



UNIVERSITY OF TORONTO

Lead Management Program for Building Maintenance and Construction Projects

**Environmental Health and Safety
University of Toronto**

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1 INTRODUCTION

Lead is a heavy metal that has been and continues to be widely used in industry for many years. Lead comes in different forms including its elemental state or combined chemically with other elements to form lead compounds. Inorganic lead compounds are commonly used in pigments, paints, glasses, plastics and rubber compounds. Lead is also a component in many metal alloys. Health effects from overexposure to lead have been well-documented. Lead overexposure may result in damage to the blood-producing system, kidneys, gastrointestinal system, nervous system, and reproductive system. Therefore, adherence to protective measures is important for the protection of workers.

Lead was a component/additive to interior and exterior paints for many years. Over time, government and industry associations have reduced the level of lead in paint. Currently, the Surface Coating Materials Regulation (SOR/2016-193) limits the amount of lead in surface coatings to less than 90 mg/kg (0.009%), with the exception of specialty products: e.g., anti-corrosive or anti-weathering coatings on the interior or exterior surface of building/equipment that have an agricultural purpose, anti-corrosive or anti-weather coating on a structures other than buildings that have an agriculture or public purpose, touch-up coatings on metal surfaces, outdoor graphic art including billboards and coatings used for an art, craft or hobby that are not used by children.

Lead is also a Designated Substance under O. Reg. 490/09 of the Ontario Occupational Health and Safety Act. Health effects from overexposure to lead have been widely documented. Lead overexposure may result in damage to the blood-producing systems, kidneys, gastrointestinal system, nervous system, and reproductive system. Therefore, adherence to protective measures is important for the protection of workers. The University of Toronto Lead Management Program for Building Maintenance and Construction outlines the roles and responsibilities of managers, supervisors and workers and defines the protective measures to be taken during different types of work.

Objectives

The objectives of the Lead Management Program for Building Maintenance and New Construction (“Lead Management Program”) are:

- 1) To protect the University community from the potential health risks associated with exposure to lead during building maintenance or construction activities;
- 2) To provide a safe and healthy work and study environment for employees, students, contractors and visitors, in accordance with the University’s Health and Safety Policy; and
- 3) To comply with the general duty clauses (Sections 23, 25(2)(h) and 27) under the Occupational Health and Safety (OHS) Act of Ontario, the Designated Substance

Regulations (O. Reg. 490/09) as it pertains to lead and the Regulation for Construction Projects (O. Reg. 213/91). This document is also based on the Guideline – Lead on Construction Projects (2011) from the Ontario Ministry of Labour, Immigration, Training and Staff Development (MLITSD).

Program Elements

The basic elements of the control program are:

- 1) Identification of work areas / tasks where workers may be exposed to lead contamination or lead-containing materials;
- 2) Training and education of workers who may come into contact with lead contaminated debris or disturb lead-containing materials;
- 3) Provision of appropriate procedures for work which may result in workers being exposed to lead: Type 1, 2a/b and 3a/b;
- 4) Reviewing the program on a regular basis and updating as needed.

Scope

This program applies to all buildings, structures, machinery and equipment owned, occupied or operated by the University of Toronto at all campuses and other locations. It applies to all employees and students at the University, to contractors, to occupants of University buildings and to external organizations who may come into contact with or disturb lead-containing material in University buildings.

2 DEFINITIONS

"construction" includes erection, alteration, repair, dismantling, demolition, structural maintenance, painting, land clearing, earth moving, grading, excavating, trenching, digging, boring, drilling, blasting, or concreting, the installation of any machinery or plant, and any work or undertaking in connection with a project but does not include any work or undertaking underground in a mine;

"constructor" means a person who undertakes a project for an owner and includes an owner who undertakes all or part of a project by himself or by more than one employer;

"designated substance" means a biological, chemical or physical agent or combination thereof prescribed as a designated substance to which the exposure of a worker is prohibited, regulated, restricted, limited or controlled. The designated substances in Ontario are: acrylonitrile, arsenic, asbestos, benzene coke oven emissions, ethylene oxide, isocyanates, lead, mercury, silica and vinyl chloride;

"lead work" in this document refers to building and maintenance activities which may result in exposure to lead dust or fumes. Refer to Appendix I for examples of materials that may contain lead and to Section 3 for examples of activities which may cause the lead in these materials to be released;

"project" means a construction project, whether public or private, including,

- (a) the construction of a building, bridge, structure, industrial establishment, mining plant, shaft, tunnel, caisson, trench, excavation, highway, railway, street, runway, parking lot, conduit, sewer, water main, service connection, telegraph, telephone or electrical cable, pipe line, duct or well, or any combination thereof,
- (b) the moving of a building or structure, and
- (c) any work or undertaking, or any lands used in connection with construction.

3 ROLES AND RESPONSIBILITIES

3.1 Environmental Health and Safety

The Executive Director, Occupational Health and Safety, or Designate has the following responsibilities:

1. To develop and maintain the Lead Management Program and Lead standard operating procedures (SOPs).
2. To provide technical advice and recommendations for controlling lead exposure during building-related activities including the classification of work (Type 1, 2a/b and 3a/b) where lead exposure may occur.
3. To assist University departments in investigations/assessments for the presence of lead.
4. To provide ongoing lead training and education programs as necessary.
5. To conduct respiratory protection training and fit-testing for all University employees who may require respiratory protection in the course of their work.
6. To maintain and review the Lead Management Program and Lead SOPs once every five years and amend/revise as necessary.

3.2 Hazardous Construction Materials Groups (HCMG), Facilities & Services – St. George Campus only

The Manager, Hazardous Construction Materials Group, in the Utilities and Building Operations Division, Facilities and Services, has the following responsibilities:

1. To assist in implementing and enforcing the requirements of the Lead Management Program for all work that HCMG partakes in. For work activities not listed in the SOPs, to notify and consult with Environmental Health and Safety on classification and work procedures.
2. To assist internal departments in the classification (Type 1, 2a/b and 3a/b) of 'lead work' (building maintenance and construction work involving lead) and make recommendations on the appropriate precautions.
3. To provide Environmental Health and Safety with the results of investigations for potential lead-containing materials.
4. To notify Environmental Health and Safety of all Type 3a and 3b lead work for which

their department is responsible.

5. To review and approve all Type 3a and 3b lead related work which HCMG partakes in.
6. For all lead work that HCMG is responsible for, ensure that work is only conducted by qualified/trained external contractors with proven service and performance, and written documentation of adequate training and experience, and in accordance with the Lead Management Program and/or the MLITSD's [Lead on Construction Projects](#) guidelines, whichever is most stringent. This shall be accomplished by monitoring the progress of such work and by conducting random site inspections.

3.3 Department Responsibilities

The Director of each Division and their Designate who contracts or performs lead work has the following responsibilities:

1. For projects, Section 30 of the Occupational Health and Safety Act requires the owner of a project to determine if lead is present on a project and, if it is, to inform all potential contractors as part of the bidding/tendering/contracting process and prior to signing the binding agreement. Departments are responsible for developing and implementing processes to meet this requirement. At the University, this is requirement is met through provision of a written preconstruction survey, a Designated Substance or Designated Substance Summary Report (DSSR)).
2. To be responsible for all lead work performed by their employees or by external individuals contracted by them to do lead-related work and in accordance with the UofT Lead Management Program and/or the MLITSD's [Lead on Construction Projects](#) guidelines, whichever is more stringent. This may be accomplished by monitoring the progress of such work and by conducting random site inspections. See Appendix III for a sample inspection checklist.
3. To classify all lead related work under their jurisdiction as Type 1, 2a/b and 3a/b lead related work, in consultation with the Manager, Hazardous Construction Materials Group (F&S) as needed.
4. To obtain approval of all Type 3a and 3b lead work from the Manager, Hazardous Construction Materials Group (F&S) prior to authorizing the start of the work – St. George campus only.
5. For all lead work that their department is responsible for, ensure that safe work procedures are in place, and that all other requirements under the Lead Management Program and/or the MLITSD's [Lead on Construction Projects](#) guidelines, whichever is most stringent, are implemented.

6. For all lead work that their department is responsible for, ensure that work is only conducted by qualified/trained employees or external contractors with proven service and performance, and written documentation of adequate training and experience, in accordance with the Lead Management Program and/or the MLITSD 's [Lead on Construction Projects](#) guidelines, whichever is most stringent.
7. Where possible, use new coatings and paint that contain the lowest amount of lead possible while meeting operational/constructional requirements.
8. To maintain records of all lead work for which their department is responsible for.
9. To provide notification of Type 3a and 3b lead work, reasonably in advance of the commencement of the work, to (or their designate):
 - a. the Manager, Hazardous Construction Materials Group (F&S) – St. George Campus only;
 - b. the Director, Property Management for areas involving the building fabric - St. George Campus only;
 - c. the Director, Utilities & Building Operations for areas under the control of Utilities & Building Operations – St. George Campus only;
 - d. the Director, Facilities Management and Planning – UTM only;
 - e. the Director, Facilities Management - UTSC only;
 - f. building occupants as appropriate
 - g. the Executive Director, Office of Occupational Health and Safety.
10. Where required, to liaise with building occupants and joint health and safety committees regarding the precautions for all lead related work in their jurisdiction/applicable area.

3.4 External Contractors

External contractors performing lead work have the following responsibilities:

1. To comply with the requirements of the University Lead Management Program, with other University programs where applicable (e.g. respiratory protection, hazardous waste management, confined space entry, etc.), with the MLITSD 's [Lead on Construction Projects](#) guidelines and other applicable regulations made under the Occupational Health and Safety Act. Where there are more than one set of requirements, the more stringent requirement applies.
2. To ensure that all employees under their direction are properly trained in the hazards of lead and control procedures prior to conducting any lead work, and to provide evidence of this to the UofT department contracting the work.

3 Lead Standard Operating Procedures (SOPs)

Where applicable, departments should consider substitution (using low-lead coatings/paints/materials) and selecting methods/equipment that reduce dust generation (e.g., wet methods such as wet scraping and wet shoveling). Wet methods should not be used if it creates a hazard or could damage equipment. Power tools should be equipped with a shroud and the shroud should be kept flush with the surface.

For the protection of workers performing lead work, SOPs have been developed. SOPs describe procedures that must be followed when planning, preparing and performing lead work. The SOPs are separate documents and are available on the [Environmental Health and Safety Policies and Procedures Listing](#) website.

Lead related work has been divided into categories (Type 1, 2a/b and 3a/b) based on the potential for exposure to lead. SOPs have been prepared for each type of work:

Type	Tasks
1	<ul style="list-style-type: none"> • Application of lead-containing coatings with a brush or roller • Removal of lead-containing coatings with a chemical gel, paste and fibrous laminated cloth • Removal of lead-containing coatings or materials, using a power tool that has an effective dust collection system equipped with a HEPA filter • Installation or removal of lead-containing sheet metal • Installation or removal of lead-containing packing, babbitt or similar material • Removal of lead-containing coatings or materials using non-powered hand tools, other than manual scraping or sanding • Soldering • High Voltage (HV) Lead Cable Splicing
2a	<ul style="list-style-type: none"> • Welding or high temperature cutting of lead-containing coatings or materials outdoors (CONDITIONS: < 1 hr consecutively and the material has been stripped prior). If none of these conditions are met, then it is a Type 3a operation. • Removal of lead-containing coatings or materials by scraping or sanding using non-powered hand tools. • Manual demolition of lead-painted plaster walls or buildings components by striking a wall with a sledgehammer or similar tool. • Burning of a surface containing lead for < 1 hr consecutively. • Removal of lead-containing coatings or materials using power tools WITHOUT an effective dust collection system equipped with a HEPA filter < 1 hr consecutively. • Work in the former Hart House shooting range that does not involve clean up but may result in incidental contact with lead (Demolition or clean-up of a facility where lead-containing products were manufactured is a Type 3a operation) • Drilling 15 or fewer holes in lead-lined drywall. • Spray application of lead-containing coatings < 1hr consecutively
2b	<ul style="list-style-type: none"> • Spray application of lead-containing coatings > 1 hr consecutively.
3a	<ul style="list-style-type: none"> • Welding or high temperature cutting of lead-containing coatings or materials INDOORS or in a CONFINED SPACE. • Burning of a surface containing lead for > 1 hr consecutively.

	<ul style="list-style-type: none"> • Removal of lead-containing coatings or materials using power tools WITHOUT an effective dust collection system equipped with a HEPA filter > 1 hr consecutively. • Dry removal of lead-containing mortar using an electric or pneumatic cutting device. • Removal or repair of a ventilation system used for controlling lead exposure. • Demolition or clean up of a facility where lead-containing products were manufactured. • Any operation that may expose a worker to lead dust, fume or mist that is not a Type 1, Type 2, or Type 3b operation.
3b	<ul style="list-style-type: none"> • Abrasive blasting of lead-containing coatings or materials. • Removal of lead-containing dust using an air mist extraction system.

4 TRAINING

All University employees who are required to perform lead work must receive suitable training on lead.

1. EHS519 Lead in Building Maintenance and Construction Activities
 - Health Hazards Associated with Lead Exposure
 - Regulatory Requirements
 - University of Toronto Lead Management Program
 - University of Toronto Lead SOPs – Safe Work Procedures
2. EHS567 Asbestos Training for Asbestos Workers and their Supervisors (Type 1 & 2) Work (and where applicable, subsequent EHS568 Refresher)
 - Generally, U of T employees who perform lead work also performs asbestos work. Many of the controls used for lead is the same as for asbestos. The asbestos training is one (1) FULL day and includes applicable topics such as work practices to reduce dust contamination, personal hygiene, use of equipment such as HEPA vacuums and how to build enclosures.
 - If there is an employee group that performs lead work but not asbestos work (i.e. does not have FULL asbestos training), please contact EHS to make alternative arrangements.
3. EHS532 Respiratory Protection
 - Note: Respirator Fit Testing (must be current within 2 years)
 - Type 2, 3a and 3b lead work require the use of respiratory protection
4. Other training where applicable based on the work (e.g., WHMIS, Confined Space, Asbestos, Mould, etc.)

Contractors must also receive [appropriate training as outlined by the MLITSD's Lead on Construction Project](#) guidelines.

Appendix I – Examples of Lead Containing Materials

In some materials, the presence of lead is obvious (such as piping, sheet metal, etc.) but in some materials or finished products, the presence of lead may not be as obvious. Here are examples of materials that may contain lead which may be less obvious:

- Acoustic dampening baffles
- Additive tin brass and other metal alloys
- Babbitt (bearing metal)
- Batteries
- Cable and wire casing
- Cast iron pipe gaskets and connections
- Counter weights
- Decorative pieces
- Flashings
- Gaskets
- Glazing
- Glass (leaded glass for radiation protection, stained glass)
- Glazed ceramic tiles (frequently used in washrooms)
- Linings that are chemically-resistant
- Metal sheets used in roofing
- Mortar (late 19th and early 20th century tinted mortar on stone cladding)
 - Lead may be present in mortar in the form of pigments added to the mortar or leached from flashings and cappings
 - In specific cases, lead sand may be used to manufacturer mortar used in radiation shielding
- Paints and Coatings
 - Particularly paint and coatings manufactured before the 1976
 - Specialty paints manufactured more recently may still contain lead. Examples are fluorescent floor paint, artist's paints, metal touch-up coatings
- Pipes
- Solder and welding rods
- Storage tanks
- Structural steel primer
- X-ray or other radiation shielding

Appendix II –Instructions for Collecting Bulk Samples for Lead Analysis

Samples are collected by the Hazardous Construction Materials Group (F&S), the Office of Environmental Health and Safety or by those individuals contracted/approved by these two groups.

Equipment:

1. Utility/Putty Knife or Sharp Scraper
2. Heavy duty zip lock bags
3. Pen or marker
4. Disposable gloves
5. Chain of custody form
6. Camera (optional)

Instructions

Please also consult with the analytical laboratory for sample collection.

1. Wear disposable gloves.
2. Select discreet area for sample collection.
3. Place a piece of paper to catch any debris that falls during paint sampling (Note: the Ziplock bag may have a lot of static, causing the paint to be stuck on the walls. It may be easier to collect the paint using paper and then pouring it into the Ziploc bag.)
4. Remove all layers of paint (to substrate), place into sample bag and seal. Sample the paint only and minimize collection of the substrate (e.g. drywall, wood) underneath.
5. Collect the appropriate amount of material required for analysis*.
6. Label sample.
7. Where necessary, clean up area by wet wiping or using a vacuum equipped with a HEPA filter.
8. Where applicable, encapsulate or repair damaged area
9. Throw away gloves if you are finished collecting samples.
10. Label sample and chain of custody form. Ensure you have documented who collected the sample and the location of the sample. You may wish to take a photo of location for reference later on.
11. After you leave the work area, wash your hands prior to eating, drinking or smoking.
12. Forward the sample(s) and the chain of custody form to the Environmental Health and Safety for processing. Samples should be analyzed using either by Flame Atomic Absorption (FAA) or Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES).

* The amount of minimum required by some labs/method is 0.25 g. Sampler collector should discuss the minimum amount required with the analytical lab before collection.

Appendix III – Sample Inspection Checklist for Type 2a/b and 3a/b Lead Work (Optional)

Project or Work Service Order #	
Description of Work	
Lead Work Classification /SOP (Type 2, 3a or 3b)	
Authorizing Department / UofT Person Authorizing Work	
Inspected By* / Company if not UofT	

* The inspection should be conducted by a person who is knowledgeable of the work activity taking place and on the requirements of the UofT Lead Management Program and the applicable SOPs.

1. The materials, equipment, personal protective equipment (PPE) specified in the SOP are on site and used in the manner described in the SOP.	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Signage has been posted at each entrance to the work area for (an example is shown in the SOPs).	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Type 3a & 3b: Enclosures and Decontamination Facilities are in good condition with no observable deficiencies.	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. General ventilation (full enclosures) and local ventilation has been tested and meets the requirements of the SOP.	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. General ventilation in the work area have been shutdown and isolated (Type 3a & b only). All air intakes and air exhaust have been sealed with polyethylene and duct tape.	<input type="checkbox"/> Yes <input type="checkbox"/> No
6. Good housekeeping is observed.	<input type="checkbox"/> Yes <input type="checkbox"/> No
7. Only HEPA vacuum or wet wiping is used to clean surfaces.	<input type="checkbox"/> Yes <input type="checkbox"/> No

<u>Corrective Actions (if any):</u>

Signature: _____	Date: _____
Send this Form to the UofT Person Authorizing the Work.	