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**Occupational Safety and Health  
Administration**

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**29 CFR Part 1915  
Personal Protective Equipment for  
Shipyards Employment; Final Rule**

**DEPARTMENT OF LABOR****Occupational Safety and Health Administration****29 CFR Part 1915**

[Docket No. S-045]

RIN 1218-AA74 (AB06)

**Personal Protective Equipment for Shipyard Employment (PPE)****AGENCY:** Occupational Safety and Health Administration, Department of Labor.**ACTION:** Final Rule.

**SUMMARY:** The Occupational Safety and Health Administration (OSHA) is revising its standards for Personal Protective Equipment (PPE) for Shipyard Employment, 29 CFR part 1915, subpart I. The final rule updates, reorganizes, and simplifies shipyard employment PPE standards into a comprehensive framework that encompasses the shipbuilding, ship repair, and shipbreaking industries. Where appropriate, the final rule deletes existing specification-oriented provisions that limit employer innovation and incorporates performance-oriented language.

**EFFECTIVE DATES:** The final rule becomes effective August 22, 1996 except for §§ 1915.152(b), 1915.152(e), 1915.159(d), 1915.160(d), will not become effective until an Office of Management and Budget (OMB) Control number is received and displayed for these "collections of information" in accordance with the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*). The incorporations by reference of certain publications listed in this final rule is approved by the Director of the Federal Register as of August 22, 1996.

**Other Dates:** Written comments on the paperwork requirements of this final rule must be submitted on or before July 23, 1996.

**ADDRESSES:** In compliance with 28 U.S.C. 2112(a), the Agency designates the Associate Solicitor for Occupational Safety and Health, Office of the Solicitor, Room S-4004, U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, D.C. 20210 for receipt of petitions for review of the standard.

Comments on the paperwork requirements of this final rule are to be submitted to the Docket Office, Docket No. S-045, U.S. Department of Labor, Room N-2625, 200 Constitution Ave., NW., Washington, DC 20210, telephone (202) 219-7894. Written comments limited to 10 pages or less in length may

also be transmitted by facsimile to (202) 219-5046.

**FOR FURTHER INFORMATION CONTACT:** Ms. Anne C. Cyr, Acting Director, Office of Information, Division of Consumer Affairs, Room N-3647, U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, D.C. 20210; Telephone (202) 219-8151.

**SUPPLEMENTARY INFORMATION:**

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## I. Background

In May 1971, the Occupational Safety and Health Administration (OSHA), under authority granted by section 6(a) of the Occupational Safety and Health Act of 1970 (29 U.S.C. 655), adopted Federal standards issued under section 41 of the Longshore and Harbor Workers' Compensation Act (33 U.S.C. 941), as standards applicable to ship repairing (29 CFR part 1915), shipbuilding (29 CFR part 1916), and shipbreaking (29 CFR part 1917) operations. OSHA also adopted other Federal standards and national consensus standards as general industry standards (29 CFR part 1910) and construction industry standards (29 CFR part 1926), which apply to shipyard hazards and working conditions not specifically covered by standards in parts 1915, 1916, or 1917.

On April 20, 1982 (47 FR 16984), the ship repairing, shipbuilding, and shipbreaking standards were consolidated into 29 CFR part 1915 "Occupational Safety and Health Standards for Shipyard Employment." The purpose of the consolidation was to eliminate duplicative provisions. The consolidation did not alter substantive requirements of these standards, nor did it affect the applicability of the general industry and construction standards in 29 CFR parts 1910 and 1926, respectively, to hazards or conditions in shipyard employment not addressed in the consolidated part 1915.

Later in 1982, the Shipbuilders Council of America (SCA) and the American Waterways Shipyard Conference (AWSC) requested that OSHA identify the specific provisions of the general industry standards that apply to shipyards and then consolidate

them into the existing part 1915 provisions, making one set of shipyard employment standards. OSHA agreed that such consolidation was appropriate, and decided to begin work on a subpart-by-subpart basis.

As part of that effort, OSHA published a Notice of Proposed Rulemaking (NPRM) in the Federal Register for subpart I of part 1915 (Personal Protective Equipment (PPE), November 29, 1988, 53 FR 48092). In particular, the proposed rule updated the pertinent references to national consensus standards, incorporated § 1910.134 (respiratory protection) by reference to replace the less comprehensive provisions in § 1915.152, and added requirements for hazard assessment, training, fall protection systems, and positioning device systems. OSHA received 10 comments in response to the NPRM. Those comments are discussed in the Summary and Explanation section of this document, below.

A short time after the November 1988 publication of the proposed rule on PPE, the Shipyard Employment Standards Advisory Committee (SESAC) was established. SESAC was chartered to provide OSHA with guidance in revising, consolidating, and modernizing the varying sets of regulations that were being applied in the shipyard industry to produce a truly vertical standard for all shipyard employment. The intended result of this activity was the development of a single set of occupational safety and health standards for shipyard employment that would cover vessels, vessel sections and related activities. The newly developed shipyard employment standards would apply to all shipyard employment. SESAC provided OSHA with comments on PPE-related issues, and their comments are discussed in the Summary and Explanation below.

Following publication of the proposed 1915 shipyard PPE standard, OSHA initiated two rulemakings to address General Industry Personal Protective Equipment (PPE) standards. The first of these PPE rulemakings (NPRM at 54 FR 33832, August 16, 1989) covered all PPE (such as eye, face, hand, and foot) other than respiratory protection, electrical protective equipment, personal protective systems, and positioning device systems. The Agency published the final rule for this rulemaking on April 6, 1994 (59 FR 16334). The Agency also initiated a second general industry rulemaking to add requirements for personal fall arrest systems and positioning systems to the general industry PPE standards (Docket S-057; NPRM at 55 FR 12323, April 10,

1990). This rulemaking had not yet been concluded.

The Agency determined that the information in the above-noted rulemaking records was relevant to the issues raised in the Shipyard PPE proposal. Accordingly, on July 6, 1994, OSHA reopened the Shipyard PPE rulemaking record (59 FR 34586) to incorporate the General Industry PPE dockets and to allow the public an opportunity to comment. The Agency indicated that it was considering more detailed guidance regarding: Adequate training requirements; verification of the proposed hazard assessment and training requirements through written certification; and prohibition of the use of body belts and non-locking snaphooks. OSHA subsequently revised its requirements for fall protection in construction (final rule at 59 FR 40672, August 9, 1994). The final rule, containing requirements for personal fall protection equipment similar to those in the shipyard PPE proposal, prohibited the use of body belts in personal fall arrest systems (PFAS) (§ 1926.502(d) introductory text) and the use of non-locking snaphooks in PFAS (§ 1926.502(d)(5)) and in positioning systems (§ 1926.502(e)(7)). Those prohibitions take effect on January 1, 1998.

The shipyard PPE reopening comment period ended August 22, 1994. OSHA received 13 comments, including one hearing request. Those comments are discussed in the Summary and Explanation section below.

In lieu of a hearing, OSHA agreed to hold an informal public meeting (59 FR 64173, December 13, 1994) to allow comments and testimony on the issues raised in the reopening. At the public meeting on January 25, 1995, there were five oral presentations and five written submissions, which are discussed in the Summary and Explanation section. The rulemaking record closed on February 28, 1995.

## II. Workplace Hazards

OSHA has determined that employees in shipyards are exposed to a significant risk of injury from hazards that can be mitigated by the use of suitable personal protective equipment. OSHA has also concluded that compliance with the final standard will substantially reduce employee exposure to PPE-related hazards.

The shipyard industry has had one of the highest rates of injuries of any industry for many years. In 1992, the shipyard industry, SIC 3731, had an injury rate of 34.2 per 100 full-time employees ("Occupational Injuries and

Illnesses: Counts, Rates, and Characteristics, 1992," published by the Bureau of Labor Statistics in April, 1995). Approximately half of these injuries were severe enough to result in lost time from work. These numbers mean that a shipyard employee has about a 1 in 3 chance (34 percent) of experiencing an injury at work *annually* and a 1 in 10 chance every year of being injured seriously enough to require time away from work to recuperate.

In comparison, the average annual risk of injury for all employees in the United States was about 9 per 100 full-time employees in 1992; for the manufacturing sector of the economy, the annual injury rate was about 11 per 100 full-time employees.

Table 1 presents estimates of lost-workday injuries by body part based on 1992 Bureau of Labor Statistics (BLS) data. These estimates are consistent with injury data from a Department of Transportation Maritime Administration survey and the Agency's analysis of OSHA 200 Forms (discussed further in the Benefits section of the summary of the Economic Analysis, presented later in this Preamble). Table 2 presents BLS lost workday injury data by nature of injury.

TABLE 1.—BLS ESTIMATES OF SHIPYARD INJURIES INVOLVING LOST WORKDAYS BY BODY PART

Body part	Number of 1992 injuries (a)	Number of extrapolated 1994 injuries (b)	Percent (%)
Head, unspecified .....	73	63	0.6
Ear(s) .....	0	0	0.0
Eyes(s) .....	1,080	925	9.4
Face .....	51	44	0.4
Scalp .....	91	78	0.8
Neck .....	350	300	3.0
Arm(s) unspecified .....	49	42	0.4
Elbow .....	265	227	2.3
Forearm .....	128	110	1.1
Wrist .....	478	409	4.1
Hand(s) .....	508	435	4.4
Finger(s) .....	720	617	6.2
Upper extremities, multiple .....	0	0	0.0
Trunk, unspecified .....	0	0	0.0
Abdomen .....	88	75	0.8
Back, unspecified .....	954	817	8.3
Back, lumbar .....	1,198	1,026	10.4
Back, thoracic .....	168	144	1.5
Chest .....	289	247	2.5
Hip .....	306	262	2.7
Shoulder(s) .....	601	515	5.2
Trunk, multiple parts .....	0	0	0.0
Lower extremities, unspecified .....	0	0	0.0
Leg(s), unspecified .....	59	51	0.5
Thighs .....	89	76	0.8
Knee(s) .....	1,073	919	9.3
Lower leg(s) .....	123	105	1.1
Leg(s), multiple .....	0	0	0.0
Ankle(s) .....	624	534	5.4
Foot/feet .....	488	418	4.2
Toe(s) .....	123	105	1.1
Lower extremities, multiple .....	0	0	0.0

TABLE 1.—BLS ESTIMATES OF SHIPYARD INJURIES INVOLVING LOST WORKDAYS BY BODY PART—Continued

Body part	Number of 1992 injuries (a)	Number of extrapolated 1994 injuries (b)	Percent (%)
Multiple body parts .....	674	577	5.8
Circulatory system .....	0	0	0.0
Digestive system .....	0	0	0.0
Excretory system .....	0	0	0.0
Nervous system .....	0	0	0.0
Respiratory system .....	0	0	0.0
Body parts, NEC .....	163	140	1.4
Not identified by body part .....	720	617	6.2
<b>Total .....</b>	<b>11,533</b>	<b>9,876</b>	<b>100.0</b>

(a) Bureau of Labor Statistics. Survey of Occupational injuries and illnesses, 1  
 (b) Extrapolation based on decline in shipyard employment of 14.4 percent bet 1992 and 1994.

TABLE 2.—BLS ESTIMATES OF SHIPYARD INJURIES INVOLVING LOST WORKDAYS, BY NATURE OF INJURY

Nature of injury	Number of 1992 injuries (a)	Number of extrapolated 1994 injuries (b)	Percent (%)
Amputation .....	0	0	0.0
Burn (heat) .....	410	351	3.6
Burn (chemical) .....	80	69	0.7
Concussion .....	0	0	0.0
Infective/parasitic disease .....	NA	NA	NA
Contusion/bruise .....	2,085	1,785	18.1
Cut/laceration/puncture .....	622	533	5.4
Dermatitis .....	0	0	0.0
Dislocation, unspecified .....	88	75	0.8
Electric shock .....	0	0	0.0
Fracture .....	558	478	4.8
Low temperature exposure .....	NA	NA	NA
Hearing loss or impairment .....	0	0	0.0
Inflammation of joints .....	114	98	1.0
Poisoning .....	114	98	1.0
Radiation effects .....	213	182	1.8
Scratches/abrasions .....	728	623	6.3
Sprains/strains, unspecified .....	5,044	4,319	43.7
Torn ligaments .....	NA	NA	NA
Sprains/strains, NEC .....	NA	NA	NA
Multiple injuries .....	308	264	2.7
Circulatory system condition .....	0	0	0.0
Eye diseases .....	0	0	0.0
Nervous system condition .....	255	218	2.2
Respiratory system condition .....	0	0	0.0
Ill-defined condition .....	0	0	0.0
Other injury, NEC .....	216	185	1.9
Not identified by nature .....	698	598	6.1
<b>Total .....</b>	<b>11,533</b>	<b>9,876</b>	<b>100.0</b>

(a) Bureau of Labor Statistics. Survey of Occupational Injuries and Illnesses, 19  
 (b) Extrapolation based on decline in shipyard employment of 14.4 percent between 1992 and 1994.  
 NA: Not applicable. Nature of injury category not included in BLS tabulations.

Shipyard employment typically involves fabrication and repair of large steel plates, beams, and pipes as well as painting and coating operations and other outfitting activities such as electrical work, ventilation and sheet metal work, and work on propulsion systems. Welding is a common production technology, requiring grinding and chipping of welds and accounting for many eye injuries. Employees also frequently work in awkward positions, out-of-doors throughout the year, on scaffolds, and in

enclosed or confined spaces. The shipyard industry's relatively high employment turnover rate contributes to the high rates of injuries, because newly hired workers tend to be less well trained and have a higher frequency of accidents.

The Agency has concluded that PPE-related hazards pose a significant risk of serious injury to shipyard employees, and that compliance with the PPE standard is needed to substantially reduce that risk. The Agency has estimated that compliance with the final

PPE regulation will significantly reduce the likelihood of an injury—from 34.2 to 21 per 100 full-time employees per year.

For a full discussion of the benefits of the final standard see the summary of the Economic Analysis presented below in this preamble or the full Economic Analysis, which is in the docket.

III. Summary and Explanation of Final Rule

In this section of the preamble, OSHA explains how the final rule relates to the proposed and existing standards, and

how the comments and testimony presented on each provision influenced the drafting of the final rule. This section also addresses issues raised in the July 6, 1994, reopening notice and the December 13, 1994, public meeting notice. Except where otherwise indicated, proposed provisions that did not elicit comments are being promulgated as proposed, for reasons stated in the preamble to the proposed rule (53 FR 48151-48158).

As discussed above, on April 6, 1994, OSHA issued a final rule for its rulemaking on PPE used in general industry (59 FR 16334) (part 1910, subpart I, Docket S-060). That document updated the regulation of PPE for eye and face (§ 1910.133), head (§ 1910.135) and foot protection (§ 1910.136), and added provisions for hazard assessment, PPE selection, disposal and training (§ 1910.132 (d)-(f)), and hand protection (§ 1910.138). The proposed rule (54 FR 33832, August 16, 1989) was consistent with the corresponding proposed rule for shipyard PPE. However, based on the rulemaking record, OSHA revised the general industry proposal to address training and the documentation of compliance with the hazard assessment and training requirements in more detail. Given the similarity of the PPE used in general industry and shipyard employment, OSHA determined that the information generated in this general industry rulemaking was relevant to the drafting of the shipyard PPE standards, as well.

Also, proposed part 1910 subpart I, PPE (Fall Protection Systems) (55 FR 13423, April 10, 1990) set criteria for the proper selection, use and maintenance of personal fall arrest systems (§§ 1910.128, 1910.129, and 1910.131) and positioning device systems (§§ 1910.128 and 1910.130) in general industry. The part 1910 subpart I proposal relied heavily on the approach taken by the Agency in its final rule on Powered Platforms for Exterior Building Maintenance, § 1910.66 (54 FR 31456, July 28, 1989, Docket S-700A). In the Preamble to the 1910 subpart I proposal, OSHA determined that the requirements for personal fall arrest systems used by employees on powered platforms should be the same as those for personal fall arrest systems used by employees in other occupations (55 FR at 13430).

Based on the record developed for the general industry fall protection PPE rulemaking (Docket S-057), OSHA decided that it was appropriate to consider prohibiting the use of non-locking snaphooks in personal fall arrest and positioning device systems and to consider prohibiting the use of body

belts in personal fall arrest systems. Recently, the Agency included such prohibitions in the final rule for fall protection in construction (59 FR 40672, August 9, 1994). As stated above, the Agency has determined that OSHA's fall protection PPE standards should be consistent with each other.

Therefore, based on its policy of promoting consistent regulation of PPE across industry lines, the Agency concluded that the information generated on PPE in general industry was relevant to the use of that PPE in shipyards, as well.

Accordingly, OSHA incorporated Dockets S-057 and S-060 into the shipyard PPE rulemaking record and reopened the comment period for part 1915 subpart I to provide an opportunity for public comment on the newly incorporated materials (59 FR 34586, July 6, 1994). The Agency provided additional opportunity for public input on these materials (59 FR 64173, December 13, 1995) at an informal public meeting on January 25, 1995.

In addition, OSHA has added certain personal fall arrest criteria, § 1910.159 (a)(4), (a)(5), (a)(7), (c)(2), (c)(3) and (c)(7) to the final rule, because the need for such requirements has been established through the corresponding General Industry and Construction rulemaking proceedings. These requirements are discussed further, below.

OSHA has concluded that the PPE needed in shipyard employment does not differ markedly from that needed in general industry or in construction, and that the standards covering PPE should not differ markedly either. The final rule reflects this determination and incorporates OSHA's review of the existing rulemaking record, including the materials incorporated from other PPE-related dockets.

#### *Section 1915.151 Scope, Application, and Definitions Applicable to This Subpart*

Final rule paragraph (a) sets forth the scope and application of Subpart I. This subpart applies to all work in shipyard employment, regardless of geographic location. This language is consistent with that in recently published part 1915 subpart B [§ 1915.11(a)] [59 FR 37816, July 25, 1994].

Proposed paragraph (a)(1) stated that this subpart would cover PPE provided for and used by shipyard workplaces and operations (including shipbuilding, ship repairing, and shipbreaking), but would not apply to construction operations in shipyards covered by part 1926.

Newport News Shipbuilding (NNS) stated [Ex. 6-2] that the term "provided" should be changed to "made available" because the suggested language was consistent with that in existing § 1915.153 and with current industry practice. However, the Agency has deleted the proposed language, "personal protective equipment to be provided for and used by employees" because it believes that requirements for the provision and use of PPE are more appropriately addressed in § 1915.152, General Requirements.

The Shipbuilding Council of America (SCA) (Ex. 6-1) and NNS (Ex. 6-2) stated that part 1926 (OSHA's construction industry standards) should not apply to employees of shipyards who perform construction work since one of the objectives of the rulemaking was to bring uniformity to the workplace by providing employees and employers with one set of safety standards to govern their work. SCA suggested that part 1926 apply only to construction work performed in shipyards by outside contractors (non-shipyard employees). OSHA believes, however, that it is inappropriate to distinguish between shipyard employees and contractor employees when setting requirements for worker protection. Therefore, OSHA is not making the suggested change.

The Agency has consistently maintained that construction activities, such as the erection of building structures, are covered by the construction standards (29 CFR part 1926) and are not subject to the requirements of the shipyard standards (29 CFR part 1915). Furthermore, § 1926.30, *Shipbuilding and ship repairs*, explicitly provides that shipyard employment is covered exclusively by the shipyard standards. Accordingly, the proposed paragraph (a)(1) language regarding the application for part 1926 in unnecessary and has been deleted.

Proposed paragraph (a)(2) provided that subpart I of part 1910—except § 1910.134, Respiratory protection—would not apply to shipyard employment. Since OSHA has chosen to view respirators as a separate, full rulemaking [59 FR 58884 November 15, 1994] which will apply to shipyard employment as well as general industry, the final shipyard PPE standard will continue to reference existing § 1910.134 for respiratory PPE until the shipyard respirator rulemaking is complete. In all other respects, subpart I of part 1915 will be a self-contained set of PPE standards for shipyard employment. It will not be

supplemented through reference to the General Industry standards.

#### *Paragraph (b), Definitions*

Paragraph (b) defines the terms used in this standard.

The proposed definitions paragraph did not include a number of terms and definitions that OSHA has used, or proposed to use, in other standards that address fall protection PPE [e.g., Powered Platforms for Building Maintenance 29 CFR 1910.66 (July 28, 1989 54 FR 31408); Fall Protection in Construction part 1926, subpart M (51 FR 42718, Aug. 9, 1994); and General Industry PPE-Fall Protection, proposed 1910.128(b), subpart I (55 FR 13423 April 10, 1990)].

The new terms and definitions included in paragraph (b) are: anchorage, connector, deceleration distance, equivalent, free fall, free-fall distance, lanyard, lifeline, lower levels, rope grab, and self-retracting lifeline/lanyard. Newly defined terms, revised terms, and proposed terms that elicited comments are discussed below. OSHA has determined that the inclusion of these definitions is appropriate for the purpose of clarity and to provide guidance consistent with that set in corresponding standards. In addition, as discussed further below, OSHA is adding a definition for the term "qualified person."

The proposed term "capable person" will be replaced by the more familiar term "qualified person" in the final rule. SESAC also recommended using "qualified person" in the regulatory text (Tr. p. 84-85, SESAC meeting, November 20, 1991).

"Deceleration device." This term describes equipment such as a rope grab, ripstitch lanyard, specially woven lanyard, tearing or deforming lanyard, and automatic self-retracting lifeline/lanyard, that serves to dissipate a substantial amount of energy during a fall arrest or otherwise limit the energy imposed on an employee during fall arrest. The proposed definition simply required that the device dissipate more energy than does a standard line or strap-webbing lanyard. After a careful review of the proposed definition, OSHA has revised the definition to indicate the extent to which a deceleration device must dissipate the energy imposed on an employee during fall arrest.

"Personal fall arrest system." This term means a system used to stop an employee's fall. The proposed definition, which was effectively identical, did not elicit comments.

"Positioning device system." This is a body belt or body harness system rigged

so that an employee can work on an elevated, vertical working surface with both hands free while leaning. The proposed definition has been rewritten for clarity. OSHA did not receive any comments on the proposed definition.

The proposed definition of "strength factor" has not been carried forward into the final rule because this term is not used in the final rule.

#### *Section 1915.152 General Requirements*

Paragraph (a) of the final rule, Provision and use of equipment, requires that employers provide and ensure that employees use personal protective equipment for eyes, face, head, extremities, torso, and respiratory system, including such PPE as protective clothing, protective shields and barriers, personal fall protection equipment, and life saving equipment, whenever such PPE is necessary for employee protection. Except for some editorial changes, this provision is identical to that in the proposed rule.

Paragraph (b) requires that employers assess the work activities in the shipyard to identify what hazards are present, or are likely to be present, which necessitate the use of PPE. OSHA is aware that many shipyard employers assess workplace hazards according to the trade or occupation of affected employees. The Agency believes that it is appropriate to allow employers flexibility in organizing their assessment efforts. Therefore, OSHA has added a note to the final rule which provides that a hazard assessment conducted according to the trade or occupation of affected employees will be considered to comply with paragraph (b), if the assessment addresses any PPE-related hazards to which employees are exposed in the course of their work activities.

Where any such hazards are identified, the employer shall select the appropriate PPE for each affected employee (both in terms of type of PPE and fit), communicate selection decisions to affected employees, and document that the hazard assessment has been performed. After the assessment has been done, the standard does not expressly require the employer to review the hazard assessment on any periodic basis. However, it is the Agency's intent that hazard assessments be conducted at the intervals and on a schedule dictated by the risks in the workplace. For example, when there is a change in technology, production operations, or an occupation's task that has the potential to affect PPE-related hazards, the employer must review the appropriateness of the existing hazard

assessment and the PPE being used and update the hazard assessment as necessary.

In the proposal, this paragraph required that employers select PPE for their employees based on an assessment of workplace hazards. Commenters who responded to the July 6, 1994 notice (59 FR 3486) and participants at the January 25, 1995 public hearing stated that the term "workplace" that appeared in the requirement for hazard assessment in proposed section § 1915.152(b) was not appropriate. They suggested that OSHA instead use the term "trade" or "work activity."

For example, the South Tidewater Association of Ship Repairers, Inc. (Ex 9-3) recommended that OSHA change "workplace to "work activity" or "trade." Tampa Shipyards Incorporated (Ex. 9-8) stated:

We would definitely agree that PPE used in general industry does not differ markedly from PPE used in the shipyards. We would point out the fact that work environment in shipyards is substantially and drastically different from general industry work environment. Most of the general industry work environment is a fixed work environment; manufacturing plant with assembly lines, consistent work processed, etc. The commercial shipyard work environment changes not only on a daily basis but sometimes on an hourly basis depending upon the size and configuration of a ship (or workplace) and the type of work to be accomplished on board that ship.

The Shipbuilders Council of America (Ex. 9-7) stated:

We believe that standards should be based on generic and uniform nature of the duties performed by specific categories of employees, rather than solely by the workplace \* \* \* shipyard workplace that is neither fixed, nor constant, nor readily quantifiable like workplaces in all other industries.

In addition, the Shipbuilders Council of America (Tr. pp. 8-9) testified that:

The general industry standard is specifically targeted toward fixed facilities and processes, unlike commercial ship repair and ship building. Now the definition of workplace differs greatly from a manufacturing environment to a commercial ship repair facility. Workplace is used throughout the general industry PPE standard. By definition, workplace means, and I quote out of the Webster's dictionary, "a place, shop or factory where work is done."

The commercial shipyard work environment changes not only on a daily basis \* \* \* And from personal experience I can tell you it changes on an hourly basis and on a ship-to-shop basis which varies by size and configuration.

OSHA acknowledges that shipyard employees—unlike general industry

employees—may work in several worksites during a shift. OSHA agrees with the commenters that the term “workplace” does not identify the appropriate source of PPE-related hazards in shipyards and believes that requiring hazard assessments by trade and related work activities effectively addresses the PPE-related risks in shipyards.

The proposal also required employers to select PPE that would protect employees from the particular occupational hazards they were likely to encounter, to communicate their selection decisions to employees who would be obtaining their own PPE, and to have employees who obtain their own PPE follow the employers' selection decisions.

The proposed rule assumed that some employees would be providing some of their own PPE. For that reason, OSHA specified, in the proposal, that employers would need to provide any such employees with PPE selection information and to make sure that their affected employees obtained the right PPE. This was intended to ensure that employees are properly protected by their PPE, regardless of who purchased it.

Subsequently, the Agency determined that it was appropriate to provide additional guidance regarding when employers would be expected to pay for PPE and when employees would be expected to pay. On October 18, 1994, OSHA issued a memorandum to its field offices which stated as follows:

OSHA has interpreted its general PPE standard, as well as specific standards, to require employers to provide and to pay for personal protective equipment required by the company for the worker to do his or her job safely and in compliance with OSHA standards. Where equipment is very personal in nature and is usable by workers off the job, the matter of payment may be left to labor-management negotiations. Examples of PPE that would not normally be used away from the worksite include, but are not limited to: welding glasses, wire mesh gloves, respirators, hard hats, specialty glasses and goggles (designed for laser or ultraviolet radiation protection), specialty foot protection (such as metatarsal shoes and linemen's shoes with built in gaffs), face shields and rubber gloves, blankets and cover-ups and hot sticks and other live-line tools used by power generation workers. Examples of PPE that is personal in nature and often used away from the worksite include non-specialty safety glasses, safety shoes, and cold-weather outer wear of the type worn by construction workers. However, shoes or outer wear subject to contamination by carcinogens or other toxic or hazardous substances which cannot be safely worn off-site must be paid for by the employer. Failure of the employer to pay for PPE that is not

personal and not used away from the job is a violation and shall be cited.

Although the equipment used in shipyard employment often differs from that mentioned in the October 18 memorandum, the same policy considerations apply in the Shipyard PPE context. Therefore, OSHA will apply the above-stated policy when determining who pays for the PPE required under § 1915.152(a).

In addition, the Agency has determined, after further consideration, that *all* affected employees need to be informed of PPE selection decisions in order to facilitate compliance with the standard. The proposed language that distinguishes between employees who pay for their own PPE and those who do not has been deleted and the provision has been revised accordingly. Paragraph (b) has also been editorially revised for clarity.

In the proposal, paragraph (b) did not specifically address documentation of the hazard assessment. The recently revised PPE standard for General Industry (§ 1910.132(d)(2)), however, requires employers to verify through a written certification that a required hazard assessment has been performed. OSHA explained its decision (59 FR 16336) to require such verification as follows:

OSHA believes that some form of record is needed to provide OSHA compliance officers and affected employees with appropriate assurance that the required hazard assessment has been performed \* \* \* It is not “necessary for employers to prepare and retain a formal written hazard assessment.” Given the performance-oriented nature of this rulemaking, OSHA has determined that the generation and review of extensive documentation would be unnecessarily burdensome.

The Agency has found that a written certification is a reasonable means by which to establish accountability for compliance.

Therefore, the Agency has determined that employers can adequately verify compliance with § 1910.132(d) of the final rule through a written certification which identifies the workplace evaluated; the person certifying that the evaluation has been performed, the date(s) of the hazard assessment; and which identifies the document as a certification of hazard assessment.

Taking into account the similarities between PPE used in General Industry and that used in Shipyard employment, OSHA reopened the Shipyard PPE rulemaking record (59 FR 34586, July 6, 1994) to provide public notice that the Agency was considering a requirement for shipyard employers to verify their compliance with the hazard assessment provision through a written certification. The notice of reopening

solicited comments on the need for and impact of a certification requirement.

The Preamble to the final rule for Fall Protection in Construction (part 1926, subpart M) (59 FR at 40721, August 9, 1994) underscored the flexibility employers have in complying with certification requirements, stating that a “certification record can be prepared in any format an employer chooses, including reprinted forms, computer generated lists, or 3×5 cards.”

Commenters to the shipyard PPE record (Exs. 9–3 and 9–7) stated that any requirement for the certification of hazard assessment should be focused on employee “work activity” or “trade” rather than on the “workplace.” For example, the South Tidewater Association of Ship Repairers (STASR)(Ex. 9–3) stated that “[t]here is a constant transition of trades moving among various shops and vessels as well as a rotation of vessels. It is not feasible for designated shipyard employees to monitor continuously a “workplace” in constant change.” In addition, STASR observed that it would be advantageous to identify “a universal requirement for trade-specific PPE as opposed to {a} site-specific requirement, peculiar to one location.” The SCA (Ex. 9–7) stated that shipyard work duties, unlike duties undertaken in a factory, are neither fixed, constant, nor readily quantifiable.

Three other commenters (Exs. 9–6, 9–8 and 9–9) were particularly concerned that compliance with the certification requirement under consideration would necessitate continuous or repeated hazard assessment. These commenters, along with several others (Exs. 9–1, 9–4, 9–5, 9–11 and 9–13), indicated that they have already implemented written programs to identify PPE needs, so that certifying performance of the hazard assessment would be redundant.

In addition, commenters (Exs. 9–10 and 9–14) suggested that OSHA accept any form of documentation which provides the information needed to verify compliance. In particular, General Dynamics Electric Boat Division (EBDiv.) (Ex. 9–10) stated “EBDiv. recommends that OSHA continue with its performance oriented approach and allow employers the flexibility in determining the most efficient and effective manner for documenting hazard assessments.”

Based on the above-discussed comments, the notice of informal public meeting (59 FR 64173, December 13, 1994) solicited input regarding the means by which shipyard employers could adequately verify compliance with the requirement for hazard assessment. In particular, the notice stated that OSHA was “considering the

extent to which current hazard assessments performed by trade or occupation provide the necessary information for selection of appropriate PPE" and provided examples of trade-based formats (for welder and for yard maintenance worker) that the Agency might consider to be acceptable.

In response, commenters (Exs. 11-2, 11-3, 11-6 and 11-8) stated that the shipyard industry already adequately documents its hazard assessment activities. NNS (Ex. 11-6) also expressed concern that the use of the term "certify" was unnecessary, stating that certification "does not contribute to improved safety and health. We suggest that certification should be replaced by a signature." In addition, NNS testified (Tr. 28-29, January 25, 1995), as follows:

We still don't understand why the word "certify" can't be left behind in favor of the word "document" or "signature" or some other type of verbiage. We think that the word "certify" carries with it some connotations that will thwart, if you will, the employee involvement efforts that we're stepping forward trying to initiate.

The SCA testified (Tr. 11-12) that:

Where hazard assessment is already in place because of existing OSHA standards \* \* \* we recommend that these assessments be allowed to meet the requirements of the portion of this standard.

Where hazard assessment does not exist, and it would be hard for me to say where it doesn't in the shipyard industry, we'd recommend that an annual assessment be made of the affected craft, possibly of the machinery or pipefitting departments. Once the hazard assessment is conducted for these crafts, we recommend that the company safety representative be allowed to make these assessments and sign the assessment certifying his or her review and assessment. This assessment should be no more than listing the personal protective equipment required for that particular craft in all working circumstances.

The UBC Health and Safety Fund of North America (Ex. 12-4) stated as follows: "OSHA should require written certification of hazard assessment for employers to select the Personal Protective Equipment (PPE) that is necessary for work being performed by trades or occupations. This assessment should take into account the PPE necessary to protect employees performing specific work tasks."

OSHA has concluded that the documentation format described by commenters and meeting participants will provide adequate assurance that the required hazard assessment has been performed. The Agency agrees that a hazard assessment record which conveys the required information does not need to be called a "certification."

Accordingly, the Agency will use the term "document" rather than the term "certification" to describe these minimal written record required under final rule § 1915.152(b)(4). Appendix A provides several acceptable ways of meeting the requirements, including some examples of the trade-based formats.

Final rule paragraph (c) requires employers to ensure that defective or damaged PPE is not used. The proposed paragraph was essentially identical. This provision does not preclude the repair and reuse of PPE. OSHA recognizes that there are many situations where PPE can be removed from service, repaired, and then returned to service. There were no comments on the proposed paragraph, and OSHA therefore promulgates this provision as proposed, except for minor editorial changes.

Final rule paragraph (d) requires that PPE that has been worn by workers and has become unsanitary be cleaned and disinfected before it is reissued. There were no comments on the proposed provision, and this paragraph is unchanged except for minor editorial changes.

Final paragraph (e) sets the training requirements for users of PPE. OSHA has consistently maintained that employees must be properly trained in order to benefit from the use of PPE. The proposed part 1910 and part 1915 PPE training provisions were identical, requiring simply that employees "be trained in the proper use of their personal protective equipment." As discussed in the part 1910 subpart I final rule preamble (59 FR 16337-40, April 6, 1994), OSHA divided the training into four training elements: what affected employees must understand about their PPE; what PPE-related skills those employees must have; when affected employees would need retraining; and what documentation of training was needed.

OSHA concluded that these training elements should also be considered for inclusion in the shipyard standard. Therefore, the July 6, 1994, shipyard PPE notice discussed the general industry training provisions and solicited comments. In order to clarify the requirements for the shipyard industry and provide clear guidance for enforcement, the Agency has revised this provision (paragraph (e)(2)) to read: "The employer shall ensure that each affected employee demonstrates the ability to use PPE properly before being allowed to perform work requiring the use of PPE." The Agency is not prescribing the means by which employers comply with this provision.

The general industry PPE standard, § 1910.132(f)(4), provides that: "[t]he employer shall verify that each affected employee has received and understood the required training through a written certification that contains the name of each employee trained, the date(s) of training and that identifies the subject of the certification."

The comments received in response to the July 6 notice opposed a requirement for a written certification of compliance. For example, STASR (Ex. 9-3) commented that:

Every shipyard in the Hampton Roads area has a safety program and a safety office. Every shipyard mandates usage of safety equipment for all employees. Those who do not comply are often sent home. STASR shipyards have safety programs with many of the PPE standards already in place. The PPE training and recordkeeping requirements are, in some cases, redundant.

When an employee is hired and undergoes initial training, that employee can be given a list of equipment to wear while performing a specific task. This is far preferable to sending a monitor to evaluate a worksite on a continuous basis. The shipyard may then certify that an individual has been given the necessary training and the employee will certify understanding of the safety requirements for his or her trade.

The SCA (Ex. 9-7) commented that:

We support the general requirement for training as it does serve to enhance a safer working environment \* \* \* we believe that training should be focused on trade specific duties of employees with the greatest emphasis being placed on orientation training at the outset. PPE serves a very useful purpose, and empirical data often establishes that causes of accident or occupational injuries are attributable to the fact that employees failed to comply with company PPE standards \* \* \*. Additionally, documentation of all training should be in the form of training logs, which should be considered to be the equivalent of "written certification" in order to avoid the non value added redundancy of record keeping.

Tampa Shipyards Incorporated (Ex. 9-8) stated that:

We are already complying with this proposed standard and we suspect many other shipyards are also complying with this standard.

Verification through written certification should not be required if an employer can produce training logs with the employee's name, the date the training took place, type of training conducted and the name of the instructor. Training logs should be interpreted under this standard as "written certification."

General Dynamics, Electric Boat Division (EBDiv) (Ex. 9-10) commented that:

EBDiv agrees with OSHA that training is an essential element of a PPE program but does not agree that "training" as specified in the standard requires certification.

EBDiv firmly believes training is a key and necessary component of safety and health programs. EBDiv provides extensive training to its employees on a variety of disciplines not mandated by OSHA in addition to training mandated by OSHA.

Based on these comments, OSHA raised the issue of the need for documentation of training in the December 13, 1994, meeting notice (59 FR 64173). AWH Corporation (Ex. 11-3) commented that training is provided when the employee is hired and at weekly "gangbox" safety meetings, and that training is periodically reinforced by including PPE as a topic at safety meetings.

NNS responded (Ex. 11-6) that "[t]he requirement to certify PPE training dictates recording specific information which can later be retrieved so as to prove training was conducted. We will provide samples of our existing system at the January 25 meeting." NNS provided copies of training documentation at the meeting (Ex. 12-2) and testified (Tr. 29-30) as follows:

We've provided a recommended definition for the word "certify" \* \* \*

"Certify" means to evaluate subjectively, based on appearance and available information at that time. The certifying individual in a training session, for example, would verify that the trained individual was present during the stated training; he would ensure that required information was delivered to the target audience in what he believed to be an understandable fashion, and he would watch individuals perform activities which indicate that they have understood the training, and then use his judgment at that time to determine whether further instruction was needed or not.

The SCA testified (Tr. 13-14, January 25, 1995) as follows:

We would request that training certification requirements be met in the following manner. Number one, documented new hire orientation \* \* \*. Secondly, we request that training certification requirements be met as documented annual refresher training.

We'd recommend this documentation be in the form of training logs which many of us already keep on the computer \* \* \*

Some of our members suggest \* \* \* giving a new employee a list of all required safety equipment that he or she should wear at the time they go through new-hire orientation, just as a reminder \* \* \* this is already being done in many of our yards.

In response to these submissions, OSHA emphasizes that any documentation of training that provides the specified information will provide adequate assurance that the training requirements have been satisfied. Therefore, § 1915.152(e)(4) of the final rule requires employers to verify that each affected employee has received the

required training with documentation that includes: employee(s) name; the date(s) of training, and type of training the employee received. In the case of an employee who has already been trained (either prior to the effective date of this standard or by another employer), OSHA will accept documentation dated as of the time the current employer determines that the employee has the requisite proficiency.

As discussed above, the rulemaking record indicates that most shipyard employers are already documenting training in the form of a log, computer database, or some type of written document. Examples of acceptable documentation would be records of stand-up safety meetings and tool box meetings, or a tool room log (where an employee has checked out PPE such as safety glasses, hard hat, gloves, face shield). OSHA will accept any form of documentation that effectively communicates the required information.

#### *Section 1915.153 Eye and Face Protection*

Final rule paragraph (a) sets out requirements for eye and face PPE. Paragraph (a)(1) requires employers to ensure that employees use eye and face PPE when employees are exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acid or caustic chemicals, chemical gases or vapors, or potentially injurious light radiation. This provision is based on the requirements in existing § 1915.151 (b)(1) and (c)(1). This provision is essentially unchanged from that proposed. OSHA did not receive any comments on this provision.

Final paragraph (a)(2) provides that front and side protection must be used when there is a hazard from flying objects. Detachable side protectors (for example clip-on or slide-on side shields) meeting the pertinent requirements of this section are acceptable.

OSHA has determined that detachable side shields that meet the pertinent criteria (ANSI Z87.1-1989, as referenced by final rule § 1915.153 (b)(1) and (b)(2)) will provide adequate protection from flying objects. Permitting detachable side shields will allow employers the flexibility to use this kind of protection when necessary, based on the working conditions at the employee's occupation or trade. The Agency has concluded that the same considerations that supported the adoption of such a requirement in other corresponding OSHA standards are relevant to shipyard employment.

Employers should be aware that some PPE could create new hazards to employees. For example, allowing

employees to wear wire-frame glasses (plano or prescription safety glasses) around energized electrical parts would increase the potential for electric shock.

In the proposal, paragraph (a)(2) required that eye and face protective equipment properly fit employees. In the final rule § 1915.152(b)(3) already requires that *all* PPE properly fit employees, and OSHA has therefore not included proposed paragraph (a)(2) in the final rule.

Paragraph (a)(3) addresses appropriate eye PPE for employees who wear prescription lenses. This provision requires that employers provide each such employee either with eye protection that incorporates the prescription in its design or with PPE that can be worn over prescription lenses without disturbing the proper position of the lenses. The final provision, which is essentially the same as the proposed paragraph except for minor editorial changes, elicited no comments.

Proposed paragraph (a)(3) required that protectors with tinted or variable tinted lenses not be worn when an employee was required in the course of work to pass from a brightly lit area, such as outdoors, into a dimly lit area, such as a vessel section. The Agency proposed this requirement to reduce the potential for extreme changes in lighting to temporarily impair an employee's vision.

OSHA received four comments on this provision, all addressing the same point. The commenters (Exs. 6-5, 6-6, 6-9 and 6-10) opposed any prohibition on the use of tinted or variable tint lenses.

Colonna's Shipyard, for example, stated that:

The use of the terms "well lighted" and "dimly lighted" are vague. Tinted lenses, that primarily reduce glare, may not appreciably reduce the amount of light passing through the lenses. As technology improves, variable tint lenses have been shown to reduce the time it takes for the lenses to change from full shading to minimal shading. In fact, employees coming from an interior location into brilliant sunlight can be temporarily blinded by the sun's glare.

In addition, two comments received on proposed subpart B of part 1915 (Doc. S-505) (Ex. 6-15, Bay Shipbuilding Corp. (BSC) and Ex. 6-36, Peterson Builders, Inc. (PBI)), addressed this proposed provision. BSC stated that: "Protectors with tinted or variable tint lenses should not be worn when an employee passes from a well lighted area into a dimly lighted area. Tinting over #2 shade is too dark, but #2 shade or under is felt to be acceptable and safe in most areas."

PBI stated that:

We need the use of tinted lenses to protect our employees from stray ultraviolet rays from weld arc. We presently limit our employees to a 1.7 tint on safety glasses. We are also in favor of the use of the variable tint lenses. This standard is in contradiction to 1915.153A1, which requires us to protect employees from injurious light radiation. This has not been a problem for us in causing accidents.

After evaluating the information in the record for this rulemaking (Doc. S-045), OSHA has concluded that the proposed requirement was too restrictive. The Agency has determined that the employer (for example, through the services of the company's safety professional) is in the best position to determine when tinted or variable tint lenses should be used, based on an awareness of working conditions. This approach is consistent with the current ANSI standard (ANSI Z87.1-1989, paragraph 6.5.2), which is (as discussed below) being incorporated by reference in the final rule. Accordingly, proposed paragraph (a)(3) has not been retained in the final rule.

Paragraph (a)(4) is essentially unchanged from the proposed paragraph. It requires employers to ensure that affected employees use equipment with filter lenses for protection against injurious light radiation and that the lenses have a shade number that is appropriate for the work being performed. Table I-1—*Filter Lenses for Protection Against Radiant Energy*—lists the necessary shade numbers for various operations. These provisions are consistent with other OSHA standards (existing § 1915.151(c)(1) and Table I-1 in § 1915.118).

In addition, a note to this provision states that, when goggle lenses and a helmet lens are worn together, the shade value of the two lenses can be summed to satisfy the shade requirements of Table I-1, § 1915.153. Bath Iron Works Corporation (BIWC) (Ex. 6-7) objected to this note, stating that the validity of the additive approach to filter lens selection has not been adequately demonstrated and violates accepted industry practice. OSHA disagrees with this view, because the technical experts responsible for the applicable consensus standard, ANSI Z87.1-1989, have indicated that the additive use of lenses is protective, provided that the combined values sum to the necessary value. Therefore, the note to Table I-1 has been retained.

Paragraph (b) sets performance criteria for eye and face PPE. Paragraph (b)(1) provides that protective eye and face devices purchased after August 22,

1996 shall comply with ANSI Z87.1-1989, "American National Standard Practice for Occupational and Educational Eye and Face Protection," which is incorporated by reference, or shall be demonstrated by the employer to be equally effective. PPE which satisfies the criteria set by subsequent editions of the pertinent ANSI standard will be considered to comply with paragraph (b)(1) if the updated ANSI criteria are substantively unchanged or provide equivalent protection.

In the proposal, this paragraph, which was designated paragraph (b)(1), required that the design of eye and face protection, in general, comply with the provisions of ANSI Z87.1-1979, while providing, in the alternative, that plano (non-prescription) spectacles comply with the performance-oriented criteria set out in proposed paragraph (b)(2). Shortly after the NPRM was issued, the 1979 edition of Z87.1 was superseded by the current 1989 edition. ANSI Z87.1-1989 is effectively identical to ANSI Z87.1-1979, except that the 1989 revision deleted design restrictive language that had limited the use of new technology in eye and face PPE. OSHA believes that performance-oriented regulatory language, such as that referenced from ANSI Z87.1-1989, will provide employers with appropriate flexibility to protect their employees while taking the particular circumstances of their workplaces into account. The Agency further believes that allowing employees to rely on the 1989 edition will facilitate compliance with the final rule, but will not prevent employers from using PPE that would have been allowed under proposed paragraph (b)(1).

Final rule paragraph (b)(2) requires that eye and face PPE purchased before August 22, 1996 comply with ANSI Z87.1-1979 or be demonstrated by the employer to be equally effective. OSHA has determined that it is appropriate to allow the continued use of such PPE in order to avoid imposing unreasonable burdens on employers. As noted above, the substantive provisions of the 1979 and 1989 editions are effectively identical, so employee safety would not be furthered by requiring that employers remove PPE tested under ANSI Z87.1-1979 from service. In this way existing stocks of PPE can be depleted, and any replacement PPE must satisfy the criteria referenced in ANSI Z87.1-1989.

Proposed paragraph (b)(2) would have set performance-oriented criteria for plano spectacles, addressing impact protection, optical requirements, flammability resistance and radiant energy protection. This paragraph was included in the proposal because OSHA

had determined that the design provisions (such as for minimum lens thickness or frame design) of the consensus standard referenced by existing § 1915.151(a)(1) (ANSI Z2.1-1959) were outdated. The removal of the design restrictive language from ANSI Z87.1 when it was revised in 1989 eliminated the need to address this problem in the final rule. Accordingly, no such provision appears in the final rule.

#### *Section 1915.154 Respiratory Protection*

Final rule § 1915.154 incorporates existing § 1910.134, Respiratory protection, by reference, as was proposed. The shipyard industry has been complying for years with § 1910.134 with regard to its respiratory protection programs. The two comments received on proposed § 1915.154 (Exs. 6-1 and 6-2) agreed with OSHA's proposal to replace § 1915.152, the existing shipyard respirator standard, with § 1910.134. Both comments expressed the belief that § 1910.134 is more protective and certainly more current than § 1915.152.

OSHA has published a proposed revision of § 1910.134, Respiratory Protection, which covers general industry, construction and shipyard employment (59 FR 58884, Nov. 15, 1994). When the revised respiratory protection standard becomes a final rule, OSHA will apply that rule to shipyard employment.

#### *Section 1915.155 Head Protection*

Final rule paragraph (a) addresses the use of protective helmets. Paragraph (a)(1) requires employers to ensure that affected employees wear protective helmets when they are working in areas where there is a potential for head injury from falling objects. This requirement is essentially the same as current § 1915.153(a). The national consensus standard for protective headgear, ANSI Z89.1, referenced in final rule § 1915.155(b), deals only with the head injury hazards posed by falling objects and high-voltage electric shock and burn. Therefore, this section of the final rule addresses PPE that is used to protect the head from these hazards.

The proposed rule addressed the use of protective helmets where there was potential for injury to the head from falling or moving objects. The duty to protect employees from other hazards to the head, such as moving objects, may be invoked through the general requirements of final rule § 1915.152(a) when such hazards are identified by the hazard assessment.

Commenting on proposed subpart B of part 1915 (Doc. S-050, Ex. 6-15 of Docket #S-050), BSC stated: "The standard should reflect what is stated in the ANSI standard for head protection." As noted above, the ANSI standard addresses falling object, not moving object, hazards and proposed paragraph (a)(1) has been revised accordingly.

Paragraph (a)(2) requires that affected employees wear protective helmets designed to reduce electric shock hazards when working in areas containing potential electrical hazards or energized conductors. This provision is essentially identical to the proposed provision and to other corresponding OSHA standards.

Final rule paragraph (b) sets the performance criteria for protective helmets. This paragraph provides that protective helmets purchased after August 22, 1996 shall comply with ANSI Z89.1-1986, "Personnel Protection—Protective Headwear for Industrial Workers—Requirements," which has been incorporated by reference, or shall be demonstrated by the employer to be equally protective. PPE which satisfies the criteria set by subsequent editions of the pertinent ANSI standard will be considered to comply with paragraph (b) if the updated ANSI criteria are substantively unchanged or provide equivalent protection. The Agency believes that this performance-oriented approach will encourage innovation and the use of improved equipment. The proposed rule also referenced the 1986 edition of ANSI Z89.1.

The consensus standard (ANSI Z.2-1959) referenced by the existing rule (§ 1915.153(a)) has been superseded several times since the existing standards were adopted. OSHA does not expect that much, if any, head PPE which was produced to meet the 1959 requirements is still in use. Furthermore, the Agency has concluded that ANSI Z.2-1959 does not provide adequate guidance regarding the selection of appropriate head protection. Therefore, unlike final rule § 1915.153, this section does not explicitly "grandfather" PPE which complies with the existing rule. Employers can continue to have their employees use head PPE which was produced to comply with a pre-1986 edition of ANSI Z89.1 if the employer establishes that the equipment either satisfies the performance criteria of ANSI Z89.1-1986 or provides equivalent protection.

The 1969 and 1986 editions of ANSI Z89.1 set essentially the same requirements, except with regard to electric insulation for Class B helmets. The Agency has concluded that Class B

helmets already in use which satisfied the criteria set by the 1969 edition would also satisfy the 1986 criteria.

Accordingly, final rule paragraph (b)(2) allows employers to continue to use protective helmets purchased before the effective date of the standard being published today provided that such helmets meet the criteria of ANSI Z.89.1-1969. This means that employers will not be required to replace protective helmets currently in use if they meet these criteria.

#### *Section 1915.156 Foot Protection*

Final paragraph (a) requires that affected employees wear protective footwear when they are exposed to hazards from falling and rolling objects, electrical hazards, and objects that may pierce a shoe sole. This is consistent with requirements in other corresponding OSHA standards. This language, which is effectively identical to that in the proposal, differs from existing § 1915.153(d), which requires employers only to make safety shoes available and "encourage" their use. OSHA believes that requiring employers to have affected employees wear protective footwear is necessary to protect their feet from the risk of serious injury. The AWSC (Ex. 6-4) commented that it would impose a cost burden on employers if they were required to purchase safety shoes for their employees. Therefore, they recommended that OSHA not require the employer to pay for foot protection, stating as follows:

The current regulatory language concerning foot protection of employees requires the employer to encourage the use of and make available appropriate foot protection. The new language states that the employer "shall ensure that employees wear protective footwear." AWSC does not object to the practice of wearing the correct protective footwear, and supports the use of this type of personal protective equipment. However, the new language indicates a dramatic shift from current shipyard operations.

Shipyard facilities have instituted many different policies to provide protective footwear to the employee, including disallowing employees to work at the facility unless they are wearing the appropriate footwear and providing an allowance to purchase the footwear. Lists of available and appropriate suppliers are circulated to the employees as a guide.

OSHA also received a comment on this subject from PBI (Docket S-050, Ex. 6-36) that stated: "This requirement is going to be cost prohibitive. We presently recommend safety shoes and contribute to their purchase. However, this standard would practically make them mandatory throughout the

shipyard. Our injury experience does not indicate a need for mandatory safety shoes."

As discussed above in reference to the provision for hazard assessment, subpart I requires employers to identify the hazards to which their employees may be exposed and have those employees equipped accordingly. Therefore, employees would be required to wear protective footwear only when such protection was appropriate. In addition, as discussed above in reference to OSHA's 1994 Memorandum on PPE, OSHA interprets the part 1915 subpart I requirements for employers to provide PPE to mean that employers pay for PPE required by the company for the worker to do his or her job safely and in compliance with OSHA standards. The above discussed policy memorandum specifically indicates that employers should expect to pay for specialty foot protection. On the other hand, OSHA policy also provides that payment for PPE which is personal in nature and useable away from the workplace (such as safety shoes) is left to labor-management negotiations.

Final rule paragraph (b) sets the performance criteria for protective footwear. Paragraph (b)(1) provides that protective footwear purchased after August 22, 1996 shall comply with ANSI Z41-1991, "American National Standard for Personal Protection-Protective Footwear," or shall be demonstrated by the employer to be equally protective.

In addition, paragraph (b)(2) allows protective footwear purchased before August 22, 1996 to continue to comply with ANSI Z41-1983, Personal Protection-Protective Footwear, or footwear that the employer can demonstrate to be equally protective. PPE which satisfies the criteria set by subsequent editions of the pertinent ANSI standard will be considered to comply with paragraph (b) if the updated ANSI criteria are substantively unchanged or provide equivalent protection. The Agency believes that this performance-oriented approach will encourage innovation and the use of improved equipment. Proposed paragraph (b) referenced the 1983 edition of ANSI Z41 for all protective footwear.

The 1991 edition of ANSI Z41, which has superseded the 1983 edition, imposes essentially the same requirements as the 1983 edition, except that the 1991 edition provides more specific performance requirements for resistance to compressive forces and standardizes the puncture resistance testing methods. OSHA believes that referencing ANSI Z41-1991 for shoes

purchased after August 22, 1996 provides appropriate and up-to-date criteria for employers and employees seeking to buy protective footwear.

OSHA has determined that it is appropriate to provide explicitly for the continued use of foot PPE purchased prior to the effective date of the final rule, as long as it complies with the pertinent provisions of the ANSI standard (ANSI Z41-1983) referenced by the proposed rule. In this way, the Agency avoids imposing unreasonable burdens on employers.

#### *Section 1915.157 Hand and Body Protection*

Final rule § 1915.157 addresses hand and body PPE. Paragraph (a) requires employers to ensure that affected employees use appropriate PPE when their hands or other parts of their bodies are exposed to hazards that could lead to injuries. The final rule identifies skin absorption of harmful substances, severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns, harmful temperature extremes, and sharp objects as examples of hazards that would require the use of PPE. The proposed provision was essentially identical to that in the final rule, except that it identified the hazards requiring protection in more general terms.

Final rule paragraph (b) requires employers to ensure that no employee wears clothing impregnated or covered in part with flammable or combustible materials (such as grease or oil) while engaged in hot work operations or working near an ignition source. This requirement is necessary to protect workers in hot work operations from fire hazards.

The proposed rule stated that employees shall not wear greasy clothing when performing hot work operations. Existing § 1915.153(e) provides that employees shall not be permitted to wear "excessively greasy" clothing while performing hot work operations.

The AWSC recommended (Ex. 6-4) that the word "excessively" be retained in the regulatory text of the final rule.

Shipyard work by definition is not a clean activity. Employees' clothing will be dirty. However, the clothing may not be "greasy" or even excessively greasy. Deletion of the descriptive term "excessively" will create rather than diminish compliance problems. We do not advocate that employees wear excessively greasy clothes when performing hot work operations, but without a proper explanation by OSHA as to the rationale for deleting the term, we advocate retention of the word "excessively" in the proposed language.

In addition, BSC commented (Ex. 6-15 in Docket S-050) that the language of the proposed paragraph was unclear. BSC suggested that OSHA revise the proposed language to require that employees "not wear clothing impregnated with flammable or combustible materials when performing hot work operations."

OSHA believes that retention of the term "excessively," as suggested by the AWSC, could potentially complicate compliance because the Agency has not established a measurable, objective standard for determining what is excessive. Moreover, the risk of flammability exists when clothing is impregnated, or covered, even impart, with a flammable or combustible substance. Therefore, the Agency has concluded that it is appropriate to prohibit employees from wearing clothing impregnated or covered with a flammable or combustible substance during hot work operations. The Agency agrees with the BSC that the standard needs to address all flammable and combustible materials, not just grease, and that adding the term "impregnated" (in the sense of permeated, imbued, or saturated) will more clearly express OSHA's intent. The provision has been revised accordingly.

Final rule paragraph (c) requires that the employer have employees wear protective electrical insulating gloves and sleeves, or other rubber protective equipment that provides equivalent protection when the employees are exposed to electrical shock hazards while working on electrical equipment. The proposed rule was effectively identical, except that it did not provide for the use of "other electrical protective equipment." The Agency has determined that the addition of this performance-oriented revision will encourage innovation and facilitate compliance.

#### *Section 1915.158 Lifesaving Equipment*

This section sets requirements for lifesaving equipment used in shipyard employment. Some of the language in the final rule has been editorially revised to reflect the language used in the U.S. Coast Guard's standard for approved lifesaving equipment (46 CFR part 160). OSHA's existing § 1915.154(a) specifies that the above-cited U.S. Coast Guard requirements for this equipment shall be followed. The OSHA final rule provides clarification of acceptable personal flotation devices and uses terminology that is consistent with current Coast Guard requirements. Also, for Type IV PFDs, the U.S. Coast Guard regulations use the term "ring life

buoys" rather than the term "life rings" as proposed by OSHA. Therefore, OSHA has replaced "life rings" with "ring life buoy" wherever the term appeared in the proposal. The proposed language did not elicit any comments.

Final rule paragraph (a)(1) requires that personal flotation devices (PFDs) worn by employees be approved by the U.S. Coast Guard as a Type I PFD, Type II PFD, Type III PFD, or Type V PFD, unless the employer provides employee worn equipment that is as effective as the types listed (e.g., a Coast Guard approved immersion suit). Any PFD which is U.S. Coast Guard approved and marked as a Type I PFD, Type II PFD or Type III PFD is acceptable to OSHA for use by employees. A Type V PFD, including Type V Hybrid PFDs, is acceptable to OSHA for use by employees if it is U.S. Coast Guard approved and marked for use as a work vest, for commercial use, or for use on vessels. The language of the proposed paragraph, which was based on existing § 1915.154(a), has been editorially revised and clarified in the final rule.

Final rule paragraph (a)(2), addressing the inspection of PFD's, was proposed by the Agency for deletion with the intent of covering defective PFD equipment under revised general requirements § 1915.152(c), "Defective and damaged equipment." After further consideration the Agency has concluded that a PFD is critical lifesaving equipment which requires specific inspection prior to each use for dry rot, chemical damage, or other defects (such as tears, punctures, missing or non-functioning components) which affect their strength and buoyancy. Therefore, the language of existing § 1915.154(b) is being retained in the final rule.

Paragraph (b) establishes requirements for ring life buoys and ladders. Paragraph (b)(1) requires that at least three 30-inch (0.78 m) U.S. Coast Guard approved ring life buoys with lines attached be kept in readily visible and accessible places when working on a floating vessel of 200 or more feet (61 meters). Ring life buoys must be located one forward, one aft, and one at the access to the gangway. Locating ring life buoys at these positions ensures that one will be readily available if a worker falls overboard at any point along the ship's length. This paragraph, which is based on existing § 1915.154(c)(1), is essentially identical to the proposed paragraph.

Paragraph (b)(2) requires floating vessels under 200 feet (61 m) in length to have at least one 30-inch (0.78 m) U.S. Coast Guard approved ring life buoy with line attached located at the gangway. The proposed paragraph,

based on existing § 1915.154(c)(1), was essentially the same.

Paragraph (b)(3) requires that at least one 30-inch (0.78 m) U. S. Coast Guard approved ring life buoy with a line attached be located on each staging float alongside the floating vessels from which work is being performed. The proposed paragraph, which was based on existing § 1915.154(c)(2), is effectively identical to the final rule's provision.

Paragraph (b)(4) requires at least 90 feet (27 m) of line to be attached to each ring life buoy. The proposed requirement, which was based on existing § 1915.154(c)(3), was effectively identical to the final rule.

Paragraph (b)(5) requires that at least one portable or permanently installed ladder be in the vicinity of each floating vessel on which work is being performed. The provision further requires that the ladder(s) be of sufficient length to assist employees to reach safety in the event that they fall into the water. The proposed paragraph, which was based on existing § 1915.154(c)(4), was effectively identical to the final rule.

#### *Section 1915.159 Personal Fall Arrest Systems*

This section sets performance criteria and other requirements for the use of personal fall arrest systems.

The Agency has determined that the fall hazards encountered by shipyard employees correspond to those faced by employees in other industries, and that it is therefore appropriate for OSHA to consider the information generated in general industry fall protection PPE rulemakings when drafting the final rule for shipyard PPE. The fall protection PPE criteria in proposed § 1915.159 were very similar to those in the corresponding proposed general industry standard (proposed §§ 1910.128 and 1910.129).

The record for the general industry fall protection PPE rulemaking (Docket S-057) indicated that the Agency should consider revising the proposed rule to prohibit the use of non-locking snaphooks and to disallow the use of body belts in personal fall arrest systems. This record, in turn, is directly relevant as the Agency considers corresponding changes in proposed § 1915.159.

To provide the public with notice and an opportunity to comment on the need for such revisions to the shipyard PPE proposed rule, the Agency solicited input through the July 6, 1994 notice of reopening (59 FR 34586) and the December 13, 1994 meeting notice (59

FR 64173). The response to those notices is discussed below.

OSHA obtained evidence (Docket S-057) in the General Industry rulemaking that employees who fall while wearing body belts are not protected as well as they would be if the fall occurred while the employee was wearing a body harness, and that the use of body belts has resulted in injuries to falling employees. A large number of rulemaking participants (Exs. 9-9, 9-10, 11-7, Tr. p. 23, Tr. pp. 59-61) supported prohibiting the use of body belts in fall protection systems. For example, Atlantic Marine (Ex. 9-9) endorsed the use of body harnesses as a safer method for employees, stating: "While the cost of body harnesses is usually twice the amount of the body belts, the added safety factor to the employee is well worth the money, and in the long run, will save the company money in case of an accident."

General Dynamics, Electric Boat Division, (Ex. 9-10) stated that it utilizes body harnesses for all of its fall protection needs.

Bath Iron Works Corporation/Local S6 (BIWC/Local S6) (Ex. 11-7) commented that they use only body harnesses in fall arrest systems and use either body harnesses or body belts in positioning device systems. BIW/Local S6 stated that it "fully supports the implementation of the proposed changes to [part 1915] subpart I."

The SCA testified (Tr. 23) that its members support the use of body harnesses in personal fall arrest systems, stating "many of our yards already use them. We find them to be very effective, and everybody seems to certainly feel a lot safer with them."

In addition, the Engineering and Safety Service (E&S) testified (Tr. 59-61) that "body belts have no useful purpose in a personal fall arrest system. E&S believes that an effective personal fall arrest system must incorporate a full body harness to protect the worker from injury and to provide an opportunity for rescue."

However, NNS (Ex. 9-11) responded as follows:

We reviewed all falls occurring at NNS since January 1, 1991. None of those occurring involved an injury which could have been prevented or mitigated by using a harness over a belt. NNS mostly uses belts with double acting clips. To replace all of our body belts with harnesses would cost in excess of \$570,000. Clearly, this is another unwarranted cost adversely affecting our global competitiveness without enhancing the safety of our employees.

The December 13, 1994 notice (59 FR 64173) solicited input regarding the extent to which a phased in ban on the

use of body belts in personal fall arrest systems would be appropriate for shipyard employment.

In their comments to this notice, NNS stated as follows:

We now understand that OSHA will agree to a phased replacement of body belts to offset the initial cost of purchasing large quantities of body harnesses. We will provide life cycle and replacement information at the January 25 meeting which should help OSHA to determine what the phased replacement period should be.

NNS subsequently testified (Tr. 34-35):

We see body harnesses coming, and we need a significant period of phase-in time for this to have a minimal financial impact on our operations. We've got 4,000 some-odd body belts either on issue or available for issue. Replacing all of those at once would cost use some \$570,000 \* \* \* [W]e'd like a reasonable period of time to phase the harnesses in, and that reasonable period of time, based on our inventory and our estimated useful life of a body belt, is seven years.

Based on the information in Docket S-057 and the shipyard industry input discussed above, OSHA has decided to bar the use of body belts in personal fall arrest systems. OSHA believes, however, that it is appropriate to allow a phase-out period, ending December 31, 1997, rather than to establish an immediate prohibition, so that shipyard employers can continue to use their body belts while they switch over to body harnesses. OSHA urges employers to phase out the use of body belts in personal fall arrest systems as soon as possible so that employees may be spared exposure to the increased risk of injuries from body belt use. It is important to note that body belts may continue to be used in positioning device systems even after they have been banned in fall arrest systems. OSHA has included paragraphs (b)(6)(i), (c)(1)(i), (c)(2), (c)(3), and (c)(8) in the final rule to provide criteria for any body belts that are used in personal fall arrest systems during the phase-out period.

In addition, OSHA has determined that it is appropriate, given the dangers related to "roll-out," to phase-out the use of non-locking connectors. The phase-out period will avoid imposing undue hardship on employers who currently use non-locking snaphooks. As discussed in the July 6, 1994 notice of reopening, the Agency has concluded that the same considerations which supported the adoption of such a requirement in other corresponding OSHA PPE standards apply to personal fall arrest system components used in shipyard employment. OSHA has

concluded that compliance with final rule paragraphs (a)(5) and (a)(6) will effectively minimize any problems related to the use of non-locking snaphooks during the phase-out period.

The input received in response to the July 6, 1994 reopening notice (59 FR 345860) and the December 13, 1994 meeting notice (59 FR 64173) indicated shipyard industry support for a ban on the use of non-locking snaphooks. For example, General Dynamics, Electric Boat Division (Ex. 9-10) stated that it "utilizes locking snaphooks and therefore takes no issue with the proposed \* \* \* language."

NNS (Tr. 52) and the UBC Health and Safety Fund of North America (UBC) (Tr. 86) testified that OSHA should require the use of locking snaphooks. In particular, the UBC stated that "OSHA should prohibit the use of non-locking snap hooks because of the recognized danger of roll-out and the resulting possibility of employee falls." Accordingly, § 1915.159 of the final rule bans the use of non-locking snaphooks in fall arrest systems, effective January 1, 1998.

Final rule paragraph (a) sets criteria for connectors and anchorages used in personal fall arrest systems. Except where otherwise indicated, any final rule provisions which were not proposed have been added to the standard because the Agency has concluded that the same considerations which supported the adoption of such requirements in other corresponding PPE standards apply to personal fall arrest systems and components used in shipyard employment.

Paragraph (a)(1), proposed as paragraph (a)(7), requires that connectors be made of drop forged, pressed, or formed steel or materials equivalent in strength. The connectors used in personal fall arrest systems must be made of steel or equivalent materials to withstand failure under fall conditions. As discussed above in relation to the definitions (§ 1915.151(b)), OSHA has replaced the proposed term "hardware" with the term "connector." Otherwise, the proposed and final rule language are identical.

Final rule paragraph (a)(2), proposed as paragraph (a)(8), requires that connectors have a corrosion-resistant finish and that all surfaces and edges be smooth to prevent damage to the interfacing parts of the system. The only difference between the final rule's provision and the proposed provision is the use of the term "connector" instead of "hardware."

Final rule paragraph (a)(3), proposed as paragraph (a)(14), requires that D-

rings and snaphooks used in these systems be capable of sustaining a minimum tensile load of 5,000 pounds (22.2 kN). No comments were received on this paragraph.

Final rule paragraph (a)(4), which is also a new provision, requires that D-rings and snaphooks be 100 percent proof tested to a minimum tensile load of 3,600 pounds (16 Kn) without cracking, breaking, or being permanently deformed. The provision is included to ensure the strength of all D-rings and snaphooks.

Paragraph (a)(5), which was not proposed, provides that snaphooks shall either be sized so as to prevent unintentional disengagement of the snaphook or shall be of a locking type which is designed and used to prevent disengagement of the snaphook. This provision has been added to prevent "rollout" conditions in a personal fall arrest system during the phase-out period for non-locking snaphooks.

Final rule paragraph (a)(6) requires that snaphooks, unless of a locking type designed and used to prevent disengagement from the following connections, must not be attached:

- (i) Directly to webbing, rope, or wire rope;
- (ii) To each other;
- (iii) To a D-ring to which another snaphook or other connector is attached;
- (iv) To a horizontal lifeline, or
- (v) To any other object that is shaped incompatibly or dimensioned in relation to the snaphook such that the connected object could depress the snaphook keeper a sufficient amount for release.

Proposed paragraphs (a)(15), (a)(16), and (a)(17), which set similar requirements, have been clarified and consolidated in final rule paragraph (a)(6).

Final rule paragraph (a)(7), which is a new provision, requires that devices used for connection to the horizontal lifeline on suspended scaffolds, or to similar work platforms with horizontal lifelines that may become vertical lifelines, be capable of locking in any direction on the lifeline. Because a suspended scaffold or platform could lose its support at either end, the connection device must be able to lock on the lifeline regardless of which end goes down.

Final rule paragraph (a)(8), requires that anchorages used for the attachment of personal fall arrest equipment be independent of any anchorage being used to support or suspend platforms. Final rule paragraph (a)(9) requires that anchorages either be capable of supporting at least 5,000 pounds (22.2 Kn) per employee attached or be designed, installed, and used as part of

a complete personal fall arrest system that maintains a safety factor of at least two, and is used under the direction and supervision of a qualified person. Both provisions are based on proposed paragraph (a)(10).

Proposed paragraph (a)(10) required that personal fall arrest systems be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall. E&S testified (Tr. 63-64) that it was "concerned about the safety factor requirements for an anchorage in the proposed standard \* \* \* [E&S] does not believe the average worker is capable of determining the safe limits of an anchorage." In the course of subsequent questioning (Tr. 70-71), E&S agreed that anchorages installed as part of a completely designed personal fall arrest system, and used under the supervision of a qualified person, would provide adequate support for employees. This approach, taken in the corresponding construction and general industry rulemakings, has been adopted in the shipyard PPE final rule. The final rule provisions, while reformatted for the sake of clarity, are essentially the same as the proposed provision.

Final rule paragraph (b) sets criteria for lifelines, lanyards, and personal fall arrest systems. Paragraph (b)(1) requires that each employee be provided with a separate lifeline when vertical lifelines are used. Proposed paragraph (a)(9), which elicited no comments, was essentially identical to this provision of the final rule.

Final rule paragraph (b)(2) requires vertical lifelines (droplines) and lanyards to have a minimum breaking strength of 5,000 pounds (22.2 Kn). This provision of the final rule consolidates the strength requirements contained in proposed paragraphs (a)(11) and (a)(13). The elements of proposed paragraph (a)(11), which addressed self-retracting lifelines, have been redesignated final rule paragraphs (b)(3) and (b)(4), as discussed below. The "exception" to the 5000-pound strength requirements contained in proposed paragraph (a)(13) appears in the final rule as a separate provision, paragraph (b)(3), to more clearly express the Agency's intent. OSHA received no comments on the proposed paragraphs relating to lifelines, lanyards, and personal fall arrest systems. The Agency has determined that reformatting the proposed requirements will facilitate compliance efforts for employers whose employees use vertical lifelines or lanyards.

Final rule paragraph (b)(3) requires that self-retracting lifelines and lanyards which automatically limit free fall to 2

feet (0.61 m) or less be capable of sustaining a minimum static tensile load of 3,000 pounds (13.3 Kn) applied to the device with the lifeline or lanyard in the fully extended position. Final rule paragraph (b)(4) requires that self-retracting lifelines and lanyards which do not limit free fall distances to 2 feet (0.61 m) or less (for example: ripstitch lanyards, tearing, and deforming lanyards) be capable of sustaining a minimum tensile load of 5,000 pounds (22.2 Kn) applied to the device (with the lifeline or lanyard in the fully extended position if such a condition can occur in use). As discussed above, final rule paragraphs (b)(3) and (b)(4), which are based on proposed paragraph (a)(11), have been included in the final rule as separate paragraphs for clarity.

Final rule paragraph (b)(5) (revised from proposed paragraph (a)(12)) requires that horizontal lifelines to be used as part of a complete personal fall arrest system be designed and installed under the supervision of a qualified person and have a safety factor of at least two. The proposed provision required that horizontal lifelines have sufficient strength to support a fall impact force of at least 5,000 pounds (22.2 Kn). As discussed above, the Agency has concluded that the same considerations which supported the adoption of such a requirement in the other corresponding OSHA standards apply to personal fall arrest system components used in shipyard employment. OSHA has revised the final rule accordingly.

Final rule paragraph (b)(6) sets the systems performance criteria for personal fall arrest systems. These are new requirements, so OSHA is making this provision effective November 20, 1996 in order to allow employers a reasonable amount of time to attain compliance. The note to final rule paragraph (b)(6) indicates that Non-mandatory Appendix B provides examples of criteria and protocols for designing and testing personal fall arrest systems that OSHA would consider to comply with the standard.

Proposed paragraph (a)(4) was similar to final rule paragraph (b)(6), except that the proposed rule set 1,800 pounds (rather than 900 pounds) as the maximum arresting force limit for systems that used body belts and required that a system have a strength factor of two (based on a design weight of 250 pounds per employee). Also, as discussed below, the proposed requirement that free fall be limited to six feet has been redesignated as a separate provision, final rule paragraph (b)(7), for the sake of clarity. The note to proposed paragraph (a)(4)(iv) is

essentially identical to that which appears in the final rule, except for editorial revisions. As discussed above, in reference to the July 6, 1994 notice (59 FR 34586), the Agency has concluded that the same considerations which supported the adoption of such requirements in the other corresponding OSHA standards apply to personal fall arrest system components used in shipyard employment. OSHA has revised the proposed rule accordingly.

Final rule paragraph (b)(7), based on proposed paragraph (a)(4)(i), requires that personal fall arrest systems be rigged to prevent an employee from free falling more than 6 feet (1.8 m) or contacting any lower level.

Final rule paragraph (c) sets criteria for the selection, use and care of personal fall arrest systems and system components. Paragraph (c)(1) (proposed as paragraph (a)(5)) of the final rule requires that the attachment point of a body belt be located in the center of the wearer's back. The attachment point of a body harness must be in the center of the wearer's back near shoulder level or above the wearer's head. The proposed rule provided that the connection point must be either above the wearer's head or above the waist in the back. Comments in the other rulemaking records supported allowing an attachment point at the chest position for limited free fall distances. The final rule, as regards body harnesses, has been revised accordingly.

Paragraph (c)(2) of the final rule, which is a new provision, requires that ropes and straps (webbing) used in lanyards, lifelines, and strength components of body belts and body harnesses be made from synthetic fibers or wire rope. OSHA has determined, given the difficulty of evaluating the deterioration of natural fiber rope, that natural fiber rope is not reliable for use in a personal safety system.

Final rule paragraph (c)(3), also a new provision, requires ropes, belts, harnesses and lanyards to be compatible with all hardware used. The use of incompatible equipment may cause a fall, or, during arrest of a fall, allow arresting forces which cause injury.

Paragraph (c)(4), proposed as paragraph (a)(3), requires that lifelines and lanyards be protected against cuts, abrasions, burns from hot work operations, and deterioration by acids, solvents, and other chemicals. The proposed provision, which did not elicit comments, was identical.

Final rule paragraph (c)(5), proposed as paragraph (a)(18), requires that personal fall arrest systems be visually inspected prior to each use for mildew, wear, damage, and any other

deterioration. This inspection need not involve testing or impact loading of the system. If there is a reasonable basis to believe that the strength or integrity of the fall arrest system has been weakened, the employer shall remove defective or damaged equipment from service. No comments were received on the proposed provision, which was identical to the provision in the final rule except for minor editorial changes.

Paragraph (c)(6), which was proposed as paragraph (a)(2), requires that personal fall arrest systems and components that have been subjected to impact loading be removed immediately from service and not be used again for employee protection until inspected and judged suitable for use by a qualified person. The proposed provision, which was effectively identical, elicited no comments and has been promulgated in the final rule with minor editorial changes.

Paragraph (c)(7) of the final rule, a new provision, requires that the employer provide for prompt rescue of employees in the event of a fall or ensure that employees who have fallen can rescue themselves. This provision also appears in the proposed general industry rule and in the final rule for construction. OSHA anticipates that employers will evaluate the potential consequences of falls in personal fall arrest systems in their work environments and choose an appropriate means of rescue. OSHA recognizes that the rescue requirements for employees wearing body harnesses and body belts will differ. For example, the Agency anticipates that self-rescue will be more difficult for employees using body belts and that the acceptable rescue time for such employees will be shorter, because falls in body belts typically result in the employee hanging in a jack-knifed position. When it is not possible to evaluate the self-rescue capacity of employees in advance, prudent employers should assume that employees will need rescue assistance and, accordingly, be prepared to offer it. Paragraph (c)(8), proposed as paragraph (a)(6), requires that body belts be at least 1.625 inches (4.1-cm) wide. OSHA has determined that this minimum width will be acceptable for any body belts that are used in personal fall arrest systems during the phase-out period. No comments were received on this provision.

Paragraph (c)(9), proposed as paragraph (a)(1), requires that personal fall arrest equipment be used exclusively for employee protection. For example, this equipment may not be used to hoist materials. This revision is intended to prevent the deterioration

potentially caused by improper uses and types of loads. The proposed provision, which was identical, elicited no comments.

Final rule paragraph (d), Training, proposed as paragraph (a)(19), requires that employees be trained to understand the application limits of the equipment and the proper hook-up, anchoring, and tie-off techniques, before using any personal fall arrest equipment. Affected employees must also be trained so that they can demonstrate the proper methods of use, inspection, and storage of the equipment. OSHA believes that employees must know how their fall arrest equipment works in order to get the appropriate protection from it. No comments were received on the proposed provision, which was effectively identical to the final rule.

#### Section 1915.160 Positioning Device Systems

Positioning device systems prevent falls by holding affected employees in place while they perform work on vertical surfaces at elevations. The provisions of proposed § 1915.159(b) have been moved to final rule § 1915.160, so there is a clear distinction between the requirements for personal fall arrest systems and those for positioning device systems.

Final rule paragraph (a) sets criteria for connectors and anchorages used in positioning device systems. For the same reasons as provided in the introductory discussion of final rule § 1915.159, the introductory text of final rule § 1915.160 provides that the use of non-locking snaphooks will not be acceptable in positioning device systems after December 31, 1997. OSHA has included paragraph (a)(4) in the final rule to address any non-locking snaphooks that may remain in use during the phase-out period.

Paragraph (a)(1), proposed as § 1915.159(b)1, requires that all hardware have a corrosion-resistant finish and that all surfaces and edges be smooth to prevent damage to the attached belt or connecting assembly. Corrosion resistance is essential to retain the integrity of the hardware, while smooth edges and surfaces prevent cuts, tears, or other damage to system components. The proposed provision was identical, except that the proposed term "hardware" has been replaced by the term "connector." As discussed above, OSHA has determined that it is appropriate to focus attention on the critical load-bearing hardware by adopting the term "connector."

Final rule paragraph (a)(2), proposed as § 1915.159(b)(2), provides that connecting assemblies, such as

snaphooks or D-rings, have a minimum tensile strength of 5,000 pounds (22.2 Kn). The proposed provision, which did not elicit comments, was identical.

Final rule paragraph (a)(3), proposed as § 1915.159(b)(3), requires that anchorages for positioning device systems be capable of supporting twice the potential impact load of an employee's fall. The proposed provision, which did not elicit comments, was identical.

Final rule paragraph (a)(4), proposed as § 1915.159(b)(6)(i), provides that snaphooks, unless of a locking type designed and used to prevent disengagement, shall not be connected to each other. The proposed rule simply prohibited the connecting of snaphooks to each other. As discussed above, in reference to the introductory text of final rule § 1915.160, the use of non-locking snaphooks is prohibited after December 31, 1997.

Final rule paragraph (b) sets performance criteria for positioning device systems. Paragraph (b)(1), proposed as § 1915.159(b)(4), requires that restraint (tether) lines have a minimum breaking strength of 3,000 pounds (13.3-Kn). This breaking strength is necessary to ensure that the line will hold under fall arrest conditions. The proposed provision, which did not elicit comments, was identical.

Paragraph (b)(2), proposed as § 1915.159(b)(5), provides the system performance criteria for the different types of positioning device systems. These are new performance requirements that are not in OSHA's current shipyard standards. In order to allow employers a reasonable amount of time to ensure that their equipment meets these requirements, OSHA is making this provision effective November 20, 1996.

Final rule paragraph (b)(2)(i) provides that window cleaner's positioning systems must be capable of withstanding a drop test involving a 6 foot (1.83 m) drop of a 250 pound (113 kg) weight. These systems must withstand a more rigorous drop test than other positioning device systems because of their potential for greater free fall distances.

Final rule paragraph (b)(2)(ii) requires that all positioning device systems, other than window cleaners' positioning systems, be capable of withstanding a drop test of 4 feet (1.2 m) with a 250 pound (113 kg) weight. Positioning device systems which comply with the provisions of Section 2 of Appendix B will be deemed by OSHA to meet the requirements of this paragraph. The

proposed provision, which elicited no comments, was identical.

Final rule paragraph (c) sets criteria for the use and care of positioning device systems. Final rule paragraph (c)(1), proposed as § 1915.159(b)(7), requires the inspection of positioning device systems before each workshift for mildew, wear, damage, and other deterioration. This provision further requires that defective components identified in such inspections be removed from service. The proposed language was nearly identical, except that it provided for removal of defective equipment "if their functions or strength may have been adversely affected." OSHA has determined that the deletion of that language will make the rule easier to understand, because employers will simply remove components from service that are identified as defective without having to make a specific determination about strength or function.

Final rule paragraph (c)(2), proposed as § 1915.159(b)(6)(ii), requires that positioning device systems or components subjected to impact loading be removed immediately from service and not be used again for employee protection, unless inspected and determined by a qualified person to be undamaged and suitable for reuse. This requirement is necessary to ensure that systems used for employee protection still meet the performance criteria for such systems before they are reused for this purpose. The proposed provision, which did not elicit comments, was identical.

Final rule paragraph (d), Training, proposed as § 1915.159(b)(6)(iii), provides that employees must be trained in the application limits, proper hook-up, anchoring, and tie-off techniques, methods of use, inspection, and storage of positioning device systems before they may use those systems. This provision emphasizes the importance of employee training in the safe use of positioning device systems; for these systems to provide employee protection, two elements are essential. The systems must be designed and used in accordance with stated performance criteria, and the employee(s) using the system must be adequately trained in the safe use of the system. The proposed provision, which did not elicit comments, was identical.

#### Incorporation by Reference

Another action in this document is the consolidation, within part 1915, of OSHA's Incorporation by Reference (IBR) statements of approval, which indicate clearance by the Office of the Federal Register, into a single section,

§ 1915.5. Existing section 1915.5 is being updated and revised to accomplish this consolidation. This approach is consistent with that taken by other Federal agencies. As amended, § 1915.5 contains the national consensus standard organizations' addresses and the IBR approval language. This approach saves text by cross-referencing from the regulatory text where an IBR is set out to the IBR section. Without such a section, the addresses of the standards organizations, the OSHA Docket Office address, and the IBR approval statement would need to be repeated with each incorporation by reference throughout the shipyard standards. A consolidated IBR Section will also be easier to update.

#### Appendices

OSHA is including two non-mandatory appendices to final part 1915 subpart I.

#### Appendix A

Appendix A provides suggested guidelines for complying with the requirements for hazard assessment for the selection of personal protection equipment.

In developing the final rule for this rulemaking, OSHA has determined that Appendix B of the corresponding General Industry standard (part 1910, subpart I) contains some useful information that would be helpful to shipyard employers. Therefore, OSHA has decided to add a detailed Appendix A to the shipyard PPE standard to provide some examples of guidelines which an employer may follow in complying with OSHA's performance-oriented final rule. Those guidelines include examples of hazard assessments performed by work activity.

#### Appendix B

Appendix B contains testing methods and other information to assist employers in complying with the performance-oriented criteria for personal fall arrest systems and positioning device systems contained in this standard. Many revisions have been made to this appendix based on the comments received during the powered platform rulemaking (Docket No. S-700A). These changes are intended to clarify and simplify the information presented. A complete discussion of the comments and reasons for the changes are included in the Powered Platforms for Building Maintenance final rule (54 FR 31452).

#### Amendments to Other Subparts of the Shipyard Standards

This final rule also revises cross references in subparts C and H of the shipyard standards, so that those provisions reference subpart I. The existing references would no longer identify the correct paragraphs in subpart I because of the reformatting of Subpart I. These revisions are editorial in nature and do not substantively change the current requirements in other subparts.

#### IV. Summary of Final Economic Analysis, Regulatory Flexibility Analysis, and Environmental Impact Assessment Summary

In accordance with Executive Order 12866, OSHA has developed a final economic analysis to support the final standard for personal protective equipment (PPE) in the shipyard industry. The Agency has also analyzed the standard's impact on small entities, as required by the Regulatory Flexibility Act, and its potential to cause adverse environmental impacts, as required by the National Environmental Policy Act. The final rule, which will be codified as subpart I of the shipyard employment standards (29 CFR 1915), covers the use of personal protective equipment for the head (e.g., hard hats), eyes (e.g., goggles), feet and hands (e.g., shoes and gloves), and body (e.g., chemical protective clothing), contains the respirator requirements that have been part of OSHA's shipyard standards since 1971, and adds requirements for personal fall protection systems and positioning device systems.

Injuries in the shipyard industry are frequent and severe. The shipyard industry (SIC 3731) has the second highest rate of lost workday injuries and illnesses (37.8 per 100 full-time workers), according to the BLS publication "Occupational Injuries and Illnesses: Counts, Rates, and Characteristics, 1992" (published in April 1995). The industry also has one of the highest average number of lost workdays per injury (more than 40 percent of lost workday injuries involve more than 10 days away from work, according to the same BLS publication).

To address those shipyard injuries that result from the failure to use PPE or from the use of inadequate PPE, and to raise the minimum standard of PPE use in the industry to the level of technology currently available, OSHA has developed this final rule. The rule requires employers to meet minimum specifications for PPE employed to protect the eyes and face, hands and body, and feet, as well as those for

respiratory protection, lifesaving, and personal fall protection equipment. In addition, the final rule requires employers to conduct hazard assessments, include specific elements related to PPE in the training they provide to their workers, document training and hazard assessments, require the use of body harnesses in place of body belts after a phase-in period, and ensure the use of locking snaphooks on personal fall protection equipment. Rulemaking participants from the shipyard industry report that most employers in the industry are already in compliance with the requirements of the final standard. For example, one industry representative stated " \* \* \* most shipyards require employees to wear personal protective equipment in all areas beyond the office doors. \* \* \* We've already identified and protected our employees and our visitors because of the hazardous work environment" [January 25, 1995 public meeting, Transcript page 9].

The economic analysis identifies a number of benefits that employers and employees will experience as a result of compliance with the standard. For example, the Agency has concluded that the rule's requirements for body harnesses and locking snaphooks will reduce the risk of fatal falls, and these requirements will also reduce the severity of the injuries resulting from non-fatal falls. In addition, the final rule is estimated to prevent about 1,550 lost workday injuries annually and 12,650 non-lost workday injuries caused by the failure to use PPE or the use of inadequate PPE.

The Agency estimates that employers in the affected industry will incur estimated annual costs of compliance of \$163,000. These costs, which average about \$2 per covered employee, will not impose substantial economic impacts on affected firms in any size-class. OSHA has also evaluated the impacts of compliance costs on the average small shipyard and has determined that, even under a no cost pass through assumption, worst case impacts on such establishments will average no more than \$100 annually. OSHA has therefore concluded that this standard will not impose an undue burden on small firms; in addition, the standard will not have an adverse effect on the environment.

#### Introduction

Executive Order 12866 requires the Agency to perform an analysis of the costs, benefits, and regulatory alternatives of its regulatory actions. If a regulation is deemed "significant" by the Administrator of OMB's Office of Information and Regulatory Affairs

(OIRA), OIRA reviews the regulation and OSHA's economic analysis. A regulatory action is considered significant if it imposes annual costs on the economy of \$100 million or more or has an adverse effect on the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities. This final rule directly affects only one well-defined industry, the shipbuilding and ship repair industry, and the estimated costs of compliance are far below the \$100 million threshold. OSHA has therefore concluded that the promulgation of this final standard for personal protective equipment in shipyard employment is not a significant action under the guidelines of E.O. 12866.

As required by the OSH Act and its judicial interpretations, the Agency must demonstrate that all of its regulations are both technologically and economically feasible, and specifically that this is the case for this rule. The Agency has concluded that this standard meets both tests of feasibility. A summary of the Agency's feasibility assessment of the final rule is presented in the following section of the Economic Analysis.

In addition, the Regulatory Flexibility Act of 1980 (5 U.S.C. 601 et seq.) requires federal agencies to determine whether a regulation will have a significant economic impact on a substantial number of small entities. The Agency must also review this standard in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 et seq.), the Guidelines of the Council on Environmental Quality (CEQ) (40 CFR Part 1500), and OSHA's DOL NEPA Procedures (29 CFR Part 11).

This summary of the economic analysis includes an overview of the affected industry and employees at risk, the estimated benefits of the rule, the technological feasibility of the standard, the estimated compliance costs shipyard employers will incur, the impact of those costs on firms in the shipyard industry, the results of the regulatory flexibility and economic analysis, and a discussion of regulatory and non-regulatory alternatives. The full text of the economic analysis is in the shipyard PPE docket (Docket S-045).

#### *Industry Profile*

The American shipyard industry has been in a long-term decline since 1981 when the federal government ended subsidies for commercial ship construction. In the period 1976-1980

the industry built an average of 64 merchant vessels per year. Only five commercial ships have been built since 1988. The decline in merchant vessel construction in the 1980's was partially offset by a large increase in military ship construction. However, the end of the military competition with the former U.S.S.R. has resulted in a sharp drop in military ships on order. The "bottom-up" review of the armed forces called for a major reduction in the number of active combat ships, and consequently has caused a drop in the number of future orders. U.S. Navy orders, which averaged 19 per year in the 1980's, are projected to fall to 8 per year during the period 1994-1999. Ship repair and construction of inland vessels and barges has remained constant during the past five years.

Recently American shipyards have received new orders for construction of commercial ships (Wall Street Journal Nov. 15, 1995). These orders result mainly from a new Federal loan guarantee program approved by Congress but also are due to exchange rates that have made American-made products cheaper relative to foreign-produced goods. Wage rates in American shipyards were already well below those of some important foreign competitors, such as Germany and Japan, whose governments heavily subsidize their shipbuilding industries. A new global trade accord that would end shipbuilding subsidies may be signed in the near future. This would allow American shipyards to compete internationally, increase commercial ship construction, and increase employment levels in the industry. The Agency estimates that employment in American shipyards will end its decline and level off or increase slightly for the next two to three years. Future employment levels depend on funding for the guaranteed loan program, exchange rates and the relative price of American versus foreign-built ships, foreign governments' level of subsidy to their shipyards, and the status and terms of a global accord to end subsidy programs.

Employment in the shipbuilding industry declined from 177,000 in 1984 to about 125,000 by 1987 and remained near that level until 1992. The Bureau of Labor Statistics estimates that employment in the industry was 106,000 by late 1993. The most recent BLS "Employment and Earnings" (May 1995) estimates the same level of employment and reports that about 79,000 of these employees are production workers. In 1994, the value of output from American shipyards was approximately \$9.5 billion (1994

Industrial Outlook estimate). Based on Dun & Bradstreet's estimated mean return for the shipyard industry of 2.9 percent, the industry earned approximately \$275 million in 1994.

The Agency estimates that there are approximately 500 firms in SIC 3731, and a majority of these have fewer than 50 employees. Employment in the shipyard industry is highly concentrated. The ten largest shipyards employ approximately 70 percent of all shipyard workers, and only the 100 largest firms have as many as 100 employees each. The Agency estimates that approximately 300 firms engaged in ship repair employ fewer than 20 employees. Many of these small firms perform contracting for larger firms; those that do so already follow the PPE guidelines of the employing shipyards.

#### *Employees at Risk*

Numerous sources confirm that about 75 percent of shipyard employees are production workers, including the 1987 *Census of Manufactures* (Bureau of the Census 1990) and CONSAD Research Corporation (1986). The Agency thus concludes that an estimated 79,000 production workers in this industry are now exposed to workplace hazards that may require the use of PPE of the types covered by the final rule.

#### *Technological Feasibility*

Equipment to meet the final PPE standard, such as hard hats, gloves, and safety shoes, is readily available and widely used throughout the industry. Off-the-shelf safety programs that include guidance on the conduct of hazard assessments, as well as training program materials, are readily available, and these programs are also well established throughout the industry. "Hazard assessments are a standard practice at EBDiv. [Electric Boat Division]" [Ex. 9-10]. "Shipyards are safety conscious. Every shipyard in the Hampton Roads area has a safety program and a safety officer \* \* \* STASR shipyards have safety programs with many of the PPE standards already in place. The [proposed standard's] PPE training and recordkeeping requirements are, in some cases, redundant" [South Tidewater Association of Ship Repairers, Ex. 9-3].

Training documentation is usually maintained by shipyard employers in a computer database. The Agency therefore concludes that the final PPE standard is technologically feasible. The performance-oriented criteria of the standard should also allow technological innovation to improve PPE protection in the future.

### Costs

The preliminary cost estimates prepared by OSHA to support the proposed shipyard PPE standard published in 1988 included compliance costs that shipyard employers would incur to comply with a number of proposed requirements for respirator use. However, the final standard does not include any new respirator requirements, because the Agency expects to publish a final rule addressing respirator use in all industries in the near future. Thus, this final rule includes only those respirator provisions that have been included in OSHA's shipyard rules since 1971.

In response to the preliminary Regulatory Impact Analysis (1988), OSHA received only one comment on the costs of the proposed standard. Peterson Builders [Ex. 6-14], referring to the proposed requirement for foot protection in Section 1915.156, stated that buying protective footwear for all employees—which the commenter interpreted as being required by the proposed standard—would be costly and unnecessary. The Agency has recently clarified its policy on the purchase of PPE to make clear that employers do not have to purchase equipment that may also have personal use; OSHA believes that the costs of PPE will therefore be substantially less than this commenter expected. In addition, as noted above, OSHA's 1988 Preliminary Regulatory Impact Analysis (see Docket S-045) noted that the use of PPE in shipyards is already widespread.

On April 6, 1994 OSHA published a final standard for PPE in general industry (59 Federal Register No. 66). On July 6, 1994, the Agency reopened the record for the shipyard PPE standard to incorporate the general industry PPE docket into the shipyard PPE docket and to propose the addition of several elements from the general industry standard to the shipyard standard. These elements included requirements for: certification of workplace hazard assessments; certification of training; specification of training elements; the phasing out of body belts in favor of body harnesses; and the replacement of non-locking snaphooks with locking snaphooks. The Agency's intent in taking this action was to make the PPE standard consistent where possible in both shipyards and the general industries. Following the comment period, a Federal Register notice announcing a public meeting and containing additional discussion of some of the issues raised by the reopening was published on December 13, 1994. A public meeting was held on

January 25, 1995 to hear testimony about the proposed changes to the shipyard standard introduced during the reopening of the record.

Representatives of the shipyard industry and industry associations opposed the new requirements for work place hazard assessments and the certification of such assessments. First, the industry asserted that job-related activities in shipyards are unique because a shipyard is not a fixed "workplace." Instead there is a constant shifting of trades between work locations as employees move among various shops and vessels; in addition, in ship repair and overhauling, the vessels being worked on constantly change. According to these commenters, it is not possible for designated shipyard employees to continuously assess the hazards of a "workplace" that is constantly changing. According to one participant, a better approach would be to perform hazard assessments by trade to determine the level of PPE required [South Tidewater Association of Ship Repairers, Ex. 9-3]. Numerous commenters agreed with this view [Exs. 9-1, 9-7 through 9-12].

As discussed above in relation to final rule § 1915.152(b), OSHA agrees that it is appropriate to allow employers flexibility in organizing their hazard assessment efforts. The Agency has underscored the performance-oriented nature of that provision by adding a note to the final rule which states that hazard assessments conducted according to the trade or occupation of affected employees are acceptable so long as they address any PPE-related hazards to which employees are exposed in the course of their work activities.

The shipyard industry also opposed the requirement for certification of hazard assessments because, in the opinion of commenters, certification would require employers to expend resources for new paperwork activities "for the convenience of the Agency" that would not result in additional safety for production workers [Ex. 9-11]. Industry commenters also were concerned that certification might increase their liability when injuries occur. Other shipyards that currently rely on worker involvement to analyze risks feared that certification would disrupt that process [January 25, 1995 public meeting transcript pages 28 and 41-47]. The shipyard industry also opposed the certification of hazard assessments on the grounds that these assessments would be redundant, since the industry already performs many PPE-related hazard assessments for individual health and safety standards

such as hearing conservation, lead, confined spaces, respirator use, and other OSHA standards.

In its Federal Register notice on December 13, 1994 announcing a public meeting on shipyard PPE issues, the Agency asked for information on whether simple documentation would suffice in place of certification. In testimony at the public meeting and in comments submitted following the meeting, industry representatives stated that they did not oppose documentation of hazard assessments. In fact, they reported that it is routine in the industry to conduct such assessments and to document them:

\* \* \* hearing conservation, respiratory protection, hazard communication, lockout/tagout, lead abatement, blood-borne pathogens, medical surveillance programs \* \* \* [are] programs that are already in place that [require] us to do hazard assessments of the workplace in order that we provide PPE \* \* \* Where hazard assessment does not exist, and it would be hard for me to say where it doesn't in the shipyard industry, we'd recommend that an annual assessment be made. [Shipbuilders Council, January 25, 1995 public meeting transcript page 11].

Commenters within the shipyard industry also opposed the general industry PPE requirement to certify training, largely for the same reasons as those noted above for the certification of hazard assessments—the creation of potential new legal liability and unnecessary paperwork. In its December 13, 1994 announcement, the Agency suggested that simple documentation could be used in lieu of certification, and the final rule requires documentation rather than certification.

Commenters were generally supportive of the standard's training requirements and the specific elements of training mandated by the rule. Commenters stated that the PPE training elements proposed by the Agency were practiced throughout the shipyard industry, as was the maintenance of training logs—usually in the form of a computer database:

We support the general requirement for training as it does serve to enhance a safer working environment [Shipbuilders' Council [Ex. 9-9]].

We are already complying with this proposed standard [for training] and we suspect many other shipyards are also complying. \* \* \* Our new hire orientation programs covers all areas of PPE and would meet the new requirements proposed in the standard [Tampa Shipyards, Ex. 9-8].

We'd recommend this documentation [for training] be in the form of training logs, which most of us already keep on the computer [Shipbuilders' Council January 25, 1995 public meeting, Transcript page 13].

There was widespread support among industry commenters for the use of body harnesses in place of body belts:

Electric Boat Division utilizes body harnesses for all of its fall protection needs. \* \* \* [Ex. 9-10].

BIW/Local S6 has implemented a policy which is consistent with the construction industry standard in that only body harnesses may be used in fall arrest systems and body belts may be used in positioning device systems [Bath Iron Works Ex. 11-7].

Without a doubt, the majority of our membership endorses the use of harnesses. Most of us already have those in place [Shipbuilders' Council January 25, 1995 public meeting, Transcript page 14].

However, Newport News Shipbuilding (NNS), which employs about 20 percent of all shipyard employees, opposed the phase-out of body belts in favor of harnesses. NNS relies almost completely on body belts for fall protection, although the shipyard did report using a small number of harnesses. Several small yards also still rely on body belts for fall protection and questioned the utility of changing to body harnesses since they had experienced no injuries due to the use of body belts [Exs. 9-1, 9-3 and 9-11]. At the public meeting, NNS stated that replacing over 4,700 body belts would be a burden and therefore that a seven-year phase-in period would be needed to reduce the economic impact. The company reported that a review of several years' accident records failed to show that falls of employees using body belts resulted in any severe injuries. NNS did not introduce its data on falls into the record, however. A cost analysis presented by NNS at the hearing showed that body belts cost NNS \$43 each and, on average, lasted 7 years; harnesses cost \$140 and have a working lifetime of 3 years.

Most other shipyards and industry associations reported that they had switched to harnesses from belts. These commenters reported that, although harnesses cost more than belts, they provide greater protection and are cost effective.

We \* \* \* endorse the use of body harnesses as a safety method for employees. While the cost of a body harness is usually twice the amount of body belts, the added safety factor to the employee is well worth the money, and in the long run will save the company money in case of an accident [Atlantic Marine Ex. 9-9].

In fact many of our yards already use them [harnesses]. We find them to be very effective, and everybody seems to certainly feel a lot safer with them [Shipbuilders' Council January 25, 1995 public meeting, Transcript page 23].

At the public meeting on January 25, 1995, representatives of the American

Insurance Service [Tr. 59] stated that body harnesses would prevent injuries that could occur in falls involving employees wearing body belts. In addition, they said that it is difficult to rescue a worker in a body belt after a fall since he or she typically is hanging "nose to toes," or upside down. Several falls involving employees (in other industries) wearing body belts had resulted in fatalities when the fallen worker had slipped out of his/her body belt. The insurance representatives also asserted that the cost of harnesses should not preclude the inclusion of a harness requirement in the rule because industry has known that the change to harnesses was going to occur, body belts are usually "expense" items, and, if treated as a capital expense, will have been fully depreciated by the effective date of the regulation. The association did not provide any data demonstrating that the injuries associated with falls in body harnesses was less severe than those in belts. Belts were estimated to cost \$35 each and harnesses \$75 each. Harnesses were estimated to last an average of 2 to 4 years.

OSHA agrees with the assessment of most of the commenters from the shipyard industry and the insurance industry who supported the requirement for harnesses in lieu of belts, and the final rule thus contains such a requirement.

Many commenters endorsed the adoption of locking snaphooks over non-locking snaphooks on lifelines [Ex. 9-10 and January 25, 1995 public meeting, Transcript page 52]. Locking snaphooks are already in widespread use in shipyards. At the January 25, 1995 public meeting, representatives from the American Insurance Service demonstrated how, in a "roll-out" situation, lifelines can detach from non-locking snaphooks. Most industry commenters reported that snaphooks were used in their shipyard, and none opposed this change to the standard or raised it as a cost issue.

Based on the record for this rulemaking, the Agency has concluded that the only provisions of the final PPE standard that will impose other than negligible costs on shipyard employers are: the replacement of body belts with body harnesses; the documentation of hazard assessments; the development of training for body harnesses in shipyards not already employing harnesses; and employee training for body harnesses. Only Newport News Shipbuilding (NNS) and a number of small shipyards reported that they still rely on body belts. (Very small shipyards specialize in trades and may not use body harnesses or body belts at all). OSHA

has taken the concerns of these commenters into account in the final rule. NNS stated that it currently uses about 4,700 body belts, although no information was available on the breakdown between belts used as positioning devices (this would not be affected by the final rule) and those used for fall protection. To the extent that some of these belts continue to be used for positioning devices, the 4700 figure overstates the number of harnesses to acquire. The Agency estimates that NNS will need to purchase no more than 3,000 harnesses (about 1 for every 5 production workers). The Agency estimates that, in addition to NNS, some smaller employers in the industry may need to buy harnesses to replace body belts, and the Agency estimates that 1,000 harnesses would be purchased by these employers. Based on evidence in the record and information from suppliers, the Agency estimates that body belts cost about \$50 and harnesses \$100. Body belts are estimated to last an average of 7 years and harnesses 3 years. Thus, body belts supply fall protection at a cost of roughly \$7 per year (\$50/7 years), while harnesses do so at \$33 per year (\$100/3 years). Harnesses therefore cost roughly \$27 more per year than belts for each affected employee. Since body belts can still be used as positioning devices, the requirement that harnesses be used for fall protection will not end the useful life of these belts. Based on these estimates, OSHA concludes that replacing body belts with harnesses will result in a new annual cost to the industry of approximately \$128,000 [(3,000 new harnesses for NNS+1,000 new harnesses for small shipyards)×\$27]. Nevertheless, to allow additional time and reduce any potential impacts, the final rule permits shipyards to phase-in compliance with the body harness requirement over two years, which is consistent with the phase-out date in other OSHA standards.

The hazard assessment documentation required by the standard consists of a record, either paper or on a computer or other storage medium, with the date of the hazard assessment, name of person performing the assessment, occupation or operations covered, and a list of the PPE required. Shipyards report that they already incorporate some of this information in their current training materials. The Agency has estimated that it would take each shipyard about an hour to develop a computer-based record format for this documentation and approximately five minutes to record the hazard assessment

for each occupation covered. Table 3 summarizes this information for the PPE standard. The total time expended by

managers to document hazard assessments is estimated to be 781

hours, a one-time commitment of management resources.

TABLE 3.—ESTIMATE OF AMOUNT OF TIME TO DOCUMENT HAZARD ASSESSMENTS, DEVELOP TRAINING PROGRAMS FOR BODY HARNESES, AND TRAIN IN USE OF BODY HARNESES FOR OSHA'S STANDARD ON PPE IN SHIPYARDS

Firm Size (number of employees)	Number of firms in size category	Hazard assessment		Develop training for harnesses			Training		
		Number of hazard assessments (trades)	Time to document hazard assessments (hours)	Time to develop training per firm (hours)	Number of firms who must do so	Total time to develop program (hours)	Training sessions per firm	Management time (hours)	Number of employees trained (hours)
1000+ .....	12	40	36	.....	none	0	150	150	3000
500-999 .....	12	30	30	8	6	48	4	24	200
100-499 .....	76	30	190	4	76	304	2	152	400
21-99 .....	100	10	150	4	100	400	1	100	200
11-20 .....	100	5	125	2	50	100	1	50	200
1-10 .....	200	5	250	2	100	200	1	100	150
Subtotals (hours) .....	.....	.....	1 781	.....	.....	1 052	.....	576	4150
Total one-time, or first year, management resources for hazard assessments and development of training .....	.....	.....	.....	.....	.....	.....	.....	.....	<sup>2</sup> 1,833
First year management resources to conduct training .....	.....	.....	.....	.....	.....	.....	.....	.....	<sup>2</sup> 576
Total management time .....	.....	.....	.....	.....	.....	.....	.....	.....	<sup>2</sup> 2,409
Total employee time .....	.....	.....	.....	.....	.....	.....	.....	.....	<sup>2</sup> 4,150

Source: Office of Regulatory Analysis.

<sup>1</sup> One-time.

<sup>2</sup> Hours.

The development of training materials for the use of personal fall arrest systems (body harnesses) imposes a one-time cost for shipyards that are not already using harnesses. Some of the very smallest shipyards who provide specialty trade work will not have or use any harnesses. All large shipyards already use harnesses to some extent, and the Agency has concluded that these shipyards also have developed training materials. Because training videos and written materials on the use of body harnesses are widely available, the Agency has concluded that the time required for establishing such a training program will be small. Table 3 presents the Agency's estimate of the time that firms will expend to develop training for the use of body harnesses; the estimate ranges from 8 hours for firms with more than 500 employees to 2 hours for the smallest employers. The total time required to develop training for body harnesses is estimated to be 1,052 hours of management time.

Firms that do not currently use body harnesses must also train their employees as harnesses are substituted over time for body belts. The cost of this training consists of management or trainers' time to provide training to employees as well as the value of employee wages foregone while

training. The Agency estimates a training session will take approximately one hour and that as many as 10 to 20 employees can receive training in a single session. Table 3 presents the Agency's estimate of the number of sessions by firm size that will be necessary for training in body harnesses and the number of employees trained. The Agency estimates that a higher fraction (10 percent or more) of smaller firms' employees will have to be trained due to the nature of their business—cleaning tanks, repairs over the ship's side, painting and maintenance—which require the use of harnesses. Among large firms only NNS relies primarily on body belts and uses only a few body harnesses. The Agency estimates that all of NNS's body belts (4,700) will not have to be replaced with harnesses, since compared with smaller yards less work conducted at large shipyards or in new ship construction requires a body harness (rather than a body belt). The Agency has estimated that NNS will replace 3,000 body belts with harnesses. Data for the cost of body harness training is included in Table 6. The Agency estimates that 576 hours of management time and 4,150 hours of employee time will be required for training.

The total one-time cost for documenting hazard assessments, developing harness training materials, and providing training is 2,409 management hours and 4,150 employee hours. Average hourly employee wages for SIC 3731 are about \$14.00 per hour ("Employment and Earnings" Bureau of Labor Statistics October, 1994). The Agency estimates that the cost of wages plus benefits is \$20 per hour for production employees and \$30 per hour for managers.

The total cost of these elements of the standard is approximately \$155,000. Annualized over five years at 7 percent, this cost is about \$35,000 per year. Added to the annual cost of body harnesses of \$128,000, the Agency estimates that the total annualized cost of the PPE standard is \$163,000 per year for the shipyard industry.

*Economic Impacts*

With industry revenues exceeding \$9 billion and an estimated profit of \$275 million in 1994, the annual estimated compliance costs associated with the standard (\$163,000) will not cause a significant impact on the revenues or profits of firms in the shipyard industry.

**Benefits**

The final shipyard PPE standard will reduce the risk of injury or fatality confronting workers who fall while wearing body belts. After the phase-in period, shipyard workers who fall while wearing body harnesses will experience fewer fatalities or severe injuries as a result of these falls. Although industry and insurance representatives testified to the beneficial effects of harnesses, data in the record are not sufficiently detailed to quantify the magnitude of the reduced risk. Accordingly, OSHA has not quantified this risk reduction or the productivity gains associated with the use of harnesses compared with belts. In addition, the use of locking snaphooks, as required by the final rule, will prevent roll-out thus reducing the risk of fatality or severe injury.

The Agency has also analyzed the more typical PPE-related injuries of lesser severity. OSHA estimates that compliance with the final shipyard personal protective equipment rule will potentially prevent about 1,550 lost workday injuries (15 percent of all shipyard PPE-related lost workday injuries) and about 12,650 non-lost workday injuries (about 46 percent of all shipyard PPE-related non-lost workday injuries). To develop this estimate, the Agency analyzed a sample of over 1,700

shipyard injuries reported on OSHA Form 200's that were collected as part of recent OSHA survey efforts. For each injury or illness in the sample, OSHA judged whether the injury or illness was potentially preventable through the use of the appropriate type of protective equipment. These judgments were based on the injury and illness descriptions on the Form 200. OSHA considered the following types of PPE to be applicable: hard hats, safety glasses and goggles, welding goggles and helmets, face shields, safety shoes, work gloves and other forms of hand protection, and chemical protective gloves, aprons, and other clothing.

To develop its estimate, OSHA first divided the sample injuries and illnesses by severity and estimated the fraction of cases that were judged to be potentially preventable by PPE use. Next, OSHA applied these preventability rates to Bureau of Labor Statistics employment levels for 1994 for the shipyard industry and calculated the number of cases that might be prevented through PPE use. The results of this analysis are shown in Table 4. Of 27,317 shipyard injuries and illnesses without lost-workdays, 12,665 (46.4 percent) were estimated to be potentially preventable through proper use of PPE. Of 9,876 cases involving days away from work, OSHA estimated

that 1,549 (15.7 percent) were potentially preventable through compliance with OSHA's PPE requirements. These estimates indicate that over 10 percent of all shipyard injuries (both lost-time and non-lost work time) are potentially preventable through the proper use of safety glasses, while 15 percent are potentially preventable through the use of work gloves or other appropriate forms of hand protection. This analysis of "typical" PPE injuries parallels the benefits analysis performed for the general industry PPE standard, with one exception. In this shipyard analysis, the Agency has reduced its estimate of the number of eye injuries that could be prevented by the use of safety glasses to 50 percent (a figure of about 99 percent was applied in the general industry analysis), because shipyard representatives and OSHA personnel report that the use of basic eye protection is standard practice in shipyards, which are widely recognized as being especially hazardous environments. The Agency concludes that fewer eye injuries occur in shipyards than general industry establishments because employees in shipyards, unlike those in general industry, are routinely required to wear safety glasses.

TABLE 4.—PREVENTABILITY OF SHIPYARD INJURIES BY TYPE OF PPE (1994)

Injury preventability/PPE type	Injuries without lost-work-days		Injuries with lost-workdays		All injuries	
	Number	Percent	Number	Percent	Number	Percent
Preventable:						
Hard hat .....	753	2.8	133	1.3	886	2.4
Safety glasses <sup>1</sup> .....	3,509	12.8	346	3.5	3,855	10.4
Safety goggles .....	422	1.5	88	0.9	510	1.4
Welding goggles/helmet .....	632	2.3	137	1.4	769	2.1
Face shield .....	1,024	3.7	33	0.3	1,057	2.8
Safety shoes (metatarsal guard) .....	392	1.4	237	2.4	628	1.7
Safety shoes (toe protection) .....	361	1.3	109	1.1	470	1.3
Safety shoes (sole protection) .....	151	0.6	0	0.0	151	0.4
Work gloves .....	5,120	18.7	406	4.1	5,526	14.9
Chemical protective gloves .....	0	0.0	48	0.5	48	0.1
Chemical protective clothing .....	301	1.1	13	0.1	314	0.8
Total preventable .....	12,665	46.4	1,549	15.7	14,214	38.2
Not Preventable .....	14,652	53.6	8,327	84.3	22,979	61.8
All injuries .....	27,317	100.0	9,876	100.0	37,193	100.0

<sup>1</sup>Rate for eye injuries preventable by safety glasses adjusted downward by 50.0% due to current high rate of safety glass use in shipyards. Source: Bureau of Labor Statistics. 1992. Survey of Occupational Injuries and Illnesses; OSHA estimates based on analysis of Form 200 Shipyard Injury Database. Estimates of the number of 1992 injuries and illnesses extrapolated to 1994 based on decline in shipyard employment of 14.4 percent over this period.

OSHA also used data supplied by the BLS describing the distribution of shipyard lost-workday cases by body part injured to develop disaggregated

estimates of the number of preventable injuries. These estimates are shown in Table 5. OSHA estimates that 90 percent of the head, scalp, and toe injuries are

potentially preventable. OSHA also judged PPE to be effective, at lower rates, in preventing face, eye, foot, hand and finger injuries.

TABLE 5.—PREVENTABLE SHIPYARD INJURIES AND ILLNESSES BY SEVERITY AND BODY PART

Injury severity/body part	Number of 1992 injuries	Number of extrapolated 1994 injuries <sup>3</sup>	Share of injuries preventable <sup>4</sup> (percentage)	Number of injuries prevented
Injuries and illnesses without lost workdays <sup>1</sup> .....	31,900	27,317	46.4	12,665
Lost-workday injuries and illnesses: <sup>2</sup>				
Head, unspecified .....	73	63	100.0	63
Ear(s) .....	0	0	0.0	0
Eye(s) .....	1,080	925	<sup>5</sup> 61.7	571
Face .....	51	44	75.0	33
Scalp .....	91	78	<sup>6</sup> 90.0	70
Neck .....	350	300	0.0	0
Arm(s), Unspecified .....	49	42	0.0	0
Elbow .....	265	227	0.0	0
Forearm .....	128	110	0.0	0
Wrist .....	478	409	12.5	51
Hand(s) .....	508	435	38.9	169
Finger(s) .....	720	617	37.9	234
Upper extremities, multiple .....	0	0	0.0	0
Trunk, unspecified .....	0	0	<sup>6</sup> NE	0
Abdomen .....	88	75	0.0	0
Back, Unspecified .....	954	817	0.0	0
Back, lumbar .....	1,198	1,026	0.0	0
Back, thoracic .....	168	144	0.0	0
Chest .....	289	247	5.3	13
Hip .....	306	262	0.0	0
Shoulder(s) .....	601	515	0.0	0
Trunk, Multiple parts .....	0	0	0.0	0
Lower extremities, multiple .....	0	0	0.0	0
Leg(s), unspecified .....	59	51	0.0	0
Thighs .....	89	76	0.0	0
Knee(s) .....	1,073	919	0.0	0
Lower leg(s) .....	123	105	0.0	0
Leg(s), multiple .....	0	0	0.0	0
Ankle(s) .....	624	534	0.0	0
Foot/feet .....	488	418	60.0	251
Toe(s) .....	123	105	90.0	95
Lower extremities, multiple .....	0	0	0.0	0
Multiple body parts .....	674	577	0.0	0
Lost workday injuries continued:				
Circulatory system .....	0	0	0.0	0
Digestive system .....	0	0	<sup>7</sup> NE	0
Excretory system .....	0	0	0.0	0
Nervous system .....	0	0	0.0	0
Respiratory system .....	0	0	0.0	0
Body parts, NEC .....	163	140	<sup>7</sup> NE	0
Unclassifiable .....	720	617	0.0	0
Total lost-workday injury .....	11,533	9,876	15.7	1,549
All injuries and illnesses .....	43,433	37,193	38.2	14,214

<sup>1</sup> Bureau of Labor Statistics. 1992 Survey of Occupational Injuries and Illnesses.

<sup>2</sup> Bureau of Labor Statistics. 1992 Survey of Occupational Injuries and Illnesses, unpublished data. Injury and illness data by body part available only for cases with lost workdays.

<sup>3</sup> Estimates of the number of 1992 injuries and illnesses extrapolated to 1994 based on decline in shipyard employment of 14.4 percent over this period.

<sup>4</sup> OSHA estimates based on analysis of Form 200 Shipyard Injury Database. Estimate of preventable share for non lost-workday injuries based on the overall ratio of preventable non-lost-workday cases in the Form 200 database.

<sup>5</sup> Rate for eye injuries preventable by safety glasses adjusted downward by 50.0% due to current high rate of safety glass use in shipyards.

<sup>6</sup> OSHA estimate. No observations for this injury category in Form 200 database.

### Regulatory Alternatives

The Agency concludes that the proposed rule is the most cost-effective regulatory alternative for this industry. One alternative considered was to apply the general industry PPE standard to the shipyard industry. However, if the general industry PPE standard (29 CFR 1910.132) were applied to the shipyard

industry in its entirety, it would impose unnecessary costs in the form of paperwork because it could require shipyards to adopt new training and documentation programs. Shipyards have long had both comprehensive and specialized safety programs and their own databases for maintaining training logs, accident data, and other information. The final rule builds on the

tools the industry has already developed and thus avoids imposing unnecessary costs and other burdens on shipyard employers.

### Regulatory Flexibility

As required by the Regulatory Flexibility Act of 1980 (as amended by Title II, Subtitle D of the Contract with America Advancement Act of 1996),

OSHA assessed the economic burden faced by small establishments in complying with this final rule. In comments to the record for this standard, no comments specifically addressed either the Regulatory Flexibility Analysis or its conclusion that the standard would impose no significant impact on small firms. In that analysis, the Agency identified the increased use of respirators as the main source of new costs for all shipyards, but this element has been dropped in the final standard.

The Agency has concluded that small shipyards in the industry have as much need of additional personal protective equipment as other shipyards. The industry has one of the highest injury and illness rates of any industry. Since the largest shipyards report injury and illness rates at or below the industry average, the Agency has concluded that the rate of preventable injuries and illnesses are at least as great in smaller yards. In addition, many of the production operations are the same for larger and smaller shipyards. Since the standard requires employers to identify and protect workers from risk by occupation or trade, the Agency concludes that the risks for each trade are similar irrespective of the size of the shipyard. The objectives of the standard are to reduce the risk of PPE-preventable injuries in shipyards.

Although no public comments were specifically addressed to issues in the Regulatory Flexibility Analysis, many of the comments applied to situations faced by smaller shipyards. However, the Agency believes that smaller yards are not impacted in a significantly different manner or scale than larger shipyards. The comments by smaller shipyards about feasibility were similar to the larger yards: questioning the utility of body harnesses rather than body belts and the need to certify hazard assessments and training.

The Agency considered applying the General Industry PPE standard as an alternative for small establishments in the shipyard industry, but testimony and comments in the docket support the Agency's decision that the final standard will more effectively meet the risk in shipyards at lowest cost.

As can be seen in Table 3, the Agency estimates that there are 200 firms in the shipyard industry with 10 or fewer employees, 100 firms with 11–20 employees, and 100 firms with 21–99 employees. The Agency believes that for the shipyard industry, firms with fewer than 100 employees is a “small” firm. Therefore, for purposes of this Regulatory Flexibility Analysis, the Agency estimates that there are

approximately 400 “smaller” businesses with an estimated 8,000 employees. From data in Table 3, smaller firms will require 525 management hours to document hazard assessments, 250 management hours to develop training for body harnesses, and 250 management hours to provide training, and 550 employee hours for training. Costs for these elements, which are a one-time cost, total \$38,450, which is equivalent to an \$8,700 annual cost (annualized over 5 years at 7 percent). Other new annual costs for small firms are estimated at \$13,500 for 500 body harnesses to replace body belts. Total annual costs for smaller shipyards are then an estimated \$22,200, or an average of about \$55 per smaller shipyard. The Agency has provided a phase-in period of two years to allow smaller shipyards time to accomplish this shift.

OSHA concludes that this standard will not impose a significant impact on a substantial number of small entities, and that the phase-in for body harnesses will further alleviate any impacts that do occur.

#### *International Trade*

In accordance with Executive Order 12866, OSHA assessed the effects of the final standard on international trade. The shipyard industry actively competes with foreign shipyards for ship repair and shipbuilding orders. If this OSHA regulation significantly increased the price of products and services of domestic shipyards, foreign shipyards could benefit. OSHA believes, however, that there will be virtually no effect on the prices of products or services as a result of this regulation.

#### *Environmental Impact*

The shipyard PPE standard has been reviewed in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 et seq.), the regulations of the Council on Environmental Quality (CEQ) (40 CFR part 1500), and DOL NEPA Procedures (29 CFR part 11). There will be no additional incremental release quantities related to this standard. Releases of substances regulated under EPA's SARA Title III or EPA NESHAP standards are subject to reporting and control requirements.

#### *Non-Regulatory Alternatives*

The primary objective of OSHA's standard for PPE is to minimize the number of shipyard employee injuries and risk of fatalities. The Agency examined non-regulatory approaches for promoting PPE use, including (1) incentives created by workers'

compensation programs or the threat of private suits, and (2) requirements of the U.S. Navy and U.S. Coast Guard. Following this review, OSHA determined that the need for government regulation arises from the significant risk of job-related injury or death. Private markets fail to provide enough safety and health resources due to the externalization of part of the social cost of worker injuries and deaths. Workers' compensation systems do not offer an adequate remedy because premiums do not reflect specific workplace risk and liability claims are restricted by statutes preventing employees from suing their employers. The U.S. Navy and U.S. Coast Guard require shipyards to follow safe procedures when performing work for them or when constructing merchant vessels; however, most firms do not come under this scrutiny. Thus, OSHA has determined that a federal standard is necessary.

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16. Hearon, Bernard F. and Brinkley, James W., "Fall Arrest and Post-Fall Suspension: Literature Review and Direction for Further Research," Air Force Aerospace Medical Research Laboratory, Aerospace Medical Division, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
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V. Paperwork Reduction Act

The Agency has estimated the paperwork burden of the shipyard PPE standard under the guidelines of the Paperwork Reduction Act of 1995. Under that Act, burden is defined as the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal Agency. The Agency has concluded that the following elements of the shipyard PPE standard potentially could create a paperwork burden for the shipyard industry:

- For hazard assessments:
  - performing a hazard assessment for each trade; documenting the hazard assessment;
- For PPE training:
  - developing training materials (or programs for PPE; training employees;

- documenting employee training.
- For personal fall arrest system training:
  - developing a training program;
  - training employees.

- For positioning device systems training:
  - developing a training program;
  - training employees.

For most of these potential sources of burden, shipyards are already performing these information collection or disclosure functions. For these elements, the final rule will not therefore require shipyards to expend additional resources on paperwork.

The Agency has concluded that only new burdens imposed specifically by new or revised provisions of a standard should be considered paperwork burdens attributable to that standard. In other words, it would be inappropriate to count as the burden actions that firms in the regulated community have already undertaken voluntarily.

The record shows that shipyards are already complying with all of the paperwork burden elements listed above, except for documenting hazard assessments, developing training for personal fall arrest systems (body harnesses), and providing training to employees for personal fall arrest systems. Among large shipyards, only Newport News Shipbuilding (NNS) reported that it relies primarily on body belts rather than body harnesses.

The hazard assessment documentation required by the standard consists of a record, either paper or on a computer or other storage medium, with the date of the hazard assessment, name of person performing the assessment, occupation or operations covered, and a list of the PPE required. Shipyards report that they already incorporate some of this information in their current training materials. The Agency has estimated that it would take each shipyard about an hour to develop a computer-based record format for this documentation and approximately five minutes to record the hazard assessment for each occupation covered. Table 6

summarizes this information for the PPE standard.

Development of training materials for the use of personal fall arrest systems (body harnesses) is the second potential burden element. All large shipyards report that they already use harnesses to some extent. Because training videos and written materials on the use of body harnesses are widely available, the Agency has concluded that the time required for establishing such a training program will be small. Table 6 presents the Agency's estimate of the time that firms will expend to develop training for the use of body harnesses; the estimate ranges from 8 hours for firms with more than 500 employees to 2 hours for the smallest employers.

Firms that do not currently use body harnesses must also train their employees as harnesses are substituted over time for body belts. The paperwork burden of this training consists of management or trainers' time to provide training to employees. The Agency estimates a training session will take approximately one hour and that as many as 10 to 20 employees can receive training in a single session. Table 6 presents the Agency's estimate of the number of sessions by firm size that will be necessary for training in body harnesses. The Agency estimates that a higher fraction (10 percent or more) of smaller firms' employees will have to be trained due to the nature of their business—cleaning tanks, repairs over the ship's side, painting and maintenance—which require the use of harnesses. Among large firms, only NNS reported that they used very few harnesses. The Agency estimates that all of NNS's body belts (4,700) will not have to be replaced with harnesses, since relatively less work at large shipyards and new ship construction require a body harness (rather than a body belt). The Agency has estimated that NNS will replace 3,000 body belts with harnesses. Data for the paperwork burden of providing training to employees are also presented in Table 6.

Table 6.—ESTIMATE OF BURDEN HOURS TO DOCUMENT HAZARD ASSESSMENTS, TO DEVELOP TRAINING PROGRAMS FOR BODY HAMESSES, AND TO TRAIN IN USE OF BODY HAMESSES FOR OSHA'S PAGE STANDARD ON PPE IN SHIPYARDS.

Firm size [number of employees]	Number of firms in size category	Hazard assessment		Develop training for hamesseess			Training	
		Number of hazard assessments [occupations]	Time of document hazard assessment's [hours]	Time develop training per firm [hours]	Number of firms who must do so	Total time to develop program	Training sessions per firm	Time to train [hours]
1000+ .....	12	40	36	.....	0	0	150	150
500-999 .....	12	30	30	8	6	48	4	24
100-499 .....	76	30	190	4	76	304	2	152
21-99 .....	100	10	150	4	100	400	1	100

Table 6.—ESTIMATE OF BURDEN HOURS TO DOCUMENT HAZARD ASSESSMENTS, TO DEVELOP TRAINING PROGRAMS FOR BODY HAMESSES, AND TO TRAIN IN USE OF BODY HAMESSES FOR OSHA'S PAGE STANDARD ON PPE IN SHIPYARDS.—Continued

Firm size [number of employees]	Number of firms in size category	Hazard assessment		Develop training for hamessees			Training	
		Number of hazard assessments [occupations]	Time of document hazard assessment's [hours]	Time develop training per firm [hours]	Number of firms who must do so	Total time to develop program	Training sessions per firm	Time to train [hours]
11-20 .....	100	5	125	2	50	100	1	50
1-10 .....	200	5	250	2	100	200	1	100
Subtotals (hours) .....	.....	.....	781	.....	.....	1052	.....	576
Total estimated burden (first-year, one-time) ....	.....	.....	.....	.....	.....	.....	.....	12,409
Estimated annual burden 300 hours.	.....	.....	.....	.....	.....	.....	.....	.....

Source: OSHA's Office of Regulatory Analysis.  
<sup>1</sup>Hours.

The Agency estimates that the shipyard PPE standard will result in about 2,409 paperwork burden hours being imposed on the shipyard industry the first year, most of it due to developing training materials in the use of body harnesses. However, these 2,409 hours are only an estimate of the first-year burden, a one-time claim on resources, not an annual burden. The future annual burden beginning in the second year, is estimated to be approximately 300 hours per year, which represents managers' time to train new employees resulting from employee turnover in firms not currently training employees in the use of harnesses.

*Collections of Information: Request for Comments*

The Department of Labor, as part of its continuing effort to reduce paperwork and respondent burden, conducts a preclearance consultation program to provide the general public and Federal agencies with an opportunity to comment on proposed and/or continuing collections of information in accordance with the Paperwork Reduction Act of 1995 (PRA95)(44 U.S.C. 3506(c)(2)(A)). This program helps to ensure that requested data can be provided in the desired format, reporting burden (time and financial resources) is minimized, collection instruments are clearly understood, and the impact of collection requirements on respondents can be properly assessed. Currently, OSHA is soliciting comments concerning the proposed approval for the paperwork requirements of 29 CFR 1915, subpart I, Personal Protective Equipment for Shipyard Employment (PPE). Written comments should:

- Evaluate whether the proposed collection of information is necessary

for the proper performance of the functions of the agency, including whether the information will have practical utility;

- Evaluate the accuracy of the agency's estimate of the burden of the proposed collection of information, including the validity of the methodology and assumptions used;
- Enhance the quality, utility, and clarity of the information to be collected; and
- Minimize the burden of the collection of information on those who are to respond, including through the use of appropriate automated, electronic, mechanical, or other technological collection techniques or other forms of information technology, e.g., permitting electronic submissions of responses.

**Background**

OSHA in its final rule for Personal Protective Equipment in Shipyard Employment is including two types of information collections. The first is a requirement for the employer to conduct a hazard assessment relative to PPE selection, and the second involves training requirements for PPE.

OSHA believes that the information collection and documentation of the hazard assessment as outlined in the final standard is necessary so that situations where PPE should be used for employee protection can be identified, and the proper PPE selected. In addition, OSHA believes that the training requirements and documentation in the final standard are essential in providing employees with the information and practical knowledge needed to effectively use PPE. Documentation can be used by the employer to ensure that all of its

employees using PPE are properly trained.

**Current Actions**

This notice requests OMB approval of the paperwork requirements in Personal Protective Equipment for Shipyard Employment (29 CFR 1915, Subpart I).

*Type of Review:* New.

*Agency:* Occupational Safety and Health Administration, U.S. Department of Labor.

*Title:* Personal Protective Equipment for Shipyard Employment (29 CFR 1915, subpart I).

*OMB Number:* 1218-AA74

*Agency:* Docket No. S-045.

*Frequency:* On occasion.

*Affected Public:* Business or other for-profit, Federal government, State and Local governments.

*Number of respondents:* 500.

*Estimated Time Per Respondent:* Varies.

*Total Estimated Cost:* \$72,270 (First year only), \$9,000 annual.

*Total Burden Hours:* 2,409 (First year only), 300 annual, recurring.

Comments submitted in response to this notice will be summarized and/or included in the request for Office of Management and Budget approval of the information collection request; they will also become a matter of public record.

**VI. Statutory Considerations**

*Introduction*

OSHA has described PPE-related hazards and the measures required to protect affected employees from those hazards in Section I, *Background*; Section II, *Hazards Involved*; and Section III, *Summary and Explanation of the Final Rule*, above. The Agency is providing the following discussion of the statutory mandate for OSHA rulemaking activity to explain the legal

basis for its determination that the revised shipyard PPE standard, as promulgated, is reasonably necessary to protect affected employees from significant risks of injury and death.

Section 2(b)(3) of the Occupational Safety and Health Act authorizes "the Secretary of Labor to set mandatory occupational safety and health standards applicable to businesses affecting interstate commerce", and section 5(a)(2) provides that "[each] employer shall comply with occupational safety and health standards promulgated under this Act" (emphasis added). Section 3(8) of the OSH Act (29 U.S.C. § 652(8)) provides that "the term 'occupational safety and health standard' means a standard which requires conditions, or the adoption or use of one or more practices, means, methods, operations, or processes, reasonably necessary or appropriate to provide safe or healthful employment and places of employment."

In two recent cases, reviewing courts have expressed concern that OSHA's interpretation of these provisions of the OSH Act, particularly of section 3(8) as it pertains to safety rulemaking, could lead to overly costly or under-protective safety standards. In *International Union, UAW v. OSHA*, 938 F.2d 1310 (D.C. Cir. 1991), the District of Columbia Circuit rejected substantive challenges to OSHA's lockout/tagout standard and denied a request that enforcement of that standard be stayed, but it also expressed concern that OSHA's interpretation of the OSH Act could lead to safety standards that are very costly and only minimally protective. The reviewing court conducted further proceedings and subsequently held that the OSH Act provides adequate constraints on the exercise of OSHA's regulatory authority (938 F.3d 1310, D.C. Cir. 1994).

In *National Grain & Feed Ass'n v. OSHA*, 866 F.2d 717 (5th Cir. 1989), the Fifth Circuit concluded that Congress gave OSHA considerable discretion in structuring the costs and benefits of safety standards but, concerned that the grain dust standard might be under-protective, directed OSHA to consider adding a provision that might further reduce significant risk of fire and explosion.

OSHA rulemakings involve a significant degree of agency expertise and policy-making discretion to which reviewing courts must defer. (See, for example, *Building & Constr. Trades Dep't, AFL-CIO v. Brock*, 838 F.2d 1258, 1266 (D.C. Cir. 1988); *Industrial Union Dep't, AFL-CIO v. American Petroleum Inst.*, 448 U.S. 607, 655 n. 62 (1980).) At

the same time, the Agency's technical expertise and policy-making authority must be exercised within discernable limits. The lockout/tagout and grain handling standard decisions sought clarification of the Agency's view of the scope of its expertise and authority. In light of those decisions, the preamble to this safety standard states OSHA's views regarding the limits of its safety rulemaking authority and explains why the Agency is confident that its interpretive views have in the past avoided regulatory extremes and continue to do so in this rule.

Stated briefly, the OSH Act requires that, before promulgating any occupational safety standard, OSHA demonstrate based on substantial evidence in the record as a whole that: (1) the proposed standard will substantially reduce a significant risk of material harm; (2) compliance is technologically feasible in the sense that the protective measures being required already exist, can be brought into existence with available technology, or can be created with technology that can reasonably be developed; (3) compliance is economically feasible in the sense that industry can absorb or pass on the costs without major dislocation or threat of instability; and (4) the standard is cost effective in that it employs the least expensive protective measures capable of reducing or eliminating significant risk. Additionally, proposed safety standards must be compatible with prior Agency action, must be responsive to significant comment in the record, and, to the extent allowed by statute, must be consistent with applicable Executive Orders. These elements limit OSHA's regulatory discretion for safety rulemaking and provide a decision-making framework for developing a rule.

A. Congress concluded that OSHA regulations are necessary to protect workers from occupational hazards and that employers should be required to reduce or eliminate significant workplace health and safety threats. At section 2(a) of the OSH Act (29 U.S.C. § 651(a)), Congress announced its determination that occupational injury and illness should be eliminated as much as possible: "The Congress finds that occupational injury and illness arising out of work situations impose a substantial burden upon, and are a hindrance to, interstate commerce in terms of lost production, wage loss, medical expenses, and disability compensation payments." Congress therefore declared "it to be its purpose and policy \* \* \* to assure so far as possible every working man and woman

in the Nation safe \* \* \* working conditions [29 U.S.C. § 651(b)]."

To that end, Congress instructed the Secretary of Labor to adopt existing federal and consensus standards during the first two years after the OSH Act became effective and, in the event of conflict among any such standards, to "promulgate the standard which assures the greatest protection of the safety or health of the affected employees [29 U.S.C. § 655(a)]." Congress also directed the Secretary to set mandatory occupational safety standards [29 U.S.C. § 651(b)(3)], based on a rulemaking record and substantial evidence [29 U.S.C. § 655(b)(2)], that are "reasonably necessary or appropriate to provide safe \* \* \* employment and places of employment." When promulgating permanent safety or health standards that differ from existing national consensus standards, the Secretary must explain "why the rule as adopted will better effectuate the purposes of this Act than the national consensus standard [29 U.S.C. § 655(b)(8)]." Correspondingly, every employer must comply with OSHA standards and, in addition, "furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees [29 U.S.C. § 654(a)]."

"Congress understood that the Act would create substantial costs for employers, yet intended to impose such costs when necessary to create a safe and healthful working environment. Congress viewed the costs of health and safety as a cost of doing business \* \* \*. Indeed, Congress thought that the financial costs of health and safety problems in the workplace were as large as or larger than the financial costs of eliminating these problems [*American Textile Mfrs. Inst. Inc. v. Donovan*, 452 U.S. 490, 519-522 (1981) (ATMI); emphasis was supplied in original]." "[T]he fundamental objective of the Act [is] to prevent occupational deaths and serious injuries [*Whirlpool Corp. v. Marshall*, 445 U.S. 1, 11 (1980)]." "We know the costs would be put into consumer goods but that is the price we should pay for the 80 million workers in America [S. Rep. No. 91-1282, 91st Cong., 2d Sess. (1970); H.R. Rep. No. 91-1291, 91st Cong., 2d Sess. (1970), reprinted in Senate Committee on Labor and Public Welfare, *Legislative History of the Occupational Safety and Health Act of 1970*, (Committee Print 1971) ("Leg. Hist.") at 444 (Senator Yarborough)]." "Of course, it will cost a little more per item to produce a washing machine. Those of us who use

washing machines will pay for the increased cost, but it is worth it, to stop the terrible death and injury rate in this country [*Id.* at 324; see also 510–511, 517].”

[T]he vitality of the Nation’s economy will be enhanced by the greater productivity realized through saved lives and useful years of labor.

When one man is injured or disabled by an industrial accident or disease, it is he and his family who suffer the most immediate and personal loss. However, that tragic loss also affects each of us. As a result of occupational accidents and disease, over \$1.5 billion in wages is lost each year [1970 dollars], and the annual loss to the gross national product is estimated to be over \$8 billion. Vast resources that could be available for productive use are siphoned off to pay workmen’s compensation and medical expenses \* \* \*.

Only through a comprehensive approach can we hope to effect a significant reduction in these job death and casualty figures. [*Id.* at 518–19 (Senator Cranston)]

Congress considered uniform enforcement crucial because it would reduce or eliminate the disadvantage that a conscientious employer might experience where inter-industry or intra-industry competition is present. Moreover, “many employers—particularly smaller ones—simply cannot make the necessary investment in health and safety, and survive competitively, unless all are compelled to do so [Leg. Hist. at 144, 854, 1188, 1201].”

Thus, the statutory text and legislative history make clear that Congress conclusively determined that OSHA regulation is necessary to protect workers from occupational hazards and that employers should be required to reduce or eliminate significant workplace health and safety threats.

B. As construed by the courts and by OSHA, the OSH Act sets clear and reasonable limits for Agency rulemaking action. OSHA has long followed the teaching that section 3(8) of the OSH Act requires that, before it promulgates “any permanent health or safety standard, [it must] make a threshold finding that a place of employment is unsafe—in the sense that significant risks are present and can be eliminated or lessened by a change in practices [*Industrial Union Dep’t, AFL-CIO v. American Petroleum Inst.*, 448 U.S. 607, 642 (1980) (plurality) (*Benzene*); emphasis was supplied in original].” Thus, the national consensus and existing federal standards that Congress instructed OSHA to adopt summarily within two years of the OSH Act’s inception provide reference points concerning the least an OSHA standard should achieve (29 U.S.C. § 655(a)). As

a result, OSHA is precluded from regulating insignificant risks or from issuing standards that do not at least lessen risk in a significant way.

The OSH Act also limits OSHA’s discretion to issue overly burdensome rules, as the Agency also has long recognized that “any standard that was not economically or technologically feasible would *a fortiori* not be ‘reasonably necessary or appropriate’ under the Act. See *Industrial Union Dep’t v. Hodgson*, [499 F.2d 467, 478 (D.C. Cir. 1974)] (“Congress does not appear to have intended to protect employees by putting their employers out of business.”) [*American Textile Mfrs. Inst. Inc.*, 452 U.S. at 513 n. 31 (a standard is economically feasible even if it portends ‘disaster for some marginal firms,’ but it is economically infeasible if it ‘threaten[s] massive dislocation to, or imperil[s] the existence of,’ the industry)].”

By stating the test in terms of “threat” and “peril,” the Supreme Court made clear in *ATMI* that economic unfeasibility begins short of industry-wide bankruptcy. OSHA itself has placed the line considerably below this level. (See for example, *ATMI*, 452 U.S. at 527 n. 50; 43 FR 27,360 (June 23, 1978). Proposed 200 µg/m<sup>3</sup> PEL for cotton dust did not raise serious possibility of industry-wide bankruptcy, but impact on weaving sector would be severe, possibly requiring reconstruction of 90 percent of all weave rooms. OSHA concluded that the 200 µg/m<sup>3</sup> level was not feasible for weaving and that 750 µg/m<sup>3</sup> was all that could reasonably be required). See also 54 FR 29,245–246 (July 11, 1989); *American Iron & Steel Institute*, 939 F.2d at 1003. OSHA raised engineering control level for lead in small nonferrous foundries to avoid the possibility of bankruptcy for about half of small foundries even though the industry as a whole could have survived the loss of small firms.) All OSHA standards must also be cost-effective in the sense that the protective measures being required must be the least expensive measures capable of achieving the desired end (*ATMI*, at 514 n. 32; *Building and Constr. Trades Dep’t, AFL-CIO v. Brock*, 838 F.2d 1258, 1269 (D.C. Cir. 1988)). OSHA gives additional consideration to financial impact in setting the period of time that should be allowed for compliance, allowing as much as ten years for compliance phase-in. (See *United Steelworkers of Am. v. Marshall*, 647 F.2d 1189, 1278 (D.C. Cir. 1980), *cert. denied*, 453 U.S. 913 (1981).) Additionally, OSHA’s enforcement policy takes account of financial

hardship on an individualized basis. OSHA’s Field Inspection Reference Manual provides for setting a “reasonable abatement date,” based on careful consideration of an employer’s particular circumstances, by which time a violation must be corrected (CPL 2.103, Chapter IV, paragraph A2, September 26, 1994).

To reach the necessary findings and conclusions, OSHA conducts rulemaking in accordance with the requirements of section 6 of the OSH Act. The rulemaking process enables the Agency to determine the qualitative and, if possible, the quantitative nature of the risk with (and without) regulation, the technological feasibility of compliance, the industry’s profit history, the industry’s ability to absorb costs or pass them on to the consumer, the impact of higher costs on demand, and the impact on competition with substitutes and imports. (See *ATMI* at 2501–2503; *American Iron & Steel Institute* generally.) Section 6(f) of the OSH Act further provides that, if the validity of a standard is challenged, OSHA must support its conclusions with “substantial evidence in the record considered as a whole,” a standard that courts have determined requires fairly close scrutiny of agency action and the explanation of that action. (See *Steelworkers*, 647 F.2d at 1206–1207.)

OSHA’s powers are further circumscribed by the independent Occupational Safety and Health Review Commission, which provides a neutral forum for employer contests of citations issued by OSHA for noncompliance with health and safety standards (29 U.S.C. §§ 659–661; noted as an additional constraint in *Benzene* at 652 n. 59). OSHA must also respond rationally to similarities and differences among industries or industry sectors. (See *Building and Constr. Trades Dep’t, AFL-CIO v. Brock*, 838 F.2d 1258, 1272–73 (D.C. Cir. 1988).)

OSHA rulemaking is thus constrained first by the need to demonstrate that the standard will substantially reduce a significant risk of material harm, and then by the requirement that compliance is technologically capable of being done and not so expensive as to threaten economic instability or dislocation for the industry. Within these bounds, further constraints such as the need to find cost-effective measures and to respond rationally to all meaningful comment militate against regulatory extremes.

D. *The revised PPE standard complies with the statutory criteria described above and is not subject to the additional constraints applicable to section 6(b)(5) standards.*

Standards which regulate hazards that are frequently undetectable because they are subtle or develop slowly or after long latency periods, are frequently referred to as "health" standards. Standards that regulate hazards, such as falls, explosions or electrocutions, that cause immediately noticeable physical harm, are called "safety" standards. (See *National Grain & Feed Ass'n v. OSHA (NGFA II)*, 866 F.2d 717, 731, 733 (5th Cir. 1989). As noted above, section 3(8) provides that all OSHA standards must be "reasonably necessary or appropriate." In addition, section 6(b)(5) requires that OSHA set health standards which limit significant risk "to the extent feasible." OSHA has determined that the revised PPE standard is a safety standard, because the revised standard addresses hazards, such as flying particles, molten metal, electric shock, falling objects and falls from elevations that are immediately dangerous to life or health, not the longer term, less obvious hazards subject to section 6(b)(5).

The OSH Act and its legislative history clearly indicate that Congress intended for OSHA to distinguish between safety standards and health standards. For example, in section 2(b)(6) of the OSH Act, Congress declared that the goal of assuring safe and healthful working conditions and preserving human resources would be achieved, in part:

\* \* \* by exploring ways to discover latent diseases, establishing causal connections between diseases and work in environmental conditions, and conducting other research relating to health problems, in recognition of the fact that occupational health standards present problems often different from those involved in occupational safety.

The legislative history makes this distinction even clearer:

[The Secretary] should take into account that anyone working in toxic agents and physical agents which might be harmful may be subjected to such conditions for the rest of his working life, so that we can get at something which might not be toxic now, if he works in it a short time, but if he works in it the rest of his life might be very dangerous; and we want to make sure that such things are taken into consideration in establishing standards. [*Leg. Hist.* at 502-503 (Sen. Dominick), quoted in *Benzene* at 648-49]

Additionally, Representative Daniels distinguished between "insidious 'silent killers' such as toxic fumes, bases, acids,

and chemicals" and "violent physical injury causing immediate visible physical harm" (*Leg. Hist.* at 1003), and Representative Udall contrasted insidious hazards like carcinogens with "the more visible and well-known question of industrial accidents and on-the-job injury" (*Leg. Hist.* at 1004). (See also, for example, S. Rep. No. 1282, 91st Cong., 2d Sess 2-3 (1970), U.S. Code Cong. & Admin. News 1970, pp. 5177, 5179, reprinted in *Leg. Hist.* at 142-43, discussing 1967 Surgeon General study that found that 65 percent of employees in industrial plants "were potentially exposed to harmful physical agents, such as severe noise or vibration, or to toxic materials"; *Leg. Hist.* at 412; *id.* at 446; *id.* at 516; *id.* at 845; *International Union, UAW* at 1315.)

In reviewing OSHA rulemaking activity, the Supreme Court has held that section 6(b)(5) requires OSHA to set "the most protective standard consistent with feasibility" (*Benzene* at 643 n. 48). As Justice Stevens observed:

The reason that Congress drafted a special section for these substances \* \* \* was because Congress recognized that there were special problems in regulating health risks as opposed to safety risks. In the latter case, the risks are generally immediate and obvious, while in the former, the risks may not be evident until a worker has been exposed for long periods of time to particular substances. [*Benzene*, at 649 n. 54.]

Challenges to the grain dust and lockout/tagout standards included assertions that grain dust in explosive quantities and uncontrolled energy releases that could expose employees to crushing, cutting, burning or explosion hazards were harmful physical agents so that OSHA was required to apply the criteria of section 6(b)(5) when determining how to protect employees from those hazards. Reviewing courts have uniformly rejected such assertions. For example, the Court in *International Union, UAW v. OSHA*, 938 F.2d 1310 (D.C. Cir. 1991) rejected the view that section 6(b)(5) provided the statutory criteria for regulation of uncontrolled energy, holding that such a "reading would obliterate a distinction that Congress drew between 'health' and 'safety' risks." The Court also noted that the language of the OSH Act and the legislative history supported the OSHA position (*International Union, UAW* at

1314). Additionally, the Court stated: "We accord considerable weight to an agency's construction of a statutory scheme it is entrusted to administer, rejecting it only if unreasonable" (*International Union, UAW* at 1313, citing *Chevron U.S.A., Inc. v. NRDC*, 467 U.S. 837, 843 (1984)).

The Court reviewing the grain dust standard also deferred to OSHA's reasonable view that the Agency was not subject to the feasibility mandate of section 6(b)(5) in regulating explosive quantities of grain dust (*National Grain & Feed Association v. OSHA (NGFA II)*, 866 F.2d 717, 733 (5th Cir. 1989)). It therefore applied the criteria of section 3(8), requiring the Agency to establish that the standard is "reasonably necessary or appropriate" to protect employee safety.

As explained in Section I, *Background*, Section III, *Summary and Explanation of the Standard*, and in Section VI, *Summary of the Final Economic Analysis and Regulatory Flexibility Analysis*, above, OSHA has determined that the failure to protect employees from PPE-related hazards poses significant risks to employees and that the provisions of the final rule are reasonably necessary to protect affected employees from those risks. The Agency estimates that compliance with the revised PPE standard will cost \$163,000 annually and will reduce the risk of the identified hazards, preventing 14,200 injuries annually (of which 1,550 would be lost workday injuries and 12,650 would be non-lost workday injuries). This constitutes a substantial reduction of significant risk of material harm for the exposed population of approximately 79,000 shipyard production employees.

The rulemaking record indicates that the measures required by the standard are already in general use throughout the shipyard industry. In addition, OSHA believes that compliance is economically feasible as documented in the Economic Analysis.

As detailed in Table 7, below, the standard's estimated costs, benefits, and compliance requirements are consistent with estimates of other OSHA safety standards, such as the Hazardous Waste Operations and Emergency Response (HAZWOPER) standard.

TABLE 7

Standard (CFR cite)	Final rule date (FR cite)	Number of deaths prevented annually	Number of injuries prevented annually	Annual cost first five yrs (mill)	Annual cost next five yrs (mill)
Grain handling (1910.272) .....	12-31-87 (52 FR 49622) .....	18	394	5.9 to 33.4 .....	5.9 to 33.4.

TABLE 7—Continued

Standard (CFR cite)	Final rule date (FR cite)	Number of deaths prevented annually	Number of Injuries prevented annually	Annual cost first five yrs (mill)	Annual cost next five yrs (mill)
HAZWOPER (1910.120) .....	3-6-89 (54 FR 9311) .....	32	18,700	153 .....	153.
Excavations (Subpt P) .....	10-31-89 (54 FR 45,954) .....	74	800	306 .....	306.
Process Safety Mgmt (1910.119) .....	2-24-92 57 FR 6356 .....	330	1,917	880.1 .....	470.8.
Permit-Required Confined Spaces (1910.146).	1-14-93 58 FR 4462 .....	54	5,041	202.4 .....	202.4.

OSHA assessed employee risk by evaluating exposure to PPE-related hazards throughout the shipyard industry. The *Summary of the Final Economic Analysis and Regulatory Flexibility Analysis*, Section IV, above, presents OSHA's estimate of the costs and benefits of the revised PPE standard in terms of the Standard Industrial Classification (SIC) code for the industry regulated.

The record indicates clearly that employees in shipyard employment face significant risks related to PPE-related hazards, and that compliance with the revised PPE standard is reasonably necessary to protect affected employees from those risks.

OSHA has considered and responded to all substantive comments regarding the proposed Shipyard PPE standard on their merits in the Section III, *Summary and Explanation of the Standard*, earlier in this preamble. In particular, OSHA evaluated all suggested changes to the proposed rule in terms of their impact on worker safety, their feasibility, their cost effectiveness, and their consonance with the OSH Act.

VII. Federalism

This regulation has been reviewed in accordance with Executive Order 12612 (52 FR 41685, October 30, 1987) regarding Federalism. This Order requires that Agencies, to the extent possible, refrain from limiting state policy options, consult with states prior to taking any actions which would restrict State policy options, and take such actions only when there is clear constitutional authority and the presence of a problem of national scope. The Order provides for preemption of state law only if there is clear Congressional intent for the Agency to do so. Any such preemption is to be limited to the extent possible.

Section 18 of the Occupational Safety and Health Act (OSH Act) expresses Congress' clear intent to preempt state laws relating to issues on which federal OSHA has promulgated occupational safety and health standards. Under the OSH Act, a state can avoid preemption only if it submits, and obtains Federal

approval of a plan for the development of such standards and their enforcement. Occupational safety and health standards developed by such states must, among other things, be at least as effective in providing safe and healthful employment and places of employment as the federal standards. Where such standards are applicable to products distributed or used in interstate commerce, they may not burden commerce unduly and must be justified by compelling local conditions (see section 18(c)(2) of the OSH Act).

The Federal standard on personal protective equipment addresses hazards which are not unique to any one state or region of the country. Nonetheless, states with occupational safety and health plans approved under section 18, of the OSH Act, will be able to develop their own state standards to deal with any special problems which might be encountered in a particular state. Moreover, this standard is written in general, performance-oriented terms. There is considerable flexibility for methods of compliance which are appropriate to the working conditions covered by the standard.

In brief, this regulation addresses a clear national problem related to occupational safety and health in shipyard employment. Those states which have elected to participate under section 18, of the OSH Act are not preempted by this standard, and will be able to deal with any special conditions within the framework of the Federal Act, while ensuring that the state standards are at least as effective as that standard.

VIII. State Plan Standards

The 25 States and territories having OSHA-approved occupational safety and health plans which cover the issues of maritime safety and health must revise their existing standards within six months of the publication date of a final standard, or show OSHA why there is no need for action because an existing state standard covering this area is already "at least as effective" as the revised Federal standard. Currently five states (California, Minnesota, Oregon,

Vermont, and Washington) have their own state plans which cover the private sector on-shore maritime activities.

Federal OSHA enforces maritime standards off shore in all states and provides on-shore coverage of maritime activities in Federal OSHA States and in the following State plan States and territories: Alaska, Arizona, Connecticut, (plan covers only State and local government employees), Hawaii, Indiana, Iowa, Kentucky, Maryland, Michigan, Nevada, New Mexico, New York, (plan covers only State and local government employees), North Carolina, Puerto Rico, South Carolina, Tennessee, Utah, Virginia, Virgin Islands, and Wyoming are All States with State plans also must extend coverage to state and local government employees engaged in maritime activities.

List of Subjects in 29 CFR Part 1915

Eye protection, Face protection, Fall protection, Foot protection, Hazard assessment, Head protection, Hard hats, Incorporation by reference, Personal flotation devices, Marine safety, Occupational safety and health, Personal Fall Arrest Systems, Positioning Device Systems, Protective equipment, Respirators, Respiratory protection, Safety, Ship repair, Shipyards, Snaphooks, and Vessels.

IX. Authority

This document has been prepared under the direction of Joseph A. Dear, Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, 200 Constitution Avenue NW., Washington, D.C. 20210.

Accordingly, pursuant to sections 4, 6, and 8 of the Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657); section 41, of the Longshore and Harbor Workers Compensation Act as amended (33 U.S.C. 941); Section 4 of the Administrative Procedure Act (5 U.S.C. 553); Secretary of Labor's Order No. 1-90 (55 FR 9033); and 29 CFR part 1911, 29 CFR part 1915 is amended as set forth below.

Signed at Washington, DC, this 15th day of April 1996.

Joseph A. Dear,

Assistant Secretary of Labor.

## PART 1915—[AMENDED]

1. The Authority citation for part 1915 continues to read as follows:

Authority: Secs. 4, 6, and 8, Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657); section 41, Longshore and Harbor Workers' Compensation Act (33 U.S.C. 941), Secretary of Labor's Order No. 8-76 (41 FR 25059), No. 9-83 (48 FR 35736), No. 1-90 (55 FR 9033), and 29 CFR part 1911.

2. Section 1915.32 is amended by revising paragraph (a)(3) to read as follows:

### § 1915.32 Toxic cleaning solvents.

(a) \* \* \*

(3) Employees shall be protected against toxic vapors by suitable respiratory protective equipment in accordance with the requirements of subpart I of this Part and, where necessary, against exposure of skin and eye contact with toxic solvents and their vapors by suitable clothing and equipment.

\* \* \* \* \*

3. Section 1915.33 is amended by revising paragraph (a) to read as follows:

### § 1915.33 Chemical paint and preservative removers.

(a) Employees shall be protected against skin contact during the handling and application of chemical paint and preservative removers and shall be protected against eye injury by goggles or face shields in accordance with the requirements of subpart I of this part.

\* \* \* \* \*

4. Section 1915.34 is amended by revising paragraphs (a)(1), (a)(4), (b)(1), (c)(3)(i), (c)(3)(ii), and (c)(3)(iii) to read as follows:

### § 1915.34 Mechanical paint removers.

(a) \* \* \*

(1) Employees engaged in the removal of paints, preservatives, rusts, or other coatings by means of power tools shall be protected against eye injury by using goggles or face shields in accordance with the requirements of subpart I of this part.

\* \* \* \* \*

(4) In a confined space, mechanical exhaust ventilation sufficient to keep the dust concentration to a minimum shall be used, or employees shall be protected by respiratory protective equipment in accordance with the requirements of subpart I of this part.

(b) \* \* \*

(1) Hardened preservative coatings shall not be removed by flame in

enclosed spaces unless the employees exposed to fumes are protected by air line respirators in accordance with the requirements of subpart I. Employees performing such an operation in the open air, and those exposed to the resulting fumes shall be protected by a fume filter type respirator in accordance with the requirements of subpart I of this part.

\* \* \* \* \*

(c) \* \* \*

(3) \* \* \*

(i) Abrasive blasters working in enclosed spaces shall be protected by hoods and air line respirators, or by air helmets of a positive pressure type in accordance with the requirements of subpart I of this part.

(ii) Abrasive blasters working in the open shall be protected as indicated in paragraph (c)(3)(i) of this section except that when synthetic abrasive containing less than one percent free silica are used, filter type respirators approved jointly by the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration for exposure to lead dusts, used in conjunction with the proper eye, face and head protection, may be used in accordance with subpart I of this part.

(iii) Employees, other than blasters, including machine tenders and abrasive recovery men, working in areas where unsafe concentrations of abrasive materials and dusts are present shall be protected by eye and respiratory protective equipment in accordance with the requirements of subpart I of this part.

\* \* \* \* \*

5. Section 1915.35 is amended by revising paragraphs (a)(1)(i), (a)(1)(ii), (a)(1)(iii), (a)(2), (b)(13), and (b)(14) to read as follows:

### § 1915.35 Painting.

(a) \* \* \*

(1) \* \* \*

(i) In confined spaces, employees continuously exposed to such spraying shall be protected by air line respirators in accordance with the requirements of subpart I of this part.

(ii) In tanks or compartments, employees continuously exposed to such spraying shall be protected by air line respirators in accordance with the requirements of subpart I. Where mechanical ventilation is provided, employees shall be protected by respirators in accordance with the requirements of subpart I of this part.

(iii) In large and well ventilated areas, employees exposed to such spraying shall be protected by respirators in accordance with the requirements of subpart I of this part.

(2) Where brush application of paints with toxic solvents is done in confined spaces or in other areas where lack of ventilation creates a hazard, employees shall be protected by filter respirators in accordance with the requirements of subpart I of this part.

\* \* \* \* \*

(b) \* \* \*

(13) All employees continuously in a compartment in which such painting is being performed shall be protected by air line respirators in accordance with the requirements of Subpart I of this part and by suitable protective clothing. Employees entering such compartments for a limited time shall be protected by filter cartridge type respirators in accordance with the requirements of subpart I of this part.

(14) All employees doing exterior paint spraying with such paints shall be protected by suitable filter cartridge type respirators in accordance with the requirements of subpart I of this part and by suitable protective clothing.

6. Section 1915 would be amended by removing Table I-1 from § 1915.118.

7. Section 1915.134 is amended by revising paragraph (j) to read as follows:

### § 1915.134 Abrasive wheels.

\* \* \* \* \*

(j) All employees using abrasive wheels shall be protected by eye protection equipment in accordance with the requirements of Subpart I of this part except when adequate eye protection is afforded by eye shields which are permanently attached to the bench or floor stand.

8. Section 1915.135 is amended by revising paragraph (b)(9) to read as follows:

### § 1915.135 Powder actuated fastening tools.

\* \* \* \* \*

(b) \* \* \*

(9) Employees using powder actuated fastening tools shall be protected by personal protective equipment in accordance with the requirements of subpart I of this part.

\* \* \* \* \*

9. Subpart I of Part 1915 is revised to read as follows:

## Subpart I—Personal Protective Equipment (PPE)

Sec.

1915.151 Scope, application and definitions.

1915.152 General requirements.

1915.153 Eye and face protection.

1915.154 Respiratory protection.

1915.155 Head protection.

1915.156 Foot protection.

1915.157 Hand and body protection.

1915.158 Lifesaving equipment.

1915.159 Personal fall arrest systems (PFAS).

1915.160 Positioning device systems.

Appendix A to subpart I—Non-mandatory Guidelines for Hazard Assessment, Personal Protective Equipment (PPE) Selection, and PPE Training program.

Appendix B to subpart I— General Testing Conditions and Additional Guidelines for Personal Fall Protection Systems.

### Subpart I—Personal Protective Equipment (PPE)

#### § 1915.151 Scope, application and definitions.

(a) *Scope and application.* This subpart applies to all work in shipyard employment regardless of geographic location.

(b) *Definitions applicable to this subpart.*

*Anchorage* means a secure point of attachment for lifelines, lanyards, or deceleration devices.

*Body belt* means a strap with means for both securing it about the waist and attaching it to a lanyard, lifeline, or deceleration device.

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

*Connector* means a device which is used to couple (connect) parts of a personal fall arrest system or parts of a positioning device system together. It may be an independent component of the system, such as a carabiner, or it may be an integral component of part of the system (such as a buckle or D-ring sewn into a body belt or body harness or a snaphook spliced or sewn to a lanyard or self-retracting lanyard).

*Deceleration device* means any mechanism, such as a rope grab, ripstitch lanyard, specially woven lanyard, tearing or deforming lanyard, or automatic self-retracting lifeline/lanyard, which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest.

*Deceleration distance* means 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.

*Equivalent* means alternative designs, materials, or methods to protect against a hazard which the employer can demonstrate will provide an equal or greater degree of safety for employees than the method or item specified in the standard.

*Free fall* means the act of falling before a personal fall arrest system begins to apply force to arrest the fall.

*Free fall distance* means 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 the device operates and fall arrest forces occur.

*Lanyard* means 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.

*Lifeline* means 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.

*Lower levels* means those areas or surfaces to which an employee can fall. Such areas or surfaces include but are not limited to ground levels, floors, ramps, tanks, materials, water, excavations, pits, vessels, structures, or portions thereof.

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

*Positioning device system* means a body belt or body harness system rigged to allow an employee to be supported at an elevated vertical surface, such as a wall or window, and to be able to work with both hands free while leaning.

*Qualified person* means a person who by possession of a recognized degree or certificate of professional standing, or who, by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or

resolve problems related to the subject matter and work.

*Restraint (tether) line* means a line from an anchorage, or between anchorages, to which the employee is secured in such a way as to prevent the employee from walking or falling off an elevated work surface. Note: A restraint line is not necessarily designed to withstand forces resulting from a fall.

*Rope grab* means a deceleration device which travels on a lifeline and automatically, by friction, engages the lifeline and locks so as to arrest the fall of an employee. A rope grab usually employs the principle of inertial locking, cam/level locking or both.

#### § 1915.152 General requirements.

(a) *Provision and use of equipment.* The employer shall provide and shall ensure that each affected employee uses the appropriate personal protective equipment (PPE) for the eyes, face, head, extremities, torso, and respiratory system, including protective clothing, protective shields, protective barriers, personal fall protection equipment, and life saving equipment, meeting the applicable provisions of this subpart, wherever employees are exposed to work activity hazards that require the use of PPE.

(b) *Hazard assessment and equipment selection.* The employer shall assess its work activity to determine whether there are hazards present, or likely to be present, which necessitate the employee's use of PPE.

Note 1 to paragraph (b): A hazard assessment conducted according to the trade or occupation of affected employees will be considered to comply with paragraph (b) of this section, if the assessment addresses any PPE-related hazards to which employees are exposed in the course of their work activities. If such hazards are present, or likely to be present, the employer shall:

(1) Select the type of PPE that will protect the affected employee from the hazards identified in the occupational hazard assessment;

(2) Communicate selection decisions to affected employees;

(3) Select PPE that properly fits each affected employee; and

(4) Verify that the required occupational hazard assessment has been performed through a document that contains the following information: occupation, the date(s) of the hazard assessment, and the name of the person performing the hazard assessment.

Note 2 to paragraph (b): Non-mandatory Appendix A to this subpart contains examples of procedures that will comply with the requirement for an occupational hazard assessment.

(c) *Defective and damaged equipment.* Defective or damaged PPE shall not be used.

(d) *Reissued equipment.* The employer shall ensure that all unsanitary PPE, including that which has been used by employees, be cleaned and disinfected before it is reissued.

(e) *Training.* (1) The employer shall provide training to each employee who is required, by this section, to use PPE (exception: training in the use of personal fall arrest systems and positioning device systems training is covered in Sections 1915.159 and 1915.160). Each employee shall be trained to understand at least the following:

- (i) When PPE is necessary;
- (ii) What PPE is necessary;
- (iii) How to properly don, doff, adjust, and wear PPE;
- (iv) The limitations of the PPE; and,
- (v) The proper care, maintenance, useful life and disposal of the PPE.

(2) The employer shall ensure that each affected employee demonstrates the ability to use PPE properly before being allowed to perform work requiring the use of PPE.

(3) The employer shall retrain any employee who does not understand or display the skills required by paragraph (e)(2) of this section. Circumstances

where retraining is required include, but are not limited to, situations where:

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

(4) The employer shall verify that each affected employee has received the required training through a document that contains the following information: name of each employee trained, the date(s) of training, and type of training the employee received.

**§ 1915.153 Eye and face protection.**

(a) *General requirements.* (1) The employer shall ensure that each affected employee uses appropriate eye or face protection where there are exposures to eye or face hazards caused by flying particles, molten metal, liquid chemicals, acid or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.

(2) The employer shall ensure that each affected employee uses eye or face

protection that provides side protection when there is a hazard from flying objects. Detachable side protectors (e.g., a clip-on or slide-on side shield) meeting the pertinent requirements of this section are acceptable.

(3) The employer shall ensure that each affected employee who wears prescription lenses while engaged in operations that involve eye hazards wears eye protection that incorporates the prescription in its design, unless the employee is protected by eye protection that can be worn over prescription lenses without disturbing the proper position of either the PPE or the prescription lenses.

(4) The employer shall ensure that each affected employee uses equipment with filter lenses that have a shade number that provides appropriate protection from injurious light radiation. Table I-1 is a listing of appropriate shade numbers for various operations. If filter lenses are used in goggles worn under a helmet which has a lens, the shade number of the lens in the helmet may be reduced so that the shade numbers of the two lenses will equal the value as shown in Table I-1, § 1915.153.

TABLE I-1.—FILTER LENSES FOR PROTECTION AGAINST RADIANT ENERGY

Operations	Electrode size 1/32 in.	Arc current	Minimum protective shade
Shielded metal arc welding .....	Less than 3 .....	Less than .....	7
	3-5 .....	60 .....	8
	5-8 .....	60-160 .....	10
	More than 8 .....	160-250 .....	11
	.....	250-550 .....	.....
Gas metal arc welding and flux cored arc welding.	.....	Less than .....	7
	.....	60 .....	10
	.....	60-160 .....	10
	.....	160-250 .....	10
	.....	250-500 .....	.....
Gas Tungsten arc welding .....	.....	Less than .....	8
	.....	50 .....	8
	.....	50-150 .....	10
	.....	150-500 .....	.....
	.....	.....	.....
Air carbon .....	(Light) .....	Less than .....	10
	(Heavy) .....	500 .....	11
Plasma arc welding .....	.....	500-1000 .....	.....
	.....	Less than .....	6
	.....	20 .....	8
	.....	20- .....	10
	.....	100 .....	11
	.....	100- .....	.....
	.....	400 .....	.....
	.....	400- .....	.....
.....	800 .....	.....	
Plasma arc cutting .....	(light)** .....	Less than 300 .....	8
	(medium)** .....	300-400 .....	9
	(heavy)** .....	400-800 .....	10
Torch brazing .....	.....	.....	3
Torch soldering .....	.....	.....	2
Carbon Arc welding .....	.....	.....	14

\*\* These values apply where the actual arc is clearly seen. Lighter filters may be used when the arc is hidden by the workpiece.

FILTER LENSES FOR PROTECTION AGAINST RADIANT ENERGY

Operations	Plate thickness— inches	Plate thickness— mm	Minimum* protective shade
Gas welding:			
Light .....	Under 1/8 .....	Under 3.2 .....	4
Medium .....	1/8 to 1/2 .....	3.2 to 12.7 .....	5
Heavy .....	Over 1/2 .....	Over 12.7 .....	6
Oxygen cutting			
Light .....	Under 1 .....	Under 25 .....	3
Medium .....	1 to 6 .....	25 to 150 .....	4
Heavy .....	Over 6 .....	Over 150 .....	5

\* As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to a lighter shade which gives sufficient view of the weld zone without going below the minimum. In oxyfuel gas welding or cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line in the visible light of the (spectrum) operation.

(b) *Criteria for Protective Eye and Face Devices*

(1) Protective eye and face devices purchased after (insert effective date of final rule) shall comply with the American National Standards Institute, ANSI Z87.1-1989, "Practice for Occupational and Educational Eye and Face Protection," which is incorporated by reference as specified in § 1915.5, or shall be demonstrated by the employer to be equally effective.

(2) Eye and face protective devices purchased before (insert effective date of final rule) shall comply with "American National Standard Practice for Occupational and Educational Eye and Face Protection, Z87.1-1979," which is incorporated by reference as specified in § 1915.5, or shall be demonstrated by the employer to be equally effective.

**§ 1915.154 Respiratory protection.**

Respiratory protection for shipyard employment is covered by 29 CFR 1910.134.

**§ 1915.155 Head protection.**

(a) *Use.* (1) The employer shall ensure that each affected employee wears a protective helmet when working in areas where there is a potential for injury to the head from falling objects.

(2) The employer shall ensure that each affected employee wears a protective helmet designed to reduce electrical shock hazards where there is potential for electric shock or burns due to contact with exposed electrical conductors which could contact the head.

(b) *Criteria for protective helmets.* (1) Protective helmets purchased after August 22, 1996 shall comply with ANSI Z89.1-1986, "Personnel Protection—Protective Headwear for Industrial Workers-Requirements," which is incorporated by reference, as specified in § 1915.5, or shall be demonstrated by the employer to be equally effective.

(2) Protective helmets purchased before August 22, 1996 shall comply with the "American National Standard Safety Requirements for Industrial Head Protection, Z89.1-1969," which is incorporated by reference as specified in 1915.5, or shall be demonstrated by the employer to be equally effective.

**§ 1915.156 Foot protection.**

(a) *Use.* The employer shall ensure that each affected employee wears protective footwear when working in areas where there is a danger of foot injuries due to falling or rolling objects or objects piercing the sole.

(b) *Criteria for protective footwear.* (1) Protective footwear purchased after August 22, 1996 shall comply with ANSI Z41-1991, "American National Standard for Personal Protection-Protective Footwear," which is incorporated by reference, as specified in § 1915.5, or shall be demonstrated by the employer to be equally as effective.

(2) Protective footwear purchased before August 22, 1996 shall comply with the "American National Standard for Personal Protection- Protective Footwear Z41-1983," which is incorporated by reference, as specified in § 1915.5, or shall be demonstrated by the employer to be equally effective.

**§ 1915.157 Hand and body protection.**

(a) *Use.* The employer shall ensure that each affected employee uses appropriate hand protection and other protective clothing where there is exposure to hazards such as skin absorption of harmful substances, severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns, harmful temperature extremes, and sharp objects.

(b) *Hot work operations.* The employer shall ensure that no employee wears clothing impregnated or covered in full or in part with flammable or combustible materials (such as grease or oil) while engaged in hot work

operations or working near an ignition source.

(c) *Electrical Protective Devices.* The employer shall ensure that each affected employee wears protective electrical insulating gloves and sleeves or other electrical protective equipment, if that employee is exposed to electrical shock hazards while working on electrical equipment.

**§ 1915.158 Lifesaving equipment.**

(a) *Personal flotation devices.* (1) Personal flotation devices (PFD) (life preservers, life jackets and work vests) worn by each affected employee shall be any United States Coast Guard (USCG) approved and marked Type I PFD, Type II PFD, or Type III PFD; or PFDs shall be a USCG approved Type V PFD which is marked for use as a work vest, for commercial use, or for use on vessels. USCG approval is pursuant to 46 CFR part 160, subpart Q, Coast Guard Lifesaving Equipment Specifications.

(2) Prior to each use, personal flotation devices shall be inspected for dry rot, chemical damage, or other defects which may affect their strength and buoyancy. Defective personal flotation devices shall not be used.

(b) *Ring life buoys and ladders.* (1) When work is being performed on a floating vessel 200 feet (61 m) or more in length, at least three 30-inch (0.76 m) U.S. Coast Guard approved ring life buoys with lines attached shall be located in readily visible and accessible places. Ring life buoys shall be located one forward, one aft, and one at the access to the gangway.

(2) On floating vessels under 200 feet (61 m) in length, at least one 30-inch (0.76 m) U.S. Coast Guard approved ring life buoy with line attached shall be located at the gangway.

(3) At least one 30-inch (0.76 m) U. S. Coast Guard approved ring life buoy with a line attached shall be located on each staging alongside of a floating

vessel on which work is being performed.

(4) At least 90 feet (27 m) of line shall be attached to each ring life buoy.

(5) There shall be at least one portable or permanent ladder in the vicinity of each floating vessel on which work is being performed. The ladder shall be of sufficient length to assist employees to reach safety in the event they fall into the water.

**§ 1915.159 Personal fall arrest systems (PFAS).**

The criteria of this section apply to PFAS and their use. Effective January 1, 1998, body belts and non-locking snaphooks are not acceptable as part of a personal fall arrest system.

(a) Criteria for connectors and anchorages. (1) Connectors shall be made of drop forged, pressed, or formed steel or shall be made of materials with equivalent strength.

(2) Connectors shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to the interfacing parts of the system.

(3) D-rings and snaphooks shall be capable of sustaining a minimum tensile load of 5,000 pounds (22.2 Kn).

(4) D-rings and snaphooks shall be proof-tested to a minimum tensile load of 3,600 pounds (16 Kn) without cracking, breaking, or being permanently deformed.

(5) Snaphooks shall be sized to be compatible with the member to which they are connected to prevent unintentional disengagement of the snaphook caused by depression of the snaphook keeper by the connected member, or shall be of a locking type that is designed and used to prevent disengagement of the snap-hook by contact of the snaphook keeper by the connected member.

(6) Snaphooks, unless of a locking type designed and used to prevent disengagement from the following connections, shall not be engaged:

- (i) directly to webbing, rope or wire rope;
- (ii) to each other;
- (iii) to a D-ring to which another snaphook or other connector is attached;
- (iv) to a horizontal lifeline; or
- (v) to any object that is incompatibly shaped or dimensioned in relation to the snaphook such that unintentional disengagement could occur by the connected object being able to depress the snaphook keeper and release itself.

(7) On suspended scaffolds or similar work platforms with horizontal lifelines that may become vertical lifelines, the devices used for connection to the horizontal lifeline shall be capable of locking in any direction on the lifeline.

(8) Anchorages used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms.

(9) Anchorages shall be capable of supporting at least 5,000 pounds (22.2 Kn) per employee attached, or shall be designed, installed, and used as follows:

(i) as part of a complete personal fall arrest system which maintains a safety factor of at least two; and

(ii) under the direction and supervision of a qualified person.

(b) *Criteria for lifelines, lanyards, and personal fall arrest systems.*

(1) When vertical lifelines are used, each employee shall be provided with a separate lifeline.

(2) Vertical lifelines and lanyards shall have a minimum tensile strength of 5,000 pounds (22.2 Kn).

(3) Self-retracting lifelines and lanyards that automatically limit free fall distances to 2 feet (0.61 m) or less shall be capable of sustaining a minimum tensile load of 3000 pounds (13.3 Kn) applied to a self-retracting lifeline or lanyard with the lifeline or lanyard in the fully extended position.

(4) Self-retracting lifelines and lanyards which do not limit free fall distance to 2 feet (0.61 m) or less, ripstitch lanyards and tearing and deforming lanyards shall be capable of sustaining a minimum static tensile load of 5,000 pounds (22.2 Kn) applied to the device when they are in the fully extended position.

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

(6) Effective November 20, 1996, personal fall arrest systems shall:

(i) limit the maximum arresting force on a falling employee to 900 pounds (4 Kn) when used with a body belt;

(ii) limit the maximum arresting force on a falling employee to 1,800 pounds (8 Kn) when used with a body harness;

(iii) bring a falling employee to a complete stop and limit the maximum deceleration distance an employee travels to 3.5 feet (1.07 m), and

(iv) have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of 6 feet (1.8 m), or the free fall distance permitted by the system, whichever is less;

Note to paragraph (b)(6) of this section: A personal fall arrest system which meets the criteria and protocols contained in Appendix B, is considered to comply with paragraph (b)(6). If the combined tool and body weight is 310 pounds (140 kg) or more, systems that meet the criteria and protocols contained in

Appendix B will be deemed to comply with the provisions of paragraphs (b)(6) only if they are modified appropriately to provide protection for the extra weight of the employee and tools.

(7) Personal fall arrest systems shall be rigged such that an employee can neither free fall more than 6 feet (1.8 m) nor contact any lower level.

(c) *Criteria for selection, use and care of systems and system components.* (1) Lanyards shall be attached to employees using personal fall arrest systems, as follows:

(i) The attachment point of a body harness shall be located in the center of the wearer's back near the shoulder level, or above the wearer's head. If the free fall distance is limited to less than 20 inches, the attachment point may be located in the chest position; and

(ii) The attachment point of a body belt shall be located in the center of the wearer's back.

(2) Ropes and straps (webbing) used in lanyards, lifelines and strength components of body belts and body harnesses shall be made from synthetic fibers or wire rope.

(3) Ropes, belts, harnesses, and lanyards shall be compatible with their hardware.

(4) Lifelines and lanyards shall be protected against cuts, abrasions, burns from hot work operations and deterioration by acids, solvents, and other chemicals.

(5) Personal fall arrest systems shall be inspected prior to each use for mildew, wear, damage, and other deterioration. Defective components shall be removed from service.

(6) 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 qualified person to be undamaged and suitable for reuse.

(7) The employer shall provide for prompt rescue of employees in the event of a fall or shall ensure that employees are able to rescue themselves.

(8) Body belts shall be at least one and five eighths inches (4.1 cm) wide.

(9) Personal fall arrest systems and components shall be used only for employee fall protection and not to hoist materials.

(d) *Training.* Before using personal fall arrest equipment, each affected employee shall be trained to understand the application limits of the equipment and proper hook-up, anchoring, and tie-off techniques. Affected employees shall also be trained so that they can demonstrate the proper use, inspection, and storage of their equipment.

**§ 1915.160 Positioning device systems.**

Positioning device systems and their use shall conform to the following provisions:

(a) *Criteria for connectors and anchorages.* (1) Connectors shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing parts of this system.

(2) Connecting assemblies shall have a minimum tensile strength of 5,000 pounds (22.2 Kn).

(3) Positioning device systems shall be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall.

(4) Snaphooks, unless each is of a locking type designed and used to prevent disengagement, shall not be connected to each other. As of January 1, 1998, only locking type snaphooks shall be used in positioning device systems.

(b) *Criteria for positioning device systems.* (1) Restraint (tether) lines shall have a minimum breaking strength of 3,000 pounds (13.3 Kn).

(2) The following system performance criteria for positioning device systems are effective November 20, 1996:

(i) A window cleaner's positioning system shall be capable of withstanding without failure a drop test consisting of a 6 foot (1.83 m) drop of a 250 pound (113 kg) weight. The system shall limit the initial arresting force to not more than 2,000 pounds (8.89 Kn), with a duration not to exceed 2 milliseconds. The system shall limit any subsequent arresting forces imposed on the falling employee to not more than 1,000 pounds (4.45 Kn);

(ii) All other positioning device systems shall be capable of withstanding without failure a drop test consisting of a 4-foot (1.2 m) drop of a 250-pound (113 kg) weight.

Note to paragraph (b)(2) of this section: Positioning device systems which comply with the provisions of Section 2 of Non-mandatory Appendix B to this subpart shall be deemed to meet the requirements of this paragraph (b)(2).

(c) *Criteria for the use and care of positioning device systems.* (1) Positioning device systems shall be inspected before each use for mildew, wear, damage, and other deterioration. Defective components shall be removed from service.

(2) A positioning device system or component subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection, unless inspected and determined by a qualified person to be undamaged and suitable for reuse.

(d) *Training.* Before using a positioning device system, employees shall be trained in the application limits, proper hook-up, anchoring and tie-off techniques, methods of use, inspection, and storage of positioning device systems.

#### Appendix A to Subpart I—Non-mandatory Guidelines for Hazard Assessment, Personal Protective Equipment (PPE) Selection, and PPE Training Program

This Appendix is intended to provide compliance assistance for hazard assessment, selection of personal protective equipment (PPE) and PPE training. It neither adds to or detracts from the employer's responsibility to comply with the provisions of this subpart.

1. Controlling hazards. Employers and employees should not rely exclusively on PPE for protection from hazards. PPE should be used, where appropriate, in conjunction with engineering controls, guards, and safe work practices and procedures.

2. Assessment and selection. Employers need to consider certain general guidelines for assessing the hazardous situations that are likely to arise under foreseeable work activity conditions and to match employee PPE to the identified hazards. The employer should designate a safety officer or some other qualified person to exercise common sense and appropriate expertise to assess work activity hazards and select PPE.

3. Assessment guidelines. In order to assess the need for PPE the following steps should be taken:

a. Survey. Conduct a walk-through survey of the area in question to identify sources of hazards.

Categories for Consideration:

- (1) Impact
- (2) Penetration
- (3) Compression (roll-over)
- (4) Chemical
- (5) Heat
- (6) Harmful dust
- (7) Light (optical) radiation
- (8) Drowning
- (9) Falling

b. Sources. During the walk-through survey the safety officer should observe:

(1) Sources of motion; for example, 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.

(2) Sources of high temperatures that could result in burns, eye injury or ignition of protective equipment.

(3) Types of chemical exposures.

(4) Sources of harmful dust.

(5) Sources of light radiation, for instance, welding, brazing, cutting, heat treating, furnaces, and high intensity lights.

(6) Sources of falling objects or potential for dropping objects.

(7) Sources of sharp objects which might pierce or cut the hands.

(8) Sources of rolling or pinching objects which could crush the feet.

(9) Layout of work place and location of co-workers.

(10) Any electrical hazards.

(11) Review injury/accident data to help identify problem areas.

*Organize data.* Following the walk-through survey, it is necessary to organize the data and other information obtained. That material provides the basis for hazard assessment that enables the employer to select the appropriate PPE.

d. *Analyze data.* Having gathered and organized data regarding a particular occupation, employers need to estimate the potential for injuries. Each of the identified hazards (see paragraph 3.a.) should be reviewed and classified as to its type, the level of risk, and the seriousness of any potential injury. Where it is foreseeable that an employee could be exposed to several hazards simultaneously, the consequences of such exposure should be considered.

4. *Selection guidelines.* After completion of the procedures in paragraph 3, the general procedure for selection of protective equipment is to:

(a) become familiar with the potential hazards and the types of protective equipment that are available, and what they can do; for example, splash protection, and impact protection;

(b) compare the hazards associated with the environment; for instance, impact velocities, masses, projectile shapes, radiation intensities, with the capabilities of the available protective equipment;

(c) select the protective equipment which ensures a level of protection greater than the minimum required to protect employees from the hazards; and

(d) fit the user with the protective device and give instructions on care and use of the PPE. It is very important that users be made aware of all warning labels and limitations of their PPE.

5. *Fitting the device.* Careful consideration must be given to comfort and fit. The employee will be most likely to wear the protective device if it fits comfortably. PPE that does not fit properly may not provide the necessary protection, and may create other problems for wearers. Generally, protective devices are available in a variety of sizes and choices. Therefore employers should be careful to select the appropriate sized PPE.

6. *Devices with adjustable features.* (a) Adjustments should be made on an individual basis so the wearer will have a comfortable fit that maintains 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 seal is appropriate for the face.

(b) In addition, proper fitting of hard hats is important to ensure that the hard hat will not fall off during work operations. In some cases a chin strap may be necessary to keep the hard hat on an employee's head. (Chin straps should break at a reasonably low force to prevent a strangulation hazard). Where manufacturer's instructions are available, they should be followed carefully.

7. *Reassessment of hazards.* Compliance with the hazard assessment requirements of § 1915.152(b) will involve the reassessment of work activities where changing circumstances make it necessary. a. The

employer should have a safety officer or other qualified person reassess the hazards of the work activity area as necessary. This reassessment should take into account changes in the workplace or work practices, such as those associated with the installation of new equipment, and the lessons learned from reviewing accident records, and a reevaluation performed to determine the suitability of PPE selected for use.

8. *Selection chart guidelines for eye and face protection.* Examples of occupations for which eye protection should be routinely considered are carpenters, engineers, coppersmiths, instrument technicians, insulators, electricians, machinists, mobile equipment mechanics and repairers, plumbers and ship fitters, sheet metal workers and tinsmiths, grinding equipment operators, machine operators, welders, boiler

workers, painters, laborers, grit blasters, ship fitters and burners. This is not a complete list of occupations that require the use of eye protection. The following chart provides general guidance for the proper selection of eye and face protection to protect against hazards associated with the listed hazard "source" operations.

EYE AND FACE PROTECTION SELECTION CHART

Source	Assessment of hazard	Protection
Impact: Chipping, grinding machining, masonry work, woodworking, sawing, drilling, chiseling, powered fastening, riveting, and sanding.	Flying fragments, objects, large chips, particles, sand, dirt, etc.	Spectacles with side protection, goggles, face shields. See notes (1), (3), (5), (6), (10). For severe exposure, use face shield.
Heat: Furnace operations, pouring, casting, hot dipping, and welding.	Hot sparks ..... Splash from molten metals ..... High temperature exposure .....	Face shields, goggles, spectacles with side protection. For severe exposure use face shield. See notes (1), (2), (3). Face shields worn over goggles. See notes (1), (2), (3). Screen face shields, reflective face shields. See notes (1), (2), (3).
Chemicals: Acid and chemicals handling, degreasing, plating.	Splash ..... Irritating mists .....	Goggles, eyecup and cover types. For severe exposure, use face shield. See notes (3), (11). Special-purpose goggles.
Dust: Woodworking, buffing, general dusty conditions	Nuisance dust .....	Goggles, eyecup and cover types. See note (8).
Light and/or Radiation: Welding: Electric arc .....	Optical radiation .....	Welding helmets or welding shields. Typical shades: 10-14. See notes (9), (12).
Welding: Gas .....	Optical radiation .....	Welding goggles or welding face shield. Typical shades: gas welding 4-8, cutting 3-6, brazing 3-4. See note (9).
Cutting, Torch brazing, Torch soldering .....	Optical radiation .....	Spectacles or welding face-shield. Typical shades, 1.5-3. See notes (3), (9).
Glare .....	Poor vision .....	Spectacles with shaded or special-purpose lenses, as suitable. See notes (9), (10).

Notes to Eye and Face Protection Selection Chart

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

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

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

(d) As required by the standard, filter lenses must meet the requirements for shade designations in § 1915.153(a)(4). Tinted and shaded lenses are not filter lenses unless they are marked or identified as such.

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

(f) Wearers of contact lenses must also wear appropriate eye and face protection devices in a hazardous environment. It should be recognized that dusty and/or

chemical environments may represent an additional hazard to contact lens wearers.

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

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

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

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

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

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

9. *Selection guidelines for head protection.*

(a) Hard hats are designed to provide protection from impact and penetration hazards caused by falling objects. Head protection is also available which provides protection from electric shock and burn.

When selecting head protection, knowledge of potential electrical hazards is important. Class A helmets, in addition to impact and penetration resistance, provide electrical protection from low-voltage conductors. (They are proof tested to 2,200 volts.) Class B helmets, in addition to impact and penetration resistance, provide electrical protection from high-voltage conductors. (They are proof tested to 20,000 volts.) Class C helmets provide impact and penetration resistance. (They are usually made of aluminum, which conducts electricity and should not be used around electrical hazards.)

(b) Where falling object hazards are present, head protection must be worn. Some examples of exposure include: working below other workers who are using tools and materials which could fall; working around or under conveyor belts which are carrying parts or materials; working below machinery or processes which might cause material or objects to fall; and working on exposed energized conductors.

(c) Examples of occupations for which head protection should be considered are: carpenters, electricians, machinists, boilermakers, erectors, plumbers, coppersmiths, ship fitters, welders, laborers and material handlers.

10. *Selection guidelines for foot protection.* (a) Safety shoes and boots must meet ANSI Z41-1991 and provide impact and compression protection to the foot. Where necessary, safety shoes can be obtained which provide puncture protection. In some work situations, metatarsal protection should be provided, and in some other special situations electrical conductive or insulating safety shoes would be appropriate.

(b) Safety shoes or boots with impact protection would be required for carrying or handling materials such as packages, objects, parts or heavy tools, which could be dropped, and for other activities where objects might fall onto the feet. Safety shoes or boots with compression protection would be required for work activities involving skid trucks (manual material handling carts) around bulk rolls (such as paper rolls) and around heavy pipes, all of which could potentially roll over an employees' feet. Safety shoes or boots with puncture protection would be required where sharp objects such as nails, wire, tacks, screws, large staples, scrap metal etc., could be stepped on by employees, causing an injury.

(c) Some occupations (not a complete list) for which foot protection should be routinely considered are: shipping and receiving clerks, stock clerks, carpenters, electricians, machinists, boiler makers, plumbers, copper smiths, pipe fitters, ship fitters, burners, chippers and grinders, erectors, press operators, welders, laborers, and material handlers.

11. *Selection guidelines for hand protection.* (a) Gloves are often relied upon to prevent cuts, abrasions, burns, and skin contact with chemicals that are capable of causing local or systemic effects following dermal exposure. OSHA is unaware of any gloves that provide protection against all potential hand hazards, and commonly available glove materials provide only limited protection against many chemicals. Therefore, it is important to select the most appropriate glove for a particular application and to determine how long it can be worn, and whether it can be reused.

(b) It is also important to know the performance characteristics of gloves relative to the specific hazard anticipated, e.g., chemical hazards, cut hazards, and flame hazards. These performance characteristics should be assessed by using standard test procedures. Before purchasing gloves, the employer should request documentation from the manufacturer that the gloves meet the appropriate test standard(s) for the hazard(s) anticipated.

(c) other general factors to be considered for glove selection are:

(A) As long as the performance characteristics are acceptable, in certain circumstances, it may be more cost effective to regularly change cheaper gloves than to reuse more expensive types; and,

(B) The work activities of the employee should be studied to determine the degree of dexterity required, the duration, frequency, and degree of exposure to the hazard, and the physical stresses that will be applied.

(d) With respect to selection of gloves for protection against chemical hazards:

(A) The toxic properties of the chemical(s) must be determined; in particular, the ability

of the chemical to cause local effects on the skin or to pass through the skin and cause systemic effects or both;

(B) Generally, any "chemical resistant" glove can be used for dry powders;

(C) For mixtures and formulated products (unless specific test data are available), a glove should be selected on the basis of the chemical component with the shortest breakthrough time, since it is possible for solvents to carry active ingredients through polymeric materials; and,

(D) Employees must be able to remove the gloves in such a manner as to prevent skin contamination.

12. *Cleaning and maintenance.* (a) It is important that all PPE be kept clean and be properly maintained. Cleaning is particularly important for eye and face protection where dirty or fogged lenses could impair vision.

(b) For the purposes of compliance, PPE should be inspected, cleaned, and maintained at regular intervals so that the PPE provides the requisite protection.

(c) It is important to ensure that contaminated PPE which cannot be decontaminated is disposed of in a manner that protects employees from exposure to hazards.

13. *Examples of work activities, trades and selection of basic PPE.*

Example 1: *Welder.* Based on an assessment of the work activity area hazards to which welders are exposed, the equipment listed below is the basic PPE required for this occupation. This does not take into account a job location in which additional PPE may be required, such as where the welder works from an elevated platform without guard rails. In this situation the welder must also wear the proper fall protection equipment, such as a body harness.

- Hard hat
- Welding Shield (Face)
- Welding Gloves
- Safety Glasses
- Safety Shoes
- Welding Sleeves (welding in the overhead position)

(Signed and dated)

Example 2: *Yard Maintenance Worker.* Based on an assessment of the workplace hazards to which shipyard maintenance workers are exposed, the equipment listed below is the basic PPE required for this occupation. Where maintenance workers are exposed to other hazards, such as asbestos, the insulation on a pipe is being repaired, maintenance workers must be provided with the appropriate supplemental PPE (requirements for asbestos PPE are set out in 1915.1001).

- Hard Hat
- Safety Glasses
- Work Gloves
- Safety Shoes

(Signed and Dated)

Example 3: *Chipper and Grinder Worker.* Based on an assessment of the workplace hazards to which shipyard chipper and grinder workers are exposed, the equipment listed below is the basic PPE required for this occupation. Where workers are exposed to other hazards, such as hazardous dust from chipping or grinding operations, chipper and

grinder workers must be provided with the appropriate supplemental PPE.

- Safety Glasses
- Transparent Face Shields
- Hearing Protection
- Foot Protection
- Gloves

(Signed and Dated)

Example 4: *Painter.* Based on an assessment of the workplace hazards to which shipyard painters are exposed, the equipment listed below is the basic PPE required for this occupation. Where painters are exposed to other hazards, such as a fall from an elevation where no guardrails are present, painters must be provided with the appropriate supplemental PPE.

- Hard Hats
- Safety Glasses
- Disposable Clothing
- Gloves
- Respiratory Protection, including Airline Respirators when working in Confined Spaces
- Barrier Creams

(Signed and Dated)

Example 5: *Tank Cleaner.* Tank cleaning operations and the basic PPE required for them depend largely upon the type of cargo shipped in the tank. Therefore, the following example is given for a tank in which gasoline has been shipped. Based on an assessment of the workplace hazards to which shipyard tank cleaners are exposed, specifically benzene and flammability hazards, the equipment listed below is the basic PPE required for this situation. Other tank cleaning operations will require variations in the PPE listed below.

- Respiratory Protection, Airline Respirators for working in confined spaces or where personal exposure limits could be exceeded.
- Chemically resistant clothing
- Face Shields
- Chemically resistant boots
- Chemically resistant gloves
- Fall Protection
- Non sparking tools and equipment
- Explosion-proof Lighting

(Signed and Dated)

Appendix B to Subpart I—General Testing Conditions and Additional Guidelines for Personal Fall Protection Systems (Non-mandatory)

1. *Personal fall arrest systems*—(a) *General test conditions.* (1) Lifelines, lanyards, and deceleration devices should be attached to an anchorage and connected to the body-belt or body harness in the same manner as they would be when used to protect employees, except that lanyards should be tested only when connected directly to the anchorage, and not when connected to a lifeline.

(2) The anchorage should be rigid, and should not have a deflection greater than .04 inches (1 cm) when a force of 2,250 pounds (10 Kn) is applied.

(3) The frequency response of the load measuring instrumentation should be 100 Hz.

(4) The test weight used in the strength and force tests should be a rigid, metal cylindrical or torso-shaped object with a girth of 38

inches plus or minus 4 inches (96.5 cm plus or minus 10 cm).

(5) The lanyard or lifeline used to create the free fall distance should be the one supplied with the system, or in its absence, the least elastic lanyard or lifeline available to be used by the employee with the system.

(6) The test weight for each test should be hoisted to the required level and should be quickly released without having any appreciable motion imparted to it.

(7) The system's performance should be evaluated, taking into account the range of environmental conditions for which it is designed to be used.

(8) Following the test, the system need not be capable of further operation.

(b) *Strength test.* (1) During the testing of all systems, a test weight of 300 pounds plus or minus 5 pounds (136 kg plus or minus 2.27 kg) should be used. (See paragraph (a)(4) above.)

(2) The test consists of dropping the test weight once. A new unused system should be used for each test.

(3) For lanyard systems, the lanyard length should be 6 feet plus or minus 2 inches (1.83 m plus or minus 5 cm) as measured from the fixed anchorage to the attachment on the body belt or harness.

(4) For rope-grab-type deceleration systems, the length of the lifeline above the center line of the grabbing mechanism to the lifeline's anchorage point should not exceed 2 feet (0.61 m).

(5) For lanyard systems, for systems with deceleration devices which do not automatically limit free fall distance to 2 feet (0.61 m) or less, and for systems with deceleration devices which have a connection distance in excess of 1 foot (0.3 m) (measured between the centerline of the lifeline and the attachment point to the body belt or harness), the test weight should be rigged to free fall a distance of 7.5 feet (2.3 m) from a point that is 1.5 feet (46 cm) above the anchorage point, to its hanging location (6 feet (1.83 m) below the anchorage). The test weight should fall without interference, obstruction, or hitting the floor or the ground during the test. In some cases, a non-elastic wire lanyard of sufficient length may need to be added to the system (for test purposes) to create the necessary free fall distance.

(6) For deceleration device systems with integral lifelines or lanyards which automatically limit free fall distance to 2 feet (0.61 m) or less, the test weight should be rigged to free fall a distance of four feet (1.22 m).

(7) Any weight which detaches from the belt or harness should constitute failure for the strength test.

(c) *Force test general.* The test consists of dropping the respective test weight once. A new, unused system should be used for each test.

(1) For lanyard systems. (i) A test weight of 220 pounds plus or minus three pounds (100 kg plus or minus 1.6 kg) should be used (see paragraph (a)(4) above).

(ii) Lanyard length should be 6 feet plus or minus 2 inches (1.83 m plus or minus 5 cm) as measured from the fixed anchorage to the attachment on the body belt or body harness.

(iii) The test weight should fall free from the anchorage level to its handling location

(a total of 6 feet (1.83 m) free fall distance) without interference, obstruction, or hitting the floor or ground during the test.

(2) For all other systems. (i) A test weight of 220 pounds plus or minus 3 pounds (100 kg plus or minus 1.6 kg) should be used (see paragraph (a)(4) above).

(ii) The free fall distance to be used in the test should be the maximum fall distance physically permitted by the system during normal use conditions, up to a maximum free fall distance for the test weight of 6 feet (1.83 m), except as follows:

(A) For deceleration systems which have a connection link or lanyard, the test weight should free fall a distance equal to the connection distance (measured between the center line of the lifeline and the attachment point to the body belt or harness).

(B) For deceleration device systems with integral life lines or lanyards which automatically limit free fall distance to 2 feet (0.61 m) or less, the test weight should free fall a distance equal to that permitted by the system in normal use. (For example, to test a system with a self-retracting lifeline or lanyard, the test weight should be supported and the system allowed to retract the lifeline or lanyard as it would in normal use. The test weight would then be released and the force and deceleration distance measured.)

(3) Failure. A system fails the force test if the recorded maximum arresting force exceeds 1,260 pounds (5.6 Kn) when using a body belt, or exceeds 2,520 pounds (11.2 Kn) when using a body harness.

(4) Distances. The maximum elongation and deceleration distance should be recorded during the force test.

(d) *Deceleration device tests—general.* The device should be evaluated or tested under the environmental conditions (such as rain, ice, grease, dirt, type of lifeline, etc.) for which the device is designed.

(1) Rope-grab-type deceleration devices. (i) Devices should be moved on a lifeline 1,000 times over the same length of line a distance of not less than 1 foot (30.5 cm), and the mechanism should lock each time.

(ii) Unless the device is permanently marked to indicate the type of lifelines which must be used, several types (different diameters and different materials) of lifelines should be used to test the device.

(2) Other-self-activating-type deceleration devices. The locking mechanisms of other self-activating-type deceleration devices designed for more than one arrest should lock each of 1,000 times as they would in normal service.

2. *Positioning device systems—(a) Test Conditions.* (1) The fixed anchorage should be rigid and should not have a deflection greater than .04 inches (1 cm) when a force of 2,250 pounds (10 Kn) is applied.

(2) For linemen's body belt and pole straps, the body belt should be secured to a 250 pound (113 kg) bag of sand at a point which simulates the waist of an employee. One end of the pole strap should be attached to the rigid anchorage and the other end to the body belt. The sand bag should be allowed to free fall a distance of 4 feet (1.2 m). Failure of the pole strap and body belt should be indicated by any breakage or slippage sufficient to permit the bag to fall free to the ground.

(3) For window cleaner's belts, the complete belt should withstand a drop test consisting of a 250 pound (113 kg) weight falling free for a distance of 6 feet (1.83 m). The weight should be a rigid object with a girth of 38 inches plus or minus four inches (97 cm plus or minus 10 cm). The weight should be placed in the waistband with the belt buckle drawn firmly against the weight, as when the belt is worn by a window cleaner. One belt terminal should be attached to a rigid anchor and the other terminal should hang free. The terminals should be adjusted to their maximum span. The weight fastened in the freely suspended belt should then be lifted exactly 6 feet (1.83 m) above its "at rest" position and released so as to permit a free fall of 6 feet (1.83 m) vertically below the point of attachment of the terminal anchor. The belt system should be equipped with devices and instrumentation capable of measuring the duration and magnitude of the arrest forces. Any breakage or slippage which permits the weight to fall free of the system constitutes failure of the test. In addition, the initial and subsequent arresting force peaks should be measured and should not exceed 2,000 pounds (8.9 Kn) for more than 2 milliseconds for the initial impact, nor exceed 1,000 pounds (4.45 Kn) for the remainder of the arrest time.

(4) All other positioning device systems (except for restraint line systems) should withstand a drop test consisting of a 250 pound (113 kg) weight falling free for a distance of 4 feet (1.2 m). The weight should be a rigid object with a girth of 38 inches plus or minus 4 inches (96 cm plus or minus 10 cm). The body belt or harness should be affixed to the test weight as it would be to an employee. The system should be connected to the rigid anchor in the manner that the system would be connected in normal use. The weight should be lifted exactly 4 feet (1.2 m) above its "at rest" position and released so as to permit a vertical free fall of 4 feet (1.2 m). Any breakage or slippage which permits the weight to fall free to the ground should constitute failure of the system.

10. Section § 1915.5 is revised as follows:

**§ 1915.5 Incorporation by reference.**

(a) Specifications, standards, and codes of agencies of the U.S. Government, to the extent specified in the text, form a part of the regulations of this part. In addition, under the authority vested in the Secretary under the Act, the specifications, standards, and codes of organizations which are not agencies of the U.S. Government, in effect on the date of the promulgation of the regulations of this part as listed below, to the extent specified in the text, form a part of the regulations of this part.

(b) The materials listed in paragraph (d) of this section are incorporated by reference in the corresponding sections noted as they exist on the date of the approval, and a notice of any change in

these materials will be published in the Federal Register. These incorporations by reference were approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51.

(c) Copies of the following standards that are issued by the respective private standards organizations may be obtained from the issuing organizations. The materials are available for purchase at the corresponding addresses of the private standards organizations noted below. In addition, all are available for inspection at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington DC, and through the OSHA Docket Office, room N2625, U.S. Department of Labor, 200 Constitution Ave., NW, Washington, DC 20210, or any of its regional offices.

(d)(1) The following material is available for purchase from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036.

(i) ANSI A14.1–1959 Safety Code for Portable Wood Ladders, IBR approved for § 1915.72(a)(6)

(ii) ANSI A14.2–1956 Safety Code for Portable Metal Ladders, IBR approved for § 1995.72(a)(4)

(iii) ANSI B7.1–1964 Safety Code for the Use, Care, and Protection of Abrasive Wheels, IBR approval for § 1915.134(c)

(iv) ANSI Z87.1–1989 Practice for Occupational and Educational Eye and Face Protection, IBR approved for § 1915.153(b)(1).

(v) ANSI 87.1–1979 Practice for Occupational and Educational Eye and Face Protection, IBR approved for § 1915.153(b)(2)

(vi) ANSI Z89.1–1986 Personnel Protection—Protective Headgear for Industrial Workers Requirements, IBR approved for § 1915.155(b)(1)

(vii) ANSI Z89.1–1969 Safety Requirement for Industrial Head Protection, IBR approved for § 1915.155(b)(2).

(viii) ANSI Z41–1991 Personal Protection—Protective Footwear, IBR approved for § 1915.156(b)(1)

(ix) ANSI Z41–1983 Personal Protection—Protective Footwear, IBR approved for § 1915.156(b)(2).

(2) The following material is available for purchase from the American Society of Mechanical Engineers, 345 East 47th Street, New York, New York 10017:

(i) ASME Boiler and Pressure Vessel Code, Section VIII, Rules for Construction of Unfired Pressure Vessels, 1963, IBR approved for § 1915.172(a).

(3) The following material is available for purchase from the American Conference of Governmental Industrial Hygienists (ACGIH), 1014 Broadway, Cincinnati, OH 45202:

(i) Threshold limit values, 1970, IBR approved for §§ 1915.12(b) and 1915.1000, table Z.

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