LEAD AWARENESS TRAINING

ESAMS COURSE ID 322

INTRODUCTION

- Lead exposure has been recognized for decades as a serious health hazard.
- Lead is a heavy, soft, gray-blue metallic element found in the earth's crust.
- If you ingest lead, it can damage your nervous system, blood forming organs, kidneys, and reproductive system.
- In children, lead poisoning can lead to mental retardation and severe learning disabilities.
- Although we normally associate lead in the Navy with lead-based paint, we also come into contact with other sources of lead.
- Lead identification should be confirmed by certified sampling.
- The NAVOSH Lead Control Program has been developed to prevent lead poisoning and related injuries during the use, handling, removal, and melting of materials containing lead.

BACKGROUND

- Since ancient times, people have used the soft, "gray metal" lead to make pipes, jars and bright pottery glazes.
- Some experts believe explorers searching for the Northwest Passage suffered lead poisoning from the solder in food cans. The resulting mental disorder caused bad decisions and all in the expedition were lost.
- Lead has been shown through years of research to be toxic to the human body.
- Lead enters the body through inhalation or ingestion. It can cause anemia and can affect the kidneys, the nervous system, and the reproductive system. Lead may adversely affect the fetus of a lead exposed worker.
- The purpose of the Lead Program is to prevent lead intoxication and related illnesses during the use, handling, removal and melting of materials containing lead at Navy activities.
- The term "lead" as used in OPNAVINST 5100.23(Series) means metallic lead, all inorganic lead compounds and organic lead soaps.

All other organic lead compounds are excluded. Lead's abundance, low melting point, high molecular weight, high density, and malleability make it a useful structural material. When added to resins, grease or rubber, lead compounds act as antioxidants (any of a group of substances that inhibit deterioration of rubber, gasoline, soaps, etc.)

In children, lead poisoning can lead to mental retardation and severe learning disabilities. Lead has been shown through years of research to be toxic to the human body. Lead's abundance, low melting point, high molecular weight, high density, and malleability make it a useful structural material.

LEAD AWARENESS TRAINING

COMMON USES FOR LEAD

- Ballast
- Radiation shielding
- Paint filler and hardener
- Rubber antioxidant
- An acoustical insulation component
- Solder for electrical components and pipe joints
- High voltage cable shielding
- Small arms ammunition
- Batteries
- Roof flashing
- Weights

While not an absolute indicator, Red, Forest Green, Chrome Yellow, “School Bus Yellow” and “OSHA Yellow” paints typically contain lead components, such as Lead Oxides and Lead Chromates. Lead may also be found in some polyurethane and water based paints. Lead is also found in primers, such as “red lead”. Leaded paints have been banned as consumer products, but industrial use products containing lead may still be manufactured.

POTENTIAL EXPOSURE OPERATIONS

- Lead and babbitt melting and casting
- Spraying, sanding, grinding, burning and abrasive blasting of lead containing materials and paint
- Ballast handling
- Soldering with torches
- High voltage cable repair
- Abrasive blasting
- Lead acid battery reclaiming
- Machining lead
- Contaminated personal clothing
- Torch burning/cutting
- Spray painting
- Manual demolition or scraping of lead containing coatings or paint

Leaded paints have been banned as consumer products, but industrial use products containing lead may still be manufactured.

METHOD AND EFFECTS OF EXPOSURE

Lead can be absorbed into your body by inhalation and ingestion. For the most part, lead is not absorbed through the skin. Inhalation of airborne lead is primarily the source of occupational exposure. Ingestion is primarily from handling food, tobacco (any form) or make-up which has lead on them or on your hands. Once absorbed, lead:

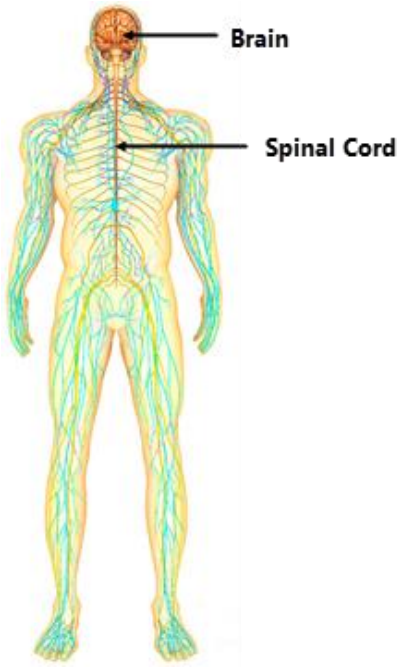
- Gets into the blood stream and circulates to all organs.
- Can be stored in various organs and body tissues.
- The higher the exposure the more is stored, especially if exposure is higher than the amount excreted.

LEAD AWARENESS TRAINING

Short Term (Acute) Overexposure can lead to acute encephalopathy. Seizures, coma and death from cardiorespiratory arrest may develop quickly. Short-term occupational exposures of this magnitude are highly unusual, but not impossible.

Long Term (Chronic) Overexposure may result in severe damage to your blood forming, nervous, urinary and reproductive systems. Common Symptoms:

- loss of appetite
- metallic taste in mouth
- anxiety
- constipation
- nausea
- pallor
- excessive tiredness
- weakness
- insomnia
- headaches
- nervous irritability
- muscle and joint pain
- fine tremors
- numbness
- dizziness
- hyperactivity
- colic (with severe abdominal pain)



Central and peripheral nervous system and brain involvement is the most severe forms of lead poisoning. “Wrist Drop” and “Foot Drop.” Kidney Disease is also associated with lead poisoning.

A house painter affected by chronic lead poisoning.
Wasted muscles and wrist drop are tell-tale symptoms of lead poisoning.

Chronic overexposure impairs the reproductive systems of both males and females.

Male symptoms are:

- decreased sex drive
- impotence
- sterility
- altered sperm cells increasing the risk of birth defects.

Female symptoms are:

- decreased fertility
- abnormal menstrual cycles

Lead can pass through the placenta and lead levels in the mother’s blood are comparable to concentrations of lead in the umbilical cord at birth. Decreased production of hemoglobin, the substance in blood that carries oxygen to the cells, therefore ultimately leading to anemia. It is extremely important to report any signs or symptoms of health problems. In recognition of the serious health hazards associated with and the numerous sources of potential lead exposure, the Navy has established strict controls to limit both occupational and environmental exposures.

LEAD AWARENESS TRAINING

Lead can be absorbed into your body by inhalation and ingestion. Chronic overexposure to lead may result in severe damage to your nervous system. Chronic overexposure to lead impairs the reproductive systems of both male and females.

EXPOSURE LIMITS

The Permissible Exposure Limit (PEL) for an 8 hour Time Weighted Average (TWA) exposure to airborne lead is 50 micrograms per cubic meter of air.

The Action Level (AL) for an 8 hour TWA exposure to airborne lead is 30 micrograms per cubic meter of air (without regard to respirator use). Exposure to airborne lead at or above the AL shall trigger the following requirements: Biological monitoring and medical surveillance shall be initiated when an employee's exposure exceeds the AL for more than 30 days per year.

When employee's exposure exceeds the PEL for more than 30 days per year, engineering and administrative controls shall be implemented to the extent feasible to reduce the exposure to below the PEL. Where such controls are not feasible they shall be used to lower the exposure to the maximum extent possible and shall be supplemented with respiratory protection. Where an employee is exposed to lead above the PEL for 30 days or less per year, engineering controls shall be used to reduce exposures at least to 200 micrograms (µg) per cubic meter of air, but thereafter, any combination of engineering work practice, and respiratory protection controls may be used to reduce employee exposure to or below 50 µg/m3.

Biological monitoring and medical surveillance shall be initiated when an employee's exposure exceeds the AL for more than 30 days per year.

CONTROLLING LEAD IN THE WORKPLACE

Design of a safe workplace (use in this order):

- Substitution with less hazardous materials
- Engineering controls - closed systems, thermostats
- Administrative controls - job rotation work time limits
- Use of personal protective equipment (PPE)

General workplace controls:

- Reduce lead level in paints used and coatings
- Heating of lead minimized through thermostatically controlled heating or the removal of lead containing surface coatings or contaminants prior to heating.
- Work surfaces should be free of lead dust as practical.
- Lead dust shall be cleaned up with high efficiency particulate air (HEPA) filtered vacuum cleaners.
- Wet sweeping and brushing may be used only when vacuuming or other equally effective methods have tried and found not to be effective.
- Lead containing waste, debris, containers, equipment, and clothing consigned for disposal, which may generate airborne lead concentrations in excess of the PEL or produce water pollution shall be collected, sealed, and labeled impermeable containers.
- To minimize exposure potential, hot work on lead and abrasive lead removal operations shall be located away from other operations.

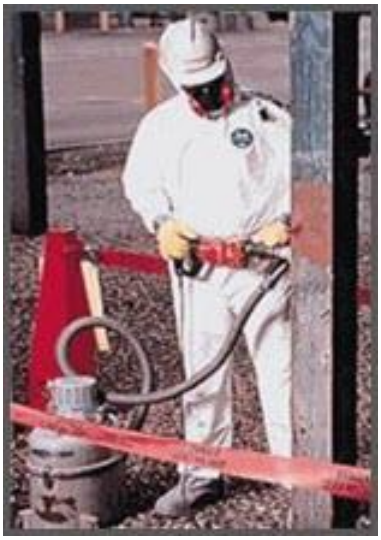
LEAD AWARENESS TRAINING

Local exhaust ventilation is frequently required to ensure atmospheric levels of lead particulate do not exceed PEL.

The first step toward minimizing lead exposure in the workplace is to substitute lead containing materials with less hazardous materials. Lead dust shall be cleaned up with high efficiency particulate air (HEPA) filtered vacuum cleaners. Local exhaust ventilation is frequently required to ensure atmospheric levels of lead particulate do not exceed the PEL.

PERSONAL PROTECTIVE CLOTHING

Personnel engaged in the handling of lead ballast, or in situations where the concentration of airborne lead particulates is likely to exceed the PEL or where the possibility of skin or eye irritation exists, shall remove clothing worn to and from work. They shall wear the protective clothing provided by the Navy (i.e. coveralls). The clothing shall be waterproof when wet lead is handled.



1. Protective clothing includes: full body, one piece reusable coveralls supplied and laundered by the Navy or a contractor. Also disposable coveralls constructed of Tyvek® or equivalent material may be used. All protective garment openings must be closed. Wrists and ankles should be taped.
2. Durable gloves and head coverings shall be used. Hoods shall extend beyond the collar of the coveralls completely protecting the neck.
3. Slip resistant shoe covers or lightweight rubber boots shall be provided. Disposable shoe covers may also be used.
4. Face shields, vented goggles, or other appropriate personal protective equipment (PPE) shall be provided and used whenever the possibility of eye irritation exists.
5. Clean protective clothing shall be provided daily when the 8-hour TWA airborne concentration exceeds 200 µg/m3.
6. Change rooms shall be provided as close as practical to the lead work area(s) for employees who work where airborne lead exposure is above the PEL.
7. Employees exposed to airborne lead concentrations above the PEL shall shower at the end of the work shift.
    a. Shower facilities shall be located between the clean and dirty change rooms.
    b. Change rooms shall have two separate clothing lockers for each employee to prevent contamination of street clothes and ensure that employees do not leave wearing work clothes.
    c. Supervisors shall ensure that employees shower at the end of their work shift.
8. Laundering of lead contaminated clothing shall be done to prevent release of lead dust in excess of the AL.
9. Contracts governing laundering of lead contaminated clothing shall specifically require that contractors comply with the precautions in 29 CFR 1910.1025
10. Lead contaminated clothing shall be transported to sealed containers. Containers should be labeled with standard “Caution Labels”.
11. Persons who clean or launder protective clothing or equipment shall be notified in writing of the potential harmful effects of exposure to lead.

LEAD AWARENESS TRAINING

WARNING SIGNS & CAUTION LABELS

Warning signs shall be provided and displayed at each location where airborne lead concentrations may be exceeding the PEL.

Signs shall be posted so personnel may read the signs and take necessary precautions before entering the area.

Signs shall state as a minimum the following:

Signs shall be posted so personnel may read the signs and take necessary precautions before entering the area.

HOUSEKEEPING, LUNCH ROOMS, & PERSONAL HYGIENE

Housekeeping:

Where lead containing materials are routinely melted, ground, or cut, all surfaces shall be maintained as free as practical of lead accumulation. Surfaces shall be cleaned at least once per shift to prevent accumulation of lead dust or more frequently, if necessary.

Cleaning methods shall include vacuuming material with HEPA filtered vacuums or washing down, where feasible, observing water pollution regulations as they pertain to lead contaminated wastewater. Wet sweeping, shoveling, or brushing shall be used
when other methods have been tried and found to be ineffective.

Compressed air shall not be used to clean work surfaces or floors.

When wash down procedures are used to clean surfaces or wetting is used to control dust, floor surfaces shall be treated with a non-skid agent and the floor drained.

The water from the drain should go to a holding tank for disposal.

Lunch Rooms and Personal Hygiene

- Lunchroom facilities shall be provided for employees who work in areas where their airborne lead exposure is above the PEL.
- Facilities shall have a positive pressure, filtered air supply and be readily accessible
  when adjacent to the lead work areas.
- Protective clothing and equipment shall be removed before entering the lunchroom.
- Eating, drinking, chewing or smoking tobacco products, the application of makeup,
  and the storage of food and tobacco products in lead work areas is prohibited.
- Clothing worn during lead work shall not be cleaned by compressed air or by shaking.

LEAD AWARENESS TRAINING

- Lead workers shall wash their hands and face prior to eating, drinking, smoking, or applying cosmetics.

Compressed air **shall not** be used to clean work surfaces or floors.
Eating, drinking, chewing or smoking tobacco products, the application of makeup, and the storage of food and tobacco products in lead work areas is prohibited.

WASTE DISPOSAL AND TRAINING

- Activities shall dispose of lead containing materials per applicable Federal, State and local environmental requirements.
- Lead waste requires bagging in heavy-duty plastic bags or other impermeable containers, which must be provided with caution labels.
- Lead waste containers such as bags, trashcans, dumpsters, etc., shall be labeled "LEAD WASTE ONLY".
- Care shall be exercised to prevent bags and other containers from rupturing.
- Waste shall be disposed of in an approved landfill.

Activities shall dispose of lead containing materials per applicable Federal, State and local environmental requirements.
All Navy personnel who work in areas where the potential exists for lead exposure shall receive initial training prior to or at time of assignment and at least annually thereafter.

GROUP DISCUSSION

Please share examples of situations that you have worked in or around where lead was immediately identified and or later confirmed. How were you able to identify it and what was done about the lead containing material?

KNOWLEDGE CHECK

1. Which of the following are possible symptoms of lead exposure in males?
2. Can lead containing materials be thrown into the trash?
3. What are the most common methods of exposure into the body?

Answers: 1. Low sex drive, impotence, birth defect, sterility; 2. No, follow environmental requirements; 3. Inhalation and ingestion