, and if engineering, work practice and administrative controls have failed to eliminate these hazards. Workplace hazards that could cause bodily injury include the following:

- Intense heat.
- Splashes of hot metals and other hot liquids.
- Impacts from tools, machinery and materials.
- Cuts.
- Hazardous chemicals.
- Contact with potentially infectious materials, like blood.
- Poison oak.
- Sunburn.
- Radiation.

If only part of the body faces potential injury, must I provide my employees with full body protection?

As with all protective equipment, protective clothing is available to protect against specific hazards. You need to provide personal protective equipment only for the parts of the body exposed to possible injury.

Depending upon hazards in your workplace, you may need to provide your employees with one or more of the following:

- Vests.
- Orange safety vests or the new lime-green NIOSH-approved vests.
- Sunscreen.
- Jackets.
- Aprons.
- Coveralls.
- Surgical gowns.
- Wetsuits.
- Life jackets.
- Back brace.
- Full body safety harness.
- Full body suits.

If your hazard assessment indicates that you must provide full body protection against toxic substances or harmful physical agents, you must:

- Inspect the clothing carefully.
- Ensure proper fit.
- Make sure the protective clothing functions properly.

From what material should protective clothing be made?

Protective clothing comes in a variety of materials, each suited to particular hazards. Conduct your hazard assessment. Identify the sources of any possible bodily injury. Install any feasible engineering controls, and institute work practice controls to eliminate the hazards. If the possibility of bodily injury still exists, provide protective clothing constructed of material that will protect against the specific hazards in your workplace. Materials for protective clothing include the following:

- Paper-like fiber. Disposable suits made of this material provide protection against dust and splashes (e.g., Tyvek® protective suit).

- Treated wool and cotton. Protective clothing made from treated wool and cotton adapts well to changing workplace temperatures and is comfortable as well as fire-resistant. Treated cotton and wool clothing protects against dust, abrasions and rough and irritating surfaces.

- Duck. This closely woven cotton fabric protects employees against cuts and bruises while they handle heavy, sharp or rough materials.

- Leather. Leather protective clothing is often used against dry heat and flame.

- Rubber, rubberized fabrics, neoprene and plastics. Protective clothing made from these materials protects against certain acids and other chemicals.

Be aware that different materials will protect against different chemical and physical hazards. When chemical or physical hazards are present, check with the clothing manufacturer to make sure that the material selected will provide protection from the specific chemical or physical hazards in your workplace.

How do I make sure employees properly use the body protection I provide?

Train your employees to use the protective clothing. Checklist G will help you instruct them in the use and care of the body protection.

Checklist G.

Summary

You must consider many factors when selecting PPE to protect your employees from workplace hazards. With the variety of operations that can present hazards and the wide array of PPE available, this selection process can be confusing and at times overwhelming. Because of this, OSHA requires that you implement a PPE program to help you systematically assess the hazards in the workplace and select the appropriate PPE that will protect your workers from those hazards. As part of this PPE program, you must do the following:

- Assess the workplace to identify equipment, operations, chemicals and other workplace components that could harm your employees.
- Implement engineering controls and work practices to control or eliminate these hazards to the extent feasible.
- Select the appropriate types of PPE to protect your employees from hazards that cannot be eliminated or controlled through engineering controls and work practices.
- Inform your employees why the PPE is necessary and when it must be worn.
- Train your employees how to use and care for the selected PPE and how to recognize PPE deterioration and failure.
- Require your employees to wear the selected PPE in the workplace.

National Park Service Permit-Required Confined Space Entry Policy

The conditions encountered by National Park Service employees when working in confined spaces are capable of causing serious bodily injury, illness and death. Accidents often occur because of the failure to recognize the confined space as a hazardous environment and subsequent failure to implement a systematic process to ensure that necessary controls are in place. It is the policy of the National Park Service to identify all confined spaces, evaluate the associated hazards, communicate hazards to workers, prevent unauthorized entry, control hazards for a safe entry and utilize a permitting process to ensure controls are implemented prior to entry. Parks will comply with the requirements of 29 CFR 1910.146, Permit-Required Confined Space Entry.

Scope.This section contains requirements for practices and procedures to protect employees in general industry from the hazards of entry into permit-required confined spaces.

Definitions

Excavation — Any man-made cut, cavity, trench or depression in an earth surface formed by earth removal.

Trench (Trench excavation) — A narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 m). If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structures to the side of the excavation to 15 feet (4.6 m) or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.

References

1. 29 CRF 1910.146. Permit-Required Confined Space Entry.

2. NPS RM 58. Structural Fire.

Program Elements

1. *Identify Permit-Required Confined Spaces*. Conduct an inventory to identify confined spaces on park property or under the control of the park. Evaluate these to determine the hazards associated with each one. Determine whether or not they are permit-required confined spaces (permit spaces).

2. *Inform Employees and Post Signs*. If permit spaces exist in the park, post them with danger signs at the entrance to each space. If spaces cannot be posted, inform employees of their existence and location.

3. *Prevent Unauthorized Access*.Take effective measures to prevent unauthorized entrance into permit spaces.

4. *Inform Contractors*. Inform contractors or other employers of hazards when their work involves entry into permit spaces within the park. Ensure they are prepared to enter permit-required confined spaces in accordance with 29 CFR 1910.146 and applicable state regulations prior to any entry. Coordinate multi-employer work in or near permit spaces.

5. *Prepare a Written Permit Space Program*. Prepare and implement space-specific procedures and work practices to eliminate or control confined space hazards. Use control measures to prevent unauthorized entry into a space; specify acceptable entry conditions; isolate hazardous energy sources; eliminate atmospheric hazards by purging, inerting, flushing or ventilating the space; provide barriers to protect entrants and pedestrians; and verify acceptable entry conditions for the duration of the entry.

6. *Implement a Permit System*. Establish a permit process that will confirm effective controls are in place and that safe entry conditions exist prior to permit space entry.

7. *Ensure Emergency and Rescue Service Availability*. Provide for timely rescue and other emergency services congruent to the specific hazards associated with the park's confined spaces.

8. *Train Personnel*. Provide training so that all employees who serve as authorized entrants, attendants or entry supervisors have the understanding, knowledge and skills necessary for the safe performance of their assigned duties.

9. *Keep Records*. Maintain copies of all confined space evaluations. The park shall maintain all permits for one year. Permits and the witten program will be reviewed annually.

Permit-Required Confined Space
Entry Program Implementation Actions

Step 1 ❑ Conduct an inventory to identify confined spaces in your park or under your park's control. Evaluate the hazards associated with each and determine whether it is a permit space (see Appendices A and B). Refer to 29 CFR 1910 146, Appendix A for a decision flow chart that will aid in classifying spaces.

Step 2 ❑ Inform employees that permit spaces exist and label the entrance to the space with the words, "DANGER, PERMIT—REQUIRED CONFINED SPACE, DO NOT ENTER."

Step 3 ❑ Advise contractors that permit spaces are present and outline existing hazards (see Appendix C).

Step 4 ❑ If park employees will not enter the space, secure the space to prevent unauthorized entry.

Step 5 ❑ If park employees will be required to enter permit spaces, prepare a written permit-required confined space entry program. General program requirements are provided in Appendix D. Prepare specific entry requirements for each space or a set of similar spaces (Appendix E provides examples of space-specific entry requirements). Alternate methods (see Appendix F) may be used under certain circumstances.

Step 6 ❑ Implement a permit system (see Appendix G).

Step 7 ❑ Train employees who will serve as attendants, authorized entrants and entry supervisors (see Appendices H and I). (Train in-house emergency rescue personnel as entrants with specific emergency response duties. Provide access to permit spaces to non-NPS rescue personnel for practice if they are to be depended upon for rescues of NPS personnel.)

Step 8 ❑ Provide in-house emergency rescue personnel, the training, equipment and access to permit spaces for practice rescues so that personnel have the capabilities required by OSHA to safely conduct confined-space rescues.

Step 9 ❑ Review entry permits and the permit space written program annually.

Technical Appendices

Appendix A: Confined Space and Permit-Required Confined Space Definitions

Appendix B: Confined Space Evaluation Worksheet

Appendix C: Entry of Contracted Personnel

Appendix D: General Requirements and Entry Procedures

Appendix E: Space-Specific Hazards and Entry Requirements (Examples)

Appendix F: Alternate Entry Procedures

Appendix G: Entry Permit

Appendix H: Employee Training Requirements

Appendix I: Attendant, Entrant and Entry Supervisor Duties and Responsibilities

Appendix A: Confined Space and Permit-Required Confined Space Definitions

Confined space: A space that has the following characteristics*:*

1. Is large enough and so configured that an employee can bodily enter and perform assigned work.

2. Has limited or restricted means for entry or exit (for example: tanks, vessels, silos, storage bins, hoppers, vaults and pits are spaces that may have limited means of entry).

3. Is not designed for continuous employee occupancy.

Permit-required confined space (permit space): A confined space that has one or more of the following characteristics:

1. Contains or has a potential to contain a hazardous atmosphere.

2. Contains a material that has the potential for engulfing an entrant.

3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section.

4. Contains any other recognized serious safety or health hazard.

Non-permit confined space: A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

Attendant: An individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the employer's permit space program.

Authorized entrant: An employee who is authorized by the employer to enter a permit space.

Entry supervisor: The person (such as a foreman or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned. This person authorizes entry, oversees entry operations and terminates entry as required by this section. NOTE: An entry supervisor also may serve as an attendant or as an authorized entrant as long as that person is trained and equipped as required by this section for each role he or she fills. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.

Entry: The action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space. Entry is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

Acceptable entry conditions: The conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter into and work within the space.

Hazardous atmosphere: An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury or acute illness from one or more of the following causes:

1. Flammable gas, vapor or mist in excess of 10 percent of its lower flammable limit (LFL).

2. Airborne combustible dust at a concentration that meets or exceeds its LFL.

3. Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent.

4. Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances, of this Part, and which could result in employee exposure in excess of its dose or permissible exposure limit.

5. Any other atmospheric condition that is immediately dangerous to life or health. "Hot Work Permit" means the employer's written authorization to perform operations (for example: riveting, welding, cutting, burning and heating) capable of providing a source of ignition.

Park Structural Fire Coordinator: The person in the park who has been properly trained and designated to issue Hot Work permits under the requirements of NPS RM58.

Appendix B: Confined Space Evaluation Worksheet

(This form may be used to document initial evaluations of confined spaces and to develop space-specific procedures and requirements.)

Space Identification: _____

Reasons of Entry: 1. _____

2. _____

3. _____

Hazards: 1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

Surveillance and Inspection Requirements: (Include testing required and frequency)

_____

_____

_____

_____

Ventilation Requirements:

_____

_____

_____

_____

Special Entry Requirements:

Personal Protective Equipment Requirements:

Rescue Equipment and Procedures:

Appendix C: Entry of Contracted Personnel

When contractors perform work that involves permit space entry, the park will:

1. Inform the contractor that the workplace contains permit-required confined spaces and that entry must be in compliance with 29 CFR 1910.146.

2. Inform the contractor of the identified hazards associated with the space.

3. Inform the contractor of any hazard controls implemented by the park as well as any appropriate precautions.

4. Debrief the contractor after entry operations are finished to discuss any problems or hazards encountered during the entry.

5. Coordinate entry operation of multiple employers working simultaneously.

Each contractor who is retained to perform permit space entry operations will:

1. Comply with all permit space requirements outlined in 29 CFR 1910.146.

2. Obtain any available information regarding space entry hazards and operations from the park.

3. Coordinate entry operations with the park and contracted personnel when they will be working simultaneously in or near a permit space.

4. Inform the park of any hazards or problems confronted or created during entry activities.

5. Provide a copy of their site-specific, permit-required, confined space entry plans to the contracting officer.

Appendix D: General Requirements and Entry Procedures

Before entry into a permit space is authorized, an entry permit shall be prepared to document that the space is safe to enter. The entry supervisor will prepare the entry permit and sign it when all requirements and acceptable entry conditions have been met. The entry supervisor will provide each authorized entrant (or that employee's authorized representative) an opportunity to observe the pre-entry and any subsequent testing or monitoring of permit spaces.

Each participant in the entry activity will review his/her responsibilities and duties and ensure that those responsibilities have been met.

The following will be completed before entry is authorized.

1. Meet all space-specific requirements for acceptable entry conditions.

2. Make Material Safety Data Sheets available on-site for any hazardous or toxic product expected to be encountered.

3. Isolate the space. Storage tanks, process vessels, sumps, pipelines, pits and similar spaces must be isolated from any other pipeline system prior to being entered. All connecting lines must be physically disconnected or blinded at a point as near as possible to tanks or vessels. The practice of double block and bleed does not meet the definition of blinding when personnel entry is involved. Pipelines between the confined space and the first valve, blank or associated equipment may contain material or hazardous contaminants. Therefore the isolation procedure must ensure that such piping has been flushed, cleaned or purged.

4. Depressurize equipment under positive or negative pressure.

5. Lockout and tag-out equipment, systems and processes. Successful isolation shall be confirmed by the entry supervisor prior to allowing entry.

6. Ensure electrical equipment including tools, lighting, communications and test equipment used in hazardous locations meet the appropriate requirements of 29CFR 1910.399 and NFPA 70.

7. Use the appropriate electrical equipment or systems where there is a potential for electrical shock. This includes protection such as ground fault circuit interrupters (GFCI), assured grounding systems, double-insulated tools, separately derived systems and low-voltage systems.

8. Guard all openings to the space with appropriate barriers to prevent accidental fall.

9. Post warning signs.

10. Test the atmosphere with calibrated, direct-reading instruments for:

    a. Oxygen (level must be between 19.5 and 23.5 %).
    b. Flammability (less than 10% of LEL).
    c. Potential toxic air contaminants.

    Note: Normal atmospheric conditions are the goal for entries. However, under certain circumstances, entry may be required when a hazardous atmosphere exists such as when ventilation systems are not capable of controlling the hazard, when entry is required in order to set ventilation systems, or during entry rescues. In these cases, appropriate exposure control measures, such as SCBA or supplied air respirators, must be planned for and implemented.

11. Continuous forced-air ventilation shall be used as follows:

    a. Ensure ventilation equipment is set up so that source air is free from airborne contaminants.

    b. Ensure that ventilation is directed toward the area where the entrant is working.

12. Test the atmosphere periodically for O2, LEL and toxic gases or vapors during entry. Follow any specific periodic monitoring instructions prescribed for spaces. In some cases, continuous monitoring will be required.

13. If an uncontrolled hazardous atmosphere (i.e., atmospheric hazards not specified on the entry permit) is detected during entry.

    a. Entrants not wearing appropriate respiratory protection for the situation must leave the space immediately.

    b. The space shall be evaluated to determine how the hazardous atmosphere developed.

    c. The hazards will be controlled prior to re-entry into the space.

14. Ensure that when drains, vents or piping is left open, reversal of flows or air contamination from adjacent processing or chemical handling cannot enter the confined space.

15. Ensure trained rescue personnel and a means of summoning those services are available and that at least one attendant is outside the space.

16. Ensure safe means of entry and egress from the space are available.

The completed permit will be made available at the time of entry to all authorized entrants so that they can confirm that all pre-entry preparations have been completed. The permit shall be placed in a clear plastic protective cover and affixed securely to, or near, the entrance.

The entry supervisor will terminate entry and cancel the entry permit when the entry operations covered by the permit have been completed, or when a condition that is not allowed under the entry permit arises in or near the permit space. The permit space will be re-evaluated in the presence of any authorized entrant (or that employee's authorized representative) who requests such re-evaluation because the entrant or representative has reason to believe that the evaluation may not have been adequate.

No food, smokeless tobacco or beverages will be taken into a confined space.

Once the job is complete and all entrants have exited the space, and the space is ready to be returned to normal service, the entry supervisor will debrief personnel involved in the entry and cancel the permit. Any problems encountered during the entry operation shall be noted so that appropriate revisions to the permit space program can be made.

Canceled entry permits will be kept on file with the safety officer for at least one year.

Rescue

Attendants will only attempt non-entry rescue. To facilitate non-entry rescue, retrieval systems or methods shall be used whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase the overall risk to the entrant or would not contribute to the rescue of the entrant. Non-entry retrieval systems shall meet the following requirements:

1. Each authorized entrant shall use a chest or full body harness with retrieval line attached at the center of the entrant's back near the level of the shoulder or above the entrant's head. Wristlets may be used in lieu of the chest or full body harness if it can be demonstrated that the use of a chest or full body harness is not feasible, that the harnesses create a greater hazard and that the use of wristlets is the safest and most effective alternative.

2. The bitter end of the retrieval line shall be attached to a mechanical device or fixed point outside the space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary. A mechanical device shall be available to retrieve entrants from spaces more than five feet deep.

If in the course of an entry an attendant becomes aware that the entrant needs assistance in escaping from the space, the attendant will:

1. Summon rescue and other emergency services.
2. Begin non-entry rescue procedures.

If an injured entrant is exposed to a hazardous material, a copy of the MSDS for that material will be made available to the medical treatment facility. Specific rescue requirements will be included in written, space-specific entry programs and should include, where appropriate, decontamination requirements in the event of hazardous material exposure.

Attendants may enter a permit space to attempt a rescue if they have been trained and equipped for rescue operations and if they have been relieved of their attendant duties by another qualified attendant.

Appendix E: Example Space-Specific Written Permit Space Programs

Hazard information and entry procedures must be prepared for each permit space in the park. These space-specific procedures provide the basis for training entry and rescue personnel, and they provide the conditions and requirements under which the entry supervisor determines whether an entry will be authorized. They must include the following information:

1. Space identification.

2. Classification as permit-required (indicate whether alternate entry method may be used) or non-permit space.

3. Reasons for entry.

4. Hazards.

5. Required surveillance and inspection.

6. Entry requirements.

7. Personal protective equipment requirements.

8. Rescue requirements.

Several examples of space-specific written plans are provided.

Example 1: Written Permit Space Program for Sewer Manholes

Space

COSP 001 Sewer Manhole, Maintenance Annex Facility
COSP 002 Sewer Manhole, Visitor's Center

Classification

Permit-Required Confined Space (Alternate entry methods may be used if criteria are met for Sewer Manhole.)

Reason for Entry

Cleaning and Maintenance

Hazards

a. Oxygen deficiency. (O2 deficient atmospheres were found in space COSP 001 (18%) during evaluation.)

b. Flammable atmosphere (methane). (Flammable atmosphere was detected in space COSP 002 – 10% LEL).

c. Toxic gas (hydrogen sulfide).

d. Biological hazards (communicable disease agents)

e. Restricted movement.

f. Drowning (standing water).

g. Falls (space COSP 002, approximately 20 feet).

h. Landfill leachates (space COSP is down gradient from landfill).

i. Ladders in disrepair or with poor design (spaces COSP 001 and COSP 002).

Surveillance and Inspection Requirements

a. Test atmosphere directly beneath cover for percent O2 and combustible gas (% LEL) prior to opening covers.

b. Test atmosphere with calibrated direct reading meter or instrument for:

- Percent oxygen content.
- Percent of the lower explosive limit.
- Hydrogen sulfide concentration (ppm, H_2S).

c. Inspect for sludge or other foreign material at the bottom or sides of the space that might give off flammable or toxic substances when disturbed by work activity. Floor of space must be visible.

d. Monitor atmosphere continuously in the vicinity of workers in the space.

e. All pumps and lines that may reasonably cause contaminants to flow into the space shall be disconnected, blinded and locked out, or effectively isolated by other means to prevent development of dangerous air contamination or engulfment. Laterals to sewers or storm drains may not require blocking if experience or knowledge of use indicates there is not a reasonable potential for contamination of air or engulfment in the occupied sewer.

Entry

a. If no atmospheric hazards are present and visual inspections reveal no potential hazard, the space may be entered using alternate procedures as described.

b. If public has access, the area will be demarcated and a barrier erected to keep pedestrians from falling and to keep objects from falling into the space and injuring the entrant.

c. All electrical power sources will be isolated.

d. Do not use Freon for leak detection.

e. Use only explosion-proof electrical equipment and lighting. All electrical switching connections and disconnections must be made outside the space and away from the opening.

f. If atmospheric hazards are present, the space must be ventilated. Where possible, open additional manholes to increase air circulation. Use mechanical ventilation to augment natural circulation if needed. After ventilation, repeat testing and follow permit-required entry procedures.

Personal Protection and Protective Equipment

a. Protective clothing to prevent contact with raw sewage residues.

b. Coveralls.

c. Rubber or PVC boots and gloves. Ensure that boot soles and glove contact surfaces provide good traction and grip so that slips and falls are prevented.

d. Hard hat.

e. Ensure that individuals follow good hygiene practices and wash after entry is complete.

Rescue

a. Provide and secure ladder for entry and egress. Ladders fixed in place must be clear and in good repair.

b. Safety harness and lifeline required.

c. Tripod and winch to assist a non-entry rescue required.

Example 2: Written Permit Space Program for Sewage Lift Station Dry Wells

Space

COSP 003 Sewage Lift Station Dry Well, North Cape site
COSP 004 Sewage Lift Station Dry Well, South Beach

Classification

Permit-required confined space. Alternate entry methods may be used when criteria have been met.

Reasons for entry

Space COSP 003 is abandoned and secured. No entry is permitted.
Space COSP 004—Cleaning, maintenance, meter reading and logging.

Hazards

a. Oxygen deficiency.
b. Flammable atmosphere (methane).
c. Toxic gas (CO).
d. Falls.

Surveillance and Inspection

a. Test atmosphere with calibrated direct reading meter or instrument for:

    - Percent oxygen.
    - Percent of lower explosive limit.
    - Carbon monoxide.

b. Ensure that mechanical ventilation systems in dry well have been turned on and operating for at least five minutes prior to entry.

Entry

a. If no atmospheric hazards are present and visual inspection reveals no potential hazard, the space may be entered using alternate entry procedures.

b. Use integral restraint systems installed in dry well. Attach lifeline prior to stepping onto platform.

c. In locations where the general public is not restricted, the area will be demarcated and a barrier erected to keep pedestrians from falling and to keep objects from falling into the space and injuring the entrant.

d. Do not use Freon for leak detection.

Personal Protection and Protective Equipment

Ensure that soles and gloves that contact surfaces provide good traction and grip so that slips and falls are prevented.

Example 3: Written Permit Space Program for Steam Vaults

Spaces

COSP 005, Steam Vault, North Administration Building
COSP 006, Steam Vault, East Administration Building

Classification

Permit-required confined space.

Reasons for entry

a. Annual inspection.

b. Maintenance. Steam distribution system maintenance may include welding and cutting with acetylene torch, valve packing and pipe repair.

Hazards

a. Oxygen-deficient atmosphere.

b. Combustible gases or vapors (organic hydrocarbons, fuel vapors from adjacent fueling station in space COSP 005).

c. Toxic gases or vapors.

d. Introduced hazard during welding and cutting (O2 enrichment, acetylene, smoke and welding fumes).

e. Hot surfaces.

f. Live steam.

g. Combustible solids (litter in space COSP 005).

h. Asbestos pipe insulation (presumed asbestos material in space COSP05).

i. Ladders in disrepair.

Surveillance and Inspection

a. Test atmosphere with calibrated direct reading meter for:

    - Oxygen.
    - Flammable atmosphere.
    - Toxic gases and vapors appropriate to the task.

Note: Meters may be sensitive to high humidity within steam vaults resulting in high reading for some instruments.

b. Drop tests must performed. Test all locations and depths within the vault.

c. Inspect for sludge or other foreign material on the bottoms and sides of the space. These may give off flammable or toxic substances if disturbed by walking or heated by hot work.

d. Isolate steam prior to entry.

e. Continuously monitor atmosphere for oxygen content, LEL and toxic gases during hot work.

Ventilation

a. Provide continuous forced air ventilation to entrants during entry.

b. Provide local exhaust ventilation during hot work to remove smoke, gases and fumes produced.

Entry

a. Area will be demarcated and a barrier erected to keep pedestrians from falling and to keep objects from falling into the space and injuring the entrant.

b. Remove combustible materials such as litter and clean surfaces of oils or other combustible substances prior to hot work.

c. Compressed gas cylinders must not be taken into spaces. Inspect hoses, connections and torches of gas welding and cutting equipment prior to use.

Personal Protective Equipment

a. Hard hat.
b. Coveralls.
c. Steel-toed rubber boots.
d. Safety goggles or glasses.
e. Heat-protective gloves when appropriate.

Rescue

a. Provide ladder or other means to ensure easy and safe entry and egress.
b. Provide and use safety harness and lifeline.
c. Provide tripod and winch to assist in non-entry rescue.

Example 4: Written Permit Space Programs for Fuel Tanks

Spaces

COSP 007, Used Oil Tank, 3500 Gal, North Hill
COSP 008, Fuel Oil Tank, Maintenance Facility
COSP 009, Gasoline Tank, Maintenance Yard

Classification

Permit-required confined space.

Reasons for Entry

Cleaning and sludge removal.

Hazards

a. Oxygen-deficient atmosphere (oxidation processes).
b. Flammable vapors.
c. Toxic vapors (organic hydrocarbons).
d. Benzene (COSP 009).
e. Dermal exposure to hydrocarbons.

Surveillance and Inspections

a. Test atmosphere with calibrated, direct-reading, intrinsically safe meter for:

    - Oxygen content.
    - Percent of LEL.
    - Toxic vapors (petroleum hydrocarbons in spaces COSP 007 and 008; benzene in COSP 009).

b. Test at all locations and depths within the tank. Pay particular attention to areas where vapors may pocket such as sumps and baffled areas. Test through openings with a drop tube.

c. Continuously monitor atmosphere for oxygen content and percent LEL, and for toxic vapors every 15 minutes.

d. Monitor for % LEL (and benzene for space COSP 009) in the area surrounding the tank during purging.

Ventilation

a. Remove all ignition sources prior to purging.
b. Purge tank and maintain forced ventilation during entry.
c. Ensure ventilation equipment is properly bonded or grounded.
d. Vent vapors well away from tank. Ensure vapors do not collect in low spots.
e. Do not use steam to purge tank.

Entry

a. Post the following signs in the vicinity of the tank:

    - NO SMOKING
    - HARD-HAT AREA
    - NO OPEN FLAMES OR SPARK-PRODUCING EQUIPMENT BEYOND THIS POINT

b. Ensure all portable hand tools are explosion-proof and designed for hazardous atmospheres.

c. Ensure all portable electric equipment capable of generating static electricity is properly bonded or grounded if tank is non-metallic.

d. Have at least two B/C-rated fire extinguishers within easy access.

e. When possible, pass through portals near ground level (within three feet) rather than portals at the top of the tank.

Personal Protective Equipment

a. Hard hat.
b. Chemical protective coveralls.
c. Chemical protective boots.
d. Safety goggles.
e. Chemical protective gloves.

Rescue

a. Provide ladder or other means to ensure easy and safe entry and egress.
b. Provide and use safety harness and lifeline.
c. Provide tripod and winch to assist a non-entry rescue.

Appendix F: Alternate Entry Procedures

If it can be demonstrated that the only hazard posed by the permit space is an actual or potential hazardous atmosphere and that it can be controlled by continuous forced-air ventilation alone, then entry may be obtained using these alternate procedures.

1. Eliminate conditions making it unsafe to remove an entrance cover.

2. Guard opening to the space with a barrier to prevent accidental fall.

3. Post warning signs.

4. Test the atmosphere with calibrated, direct-reading instruments for

    a. Oxygen (must be between 19.5% and 23.5%).
    b. Flammability (must be less than 10% of the LEL).
    c. Potential toxic air contaminants.

    The lead worker who has completed training in the use of the gas-detection equipment used to conduct the testing must perform the testing.

    Note: Entry must not be authorized if a hazardous atmosphere exists.

5. Continuous forced-air ventilation shall be used as follows:

    a. No entry will be made until forced-air ventilation has eliminated any hazardous atmosphere.

    b. Ensure ventilation equipment is set up in an area that is clean and free from airborne contaminants.

    c. Ensure that the ventilation is directed toward the area where the entrant is working. Ventilation shall be provided for as long as the entrant is in the space. If ventilation is interrupted, entrants will immediately leave the space. Re-entry will be made only after ventilation is restored and the atmosphere has been retested and determined safe for re-entry.

6. Test the atmosphere periodically for O2, LEL and toxics. Follow any specific periodic monitoring instruction listed in space-specific guidelines.

7. If a hazardous atmosphere is detected during entry:

    a. Entrants must leave the space immediately.

    b. The space shall be evaluated to determine how the hazardous atmosphere developed.

    c. The hazards will be controlled prior to re-entry into the space.

8. No fewer than two authorized entrants will be on-site during confined space entry activities.

9. Supervisors will certify in writing that the above pre-entry measures have been taken. Certification will include the date, location of the space and signature of the supervisor serving as a responsible entry supervisor. The confined space entry permit may be used to document this certification.

Appendix G: Entry Permit

An entry permit must be prepared before any entry into a permit-required confined space is authorized. This permit verifies and documents that all pre-entry requirements have been completed. It must be signed by the Entry Supervisor.

The permit will be available to all authorized entrants and posted at the entrance to the space.

Permits will be valid for no longer than the time required to complete the task identified on the permit. Permits will be canceled when the covered entry operations have been completed or when a condition that is not allowed under the permit occurs in or near the space.

Permits must include the following information:

1. Space identification.
2. Purpose for entry.
3. Date and duration of the permit.
4. Names of authorized entrants.
5. Names of attendants.
6. Name of the entry supervisor.
7. The hazards that may be encountered.
8. Hazard control measures used (examples include lockout and tag-out, ventilation).
9. Acceptable entry conditions.
10. Results of initial and periodic testing.
11. Rescue and emergency services.
12. Communication procedures.
13. Required equipment.

An example permit is provided. You may wish to customize the permit to fit your particular space-specific requirements.

Confined Space Entry Permit

Date Expiration (time)

Space :	Reason for Entry

Attendants	Authorized Entrants
1)	1)
2)	2)
3)	3)
	4)

Hazards:

1 _____ 2 _____

3 _____ 4 _____

5 _____ 6 _____

HAZARD CONTROL MEASURE REQUIRED	COMPLETED
1	
2	
3	
4	
5	
6	

TESTING							
	Initial	Periodic					
Time							
% O2							
% LEL							
Specific toxic							
Specific toxic							

Rescue and Emergency Services

Communication Procedures

Required Equipment

Entry Supervisor_____ Signature _____

Hot Work Permits

When hot work is required within a confined space, the entry supervisor will ensure that the space is safe for hot work. The entry supervisor will coordinate with the Park Structural Fire Coordinator (PSFC) for approval to conduct hot work. The PSFC will issue a hot work permit in accordance with NPS RM 58. The hot work permit will be attached to the entry permit.

Appendix H: Employee Training Requirements

The following training requirements are the minimum and must be completed before authorized personnel are allowed to work around or in a confined space. Authorized personnel shall acquire the understanding, knowledge and skills necessary for the safe performance of their assigned duties. Personnel shall be trained as follows:

a. Before they are first assigned duties.
b. When there is a change in assigned duties.
c. When changes in operations present new hazards.
d. When inadequacies in knowledge and competencies are perceived.

Training must be documented.

Entry Supervisor

The entry supervisor will be trained in the duties and responsibilities of the entry supervisor (Appendix I), the authorized entrants, attendants and rescue personnel as well as in the requirements of this program, first aid, CPR and the specific hazards and entry requirements of each confined space.

Authorized Entrants

Authorized entrants will be trained in the duties and responsibilities of the entrant (Appendix I) and in the duties of the attendant and rescue persons, if they are required to perform those duties.

Attendants

Attendants will be trained in the duties and responsibilities of an attendant (see Appendix I).

Rescuers

Rescuers will be trained in the duties of a rescue person and entrant. Each rescuer will be trained in the proper use of personal protective equipment and rescue equipment, first aid and CPR. Initially, and once every 12 months, rescuers must practice making permit-space simulated rescues that involve removal of dummies or actual persons from representative spaces. Initial training must be provided prior to allowing personnel to perform rescues.

Appendix I: Attendant, Entrant and Entry Supervisor Duties and Responsibilities

Entry Supervisor

The entry supervisor shall:

1. Know the hazards that may be faced during entry, and know the signs, symptoms, modes and consequences of exposure.

2. Verify, by checking, that the entry permit has been completed properly, that all required tests have been performed and recorded on the permit, and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin.

3. Terminate the entry and cancel the permit when prohibited conditions arise and the safe condition in the space has changed.

4. Verify that rescue services are available and that the means for summoning them are operable.

5. Designate individuals authorized to enter the permit space. Prevent unauthorized individuals from entering the space.

6. Monitor the conditions in and around the confined space and ensure operations remain consistent with the terms of the entry permit and that acceptable entry conditions are maintained.

7. Determine the number or attendants needed and the requirements for rescue persons, teams and resources.

Authorized Entrant

The authorized entrant shall:

1. Know the hazards that may be faced during confined space entry and work.

2. Know how to properly use all supplied equipment for work, entry and exit.

3. Communicate with the attendant as necessary to enable the attendant to monitor entrant's status.

4. Alert the attendant when warning signs and symptoms of exposure are recognized and when prohibited conditions are detected.

5. Know how to exit the permit space quickly.

6. Recognize the designated evacuation alarm.

Attendant

The assigned attendant shall:

1. Know the hazards that may be faced during entry, including information of the mode, signs and symptoms, and consequences of exposure to the hazards.

2. Be aware of possible behavioral effects of hazard exposure in authorized entrants.

3. Continuously maintain an accurate count of authorized entrants in the permit space.

4. Remain outside the permit space until all entrants have exited the permit space or until relieved during entry operations.

5. Maintain communication with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the permit space.

6. Monitor activities inside and outside the permit space to determine if it is safe for entrants to remain in the space. Order evacuation if the following conditions occur:

    a. Attendant detects prohibited conditions.
    b. Attendant detects behavioral effects of hazard exposure in entrants.
    c. Attendant detects a situation outside the space that could endanger the entrants.
    d. Attendant cannot effectively and safely perform all of his or her duties.

7. Summon rescuer and other emergency services as soon as it is determined that authorized entrants may need assistance to escape from permit space hazards.

8. Warn unauthorized personnel that they are not allowed to enter the permit space.

9. Perform non-entry rescue.

10. Perform no other duties that may interfere with the attendant's primary duty to monitor and protect the entrants.

Rescuer

Rescue personnel shall:

1. Ensure rescue and personal protective equipment is available and functional.

2. Ensure that training requirements have been met for all team members.

3. Know the hazards associated with the space, which might be encountered during a rescue prior to entry.

National Park Service Lockout/Tagout Policy

This standard helps safeguard employees from hazardous energy while they are performing service or maintenance on machines and equipment. The standard identifies the practices and procedures necessary to shut down and lockout or tagout machines and equipment, requires that employees receive training in their roles in the lockout/tagout program and mandates that periodic inspections be conducted to maintain or enhance the energy control program.

The standard requires employers to establish procedures for isolating machines or equipment from the input of energy and affixing appropriate locks or tags to energy-isolating devices to prevent any unexpected energization, start-up or release of stored energy that would injure workers. When tags are used on energy-isolating devices capable of being locked out, the employer must provide additional means to assure a level of protection equivalent to that of locks. The standard also requires the training of employees and periodic inspections of the procedures to maintain or improve their effectiveness.

This rule requires that, in general, before service or maintenance is performed on machinery or equipment, it must be turned off and disconnected from the energy source and the energy-isolating device must be either locked or tagged out. OSHA estimates that adherence to the requirements of this standard can eliminate nearly two percent of all workplace deaths in establishments affected by this rule and can have a significant impact on worker safety and health in the United States.

Scope

The lockout/tagout standard applies to NPS work environments, and covers the servicing and maintenance of machines and equipment in which the unexpected start-up or the release of stored energy could cause injury to employees. (If employees are performing service or maintenance tasks that do not expose them to the unexpected release of hazardous energy, the standard does not apply.) This program applies to all employees and volunteers of the National Park Service who use lockout/tagout in the course of their duties.

The standard establishes minimum performance requirements for the control of hazardous energy.

The standard does not apply in the following situations:

- While servicing or maintaining cord and plug connected electrical equipment. (The hazards must be controlled by unplugging the equipment from the energy source; the plug must be under the exclusive control of the employee performing the service and/or maintenance.)

- During hot-tap operations that involve transmission and distribution systems for gas, steam, water or petroleum products when: they are performed on pressurized pipelines; when continuity of service is essential and shutdown of the system is impractical; and when employees are provided with an alternative type of protection that is equally effective.

Normal Production Operations

OSHA recognizes that machines and equipment present many hazardous situations during normal production operations – i.e., whenever machines and equipment are used to perform their usual production function. These production hazards are covered by rules in other General Industry Standards, such as the requirements in Subpart O of Part 1910 for general machine guarding and guarding power transmission apparatus (1910.212 and 1910.219). In certain circumstances, however, some hazards encountered during normal production operations may be covered by the lockout/tagout rule. The following paragraphs illustrate some of these instances.

Servicing and/or Maintenance Operations

If a servicing activity, such as lubricating, cleaning or unjamming the production equipment, takes place during production, the employee performing the servicing may be subjected to hazards that are not encountered as part of the production operation itself. Workers engaged in these operations are covered by lockout/tagout when any of the following conditions occurs:

- The employee must either remove or bypass machine guards or other safety devices, resulting in exposure to hazards at the point of operation.

- The employee is required to place any part of his or her body in contact with the point of operation of the operational machine or piece of equipment.

- The employee is required to place any part of his or her body into a danger zone associated with a machine operating cycle.

In the above situations, the equipment must be de-energized and locks or tags must be applied to the energy-isolation devices.

In addition, when normal servicing tasks, such as setting equipment up, and/or making significant adjustments to machines, do not occur during normal production operations, employees performing such tasks are required to lock out or tag out if they can be injured by unexpected energization of the equipment.

OSHA also recognizes that some servicing operations must be performed with the power on. Making many types of fine adjustments, such as centering the belt on conveyors, is one example. Certain aspects of troubleshooting, such as identifying the source of the problem as well as checking to ensure that it has been corrected, is

another. OSHA requires the employer to provide effective protection for employees performing such operations. Although in these cases, a power-on condition is essential either to accomplish the particular type of servicing or to verify that it was performed properly. Lockout or tagout procedures are required when servicing or maintenance occurs with the power off.

Minor Servicing Tasks

Employees performing minor tool changes and adjustments and/or other minor service activities during normal production operations that are routine, repetitive and integral to the use of the production equipment are not covered by the lockout/tagout standard, provided the work is performed using alternative measures that give effective protection.

References

1. 29 CFR, 1910.147, OSHA General Industry Standards, Subpart J – General Environmental Controls.

Definitions

Affected employee – An employee who performs the duties of his or her job in an area in which the energy control procedure is implemented and servicing or maintenance operations are performed. An affected employee does not perform servicing or maintenance on machines or equipment and, consequently, is not responsible for implementing the energy control procedure. An affected employee becomes an “authorized” employee whenever he or she performs servicing or maintenance functions on machines or equipment that must be locked or tagged.

Authorized employee – A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee’s duties include performing servicing or maintenance covered under this section.

Capable of being locked out – An energy-isolating device is considered capable of being locked out if it meets one of the following requirements:

- It is designed with a hasp to which a lock can be attached.
- It is designed with any other integral part through which a lock can be affixed.
- It has a locking mechanism built into it.
- It can be locked without dismantling, rebuilding or replacing the energy-isolating device or permanently altering its energy control capability.

Energized – Machines and equipment are energized when they are connected to an energy source or they contain residual or stored energy.

Energy source – Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal or other energy.

Energy control procedure – A written document that contains those items of information an authorized employee needs to know in order to safely control hazardous energy during servicing or maintenance of machines or equipment. (A more comprehensive explanation is given beginning on page six.)

Energy control program – A program intended to prevent the unexpected energizing or the release of stored energy in machines or equipment on which servicing and maintenance is being performed by employees. The program consists of energy control procedure(s), an employee-training program and periodic inspections.

Energy-isolating device – A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: A manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy-isolating devices.

Hot tap – A procedure used in the repair, maintenance and services activities, which involves welding on a piece of equipment (pipelines, vessels or tanks) under pressure in order to install connections or appurtenances. It is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam and petrochemical distribution systems.

Lockout –The placement of a lockout device on an energy-isolating device in accordance with an established procedure, ensuring that the energy-isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout device – Any device that uses positive means such as a lock (either key or combination), to hold an energy-isolating device in a safe position, thereby preventing the energizing of machinery or equipment. When properly installed, a blank flange or bolted slip blind are considered equivalent to lockout devices.

Normal production operations – The utilization of a machine or equipment to perform its intended production function.

Servicing and/or maintenance – Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes when the employee may be exposed to the unexpected energization or startup of the equipment or release of hazardous energy.

Setting up – Any work performed to prepare a machine or equipment for its normal production operation.

Tagout – The placement of a tagout device on an energy-isolating device in accordance with an established procedure to indicate that the energy-isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Tagout device – Any prominent warning device, such as a tag and a means of attachment, that can be securely fastened to an energy-isolating device in accordance with an established procedure. The tag indicates that the machine or equipment to which it is attached is not to be operated until the tagout device is removed in accordance with the energy control procedure.

Program Elements

1. Energy Control Program

The lockout/tagout rule requires that the employer establish an energy control program that includes: documented energy control procedures; an employee-training program and periodic inspections of the procedures. The standard requires employers to establish a program to ensure that machines and equipment are isolated and inoperative before any employee performs service or maintenance where the unexpected energization, startup or release of stored energy could occur and cause injury.

The purpose of the energy control program is to ensure that whenever the possibility of unexpected machine or equipment startup exists, or when the unexpected release of stored energy could occur and cause injury, the equipment is isolated from its energy source(s) and rendered inoperative prior to servicing or maintenance.

Employers have the flexibility to develop a program and procedures that meet the needs of their particular workplace and the particular types of machines and equipment being maintained or serviced.

2. Energy Control Procedures

This standard requires that energy control procedures be developed, documented and used to control potentially hazardous energy sources whenever workers perform activities covered by the standard.

The written procedures must identify the information that authorized employees must know in order to control hazardous energy during service or maintenance. If this information is the same for various machines or equipment or if other means of logical grouping exists, then a single energy control procedure may be sufficient. If there are other conditions (such as multiple energy sources), different connecting means or a particular sequence that must be followed to shut down the machine or equipment, then the employer must develop separate energy control procedures to protect employees.

The energy control procedure must outline the scope, purpose, authorization, rules and techniques that will be used to control hazardous energy sources as well as the means that will be used to enforce compliance. At a minimum it includes, but is not limited to, the following elements:

- A statement on how the procedure will be used.
- The procedural steps needed to shut down, isolate, block and secure machines or equipment.
- The steps designating the safe placement, removal and transfer of lockout/tagout devices and who has the responsibility for them.
- The specific requirements for testing machines or equipment to determine and verify the effectiveness of locks, tags and other energy-control measures.

The procedure must include the following steps: (1) preparing for shutdown, (2) shutting down the machine(s) or equipment, (3) isolating the machine or equipment from the energy source(s), (4) applying the lockout or tagout device(s) to the energy-isolating device(s), (5) safely releasing all potentially hazardous stored or residual energy, and (6) verifying the isolation of the machine(s) or equipment prior to the start of service or maintenance work.

In addition, before lockout or tagout devices are removed and energy is restored to the machines or equipment, certain steps must be taken to re-energize equipment after service is completed, including: (1) assuring that machines or equipment components are operationally intact; and (2) notifying affected employees that lockout or tagout devices are removed from each energy-isolating device by the employee who applied the device.

3. Energy-Isolating Devices

The employer's primary tool for providing protection under the standard is the energy-isolating device, which is the mechanism that prevents the transmission or release of energy and to which all locks or tags are attached. This device guards against accidental machine or equipment startup or the unexpected re-energization of equipment during servicing or maintenance. There are two types of energy-isolating devices: those capable of being locked and those that are not. The standard differentiates between the existence of these two conditions and the employer and employee responsibilities in each case.

When the energy-isolating device cannot be locked out, the employer must use tagout. Of course, the employer may choose to modify or replace the device to make it capable of being locked. When using tagout, the employer must comply with all tagout-related provisions of the standard and, in addition to the normal training required for all employees, must train his or her employees in the following limitations of tags:

- Tags are essentially warning devices affixed to energy-isolating devices and do not provide the physical restraint of a lock.

- When a tag is attached to an isolating means, it is not to be removed except by the person who applied it. It is never to be bypassed, ignored or otherwise defeated.

- Tags must be legible and understandable by all employees.

- Tags and their means of attachment must be made of materials that will withstand the environmental conditions encountered in the workplace.

- Tags may evoke a false sense of security. They are only one part of an overall energy-control program.

- Tags must be securely attached to the energy-isolating devices so that they cannot be detached accidentally during use.

If the energy-isolating device is lockable, the employer shall use locks unless he or she can prove that the use of tags would provide protection at least as effective as locks and would assure "full employee protection."

Full employee protection includes complying with all tagout-related provisions plus implementing additional safety measures that can provide the level of safety equivalent to that obtained by using lockout. This might include removing and isolating a circuit element, blocking a controlling switch, opening an extra disconnecting device or removing a valve handle to reduce the potential for any inadvertent energization.

Although OSHA acknowledges the existence of energy-isolating devices that cannot be locked out, the standard clearly states that whenever major replacement, repair, renovation or modification of machines or equipment is performed and whenever new machines or equipment are installed, the employer must ensure that the energy-isolating devices for such machines or equipment are lockable. Such modifications and/or new purchases are most effectively and efficiently made as part of the normal equipment replacement cycle. All newly purchased equipment must be lockable.

4. Requirements for Lockout/Tagout Devices

When attached to an energy-isolating device, both lockout and tagout devices are tools that the employer can use in accordance with the requirements of the standard to help protect employees from hazardous energy. The lockout device provides protection by holding the energy-isolating device in the safe position, thus preventing the machine or equipment from becoming energized. The tagout device does so by identifying the energy-isolating device as a source of potential danger; it indicates that the energy-isolating device and the equipment being controlled may not be operated until the tagout device is removed. Whichever devices are used, they must be singularly identified, must be the only devices used for controlling hazardous energy and must meet the following requirements:

- Durable – Lockout and tagout devices must withstand the environment to which they are exposed for the maximum duration of the expected exposure. Tagout devices must be constructed and printed so that they do not deteriorate or become illegible, especially when used in corrosive (acid and alkali chemicals) or wet environments.

- Standardized – Both lockout and tagout devices must be standardized according to color, shape or size. Tagout devices must also be standardized according to print and format.

- Substantial – Lockout and tagout devices must be substantial enough to minimize early or accidental removal. Locks must be substantial to prevent removal except by excessive force of special tools such as bolt cutters or other metal-cutting tools. Tag means of attachment must be non-reusable, attachable by hand, self-locking and non-releasable, with a minimum unlocking strength of no less than 50 pounds. The device for attaching the tag also must have the general design and basic characteristics equivalent to a one-piece nylon cable tie that will withstand all environments and conditions.

- Identifiable – Locks and tags must clearly identify the employee who applies them. Tags must also warn against hazardous conditions if the machine or equipment is energized and must include a legend such as the following: DO NOT START, DO NOT OPEN, DO NOT CLOSE, DO NOT ENERGIZE, DO NOT OPERATE.

5. Employee Training

The employer must provide effective initial training and retraining as necessary and must certify that such training has been given to all employees covered by the standard. The certification must contain each employee's name and dates of training.

For the purposes of the standard, there are three types of employees – authorized, affected and other. The amount and kind of training that each employee receives is based upon (1) the relationship of that employee's job to the machine or equipment being locked or tagged out, and (2) the degree of knowledge relevant to hazardous energy that he or she must possess. For example, the employer's training program for authorized employees (those who are charged with the responsibility for implementing the energy control procedures and performing the service and maintenance) must cover, at minimum, the following areas:

- Details about the type and magnitude of the hazardous energy sources present in the workplace.

- The methods and means necessary to isolate and control those energy sources (i.e., the elements of the energy control procedure[s]).

By contrast, affected employees (usually the machine operators or users) and all other employees need only be able to (1) recognize when the control procedure is being implemented, and (2) understand the purpose of the procedure and the importance of not attempting to start up or use the equipment that has been locked or tagged out.

Because an "affected" employee is not one who is performing the service of maintenance, that employee's responsibilities under the energy control program are simple: whenever there is a lockout or tagout device in place on an energy-isolating device, the affected employee leaves it alone and does not attempt to operate the equipment.

Every training program must ensure that all employees understand the purpose, function and restrictions of the energy control program and that authorized employees possess the knowledge and skills necessary for the safe application, use and removal of energy controls.

Training programs used for compliance with this standard, which is performance-oriented, should deal with the equipment, type(s) of energy and hazard(s) specific to the workplace being covered.

Retraining must be provided, as required, whenever there is a change in job assignments, a change in machines, equipment or processes that present a new hazard, or a change in energy control procedures. Additional retraining must be conducted whenever a periodic inspection reveals, or whenever the employer has reason to believe, that there are deviations from or inadequacies in the employee's knowledge or use of the energy control procedure.

6. Periodic Inspections

Periodic inspections must be performed at least annually to assure that the energy control procedures (locks and tags) continue to be implemented properly and that the employees are familiar with their responsibilities under those procedures. In addition, the employer must certify that the periodic inspections have been performed. The certification must identify the machine or equipment on which the energy control procedure was used, the date of the inspection, the employees included in the inspection and the name of the person performing the inspection. For lockout procedures, the periodic inspection must include a review between the inspector and each authorized employee of that employee's responsibilities under the energy control procedure being inspected. When a tagout procedure is inspected, a review on the limitation of tags, in addition to the above requirements, must also be included with each affected and authorized employee.

7. Application of Controls and Lockout/Tagout Devices

The established procedure of applying energy controls includes the specific elements and actions that must be implemented in sequence. These are briefly identified as follows:

a. Prepare for shut down.
b. Shut down the machine or equipment.
c. Apply the lockout or tagout device.
d. Render safe all stored or residual energy.
e. Verify the isolation and de-energization of the machine or equipment.

8. Removal of Locks and Tags

Before lockout or tagout devices are removed and energy is restored to the machine or equipment, the authorized employee(s) must take the following actions or observe the following procedures:

a. Inspect the work area to ensure that non-essential items have been removed and that machine or equipment components are intact and capable of operating properly.

b. Check the area around the machine or equipment to ensure that all employees have been safely positioned or removed.

c. Notify affected employees immediately after removing locks or tags and before starting equipment or machines.

d. Make sure that locks or tags are removed ONLY by those employees who attached them. (In the very few instances when this is not possible, the device may be removed under the direction of the employer, provided that he or she strictly adheres to the specific procedures outlined in the standard.)

9. Additional Safety Requirements

Special circumstances exist when: (1) machines need to be tested or repositioned during servicing, (2) outside (contractor) personnel are at the worksite, (3) servicing or maintenance is performed by a group (rather than one specific person), and (4) shifts or personnel changes occur.

- Testing or positioning of machines.

  OSHA allows the temporary removal of locks or tags and the re-energization of the machine or equipment ONLY when necessary under special conditions (for example, when power is needed for the testing or positioning of machines, equipment or components). The re-energization must be conducted in accordance with the sequence of steps listed below:

  a. Clear the machine or equipment of tools and materials.
  b. Remove employees from the machine or equipment area.
  c. Remove the lockout or tagout devices as specified in the standard.
  d. Energize and proceed with testing or positioning.
  e. De-energize all systems, isolate the machine or equipment from the energy source, and reapply lockout or tagout devices as specified.

- Outside personnel (contractors, etc.).

  The on-site employer and the outside employer must inform each other of their respective lockout or tagout procedures. Each employer must ensure that his or her personnel understand and comply with all restrictions and/or prohibitions of the other employer's energy control program.

- Group lockout or tagout.

  During all group lockout/tagout operations where the release of hazardous energy is possible, each authorized employee performing service or maintenance shall be protected by his/her personal lockout or tagout device or comparable mechanism that affords equivalent protection.

- Shift or personnel changes.

  Specific procedures must ensure the continuity of lockout or tagout protection during shift or personnel changes.

Technical Appendixes

Appendix A: Written Lockout/Tagout Program

Appendix B: List of Authorized Personnel for Lockout/Tagout Procedures

Appendix C: Certification of Training for Authorized Personnel

Appendix D: Certification of Training for Affected Personnel

Appendix E: Authorized Employee Lockout/Tagout Annual Certification

Appendix F: Outside Personnel/Contractor Certification

Appendix G: Equipment Specific Procedure

Appendix H: Lockout/Tagout Procedures Checklist

Appendix I: Supervisors' Safety Checklist – Lockout Tagout

Appendix J: Lockout/Tagout Decision Flowchart

Appendix A: Written Lockout/Tagout Program

Written Program Requirements

A written lockout/tagout program should be prepared that covers all workplaces where employees use lockout/tagout. The written plan must describe the park's flexibility to develop a program and procedures that meet the needs of their particular workplace and the particular types of machines and equipment being maintained or serviced. It must be maintained at each work site. The written program must include the following:

Lockout/Tagout Procedure for (Name Of Park)

1. Purpose

This procedure establishes the minimum requirements for controlling hazardous energy whenever maintenance or repair is done on machinery, utility supplies or electrical equipment and fixtures. It is used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

2. Introduction

This Standard Operating Procedure (SOP) has been written to guide and document the lockout/tagout of energy isolated devices as required by the Occupational Safety and Health Administration (OSHA) regulation 29 CFR 1910.147. The SOP is meant as a guiding document to help you understand and interpret OSHA regulations. It has been written with the park's specific equipment and machinery in mind.

If you have any questions about this program or identified procedures, contact your Supervisor or Park Safety Manager.

3. Objectives

To establish a means of positive control to prevent the accidental starting or activating of machinery or systems while they are being repaired, cleaned and/or serviced.

a. To establish a safe and positive means of shutting down machinery, equipment and systems.

b. To prohibit unauthorized personnel or remote control systems from starting machinery or equipment while it is being serviced.

c. To provide a secondary control system (tagout) when it is impossible to positively lockout the machinery or equipment.

d. To establish responsibility for implementing and controlling lockout/tagout procedures.

e. To ensure that only approved locks, standardized tags and fastening devices provided by the park will be utilized in the lockout/tagout procedures.

4. Areas Of Responsibility

a. _____ will be responsible for implementing the lockout/tagout program.

b. _____ are responsible to enforce the program and ensure compliance with the procedures in their department.

c. _____ is responsible for monitoring the compliance of this procedure and will conduct the annual inspection and certification of the authorized employees.

d. Authorized employees (those contained in Appendix B) are responsible to follow established lockout/tagout procedures.

e. Affected employees (all other employees in the facility) are responsible for ensuring they do not attempt to restart or re-energize machines or equipment which are locked out or tagged out.

Procedures

Preparation for Lockout or Tagout

Employees who are required to utilize the lockout/tagout procedure (see Appendix B) must be knowledgeable of the different energy sources and the proper sequence of shutting off or disconnecting energy means.

The four types of energy sources are:

a. Electrical (most common form)
b. Hydraulic or pneumatic
c. Fluids and gases
d. Mechanical

Make a survey to locate and identify all isolating devices to be certain which switch(s), valve(s) or other energy-isolating devices apply to the equipment to be locked or tagged out. More than one energy source can be utilized on some equipment and the PROPER procedure must be followed in order to identify energy sources and lockout/tagout accordingly. See Appendix G for specific procedure format.

Electrical

a. Shut off power at machine and disconnect.

b. Disconnecting means must be locked or tagged.

c. Press start button to see that correct systems are locked out.

d. All controls must be returned to their safest position.

e. Points to remember:

   1) If a machine or piece of equipment contains capacitors, they must be drained of stored energy.

   2) Disconnecting should include the power cord, power panels (look for primary and secondary voltage), breakers, the operator's station, motor circuit, relays, limit switches and electrical interlocks.

   Note:

   1) Some equipment may have a motor isolating shut-off and a control isolating shutoff.

   2) If the electrical energy is disconnected by simply unplugging the power cord, the cord must be kept under the control of the authorized employee or the plug end of the cord must be locked out or tagged out.

Hydraulic/Pneumatic

a. Shut off all energy sources (pumps and compressors). If the pumps and compressors supply energy to more than one piece of equipment, lock out or tag out the valve supplying energy to this piece of equipment.

b. Stored pressure from hydraulic/pneumatic lines shall be drained/bled when release of stored energy could cause injury to employees.

c. Make sure controls are returned to their safest position (off, stop, standby, inch, jog, etc.).

Fluids and Gases

a. Identify the type of fluid or gas and the proper [NEED MORE INFO HERE]

b. Close valves to prevent flow, lockout/tagout.

c. Determine the isolating device, close and lockout or tagout.

d. Drain and bleed lines to zero energy state.

NOTE: Some systems may have electrically controlled valves; if so, they must be shut off, locked or tagged out.

e. Check for zero energy state at the equipment.

Mechanical Energy (Gravity activation, stored in springs, etc.)

a. Block out or use die ram safety chain.

b. Lockout or tagout safety device.

c. Shut off, lockout or tagout electrical system.

d. Check for zero energy state.

e. Return controls to safest position.

Release From Lockout/Tagout

a. Inspection – Make certain the work is completed; inventory tools and equipment used.

b. Clean-up – Remove all towels, rags, work-aids, etc.

c. Replace guards – Replace all guards possible. Sometimes a particular guard may have to be left off until the start sequence is over due to possible adjustments. However, all other guards should be put back into place.

d. Check controls – All controls should be in their safest position.

e. The work area shall be checked to ensure that all employees have been safely positioned or removed and notified that the lockout/tagout devices are being removed.

f. Remove locks/tags – Remove only your lock or tag.

Procedure Involving More Than One Person

When servicing and/or maintenance is performed by more than one person, each authorized employee shall place his or her own lock or tag on the energy-isolating source. This shall be done by utilizing a multiple lock scissors clamp if the equipment is capable of being locked out. If the equipment cannot be locked out, then each authorized employee must place his or her tag on the equipment.

Procedure for the Removal of an Authorized Employee's Lockout/Tagout by the Park

Each location must develop written procedures under the above heading that complies with 1910.147(e)(3) that can be utilized at that location. Your procedures should include the following:

1. Verification by employer that the authorized employee who applied the device is not in the facility.

2. Make reasonable efforts to advise the employee that his or her device has been removed. (This can be done when he returns to the facility).

3. Ensure that the authorized employee has this knowledge before he resumes work at the facility.

Procedures for Shift or Personnel Changes

Specific procedures shall be utilized during shift or personnel changes to ensure the continuity of lockout or tagout protection. This includes provision for the orderly transfer of lockout or tagout device protection between off-going and oncoming employees to minimize exposure to hazards from the unexpected energization or start-up of the machine or equipment, or the release of stored energy.

Should the shift change before the machinery or equipment can be restored to service, the lockout and tagout must remain. If the task is reassigned to the next shift, those employees must lockout and tagout before the previous shift may remove their lock and tag.

Procedures for Outside Personnel/Contractors

Outside personnel/contractors shall be advised that the park has and enforces the use of lockout/tagout procedures. They will be informed of the use of locks and tags and notified about the prohibition relating to attempts to restart or re-energize machines or equipment that are locked out or tagged out.

The park will obtain information from the outside personnel/contractor about their lockout/tagout procedures and advise affected employees of this information.

The outside personnel/contractor will be required to sign a certification form (see Appendix F). If the outside personnel/contractor has previously signed a certification that is on file, there is no need to have them sign a new certification.

Training and Communication

Each authorized employee who will be utilizing the lockout/tagout procedure will be trained in the recognition of applicable hazardous energy sources, type and magnitude of energy available in the work place and the methods and means necessary for energy isolation and control.

Each affected employee (all employees other than authorized employees utilizing the lockout/tagout procedure) shall be instructed in the purpose and use of the lockout/ tagout procedure and the prohibition relating to attempts to restart or re-energize machines or equipment which are locked out or tagged out.

All other employees whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed about the procedure and about the prohibition relating to attempts to restart or re-energize machines or equipment which are locked out or tagged out.

Training will be certified using Appendix C: Authorized Personnel or D: Affected Personnel. The certification will be retained in the employee's personnel file.

Procedures for Periodic Inspection

A periodic inspection (at least annually) will be conducted of each authorized employee under the lockout/tagout procedure. This inspection shall be performed by the **(Responsible person)** provided they are not the ones utilizing the energy control procedure being inspected.

The inspection will include a review between the inspector and each authorized employee of that employee's responsibilities under the energy control (lockout/tagout) procedure. The inspection will also consist of a physical inspection of the authorized employee while performing work under the procedures.

The **(Responsible person)** shall certify in writing that the inspection has been performed. The written certification (see Appendix E) shall be retained in the individual's personnel file.

Appendices H-J contain checklists and a flowchart that may be used as a tool for the park's annual self-evaluation.

Appendix B: List of Authorized Personnel for Lockout/Tagout Procedures

NAMES	JOB TITLE

Appendix C: Certification of Training for Authorized Personnel

Training Certificate

Name _____ Department _____

I understand the training I have received on the Mandatory Lockout – Tagout Program. The training consisted of:

- Location of equipment, control operation and energy isolation points
- How to safely turn on and off equipment
- Types and hazards of energy sources
- Type and magnitude of the energy
- Methods and means necessary for energy isolation

I understand the hazards of electricity, hydraulic force and machines in motion. I understand that I have been trained to protect myself by not reaching into (breaking the plane on) any machinery until I have personally locked and tagged all sources of energy and ensured that the machinery controls have been disabled.

I understand that if I chose to isolate a machine energy source by unplugging the power cord, I must be in control of the plug at all times, and that I may not leave the area until the machine is in a condition that would allow the machine to be safely plugged into a receptacle.

I acknowledge receipt of necessary locks, hasps, tags, etc. required for effective isolation of electrical power to a single piece of equipment, and that I have available (from Supervisors) material needed for isolating hydraulic fluid flow to hydraulic motors. I understand that if I need additional lockout/tagout material, I am accountable for requesting it from a Supervisor in my Department.

I understand that VIOLATING THE LOCKOUT/TAGOUT PROCEDURE will result in disciplinary action up to and including termination of employment.

Employee _____

Trainer Signature _____ Date _____

Appendix D: Certification of Training for Affected Personnel

I CERTIFY THAT I RECEIVED TRAINING AS AN AFFECTED EMPLOYEE UNDER _____ LOCKOUT/TAGOUT PROGRAM. I FURTHER CERTIFY AND UNDERSTAND THAT I AM PROHIBITED FROM ATTEMPTING TO RESTART OR RE-ENERGIZE MACHINES OR EQUIPMENT WHICH ARE LOCKED OUT OR TAGGED.

_____ _____

AFFECTED EMPLOYEE SIGNATURE DATE

Appendix E: Authorized Employee Lockout/Tagout Annual Certification

The Authorized Employee listed below was observed conducting a Lockout/Tagout. The purpose of this observation is to ensure this employee understands the procedures used at this facility for the control of energy associated with equipment. The below listed employee successfully conducted the Lockout/Tagout and understands the 10-step procedure listed below.

Employee _____ Date _____

Department _____ Shift _____

Selected Piece of Equipment _____

10 Step Procedure

Installing Locks and Tags

- Notified Affected Employees
- Shutdown equipment
- Isolated all energy to the equipment
- Locked and Tagged energy controls
- Released stored and/or residual energy
- Tested controls to ensure inadvertent startup is not possible

Restoring from Lockout/Tagout

- Notified Affected Employees – Locks and Tags to be removed
- Checked equipment to ensure all guards in place and tools removed
- Ensured controls were in Neutral or Off position
- Properly removed Locks and Tags and made equipment ready for use

Changes or Recommendations in Procedure

_____
_____
_____
_____

Inspector Signature _____

Employee Signature _____

Appendix F: Outside Personnel/Contractor Certification

I CERTIFY THAT _____AND_____

(OUTSIDE PERSONNEL/CONTRACTOR) HAVE INFORMED EACH OTHER OF OUR RESPECTIVE LOCKOUT OR TAGOUT PROCEDURES.

_____
NAME (PRINTED)

_____ _____
SIGNATURE DATE

_____
OUTSIDE PERSONNEL/CONTRACTOR (PRINTED)

_____ _____
SIGNATURE DATE

Appendix G: Equipment-Specific Procedure

Equipment Specific Procedure

FOR _____

DATE _____

Machine Identification

General Description:

Manufacturer:

Model Number:

Serial Number:*

Location of equipment:

Operator Controls

The type of controls available to the operator need to be determined. This should help identify energy sources and lockout capacity for the equipment.

List types of operator controls:

* If more than one piece of same equipment, list all serial numbers.

Energy Sources

The energy sources present on this equipment are: (electrical, steam, hydraulic, pneumatic, natural gas, stored energy, etc.).

Stored Energy: Following the application of the lockout or tagout devices to the energy-isolating devices, all potential or residual energy will be relieved, disconnected, restrained and otherwise rendered safe.

ENERGY	LOCATION	LOCKABLE		TYPE OF LOCK OR BLOCK NEEDED
		YES	NO	

Location shall positively identify the exact breaker, valve, switch or other disconnect or blocking device to be locked and tagged to isolate the source of energy from the work area.

Type of Lockout shall specifically name the exact type of locking device needed to ensure the disconnect or blocking device stays in the isolated condition/position (i.e. Breaker Clip, Valve Handwheel Cover, Blank Flange, etc.).

Shutdown Procedures

List the steps in the order necessary to shut down and de-energize the equipment. Be specific. For stored energy, be specific about how the energy will be dissipated or restrained.

Procedure:

Lock Type and Location:

De-energized State To Be Verified? How?

Notify all affected employees when this procedure is in application

Start-Up Procedures

List the steps in the order necessary to reactivate (energize) the equipment. Be specific.

Procedure:

Energy Source Activated:

Notify all affected employees when this procedure is in application

Procedures for Operations and Service/Maintenance

List those operations where the procedure above does not apply (see 29 CFR 1910.147 (a)(2)). Alternate measures that provide effective protection must be developed for these operations. Job Safety Analysis is one method of determining appropriate measures.

Operation Name:

Affected and Authorized Employees

List each person affected by this procedure and those authorized to use this procedure.

AFFECTED EMPLOYEES	
NAME	**JOB TITLE**

AFFECTED EMPLOYEES	
NAME	**JOB TITLE**

Approved by (and date): _____

Approved by (and date): _____

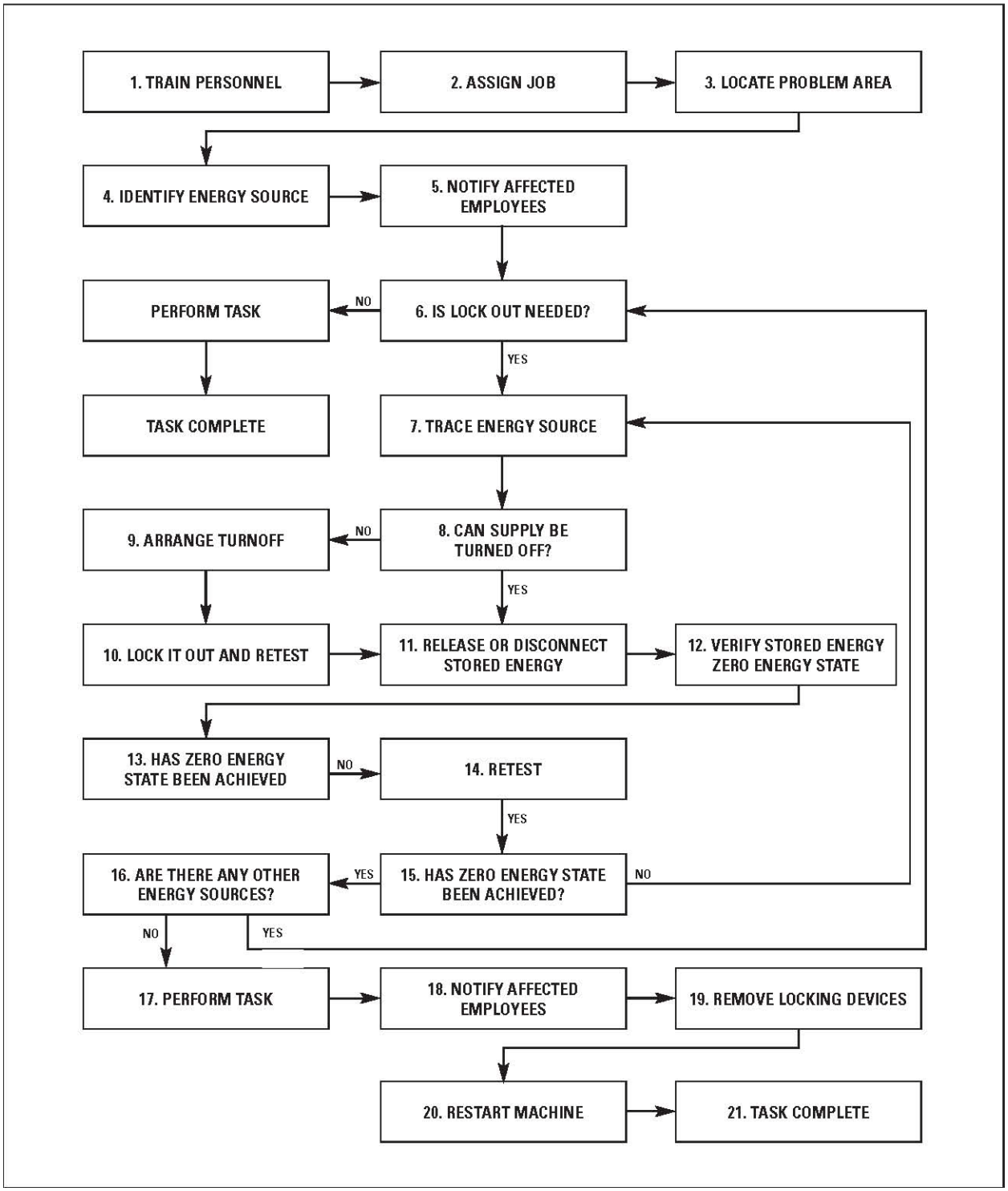
Appendix H: Lockout/Tagout Procedures Checklist

	LOCKOUT/TAGOUT PROCEDURES CHECKLIST
YES/NO	
	Where the power disconnecting means for equipment does not also disconnect the electrical control circuit:
	Are the appropriate electrical enclosures identified?
	Is means provided to assure the control circuit can also be disconnected and locked out?
	Is the locking out of control circuits in lieu of locking out main power disconnects prohibited?
	Are all equipment control valve handles provided with a means for locking out?
	Does the lock-out procedure require that stored energy (mechanical, hydraulic, air, etc.) be released or blocked before equipment is locked out for repairs?
	Are appropriate employees provided with individually keyed personal safety locks?
	Are employees required to keep personal control of their key(s) while they have safety locks in use?
	Is it required that only the employee exposed to the hazard, place or remove the safety lock?
	Is it required that employees check the safety of the lock out by attempting a startup after making sure no one is exposed?
	Are employees instructed to always push the control circuit stop button immediately after checking the safety of the lock out?
	Is there a means provided to identify any or all employees who are working on locked-out equipment by their locks or accompanying tags?
	Are a sufficient number of accident preventive signs or tags and safety padlocks provided for any reasonably foreseeable repair emergency?
	When machine operations, configuration or size requires the operator to leave his or her control station to install tools or perform other operations, and that part of the machine could move if accidentally activated, is such element required to be separately locked or blocked out?
	In the event that equipment or lines cannot be shut down, locked out and tagged, is a safe job procedure established and rigidly followed?

Appendix I: Supervisor's Safety Checklist-Lockout/Tagout

SUPERVISOR'S SAFETY CHECKLIST-LOCKOUT/TAGOUT		
Supervisor: **Date:** **Department/Area:**		
YES	**NO**	
Area Safety Check		
		No broken valve hand-wheels, controls or switches
		All controls, valves and switches are labeled
		Each authorized employee has been issued locks and tags
		Locks and tags are standardized throughout facility
		Locks and tags are identifiable to a specific employee
		Locks and tags are not used for other purposes
		Locking devices are available for every type of isolation device
		Material used to affix tag rated at 50 pounds or greater – no strings allowed
		All breakers are labeled
Employee Training – Workers are trained:		
		that only authorized employees may attach a lock and tag
		that only the person who attached the lock and tag may remove it
		to verify isolation before beginning work
		to notify "affected" employees before locking out equipment
		to re-install machine guards before removing locks and tags
		to notify "affected" employees before removing locks or re-starting

Appendix J: Lockout/Tagout Decision Flow Chart



National Park Service Ergonomics Policy

Parks will implement a program designed to prevent injuries and illness by eliminating or reducing worker exposure to work-related musculoskeletal disorder (WMSD) risk factors; to reduce the potential for fatigue, error and unsafe acts by adapting the job and workplace to the worker's capabilities and limitations; to increase the overall productivity of the work force; and to reduce workers' compensation claims and costs.

Scope

This section provides guidance for park ergonomics programs. It discusses the development of an ergonomics program that focuses on the identification and control of improper workplace and work process design.

Effects of WMSDs

Repeated biomechanical stress and microtrauma cause or aggravate WMSDs. Over time, repeated microtrauma can evolve into a painful, debilitating state involving muscles, tendons, tendon sheaths and nerves. Examples of WMDSs are tendonitis, tenosynovitis, bursitis, chronic muscle strain and nerve entrapment syndromes such as carpal tunnel syndrome.

The expense associated with a poorly designed workplace is considerable and includes both direct and indirect costs. Direct costs include medical treatment, rehabilitation and workers' compensation costs. Indirect costs include lost work time, decreased productivity, decreased work quality, retraining costs and diminished morale.

C. References

1. NIOSH. 1997. Health Hazard Evaluation Report HETA 97-0199-2680, U.S. Department of the Interior, Yosemite National Park, California.

2. NIOSH. 1997. Elements of Ergonomics Programs, 1997. NIOSH PUB 97-117

3. NIOSH. 1994. Workplace Use of Back Belts Review and Recommendations Publication No. 1994-122:

4. Department of the Army. 2000. Ergonomics program. DA Pam 40-21

5. ACGIH. 2002. Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.

6. Brown, B.W., Greitzer, F.L., Pond, D. 1997. Ergonomics Education, Awareness System Evaluation and Recording (ErgoEASER2). US Dept of Energy.

Program Elements

1. Worksite Analysis and Risk Factors. Conduct an analysis of park facilities and operations to identify jobs and worksites with WMSD risk factors. There are several approaches that may be used to determine whether conditions in the workplace might be contributing to employees developing musculoskeletal disorders. These approaches can be used individually or in combination.

    a. Review and analyze injury and illness records such as OSHA 300 Logs and supporting 301 forms and Workers' Compensation claims to determine whether there is a pattern of ergonomic-related injuries in certain jobs or work tasks.

    b. Analyze jobs or work tasks to identify potential ergonomic problems before employee injuries occur. Determine if jobs present ergonomic risks that may contribute to musculoskeletal disorders. This should be completed as part of Job Hazard Analysis (see Section 3.1)

Analysis tools may help in analyzing jobs. There are numerous analysis tools that may be used to learn more about potential ergonomic risks associated with jobs. An example is ErgoEASER2 software . ErgoEASER2 is a software package that has been developed to aid in identifying, evaluating and preventing work-related musculoskeletal disorders. Evaluating video-display terminal (VDT) workstations and lifting task design, ErgoEASER offers suggestions on how to address ergonomic hazards and reduce worker disabilities.

Seek employee input about the existence of ergonomic problems related to particular jobs or work tasks. This may be accomplished by speaking with employees, conducting symptom surveys, or through employee questionnaires

1ErgoEASER2 is available for download at http://www.osti.gov/estsc/ . Federal Agencies and their contractors may obtain a Government Licensed version of ErgoEASER 2.0 from the U. S. Department of Energy's centralized software management facility (Energy Science and Technology Software Center http://www.osti.gov/html/osti/estsc/estsc.html).

The following conditions can contribute to the development of WMSDs. Injury may be more likely when several of these risk factors are combined in the workplace. These disorders include:

a. Repetitive motions, especially during prolonged activities.
b. Sustained or awkward postures.
c. Excessive bending or twisting of the wrists.
d. Continued elbow or shoulder elevation such as in overhead work.
e. Forceful exertions, especially in awkward positions.
f. Excessive use of small muscle groups such as with the pinch grip.
g. Acceleration and velocity of dynamic motions.
h. Vibration.
i. Mechanical compression.
j. Estrictive workstations such as those with inadequate clearances.
k. Improper seating or support.
l. Inappropriate hand tools.
m. Machine-pacing and production –based incentives.
n. Extreme temperatures.
o. Extended exposure to hazardous or annoying noise.

2. *Prevention and Control*. The primary method of preventing and controlling exposure to WMSD hazards is through effective design or redesign of a job or a worksite. There are six methods of controlling WMSD hazards. They should be considered in the order in which they are presented here.

   a. *Process Elimination*. Elimination of the demanding process essentially eradicates the WMSD hazard.

   b. *Engineering Controls*. Ergonomic engineering controls redesign the equipment or worksite to fit the limitation and capabilities of workers. Equipment or work-site redesign typically offers a permanent solution. For example, provide a video display terminal workstation that can be adjusted to a wide range of worker dimensions.

   c. *Substitution*. Substituting a new work process or tool without WMSD hazards for a work process with identified WMSD hazards can effectively eliminate the hazard. For example, replace hand tools that require awkward wrist positions of wrist flexion, extension or deviation, with tools that allow a neutral wrist position.

   d. *Work Practices*. Practices that decrease worker exposure to WMSD risk factors include changing work techniques, providing workforce conditioning programs and regularly monitoring work practices. Also included are maintenance, adjustment and modification of equipment and tools as needed.

1) Proper work techniques include methods that encourage correct posture, use of proper body mechanics, appropriate use and maintenance of hand and power tools and correct use of equipment and workstations.

2) Personnel conditioning refers to the use of a conditioning or break–in period. New and returning seasonal employees may need gradual integration into a full workload, depending on the job and the person. Supervisors, safety officers, industrial hygienists or health care personnel should identify those jobs that require a break–in period.

3) Regular monitoring of operations helps to ensure proper work practices and to confirm that the work practices do not contribute to WMSD or hazardous risk factors.

4) Effective schedules for facility, equipment and tool maintenance, adjustments and modifications will reduce WMSD hazards. This includes ensuring proper working conditions, having sufficient replacement tools to facilitate maintenance, and ensuring effective housekeeping programs. Tool and equipment maintenance may also include vibration monitoring.

e. Administrative Controls. Use administrative controls to limit the duration, frequency and severity of exposure to WMSD hazards. Examples of administrative controls include, but are not limited to:

1) Decreasing production rate requirements and limiting the duration of the process to reduce the number of repetitions.

2) Reducing the number and speed of repetitions by having worker input regarding production speed.

3) Provide for adequate warm-up before engaging in physically demanding tasks.

4) Providing rest breaks to relieve fatigued muscle–tendon groups or to stretch breaks for sedentary tasks. Determine the length of the rest break by the effort required, total cycle time and the muscle–tendon group involved.

5) Increasing the number of personnel assigned to the task (for example, lifting in teams rather than individually).

6) Instituting job rotation as a preventive measure, with the goal of alleviating physical fatigue and stress to a particular set of muscles and tendons. Do not use job rotation in response to symptoms of WMSD. This can contribute to symptom development in all personnel involved in the rotation schedule rather than preventing problems.

7) Providing modified or restricted duty assignments to allow injured muscle–tendon groups time to rest, which assists in the healing process. Make every effort to provide modified or restricted duty assignments when physical limitations as identified by a healthcare provider, allowing the worker to return to work performing less than his or her normal work requirements. In regard to modified or restricted duty assignments:

   I. A healthcare provider should specifically identify assignments or job tasks for the individual worker based on his or her symptoms, capabilities and limitations.

   II. Healthcare providers with specific knowledge in both occupational demands and cumulative trauma injuries should cooperate with trained ergonomics personnel to develop a list of jobs with low WMSD risk.

f. Personal Protective Equipment. Personal protective equipment (PPE) is not necessarily recommended for controlling exposure to WMSD hazards, since little research has been conducted to support claims of its usefulness.

   1) Appliances, such as wrist rests, back belts, back braces, etc., are not considered PPE. Before purchasing such devices, discuss their effectiveness with trained ergonomics personnel. (The NPS does not support the blanket use of back belts as a back injury preventive measure.) Anti-vibration gloves are an example of PPE that addresses WMSD hazards.

   2) Consider WMSD hazards when selecting PPE. The PPE should be properly worn or used according to the manufacturers' specifications, available in a variety of sizes, accommodate the physical requirements of personnel and the job, and it should not contribute to WMSD hazards.

3. Healthcare Management

Early recognition and healthcare management of WMSDs are critical to reducing the impact of injury on both the employee and the park. Common symptoms of WMSDs can include pain, tingling, numbness, stiffness and weakness in the neck, shoulders, arms, hands, back and legs. Other symptoms can include headaches, visual fatigue and increased errors. Employees should be encouraged to report symptoms of WMSDs early and to seek the services of their personal healthcare provider for evaluation and to determine work-relatedness.

Work-related musculoskeletal disorders do not require a general medical surveillance program. Rather, worksite analysis methods for the identification of problems and risk factors should be used. Periodic worksite surveys to update evaluations and recognize emerging problems should be conducted at least annually. Additional surveillance should be conducted for jobs where there is a high incidence of WMSDs or that have been identified as high risk.

4. Training and Employee Participation

Training must be provided to workers who are potentially exposed to WMSD risk factors. Workers must receive instruction in the following topics:

a. Potential risks and possible causes of WMSDs
b. How to recognize and report symptoms.
c. How to prevent WMSDs.
d. Sources of treatment.
e. Demonstration of the proper use and care of all tools and equipment.
f. Correct use of safety equipment (PPE)
g. Safe and proper work procedures, such as proper lifting techniques.

Employees must be encouraged to proactively participate in the park's efforts to reduce work-related injury, disease in general and ergonomic problems in particular. This may be accomplished by promoting direct individual input from employees. For example, knowledge of the work process and equipment characteristics directly support worksite ergonomic evaluations. Workers should also participate in safety committees or similar forums in order to effectively identify and resolve ergonomic issues.

Purpose

The purpose of this program is to provide guidance to office managers and office staff on the elements of safe office work. The office is like any other work environment in that it may present potential health and safety hazards. Most of these, however, may be minimized or eliminated by designing jobs and workplaces properly and by taking into account differences among tasks and individuals. Inadequate environmental conditions, such as noise, temperature and humidity, may cause temporary discomforts. Environmental pollutants, such as chemical vapors released from new carpeting and furniture, may also induce discomforts.

Responsibilities

1. Management

    a. Provide training for all office staff in:

        - Emergency Procedures
        - Electrical Safety
        - Office Ergonomics

    b. Ensure office equipment is in safe working order

    c. Provide proper storage for office supplies

2. Office Staff

    a. Report all safety problems immediately

    b. Do not attempt to repair any office equipment or systems

    c. Maintain a neat and sanitary office environment

Noise Hazards

Noise can be defined very simply as unwanted sound. Whether a sound is classified as noise or not depends mostly on personal preferences. For noise levels in offices, the most common effects are interference with speech communication, annoyance and distraction from mental activities. Noise in the office can interfere with communications. For example, it may be difficult to talk on the telephone when other people are talking nearby. Speech is likely to interfere with communications, especially if the speakers have similar voices.

The annoying effect of noise can decrease performance or increase errors in some task situations. If the task requires a great deal of mental concentration, noise can be detrimental to performance. Also, there is some indication that unexpected or unpredictable noise can have more of an effect than continuous or periodic noise. The annoyance caused by noise depends on the individual. Noise can be distracting. A sudden noise can interrupt activity temporarily, such as when someone drops a heavy object.

1. Reducing Noise

   Many unexpected noises cannot be controlled, as when someone accidentally drops something. For many of the annoying sounds in the office environment, the following measures are useful for reducing the level of noise or its effects:

a. Select the quietest equipment if possible. When there is a choice between two or more products, sound levels should be included as a consideration for purchase and use.

b. Provide proper maintenance of equipment, such as lubrication and tightening of loose parts that can cause noise.

c. Locate loud equipment in areas where its effects are less detrimental. For example, place impact printers away from areas where people must use the phone.

d. Use barrier walls or dividers to isolate noise sources. Use of buffers or acoustically treated materials can absorb noise that might otherwise travel farther. Rubber pads to insulate vibrating equipment can also help to reduce noise.

e. Enclose equipment, such as printers, with acoustical covers or housings.

f. Schedule noisy tasks at times when it will have less of an effect on the other tasks in the office.

Electrical Safety

Electric cords should be examined on a routine basis for fraying and exposed wiring. Particular attention should be paid to connections behind furniture, since files and bookcases may be pushed tightly against electric outlets, severely bending the cord at the plug. Electrical appliances must be designed and used in accordance with UL requirements.

1. Use of Extension Cords

   a. Extension cords shall only be used in situations where fixed wiring is not feasible.

b. Extension cords shall be kept in good repair and be free from defects in their insulation. They will not be kinked, knotted, abraded or cut.

c. Extension cords shall be placed so they do not present a tripping or slipping hazard.

d. Extension cords shall not be placed through doorways, where doors can be closed. This may result in damage to the cord.

e. All extension cords shall be of the grounding type (three-conductor).

2. Unsafe/non-approved Equipment

   The use of poorly maintained or unsafe, poor quality, non-approved (by national testing laboratories) coffee makers, radios, lamps, etc. (often provided by or used by employees) should be discarded. Such appliances can develop electrical shorts, creating fire and/or shock hazards. Equipment and cords should be inspected regularly, and a qualified individual should make repairs.

Housekeeping

Good housekeeping is an important element of accident prevention in offices.

Poor housekeeping may lead to fires, injuries to personnel or unhealthful working conditions. Mishaps caused by dropping heavy cartons and other related office equipment and supplies could also be a source of serious injuries to personnel.

Passageways in offices should be free and clear of obstructions. Proper layout, spacing and arrangement of equipment, furniture and machinery are essential.

All aisles within the office should be clearly defined and kept free of obstructions.

Chairs, files, bookcases and desks must be replaced or repaired if they become damaged. Damaged chairs can be especially hazardous. Filing cabinet drawers should always be kept closed when not in use. Heavy files should be placed in the bottom file drawers.

Materials stored within supply rooms must be neatly stacked and readily reached by adequate aisles. Care should be taken to stack materials so they will not topple over. Under no circumstances will materials be stacked within 18 inches of ceiling fire sprinkler heads or Halon nozzles. Materials shall not be stored so that they project into aisles or passageways in a manner that could cause persons to trip or could hinder emergency evacuation.

Computer Workstations

Complaints concerning musculoskeletal problems are frequently heard from computer operators. Most common are complaints relating to the neck, shoulders and back. Other concerns are the arms, hands and occasionally the legs.

Certain common characteristics of VDT jobs have been identified and associated with increased risk of musculoskeletal problems. These include:

a. Design of the workstation.
b. Nature of the task.
c. Repetitiveness of the job.
d. Degree of postural constraint.
e. Work pace.
f. Work/rest schedules.
g. Personal attributes of individual workers.

The key to comfort is in maintaining the body in a relaxed, natural position. The ideal work position is to have the arms hanging relaxed from the shoulders. If a keyboard is used, arms should be bent at right angles at the elbow, with the hands held in a straight line with forearms and elbows close to the body. The head should be in line with the body and slightly forward.

1. Display Screens

   When work is conducted at a computer, the top of the display screen should be at, or just slightly below, eye level. This allows the eyes to view the screen at a comfortable level, without having to tilt the head or move the back muscles.

   Control glare at the source whenever possible. Place VDTs so that they are parallel to direct sources of light such as windows and overhead lights, and use window treatments if necessary. When glare sources cannot be removed, seek appropriate screen treatments such as glare filters. Keep the screen clean.

2. Your Chair

   The chair is usually the most important piece of furniture that affects user comfort in the office. The chair should be adjusted for comfort, making sure the back is supported and that the seat pan is at a height so that the thighs are horizontal and feet are flat on the floor. An ergonomically sound chair requires four degrees of freedom — seat pan tilt, backrest angle, seat height and backrest height. Operators can then vary the chair adjustments according to the task. In general, chairs with the most easily adjustable dimensions permit the most flexibility to support people's preferred sitting postures.

Armrests on chairs are recommended for most office work except where they interfere with the task. Resting arms on armrests is a very effective way to reduce arm discomforts. Armrests should be sufficiently short and low to allow workers to get close enough to their work surfaces, especially for tasks that require fixed arm postures above the work surface.

3. Working Height

   The work surface height should fit the task. The principle is to place the surface height where the work may be performed in such a manner as to keep arms low and close to the body in relation to the task. If the working height is too high, the shoulders or the upper arms have to be lifted to compensate, which may lead to painful symptoms and cramps at the level of the neck and shoulders. If, on the other hand, the working height is too low, the back must be excessively bowed, which may cause backache. Generally, work should be done at about elbow height, whether sitting or standing. Adjustable workstations should be provided so that individuals may change the stations to meet their needs. A VDT workstation without an adjustable keyboard height and without an adjustable height and distance of the screen is not suitable for continuous work.

4. Work/Rest Schedules

   One solution for stress and fatigue is to design the computer operator's work so that tasks requiring concentrated work at the terminal are alternated with non-computer-based tasks throughout the workday. Also, a short break (5-10 minutes) should be taken at least once each hour when involved in continuous work at the computer.

5. Other Solutions

   Additional measures that will aid in reducing discomfort while working with VDTs include:

   a. Change position, stand up or stretch whenever you start to feel tired.

   b. Use a soft touch on the keyboard and keep your shoulders, hands and fingers relaxed.

   c. Use a document holder, positioned at about the same plane and distance as the display screen.

   d. Rest your eyes by occasionally looking off into the distance.

Office Lighting

Different tasks require different levels of lighting. Areas in which intricate work is performed, for example, require greater illumination than warehouses. Lighting needs vary from time to time and person to person as well. One approach is to use adjustable task lighting that can provide needed illumination without increasing general lighting.

Task lamps are very effective to supplement the general office light levels for those who require or prefer additional light. Some task lamps permit several light levels. Since task lamps are controlled by the individual, they can accommodate personal preferences.

Indoor Air Quality

Indoor air quality (IAQ) is an increasingly important issue in the work environment. The study of indoor air quality and pollutant levels within office environments is a complex problem. The complexity of studying and measuring the quality of office environments arises from various factors, including:

a. Building floor plans are frequently changing to accommodate increasingly more employees and reorganization.

b. Buildings frequently undergo renovations such as installation of new carpet, modular office partitions and free-standing offices, and painting.

c. Many of the health symptoms appearing are vague and common both to the office and home environments.

d. In general, very little data on pollutant levels within office environments is available.

e. Guidelines or standards for permissible personal exposure limits to pollutants within office buildings are very limited.

Many times odors are associated with chemical contaminants from inside or outside the office space, or from the building fabric. This is particularly noticeable following building renovation or installation of new carpeting. Off-gassing from such things as paints, adhesives, sealants, office furniture, carpeting and vinyl wall coverings is the source of a variety of irritant compounds. In most cases, these chemical contaminants can be measured at levels above ambient (normal background), but far below any existing occupational evaluation criteria.

Waste Disposal

Personnel should carefully handle and properly dispose of hazardous materials, such as broken glass. A waste receptacle containing broken glass or other hazardous material should be labeled to warn maintenance personnel of the potential hazard.

Chemical Safety

Each office employee must be made aware of all hazardous materials they may contact in their work area. The Hazard Communication Program includes:

a. Written program.
b. Material Safety Data Sheets for each hazardous substance used.
c. Specific safe handling, use and disposal.
d. Employee training.

Emergency Action Plans

Emergency Action Plans are designed to control events and minimize the effects. Through careful preplanning, establishment of Emergency Action Teams, training and drills, employees can be safeguarded and potential for damage to work-site assets minimized.

Emergency Action Plans include:

a. Exit routes, meeting areas and employee accounting.

b. Emergency evacuation, incident command and notification to emergency services.

c. Personal injury and property damage.

d. Protection of government information, both hard copy and electronic media.

e. Bomb threats and facility security.

f. First-aid response.

g. Use of fire extinguishers.

Emergency Action Team Members (for example, Supervisors, Receptionist/Telephone Operators and key assigned members) should be trained with quarterly reviews and drills. Semiannual drills with all employees should be conducted to ensure effectiveness. First-aid kits or first-aid supplies should be available along with trained first-aid providers.

Office Fire Prevention Strategies

The best time to think about safety is before a fire starts. Learn the location of fire escape routes and how to activate the fire alarm. Participate in practice fire drills on a regular basis. Become familiar with stairway exits — **Do not use elevators during a fire evacuation, because they may not function during a fire or may expose passengers to heat, gas and smoke.**

1. Heat-producing equipment — copiers, work processors, coffee makers and hot plates — is often overlooked as a potential fire hazard. Keep these devices away from anything that might burn.

2. Electrical appliances can be fire hazards. Be sure to turn off all appliances at the end of the day. Use only grounded appliances plugged into grounded outlets (three-pronged plugs).

3. If electrical equipment malfunctions or gives off a strange odor, disconnect it and call the appropriate maintenance personnel. Promptly disconnect and replace cracked, frayed or broken electrical cords.

4. Keep extension cords clear of doorways and other areas where they can be stepped on or chafed, and never plug one extension cord into another.

5. Do not allow combustible material (boxes, paper, etc.) to build up in inappropriate storage locations (near sources of ignition).

Through a program of scheduled inspections, unsafe conditions can be recognized and corrected before they lead to serious injuries. Take a few moments each day to walk through your work area. Look for items previously pointed out, such as objects protruding into walkways, file cabinets that are weighted toward the top or frayed electrical cords. Advise personnel in the area of the hazards and set about correcting them.

FROM PWR “SAFETY KIT FOR SUPERVISORS” (SEPT. 2001)

References

1. NPS Training Module, “Personal Safety and Security,” a 16-hour course focusing on awareness and communication, as well as assessment and response techniques. For further information, contact course coordinator Myra Dec at myra_dec@nps.gov.

2. U.S. Forest Service Videos, Module 1: General Awareness, Personal Safety in Remote Locations, and Module 2: Supervisor Responsibilities, Personal Safety in Remote Work Locations.

3. Further information at NIOSH Web site at www.cdc.gov/niosh/violrisk.

4. Further information at OSHA Web site at www.osha.gov, “Violence in the Workplace.”

Requirements

Employees may encounter opportunistic individuals, persons under the influence of drugs and/or alcohol, and extremist groups. Employees may encounter visitors who are verbally aggressive and/or behaving in a forward, rude or inappropriate manner.

1. Parks must provide training to employees regarding risk assessment, threat assessment awareness and communication skills for conflict situations.

2. Awareness. Employees must be made aware of potential criminal activity in areas (e.g., drug labs, marijuana cultivation, poaching, gang activity, etc.) and be provided with instruction in professional responses should these activities be encountered.

3. Parks must be responsible for facility assessments (meaning all structures, trails, parking lots, campgrounds, etc.) that target places where opportunists could gain an advantage over employees.

4. Parks should provide information for safe personal travel and safe behavior to employees visiting their area for training or details.

5. Parks should secure the workplace appropriate to the work conducted there.

6. Employees should **report all incidents** and threats of workplace violence.

Stop, Think, Observe, Plan, Act

- Practice mental and physical preparedness techniques every day.
- Be aware. Many individuals do not naturally practice the broad, sweeping awareness necessary for personal safety. This is not a “natural” or “common” skill, and it should be taught.
- Ask questions of supervisors, maintenance, law enforcement and safety personnel.
- Be sure that communication devices are in operation: batteries are charged and radio/cell phones work.
- Know escape routes.
- Have a safe harbor.
- Do not conduct an activity if you feel it is unsafe.

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Flammable and combustible liquids vaporize and form flammable mixtures with air when in open containers, when leaks occur or when heated. To prevent fires, special precautions need to be taken when storing, handling and using flammable and combustible liquids.

References

1. Flammable and Combustible Liquids Code Handbook, National Fire Protection Association, 4th Edition, 2000, Benedetti, Robert P.

2. OSHA, 29 CFR 1910.106

3. Flammable and Combustible Liquids Code, NFPA 30, 2000 Edition

Definition

Understanding the differences between liquids is important when meeting the OSHA requirements for the safe storage and handling of these liquids.

Flammable and combustible liquids are defined and classified by their flash point and boiling point. A flammable liquid is any liquid that has a flash point below 100 degrees F (37.8 degrees C). Flammable liquids are known as Class I liquids. A combustible liquid is any liquid with a flash point at or above 100 degrees F (37.8 degrees C). Combustible liquids are known as Class II and Class III liquids.

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FLAMMABLE AND COMBUSTIBLE LIQUID CLASSES			
	Class	Flash Point	Boiling Point
Flammables	IA IB IC	<73ºF <73ºF >73ºF and <100ºF	<100ºF >100ºF –
Combustibles	II IIIA IIIB	>100ºF and <140ºF >140ºF and <200ºF >200ºF	–
NOTE: • The class of a liquid can change due to contamination. • Classifications do not apply to mixtures. •Volatility of liquids increases when heated.			

STORAGE OF FLAMMABLE AND COMBUSTIBLE LIQUIDS

Flammable and combustible liquids should be stored only in approved containers. Approval for containers is based on specifications developed by the U.S. Department of Transportation (DOT), OSHA, the National Fire Protection Association (NFPA),

Underwriters Laboratory (UL) or Factory Mutual (FM). Containers used by manufacturers of flammable and combustible liquids usually meet these specifications.
Safety Cans and Containers

All flammable or combustible liquids must be stored in an approved container. A “safety can” by OSHA definition is “an approved container of not more than five gallons capacity, having a spring-closing lid and spout cover, and so designed that it will safely relieve internal pressure when subjected to fire exposure.” An “approved container” by OSHA definition is a can that is approved by an NRTL (nationally recognized testing laboratory) such as FM (Factory Mutual), UL (Underwriters Laboratory) or other recognized laboratory. All cans or containers must have an NRTL approval. NOTE: OSHA has determined that it is acceptable to store flammable/combustible liquids in plastic containers if the containers are approved by an NRTL.

In addition to the storage of flammable and combustible liquids in safety containers, 29 CFR 1910.106 limits the amount of liquid in a single container. The following chart lists the allowable amount of liquid for each class of liquid.

Flammable Liquid Storage Cabinets

A flammable liquid storage cabinet is an approved cabinet that has been designed and constructed to protect the contents from external fire. In accordance with NFPA requirements, the storage cabinet shall not be vented for fire protection purposes, and vent openings shall be sealed with the bungs supplied by the cabinet manufacturer. Storage cabinets shall be labeled “FLAMMABLE — KEEP FIRE AWAY,” and the doors shall be self-closing.

MAXIMUM ALLOWABLE SIZE OF CONTAINERS AND METAL PORTABLE TANKS					
Container Type	Flammable Liquids			Combustible Liquids	
	CLASS IA	CLASS IB	CLASS IC	CLASS II	CLASS III
Glass	1 pt.	1qt.	1 gal.	1 gal.	1 gal.
Metal (other than DOT drums) or approved plastic	1 gal.	5 gal.	5 gal.	5 gal.	5 gal.
Safety Cans	2 gal.	5 gal.	5 gal.	5 gal.	5 gal.
Metal Drum (DOT Spec)	60 gal.	60 gal.	60 gal.	60 gal.	60 gal.
Approved Metal Portable Tanks	660 gal.	660 gal.	660 gal.	660 gal.	660 gal.

The amount of liquid storage and location of cabinets is regulated by OSHA and NFPA. No more than 60 gallons of Class I or Class II liquids, nor more than 120 gallons of Class III liquids, may be stored in a storage cabinet. No more than three (3) cabinets shall be located in any one fire area. Additional cabinets shall be permitted to be located

in the same fire area if a minimum separation of 100 feet is maintained between each group of not more than three cabinets.

Storage Outside of Flammable Cabinets

In accordance with OSHA requirements, the quantity of liquid that may be stored outside of an inside storage room or cabinet in any one fire area of a building shall not exceed the following:

- 25 gallons of Class IA liquids in safety cans.
- 120 gallons of Class IB, IC, II or III liquids in approved containers.
- 660 gallons of Class IB, IC, II or III liquids in a single approved portable tank.

Storage and Handling Precautions

- Quantities of flammable and combustible liquids should be limited to the amount necessary for work in progress.

- Storage of flammable/combustible liquids shall not obstruct any exit.

- Flammable liquids shall be stored separately from strong oxidizers or other incompatible materials, and away from direct sunlight and other heat sources.

- All ignition sources shall be controlled in areas where flammable liquids are used. Smoking, open flames and spark-producing equipment shall not be used.

- Spark-free, intrinsically safe motors and equipment shall be used. This equipment must meet National Electric Code (NEC) requirements for explosion-proof equipment.

- Minimize the production of vapors and the risk of ignition. Vapors from flammable liquids are heavier than air and tend to settle at floor level, where they can spread over a large area.

- Electrically bond metal containers when transferring flammable liquids from one to another. Bonding can be direct, by wire attached to both containers, or indirect through a common ground system.

- When grounding non-metallic containers, contact must be made directly to the liquid rather than to the container.

- Portable fire extinguisher(s) and control equipment in quantities and types needed shall be provided for the hazards of operation and storage.

- All fire equipment shall be maintained and periodically inspected and tested by a competent person to ensure they are in satisfactory operating condition and ready in case of an emergency.

- Rags soaked with flammable or combustible liquids shall be disposed of in an approved oil waste can. The cans shall be emptied daily and the contents disposed of properly, in accordance with all environmental regulations.

Compressed gases can be toxic, flammable, oxidizing, corrosive, inert or a combination of hazards. In addition to the chemical hazards, compressed gases are under very high pressure. The amount of energy in a compressed gas cylinder makes it a potential rocket. Appropriate care in the handling and storage of compressed gas cylinders is crucial.

References

1. 29 CFR 1910.101

2. The Compressed Gas Association (CGA)

Hazards

The following is a list of the hazards to be avoided during the handling and storing of compressed gases:

- *Asphyxiation*: Asphyxiation is the primary hazard associated with inert gases. Because inert gases are colorless and odorless, they can escape into the atmosphere undetected and quickly reduce the concentration of oxygen below safe levels. Oxygen-monitoring equipment should be used when inert gases are being used in enclosed areas.

- *Fire and Explosion*: Fire and explosion are the primary hazards associated with flammable gases, oxygen and other oxidizing gases. Flammable gases can be ignited by static electricity or a heat source. Oxygen and oxidizing gases do not burn but will support combustion of organic materials. Increasing the concentration of an oxidizer accelerates the rate of combustion. Materials that are ordinarily nonflammable may burn in an oxygen-enriched atmosphere.

- *Chemical Burns*: Corrosive gases can chemically attack various materials, including fire-resistant clothing. Some gases are not corrosive in their pure form, but can become extremely corrosive if a small amount of moisture is added. Corrosive gases can cause rapid destruction of skin, mucous membranes and eye tissue.

- *Chemical Poisoning*: Chemical poisoning is the primary hazard of toxic gases. Even in very small concentrations, brief exposure to a toxic gas can result in a serious poisoning injury. Symptoms of exposure can be delayed.

- *High Pressure*: All compressed gases are potentially dangerous because of the high pressure stored inside the cylinder. A sudden release of pressure can cause injuries or serious property damage by propelling a cylinder or whipping a line.

- Cylinder Weight: A full-size cylinder can weigh more than 130 pounds. Moving a cylinder manually may cause a serious back or muscular injury. Dropping or dragging a cylinder could also cause a serious injury.

Handling Requirements

- A suitable hand truck or cart equipped with a chain or belt for securing the cylinder to the cart shall be used when moving cylinders, even for short distances.

- Cylinders shall not be lifted by the cap.

- Cylinders shall not be lifted with a lifting magnet. Slings, ropes or chains shall not be used unless the cylinder is equipped with appropriate lifting attachments, (i.e., lugs). Cranes shall not be used unless a safe cradle or platform has been provided to hold the cylinder(s).

- Do not permit cylinders to strike each other violently. Cylinders shall not be used as rollers for moving material or other equipment.

- Cylinder caps shall be kept on the cylinders at all times, except when in use.

- Never tamper with pressure-relief devices in valves or cylinders.

- Only wrenches or tools provided by the cylinder supplier shall be used to remove a cylinder cap or to open a valve. Never use a screwdriver or pliers.

- The cylinder valve shall be kept closed at all times except during use.

- The cylinder shall be positioned so that the valve is accessible at all times.

Storage Requirements

- Cylinder storage areas shall be posted with the types of gases stored.

- All cylinders shall be properly labeled as to their contents.

- All cylinders shall be secured to a wall, bench or fixed support using a chain or strap placed two-thirds of the way up. Cylinder stands may be used as an alternative to straps. Cylinders shall be strapped individually.

- Where gases of different types are stored at the same location, cylinders shall be grouped by types of gas and arranged so that oxidizers and flammable gases are not stored together.

- When oxygen and a fuel gas (acetylene) are to be stored, they shall be separated by a distance of 20 feet or by a non-combustible barrier at least 5 feet high and having a fire resistance rating of 30 minutes. (Two layers of 5/8" sheetrock or _"-thick metal separation.

- Never place acetylene cylinders on their side.

- Do not store empty and full cylinders together.

- Cylinders shall not be stored near flammable or combustible substances.

- Cylinders shall not be placed where they could become part of an electric circuit. When cylinders are used in conjunction with electric welding, precautions must be taken against accidentally grounding the compressed gas cylinders and allowing them to be burned by the electric welding arc.

- Cylinders shall not be stored at temperatures above 125ºF or near other sources of heat.

- If cylinders are stored outdoors, they shall be protected from weather extremes and damp ground to prevent corrosion. Cylinders shall be protected from direct sunlight. If snow or ice accumulates on a cylinder, it should be thawed at room temperature or with water at a temperature not exceeding 125ºF.

- Cylinders shall be protected from objects that may produce a cut or other abrasion in the surface of the metal. Do not store cylinders in locations where heavy moving objects could strike or fall on them.

- The number of cylinders shall be kept to the minimum necessary to reduce fire and toxicity hazards.

Use Requirements

- Before using cylinders, read all label information and material safety data sheets (MSDS) associated with the gas being used.

- Use compressed gases only in a well-ventilated area. Toxic, flammable and corrosive gases must be carefully handled.

- Where more than one type of gas is in use, label gas lines. This is especially important when the gas supply is not in the same room or area as the operation using the gases.

- Cylinder valves should be opened slowly. Never direct high-pressure gas streams toward the body.

- Never use wrenches or tools to open a cylinder valve except those provided or approved by the gas manufacturer. Never hammer the valve wheel in an attempt to close the valve.

- Do not attempt to open valves or caps that are hard to open or are frozen because of corrosion. Return these cylinders to the vendor.

- Connections to piping, regulators and other equipment should always be kept tight to prevent leakage. Where hoses or metal coils are used, they shall be maintained in good condition. Use soap or a similar material to check for leaks. A flame should never be used for leak detection.

- Before a cylinder is removed from service, determine that the cylinder valve is securely closed and that all pressure is released from the connected system.

- Use Teflon tape or thread lubricant for assembly.

- Do not force threads that do not fit exactly.

- Do not use oil or lubricants on equipment with oxygen.

- Do not use copper piping for acetylene.

- When the cylinder is empty, remove the regulator and replace the cylinder cap. Tag the cylinder as empty (MT) and store in a designated area for return to the vendor.

- Do not empty cylinders to a pressure below 25 psi. The residual contents may become contaminated with air.

- Compressed gas cylinders shall be inspected by the user prior to and during use to determine that they are in safe condition for use. Such an inspection should look for corrosion, valve damage or leaks, evidence of tampering, etc. Most compressed gas cylinders are required to be retested periodically. The last test date is stamped on the shoulder. Those cylinders requiring tests shall be returned to the vendor. Hydrostatic pressure tests are to be performed in order to determine whether the cylinders are in good condition for use.

National Park Service Construction Safety Policy

All National Park Service units shall implement Construction Safety programs to protect NPS employees, volunteer workers, contract employees and visitors from hazards associated with construction, demolition, renovation or historical restoration projects. Construction activities that include scaffolds, excavations or fall hazards of six feet or more are responsible for approximately 40 percent of the construction fatalities nationally, and, due to the higher than normal level of risk inherent in these activities, receive special attention within this Reference Manual.

Scope

This program applies to all NPS units and all NPS employees, NPS volunteers and contract employees under direct supervision by the NPS engaged in construction activities. All NPS units are expected to ensure that contracts for maintenance and construction activities include the requirement to incorporate all pertinent federal Occupational Safety and Health Administration standards, or equivalent state plan safety and health standards where applicable. Contact your Regional Safety Office if you are uncertain which jurisdiction applies to your employees and/or outside contractors.

Construction activities are defined by OSHA as any “construction, alteration and/or repair, including painting and decorating. ”This is differentiated from maintenance activities, which are generally defined as “keeping a structure, fixture or foundation (substrate) in proper condition in a routine, scheduled or anticipated fashion.”

For legal purposes, it may be difficult to ascertain whether a project is maintenance or construction, and therefore governed by OSHA General Industry Standards (29 CFR 1910) or OSHA Construction standards (29 CFR 1926). NPS supervisors shall always use the most protective standard (i.e., the procedures that will best ensure employee safety).

References

NPS Construction Safety programs will meet the requirements OSHA has codified in Title 29 Code of Federal Regulations Part 1926 (Construction); 29 CFR 1910 (General Industry) where referenced by 1926 standards, and:

1. Regulations specific to scaffold use are 29 CFR 1926.450-454.

2. Regulations specific to fall protection are 29 CFR 1926.500-503.

3. Regulations specific to excavations/trenching are 29 CFR 1926.650-652.

Program Elements

1. Competent Person.

Per OSHA regulation, all construction activities incorporating scaffolds, excavations and trenching, or fall hazards of six feet or more, must have a competent person involved in the project or task. As defined by OSHA, a competent person for scaffolds, excavations or fall protection must possess:

a. Knowledge and experience to be able to identify hazards.
b. Authority from the employer to correct identified hazards.

A competent person typically requires training to gain the knowledge of the foreseeable hazards, applicable OSHA regulations and current industry practices. Training provider sources are listed in Appendix A.

The competent person can be any NPS employee, regardless of WG/GS rating, as long as that person meets the two requirements listed above.

2. Qualified Person.

Per OSHA definition, a qualified person means one who, by possession of a recognized degree, certificate or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter, the work or the project. Qualified persons are often contract engineers, consultants or trainers who provide specialized services assessing or designing scaffolds, fall protection systems and trench and excavation protection systems. The requirement to use qualified persons in certain instances is listed in 29 CFR 1926 for scaffolds, trenches and fall protection.

3. Training.

It is a supervisory responsibility to ensure all employees engaged in construction activities within the scope of this program receive effective training before engaging in these activities. Employee training requirements and sources are found in Appendices B, C and D.

4. Inspections.

NPS Supervisors shall ensure that projects involving scaffolds, excavations and trenches, or fall hazards of six feet or more, are inspected by “Competent Persons” per requirements within the standards.

5. Safety Plan and Job Hazard Analyses.

A Job Hazard Analysis (JHA) and Site-Specific Safety Plan should be written and used by affected employees and supervisors. The JHA is a planning tool used by supervisors and employees to identify foreseeable hazards and effective hazard control methods. The Site-Specific Safety Plan incorporates all pertinent JHAs into a comprehensive document that fully describes all phases of the work and specifies work practices, engineering controls and personal protective equipment to control or abate hazards identified in the JHAs. A JHA template can be found in Appendix E. An example of a Safety Plan can be found in Appendix F.

Construction (Scaffold, Fall Protection, Excavation and Trenching) Program Checklist

Step 1 ❑ Identify Shops and Employees who conduct work activities that meet the OSHA definition of construction. Ensure these supervisors and employees are aware of and meeting the OSHA requirements as listed in 29 CFR 1926 and 29 CFR 1910, or state plan equivalent (generally Facilities Maintenance employees).

Step 2 ❑ Identify Shops and Employees who conduct work activities specifically involving scaffolds, fall hazards or trenching and excavations (generally Facilities Maintenance employees).

Step 3 ❑ Identify employees or supervisors who will be designated “Competent Persons” to support Shops and Employees who conduct work activities specifically involving scaffolds, fall hazards or trenching and excavations (generally Facilities Maintenance employees).

Step 4 ❑ Ensure Competent Persons receive training at an OTI Center or equivalent as listed in Appendix A and are granted the authority to identify and immediately control hazards or stop work until hazards can be controlled.

Step 5 ❑ Train exposed workers and their supervisors per appendices B, C or D.

Step 6 ❑ Take steps to eliminate or control hazards by engineering or administrative controls as may be recommended by competent or qualified persons.

Step 7 ❑ Provide workers with appropriate personal protective equipment when engineering and administrative control measures (Step 3) fail to control hazards. Ensure workers know how to use this equipment properly. Use JHAs and Site Specific Safety Plans per Appendices E and F.

Step 8 ❑ Identify contracts and contractors that conduct work activities involving scaffolds, fall hazards or trenching and excavations. Ensure that contractors are aware of OSHA requirements and provide for the presence of a competent person at such jobs.

Step 9 ❑ Set up a system to maintain training records.

Technical Appendices

Appendix A: Competent Person Training Requirements and Sources

Appendix B: Required Training Elements for Scaffolds

Appendix C: Required Training Elements for Fall Protection

Appendix D: Required Training Elements for Trenching and Excavations

Appendix E: Job Hazard Analysis Template Appendix F: Site-Specific Safety Plan Example

Appendix A: Competent Person Training Requirements and Sources

Training to become a competent person for Scaffolds, Fall Protection or Trenching and Excavation activities in construction can be received from many sources. The following is a description of training available from OSHA, and an abbreviated national listing of OSHA-approved training providers.

1. OSHA Training Institute

The Occupational Safety and Health Administration Training Institute (OTI) in Des Plaines, Illinois, provides separate courses of instruction designed to provide the knowledge necessary to function as a Competent Person for Scaffold Erection and Use, Excavation and Trenching Operations and Fall Protection Training, as well as many other safety training topics. The annual schedule of courses OTI provides can be found at the OSHA Web site at www.osha.gov under the tab for Training.

2. OTI Outreach Centers

The table below also lists the OTI Outreach Training Centers or training providers that provide Safety and Health related training nationally using OSHA-developed curriculum. Call or contact the most convenient center in your locale.

Keene State College **OSHA Education Center** 175 Ammon Drive Manchester, NH 03103-3308 Phone: (800) 449-6742 Fax: (603) 358-2569 Keene State College	**Rochester Institute of Technology** 31 Lomb Memorial Dr. Rochester, NY 14623-5603 Phone: (866) 385-7470 x-2919 Fax: (585) 475-6292 Rochester Institute of Technology	**Atlantic OSHA Training Center** **Univ. of Medicine & Dentistry NJ** 317 George St. Suite 203 New Brunswick, NJ 08901 Phone: (732) 235-9459 Fax: (732) 235-9460 Univ. of Medicine & Dentistry NJ
Atlantic OSHA Training Center University of Buffalo 3435 Main Street Room 134 Buffalo, NY 14214-3000 Phone: (716) 829-2125 Fax: (716) 829-2806 University of Buffalo	**Atlantic OSHA Training Center Universidad Metropolitana** PO Box 21150 San Juan, PR 00928-1150 Phone: (787) 766-1717 x-6553 Fax: (787) 751-5540 Universidad Metropolitana	**Minnesota Safety Council Continuing Education** 474 Concordia Avenue St. Paul, Minnesota 55103 Phone:(800)444-9150 Fax:(651)291-7584 Minnesota Safety Council
West Virginia University Safety and Health Extension 130 Tower Lane Morgantown, WV 26506-6615 Phone: (800) 626-4748 Fax: (304) 293-5905 West Virginia University	**Keystone Occupational Safety and Health Center (KOSH) Science Center** 3701 Market St. 3rd Floor Philadelphia, PA 19104 Phone: (800) 318-4846 Fax: (215) 387-6321 KOSH Center	**Keystone Occupational Safety and Health Center Indiana University of Pennsylvania** 1010 Oakland Ave Indiana, PA 15705-1087 Phone: (724) 357-3019 Indiana University of Pennsylvania

Eastern Kentucky University 521 Lancaster Ave. Room 202 Richmond, KY 40475-3100 Phone: (888) 401-1956 Fax: (859) 622-6205	**Georgia Institute of Technology** 151 Sixth Street Atlanta, GA 30332-0837 Phone: (800) 653-3629 Fax: (404) 894-8275 Georgia Institute of Technology	**University of South Florida** 13201 Bruce B. Downs Blvd. MDC 56 Tampa, FL 33612-3805 Phone: (866) 697-0975 Fax: (813) 974-9972
Mid-America OSHA Trng. Inst. Sinclair Community College 444 W. 3rd St. Dayton, OH 45402-1460 Phone: (937) 512-3242 Fax: (937) 512-2279 Mid-America OSHA Trng. Inst.	**Mid-America OSHA Trng Inst. Ohio Valley Const. Ed. Foundation** 33 Greenwood Lane Springboro, OH 45066-3034 Phone: (866) 444-4412 Fax: (937) 704-9394 Mid-America OSHA Trng. Inst	**University of South Florida** National Safety Education Center Northern Illinois University 590 Garden Rd. RM 318 DeKalb, IL 60115-2854 Phone: (800) 656-5317 Fax: (815) 753-4203 Northern Illinois University
National Safety Education Center Construction Safety Council 4100 Madison Street Hillside, IL 60162-1768 Phone: (800) 552-7744 Fax: (708) 544-2371 Construction Safety Council	**National Safety Education Center National Safety Council** 1121 Spring Lake Drive Itasca, IL 60143-3201 Phone: (800) 621-7615 Fax: (630) 285-1613	**Great Lakes Region OSHA Training Consortium MWC for Occ Safety & Hlth** 2221 Univ. Ave. SE Ste. 350 Minneapolis, MN 55414 Phone: (800) 493-2060 Fax: (612) 626-4525 MWC for Occup. Safety & Health
Motor City Education Center Eastern Michigan University 2000 Huron River Drive, Ste. 101 Ypsilanti, MI 48197-1699 Phone: (800) 932-8689 Fax: (734) 481-0509 Eastern Michigan University	**Midwest OSHA Education Center, Kirkwood Community College** 6301 Kirkwood Blvd. SW Cedar Rapids, IA 52404 Phone: (800) 464-6874 Fax: (319) 398-1250 Kirkwood Community College	**OSU OSHA Training Institute Oklahoma State University** 512 Engineering North Stillwater, OK 74078-5023 Phone: (866) 449-7993 Fax: (405) 744-5369 Oklahoma State University
Southwest Education Center Texas Engineering Ext. Service 15515 IH-20 at Lumley Mesquite, TX 75181-3710 Phone: (800) 723-3811 Fax: (972) 222-2978 Southwest Education Center	**Midwest OSHA Education Center** **National Safety Council** 11620 M Circle Omaha, NE 68137-2231 Phone: (800) 592-9004 Fax: (402) 896-6331 National Safety Council	**Midwest OSHA Education Centers** **Saint Louis University** 3545 Lafayette Ste. 300 St. Louis, MO 63104-8150 Phone: (888) 382-3756 Fax: (314) 977-8150 Saint Louis University
Metropolitan Community Colleges/ Business & Technology College 1775 Universal Avenue Kansas City, MO 64120-1313 Phone: (800) 841-7158 Fax: (816) 482-5408 Business & Technology College	**Rocky Mountain Education Center Red Rocks Community College** 13300 West Sixth Avenue Lakewood, CO 80228-1255 Phone: (800) 933-8394 Fax: (303) 980-8339 Rocky Mountain Education Center	**Mountain West OSHA Trng & Outreach Ctr Consortium of Salt Lake C.C./ University of Utah** 75 South 2000 East Salt Lake City, UT 84112 Phone: (801) 581-4055 Fax: (801) 585-5275 Mountain West OSHA Training

Region IX OSHA Training Center University of California, San Diego 15373 Innovation Drive, Ste. 105 San Diego, CA 92128-3424 Phone: (800) 358-9206 Fax: (858) 485-7390 Pacific Coast Education Center	**Georgia Institute of Technology WESTEC Westside Energy Services** 210 East Center Street Taft, CA 93268-3605 Phone: (866) 493-7832 Fax: (661) 763-5162 Westside Energy Services	**Region X OSHA Training Center University of Washington** 4225 Roosevelt Way NE #100 Seattle, WA 98105-6099 Phone: (800) 326-7568 Fax: (206) 685-3872 University of Washington
Niagara County Comm. College 50 Main Street Street Lockport, NY 14094-3607 Phone: (800) 280-6742 Fax: (716) 433-5155 Niagara County Comm. College		

Appendix B: Required Training Elements for Scaffolds

This Appendix is provided as a guide for NPS supervisors when evaluating the training needs of employees who are using scaffolds at NPS work sites. Initial training is required before allowing NPS employees to erect, dismantle or work on any scaffold.

The following training provisions for scaffolds are from 29 CFR 1926.454. They supplement and clarify OSHA's general training requirements listed in 29 CFR 1926.21.

Scaffold Erector

The supervisor shall have each employee who is involved in erecting, disassembling, moving, operating, repairing, maintaining or inspecting a scaffold trained by a competent person to recognize any hazards associated with the work in question. The training shall include the following general topics:

- The nature of scaffold hazards.
- The correct procedures for erecting, disassembling, moving, operating, repairing, inspecting and maintaining the type of scaffold in question.
- The design criteria, maximum intended load-carrying capacity and intended use of the scaffold.

All scaffold erectors and dismantlers should receive the general overview and specific training for the type of supported scaffold being used as listed below:

General Overview of Scaffolding

- regulations and standards
- erection/dismantling planning
- PPE and proper procedures
- fall protection
- materials handling
- access
- working platforms
- Foundations
- guys, ties and braces

Tubular Welded Frame Scaffolds

- specific regulations and standards
- components
- parts inspection
- erection/dismantling planning
- guys, ties and braces
- all protection
- general safety
- access and platforms
- erection/dismantling procedures
- rolling scaffold assembly
- Putlogs

Tube and Clamp Scaffolds

- specific regulations and standards
- components
- parts inspection
- erection/dismantling planning
- guys, ties and braces
- fall protection
- general safety
- access and platforms
- erection/dismantling procedures
- buttresses, cantilevers and bridges

System Scaffolds

- specific regulations and standards
- components
- parts inspection
- erection/dismantling planning
- guys, ties and braces
- fall protection
- general safety
- access and platforms
- erection/dismantling procedures
- buttresses, cantilevers and bridges

Certification of Training

The supervisor must verify compliance with these training requirements by preparing a written training certification record. The written certification record shall contain the name(s) of the employee(s) trained, the date(s) of the training, a synopsis of the curriculum used, and the signature of the person who conducted the training or the signature of the supervisor. If the NPS supervisor relies on training conducted by another park, the certification record shall indicate the date the supervisor confirmed that the prior training was adequate rather than the date of actual training.

Retraining Requirements

When the supervisor has reason to believe that an employee lacks the skill or understanding needed for safe work involving the erection, use or dismantling of scaffolds, the supervisor shall have each such employee retrained so that the requisite proficiency is regained. Retraining is required in at least the following situations:

- Where changes at the work site present a hazard about which an employee has not been previously trained.

- Where changes in the types of scaffolds, fall protection, falling object protection or other equipment present a hazard about which an employee has not been previously trained.

- Where inadequacies in an affected employee's work involving scaffolds indicate that the employee has not retained the requisite proficiency.

Appendix C: Required Training Elements for Fall Protection

This Appendix is provided to serve as a guide for NPS supervisors when evaluating the training needs of employees who use fall-protection systems at NPS work sites. Initial training is required before allowing NPS employees to be exposed to fall hazards, or install or use fall-protection systems.

The following training provisions for fall-protection systems are from 29 CFR 1926.503. They supplement and clarify OSHA's general training requirements listed in 29 CFR 1926.21.

Training Program

NPS supervisors shall provide an effective training program for each NPS employee who is exposed to fall hazards. The goal of the training program is to enable NPS employees to recognize fall hazards and understand the procedures to be followed to control or minimize these hazards.

Training must be conducted by a competent or qualified person and cover the following topics:

- The nature of fall hazards in the specific work area.
- The correct procedures for erecting, maintaining, disassembling and inspecting the fall protection systems to be used.
- The use and operation of guardrail systems, personal fall-arrest systems, safety-net systems, warning-line systems, safety-monitoring systems, controlled-access zones and other protection to be used.
- The role of each employee in the safety-monitoring system when this system is used.
- The limitations on the use of mechanical equipment during the performance of roofing work on low-sloped roofs.
- The correct procedures for the handling and storage of equipment and materials and the erection of overhead protection.
- The role of employees in fall-protection plans.
- The standards contained in 29 CFR 1926.500.

Certification of Training

The supervisor shall verify compliance with these training requirements by preparing a written training certification record. The written certification record shall contain the name(s) of the employee(s) trained, the date(s) of the training, a synopsis of the curriculum used, and the signature of the person who conducted the training or the signature of the supervisor. If the NPS supervisor relies on training conducted by another park, the certification record shall indicate the date the supervisor confirmed that the prior training was adequate rather than the date of actual training.

Retraining Requirements

When the supervisor has reason to believe that an NPS employee who has previously been trained lacks the skill or understanding needed for safe work involving the use of fall-protection systems, the supervisor shall have each such employee retrained so that the requisite proficiency is regained. Retraining is required in at least the following situations:

- Where changes at the work site present a hazard about which an employee has not been previously trained.

- Where changes in the types of fall hazards, fall-protection systems and equipment, falling-object protection or other equipment present a hazard about which an employee has not been previously trained.

- Where inadequacies in an affected employee's work involving fall hazards indicate that the employee has not retained the requisite proficiency.

Appendix D: Required Training Elements for Trenching and Excavation

This Appendix is provided to serve as a guide for NPS supervisors when evaluating the training needs of employees who conduct Trenching or Excavation operations at NPS work sites. Initial training is required before allowing NPS employees to enter trenches or excavations, or be exposed to trenching or excavation hazards.

While there are no specific training requirements listed for Trenching or Excavations in 29 CFR 1926.650-653, OSHA's Safety Training and Education standard, 29 CFR 1926.21, puts forth the general requirement for the employer to instruct each NPS employee in the recognition and avoidance of unsafe conditions and the regulations applicable to control or eliminate any hazards. This duty falls to the supervisor.

Training Program

NPS supervisors shall provide an effective training program for each NPS employee who is exposed to trenching or excavation hazards. The goal of the training program is to enable NPS employees to recognize these hazards and understand the procedures to be followed to control or minimize them.

Training must be conducted by a competent or qualified person and cover the requirements in 29 CFR 1926.650-653, with an emphasis on the following topics:

- Identifying and controlling hazards posed by surface encumbrances and underground installations.
- Access and egress of excavations and trenches.
- Protection from vehicular traffic.
- Protection from falling loads.
- Warning system for mobile equipment.
- Hazardous atmospheres and ventilation.
- Emergency rescue equipment.
- Protection from hazards associated with water accumulation.
- Stability of adjacent structures.
- Protection of employees from loose rock or soil.
- Inspections.
- Fall protection.

Certification of Training

The supervisor shall verify compliance with these training requirements by preparing a written training certification record. The written certification record shall contain the name(s) of the employee(s) trained, the date(s) of the training, a synopsis of the curriculum used, and either the signature of the person who conducted the training or the signature of the supervisor. If the NPS supervisor relies on training conducted by another park, the certification record shall indicate the date the supervisor confirmed that the prior training was adequate rather than the date of actual training.

Retraining Requirements

When the supervisor has reason to believe that an NPS employee who has already been trained lacks the skill or understanding needed for safe work in trenches or excavations, the supervisor shall have each such employee retrained so that the requisite proficiency is regained. Retraining is required in at least the following situations:

- Where changes at the work site present a hazard about which an employee has not been previously trained.

- Where changes in the types of soils, equipment or techniques present a hazard about which an employee has not been previously trained.

- Where inadequacies in an affected employee's work involving trenches and excavations indicate that the employee has not retained the requisite proficiency.

Appendix E: Job Hazard Analysis Example/Template

This Appendix provides an example of a useful Job Hazard Analysis (JHA) template designed to help identify hazards and recommended controls associated with specific tasks. The JHA is most effective when supervisors and employees familiar with the tasks work together to identify the steps necessary to complete the jobs and the hazards that are foreseeable at each step, as well as the procedures, techniques and equipment necessary to control or minimize the hazards.

HISTORIC PRESERVATION
JOB HAZARD ANALYSIS – YOSEMITE NATIONAL PARK

JSA #11
JOB / ACTIVITY: USING POWER TOOLS
Date Revised: 9/17/02
PPE: Eye protection, ear protection

TASK/STEP	HAZARDS/SAFETY CONCERNS	SAFETY PROCEDURE
Training inexperienced Workers	Injuries of all types due to a lack of knowledge.	All employees will receive safety and operational training before operating any power equipment.
General use of power tools	Bodily injury from major malfunction Electrocution Serious injury from contact with moving parts, blades, wheels.	Close inspection of power tools prior to use should include checking housing, electrical cords, accessories, bits, blades and wheels for defects. Replace damaged parts/accessories and label of discard defective ones. Be sure that operators are protected from becoming potential ground. Use ground fault-protected circuits, plugs and extension cords. Avoid working where there are puddles that could increase ground potential. Make sure outer casing on electrical cords are in excellent condition. Be sure that power source can put out amperage required to run equipment at proper rating All factory installed guards and shields will remain in place and will be inspected for proper operation before job onset. Operators should not be wear any loose clothing that could get caught in moving parts.
Operating power saws	Major cuts from blades Kickback from binding blade.	Be sure spring-loaded blade guard is operating properly; returning after each cut. Do not allow cut in material to close behind blade. This is called binding and will cause the power saw to “kick-back” toward the operator.

TASK/STEP	HAZARDS/SAFETY CONCERNS	SAFETY PROCEDURE
	Cutting through underlying supports. Wood splinters in eyes.	Manage cords, to ensure you do not cut through them. Check blades before use. Damaged blade pieces can become missiles. Check blade tightness. Do not assume that they are tight or attached properly. Check that there are no nails or screws in material being cut. Work in areas with minimal amount of casual traffic of unprotected individuals. Adjust blade to cut slightly more than material width. Observe where saw horses are in relation to cut. Wear safety glasses.
Operating drills	Drilling into body parts/Severe injuries with long-term or permanent disabilities. “Bit binding” causing twisting injuries to wrists and forearms.	Never drill using pressure that is aimed at any person. Any slip of the bit off of material being drilled should go to “free” space. Be sure hands, etc., are clear when drilling through any material. Do not over commit to drill by gripping too hard. Be sure you can release and avoid twisting injury.
Operating recipro-cating saws	Stabbing or laceration injuries from unprotected blades.	Avoid running saw outside of material being cut. Having the blade buried in material you are cutting is the safest place for it. Be sure no one is standing or leaning against material on other side (injury common during demolition work). Adjust blade guards.
Drill press	Drilling into body; flying debris; object being drilled rotating at high speed.	Clamp objects being drilled to prevent them from moving unpredictably if the bit binds. Wear safety glasses. Proper settings should be used depending on materials being drilled, (e.g., set drill rpm, adjust drill press mast, etc.), to ensure safe and smooth transition through the drilling process (e.g., when starting the bit or when boring through).
Table saws	Bodily injury (i.e., loss of limbs, digits, hearing or sight). Kickback of material.	Provide extensive training before unsupervised use of this equipment is permitted. This includes general maintenance like periodically

TASK/STEP	HAZARDS/SAFETY CONCERNS	SAFETY PROCEDURE
		clearing debris from workspace and replacing dull blades. And it should address specific techniques such as how to avoid kickback due to blade bind or pinch, use of common saw tools and attachments as extension tables, push sticks and feather boards, and use of proper clothing to prevent being pulled into machinery. Use of blade guard and splitter. Use of safety glasses and hearing protection. Anchor industrial table saws when in use, either fixed to the floor or wheel locks engaged.
Bench-mounted grinder and wire wheel	Injury from flying pieces of broken wheel.	With each installation of new grinding wheels, a “ring” test needs to be performed to determine their structural soundness. Operators should stand to one side when using grinders or wheels to minimize risk of injury due to malfunctions that discharge flying debris. Debris will discharge in a line consistent with the direction the wheel is spinning (directly in front of grinder). All guards and safety shields must be in use during operation and adjusted per OSHA standard, and operator wears ANSI-approved face shield when necessary.
Hand-held grinder	Injury from flying debris.	Use face shield or safety glasses due to absence of shield fixed to machinery. Operator can direct majority of grinding discharge (i.e., sparks and debris) by using different parts of grinding wheel. Discharge should be directed away from personnel, and fuel sources and toward the ground when possible.
Air Tools (Up to 120 psi)	Impact injuries from charged hoses. Accidental discharge of bits during operation.	Inspect all hoses and hose connections before charging air lines. Be certain that operating handles are in off position before charging air lines. Avoid slicing, pinching or kinking air hoses. Inspect individual air tools for defects before using them. Specifically check the chuck on

TASK/STEP	HAZARDS/SAFETY CONCERNS	SAFETY PROCEDURE
		these tools for cracks or deformities and be sure that chuck-locking devices function properly.
Operating generators	Electrocution.	Workers should be made aware of this hazard and the preventive measures they can take such as checking generator for ground fault circuit interrupter (GFCI) or use of extension cords with this feature.
Chain mortiser	Serious injury from contact with moving parts and blades. Electrocution.	Keep guards in place and in working order. Remove adjusting keys and wrenches. Don't force tool, it will do the job better and faster at the rate for which it was designed. Secure work. Use both hands to operate tool. Keep tool sharp and clean for best and safest performance. Never leave tool running unattended. Turn power off. Make sure switch is in off position before plugging in. Don't use in damp or wet locations or expose to rain. This tool should be grounded while in use to protect the operator. Use only three-prong extension cords that have three-prong grounding-type plugs and three-prong receptacles that accept the tool's plug. When used outdoors or in damp locations, a ground fault circuit interrupter (GFCI) must be used for employee protection from electrical shock hazard.

Appendix F: Site-Specific Safety Plan Template

NPS units engaged in construction projects are encouraged to use Site-Specific Safety Plans to address hazards proactively. This planning document identifies procedures, tools, equipment and special skills and/or training that will be necessary to complete projects safely, on time and within budget. The Site-Specific Safety Plan should capture all of the JHAs written for this series of tasks necessary to complete the entire project. An example Site-Specific Safety Plan is provided below:

SITE-SPECIFIC SAFETY PLAN EXAMPLE

Roadway Repair at Highway 41 in Yosemite NP

Scope

(Note: This describes the project and resources, personnel and tools that will be used.)

This project entails the repair of roadway sections on Highway 41 from South entrance to the Wawona Tunnel. The repair will include the cutout and replacement of deteriorated asphalt pavement. Once the cutouts are completed, the crew will lay in AR-4000 hot mix in cutouts. There will be a Backhoe in position to remove old pavement from the cutouts, a Distributor Oiler will be used to spray hot Tac-Oil to help stick the AR-4000 material to the existing pavement and a Grader will lay it in with the grader blade. A Roller will be used for proper compaction of the AR-4000. This job will also include repair of the decaying shoulders that accrue on Highway 41 and centerlines of the roadway. If materials are low in the cutouts, the L-9000 will be on hand to help distribute aggregate material to the cutouts. After the process is complete, the roadway will be swept clean of all loose rock and pavement material.

Throughout this entire operation, it will take two flaggers and a pilot car to move visitor traffic in and out of the working area in a safe manner at 15 to 20 miles per hour. There will be a supervisor at all times within the area to ensure the safety and compliance of the workers, machines and the traffic.

The total list of heavy equipment includes backhoe, grader, 210-gal. Tac-Oil trailer, L-9000 dump truck, three-ton roller and trailer, and a pull-behind sweeper. A wide variety of hand tools will also be used, including: shovels, steel rakes and pavement rakes. Two sets of “Construction Ahead” traffic signs, two sets of “Flagger Ahead” signs and two 25-mph signs will be necessary.

Safety Program and References

(Note: This describes the NPS unit’s specific safety program requirements and any pertinent standards or regulations from OSHA, EPA, DOT, etc.)

An aggressive safety program, including the review of Job Hazard Analyses (JHA) at the outset of performing new tasks, weekly tailgate safety sessions, weekly work site inspections and daily safety reminders involving all employees on the work-site.
All employees are encouraged to report unsafe conditions and to incorporate any suggestions brought into the construction site by visiting management and other observers. Per park superintendent verbal instruction, all employees are authorized to stop work when unsafe/unhealthful conditions are observed.

Work on this site will be performed per requirements listed in the Park Safety Policies found in the “Workers Guide to Safety” and the OSHA 29 CFR 1926 requirements for Construction that the supervisor has been issued. Another copy of the 29 CFR 1926 may be found in the park Safety Office.

Job Hazard Analyses (JHAs) For Associated Tasks

(Note: This lists all the specific JHAs that the employees and supervisor have worked up for this project, and the JHAs identified here should be appended to the end of this plan.)

Flagging Operations: JHA 1
Pilot Car Operation: JHA 2
950- Cat Loader: JHA 3
Paving and Overlaying: JHA 4
SS1 Tac-Oil: JHA 5
Two Drum, 3-ton rollers: JHA 6
Road Sweeping Pull Broom: JHA 7
Core-Cut, Self-Propelled Pavement Cutter: JHA 8
Backhoe Operation: JHA 9

Personal Protective Equipment

(Note: This lists the personal protective equipment (PPE) requirements for this specific job, and this list should take into account hazards that are a result of the job, such as movement of heavy equipment, use of material handling equipment and environmental factors such as traffic, weather, etc. This section should also list PPE requirements for visitors, such as contracting officers, park management, etc.)

Employees will wear yellow hardhats, safety glasses, retro-reflective traffic vests in fluo-rescent green or orange, steel-toe boots, long pants and gloves. Hearing protection will be worn when required, and hand-held radios will be used regularly on this construction site. Hardhats, safety glasses, steel-toe boots and traffic vests will be ANSI-approved. Due to hot weather and heat stress conditions, all crews will have five-gallon water coolers on hand to prevent dehydration as well as sunscreen. When specified by JHAs, employees will use specific protective equipment, such as respirators for quarrying and chainsaw chaps when sawing.

When heavy equipment is operating on the site, ALL persons on the site will wear orange or lime-green safety vests and radios in addition to the standard PPE.
All visitors to the job site, including park management, will be escorted and must wear hardhats and traffic vests. Three sets of hardhats and lime-green traffic vests will be kept in the supervisor’s truck for such purpose

Work Zone Controls

(Note: Protection of the general public must always be considered and addressed.)
Through the use of barricades, flagging, traffic cones, signage and flagging guards, the visiting public and park personnel will be kept “out of harm’s way.”These closures will be left in place throughout the period in which injury could be incurred due to heavy equipment or other obstacles caused by project procedures. All park personnel must wear the proper PPE to enter the work site.

Flagging Operations

(Note: These are the specific rules the flagging operations supervisor has adopted to protect his work zone from traffic.)

1. High-Visibility Clothing

   All Flaggers and Workers will wear orange or yellow-green fluorescent warning garments (ANSI-approved Type II vest).

   Approved Standard Hard Hats (Wide Brim) From Sun Protection

2. Flagger Equipment

   A STOP/SLOW paddle (C28A & B) in good shape.

   Advanced warning signs for day or night operations.

Channelizing devices such as traffic cones. A method of communications (Park Radio Channel 8) Drinking Water Protective clothing (raincoat in case of expected bad weather).

3. Work Zone Layout

   Approved transitions to channelize traffic from normal to a new path (per MUTCD and ATSSA guidelines).

   An Active area should consist of a work space, traffic space and buffer space and a termination area to return traffic to the normal traffic path.

4. Flagger Station

   Shall have the proper advance warning signs. Will be visible to approaching traffic at all times. Have an escape route. Adequate lighting (out of shadows) during the daylight hours. When flaggers are no longer needed, be sure to cover or remove

   “Flagger Ahead” and “Prepare to Stop” signs. Park all vehicles away from the flagging station. Eliminate distractions like chairs, books and music radios.

5. Pilot Car

   All traffic waits for pilot car.

   Provides guidance and speed control. During long lane closures, two pilot cars may be used. Pilot cars require special signs and radios.

6. Emergency Vehicle and Traffic Accidents and Violations.

When informed in advance of an approaching emergency vehicle, the Flagger should clear an unimpeded path for the emergency traffic in both directions. Ensure the supervisor is informed immediately so that all work is stopped in the working area.

When an unauthorized, uncontrolled vehicle has entered the work zone, warn all workers and equipment operators that a vehicle has run the stop sign. Stop all traffic from continuing and hold till told to let go. Prepare for this ahead of time and have an escape route in your plan in case of this emergency.

7. Traffic Accidents:

   Notify your supervisor and call for help.

   If an accident happens in the line of waiting traffic, stay at your station and continue to control traffic until you receive instruction from your supervisor or park ranger. If an accident happens in the controlled area, hold approaching traffic and follow instructions from your supervisor, safety officer or park ranger.

   Flaggers are to communicate with each other before releasing or stopping traffic.

   There is a handbook with the JHAs for flagging.

Heavy Equipment

When mechanized heavy equipment is used on site, all vehicles will be checked daily for proper operation of all equipment, with particular emphasis on backup alarms, mirrors (if equipped), brakes, seatbelts, etc.

When so equipped, seatbelts will be worn at all times. Ground guides will be used to direct heavy equipment.
During refueling operations, operators must use catch pans and have spill control absorbent materials on hand to prevent environmental damage.

Job-Site Inspections

(Note: All projects of more than a day's duration should have job-site inspection requirements to ensure that changing job-site conditions do not create new hazards.)

Before the project starts: All employees will be familiar with the requirements of this program before work commences.

Daily: Supervisors will inspect the job site daily before work starts and will brief the work crew on the Job Safety Analysis for that phase of work and expected actions to enhance safety.

Weekly: Supervisors will inspect the job site weekly using checklist provided in the below listed appendix. The checklist will be kept on file for the duration of the job.

Stop-Work Policy

(Note: This is a policy specific to this park and is a policy that would have to be approved by park management and the superintendent.)

Any park employee on this site has authority to stop work when unsafe/unhealthful conditions are noted. The supervisor will address the issue before work commences or on the day the condition was reported. If the employee is not satisfied with the supervisor's actions, the employee will file an unsafe/unhealthful from directly with the Safety Officer, either by phone call or by filling out and forwarding to the Safety Officer the written Park Unsafe/Unhealthful Form.

Crew Training Requirements

(Note: This section is used by the supervisor to identify any training requirements necessary to complete the job safely or as required by NPS directive or regulations from OSHA, the EPA, DOT, FHWA, State or Local authorities, etc.)

Hazcom training
CPR/ First-aid certification
Loader training
JHAs
Tailgate-safety meeting
Grader operations
Tac-oil operations
Roller operations
Backhoe operations
Radio communications
Hand-signals training
Core-cut pavement cutter (self-propelled)
Flagger operations
All training rosters will be submitted to the Safety Office

Emergency Response Plan

Life-Threatening Injuries

- Call 911 and/or dispatch.
- Perform first-aid/ first-responder protocols.
- Contact clinic and transport ASAP.

- Wilderness First Responder and Crew First Aid Kits located in “Job Box” at work site.

- Notify the Safety Office when the incident is under control.

Non-Life-Threatening Injuries

- First-aid first (contact clinic and transport if necessary).

- Notify Safety Office and immediate supervisor.

- Each individual employee carries minimal first-aid kits in personal packs.

Hazardous Materials Spills

MSDS located in “Job Box” at work site or equipment.

Any spill over five gallons: Contain and then call 911 to notify dispatch.

Smaller spills: immediately contain hazardous materials using spill kits. Spill kits will be provided for each piece of equipment and be updated and restocked as necessary.

Refuel heavy equipment in maintenance area when possible. Use spill pans and absorbent material to prevent HazMat spills onto soil or water. Wrap absorbent material around any leaking hydraulic hose fittings. Supply and re-supply each maintenance kit for hand-held equipment with spill kits. Always use absorbent blankets when refueling hand-operated equipment.

Emergency Phone Numbers

911 – Life-threatening injuries / Hazardous spills more than five gallons
Dispatch _____
Medical Clinic _____
Fire- _____
Police/LE Rangers- _____
Safety Officer: Phone _____
Pager _____

A COPY OF THE JOB SAFETY PLAN, JHAs AND FLAGGING HAND BOOK WILL BE KEPT AT THE JOB SITE IN THE SUPERVISOR'S VEHICLE FOR EMPLOYEE REVIEW.