Hazardous Materials in the Built Environment

Presented to IIBEC

January 24, 2025

Today's Presenter

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National Practice Leader
Hazardous Materials

Pinchin Ltd. is an environmental, engineering, building science, and health & safety consulting firm with over 800 staff in 40 offices in Canada.

Sean Douglas has 37 years of experience working in the asbestos and hazardous materials consulting industry. Sean holds a Diploma of Technology from the British Columbia Institute of Technology and is an Applied Science Technologist.

Sean has an in-depth working knowledge of asbestos-related environmental, health and safety regulations, codes and standards. Sean frequently provides industry stakeholder input on regulatory policy updates and provides professional opinion and subject matter expertise on legal matters.

Sean was key informant to CSA publication "Asbestos Management in Canada", contributor to Asbestos and Lead Paint guidelines, WorkSafe BC, and a member of various associations and working committees.

Poll Question #1

How much knowledge do you have on building materials or products that contain asbestos?

a) A little.

b) Moderate, I know some products that contain asbestos.

c) High, I am familiar with most products that contain asbestos.

d) I am an expert or a consultant.

Poll Question #2

1. Have you ever worked on a project and encountered asbestos?

2. How did it go?

Outline / Topics

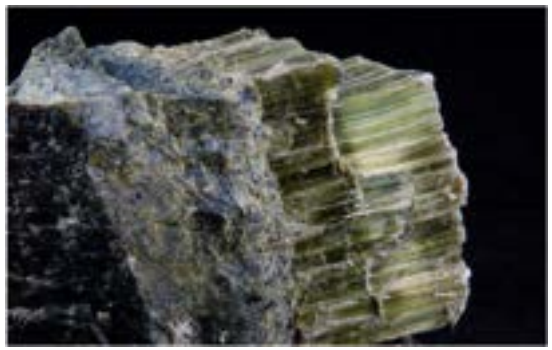
1. Hazardous materials used in construction.
2. Regulations pertaining to asbestos and hazardous materials
3. Testing and reporting requirements.
4. Remediation process and project workflow.
5. Q&A

HAZARDOUS MATERIALS USED IN CONSTRUCTION

Asbestos Use in Buildings

- Asbestos was added to building materials because of its unique properties: *heat resistant, chemical resistant, electrical insulator, high tensile strength.*
- There are over 3,000 documented commercial products that used asbestos in its formulation
- Exposure to asbestos can cause lung-related diseases
- Use diminished from mid-1970's through to the mid-1980's
- Limited use 1990+
- Banned in Canada in 2018*

** Prohibition of Asbestos and Products Containing Asbestos Regulations (SOR/2018-196).*



Friability and Exposure

Friable Asbestos

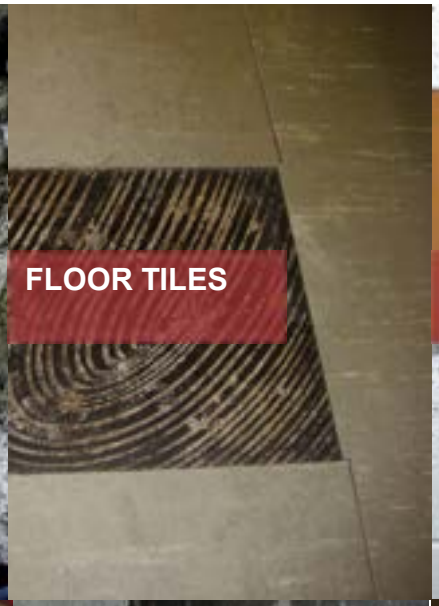
- Can be easily crushed by hand pressure
- Readily releases asbestos in air when disturbed
- Results in higher airborne concentration

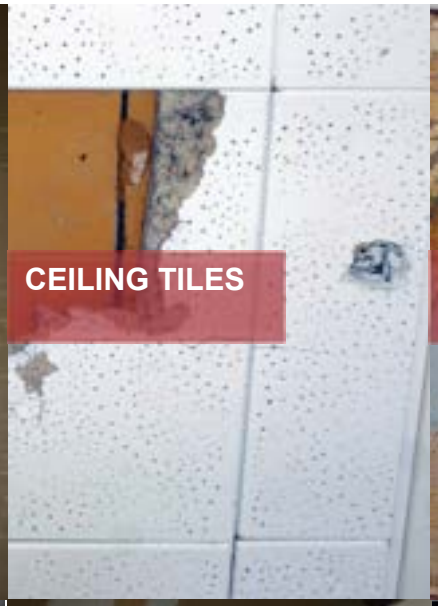
Non-Friable Asbestos

- Asbestos is tightly bound with other materials
- High resistance to damage
- Less likely to release asbestos fibres
- Resulting in lower airborne concentrations

Regulations and handling procedures are based on the friability of asbestos.


FIREPROOFING


FLOOR TILES


CEILING TILES


VINYL SHEET FLOORING


TEXTURE COAT


PIPE INSULATION


VERMICULITE


DRYWALL JOINT COMPOUND


PLASTER


CEMENT PIPES


STUCCO FINISH


PAINT


BLOCK FILLER


CORRUGATED
ROOF PANELS

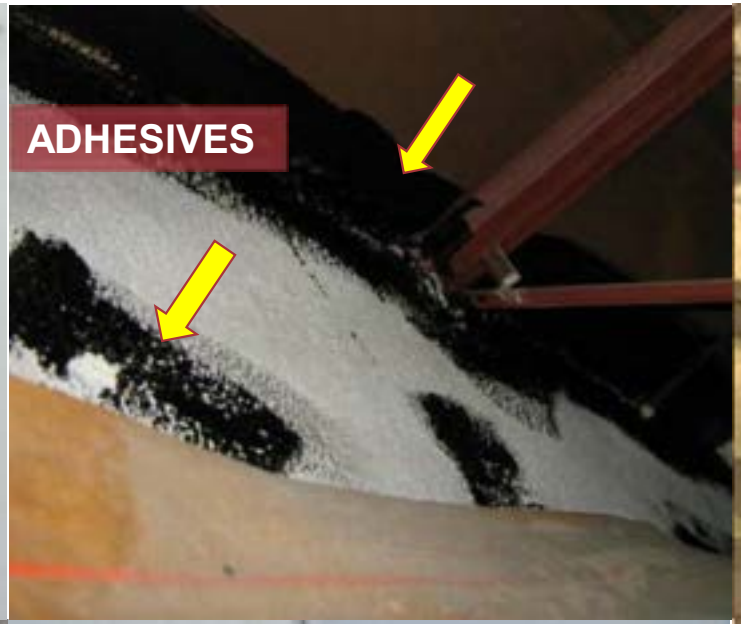

BUILT-UP
ROOFING


SHINGLES
AND PAPER


ROOF
ADHESIVE

PINCHIN


WALL
ADHESIVES


ADHESIVES


FIRESTOP MASTIC


FIRESTOP
CEMENT


SEALANTS


CAULKING


WATERPROOFING


WINDOW
SEALS
BUTYL TAPE

Asbestos - The List is Long!

Sprayed Materials

Fireproofing

Acoustical texture

Thermal insulation

Insulating Materials

Pipe insulation

Boiler insulation

Flooring and Ceiling Materials

Vinyl floor tiles

Sheet flooring

Ceiling tiles

Cement Materials

Sidings and shingles

Rain Water Leaders and Water Pipes

Plasters and Compounds

Joint compound

Wall and ceiling plaster

Stucco

Leveling Compounds

Sealants / Adhesives / Mastics

Roofing Adhesives

Sealants and Caulking

Duct Mastics

Floor Mastics

Sink Undercoating

Window Putty and Butyl Tapes

Fire Stop / Smoke Seals

Waterproofing

Textiles

Gaskets

Electrical Insulation

Ropes and Packing

Vibration Dampers / Duct Connectors

Miscellaneous

Vermiculite

Fire rated doors

Brakes

Felts and Paper

Paint

Heat Shields

Friable **Non-friable** **Potentially Friable**

Timeline of Asbestos Control

YEAR	EVENT
1973	Sprayed asbestos banned in U.S. (USEPA)
1975	Asbestos pipe insulation banned in U.S. (USEPA)
1978	Application of sprayed of asbestos is prohibited (WCB Industrial Health and Safety Regulations)
1980	Asbestos drywall joint compound, spackling and patching compounds banned in Canada (Hazardous Products Act)
1985	Application of friable asbestos is prohibited, sprayed and pipe and boiler insulation (O.Reg 654/85)
1989	Prohibition of Application of Sprayed Asbestos Products, Hazardous Products Act
1990	Vermiculite Mine in Libby, Montana closes.
2018	Prohibition of Asbestos and Products Containing Asbestos Regulations (SOR/2018-196)

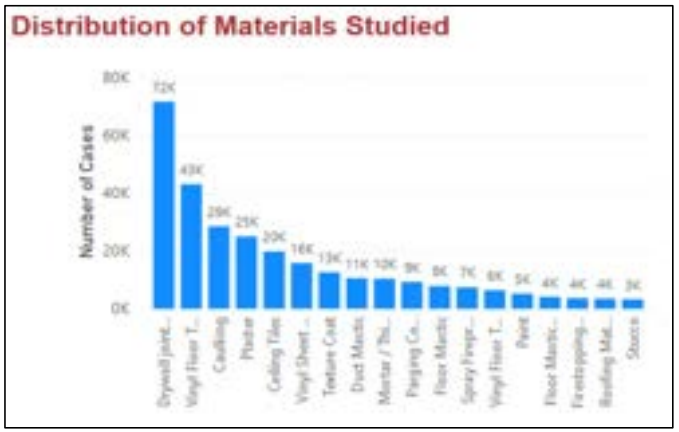
Pinchin Study of Asbestos Use in Canada – Cut-off Dates

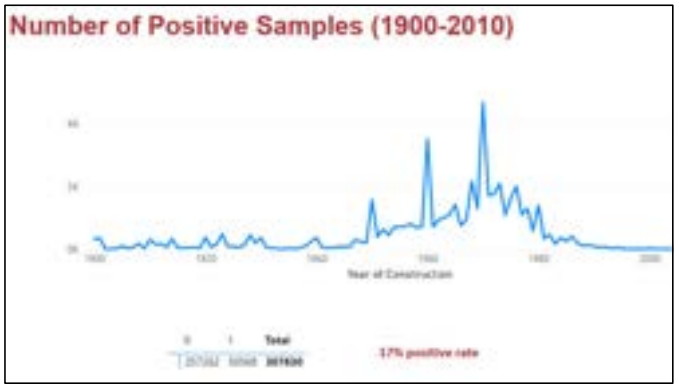
End of Use Dates

- Analyzed large internal data set (300,000 samples)
- Predicting asbestos use relating to date of construction

Conclusions

- Friable asbestos stopped in 1986
- Non-friable used up until 2010 at least
- Post-1990, cement pipe, floor tiles, mastics, sealants, adhesives, tar, caulking, gaskets.

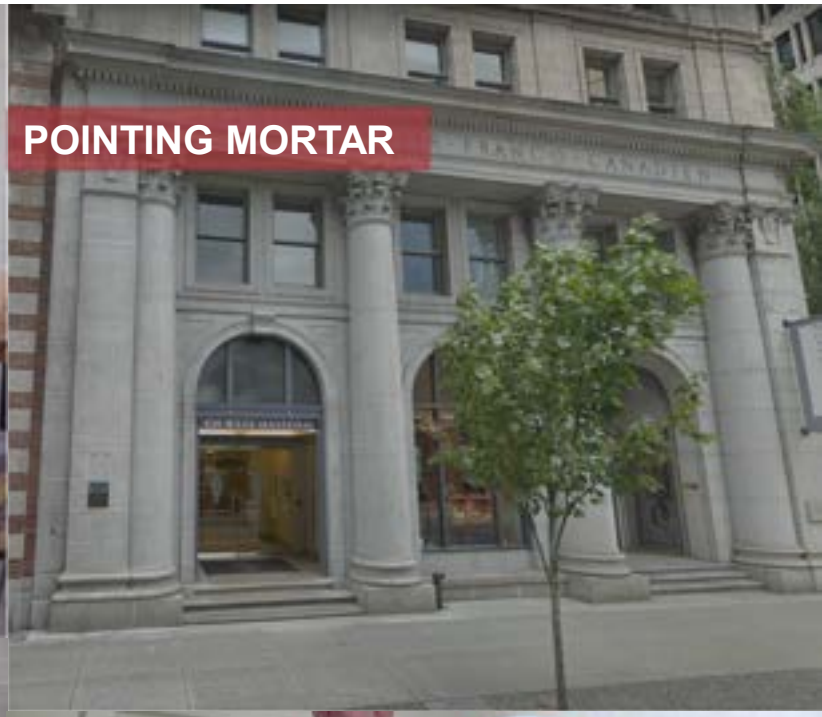


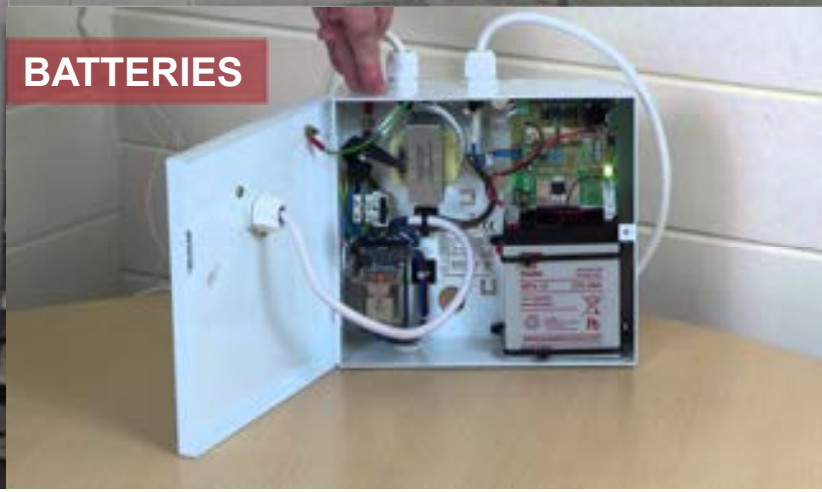


Lead Paint

- Lead added durability to paints, primers
- Lead content in paint was unrestricted until 1978 (5,000 ppm)
- Set at 90 ppm, (2010)
- Exposure to lead can affect the vital organs and brain development
- Children are the most susceptible

Other Uses of Lead





Timeline of Lead Control

Year	Event
1978	Hazardous Products Act restricts lead in consumer paints to 5,000 ppm (0.5%). No restriction on industrial or exterior paints (anti-corrosion).
1991	Canadian Paint and Coatings Association (CPCA) voluntarily restrict lead in interior and exterior consumer paint to 600 ppm.
2005	Hazardous Products Act limits lead in interior paint to 600 ppm. No restriction on anti-corrosion paints (primers).
2010	Hazardous Products Act limits lead in interior paint to 90 ppm (0.009%). Still no restriction on anti-corrosion paints and primers (exclusions removed in 2016).
2011	WorkSafe BC adopts 90 ppm level as action level.

Silica

- A component of concrete and masonry
- Silicosis
- Exposure to silica dust can occur:
  - Chipping
  - Grinding
  - Cutting
  - Tuck-pointing
- Use dust control and respirator protection

Mercury

- Liquid at room temperature
- Volatility increases when heated
- Exposure can affect central nervous system and vital organs

PCBs

- Insulating fluid used in electrical equipment (transformers, capacitors, ballasts)
- Manufacturing ceased in 1978
- Limited use allowed until 2025 (pole-top transformers and ballasts)
- Non-liquid forms, used as plasticizer in paint and caulking.

Mould

- Mould growth occurs when:
  - Moisture
  - Nutrient source
  - Temperature
- Removal of the source product
- Clean surfaces to remove light mould
- Heavy mould growth on wood requires removal

REGULATIONS

PARTIES AFFECTED BY REGULATIONS

- Owner
- Project Manager (acting as Owner's representative)
- Contractor
- Consultant

REGULATIONS

- Asbestos and hazardous materials are governed by three primary pieces of legislation:
  - The Occupational Health and Safety Regulation (WSBC), B.C. Reg. 296/97
  - The Hazardous Waste Regulations (Ministry of Environment), B.C. Reg. 63/88
  - Transportation of Dangerous Goods (TDG)
- Canada Labour Code*
  - Canada Occupational Health and Safety Regulations (SOR/86-304)

WorkSafeBC

British Columbia
Ministry of Environment

Transport Canada
Canada

WORKSAFE BC

- Asbestos, and other hazardous materials are referred to in:
  - Part 5 – Chemical and Biological Substances;
  - Part 6 – Substance Specific Requirements; and
  - Part 20 – Construction, Excavation and Demolition

HIGHLIGHTS OF REGULATIONS

- Inventory, Assessment and Testing
- Reporting
- Safe Work Procedures for Handling
- Packaging and Disposal
- Site Reviews and Monitoring
- Close-out / Clearance Report

TESTING AND REPORTING

- The Owner must ensure that prior to renovation work, all hazardous materials are to be identified
- aka “Hazardous Building Materials Report” (HBMA)
- Must be conducted by a qualified person (e.g. Consultant)
- City of Vancouver has special requirements and permitting requirements (e.g. QP of Record, and Sign-off) for demolition.

REPORTING - CAVEAT

- Use previous reports with caution!
- May not be applicable for the work
- Destructive vs non-destructive
- Exclusions

- **Inventory (Management) Assessments**
  - Required by regulation to identify and manage asbestos-containing materials within a building. Essentially, to get a “baseline” of asbestos-containing materials present
- **Asbestos Re-assessments**
  - Required by regulation to monitor and re-evaluate the condition of previously identified asbestos-containing materials
- **Pre-construction Assessments**
  - Required by regulation prior to construction activities (renovation, demolition, construction, etc.) to identify all potential hazardous materials present within the project area(s)

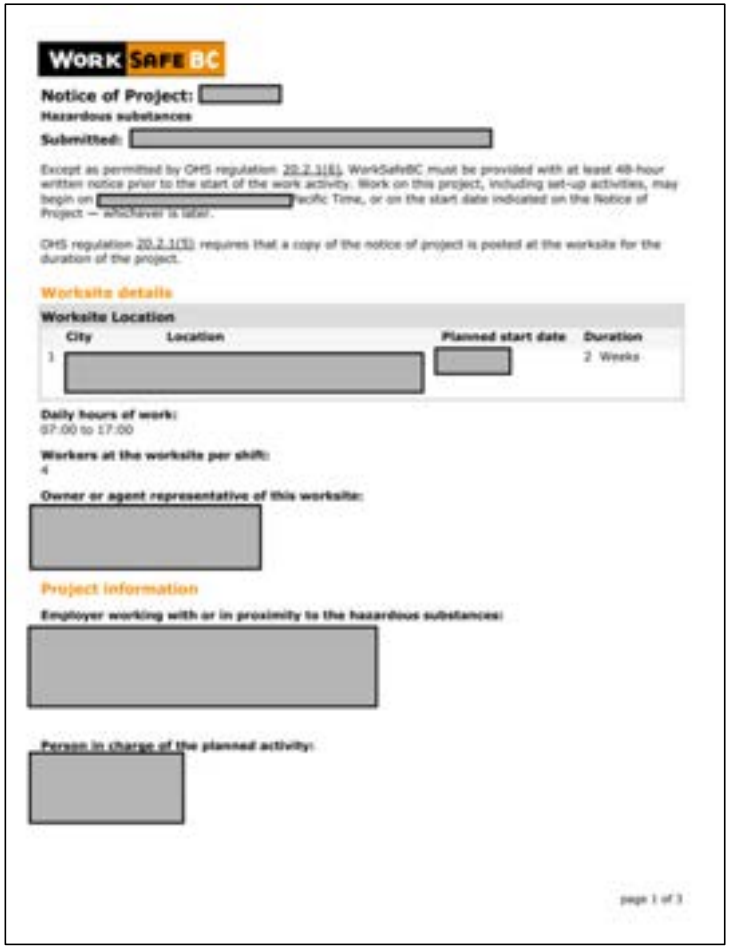
ABATEMENT PROCESS

SAFE WORK PROCEDURES AND REMEDIATION

- The Contractor must ensure that project-specific work procedures are provided and followed by all workers.
  - Containment
  - Control of asbestos fibre release and dust
  - Provision, use and maintenance of personal protective equipment
  - Decontamination of workers
  - Removal & cleanup

NOTICE OF PROJECT

- The Contractor must ensure that a written Notice of Project for Hazardous Materials (NOP-H) is submitted to WorkSafeBC
- Submitted at least 48 hours in advance of work.
- The NOP must include:
  - Name of Contractor
  - Address of Project
  - Start and End Dates
  - Description of Work
  - Written Safe Work Procedures
  - HBMA Report



WORKSAFEBC

Notice of Project: [redacted]

Hazardous substances

Submitted: [redacted]

Except as permitted by OHS regulation 20.2.1(6), WorkSafeBC must be provided with at least 48-hour written notice prior to the start of the work activity. Work on this project, including set-up activities, may begin on [redacted] cific Time, or on the start date indicated on the Notice of Project — whichever is later.

OHS regulation 20.2.1(5) requires that a copy of the notice of project is posted at the worksite for the duration of the project.

Worksite details

Worksite Location

	City	Location	Planned start date	Duration
1	[redacted]	[redacted]	[redacted]	2 Weeks

Daily hours of work:
07:00 to 17:00

Workers at the worksite per shift:
4

Owner or agent representative of this worksite:
[redacted]

Project information

Employer working with or in proximity to the hazardous substance(s):
[redacted]

Person in charge of the planned activity:
[redacted]

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LEVELS OF RISK - LOW

- Working near asbestos without disturbance
- Transporting waste that is bagged and sealed

Controls

- Personal protective equipment is not required
- Workers must have some knowledge of the hazards and be aware of the locations
- Workers are to be instructed to prevent disturbance

LEVELS OF RISK - MODERATE

Activities

- Using hand tools to remove non-friable products
  - cement board
  - drywall joint compound
  - vinyl floor tile
  - Any other non-friable materials
- Using power tools with dust collectors to remove non-friable products

Controls

- Partial containment (poly)
- Warning signs
- Disposal coveralls and half-facepiece respirators

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LEVELS OF RISK - HIGH

Activities

- Removing friable asbestos
  - Fireproofing
  - Pipe or boiler insultation
  - Vermiculite
- Using power tools (without water or dust controls) to grind, cut or drill non-friable asbestos-containing materials

Controls

- Full enclosure, negative pressure
- Disposable coveralls and full-face powered respirators
- Worker decontamination (shower)

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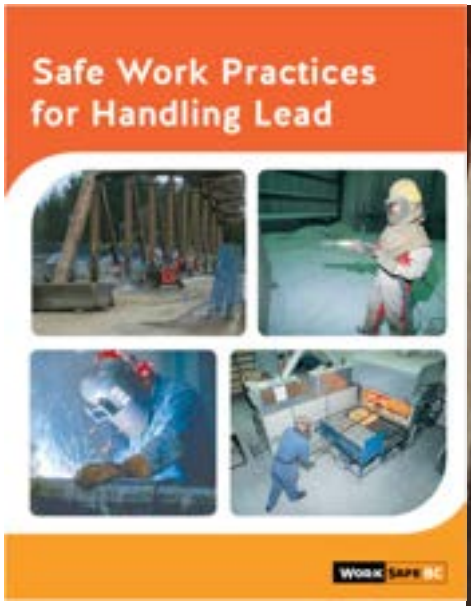
LEVELS OF RISK - LEAD

Risk Level	Description
Low	Operating an excavator during building demolition
Low-Moderate	Manual Scraping, Using power tools with dust collection
Moderate	Demolishing lead-painted walls, removing lead dust
Moderate-High	Using power tools without dust collection, removal by high pressure water
High	Abrasive blasting



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TRANSPORT AND DISPOSAL

- The Contractor is responsible for the transportation and disposal.
  - Waste manifest is required
  - >1000 kg of waste must be registered with Ministry of Environment
  - Waste must be double bagged in 6 mil poly bags, labelled
  - Must be transported by licenced hauler

Drywall with asbestos joint compound is not accepted in the GVRD. Must be shipped to Alberta for $$$.

SITE REVIEW AND INSPECTION

- Site Reviews are conducted by the consultant to document work progress and site conditions.
- Validates safe work procedures and scope completion.

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Site Review Report

Project Information

Date: [Click to Enter Date]	Pinchin Representative: [Inspector's Name]	Report Number: [X] Pinchin File: [12345]
Project Name: [Enter Applicable Project Name (i.e. asbestos/lead abatement)]	Site Address: [Enter Site Address]	
Client: [Enter Client Name]		Client File Number: [Reference if Provided in ATP or Via PO]
Contractor: [Enter Contractor's Name]		Arrival on Site: [Enter Time-24hr] Number of Workers: [XX]

Distribution:

cc:	[Enter Persons Name]	[Enter Client Company]	[Enter Hyperlinked Email Address]
	[Enter Persons Name]	[Enter Client Company]	[Enter Hyperlinked Email Address]
	[Enter Persons Name]	[Enter Client Company]	[Enter Hyperlinked Email Address]
	[Enter Persons Name]	[Enter Client Company]	[Enter Hyperlinked Email Address]

Description of Work in Progress

Material	Work Area	Work in Progress	Type of Review	Status
Choose an item.	Work Area 1: [WA1Description]	[Describe the scope of the abatement work. Be sure to include type of work (ie. low, moderate, high risk)]	Choose an item. [List each type of site review completed]	Choose an item
Choose an item.	Work Area 2: [WA2Description]		Choose an item	Choose an item
Choose an item.	Work Area 3: [WA3Description]		Choose an item	Choose an item
Choose an item.	Work Area 4: [WA4Description]		Choose an item	Choose an item
Choose an item.	Work Area 5: [WA5Description]		Choose an item	Choose an item
Choose an item.	Work Area 6: [WA6Description]		Choose an item	Choose an item

Discussion Points and Action Items	[Enter any Important Discussion Points or Action Items for the Site Review]

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Mississauga, ON
www.pinchin.com

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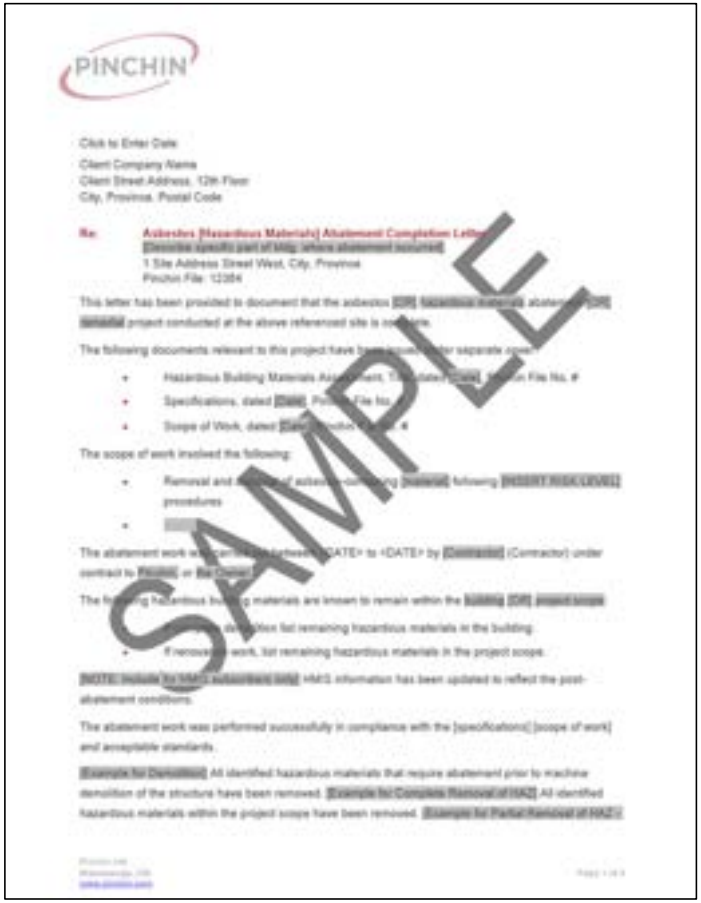
MONITORING

- The Owner and/or Contactor must ensure that air monitoring is conducted.
  - Must sample during the handling of asbestos (High Risk)
  - Inside containment / outside containment
  - Clearance testing required before tear-down of High Risk enclosures
  - Results must be available to workers within 24 hours (asbestos)
  - Conducted by qualified person (e.g. Consultant)

CLEARANCE REPORT

- After removal is conducted and inspected, a qualified person must prepare a close-out report or clearance letter that certifies all hazardous materials have been properly removed (WSBC OHS Reg).
- If project is in the City of Vancouver, and involves demolition, a city-approved QP must be on record and sign-off.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Click to Enter Date
Client Company Name
Client Street Address, 12th Floor
City, Province, Postal Code

Re: Asbestos [Hazardous Materials] Abatement Completion Letter
[Describe specific part of bldg. where abatement occurred]
1 Site Address Street West, City, Province
Pinchin File: 12384

This letter has been provided to document that the asbestos [OR] hazardous materials abatement [OR] remedial project conducted at the above referenced site is complete.

The following documents relevant to this project have been prepared for separate review:

- Hazardous Building Materials Assessment, [Report Date], Pinchin File No. #
- Specifications, dated [Date], Pinchin File No. #
- Scope of Work, dated [Date], Pinchin File No. #

The scope of work involved the following:

- Removal and disposal of asbestos-containing [material] following [INSERT RISK LEVEL] procedures
- [ ]

The abatement work was performed between <DATE> to <DATE> by [Contractor] (Contractor) under contract to Pinchin or the Owner.

The following hazardous building materials are known to remain within the [building] [OR] project scope:

- [ ] description list remaining hazardous materials in the building
- If renovation work, list remaining hazardous materials in the project scope.

[NOTE: Include for Multi-Tenant buildings] HMIS information has been updated to reflect the post-abatement conditions.

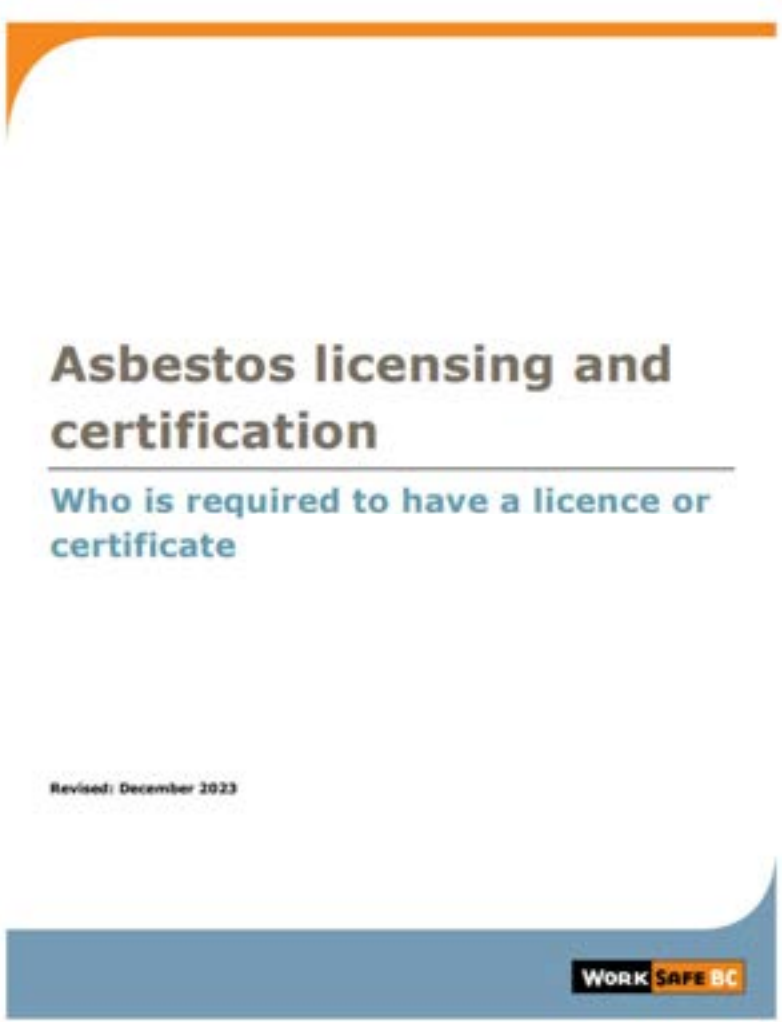
The abatement work was performed successfully in compliance with the [specifications] [scope of work] and acceptable standards.

[Example for Demolition] All identified hazardous materials that require abatement prior to machine demolition of the structure have been removed. [Example for Complete Removal of HAZ] All identified hazardous materials within the project scope have been removed. [Example for Partial Removal of HAZ -

SAMPLE

CERTIFICATION AND LICENSING

- Contractors / Abatement
  - Level 1, 2, 3 Worker Certification
  - Licenced Company
- Consultants / Survey and Assessment
  - Level S Worker Certification
  - Licenced Company
- Waste Haulers
  - Level 1 Worker Certification
  - Licenced Company
- Certificate is valid for 3 years
- License is valid for 1 year



TYPICAL WORKFLOW FOR A CONSTRUCTION PROJECT

PHASES	ACTION	DELIVERABLE
1. Design and Planning	Discuss project requirements with Consultant	
2. Pre-Construction	Consultant performs project-specific HBMA	HBMA Report / Scope of Work Specifications / Costing Estimate
3. Tender and Procurement	Consultant supports with tendering, walkthrough, addenda, bid review.	Addenda, Bid Evaluation, Recommendation for Award
4. Remediation	Consultant provides site reviews and air monitoring during abatement and contract management	Site Review Reports, Air Monitoring Reports, Change Order Valuation, Progress Payment Approvals
5. Project Closeout	Consultant to validate the work	Closure Report / Clearance Letter Certificate of Substantial Completion

TIPS FOR PROJECT SUCCESS

- Engage the Consultant at the design stage of the project.
- Provide accurate details on the scope of the renovation or restoration work (drawings, scope documents, etc.)
- Conduct detailed assessment with intrusive or destructive sampling.
- Include for the development of a scope of work or specifications which is not only beneficial for tendering and pricing “apples to apples”, but also for contractual obligations
- Be prepared for concealed or hidden materials and changes in scope that may not have been contemplated.

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TIPS FOR PROJECT SUCCESS

- Tender to qualified contractors who have completed this type of work before and carry the proper licensing, certification and insurance
- Monitor the work for compliance, scope and schedule
- Conduct site reviews, air monitoring and document management
- Document all work in a close-out / clearance report.

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THANK YOU / QUESTIONS

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