Manitoba
Sustainable Development

Guidance Document: Managing Demolition Debris Containing Hazardous Wastes

Intent
To provide information and guidance based on provincial hazardous waste statutes and regulations for the management of building renovation and demolition wastes that contain, or may contain, hazardous wastes. This guide clarifies the requirements for management of renovation and demolition wastes that contain or may contain materials and other debris containing lead, PCBs, and/or asbestos.

Note: Materials described in this guide may also be regulated under other municipal, provincial or federal statutes and regulations.

Applicability
This guide applies to anyone handling construction and/or demolition wastes that may contain hazardous wastes. This guide does not address renovation and demolition wastes originating from households.

Introduction
Management of hazardous and potentially hazardous components of renovation and demolition waste requires special consideration due to the high potential for harm to human health and the environment if handled or disposed of improperly.

Pre-demolition assessment
Proper removal of hazardous building materials is required:

- to protect the health and safety of workers;
- to protect the health of people living in the surrounding environment; and
- to protect the environment.

Hazardous waste, therefore, needs to be identified and removed systematically prior to renovation or demolition. As such, a hazardous material assessment should be carried out before any renovation or demolition project that includes an inventory of hazardous and potentially hazardous materials. This will help to identify the nature and quantity of hazardous wastes that will be generated during renovation or demolition, and will enable planning for proper dismantling and demolition practices.

Preparation of a waste management plan based on the assessment will ensure the safety of workers and proper handling and management of waste materials. The plan should include methods for selective demolition, handling, removal, packaging, transportation and disposal of these materials. In addition, the waste management plan should provide action to be taken if unexpected hazardous wastes are found.

Hazardous waste should not be mixed with non-hazardous waste. Materials that are non-hazardous waste may become hazardous waste due to mixing or processing during the demolition stage. They can also pollute non-hazardous materials and thus make them non-reusable/recyclable (e.g., materials containing

lead-based paint mixed with a load of bricks and concrete, may result in the whole load requiring treatment as hazardous waste).

Regulatory requirements

Throughout the demolition process, hazardous waste handling and removal must comply with applicable hazardous waste and workplace safety & health regulatory requirements.

As per the requirements of The Dangerous Goods Handling and Transportation Act (Act) and Hazardous Waste Regulation, M.R. 195/2015 (regulation):

- The generator is the person or business who causes the creation of hazardous waste.
- The generator is responsible for determining if materials generated during renovation and demolition are hazardous. This can be determined by either applying verifiable historical knowledge of the building (date of construction, subsequent renovations, etc.) and assuming the materials to be hazardous, or subjecting the materials to sampling and analysis. If analytical testing is the preferred option, reliable field-testing and/or representative sampling needs to be carried out. This can be performed by a hazardous materials consulting firm, or by other qualified personnel.
- The generator of demolition materials and residues identified as hazardous waste must register with Manitoba Sustainable Development (the Department) as a hazardous waste generator and obtain a registration ID for the location of hazardous waste generation (i.e. the demolition / renovation site). This can be completed by following the procedure and form provided on the Manitoba Hazardous Waste Program website. There is no fee for registration.
- If hazardous waste will be stored at the generation site, the generator must follow the applicable storage requirements provided in the regulation [sub sections 5(1) to 10(4)]. The regulation can be accessed through the Manitoba Hazardous Waste Program Website, or the Manitoba Laws website.
- Off-site shipment of hazardous waste must be carried out by a licensed hazardous waste carrier.
- Each shipment of hazardous waste must be accompanied by a properly completed movement document. The movement document is filled by each of the three parties (generator, carrier and receiver) involved in transporting the waste. It is a 6-page color-coded carbon-copy form, with copies distributed to the appropriate authorities and to all others involved in the transport and disposal of waste.
- Prior to offering the hazardous waste for transport, the generator must ensure that the carrier being used is licensed to carry hazardous waste and the receiver is licensed or operating under a Director's order.

Hazardous wastes

Hazardous wastes can include substances such as:

- building materials containing asbestos
- lead paint
- mercury (fluorescent lamps, switches, thermostats, thermostat probes, gauges)
- polychlorinated biphenyls (PCBs) found in florescent light ballasts, paints, electrical insulating materials)
- oils, lubricants and fuels
- batteries
- paints and thinners
- glues and solvents

- cooling system chemicals such as Freon
- compressed gases

Other wastes requiring special consideration can include biological substances such as mould and other micro organisms from human or animal wastes, including:

- sewage
- manure
- bird and rodent droppings
- dead animals

Segregating and removing these materials before demolition not only keeps them from contaminating the soil and groundwater near the demolition site, but also prevents them from entering the landfills or recycling systems which may be a risk to workers at those facilities. Some of these waste materials will have legislated disposal requirements. This includes The Onsite Wastewater Management Systems Regulation (sewage) and The Livestock Manure and Mortalities management Regulation (manure, dead animals).

Typical Renovation / Demolition Hazardous Materials

The discussion in this guide is limited to the three most common contaminants identified in construction and demolition wastes; lead, polychlorinated biphenyls (PCBs), and asbestos. For information about the identification and handling of other hazardous building materials, please refer to the regulation or contact the Department.

LEAD

Buildings constructed or renovated before 1960 may contain lead-based paint, lead architectural coatings, or other lead containing structures. Lead is found in both indoor and outdoor applications. Lead dust can arise when lead coated, painted, or lead containing structures are scraped, sanded, or heated.

Potential sources of lead containing or coated materials associated with pre-1960s buildings:

- woodwork
- metal equipment (ladders, boilers, etc.)
- lead window-sash weights
- roof vents
- lead flashing moulds
- lead pipes
- lead solder
- painted surfaces,
- peeling, chipping, chalking, cracking, or damaged paint
- paint chips,
- paint scrapings,
- paint blast residue,
- contaminated water and sludge

People can become exposed to lead through occupational and environmental sources. This mainly results from inhalation of lead particles (generated by burning materials containing lead, recycling, stripping leaded paint) and ingestion of lead-contaminated dust.

Young children are particularly vulnerable to the toxic effects of lead and can suffer profound and permanent adverse health effects, particularly affecting the development of the brain and nervous system.

1 Determining lead levels

If the generator's knowledge of the material is insufficient to make an accurate hazardous waste determination, materials must be either assumed to contain lead, or screened for the presence of lead on surfaces by using one or a combination of the following screening methods:

(a) Obtain verifiable historical knowledge of types of paint used before deciding on a test or analysis.

(b) Test the paint for lead before removing or disturbing using:
- a chemical test kit; or
- a portable X-ray fluorescence spectrum analyzer (XRF Analyzer).

(c) Have a laboratory test performed by collecting a paint sample (paint chip) and sending it to a laboratory for analysis.

If the initial screening indicates the presence of lead, a further evaluation is required to determine if the materials exhibit the characteristics of leachable toxic waste. This is carried out by subjecting the representative core sample of the material (i.e., core through the wall, including both paint and wood/drywall) to the Toxicity Characteristic Leaching Procedure.

Toxicity Characteristic Leaching Procedure (TCLP) testing is an analytical test method that is used to:

- identify whether a waste shows characteristics of leachate toxicity (if a liquid passed through or over the material, would it cause the liquid to become toxic), and
- to determine whether the concentration of lead is within treatment standards.

If the test results of the representative sample indicate that the concentration of lead is **greater than 5 mg/L**, then that waste (the material) is characterized as leachable toxic waste and must be managed as hazardous waste and disposed of at a hazardous waste disposal facility.

If laboratory result is **5 mg/L or lower**, the materials can be disposed of at a landfill permitted under the Waste Management Facilities Regulation, M.R. 37/2016 or a licensed facility under The Environment Act. Prior approval must be obtained from the owner/operator of the facility for disposal.

2 Painted Surfaces (Non-metallic)

2.1 Whole Building Demolition

Whole-building demolition debris (consists of painted and non-painted components including wood, brick, cement, plaster, drywall, etc.) is not likely to exceed the TCLP testing for lead if it is handled as a single, whole waste stream and disposed of all together. This is because of the small ratio of lead paint to total waste mass. Therefore, hazardous waste determination (i.e., TCLP Testing) is generally not required for demolition debris that may contain materials coated with lead-based paint, provided that:

(a) prior to demolition, reasonable precautionary measures are taken to minimize contamination of waste from other sources of contaminants;

(b) demolition waste is disposed of at a waste disposal ground permitted under the Waste Management Facilities Regulation or a facility licensed under The Environment Act;

(c) the disposal facility has, at a minimum, a composite liner and leachate collection system and meets groundwater sampling and analysis requirements; and

(d) the generator of the demolition waste notifies the owner/operator of the receiving disposal facility that the waste contains or is assumed to contain lead-based paint, and the owner/operator of that facility provides approval to the generator for its disposal at that facility.

This approach does not restrict the Department's right to request a complete hazardous waste determination for any demolition waste, based on information indicating that such a determination is necessary.

2.2 Painted portions or sections of a structure

Unlike whole-building demolition debris, hazardous waste determination (i.e., TCLP Testing) is required for demolition debris that may originate from a section of a building structure (partial demolition or renovation) that is handled as separate waste stream (eg. a single load of debris obtained from a single area or object within a larger demolition project).

This waste stream would be subjected to hazardous waste determination as described in Section 1

3 Painted Metal Surfaces

Metallic building and structural components may contain lead-based paint. If these components are sent to metal processing/recycling facilities, sampling or characterization of painted components for lead is not required.

If such disposal is not possible, these metallic components would be subjected to hazardous waste determination as described in Section 1.

4 Paint Residue

Paint residue may be generated during renovation, maintenance or demolition when paint coatings are removed from surfaces. Resulting residue may contain paint chips, flakes, blasting debris, vacuum debris and dust, waste wash water, and/or sludge from chemical paint stripping.

Due to the more concentrated nature, paint residue waste is more likely to exceed the leachable toxicity characteristic for lead. Therefore, it shall be managed as hazardous waste without having to undergo TCLP testing. However, if an evaluation is required to determine if the paint residue exhibits the characteristic of leachable toxic waste, representative samples must be subjected to the TCLP test.

Demolition debris should not be shredded, milled, chipped, mulched or similarly processed in such a way that would increase the leachability of the material prior to disposal (ie. increasing the total surface area and/or assisting in the breakdown of the material so as to promote absorption of the material into liquid).

Polychlorinated biphenyls (PCBs)

PCBs belong to a broad family of man-made organic chemicals known as chlorinated hydrocarbons. PCBs have a range of toxicity and vary in consistency from light coloured liquids to black waxy solids, depending on the exact chemical make-up. They are very stable and extremely persistent in the environment. They last for many years because they do not break down easily on their own and they are difficult to destroy. PCBs have been demonstrated to cause a variety of adverse health effects in humans and animals.

PCBs may also be referred to as chlorobiphenyls, chlorinated biphenyls or Aroclor, a commercial name. Due to their non-flammability, chemical stability, high boiling point and electrical insulating properties, PCBs were used in numerous industrial and commercial applications including:

- Electrical, heat transfer and hydraulic equipment
- Plasticizers in paints, plastics and rubber products
- Pigments, dyes and carbonless copy paper
- Other industrial applications

PCB containing materials may be present in buildings constructed or renovated in the 1950s through the 1970s. These materials were primarily used in or around windows, doorframes, stairways, building joints, masonry columns and other materials such as electrical components.

Potential sources:

- caulking
- sealant materials
- asphalt
- paints and coatings (primarily in industrial & military applications)
- electrical equipment in the form of oil (eg. transformers, capacitors, cables, florescent lamp ballasts)

If caulk contains PCBs, the PCBs may be released into the air through off-gassing. PCBs in air can then be absorbed into other building materials, creating secondary sources. PCBs in caulk may also move directly into adjoining porous materials such as concrete and wood.

Prior to demolition, PCB testing of caulk, sealants, painted surfaces and other building materials that are going to be removed should be carried out in order to determine:

(a) the type of protections needed during removal; and
(b) the proper disposal requirements.

Materials can be screened for the presence of PCB on surfaces by a “surface swipe” approach or another appropriate method.

If the initial screening test results indicate the presence of PCBs, a further evaluation is required to determine if the demolition or renovation waste contains PCBs at or above the regulated level.

If testing confirms the presence of PCBs at or above the regulated levels (greater than 50 ppm), these building materials must be handled and disposed of in accordance with:

- the PCB Storage Site Regulation, M.R. 474/1988,
- the Hazardous Waste Regulation, M.R. 195/2015,
- the federal PCB Regulation, SOR/2008-273 and
- the federal Transportation of Dangerous Goods Regulation, SOR/2017-253.

Equipment such as transformers, capacitors and florescent light ballasts manufactured prior to 1982 may contain PCBs. Presence of PCB can be determined by checking the name plate information and labels, contacting the manufacturer, or sampling and analyzing the oil. The Environment Canada guide on Identification of lamp ballasts containing PCBs may be referenced for interpreting the markings and codes of various brands of lamp ballasts. If the presence of PCBs at or above the regulated levels is determined, equipment must be managed as per the regulatory requirements.

If no testing is carried out, all potentially PCB containing building materials that are part of the demolition may be assumed to contain PCBs at or above the regulated levels and disposed of in accordance with the regulatory requirements.

ASBESTOS CONTAINING MATERIAL (ACM)

Asbestos containing materials (ACMs) have been widely used for fire resistance and insulation in buildings constructed before the 1990s. Health risks arise from asbestos during repair, renovation or demolition activities where the asbestos fibres can become airborne. All forms of asbestos have been shown through extensive scientific studies to be carcinogenic health hazards in humans. Proper handling and disposal of asbestos at a landfill will minimize the risk to human health and the environment.

ACM can be defined as a 0.1% or greater concentration of asbestos in a friable (ie. easily airborne, such as thermal insulation and sprayed coatings) materials or a 1% or greater asbestos concentration in a non-friable material (ie. bound within the material, such as floor tiles and cement sheets).

Friable ACMs, when dry, can be crumbled, crushed or powdered easily by hand pressure and include spray-applied fireproofing or insulation. ACMs that are friable have a much greater potential to release inhalable asbestos fibres into the air when disturbed.

Non-friable ACMs, when dry, cannot be crumbled, crushed or powdered and include floor tiles. These ACMs are more resistant to damage and abrasion, so is less likely to release harmful fibres into the air.

Because it was added to many products and used in construction, asbestos can be difficult to identify. The most common way of identifying the presence of asbestos is by sampling and analyzing the materials in a laboratory. If in doubt, the waste should be treated as ACMs, unless proven otherwise.

Common sources:

- insulation (blown, rolled or wrapped)
- ceiling and floor tiles
- siding
- cement and plaster
- asphalt roofing
- insulation associated with industrial furnace and heating systems

- plasters (lathe and drywall sealants)
- glues and adhesives (wallpaper and carpet glues)

ACMs that contain amphibole asbestos or chrysotile asbestos, when not fixed in a natural or artificial binder material, are regulated hazardous wastes. Testing labs can determine the type of asbestos present.

Prior to demolition or renovation of a building or equipment, all ACMs must be removed from the affected areas.

Removal of asbestos from building renovation and demolition projects must follow the requirements of the Workplace Safety and Health Division of the Manitoba Growth, Enterprise and Trade.

"Guide for Asbestos Management" provides general information and minimum requirements to building owners, consultants, contractors (including abatement contractors), workers and others concerned with the presence of asbestos and ACMs in workplace locations and buildings (https://www.safemanitoba.com/Page%20Related%20Documents/resources/Asbestos%20Guide.pdf).

Transportation and disposal of ACMs must be in accordance with the guideline: "Asbestos Disposal at a Landfill" (http://www.gov.mb.ca/sd/envprograms/swm/pdf/asbestos_disposal_wdg.pdf).

Unless otherwise approved, only landfills permitted under the Waste Management Facilities Regulation, M.R. 37/2016 or a licensed facility under The Environment Act will be considered for asbestos disposal. Prior approval must be obtained from the owner/operator of the facility for disposal.

DEFINITIONS

asbestos: the fibrous form of crocidolite, amosite, chrysotile, anthophyllite, actinolite, tremolite or a mixture containing any of those minerals;
asbestos containing material (ACM): a friable material containing 0.1 per cent or greater asbestos or a non-friable material containing 1.0 per cent or greater asbestos;
building: any structure, vault, chamber or tunnel including, without limitation, the electrical, plumbing, heating and air handling equipment (including rigid duct work) of the structure, vault, chamber or tunnel;
carrier: A person who is engaged in the transport of hazardous waste;
contaminant: Any solid, liquid, gas, waste, radiation or any combination thereof that is foreign to or in excess of the natural constituents of the environment and

(a) that affects the natural, physical, chemical or biological quality of the environment, or
(b) that is or is likely to be injurious or damaging to the health or safety of a person;

demolition: includes dismantling and breaking up;
department: The department of government over which the minister presides and through which the Act is administered;
friable material: material that,

(a) when dry, can be crumbled, pulverized or powdered by hand pressure, or
(b) is crumbled, pulverized or powdered;

generator: is a person who, by virtue of ownership, operation, management or control causes or allows to cause the creation or storage of hazardous waste;
hazardous renovation/demolition waste: debris that has hazardous properties and that may prove to be harmful to human health or the environment;
hazardous waste: a product, substance or organism that

(a) is prescribed, designated or classified as hazardous waste in the regulations, or
(b) by its nature conforms to the classification criteria for one or more classes of hazardous waste set out in the regulations;

hazardous waste disposal facility: a facility or place operated in whole or in part for the purpose of treatment, disposal or bulk storage of hazardous waste but does not include a facility or place approved by the director

(a) that treats, stores or disposes of hazardous wastes on the generation site, or
(b) that treats or stores hazardous wastes as part of a process for the recycling, reuse or reclamation of hazardous wastes;

landfill: a facility at which solid waste is disposed of by placing it on or in land, but does not include a remote seasonal waste facility;
Leachable Toxic Waste: A liquid on its own or a solid that, when exposed to acidified water according to the procedure in US EPA *Method 1311*, produces a liquid in a concentration equal to or greater than the concentration specified in the Hazardous Waste Regulation;
movement document: a numbered document, prescribed in the regulations, that relates to hazardous wastes that are being transported or offered for transport and that contains the information relating to the hazardous wastes required by the Act or the regulations;
non-friable material: a material that when dry cannot be crumbled, crushed or powdered;
receiver: operator of any facility to which waste is transferred by a carrier. This includes transfer stations, bulk storage facilities, processing facilities, treatment facilities or final disposal sites;
Toxicity Characteristic Leaching Procedure (TCLP): an analytical test method that is used to identify whether a waste exhibits the characteristic of leachate toxicity, and to measure compliance with treatment standards;
waste management plan: sets out the approach to identification, demolition, handling, transportation and disposal of the materials identified in the pre-demolition assessment.
XRF Analyzer: (X-ray fluorescence spectrum analyzer) a device that is used in-situ to determine the presence of lead-based paint.

MANITOBA SUSTAINABLE DEVELOPMENT CONTACTS

For all questions regarding Hazardous Waste Storage Requirements, you may contact the Environmental Approvals Branch or the Environmental Compliance and Enforcement Branch regional offices listed below:

Manitoba Sustainable Development

Environmental Approvals Branch
1007 Century Street, Winnipeg MB R3H 0W4
Telephone: (204) 945-8321 [Hazardous Waste Program]: (204) 945-7086
Fax: (204) 948-2338 http://www.gov.mb.ca/sd/eal/index.html

Environmental Compliance and Enforcement Branch

WINNIPEG: 1007 Century St. Winnipeg MB R3H 0W4 Telephone: (204) 945-0675	**PORTAGE LA PRAIRIE:** 309-25 Tupper Street North Portage la Prairie MB R1N 3K1 Telephone: (204) 239-3608
BRANDON : 1129 Queens Ave. Brandon MB R7A 1L9 Telephone: (204) 726-6565	**STEINBACH:** Unit B-284 Reimer Ave. Steinbach MB R5G 0R5 Telephone: (204) 346 -6060
DAUPHIN: 27-2ND Ave. S.W. Dauphin MB R7N 3E5 Telephone: (204) 622-2030	**STE. ANNE:** Unit A - 30 Dawson Rd. Ste. Anne R5H 1B5 Telephone: (204) 422-7020
GIMLI : 75-7th Avenue, Box 6000, Gimli MB R0C 1B0 Telephone: (204) 641-4091	**THE PAS:** PO Box 2550, Provincial Bldg. The Pas MB R9A 1M4 Telephone: (204) 627-8499
LAC DU BONNET: PO Box 4000, Lac du Bonnet MB R0E 1A0 Telephone: (204) 345-1486	**THOMPSON:** Provincial Bldg., 59 Elizabeth Drive PO Box 32, Thompson MB R8N 1X4 Telephone: (204) 677-6703
SELKIRK: Lower Level, 446 Main St., Selkirk MB R1A 1V7 Telephone: (204) 785-5021	

Emergency Response
24 Hour Emergency Response Line Telephone: 1-204-944-4888 Toll Free Number: 1-855-944-4888 http://www.gov.mb.ca/sd/envprograms/env-emresp/index.html