



Lead Hazard Awareness and Management Tactics, Techniques, and Procedures (TTP)



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COAST GUARD TACTICS, TECHNIQUES, AND PROCEDURES 4-11.6

Subj: LEAD HAZARD AWARENESS AND MANAGEMENT

- Ref:
- (a) Safety and Environmental Health Manual, COMDTINST M5100.47 (series).
 - (b) OSHA General Industry Standards, 29 CFR 1910.1000, Subpart Z, Toxic and Hazardous Substances.
 - (c) ACGIH, "Documentation of the Threshold Limit Values and Biological Exposure Indices," latest revision.
 - (d) NIOSH, "Pocket Guide to Chemical Hazards," latest revision.
 - (e) OSHA General Industry Standards, 29 CFR Part 1910.1025, Subpart Z, Lead Standard.
 - (f) Coatings and Color Manual, COMDTINST M10360.D.
 - (g) OSHA Compliance Directive (CPL) 2-2.58, Lead Exposure – Inspection and Compliance Procedures.
 - (h) OSHA Shipyard Industry Standards, 29 CFR Part 1915.1025, Subpart Z, Lead Standard.
 - (i) OSHA Shipyard Industry Standards, 29 CFR Part 1915.51-1915.57, Subpart D, Welding, Cutting and Heating.
 - (j) SOH and Major Hazard-Specific Programs, VOL. I – OPNAVINST 5100.19E.
 - (k) Environmental Protection Agency (EPA) Toxic Substance Control Act, 40 CFR Part 745.65.
 - (l) Ordnance Manual, COMDTINST M8000.2E.
 - (m) Navy and Marine Corps Public Health Center, Indoor Firing Ranges Industrial Hygiene, Technical Manual NEHC–TM6290.99-10 Rev.1, May 2002.
 - (n) Department of the Army and Air Force, NGR 385-15 - Evaluation and Maintenance of Indoor Firing Ranges, November 2006.

(o) National Shooting Sports Foundation, Inc, Facility Development Division. Lead Management & OSHA Compliance for Indoor Shooting Ranges, 2005.

(p) HUD Technical Guidelines for the Evaluation and Control of Lead-Based Paint (LBP) Hazards in Housing.

(q) Environmental Protection Agency (EPA) Lead-Based Paint (LBP) Poisoning Prevention in Certain Residential Structures, 40 CFR Part 745.

(r) Maintenance Assessment Guide for Coast Guard Housing, COMDTPUB P11101.21 (series).

(s) U. S. Coast Guard Real Property Management Manual, COMDTINST M11011.11 (series).

(t) Centers for Disease Control and Prevention, "Screening Young Children for Lead Poisoning: Guidance for State and Local Public Health Officials".

(u) Child Development Services Manual, COMDTINST M1754.15.

(v) Caring for Our Children: National Health and Safety Performance Standards; Guidelines for Early Care and Education Program.

(w) Safety and Health Regulations for Construction 29 CFR Part 1926.62, Subpart D, Occupational and Environmental Controls, Lead.

(x) Information and Life Cycle Management Manual, COMDTINST M5212.12 (series).

1. PURPOSE. To provide Coast Guard personnel with Coast Guard tactics, techniques, and procedures (CGTTP) on avoiding lead exposure hazards. It also provides unit assistant safety officer/manager's with guidance to develop implement and maintain a lead hazard management plan (LHMP) where lead exposure hazards have been identified.
2. ACTION. This CGTTP publication applies to all Coast Guard personnel. Internet release is authorized.
3. DIRECTIVES/TTP AFFECTED. None.
4. DISCUSSION. Lead Hazard Awareness and Management TTP identifies specific known sources of potential lead exposure. It describes the consequences of exposure and provides TTP for avoiding exposure. It also structures a unit LHMP that identifies and tracks static (i.e., in-place) sources of lead (e.g., paint and ballast ingots), and guides units to develop OSHA compliant procedures whenever a work process has the potential to generate a lead exposure hazard, and procedures in the TTP publication are not sufficient to keep workers safe.

5. DISCLAIMER. This guidance is not a substitute for applicable legal requirements, nor is itself a rule. It provides guidance for Coast Guard personnel and does not impose legally-binding requirements on any party outside the Coast Guard.
6. ENVIRONMENTAL ASPECT AND IMPACT CONSIDERATIONS. While developing this publication, Integrated Process Team (IPT) members examined environmental considerations under the National Environmental Policy Act (NEPA) and determined they are not applicable.
7. DISTRIBUTION. FORCECOM TTP Division posts an electronic version of this TTP publication to the CGTTP Library on CGPortal. In CGPortal, navigate to the CGTTP Library by selecting **References > Tactics, Techniques, and Procedures (TTP)**. FORCECOM TTP Division does not provide paper distribution of this publication.
8. RECORDS MANAGEMENT CONSIDERATIONS. Integrated Process Team (IPT) members thoroughly reviewed this publication during the TTP coordinated approval process and determined there are no further records scheduling requirements per Federal Records Act, 44 U.S.C. Chapter 31 § 3101 et seq., National Archives and Records Administration (NARA) requirements, and Information and Life Cycle Management Manual, COMDTINST M5212.12 (series). This publication does not have any significant or substantial change to existing records management requirements.
9. FORMS/REPORTS. None.
10. REQUEST FOR CHANGES. Submit recommendations for TTP improvements or corrections via email to FORCECOM-PI@uscg.mil or through the TTP Request form on CGPortal. In CGPortal, navigate to the TTP Request form by selecting **References > Tactics, Techniques, and Procedures (TTP) > TTP Request**.

Send lessons learned applicable to this TTP publication via command email to FORCECOM TTP Division at CMD-SMB-CG-FORCECOM.

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By Direction of Commander,
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Table of Contents

Table of Tables.....	i
Chapter 1: Introduction	1-1
Section A: Introduction	1-2
Section B: Roles and Responsibilities	1-3
Section C: Notes, Cautions, and Warnings.....	1-5
Chapter 2: Lead Exposure Hazards	2-1
Section A: General Information about Lead Hazards	2-2
Section B: Aviation.....	2-5
Section C: Afloat	2-8
Section D: Armories and Ranges	2-13
Section E: Industrial Production	2-16
Section F: Housing.....	2-20
Section G: Child Development Centers (CDCs).....	2-22
Section H: Construction (Not Housing or CDC)	2-24
Chapter 3: Lead Hazard Management Plan	3-1
Section A: Developing a Lead Hazard Management Plan	3-2
Appendix A: Glossary and Acronyms	A-1
Appendix B: SAFR Safety Checklist.....	B-1

Table of Tables

Table 2-1: SAFR and armory assessment types and frequencies	2-15
-------------------------------------------------------------------	------

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Chapter 1: Introduction

Introduction

This chapter introduces the topic of lead exposure in the Coast Guard. It describes the contents of this TTP publication, its intended audience, and defines roles and responsibilities with regard to the management of lead exposure risk. It also defines the use of notes, cautions, and warnings in TTP publications.

In This Chapter

This chapter contains the following sections:

Section	Title	Page
A	Introduction	1-2
B	Roles and Responsibilities	1-3
C	Notes, Cautions, and Warnings	1-5

Section A: Introduction

A.1. Background

Safety and environmental health personnel assessed lead exposure risk across the Coast Guard. In nearly every assessment the hazard controls implemented to reduce exposure risks were incomplete or insufficient. For example, indoor small arms firing ranges had inadequate airflow, lead content was not confirmed before removing lead coating, and safe work practices were not followed onboard cutters with lead ingot ballast. These observations reveal an unsettling trend—Coast Guard personnel lack overall lead hazard awareness.

The Health, Safety, and Work-Life Service Center’s Safety and Environmental Health Division [HSWL SC (se)] produced this publication to:

- Inform units of lead exposure hazards.
- Communicate established safe work practices for known exposure risks.
- Provide guidance on regulatory compliance.

A.2. Scope

This TTP publication provides guidance at two levels.

Broadly, it provides information to identify, and procedures to control, lead exposure risk in the workplace. Intended users are all Coast Guard personnel and employees with the potential for lead exposure.

Specifically, this publication guides the assistant safety officer/manager (ASO/M) to develop, implement, and maintain a lead hazard management plan (LHMP).

A.3. Using this Publication

When reading Chapter 2, read Section A first—it provides general information applicable to lead exposures in all operations. Read the section that applies to your operational domain second.

A.4. Policies and Regulations

Each section of Chapter 2 provides a list of applicable policies and regulations specific to the operational domain.

Section B: Roles and Responsibilities

**B.1.
Commanding
Officer/Officer
in Charge**

The Commanding Officer/Officer in Charge (CO/OIC) coordinates with HSWL SC (se) to develop and implement the unit LHMP. Typically this is the responsibility of the assistant safety officer/manager (ASO/M).

**B.1.a. Units with
Static Lead
Exposure Hazards**

Maintain an inventory of all static sources of potential lead exposure, such as lead-based paint (LBP) or ballast ingots, at the unit. Use the [Lead Inventory Inspection and Condition Assessment Worksheet](#), provided in Chapter 3: Lead Hazard Management Plan, or some other record of inventory that captures the same information.

Annually inspect the condition of all coatings containing lead and document findings.

Report damage to lead surface coatings, and damage to coatings suspected to contain lead that have not been tested previously to the command and HSWL SC (se).

Provide lead hazard awareness training to all personnel initially upon reporting to the unit and annually thereafter.

Notify outside contractors and personnel visiting the unit of lead hazards and their locations before permitting access.

Follow up with the contracting officer representative (COR) to obtain final documentation of abatement, including clearance sampling results, and document in unit inventory.

Prior to relief, conduct inventory of all lead coatings with new ASO/M.

**B.1.b. Units with
Operations that
Generate Lead
Exposure
Potential**

Contact HSWL SC (se) to assist in the development of an Occupational Safety and Health Administration (OSHA) compliant lead management program.

Maintain worker exposures below the OSHA permissible exposure limit (PEL).

Alternatively, the unit may arrange to have done by a licensed contractor certified to perform lead work.

B.1.c. Respiratory Protection Use the lead safe procedures in this TTP and engineering controls (e.g., local exhaust ventilation, downdraft table) to reduce concentrations of lead dust in air and on surfaces whenever feasible. If other control options fail, choose respiratory protection. Contact HSWL SC (se), or your local safety and environmental health officer (SEHO) for guidance.

If personnel at your unit use respirators, develop and implement a written respiratory protection program.

Find the TTP for creating a respiratory protection program here:
https://cgportal2.uscg.mil/communities/hp/HPCenter/Pubs/CGTTP_4-11_4_Respiratory_Protection_Program.pdf

B.2. Contractors Maintain communication with ASO/M regarding all lead abatement and cleaning activities.

Following the work activities, provide final documentation to COR and ASO/M including clearance sampling results.

B.3. HSWL SC (se) and SEHO

Works directly with the ASO/M to support units.

Maintains communication with ASO/M regarding all lead abatement/cleaning work activities.

Works with ASO/M on all reported damage to identified and suspected lead coatings.

Follows up with ASO/M and COR on final documentation including clearance sampling results following abatement or cleaning.

Assists the ASO/M in the development of the OSHA-compliant LHMP. See Section B.1.b above.

Conducts health risk assessments, sampling, and hazard awareness training as needed.

Section C: Notes, Cautions, and Warnings

C.1. Overview The following definitions apply to notes, cautions, and warnings found in TTP publications.

NOTE: **An emphasized statement, procedure, or technique.**

CAUTION: **A procedure, technique, or action that, if not followed, carries the risk of equipment damage.**

WARNING: *A procedure, technique, or action that, if not followed, carries the risk of personnel injury or death.*

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Chapter 2: Lead Exposure Hazards

Introduction This chapter discusses lead exposure hazards and how to avoid them.

NOTE: **Read Section A first, and then read the section that applies to your operational domain.**

NOTE: **This TTP publication contains the most up to date lead safe procedures at the time of publication. As standards and practices change, newer guidance is developed. If there is a discrepancy between this publication and other guidance [e.g., maintenance procedure cards (MPC) or HSWL Safe Work Practices (SWP)], use the most updated procedures that apply to your work environment.**

In This Chapter This chapter contains the following sections:

Section	Title	Page
A	General Information about Lead Hazards	2-2
B	Aviation	2-5
C	Afloat	2-8
D	Armories and Ranges	2-13
E	Industrial Production	2-16
F	Housing	2-20
G	Child Development Centers (CDCs)	2-22
H	Construction (Not Housing or CDC)	2-24

Section A: General Information about Lead Hazards

A.1. As an Element

Lead is a heavy, blue-gray colored elemental metal found naturally in the earth. Historically, lead was used as a gasoline additive and in the production of batteries, paints, ammunition, metal solder, and pipes. Once released into the environment, lead does not break down and tends to accumulate in soil and on surfaces.

A.1.a. Identifying Lead

In some cases, such as ingots, the presence of lead is obvious. In other cases, presence of lead is more likely in paint applied prior to 1981. In most cases, only laboratory testing can determine the presence or absence of lead.

A.2. In the Body

Lead can harm nearly every organ and system in the body. Lead exposure most often occurs through inhalation of lead fumes or dust, and ingestion of lead dust through hand-to-mouth contact. Once it enters the body, red blood cells distribute lead to the soft tissues and bones, where it may remain for years to decades. Over time, the bones slowly release and excrete lead.

A.2.a. Personal Hygiene

Good personal hygiene is the number one way to prevent lead ingestion and the transferring exposure of lead to areas.

Immediately following any activities where lead exposure is a concern, thoroughly wash your hands and forearms with warm water and soap. This is especially important before taking breaks and at the end of the work shift, where accidental ingestion may occur from eating, drinking, smoking, applying cosmetics, or generally touching the face with dirty hands—something that unconsciously happens many times over the course of the day.

Remove and launder any clothing potentially contaminated with lead as soon as possible. Take measures to prevent lead spreading from that clothing to other locations, especially where children are present.

A.3. Health Effects

Exposure to high levels of lead severely damages the brain and kidneys, and can result in death.

Exposure to low and moderate levels of lead over time can cause:

- Decreased nervous system performance.
- Weakness in fingers, wrists, or ankles.

- Increased blood pressure.
- Impaired blood formation and anemia.
- Reproductive system impairment including:
 - Reduced sex drive.
 - Deformed sperm.
 - Lowered fertility.
 - Miscarriage.

**A.4. Common
Exposure Routes
for CG
Personnel**

Common sources of lead exposure to Coast Guard personnel include:

- Paint removal and other disturbance of surfaces with coatings containing lead including:
 - Power sanding.
 - Sandblasting.
 - Needle-gunning.
 - Dry sweeping lead dust.
- Lead ingot ballast on Coast Guard cutters.
- Handling lead batteries.
- Small arms firing range activities including:
 - Training.
 - Shooting.
 - Weapons and range maintenance.
- Soldering.
- Industrial activities such as plumbing and pipe-fitting.
- Welding on galvanized steel or welding with consumables or on other surfaces containing lead.
 - Field activities at commercial facilities, including vessels and shipyards, while these operations are being performed.
- Many other possible exposure sources including:
 - Shooting and maintaining personal firearms.

- Using molten lead to cast ammunition, make fishing weights, or other purposes.
- Making stained glass with lead solder.
- Handling lead glazes for making pottery.
- Using some platinum printing and screen printing materials.
- Lead in drinking water.

A.5. Children Especially Vulnerable

Children are more vulnerable to lead poisoning than adults. Low levels of lead exposure can impair mental and physical growth, and cause learning and behavioral problems.

Exposure to higher levels of lead in children can cause anemia, kidney damage, colic (severe stomach ache), muscle weakness, and brain damage.

A.6. Common Exposure Routes for Children

Childhood lead exposure typically happens through:

- Hand-to-mouth contact of household dust or soil containing lead from deteriorated LBP applied before 1981.
 - Ingesting lead in drinking water.
 - Contact with “take-home lead” from parents’ clothing.
 - High lead levels in pregnant and lactating mothers.
-

A.7. Exposure Limits

Definitions for lead monitoring, action, and major finding levels for Coast Guard housing and CDCs are in reference (a), Safety and Environmental Health Manual, COMDTINST M5100.47 (series).

For all other operational domains, per reference (a), strive to maintain exposures below the lowest occupational exposure limit (OEL) in references:

- Reference (b), OSHA General Industry Standards, 29 CFR 1910.1000, Subpart Z, Toxic and Hazardous Substances.
 - Reference (c), ACGIH, “Documentation of the Threshold Limit Values and Biological Exposure Indices,” latest revision.
 - Reference (d), NIOSH, “Pocket Guide to Chemical Hazards,” latest revision.
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A.8. Waste Disposal

Place all wastes (i.e. disposable personal protective equipment (PPE), cleaning supplies) contaminated with lead dust in impermeable bags and seal them to prevent cross-contamination. Follow established guidance for hazardous lead waste disposal, or coordinate with the local CG Base or other environmental specialist to ensure proper disposal.

Section B: Aviation

B.1. Policy Overview

Reference (e), OSHA General Industry Standards, 29 CFR Part 1910.1025, Lead Standard, provides regulations for the aviation domain.

B.2. HC-144 Lead Ingots

Lead controls flight balancing in the HC-144A's elevator, aileron, and rudder. During periodic depot maintenance, employees check and adjust the balance as necessary. This may involve removal or installation of lead weights. Friction between the weights during aircraft movement creates lead dust. This dust can become airborne during disassembly of the aircraft part. In addition, machining (drilling) the lead to install or adjust a weight produces lead dust.

Lead weight installation and placement is inconsistent. Therefore, absence of lead weights in a particular location does not necessarily indicate a total absence of lead.

B.2.a. Hazard Management

Follow this procedure to manage the lead hazard.

1. Assemble supplies:
 - a. PPE: protective clothing (i.e., Tyvek suit with attached hood and booties), gloves, eye protection, hearing protection (if needed), respirator, and P100 respirator cartridges.
 - b. Tools.
 - c. Spray bottle.
 - d. Disposable wiping cloths.
 - e. HEPA-filtered vacuum.
 - f. Barriers.
 - g. Caution signs.
 - h. Lead waste disposal container such as a plastic bag, or a plastic lined container with a lid, labeled "lead waste".
2. Stage wet wipes, lead waste disposal container, and bench or chair immediately outside the lead dust hazard area.
3. Cordon off the work area and hang caution signs identifying the lead hazard.
4. Control access to the lead dust hazard areas during work. Post a watch if necessary.
5. Don all required PPE.

6. Perform aviation maintenance or repair tasks.
7. After the work is complete, thoroughly clean all surfaces within the work area including: aircraft part, tools, lead weight, floor, machine, engineering controls, and other horizontal surfaces containing visible dust and residue using a HEPA-filtered vacuum followed by wet wiping (spray bottle/wiping cloths). Continue cleaning until all surfaces are free of visible dust and residue.
8. Move to the clean up area staged in step 2 and remove PPE as follows:
 - a. Remove protective clothing using inside out method, rolling the suit off from the inside, and removing gloves last.
 - b. Remove respirator and eye protection.
 - c. Decontaminate reusable PPE using wet wipes.
 - d. Remove and dispose of gloves and wipes in lead waste disposal container.
 - e. Properly store respirator in clean bag in clean locker.
9. Shower and launder work clothes after work and prior to eating, drinking, chewing gum or using tobacco products.

B.3. C-130 Brake Assembly

Although the manufacturer may not identify lead as part of the brake assembly composition in the safety data sheet (SDS) there is lead in C-130 aircraft brake assembly parts. Lead exposure is possible when workers are handling these parts.

Measured levels of lead dust on the workbench surface indicated a significant amount of contamination that could pose a skin contact and ingestion hazard. Also a concern is metallic dust that can accumulate on the brakes after many touch-and-go maneuvers and short-field tactical landings where the brakes are used heavily.

Determine if exposure assessments are necessary. At this time, it is unknown if other airframes are affected.

B.3.a. Hazard Management

When removing the wheels, and when handling any C-130 brake assembly parts, wear PPE as recommended by Technical Order publications, and local safety and industrial hygiene professionals, or as indicated in Chapter 2, Section B.2. above.

Regardless of PPE, follow the decontamination procedures in Chapter 2, Section B.2.a.8.

Thoroughly wash hands and forearms with warm water and soap immediately after handling any C-130 brake assembly parts.

B.4. Lead-Based Paint (LBP)	Lead-based paint (LBP) may coat the surfaces (e.g., walls, ceilings) of aviation facilities. Include identified LBP in unit LHMP. If you suspect LBP, contact a SEHO for assistance.
B.4.a. Hazard Management	Do not disturb surfaces coated with LBP. If you are planning a project where disturbing the LBP is possible, see Chapter 2, Section H: Construction for further guidance.
B.5. Lead Soldering	Lead soldering of aircraft parts, such as central display circuit boards, is common. The solder commonly used is a tin/lead/silver alloy consisting of approximately 36% lead. Soldering creates lead fumes which are an inhalation hazard if not controlled.
B.5.a. Hazard Management	<ul style="list-style-type: none">• Limit access to the lead soldering work area to personnel trained to work and clean according to lead safe procedures.• Use high-efficiency particulate air (HEPA) filtered local exhaust ventilation.• Do not eat or drink inside the lead soldering work area, including the entire avionics shop.• Perform a full shop clean-up at the end of every shift when lead soldering has occurred.• Use only wet cleaning methods (e.g., mopping, wet rags, wipes).<ul style="list-style-type: none">➤ Do not use dry sweeping or other methods that would cause settled lead dust to become airborne.
B.6. Welding, other Hot Work, and Corrosion Control Application and Removal Operations (CarOps)	Welding, sanding, and grinding on aircraft parts is common. Personnel have not identified any lead exposure hazards to date at Coast Guard aviation facilities. However, welding, sanding, or grinding on a part of unknown substrate, or a painted part of unknown coating composition that contains lead can generate lead fume and dust, which is an inhalation hazard if not controlled.
B.6.a. Hazard Management	<ul style="list-style-type: none">• Use HEPA filtered local exhaust ventilation whenever possible.• Consult Aviation Logistics Center (ALC) safety, or local SEHO, if welding on a part of unknown substrate or a painted part of unknown coating composition.

Section C: Afloat

C.1. Policy Overview

Policies, regulations, and information regarding lead aboard Coast Guard cutters and boats are in the following references:

- Reference (e), OSHA General Industry Standards, 29 CFR Part 1910.1025, Subpart Z, Lead Standard.
- Reference (f), Coatings and Color Manual, COMDTINST M10360.D.
- Reference (g), OSHA Compliance Directive (CPL) 2-2.58, Lead Exposure – Inspection and Compliance Procedures.
- Reference (h), OSHA Shipyard Industry Standards, 29 CFR Part 1915.1025, Subpart Z, Lead Standard.
- Reference (i), OSHA Shipyard Industry Standards, 29 CFR Part 1915.51-1915.57, Subpart D, Welding, Cutting and Heating.
- Reference (j), SOH and Major Hazard-Specific Programs, VOL. I – OPNAVINST 5100.19E
- Reference (k), Environmental Protection Agency (EPA) Toxic Substance Control Act, 40 CFR Part 745.65.

C.2. General Hazard Management

Protect Coast Guard personnel from lead exposure through sound housekeeping and personal hygiene.

- Emphasize hand washing, and personal cleanliness.
- Provide and ensure that workers use washing facilities.
- Provide clean changing areas.
- Maintain surfaces as free as practical of accumulations of dust and paint chips.

C.3. Medical Surveillance

Previous personal air sampling data indicate employees were under the PEL. Strict adherence to the following procedures will mitigate exposure risk. There is no need to enroll afloat crew members in the CG medical surveillance program. Contact SEHO for further information.

C.4. Deteriorating Paint

Lead based paint (LBP) might be on many surfaces of all cutters constructed prior to 1981— particularly in the base coating. Lead paint can be on cutters constructed since 1981. Disturbing these coatings can generate paint chips and dust.

C.4.a. Hazard
Assessment

Intact LBP in good condition presents a minimal exposure risk.

If you suspect that your cutter has LBP, and it is in deteriorating condition, or you are planning a unit self-help project that could disturb the surface, contact your SEHO to arrange for a lead hazard assessment.

**C.5. Ballast
Ingots**

Some cutters use raw lead ingots as ballast. Friction between ballast ingots—caused by vessel movement and vibration—creates lead dust.

Ingots encapsulated in rubber or some other material to prevent exposed surfaces from rubbing and creating dust do not present an exposure hazard.

C.5.a. Hazard
Assessment

Cutters strive to maintain lead surface concentrations below 200 micrograms per square foot in work areas, and 40 micrograms per square foot in berthing, eating, and food preparation areas.

Independent Duty Health Service Technicians (IDHS) conduct lead wipe sampling according to maintenance procedure cards (MPC).

If wipe samples reveal surface lead concentrations above the aforementioned thresholds, clean space according to Compartment Lead Contamination Wash MPC.

NOTE:

MPCs for wipe sampling are in ongoing development by the Surface Forces Logistics Center (SFLC). If you have no MPC for IDHS wipe sampling yet, contact SFLC.

**C.6. Lead Safe
Work Practices**

These procedures prevent lead dust exposure to personnel and cross contamination of adjacent compartments.

Look for visible dust in the space. If dust is visible, follow Compartment Lead Contamination Wash MPC.

Do not perform any of the following actions in spaces with any lead exposure risk:

- Blowing compressed air.
- Cleaning with dry methods, such as sweeping.
- Vacuuming without a HEPA filter.
- Chipping, sanding, or grinding.
- Eating, drinking, chewing gum or tobacco, or smoking.

Classify actions in spaces with a known lead exposure hazard as NOT LIKELY to cause settled lead dust to become airborne, or LIKELY to cause settled lead dust to become airborne.

C.6.a. NOT
LIKELY

Certain activities in spaces with where there is no visible dust, and lead ingots are not disturbed are NOT LIKELY to cause settled dust to become airborne, and do not pose an inhalation exposure risk to personnel. However, activity in lead ingot compartments can cause cross-contamination of adjacent spaces and hand-to-mouth consumption of lead. Examples include:

- Typical underway maintenance.
- Bench-top work.
- Watch rounds, or similar activities.

C.6.b. LIKELY

Assume activities in spaces with visible dust that are LIKELY to re-suspend lead dust in the air generate airborne lead dust levels in excess of the OSHA action level. Examples include:

- Moving dusty objects.
- Disturbing or making contact with lead ingots.
- Damaging the surface of LBP.

C.6.c. “NOT
LIKELY”
Procedure

Follow these procedures for activities NOT LIKELY to cause settled lead dust to become airborne.

1. Assemble PPE: Boot covers or smooth rubber boots, and disposable gloves.
 2. Stage wet wipes, disposable swab, bucket, and garbage bags at the established decontamination area as close as possible to the compartment access, whenever feasible not in berthing, mess, other living spaces, or high traffic areas.
 3. Don PPE.
 4. Enter area and perform work/watch rounds.
 5. Exit compartment to decontamination area and remove PPE as follows;
 - a. Remove/dispose of boot covers, or use wet wipes to clean smooth rubber boots.
 - b. Remove/dispose of gloves.
 6. Use wet methods to thoroughly clean the decontamination area deck.
 7. Wash hands and face with clean running water.
 8. When full, seal trash bag at decontamination area and dispose of according to Section A.8.
-

C.6.d. "LIKELY"
Procedure

Follow these procedures for activities LIKELY to cause settled lead dust to become airborne.

1. Assemble PPE: half face respirator with HEPA cartridges, disposable protective clothing with hood (e.g., Tyvek), boot covers or smooth rubber boots, and disposable gloves.
2. Stage wet wipes, disposable swab, bucket, and garbage bags at the established decontamination area as close as possible to the compartment access, but not in berthing, mess, other living spaces, or high traffic areas.
3. Don PPE and perform respirator fit-check to ensure respirator seal is good.
4. Enter area and perform work activity.
 - a. If cleaning, use HEPA vacuum or wet methods only.
5. Exit compartment to decontamination area and remove PPE.
 - a. Remove and dispose of protective clothing in garbage bags.
 - b. Remove and dispose of boot covers in garbage bag, or use wipes to remove lead dust from rubber boots.
 - c. Remove respirator and eye protection, and decontaminate using wet wipes.
 - d. Ensure all contaminated wet wipes are in the garbage bag.
 - e. Remove and dispose of gloves in the garbage bag.
6. Use wet methods to thoroughly clean the decontamination area deck.
7. Wash hands and face with clean running water.
8. Seal trash bag containing contaminated disposable PPE and other cleaning/decontamination materials, and dispose of according to Chapter 2, Section A.8.

C.7. Hot Work

Welding, cutting, heating, riveting and burning aboard vessels involving lead containing materials can create dust and fume containing lead. This is an inhalation hazard and an ingestion hazard if not controlled.

C.7.a. Hazard
Management

For any hot work on known or suspected lead containing materials, contact SEHO to develop OSHA compliant procedures tailored to the specific work to be done.

Contact a SEHO to see if general mechanical ventilation is sufficient. If general mechanical ventilation is insufficient, use local exhaust ventilation as described below.

- Use freely moveable hoods.
- Place the hood as close as practical to the hot work.
- Remove fumes and smoke at the source.
- Discharge ventilation exhaust into the open air.
- Ensure replacement air is coming from a clean breathable source.

WARNING:

Provide everyone breathing in the space with the same level of protection. If the hot worker wears a respirator, everyone in the space wears a respirator.

WARNING:

Do not use compressed air for ventilation purposes, comfort cooling, blowing dust or dirt from clothing, or for cleaning the work area.

NOTE:

Additional controls and PPE might be required. Follow SEHO guidance.

Section D: Armories and Ranges

D.1. Policy Overview

Policies, regulations, and information regarding lead in armories and ranges are provided in the following references:

- Reference (l), Ordnance Manual, COMDTINST M8000.2E.
- Reference (m), Navy and Marine Corps Public Health Center, Indoor Firing Ranges Industrial Hygiene, Technical Manual NEHC–TM6290.99-10 Rev.1, May 2002.
- Reference (n), Department of the Army and Air Force, NGR 385-15 - Evaluation and Maintenance of Indoor Firing Ranges, November 2006.
- Reference (o), National Shooting Sports Foundation, Inc, Facility Development Division. Lead Management & OSHA Compliance for Indoor Shooting Ranges, 2005.

D.2. General Lead Exposure Hazard

The potential for lead exposure has long been established as a hazard at small arms firing ranges (SAFRs) and armories. Several different components of ammunition may contain lead, including the bullet and explosive primer. When firing a weapon, the lead can be vaporized and released into the air. Lead can also be released when the bullet strikes the backstop or other surfaces.

Lead dust is heavy and tends to settle out of the air quickly. Ventilation should transport the lead particles downrange, away from the shooter. Ensure during cleaning that lead dust is not re-suspended into the air.

If engineering controls are ineffective or if personnel do not follow safe work practices, personnel can be exposed to lead during small arms training and when performing weapons, range, and armory cleaning and maintenance activities.

Lead exposure in SAFRs is controlled by:

- Design
 - Maintenance
 - Assessment
-

D.2.a. Design Engineering controls reduce lead exposure in armories and SAFR facilities through design and construction.

When designing or modifying existing facilities, follow the latest Air Force Engineering Technical Letter (ETL) for Small Arms Range Design and Construction per reference (l), Ordnance Manual, COMDTINST M8000.2E, Section F8.

D.2.b. Maintenance Reference (l) also requires each CG SAFR to have standard operating procedures (SOP) that includes an outline of maintenance procedures.

Add unit specific information to the template provided below to develop SAFR maintenance SOP:

- http://www.uscg.mil/forcecom/ttp/downloads/LHAM_Range_Maintenance_SOP_Template.docx.

The procedures in the template reflect the minimum standard for lead safety at SAFRs. Follow these procedures unless an industrial hygienist, using sampling data, concludes that fewer protective measures are satisfactory.

When range maintenance activities are not covered by procedures in the SOP template, consult reference (m), Navy and Marine Corps Public Health Center, Indoor Firing Ranges Industrial Hygiene, Technical Manual NEHC-TM6290.99-10 Rev.1, May 2002, and industrial hygiene professionals (e.g., SEHO) to develop additional procedures, and include them in the SOP.

D.2.b.(1). Annual Cleaning Clean the range once annually using a certified lead contractor.

Use the scope of work template provided below when developing contracts for SAFR cleaning services. This template is provided to help ensure that contracts specify cleaning procedures according to established regulations, and that people are safe.

http://www.uscg.mil/forcecom/ttp/downloads/LHAM_Range_Annual_Cleaning_Scope_of_Work_Template.docx

D.2.c. Assessments Periodic assessments of armories and SAFRs can identify potential sources of lead exposure and appropriate controls. Only properly trained personnel or contractors perform these assessments. Contact your SEHO, HWSL SC (se), or a certified contractor, for assistance. See Table 2-1, on the following page, for assessment types and frequencies.

Use the checklist provided as [Appendix B: SAFR Safety Checklist](#) to conduct quarterly safety checks.

Maintain records of all assessments with unit LHMP.

Assessment Type	Condition	Minimum Frequency
Surface lead dust assessment of contact surfaces	New or modified housekeeping procedures	Initially, and at 3 months & 6 months
	Surface loading increases	Repeat step above
	Surface loading remains stable/declines	Every 12 months
Personal exposure monitoring (air sampling)	New or change to equipment, process, control, personnel, or task involving any lead in the workplace	Initially
	Personal exposure above OSHA Action Level	Every 6 months
	Personal exposure above OSHA PEL	Quarterly
Safety check	All SAFRs	Quarterly
Unit Self Assessment Tool (USAT) inspection	All CG units, including armories	Every 12 months
Ventilation assessment	Wherever ventilation is used to reduce employee exposure	Upon installation
		Every 3 months
		Within 5 days of any change in activities or controls that could change lead exposure

Table 2-1: SAFR and armory assessment types and frequencies

Section E: Industrial Production

E.1. Policies Reference (e), OSHA General Industry Standards, 29 CFR Part 1910.1025, Subpart Z, Lead Standard, provides regulations for industrial production facilities.

E.2. General Procedures All personnel associated with lead activities attend lead awareness training. For all lead work, use the following PPE in addition to PPE mandated for industrial work:

- Coveralls.
- Foot covers.
- Gloves.

NOTE:

Additional PPE, respiratory protection for example, is specific to the task and listed in the sections that follow.

At the end of each shift all employees:

1. Remove PPE in designated clean area.
2. Dispose of coveralls, boot covers and gloves in designated bins.
3. Shower, and wash hands and face prior to eating, drinking or smoking.

E.3. Lead Ingot Handling Personnel transport lead ingots from the bilge of vessels to pallets for ballast replacement and reconfiguration.

E.3.a. Hazard Management Follow this procedure to manage lead exposure hazards.

1. Secure ship's ventilation.
2. Seal hatches and quick acting water tight doors (QAWTD) and label them "Warning Lead Work—Authorized Personnel Only".
3. Don PPE listed in Section E.2. and P-100 air purifying respirator (APR).
4. Remove lead ingots using hull access.
5. Load ingots onto pallet.
6. Move pallet to holding area.
7. Shrink wrap pallet.
8. Perform lead dust clean-up procedures in Chapter 2, Section E.8.

**E.4. Sanding,
Grinding,
Needle-Gunning**

Personnel use tools to remove LBP from metal surfaces in preparation for structural maintenance and repairs.

E.4.a. Hazard
Management

Follow this procedure to manage lead exposure hazards.

1. Secure the ship's ventilation.
 2. Quarantine the space by covering all vents, hatches, QAWTD, and any other access to the space with plastic to prevent the spread of lead dust.
 3. Post signs that read, "Warning Lead Work—Authorized Personnel Only".
 4. Establish local ventilation with HEPA filter in the space.
 5. Don PPE listed in Section E.2. and:
 - a. Face shield.
 - b. P-100 APR. (Use full-face APR without a face shield.)
 6. Use HEPA filtered vacuum attachment with mechanical tools.
 7. Do the work.
 8. Perform lead dust clean-up procedures in Chapter 2, Section E.8.
-

**E.5. Abrasive
Blasting**

Personnel use high velocity abrasive blasting equipment to remove LBP.

E.5.a. Hazard
Management

Follow this procedure to manage lead exposure hazards.

1. Secure the ship's ventilation.
2. Quarantine the space by covering all vents, hatches, QAWTD, and any other access to the space with plastic to prevent the spread of lead dust.
 - a. Abrasive blasting can puncture weak or corroded metal, contaminating adjacent spaces. Include adjacent spaces in the quarantined area as necessary.
3. Post signs that read, "Warning Lead Work—Authorized Personnel Only"
4. Don PPE listed in Chapter 2, Section E.2. and:
 - a. Type CE air line respirator.
 - b. Coveralls (heavy cloth).
 - c. Leather or impermeable rubber gloves.
 - d. Hearing protection.
5. Use a dust collection unit with HEPA filter.

6. Do the work.
7. Perform blast media clean up according to the procedures in Chapter 2, Section E.7.

E.6. Hot Work

Personnel perform hot work, such as welding and plasma cutting on structural steel using a variety of techniques.

E.6.a. Hazard Management

Follow this procedure to manage lead exposure hazards.

1. Secure the ship's ventilation.
2. Quarantine the space by covering all vents, hatches, QAWTD, and any other access to the space with plastic to prevent the spread of lead dust.
3. Post signs that read, "Warning Lead Work—Authorized Personnel Only".
4. Establish local ventilation with HEPA filter in the space.
5. Post fire watch wearing the following PPE:
 - a. Disposable coveralls.
 - b. Hard hat.
 - c. Safety glasses.
 - d. Positive pressure airline respirator.
 - e. Safety boots.
6. Don PPE listed in Chapter 2, Section E.2. and:
 - a. Positive pressure airline respirator.
 - b. Welding shield.
7. Remove paint down to 6 inches on both sides of the weld or hot work.
 - a. If this work still needs to be done, follow procedures in Chapter 2, Section E.4.
8. Do the work.
9. Perform lead dust clean-up procedures in Chapter 2, Section E.8.

NOTE:

Use this maximum level of respiratory protection until personal sampling demonstrates employees are under the permissible exposure limit (PEL). When sampling results allow, substitute the airline respirator with a lower protection factor.

E.7. Blast Media Cleanup

Personnel use industrial vacuum equipment to remove used blast media.

E.7.a. Hazard Management

Follow this procedure to manage lead exposure hazards.

1. Maintain area quarantine during abrasive blasting.
 2. Don PPE listed in Chapter 2, Section E.2. and P-100 APR.
 3. Use a vacuum dust collection unit with HEPA filter.
 4. Perform lead dust clean-up procedures in Chapter 2, Section E.8.
-

E.8. Lead Dust Cleanup

Personnel clean lead dust contaminated surfaces.

E.8.a. Hazard Management

Follow this procedure to manage lead exposure hazards.

1. Maintain enclosure of space and signage established for previous operation.
 2. Assemble cleaning equipment:
 - a. Vacuum with HEPA filter.
 - b. Bucket of water.
 - c. Large quantity of cloth rags.
 - d. Trash bag labeled “HAZMAT” (6 mil, or double bagged).
 3. Don PPE listed in Section E.2. and P-100 APR.
 4. Working from the furthest point within the space backward toward the exit:
 - a. Vacuum the space using HEPA filter.
 - b. Dip one rag at a time into the water.
 - c. Clean surfaces.
 - (1) Do not reuse rags. Only dip clean rags into water once. Do not contaminate clean water with dirty rags.
 - d. Dispose of the single use wet rag into the trash bag.
-

Section F: Housing

F.1. Policy Overview

Policies, regulations, and information regarding lead in USCG housing are in the following references:

- Reference (a), Safety and Environmental Health Manual CIM 5100.47 (series).
- Reference (p), HUD Technical Guidelines for the Evaluation and Control of Lead-Based Paint (LBP) Hazards in Housing.
- Reference (q), Environmental Protection Agency (EPA) Lead-Based Paint (LBP) Poisoning Prevention in Certain Residential Structures, 40 CFR Part 745.
- Reference (r), Maintenance Assessment Guide for Coast Guard Housing, COMDTPUB P11101.21 (series).
- Reference (s), U. S. Coast Guard Real Property Management Manual, COMDTINST M11011.11 (series).
- Reference (t), Centers for Disease Control and Prevention, “Screening Young Children for Lead Poisoning: Guidance for State and Local Public Health Officials”.

Per reference (a), Safety and Environmental Health Manual CIM 5100.47A, Chapter 25, for all CG controlled housing:

- A certified lead inspector or risk assessor shall conduct inspections and sampling. For the analysis of lead samples, only laboratories accredited under EPA National Lead Laboratory Accreditation Programs (NLLAP) will be used. Only a certified lead risk assessor will interpret and make recommendations of sampling results.
- Licensed renovators or licensed firms performing renovations must use the new EPA-developed pamphlet titled “Renovate Right”.
- Coast Guard personnel are only allowed to conduct minor repair and maintenance activities. Contact SEHO to determine if this is appropriate.

See reference (a), for monitoring, action, and major finding levels.

F.2. Safeguard Children

When a major finding or action level lead exposure is reported in Coast Guard housing, urge parents to have their children tested per reference (a), Chapter 25. Contact SEHO for assistance.

**F.3. Potential
Lead Hazards**

There can be LBP in structures painted prior to 1981, and lead in dust. Soil and water are also vulnerable to lead contamination.

F.3.a. Hazard
Assessment

If you suspect LBP, or water or soil contamination, contact SEHO for a hazard assessment, and contact the local housing office.

F.3.b. Hazard
Management

With SEHO support, develop procedures for hazard management on a case by case basis.

Section G: Child Development Centers (CDCs)

G.1. Policy Overview

Policies, regulations, and information regarding lead in CDCs are provided in the following references:

- Reference (a), Safety and Environmental Health Manual CIM 5100.47A, Chapter 25.
- Reference (t), Centers for Disease Control and Prevention, “Screening Young Children for Lead Poisoning: Guidance for State and Local Public Health Officials”.
- Reference (u), Child Development Services Manual, COMDTINST M1754.15.
- Reference (v), Caring for Our Children: National Health and Safety Performance Standards; Guidelines for Early Care and Education Program.

Per reference (a), Safety and Environmental Health Manual CIM 5100.47A, only licensed contractors are authorized to remove lead from CDCs. CG personnel are NOT authorized.

G.2. Safeguard Children

For any CDC where a major or action level lead exposure is identified, urge parents to have their children tested per reference (a), Safety and Environmental Health Manual CIM 5100.47A, Chapter 25. Contact SEHO for assistance.

G.3. Surface Coatings (Paint)

Lead can exist in surface coatings applied prior to 1981.

G.3.a. Hazard Management

If you suspect LBP, have a licensed lead contractor sample and analyze paint. SEHO can help coordinate.

Remove, or make inaccessible to children, paint with lead levels of 0.06% and above, or equal to or greater than 1.0 milligram per square centimeter, regardless of the condition of the paint.

G.4. Toys

Lead can exist in some types of toys.

G.4.a. Hazard Management

Caregivers and teachers check the U.S. Consumer Product Safety Commission’s website for:

- Warnings of potential lead exposure to children.
 - Recalls of play equipment, toys, jewelry, and food contact products.
 - <http://www.cpsc.gov>
-

**G.5. Soil or
Ground Cover**

It is possible that there is lead in soil from previous surface coatings, demolition, and resurfacing.

If you suspect lead in the soil, or other ground covering surface, contact SEHO.

G.5.a. Hazard
Management

If the soil is contaminated with lead, then contact a contractor for abatement.

When installing a new surface at a CDC that children will contact—or grounds around and under surfaces, including dirt and grassy areas—use only playground padding, woodchips, sand, and dirt that are certified lead safe.

G.6. Water

Lead contamination in water can come from old pipes, a bad source, or bad filtration.

If you suspect lead in water, contact SEHO.

G.6.a. Hazard
Management

For lead-contaminated water, develop a hazard management plan with SEHO on a case-by-case basis.

Section H: Construction (Not Housing or CDC)

H.1. Policy Overview

Reference (w), OSHA Safety and Health Regulations for Construction 29 CFR Part 1926.62, Subpart D, Occupational and Environmental Controls, Lead provides regulations for construction.

H.2. Construction

The Coast Guard operates in and around many old structures where lead exposure is a risk due to the age of the structure, including historical unit buildings and lighthouses. Coast Guard personnel maintain many of these structures.

Construction work is defined as work for construction, alteration or repair. Examples of construction work include:

- Painting and decorating.
- Installation of products.
- Demolition or salvage of structures.
- Removal or encapsulation of materials.
- New construction, alteration, repair, or renovation of structures, substrates, or portions thereof.
- Transportation, disposal, storage, or containment of materials on the site or location at which construction activities are performed.
- Maintenance operations associated with the construction activities described in this paragraph.

H.3. Hazard Assessment

Before beginning any construction work, check the unit LHMP lead hazard inventory to see if the work area contains a lead hazard, then contact a SEHO to assess the scope of work.

Together determine if there is a potential lead exposure risk to an employee.

In many cases the SEHO can sample for lead. If the SEHO cannot provide sampling, then they can assist the unit in finding a licensed lead contractor to determine if the material in question contains lead, and to characterize the condition of the material.

H.3.a. Hazard Management

If a lead hazard is present, develop a LHMP or OSHA compliant safe work practices in coordination with SEHO.

To minimize exposure, perform the construction work only after removal of lead exposure hazard, or installation of controls (i.e., PPE and safe work practices).

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Chapter 3: Lead Hazard Management Plan

Introduction This chapter discusses the elements of the LHMP and how to develop one.

In This Chapter This chapter contains the following sections:

Section	Title	Page
A	Developing a Lead Hazard Management Plan	3-2

Section A: Developing a Lead Hazard Management Plan

A.1. Overview Identification of lead hazards in the workplace is the first step in controlling lead exposure. After identifying the hazard, the ASO/M develops, implements, and maintains a unit specific LHMP to help manage the lead hazard in a systematic and risk-prioritized manner.

The LHMP consists of lead training, and one or both of the following elements:

- Tracking static lead exposure hazards (e.g., LBP, lead ballast ingots).
- Developing OSHA compliant procedures for operations that generate lead exposure hazards (e.g., firing ranges, sanding, welding, servicing lead ingots) that are not already covered by procedures in this publication.

A.2. Training Ensure all employees and crew members are given lead hazards awareness training upon arrival to the unit and annually.

Include in the training:

- A description of adverse health effects associated with excessive lead exposure. Identify locations and conditions of all tracked lead hazards.
- Specific nature of the operations that could lead to lead exposure above the PEL, and any procedures for hazard management.
- Required PPE and how to use it.

Document all training.

Consult HSWL SC (se), or SEHO, for training guidance and resources.

A.3. Tracking Static Hazards

Units with static lead exposure hazards:

- Inventory static lead exposure hazards annually. Use the worksheet provided at the link below, or some other means of recording inventory that captures the same information.
 - http://www.uscg.mil/forcecom/ttp/downloads/LHAM_Lead_Inventory_Inspection_Condition_Assessment_Worksheet.docx
- Maintain records indefinitely per reference (x), Information and Life Cycle Management Manual, COMDTINST M5212.12 (series).
- Include the following items in the LHMP:

- Lead inventory.
- Copies of all lead sampling lab analysis reports.
- Scope of work, sample results, and clearance results after abatement projects.
- Any other supporting material.

A.3.a. Annual Re-Assessment

Visually re-inspect all static lead exposure hazards at the unit and complete a new inventory worksheet annually.

A.4. Developing OSHA Compliant Procedures

Units with operations that generate lead exposure hazards:

- List operations with the potential to generate lead hazard and follow the lead hazard management procedures in this TTP.
- Consult SEHO to develop a unit specific OSHA compliant LHMP.

NOTE:

After LHMP is in place, contact SEHO to develop further OSHA compliant procedures for any new operation with the potential to generate a lead exposure hazard.

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Appendix A: Glossary and Acronyms

ALC	Aviation Logistics Center.
APR	Air purifying respirator.
ASO/M	Assistant safety officer/manager.
CarOps	Corrosion control application and removal operations.
CDC	Child development center.
COR	Contracting officer representative.
EPA	Environmental Protection Agency.
FPM	Foot per minute.
HEPA	High efficiency particulate air.
HSWL SC (se)	The Health, Safety, and Work-Life Service Center's Safety and Environmental Health Division.
LBP	Lead-based paint.
LEV	Local exhaust ventilation.
LHMP	Lead hazard management plan.
NLLAP	National Lead Laboratory Accreditation Programs.
OEL	Occupational Exposure Limit.
OSHA	Occupational Safety and Health Administration.
PEL	Permissible exposure limit.

PPE	Personal protective equipment.
QAWTD	Quick acting water tight door.
SAFR	Small arms firing range.
SCP	Shipyards competent person.
SEHO	Safety and environmental health officer.
SOP	Standard operating procedure.
USAT	Unit Self Assessment Tool.

Appendix B: SAFR Safety Checklist

Overview

This checklist mirrors the requirements of the USAT checklist. Review it quarterly to check that all required elements are still in place.

- Occupational exposure assessments, including ventilation system, dust wipe sampling, and personal air sampling, are scheduled as needed based on visible dust levels, elevated blood lead levels, and changes to operations or cleaning procedures, or other factors.
- All weapons instructors, trainers, coaches, and students involved in handling weapons, ammunition, and shooting activities practice good personal hygiene to prevent cross-contamination of clean areas, ingestion of lead, or accidental lead exposure to others.
- Students and staff are briefed about activities and areas where their clothing or skin may become contaminated with lead.
- Firing range instructors, trainers, and coaches do not wear or carry work clothes to their home.
- All personnel are prohibited from consuming food, beverages, tobacco, gum, or applying cosmetics in firing range areas.
- Shooters are not allowed beyond the firing line in indoor ranges.
- There is adequate hand soap in all hands and hand-washing facilities. The hot and cold water is operating.
- There are adequate cleaning supplies, including wet wipes, disposable gloves, disposable suits, squeegees, and mops.
- Easily cleanable rubber mats with tapered edges are available for shooters during shooting exercises requiring kneeling or prone positions. Mats are in good condition (covers intact) and properly stored out of the way when not in use.
- Adequate disposable gloves are available for range users during brass recovery.
- There is a designated changing area with hand washing sink for instructors, trainers, and coaches to remove their potentially contaminated clothing before entering offices or other clean areas.

- There is a means available at the entrance(s) to the range to clean lead from shoes/boots prior to exiting the range (sticky walk-off mats, shoe covers, or wet wipes).
- Armory personnel, small arms instructors, and coaches performing duties at the range for at least 30 days/year are enrolled in OMSEP for lead and are up-to-date on required periodic exams.
- Hazard Communications program is up to date, including description of lead dust hazards, MSDS/SDS for ordinance stored, lead awareness training, controlling lead dust exposure, types of respirators required, and use of PPE.
- Firing range is properly constructed and meets building requirements necessary to ensure weapons training can be conducted in a safe manner. The unit has documentation of design specifications and any modifications.
- Lighting provides uniform illumination and is free of glare without shadows. Lighting behind the line does not interfere with shooter's view downrange. The lighting is intense enough to avoid enlargement of the eye pupil, which reduces visual acuity.
- Range lighting provides at least 75 foot candles of illumination and is positioned so there is no direct lighting on the firing line (baffled) and protected from misdirected shots.
- Indoor range has operable emergency lighting.
- There are signs on the exterior of the entrance to indicate "Range in use."
- Exterior lighting illuminates safe transit in and out of the facility.
- Lighting behind the bullet trap provides at least 30 foot candles of illumination for maintenance and cleaning.
- There is a functioning electrical interlock between the indoor firing range ventilation system and lighting system to prevent light activation if the ventilation system is inoperable, or there is an alarm that signals when the ventilation system is inoperable.
- There are functioning interlocks that require the supply and exhaust fans to run simultaneously.

- The indoor firing range exhaust system effectively removes contaminated air from the range. Air flows from the firing line toward the trap. Volumetric exhaust air flow is 3-7% greater than supplied air (the range is under negative air pressure, or air flows into the range, not out of it).
- Air flow is evenly distributed at the firing line. There is no turbulence that prevents lead and other contaminants from being carried back into the shooter's breathing zone.
- Air flow velocity for indoor ranges is at the preferred 75 FPM across the cross-section of the range, but not less than 50 FPM.
- The air downrange for indoor ranges is maintained at a minimum 30 FPM, with even distribution, and is exhausted at or behind the bullet stop.
- For indoor ranges, the supply system provides 100% outdoor air.
- Spot heaters at the firing line function and do not disrupt air flow.
- Open-fired gas fueled heaters installed in the supply air system of indoor ranges have functioning carbon monoxide detectors and alarms.
- For indoor ranges the exhaust system discharge is remotely located from the supply air intake.
- Lead dust filters are replaced per the established protocol.
- The lunch room and all break areas are being adequately cleaned.
- Personal items and extra clothing are not permitting in the firing range area.
- There are areas exterior to the range where range users can stow their personal gear.
- All generated lead waste and soil cleaning items are being properly disposed of as hazardous material.
- Perform annual comprehensive clean up within the workspaces where ordinance and weapons are serviced and at the firing range downrange, bullet trap, and exhaust system.

CGTTP 4-11.6
Lead Hazard Awareness and Management

- Work surfaces in the armory and firing range are cleaned using HEPA vacuuming or wet mopping methods, except those found not to contain lead hazards.
 - Proper respirators and PPE are consistently worn.
 - Tools, surfaces, and non-weapon equipment used inside the firing range are being decontaminated using HEPA vacuuming and wet wipe techniques.
 - Coast Guard personnel are prohibited from performing lead abatement projects.
 - Pregnant women are not permitted to attend live firing range training.
-

Afloat	2-9	as an element	2-2
Armories and ranges	2-14	children	2-4
Aviation	2-6	common exposure routes	2-2
Child Development Centers	2-23	common routes for children	2-4
Construction	2-25	exposure limits	2-4
Housing	2-21	health effects	2-2
Industrial production	2-17	in the body	2-2
Lead hazard management plan	3-1	waste disposal	2-4
developing OSHA compliant procedures...	3-3	Notes, cautions, and warnings	1-5
overview	3-2	Roles and responsibilities	
tracking static hazards	3-2	commanding officer/officer in charge	1-3
training	3-2	contractors	1-4
Lead hazards		HSWL SC and SEHO	1-4