

SECTION 27

LEAD SAFETY AWARENESS

1. PURPOSE AND SCOPE

- 1.1. This safety guideline is intended to provide suitable information to all MAPP employees regarding the potential effects of Lead and where lead may be found so that adequate measures can be taken to limit exposures through controls in the workplace.

2. GENERAL

- 2.1. The objective of this guideline is to prevent absorption of harmful quantities of lead. The guideline is intended to protect employees from the immediate toxic effects of lead and from the serious toxic effects that may not become apparent until years of exposure have passed.

3. CHARACTERISTICS & WHERE IT CAN BE FOUND

- 3.1. To understand why lead is so hazardous, it is important to know what it is, the hazardous effects on people, and which materials do or may contain lead. Once this is understood, employees will gain a respect for the safety guidelines set forth in this policy.
 - I. **What Is It?** Pure lead (Pb) is a heavy metal and is a basic chemical element. It can combine with various other substances to form numerous lead compounds.
 - II. **Where Can It Be Found?** Lead can be found in:
 - Old glossy paints used on walls and pipe.
 - Building and roof metal support frames.
- 3.2. Report to the MAPP Superintendent and/or client project manager anytime you suspect lead-containing materials that may not have been disclosed:
 - I. Cracked or peeling paint,
 - II. Visible paint dust, grindings, or shavings.

4. HEALTH EFFECTS:

- 4.1. **Ways in which lead enters your body.** Lead can be absorbed into your body by inhalation (breathing) and ingestion (eating). When lead is scattered in the air it can be inhaled and absorbed through your lungs and upper respiratory tract. Inhalation of airborne lead is generally the most important source of occupational lead absorption. You can also absorb lead through your digestive system if lead gets into your mouth and is swallowed.
 - I. Hazards encountered with lead occur when:
 - Inhaling lead as a dust, fume or mist. Or ingesting lead through food, cigarettes, and chewing tobacco when handled with contaminated hands.
 - II. Lead (except for certain organic lead compounds not covered by the standard, such as tetraethyl lead) is not absorbed through your skin. When lead is scattered in the air as a dust, fume or mist it can be inhaled and absorbed through your lungs and

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upper respiratory tract. Inhalation of airborne lead is generally the most important source of occupational lead absorption. You can also absorb lead through your digestive system if lead gets into your mouth and is swallowed. If you handle food, cigarettes, chewing tobacco, or make-up, which have lead on them or handle them with hands contaminated with lead, this will contribute to ingestion.

- III. A significant portion of the lead that you inhale or ingest gets into your blood stream. Once in your blood system, lead is circulated throughout your body and stored in various organs and body tissues. Some of this lead is quickly filtered out of your body and excreted, but some remains in the blood and other tissues. As exposure to lead continues, the amount stored in your body will increase if you are absorbing more lead than your body is excreting. Even though you may not be aware of any immediate symptoms of disease, this lead stored in your tissues can be slowly causing irreversible damage, first to individual cells, then to your organs and whole body systems.

4.2. Effects of overexposure to lead –

I. Short-term (acute) overexposure.

- Lead is a potent, systemic poison that serves no known useful function once absorbed by your body. Taken in large enough doses, lead can kill you in a matter of days. A condition affecting the brain called acute encephalopathy may arise which develops quickly to seizures, coma, and death from cardiorespiratory arrest. A short-term dose of lead can lead to acute encephalopathy. Short-term occupational exposures of this magnitude are highly unusual, but not impossible. Similar forms of encephalopathy may, however, arise from extended, chronic exposure to lower doses of lead. There is no sharp dividing line between rapidly developing acute effects of lead and chronic effects, which take longer to acquire. Lead adversely affects numerous body systems and causes forms of health impairment and disease which arise after periods of exposure as short as days or as long as several years.

II. Long-term (chronic) overexposure.

- Chronic overexposure to lead may result in severe damage to your blood-forming, nervous, urinary and reproductive systems. Some common symptoms of chronic overexposure include loss of appetite, metallic taste in the mouth, anxiety, constipation, nausea, pallor, excessive tiredness, weakness, insomnia, headache, nervous irritability, muscle and joint pain or soreness, fine tremors, numbness, dizziness, hyperactivity and colic. In lead colic there may be severe abdominal pain.
- Damage to the central nervous system in general and the brain (encephalopathy) in particular is one of the most severe forms of lead poisoning. The most severe, often fatal, form of encephalopathy may be preceded by vomiting, a feeling of dullness progressing to drowsiness and

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stupor, poor memory, restlessness, irritability, tremor, and convulsions. It may arise suddenly with the onset of seizures, followed by coma, and death. There is a tendency for muscular weakness to develop at the same time. This weakness may progress to paralysis often observed as a characteristic "wrist drop" or "foot drop" and is a manifestation of a disease to the nervous system called peripheral neuropathy.

- Chronic overexposure to lead also results in kidney disease with few, if any, symptoms appearing until extensive and most likely permanent kidney damage has occurred. Routine laboratory tests reveal the presence of this kidney disease only after about two-thirds of kidney function is lost. When overt symptoms of urinary dysfunction arise, it is often too late to correct or prevent worsening conditions, and progression to kidney dialysis or death is possible.
- Chronic overexposure to lead impairs the reproductive systems of both men and women. Overexposure to lead may result in decreased sex drive, impotence and sterility in men. Lead can alter the structure of sperm cells raising the risk of birth defects. There is evidence of miscarriage and stillbirth in women whose husbands were exposed to lead or who were exposed to lead themselves. Lead exposure also may result in decreased fertility and abnormal menstrual cycles in women. The course of pregnancy may be adversely affected by exposure to lead since lead crosses the placental barrier and poses risks to developing fetuses. Children born of parents either one of whom were exposed to excess lead levels are more likely to have birth defects, mental retardation, or behavioral disorders or to die during the first year of childhood.
- Overexposure to lead also disrupts the blood-forming system resulting in decreased hemoglobin (the substance in the blood that carries oxygen to the cells) and ultimately anemia. Anemia is characterized by weakness, pallor and fatigue as a result of decreased oxygen-carrying capacity in the blood.

5. PROCEDURES:

- 5.1. Permissible Exposure Limit (PEL) - The current OSHA lead standard is 50 µg/m³ as an 8-hour Time Weighted Average (TWA). The standard as it applies to construction is unique in that it groups tasks **presumed** to create employee exposures above the PEL of 50 µg/m³ as an 8-hour TWA, as follows:

SAMPLE CONSTRUCTION TASKS AND THEIR 8-HOUR TWA EXPOSURE LEVELS

| > 50 to 500 µg/m ³ | > 500 µg/m ³ to 2,500 µg/m ³ | > 2,500 µg/m ³ |
|-------------------------------|--|---------------------------|
| Manual demolition | Using lead-containing mortar | Abrasive blasting |

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| Dry manual scraping | Lead burning | Welding |
| Dry manual sanding | Rivet busting | Torch cutting |
| Heat gun use | Power tool cleaning without dust detection systems | Torch burning |
| Power tool cleaning with dust collection systems | Cleanup of dry expendable abrasive blasting jobs | |
| Spray painting with lead paint | Abrasive blasting enclosure movement and removal | |

- 5.2. Action Level - The standard also establishes an action level of 30 micrograms per cubic meter of air (30 µg/m³), time-weighted average, based on an 8-hour workday. The action level requires the client to initiate several requirements of the standard, such as exposure air monitoring, medical surveillance, and training and education.
- 5.3. Evaluation Process - The client will provide MAPP employees with results of any evaluation processes and a listing of lead containing material. The Contracting Company will provide all precautions and render the area safe for MAPP employees or its subcontractors before work begins. Any area that test above the action level during initial monitoring shall be tested every sixth months at minimum until two consecutive tests are below the action level.
- 5.4. Medical Surveillance – If it is found that MAPP employees have been exposed to lead levels above the OSHA PEL, they will be placed into a medical surveillance program. The medical surveillance program is part of the OSHA standard's comprehensive approach to the prevention of lead-related disease. Its purpose is to supplement the main thrust of the standard, which is aimed at minimizing airborne concentrations of lead and sources of ingestion. Only medical surveillance can determine if the other provisions of the standard have effectively protected you as an individual. Compliance with the standard's provisions will protect most workers from the adverse effects of lead exposure, but may not be satisfactory to protect individual workers:
- Who have high body burdens of lead acquired over past years,
 - Who have additional uncontrolled sources of non-occupational lead exposure,
 - Who exhibit unusual variations in lead absorption rates, or
 - Who have specific non-work related medical conditions that could be aggravated by lead exposure (e.g., renal disease, anemia).
- 5.5. In addition, control systems may fail, or hygiene and respirator programs may be inadequate. Periodic medical surveillance of individual workers will help detect those failures. Medical surveillance will also be important to protect your reproductive ability

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regardless of whether you are a man or woman. The blood sampling & monitoring should be conducted every 6 months until two consecutive blood samples & analysis are acceptable. The sampling & monitoring should be performed at least monthly during the removal period. Any employee with elevated blood levels should be temporarily removed. Employees should be notified in writing within five days when lead levels are not acceptable. The standard requires temporary medical removal with Medical Removal Protection benefits.

- 5.6. The employer must, within 15 working days after the receipt of the results of any monitoring performed under this section, notify each affected employee of these results either individually in writing or by posting the results in an appropriate location that is accessible to affected employees. Whenever the results indicate that the representative employee exposure, without regard to respirators, exceeds the permissible exposure limit, the employer shall include in the written notice a statement that the permissible exposure limit was exceeded and a description of the corrective action taken or to be taken to reduce exposure to or below the permissible exposure limit.

6. SAFETY MEASURES:

- 6.1. **MAPP employees are not permitted to work in areas where there may be a potential for Lead exposure.** If it is necessary to perform any work where the exposure to Lead is about the OSHA acceptable limits, then MAPP must implement a comprehensive mandated safety policy and procedure that includes special elements of exposure monitoring, formal medical program, special personal protective equipment, and much more. The respirator shall be used during the time period necessary to install or implement engineering or work practice controls, where engineering and work practice controls are insufficient and in emergencies.
- 6.2. If MAPP employees or subcontractors are required to work immediately adjacent to a lead abatement activity are exposed to lead due to the inadequate containment of such job, their MAPP and subcontractors shall either remove the employees from the area until the enclosure breach is repaired or perform an initial exposure assessment.
- 6.3. Employees must abide by any signs/labels/assessment reports indicating the presence of lead containing materials. Appropriate work practices should be followed to ensure the lead containing materials are not disturbed.
- 6.4. Employees' hands and faces should be washed if lead containing materials are contacted.

7. WORK PRACTICE CONTROLS

- 7.1. Below are listed possible work controls and practices that can be taken by the client:
 - I. **WELDING, BURNING, AND TORCH CUTTING.** Welding and cutting activities that potentially involve exposure to lead can occur as part of a number of construction projects such as highway/railroad bridge rehabilitation (including elevated mass-transit lines), demolition, and indoor and outdoor industrial facility maintenance

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and renovation. Lead exposures are generated when a piece of lead-based painted steel is heated to its melting point either by an oxyacetylene torch or an arc welder. In this situation, lead becomes airborne as a volatilized component of the coating.

- Engineering Controls. The engineering controls that can be used, depending on feasibility, are:
 1. Local exhaust ventilation (LEV) that has a flanged hood and is equipped with HEPA filtration may be appropriate where the use of LEV does not create safety hazards. Use of a flexible duct system requires that the welder be instructed to keep the duct close to the emission source and to ensure the duct is not twisted or bent.
 2. A fume-extractor gun that removes fumes from the point of generation is an alternative to an exhaust hood for gas-shielded arc-welding processes. Such extraction systems can reduce breathing zone concentrations by 70% or more. These systems require that the gun and shielding gas flow rates be carefully balanced to maintain weld quality and still provide good exhaust flow.
 3. A longer cutting torch can be used in some situations to increase the distance from the lead source to the worker's breathing zone.
 4. Hydraulic shears can sometimes be used to mechanically cut steel that is coated with lead based-paint. The use of this method is limited by the ability of the shears to reach the cutting area.
 5. Whenever possible, pneumatic air tools should be used to remove rivets in lieu of burning and torch cutting.
- Work Practice Controls. The following work practice controls will help to reduce worker exposures to lead during welding, burning, and torch cutting:
 1. Strip back all lead-based paint for a distance of at least 4 inches in all directions from the area of heat application. Chemical stripping, vacuum-shrouded hand tools, vacuum blasting, or other suitable method may be used. However, in enclosed spaces, strip back or protect the workers with air-line respirators.
 2. Ensure that workers avoid the smoke plume by standing to the side or upwind of the cutting torch whenever the configuration of the job permits.
 3. Prohibit burning to remove lead-based paint. Paint should be removed using other methods, such as chemical stripping, power tools (e.g. needle guns) with vacuum attachments, etc.
 4. PPE Shall be provided to employees at no additional cost. Gloves, hats, vented goggles, shoes or disposable shoe covers shall be provided. Protective clothing shall be in clean & dry condition at least weekly. Protective clothing

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shall be cleaned, laundered, properly disposed and repaired or replaced as necessary.

- II. **MANUAL SCRAPING AND SANDING OF LEAD-BASED PAINTS.** Hand scraping of lead-based paints involves the use of a hand-held scraping tool to remove paint from coated surfaces. The health hazards in this activity are caused by the lead dust and paint chips produced in the scraping process. Hand sanding can also produce excessive dust. These activities are typically performed during residential and commercial/institutional lead abatement projects.
 - Engineering and Work Practice Controls. Controls that employers can implement to protect workers performing scraping and sanding of lead-based paints are:
 1. Use of wet-sanding and wet-scraping methods in conjunction with HEPA vacuuming or HEPA mechanical ventilation. Wet methods include misting of peeling paint with water before scraping, and sanding and misting of debris prior to sweeping or vacuuming.
 2. Use of shrouded power tools with HEPA vacuum attachments. The shroud must be kept flush with the surface.
 3. Use of techniques with known low exposure potential, such as encapsulation and removal or replacement instead of hand scraping and hand sanding.

8. REGULATED AREAS:

- 8.1. The contracting client will ensure a work plan is designed and implemented that will:
 - Eliminate lead dust or fumes from exposing both work personnel and building occupants.
 - Ensure that unauthorized persons cannot access the area.
 - Use of signage - warning signs shall be provided and displayed at each regulated area, and is posted at all approaches to regulated areas.
 - Ensure that sanitation, lunch, hygiene, and shower facilities are available when areas test above the action levels.

9. TRAINING:

- 9.1. All potentially exposed employees will be provided awareness training upon hire and annually thereafter of this program in order to be familiar with the potential hazards and proper safe work procedures to follow if exposed to this health hazard. Training and information will be provided for all employees exposed to lead at or above the action level, or who may suffer skin or eye irritation from lead. The training will inform exposed employees of:
 - Specific hazards associated with their work environment,
 - Protective measures which can be taken,
 - Danger of lead to their bodies (including their reproductive systems), and
 - Their rights under the standard.
- 9.2. Lead awareness training shall be documented including dates of training, employee name, and trainer name.

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