Langley Research Center

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PERSONNEL PROTECTION - CLOTHING AND EQUIPMENT

National Aeronautics and Space Administration

Responsible Office: Safety and Mission Assurance Office

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PREFACE

P.1 PURPOSE

a. This Langley Procedural Requirement (LPR) is published to establish the standards for the management of protective clothing and equipment for civil servant and contractor employees on Langley Research Center (LaRC).

b. The management of the protective clothing and equipment process includes the responsibilities for the acquisition, issuance, control, and maintenance of these items.

P.2 APPLICABILITY

a. These requirements apply to all persons performing work at Langley Research Center (LaRC), including civil servants, contractors, research associates, and others.

b. Non-compliance with this LPR will result in appropriate disciplinary action that may include termination for a civil servant employee or exclusion from the Center for a contractor employee, research associate or others.

P.3 AUTHORITY

a. NPD 8710.2, “NASA Safety and Health Program Policy.”

b. Occupational Safety and Health Administration (OSHA), U.S. Department of Labor, Regulation 29 CFR 1910, "Standards for General Industry."

c. Occupational Safety and Health Administration (OSHA), U.S. Department of Labor, Regulation 29 CFR 1926, "Safety and Health Regulations for Construction."

d. American National Standards Institute (ANSI).

e. National Institute for Occupational Safety and Health.

P.4 APPLICABLE DOCUMENTS

a. NPR 8715.3, "NASA Safety Manual."

b. LAPD 1700.2, “Safety Assignments.”

c. LPR 1710.5, "Ionizing Radiation."

d. LPR 1710.8, "Nonionizing Radiation."

e. LPR 2710.1, “LaRC Noise Control and Hearing Conservation Program.”

f. LPR 1710.12, "Potentially Hazardous Materials."

g. LPR 1710.6, "Electrical Safety."

h. Langley Form 59, "Certification for Industrial Grade Safety Glasses."

i. Langley Form 73, "Self-Contained Breathing Apparatus (SCBA) Inspection & Maintenance Report (Weekly/Monthly Log on Back)."

j. Mine Safety Appliances (MSA) Bulletin No. 0105-51.

k. ANSI Z87.1-1989, "American National Standard Practice for Occupational and Educational Eye and Face Protection."

l. ANSI Z41-1991, "American Standard for Personal Protection-Protective Footwear."

m. ANSI Z89.1-1986, "American Standard for Personal Protection-Protective Headwear."

n. OSHA 29 CFR 1910.134, "Personal Protective Equipment."

P.5 MEASUREMENT/VERIFICATION

None

P.6 CANCELLATION

LPR 1710.4 dated November 17, 2005.

Original signed by

Lesa B. Roe
Center Director

Distribution:
Approved for public release via the Langley Management System; distribution is unlimited.

Chapter 1

1. INTRODUCTION

1.1 GENERAL

1.1.1 Protective clothing and equipment shall be issued to civil service employees at Government expense and to contracting employees at the contracting company's expense in those situations where engineering controls, management controls, or other corrective actions have not reduced a hazard to an acceptable level or where use of engineering controls, management controls, or other techniques are not feasible.

1.1.2 Personal Protective Equipment (PPE) shall be provided and used or worn whenever employees encounter the following hazards in the work environment:

a. Chemical hazards.

b. Radiological hazards.

c. Mechanical-particulate or toxic irritants encountered in a manner capable of causing injury or impairment in the function of any part of body through absorption, inhalation or physical contact.

1.1.3 Procurement

1.1.3.1 The purchase of protective clothing and equipment for civil service employees shall require the approval of the Safety and Facility Assurance Branch (SFAB), Safety and Mission Assurance Office (SMAO), prior to purchase to ensure the proper protective clothing and equipment is obtained for the task being performed.

1.1.3.2 The purchase of protective clothing and equipment for contractor employees shall require the approval of the contracting company safety representative, prior to purchase to ensure the proper protective clothing and equipment is obtained for the task being performed.

1.1.4 Issuance of Proper Clothing and Equipment

1.1.4.1 Protective clothing and equipment shall be provided, used, stored, and maintained in a serviceable condition at all times.

1.1.4.2 Protective clothing and equipment turned in by an employee or that has been worn by an employee shall be cleaned and sanitized prior to being reused or reissued to another employee.

1.1.4.3 Employees shall be trained in the proper use of provided protective clothing and equipment, in accordance with Federal and Agency regulations. Items, which may be purchased and issued by LaRC or a contracting company include, but are not limited to, the following:

a. Safety goggles and safety spectacles (prescription and nonprescription).

b. Welding helmets and shields.

c. Safety shoes and/or boots.

d. Aprons, suits, and gloves (e.g., fire resistant materials, leather, rubber, cotton, and synthetics).

e. Protective headgear (e.g., hard hats and caps, liners, helmets, and hoods).

f. Face shields.

g. Fall protection.

h. Health-related protective clothing and equipment, such as respirators.

i. Hearing protection.

> ***NOTE:*** *Requirements concerning shock and arc flash personal protective clothing and equipment are indicated in LPR 1710.6, "Electrical Safety."*

1.1.5 Safety Planning for New Operations

1.1.5.1 Civil service and contractor research and engineering personnel shall coordinate in advance with Facility Coordinators (FCs), Facility Safety Heads (FSHs), and the LaRC Safety Manager or contracting company manager when planning new operations or tests.

1.1.5.2 Safety planning ensures a review of the operation or test is conducted and the appropriate protective clothing and equipment is identified and its required use explained in the operation or test procedures, to ensure the safety and health of personnel.

1.1.5.3 The planning process also ensures that personnel have received training in the use, limitations, and maintenance of required safety items.

1.2 RESPONSIBILITIES

The following paragraphs summarize responsibilities assigned to specific individuals on LaRC, ensuring the proper management and administration of personnel protection clothing and equipment.

1.2.1 LaRC Safety Manager

The LaRC Safety Manager is responsible for the issuance of protective clothing and equipment in accordance with LAPD 1700.2, "Safety Assignments," and LaRC procurement procedures. The LaRC Safety Manager shall:

a. Provide advice to Research Project Engineers, FSHs, FCs or supervisors concerning the determination and designation of hazardous areas and/or occupations where protective clothing and equipment are required.

b. Determine the appropriate protective clothing and equipment authorized for use by civil service employees while working around hazards.

c. Provide advice concerning the selection of protective clothing and equipment for civil service employees.

d. Approve purchase requests for NASA LaRC-furnished protective clothing and equipment.

e. Consult with the proper medical authority, when professional medical advice is necessary, to determine specific requirements of protective clothing and equipment.

f. Coordinate with radiation safety personnel to determine protective clothing and equipment requirements for items worn around ionizing and nonionizing radiation (see LPR 1710.5, "Ionizing Radiation," and LPR 1710.8, "Nonionizing Radiation").

g. Ensure all applications for respiratory protective devices are specified.

h. Ensure civil service employees issued respiratory protection equipment are fitted for use.

i. Ensure civil service employees requiring respiratory protection equipment receive instruction from the SFAB Industrial Hygienist concerning the use of and limitations of respiratory protection.

j. Ensure that other required protective devices, such as gloves, hearing protection, and eye protection are issued to civil service employees and instruction provided concerning fitting and maintenance requirements.

1.2.2 Contract Manager

The Contract Manager or his/her designee is responsible for the issuance of protection clothing and equipment in accordance with the terms and conditions of their contract or agreement. The Contract Manager or his/her designee shall:

a. Provide advice to contractor Research Project Engineers, FSHs, FCs or supervisors concerning the determination and designation of hazardous areas and/or occupations where protective clothing and equipment are required.

b. Determine the appropriate protective clothing and equipment authorized for use by contractor employees while working around hazards.

c. Provide advice concerning the selection of protective clothing and equipment for contractor employees.

d. Approve the purchase of contractor provided protective clothing and equipment.

e. Consult with the proper medical authority, when professional medical advice is necessary, to determine specific requirements of protective clothing and equipment.

f. Coordinate with radiation safety personnel to determine protective clothing and equipment requirements for items worn around ionizing and nonionizing radiation (see LPR 1710.5, "Ionizing Radiation," and LPR 1710.8, "Nonionizing Radiation").

g. Ensure all applications for respiratory protective devices are specified.

h. Ensure contractor employees issued respiratory protection equipment are fitted for use.

i. Ensure contractor employees requiring respiratory protection equipment receive instruction from the contracting company's qualified individual concerning the use of and limitations of respiratory protection.

j. Ensure that other required protective devices, such as gloves, hearing protection, and eye protection are issued and instruction provided concerning fitting and maintenance requirements.

1.2.3 Cognizant Line Supervisor (Civil Service and Contractor)

Line supervisors shall have the following responsibilities concerning the issuance of protective clothing and equipment:

a. Surveying and identifying, for review by the LaRC Safety Manager/Contract Manager, all actual and potentially hazardous work areas, job operations and working conditions where protective clothing or equipment may be essential for the safety and personal protection of employees.

b. Initiating and approving stores stock requisitions for required protective clothing and equipment available in the Center's/contracting company's stores stock inventory. The approval of the requisition is subject to the verification of the need for and appropriateness of the items requisitioned.

c. Ensuring that each employee under their jurisdiction is aware of the specific protective clothing and equipment requirements for work assignments and is trained in the use and safety limitations of those items.

1.2.4 Office of Human Capital Management (OHCM)

1.2.4.1 The LaRC Office of Human Capital Management and the contracting company's equivalent office shall provide new employees with information concerning job specific requirements for apparel or clothing.

1.2.4.2 New employees shall be informed when items shall be required for employees to perform their assigned job functions and are a condition of employment must be furnished at the employee’s expense.

1.3 ACCOUNTABILITY AND CONTROL

Protective clothing and equipment issued by LaRC or the contracting company shall be accounted for and controlled by applicable Agency, Center, or contracting company property control procedures.

1.4 FAIR WEAR AND TEAR, LOST, DAMAGED, OR DESTROYED ITEMS

1.4.1 Items, which have served their purpose through normal wear and tear, shall be turned in by the user to the cognizant supervisor for disposal**.**

1.4.2 Items that become lost, misplaced, damaged, or destroyed shall be reported to the cognizant supervisor prior to issuance of replacement.

1.4.2.1 The supervisor shall account for such items in accordance with applicable Agency, Center, or contracting company property control procedures.

1.5 CLEANING OF PROTECTIVE CLOTHING

1.5.1 Protective clothing, as defined in this LPR, shall be laundered, cleaned, and decontaminated at Government or contracting company expense.

1.5.2 An annual purchase requisition shall be submitted through the Logistics Management Team, Center Operations Directorate, to cover laundry and/or dry cleaning services for civil service organizations.

1.5.2.1 Laundry and/or dry cleaning services are available for coveralls, towels, lab coats, pants, shirts, night suits, and jackets to all civil service employees.

1.5.2.2 The initiator, or designee of the purchase request for laundry or dry cleaning service shall ensure accountability of items cleaned and sign appropriate delivery tickets certifying quantities received.

1.5.2.3 Contracting companies shall have an equivalent process to provide for the laundry and/or dry cleaning services of protective clothing for contractor employees.

1.6 LOAN OF PROTECTIVE CLOTHING AND EQUIPMENT

Protective clothing and equipment is not normally issued to contractor personnel by the Government; however, the contract technical monitor or on-site supervisor shall contact the LaRC Safety Manager to obtain authorization for the issuance or loan of appropriate protective devices in an emergency or when such issuance is beneficial to the Government.

Chapter 2

2. EYE AND FACE PROTECTION

2.1 PURPOSE

This chapter contains specific instructions for the authorization, issuance, and use of eye and face protective devices, including goggles, spectacles, face shields, and welding helmets.

2.2 PROTECTIVE EYEGLASSES (SAFETY GLASSES)

2.2.1 Nonprescription and prescription safety glasses (lens and frames) shall be manufactured to meet the requirements of ANSI Z87.1-1989, "American National Standard Practice for Occupational and Educational Eye and Face Protection."

2.2.2 For safety purposes, there shall be no deviation from prescribed manufacturing standards when providing eye protection.

2.2.3 Photo chromic lenses (lens that darken when exposed to sunlight, and which fade when removed from sunlight) are unacceptable in LaRC hazardous work environments.

2.2.4 Wearers of contact lenses shall be required to wear the appropriate eye protection in LaRC hazardous work environments.

2.2.5 Nonprescription Safety Glasses

2.2.5.1 Nonprescription protective eyeglasses (safety glasses) shall be provided to civil service employees by the Government and to contractor employees by their contracting company, when they are engaged in work operations or in work environments, when there is inherent danger to workers' eyes or the probability of incurring an eye injury is high.

2.2.5.2 When the danger is high, protective eyeglasses shall be provided at no cost to employees engaged in operations where they are exposed to hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation such as cutting, grinding, machining, soldering, filing, fabricating and major maintenance work, and employees performing frequent survey, audit, inspection, or overview functions in eye hazardous areas, or any other work environments deemed by the LaRC Safety Manager/Contract Manager to present eye hazard elements.

2.2.5.2.1 This requirement also includes employees who are required to wear prescription eyeglasses in the normal course of these duties.

2.2.5.2.2 The cost of the eye examination to obtain the prescription for the glasses shall be borne by the employee.

2.2.6 Prescription Safety Glasses

2.2.6.1 Civil service employees who are eligible for prescription safety glasses shall obtain them by requesting authorization from the SFAB.

2.2.6.2 The civil service employee shall submit a prescription less than 2 years old when initiating the request for safety glasses.

2.2.6.3 Upon SFAB verification of eligibility and need, the SFAB shall issue NASA Langley Form 59, "Certification for Industrial Grade Safety Glasses," authorizing the employee to obtain prescription safety glasses through the Workforce Management and Policy Office (WMPO) contracted optical services company.

2.2.6.4 Upon receipt of the authorization from the SFAB and prescription from the employee, the WMPO contracted optical services company shall arrange for the prescription safety glasses.

2.2.6.4 The repair or replacement of civil service supplied prescription safety glasses shall be borne by the Government, provided such repair or replacement is a result of normal wear and usage, or accidental damage while performing work functions.

2.2.6.5 Civil service employees desiring a second pair of safety glasses may elect to procure them through the WMPO contracted optical services company at the employee's own cost.

2.2.6.5.1 The cost of the second pair of safety glasses shall be borne by the employee.

2.2.6.5.2 Contractor employees shall be provided prescription safety glasses through an equivalent process by their contracted company.

2.3 PROTECTIVE EQUIPMENT

2.3.1 Protective equipment shall be required in work operations and work environments having the capacity to produce an injury to an employee's eyes or face.

2.3.2 The Selection Chart (Figure 2-1) provides the following information:

a. Illustrates and identifies the protective equipment, which is available for use on LaRC.

b. Contains recommended applications of the equipment to optimize eye and face protection while performing hazardous work.

c. Serves as a guide to employees and supervisors in selecting eye and face protectors consistent with prevalent working conditions.

2.3.3 **Requisitioning Protective Equipment**

2.3.3.1 Face and eye protective equipment and devices required by civil service employees for normal operations shall be obtained through the employee's supervisor/organization with approval by SFAB.

2.3.3.2 When work efforts require special devices—such as, laser goggles, foundry devices, or newly developed devices—the required equipment shall be requisitioned through a Government Purchase Request, and processed through the LaRC Safety Manager for approval.

2.3.3.3 Contractor companies shall have a process equivalent to the requirements of civil servant employees to provide the required equipment for contractor employees.

2.3.4 **Maintaining an Adequate Supply of Protective Equipment**

2.3.4.1 Supervisors and/or FSHs shall ensure that their respective facilities maintain an adequate supply of protective equipment and devices, including appropriate protective devices for personnel who visit their facilities.

2.3.4.2 Supervisors and/or FSHs shall ensure that employees and visiting personnel wear required protective equipment and devices while working in or visiting hazardous areas.

2.3.5 **Identifying Hazardous Areas**

2.3.5.1 Hazardous areas shall be designated and shall be prominently identified by special signs and designators.

2.3.5.2 Where necessary, the SFAB/contractor company shall inspect and verify the locations of areas that present hazards to employees’ eyes and faces.

2.3.5.2.1 This inspection shall ensure that hazardous areas are properly designated and that protective devices and equipment are being used while performing work functions.

2.3.5.2.2 The SFAB/contract company shall make recommendations concerning the type of devices including goggles, spectacles, and face shields that are most suitable to the working conditions in that work area.

American National Standard Institute (ANSI) Z87.1-1989 Selection Chart
Protectors

		Assessment See Note (1)	Protector Type	Protectors	Limitations	No Recommended
IMPACT	Chipping, grinding machining, masonry work, riveting and sanding	Flying fragments, objects, large chips, particles, sand, dirt, etc.	B,C,D, E,F,G, H,I,J, K,L,N	Spectacles, goggles, face shields SEE NOTES (1) (3) (5) (6) (10) for severe exposure add N	Protective devices do not provide unlimited protection. SEE NOTE (7)	Protectors that do not provide protection from side exposure (SEE NOTE (10) Filter or tinted lenses that restrict light, transmittance, unless it is determined that a glare hazard exists. Refer to OPTICAL RADIATION.
HEAT	Furnace operations, pouring, casting not dipping, gas cutting, and welding.	Hot Sparks	B,C,D, E,F,G, H,I,J, K,L,N	Face shields, goggles, spectacles. *For severe exposure add N SEE NOTES (2) (3)	Spectacles, cup and cover type goggles do not provide unlimited facial protection. SEE NOTE (2)	Protectors that do not provide protection from side exposure
		Splash from molten metals	N	*Face shields worn over goggles H, K SEE NOTES (2) (3)		
		High temperature exposure	N	Screen face shields, Reflective face shields SEE NOTES (2) (3)	SEE NOTE (3)	
CHEMICAL	Acid and chemicals handling, decreasing	Splash	G,H,K N	Goggles, eyecup and cover types *For sever exposure, add N	Ventilation should be adequate but well protected from splash entry	Spectacles, welding helmets, hand shields
		Irritating mists	G	Special purpose goggles	SEE NOTE (3)	
	Woodworking, buffing, general dusty conditions	Nuisance dust	G,H,K	Goggles, eyecup and cover types	Atmospheric conditions and the restricted ventilation of the protector can cause lenses to fog. Frequent cleaning may be required.	
	WELDING: Electric Arc		O,P,Q	TYPICAL FILTER LENS SHADE PROTECTORS	Protection from optical radiation is directly related to filter lens density. SEE	Protectors that do not provide protection from optical radiation

				SEE NOTE (9) 10-14	Welding Helmets Or Welding Shields	NOTE (4). Select the darkest shade that allows adequate task performance.	SEE NOTE (4)
OPTICAL RADIATION	WELDING GAS CUTTING	J,K,L, M,N,O P,Q	SEE NOTE (9) 4-6 3-6	Welding Goggles Or Welding Face - shields			
	TORCH BRAZING		3-4		SEE NOTE (3)		
	TORCH SOLDERING GLARE	B,C,D. E.F.N A,B	1.5-3	Spectacles Or Welding Face- shields Spectacle SEE NOTES (9) (10)	Shaded or special Purpose, lenses, as suitable. SEE NOTE (8)		

Figure 2-1 American National Standard Z87.1-1989—Selection Chart

NOTES:

(1) Care shall be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of each of the hazards must be provided.
(2) Operations involving heat may also involve optical radiation. Protection from both hazards shall be provided.
(3) Face shields shall only be worn over primary eye protection.
(4) Filter lenses shall meet the requirements for shade designates in Table 1 of ANSI Standard Z87.1.
(5) Persons whose vision requires the use of prescription lenses shall wear either protective devices fitted with prescription lenses or protective devices designed to be worn over regular prescription eyewear.
(6) Wearers of contact lenses shall also be required to wear appropriate covering eye and face protection devices in a hazardous environment. It should be recognized that dusty and/or chemical environments may represent an additional hazard to contact lens wearers.
(7) Caution should be exercised in the use of metal frame protective devices in electrical hazard areas.
(8) Refer to Section 6.5, Special Purpose Lens, of ANSI Standard Z87.1.
(9) Welding helmets or hand shields shall be used only over primary eye protection.
(10) Non-side shield spectacles are available for frontal protection only.

ANSI (Z87.1 – 1989) Recommended Eye and Face Protectors for Use in Industry, Schools and Colleges

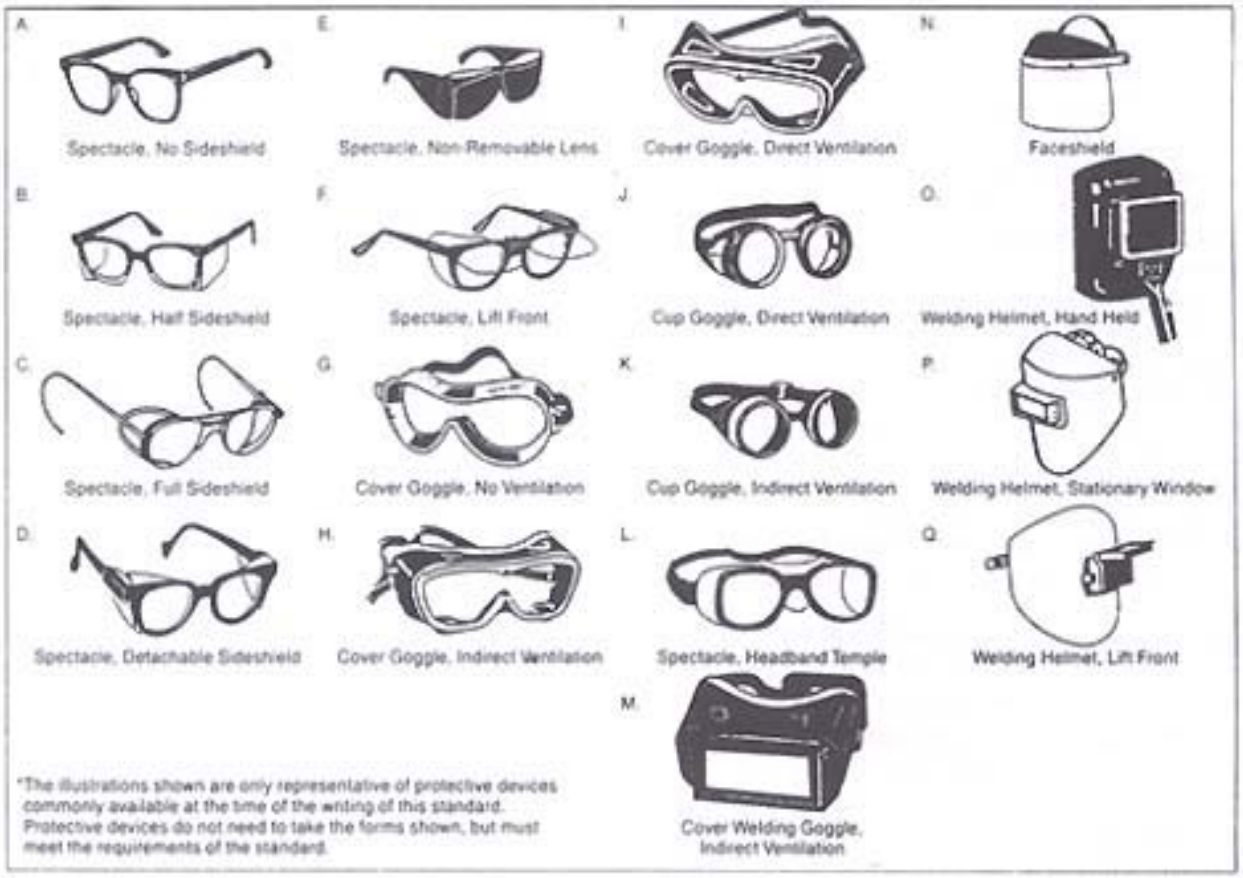

Figure 2-2, American National Standard Institute Z87.1 – 1989—Protective Devices

Chapter 3

3. PROTECTIVE FOOTWEAR

3.1 POLICY

3.1.1 Protective footwear shall be provided to employees engaged in work operations where there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, and where such employee's feet are exposed to electrical hazards.

3.1.2 Civil service employees engaged in continuous work situations where foot hazards are present shall be furnished appropriate protective footwear at no cost to the employee by the Government and to contractor employees by the contractor company.

3.1.3 The cost to repair/replace required protective footwear for civil service employees shall be borne by the Government and for contractor employees by the contractor company.

3.1.5 All protective footwear shall meet the requirements of ANSI Standard Z41-1991, "American Standard for Personal Protection-Protective Footwear."

3.2 RESPONSIBILITIES

Responsibilities concerning the use of protective footwear are discussed in the following paragraphs.

3.2.1 **Safety and Facility Assurance Branch** shall:

a. Implement and maintain a protective footwear program, including authorizing the procurement of and issuance of protective footwear to designated civil service employees

b. Determine the areas of operation and work environments where the use of protective footwear is required.

3.2.2 **Contractor Company** shall:

a. Implement and maintain a protective footwear program, including authorizing the procurement of and issuance of protective footwear to designated contractor employees, and

b. Determine the areas of operation and work environments where the use of protective footwear is required.

3.2.3 **Line Supervisors**

3.2.3.1 **Civil servant** line supervisors shall:

a. Initiate requests to purchase protective footwear for civil service employees, through their organization.

b. Obtain approval for the purchase of protective footwear from the SFAB for civil service employees.

c. Assure that the furnished protective footwear is worn by employees in designated foot hazard areas.

3.2.3.2 **Contractor** line supervisors shall:

a. Initiate requests to purchase protective footwear for contract employees, through their organization.

b. Obtain approval for the purchase of protective footwear from the SFAB for contract employees.

c. Assure that the furnished protective footwear is worn by employees in designated foot hazard areas.

3.2.4 **Employees**

3.2.4.1 Employees shall be responsible for the normal care and appropriate use of protective footwear.

3.2.4.2 Employees shall return used footwear for replacement, or repair when required.

3.2.4.3 Employees shall be restricted from wearing defective or worn-out protective footwear, which could contribute to a foot injury.

Chapter 4

4. HEARING PROTECTION DEVICES

4.1 PURPOSE

4.1.1 This chapter provides instructions for the issuance and use of hearing protection devices on LaRC.

4.1.2 Issues concerning the LaRC Noise Control and Hearing Conservation Program are referred to in LPR 2710.1, “LaRC Noise Control and Hearing Conservation Program.”

4.1.3 Uncontrolled, noise can cause numerous hazards in the work place. Employees shall protect themselves from excessive noise levels in order to prevent:

a. Being annoyed by noise in the workplace,

b. Having their concentration disrupted when working on assigned tasks,

c. Suffering from ear pain,

d. Suffering from nausea,

e. Incurring a permanent noise-induced hearing loss, and

f. In extreme cases, incurring other health complications.

4.2 GENERAL REQUIREMENTS

4.2.1 Generally, whenever noise levels exceed an eight-hour time-weighted average (TWA) of 90 decibels, OSHA requires that administrative and engineering controls be utilized to limit employees’ exposure to noise.

4.2.2 When administrative and engineering controls cannot reduce the noise to an acceptable level, personal protective equipment (PPE) shall be required.

4.2.3 The use of hearing protection devices is required on LaRC whenever personnel are exposed to sound pressure levels in excess of:

a. 85 dBA for steady sound pressure and/or intermittent noise, or
b. 140 dB peak sound pressure or greater for impact/impulse noise.

4.3 PROTECTION AGAINST NOISE HAZARDS

4.3.1 Hearing protection devices such as earplugs and/or earmuffs are the primary methods used to protect the hearing of employees who work in noise hazardous areas.

4.3.2 These protective devices are designed to reduce hazardous noise while allowing passage of sounds, which fall in the speech frequency range. This allows workers to safely communicate with each other while working.

4.3.3 Earplugs and/or earmuffs allow employees to work in a high noise area without developing a hearing loss.

4.3.4 In most situations, either earplugs or earmuffs will provide adequate protection; however, there are some noise conditions requiring both earplugs and muffs to be worn at the same time.

4.4 TYPES OF PERSONAL PROTECTIVE EQUIPMENT (PPE)

4.4.1 Hearing protection devices provided to workers on LaRC shall be either earplugs or earmuffs.

4.4.1.1 Earplugs shall be individually available at hazardous noise areas while earmuffs shall be issued on an individual basis through the SFAB Industrial Hygienist for civil service employees and through the contractor company Industrial Hygienist for contractor employees.

4.4.2 Hearing protection devices shall possess a Noise Reduction Rating of at least 20 dB as defined by the Environmental Protection Agency.

4.4.2.1 Communications headsets may be worn in noise hazardous areas as a hearing protection device if they provide the required amount of hearing protection.

4.4.3 Both earplugs and earmuffs shall be worn when personnel are exposed to steady and/or intermittent sound pressure levels of 110 dBA or above.

4.4.4 **Disposable Earplugs**

4.4.4.1 Disposable earplugs shall be provided to employees to be used one time and then thrown away.

4.4.4.2 Disposable earplugs are made of an expandable foam material designed to be inserted into the ear canal to block out noise hazards.

4.4.4.3 Personnel shall wash their hands before using these earplugs and should keep them free from grease and dirt.

4.4.5 **Earmuffs**

4.4.5.1 Earmuffs cover the external ear to provide a barrier against hazardous noise.

4.4.5.2 Earmuffs shall be equipped with soft plastic cushions, which are filled with either foam or liquid.

4.4.5.3 Earmuffs must form a perfect seal around the ear to be effective.

4.4.5.4 Earmuffs shall be kept clean by regularly wiping them with a damp cloth, and the cushions shall be replaced when they become worn, stiff or torn.

Note: Glasses, long sideburns, long hair, and facial movements, such as chewing, can reduce their protective qualities.

4.5 EXAMPLES OF NOISE LEVELS:

The "A" weighted network is the relative frequency response of the average ear when sound pressure levels of about 20 to 30 dB are heard. Examples of approximate decibel levels for selected situations are as follows in Figure 4-1:

SITUATION	DECIBEL LEVEL
Soft whisper	30 decibels
Conversational Speech	60 decibels
Printing press plant	90 decibels
Pneumatic drill	100 decibels
Jackhammer	125 decibels
Jet plane	140 decibels
Rocket launching pad	180 decibels

Figure 4-1. EXAMPLES OF NOISE LEVELS

4.5.1 **RESPONSIBILITIES**

4.5.1.1 Line supervisors shall have day-to-day responsibility for ensuring hearing protection devices are worn in noise hazardous areas.

4.5.1.2 Users shall be instructed in the limitations of hearing devices and in proper procedures for their use, maintenance and storage.

4.5.1.3 A record of employees who use hearing protection devices shall be maintained, and an entry shall be made in the medical records of each user.

4.5.1.3 Additionally, the medical status of employees who work in noise hazard shall be reviewed by the medical staff, in regard to the use of the hearing protection device.

4.5.1.4 A supply of hearing protection devices, including disposable earplugs, shall be maintained at noise hazardous areas for visitors, transients and personnel who do not have individually issued earmuffs in their possession.

4.6 LaRC NOISE CONTROL AND HEARING CONSERVATION PROGRAM

4.6.1 Government employees, who are exposed to noise levels above the NASA Action level, shall be placed in the LaRC Noise and Control Hearing Conservation Program (NCHCP).

4.6.2 The LaRC NCHCP is used to measure any change in employee's hearing from year to year while working in a high noise area.

4.6.3 Employees placed in the LaRC NCHCP shall undergo medical surveillance and receive annual training.

4.6.4 Contractor companies shall have an equivalent Noise and Control Hearing Conservation Program.

4.6.1 **Medical Surveillance**

4.6.1.1 Individuals in the LaRC NCHCP shall undergo a precertification, annual and termination physical examinations in compliance with LaRC Occupational Medical Examination Protocols (OMEPs).

4.6.1.2 Contractor companies shall provide individuals with an equivalent pre-certification, annual and termination physical examination in compliance with LaRC OMEPs.

4.6.2 **Training Requirements.**

4.6.2.1 There shall be an annual training program for employees who are in the LaRC NCHCP.

4.6.2.2 This annual training is the responsibility of the WMPO for civil service employees and the contracting company for contractor employees.

Chapter 5

5. PROTECTIVE HEADWEAR

5.1 POLICY

5.1.1 Protective headwear shall be provided to employees engaged in work operations where there is a potential for injury to the head from falling objects and when near exposed electrical conductors which could contact the head.

5.1.2 Civil service employees engaged in continuous work situations where hazards to the head are present shall be furnished appropriate protective headwear at no cost to the employee by the Government and to contractor employees by the contractor company.

5.1.3 The cost to repair/replace required protective headwear for civil service employees shall be borne by the Government and for contractor employees by the contractor company.

5.2 GENERAL REQUIREMENTS

5.2.1 All protective headwear shall meet the requirements of ANSI Standard Z89.1-1986, "American Standard for Personal Protection-Protective Headwear."

5.2.2 Protective helmets are classified according to the specific impact and electrical performance requirements they are designed to meet.

5.2.3 All protective helmets in accordance with ANSI Standard Z89.1-1986, shall meet either Type I or Type II impact requirements.

5.2.4 All helmets are further classified as meeting Class G, E, or C electrical requirements (i.e., Type I, Class G or Type II, Class E).

5.2.5 **Impact Types:**

a. Type 1 - Helmets intended to reduce the force of impact resulting from a blow only to the top of the head.

b. Type 2 - Helmets intended to reduce the force of impact resulting from a blow, which may be received off center or to the top of the head.

5.2.6 **Electrical Classes:**

a. Class G (General) - Helmets intended to reduce the danger of contact exposure to low voltage conductors.

b. Class E (Electrical) - Helmets intended to reduce the danger of exposure to high voltage conductors.

c. Class C (Conductive) - Helmets intended to provide protection against contact with electrical conductors.

5.2.3 **Helmet Accessories**

Helmet accessories, as indicated below, are permissible if manufactured and used in accordance with the requirements of ANSI Standard Z89.1-1986:

a. Sweatbands of the removable/replaceable type or that are an integral with the headband.
   (1) They shall cover at the forehead portion of the headband.

b. Winter liners that shall be made of suitable materials and shall not affect the protective capabilities of the helmet.
   (1) There shall be no metal parts in winter liners intended for use with helmets labeled as meeting Class E requirements.

5.3 RESPONSIBILITIES

Responsibilities concerning the use of protective headwear are discussed in the following paragraphs.

5.3.1 **Line supervisors shall:**

a. Determine the appropriate type of protective headwear (Type and Class) required to perform tasks.

b. Obtain required protective headwear for employees in designated protective headwear hazard areas.

c. Assure that the furnished protective headwear is worn by employees in designated protective headwear hazard areas.

5.3.2 **Employees**

5.3.2.1 Employees shall be responsible for the normal care and appropriate use of protective headwear.

5.3.2.2 Employees shall return used headwear for replacement, or repair when required.

5.3.2.3 Employees shall be restricted from wearing defective or worn-out protective headwear, which could contribute to a head injury.

Chapter 6

6. PROTECTIVE HANDWEAR

6.1 POLICY

6.1.1 Protective handwear shall be provided to employees engaged in work operations where the employees' hands are exposed to hazards such as:

a. Skin absorption of harmful substances.

b. Severe cuts or lacerations.

c. Severe abrasions.

d. Punctures.

e. Chemical burns.

f. Thermal burns.

g. Harmful temperature extremes.

6.1.2 The appropriate protective handwear shall be determined by an evaluation of the tasks to be performed by the employee, including the conditions present, duration of the task, and the hazards and potential hazards identified during the evaluation.

6.1.3 Civil service employees engaged in continuous work situations where hand hazards are present shall be furnished appropriate protective handwear at no cost to the employee by the Government and to contractor employees by the contractor company.

6.1.4 The cost to repair/replace required protective handwear for civil service employees shall be borne by the Government and for contractor employees by the contractor company.

6.1.5 Direct requirements on protective handwear shall be obtained through:

a. LPR 1710.12, "Potentially Hazardous Materials."

b. LPR 1710.6, "Electrical Safety."

c. SFAB Industrial Hygienist for civil service employees or contractor company's qualified individual for contractor employees.

6.2 RESPONSIBILITIES

Responsibilities concerning the use of protective handwear are discussed in the following paragraphs.

6.2.1 **Safety and Facility Assurance Branch** shall:

a. Provide assistance in determining the areas of operation and work environments where the use of protective handwear is required for civil service employees.

b. Provide guidance in the selection and issuance of protective handwear to civil service employees.

6.2.2 **Contractor Company** shall:

a. Provide assistance in determining the areas of operation and work environments where the use of protective handwear is required for contractor employees.

b. Providing guidance in the selection and issuance of protective handwear to contractor employees.

6.2.3 **Line Supervisors** shall:

a. Evaluate work areas and tasks to determine if protective handwear is required.

b. Obtain required protective handwear for employees in designated protective handwear hazard areas.

c. Assure that the furnished protective handwear is worn by employees in designated protective handwear hazard areas.

6.2.4 **Employees**

6.2.4.1 Employees shall be responsible for the normal care and appropriate use of protective handwear.

6.2.4.2 Employees shall return used handwear for replacement, or repair when required.

6.2.4.3 Employees shall be restricted from wearing defective or worn-out protective handwear, which could contribute to a hand injury.

Chapter 7

7. FALL PROTECTION

7.1 PURPOSE

This chapter provides instruction governing the issuance, maintenance and use of fall protection on LaRC for civil service and contractor employees.

7.2 FALL PROTECTION REQUIREMENTS

7.2.1 In accordance with OSHA 29 CFR 1926.501 fall protection shall be provided to all civil service and contractor employees engaged in work operations where the employee is required to work on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge, which is 6 feet or more above a lower level.

7.2.1.1 The fall protection shall be a guardrail system, safety net system, a personal fall arrest system, or a safety monitoring system.

7.2.2 Civil service employees engaged in work situations where fall protection is required shall be furnished the appropriate fall protection at no cost to the employee by the Government and to contractor employees by the contractor company.

7.2.3 The cost to repair/replace the required fall protection for civil service employees shall be borne by the Government and for contractor employees by the contractor company.

7.2.4 Guardrail systems shall comply with the provisions outlined in OSHA 29 CFR 1926.502(b), including, but not limited to, the following:

a. Top edge of rail shall be 42 inches (plus or minus 3 inches) above the walking/working level.

b. Midrails shall be placed at a height of at least 21 inches.

c. Shall be capable of withstanding, without failure, a force of at least 200 pounds applied within 2 inches of the top edge, in any outward or downward direction, at any point along the top edge and 150 pounds applied in any downward or outward direction at any point along the midrail or other member.

d. Top rails and midrails shall be at least one-quarter inch nominal diameter or thickness to prevent cuts and lacerations. If wire rope is used for top rails, it shall be flagged at not more than 6-foot intervals with high-visibility material.

e. When used around holes, which are used as points of access, they shall be provided with a gate, or be so offset that a person cannot walk directly into the hole.

7.2.5 Safety net systems shall comply with the provisions outlined in OSHA 29 CFR 1926.502(c), including, but not limited to, the following:

a. Shall be installed as close as practicable under the walking/working surface on which employees are working, but in no case more than 30 feet below such level.

b. Shall be installed with sufficient clearance under them to prevent contact with the surface or structures below when subjected to an impact force equal to the drop test specified in paragraph OSHA 29 CFR 1926.502(c)(4).

c. Shall be drop-tested at the worksite after initial installation and before being used as a fall protection system, whenever relocated, after major repair, and at 6-month intervals if left in one place.

(1) The drop-test shall consist of a 400 pound bag of sand 30 + or - 2 inches in diameter dropped into the net from the highest walking/working surface at which employees are exposed to fall hazards, but not from less than 42 inches above that level.

d. Shall have a border rope for webbing with a minimum breaking strength of 5,000 pounds.

e. Shall be inspected at least once a week for wear, damage, and other deterioration and after any occurrence, which could affect the integrity of the safety net system.

(1)Defective components shall be removed from service.

f. Mesh shall not exceed 36 square inches nor be longer than 6 inches on any side, and the opening, measured center-to-center of mesh ropes or webbing, shall not be longer than 6 inches.

g. Connections between safety net panels shall be as strong as integral net components and shall be spaced not more than 6 inches apart.

7.2.6 Personal fall arrest systems shall comply with the provisions outlined in OSHA 29 CFR 1926.502(d), including, but not limited to, the following:

a. Horizontal lifelines shall be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains a safety factor of at least two.

b. Lanyards and vertical lifelines shall have a minimum breaking strength of 5,000 pounds.

c. Each employee shall be attached to a separate lifeline, except during the construction of elevator shafts.

d. Self-retracting lifelines and lanyards that automatically limit free fall distance to 2 feet or less shall be capable of sustaining a minimum tensile load of 3,000 pounds applied to the device with the lifeline or lanyard in the fully extended position.

e. Self-retracting lifelines and lanyards which do not limit free fall distance to 2 feet or less, rip stitch lanyards, and tearing and deforming lanyards shall be capable of sustaining a minimum tensile load of 5,000 pounds applied to the device with the lifeline or lanyard in the fully extended position.

f. Ropes and straps (webbing) used in lanyards, lifelines, and strength components of body harnesses shall be made from synthetic fibers.

g. Anchorages used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 pounds, per employee attached, or shall be designed, installed, and used as part of a complete personal fall arrest system, which maintains a safety factor of a least two; and under the supervision of a qualified person.

h. Person fall arrest systems, when stopping a fall, shall limit maximum arresting force on an employee to 1,800 pounds when used with a body harness.

i. Personal fall arrest systems shall:

(1) Be rigged such that an employee can neither free fall more than 6 feet nor contact any lower level.

(2) Bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet and have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of 6 feet or the free fall distance permitted by the system, whichever is less.

(3) Shall be inspected prior to each use for wear, damage and other deterioration, and defective components shall be removed from service.

(4) Shall not be attached to guardrail systems, nor shall they be attached to hoists except as specified in other subparts of OSHA 29 CFR 502.

j. The attachment point of the body harness shall be located in the center of the wearer's back near shoulder level, or above the wearer's head.

k. Personal fall arrest systems and components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection

until inspected and determined by a competent person to be undamaged and suitable for reuse.

7.2.7 Safety monitoring systems shall be a safety system in which a competent person is responsible for recognizing and warning employees of fall hazards and shall comply with the provisions outlined in OSHA 29 CFR 1926.502, including, but not limited to, the following:

a. The competent person shall be designated by the employing organization as the safety monitor and shall be an individual who is competent to recognize fall hazards, and who shall monitor the safety of other employees.

b. The safety monitor shall not have any other responsibilities that could deter his/her attention from the monitoring function; shall warn employees when it appears that the employee is unaware of a fall hazard or is acting in an unsafe manner; and shall be close enough to communicate orally with employees.

c. Each employee working in a controlled access zone shall be directed to comply promptly with fall hazard warnings from the safety monitor.

d. Safety monitoring systems shall be required for roofing work, with warning lines a minimum of 6 feet from the edge of a roof, unless guardrails are erected at the edge of the roof.

e. Contractors using safety monitoring system shall have a written fall protection plan in place in accordance with OSHA 29 CFR 1926.502(k), that includes a description of the training conducted and procedures in place to protect employees.

7.2.8 Additional fall protection requirements relating to construction activities shall be adhered to by all civil servants and contractors, as specified in OSHA 29 CFR 1926.502.

7.3 TRAINING REQUIREMENTS

7.3.1 All civil servant and contractor employees who might be exposed to fall hazards shall be trained to recognize the hazards of falling and the procedures to be followed in order to minimize these hazards.

7.3.2 The training shall be conducted by a qualified person.

7.3.3 The training shall include, but not be limited to, the following:

a. The nature of fall hazards in the work area.

b. The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used.

c. The use and operation of guardrail systems, personal fall arrest systems, safety net systems, and other protection to be used.

7.3.4 A written certification record shall be maintained and shall contain the name or other identity of the employee trained, the date(s) of the training, and the signature of the person who conducted the training.

7.3.5 When the Government or contractor company has reason to believe that any affected employee who has already been trained does not have the understanding and skill required to recognize fall hazards, the employer shall retrain such employee.

7.3.6.1 Circumstances where retraining shall be required include, but are not limited to, situations where:

a. Changes in the workplace render previous training obsolete.

b. Changes in the types of fall protection systems or equipment to be used render previous training obsolete.

c. Inadequacies in an affected employee's knowledge or use of fall protection systems or equipment indicate that the employee has not retained the requisite understanding or skill.

7.4 RESPONSIBILITIES

Responsibilities concerning the use of fall protection are discussed in the following paragraphs.

7.4.1 **Safety and Facility Assurance Branch** shall:

a. Provide assistance in determining the areas of operation and work environments where the use of fall protection is required for civil service and contractor employees, as well as the type of fall protection to be used that will most effectively protect civil service and contractor employees.

b. Provide guidance in the selection and issuance of fall protection to civil service employees.

c. Provide assistance in the training of civil service employees.

7.4.2 **Contractor Company** shall:

a. Determine the areas of operation and work environments where the use of fall protection is required for contractor employees

b. Determine the appropriate fall protection device is selected and issued to contractor employees in required areas.

c. Provide training to contractor employees.

7.4.3 **Line Supervisors** shall:

a. Evaluate work areas and tasks to determine if fall protection is required.

b. Developing procedures for the use of fall protection in fall hazard areas.

c. Obtaining required fall protection for employees in designated fall protection hazard areas.

d. Assuring that the furnished fall protection is worn by employees in designated fall protection hazard areas.

e. Ensuring employees are trained/retrained as required and the appropriate training certification is maintained.

7.4.4 **Employees**

7.4.4.1 Employees shall be responsible for adhering to all fall protection procedures and shall maintain all fall protection devices in good condition.

7.4.4.2 Employees shall also be responsible for notifying their line supervisor of any potential fall hazards they encounter while performing their assigned tasks.

APPENDIX A:DEFINITIONS

A.1 Anchorage - a secure point of attachment for lifelines, lanyards or deceleration devices.

A.2 Appropriate Hair Length - Exposed hair in excess of 2 inches may constitute a hazard in LaRC industrial work places.

A.3 Body harness - straps which may be secured about the employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system.

A.4 Deceleration distance - the additional vertical distance a falling employee travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration device begins to operate. It is measured as the distance between the location of an employee's body belt or body harness attachment point at the moment of activation (at the onset of fall arrest forces) of the deceleration device during a fall, and the location of that attachment point after the employee comes to a full stop.

A.5 Decibel (dB) - the basic unit of level in acoustics

A.6 Free fall - the act of falling before a personal fall arrest system begins to apply force to arrest the fall.

A.7 Free fall distance - the vertical displacement of the fall arrest attachment point on the employee's body belt or body harness between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance, and lifeline/lanyard elongation, but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.

A.8 Guardrail system - a barrier erected to prevent employees from falling to lower levels.

A.9 Hole - a gap or void 2 inches or more in its least dimension, in a floor, roof, or other walking/working surface.

A.10 Lanyard - a flexible line of rope, wire rope, or strap, which generally has a connector at each end for connecting the body belt or body harness to a deceleration device, lifeline, or anchorage.

A.11 Level - in acoustics, this term is used to designate that the quantity is referred to some reference value, which is either stated or implied

A.12 Lifeline - a component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

A.13 Lower levels - those areas or surfaces to which an employee can fall. Such areas or surfaces include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits, tanks, material, water, equipment, structures, or portions thereof.

A.14 Normal Clothing - An item of clothing furnished by employees at their own expense as a condition of employment. Typical items of normal clothing are: dress or street shoes, boots, raincoats, standard work gloves, winter clothing for outdoor jobs, and wide brim hats or tinted sunglasses for sun protection. Certain items of normal clothing may be unacceptable in industrial work places and thus restricted from use. These items include sandals, tennis shoes, shorts, and extremely loose clothing.

A.15 Personal fall arrest system - a system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, a body belt or body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these. As of January 1, 1998, the use of a body belt for fall arrest is prohibited.

A.16 Protective Clothing - An article of clothing furnished to an employee at Government or contracting company expense, that when worn properly will protect part or all of the body from foreseeable risks of injury or disease in the workplace. Protective clothing shall be worn when performing work assignments in a potentially hazardous work environment or performing work under hazardous conditions. Typical items of protective clothing are protective footwear, headwear, or gloves.

A.17 Protective Equipment - A device or item provided to an employee at Government or contracting company expense, that when used correctly will protect part or all of the body from foreseeable risks of injury or disease in the workplace. Protective equipment shall be utilized when entering or performing work assignments in hazardous work environments or during hazardous conditions. Protective equipment includes hearing protection, eye protection respirators, barricades, warning cones, lights, alarms, full body harnesses and lanyards.

A.18 Qualified Person - 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.

A.19 Safety-monitoring system - a safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.

A.20 Self-retracting lifeline/lanyard - a deceleration device containing a drum-wound line, which can be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.

A.21 Walking/working surface - any surface, whether horizontal or vertical on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, formwork and concrete reinforcing steel but not including ladders, vehicles, or trailers, on which employees must be located in order to perform their job duties.

A.22 Weighting networks - the letter following dB, i.e. A, B, or C represents frequency characteristics of the average human ear for various sound intensities.