

Safety Hazards

Abatement of Hazardous Materials

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What is abatement, and what is its purpose?

Abatement is a process that involves identifying, controlling, and removing hazardous materials to minimize the risk of exposure and associated health effects. These materials often include [asbestos](#), [lead](#)-based paint, [mould](#), polychlorinated biphenyls (PCBs), [mercury](#), sewage, byproducts of fire damage, etc. Some of these materials are present in older buildings and were used as building materials before the knowledge that they are hazardous.

Abatement activities can be part of a restoration or construction project. They may also be required following a disaster, such as a fire or flood, and can be part of the remediation process.

Abatement activities can range from the complete removal of the hazardous materials to encapsulation or enclosure.

- **Complete material removal** involves removing the hazardous materials entirely from the premises or structure.
 - **Material encapsulation** involves sealing the material to prevent its release.
 - **Material enclosure** means building a physical barrier around the material.
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What is the process for the abatement of hazardous materials?

The abatement process will vary depending on the hazardous material being removed and the circumstances and events surrounding the scope of work. Many hazardous materials have a regulated assessment and removal process, and [jurisdictional](#) requirements should be verified and included in your safe work process. The following is an example of what you can expect to do during an abatement process.

1. **Site assessment and hazardous material sampling or testing:** The area where you plan to do abatement should be assessed and tested. Testing generally requires the expertise of an occupational (industrial) hygienist. Testing is the first step of the abatement process, providing details about the extent of the hazardous material(s) present. For example, the building's owner may be required to complete a hazardous material assessment before engaging an abatement team.

After an emergency, such as a fire, professionals, such as an occupational hygienist, conduct testing to assess the condition, including the hazardous materials present, which helps determine the remedial measures that will need to be taken.

2. **Scope of work (including sequence of work):** The scope of work should include the sequence in which the abatement of the hazardous materials will be removed, as well as the method in which they will be removed. Developing this scope may require the expertise of a subject matter expert with assistance from the occupational hygienist who took the initial samples.
3. **Safety Measures:** A [risk assessment](#) should be conducted specifically for each scope of work, factoring in safety considerations advised by the occupational hygienist in their assessment report. A safe work plan should be created for each scope of work, which includes the safety measures that will be taken, the training required, and the [personal protective equipment](#) needed.
4. **Disposal Methods:** After hazardous materials have been removed, they must be disposed of according to local, provincial, and federal regulations. Check with the local municipality or the [Ministry of Environment](#) and consider the environmental impact.

5. Site Decontamination: Site decontamination eliminates residual hazardous materials. Regulations for decontamination may vary depending on the type of structure, the hazards present, and jurisdictional requirements. Decontamination measures will depend on whether the structure will proceed with renovations or rebuilding, be reoccupied, or be demolished. Decontamination measures are to be taken to make a structure safe for re-entry. Check with the local regulator to confirm decontamination measures.

Site decontamination measures can include air or surface sampling. Some materials can linger in the air and on surfaces at levels above the allowable legal limit. Occupational hygienists may make recommendations about [control measures](#) such as cleaning procedures to follow during decontamination activities, using air purification devices such as air scrubbers, using negative air pressure, and using various control methods.

What are the hazards related to abatement activities?

Every scope of work will have different hazards. A hazard identification and risk assessment must be completed for every project. The following are hazards you may expect to encounter during abatement activities.

- Exposure to hazardous materials, dust and fumes,
- Exposure to chemicals, solvents, and [cleaning solutions](#)
- Exposure to biological hazards such as mould or sewage
- Fire and explosion hazards
- Hazardous byproducts resulting from fire or other events
- [Confined space](#)
- Oxygen-deficient environments
- [Electrical hazards](#)
- [Working at heights](#)
- [Hand tools](#)
- [Noise hazards](#)
- [Ergonomic issues](#), such as overexertion, awkward posture and repetitive motions
- [Heat Stress](#)
- [Cold stress](#)
- [Slips, trips and falls](#)
- [Cuts and abrasions](#)

- Poorly fitting [personal protective equipment \(PPE\)](#).
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What are some controls used in abatement operations?

Controls for abatement operations will vary, depending on the hazards present and the risk assessment. Controls may include:

- [Negative air pressure](#) enclosure to contain airborne contaminants
 - Isolation barriers such as containments
 - High Efficiency Particulate Air (HEPA) filtered exhaust ventilation
 - Wet methods for dust suppression
 - [Lock-out tag-out](#)
 - Showering before exiting the containment area, where applicable
 - Air monitoring
 - [Noise level assessment](#)
 - Exposure control plan
 - [Working at height fall protection plan](#)
 - Restricted access to areas that may be hazardous
 - Caution or danger signage
 - Caution or danger tape
 - [Housekeeping](#)
 - Training
 - [Ergonomic practices](#) - Avoid excessive lifting or repetitive motion where possible
 - Personal hygiene practices
 - Using [personal protective equipment](#), including wearing and removing PPE safely
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What is an exposure control plan?

An exposure control plan generally includes how an employer manages a worker's exposure to hazardous materials. This plan can consist of procedures, control measures, and practices that an employer will implement to minimize or prevent worker exposure to hazardous materials. Many jurisdictions have requirements for what should be included in an exposure control plan. Check your [jurisdiction's](#) requirements.

What are examples of specific control measures used during abatement?

[Control measures](#) should be determined from a [hazard assessment](#) and [risk identification](#) and may also be recommended by an occupational hygienist. [Control measures](#) commonly used during abatement can include any of the following. This list is not complete, and other measures may be required. Check your jurisdiction's legislation for the need for building containment controls and showers for abatement activities.

Containment

Containment describes an isolation system designed to contain (or hold) hazardous materials within a designated workspace where hazardous material is handled, removed, encapsulated, or enclosed. The purpose of containment is to reduce the exposure of workers, others, and the outside environment. A containment may include using tarps or impermeable materials to reduce the amount of dust that can travel to other areas.

A qualified person should assess the scope of work, design the containment space, determine the number of air filtration devices required, and determine if decontamination showers are required. An occupational hygienist may test the efficiency of the containment.

Negative air pressure enclosures

Containment may include negative air pressure enclosures that maintain negative air pressure inside the containment zone. Containments are equipped with air filtration devices (AFDs), often called negative air machines, air scrubbers, HEPA units, or air filters. The number of AFDs needed is determined by the cubic volume of the treated area and the air movement produced by your equipment. The National Institute for Occupational Health and Safety (NIOSH) states that an air exchange rate of 5 can be used as a guideline. NIOSH further notes that "Five ACH will not guarantee totally safe air in any space, but it reduces the risk of exposure to viral particles and other harmful air contaminants."

The calculation is:

Calculating Air Exchanges per Hour (AEH) (standard)

$\text{ft}^3 \times \text{AEH} / 60 = \text{cubic feet per minute of air movement required}$

$\text{m}^3 \times \text{AEH} / 60 = \text{cubic meters per minute of air movement required}$

Where:

ft^3 or m^3 = the volume of air in the area being treated

AEH = Air exchanges required (use a value from 4 to 6, depending on the degree of contamination)

60 = Converts Air Exchanges per Hour to Cubic Feet per Minute

Showers and change rooms

If your operation requires showers to help remove hazardous materials from the workers before they leave the worksite, the [showers](#) should be located within the containment area.

What is dispersed oil particulate (DOP) testing for filter systems?

A DOP test is a test done on air filtration devices (AFDs) to detect if there are any leaks in the filter installation, and if the filters are free of leaks and defects (small holes and other damage in the filter medium, frame, seal and leaks in the filter bank framework).

What training should workers involved in abatement activities have?

Training must be determined based on a hazard identification and risk assessment specific to the scope of work. Some jurisdictions may have mandatory training requirements.

- [Workplace Hazardous Materials Information System \(WHMIS\)](#) training covering the hazardous products used
 - Health effects associated with exposure to hazardous materials
 - Removal of hazardous materials, including any jurisdictional requirements for mandatory training for the removal of hazardous materials.
 - [Working from heights](#) training
 - [Confined space](#) training (if applicable)
 - [Musculoskeletal injuries \(MSDs\)](#)
 - Repetitive strain
 - [Heat stress](#)
 - [Personal protective equipment](#) training, including how to remove contaminated personal protective equipment without re-contaminating themselves
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What personal protective equipment can you expect to use during abatement activities?

Personal protective equipment must be determined based on a hazard identification and risk assessment specific to the activity. The industrial hygienist who performed the initial assessment may also advise on minimum requirements.

- [Respiratory protection](#)

- [Fit-testing](#)
 - Disposable coveralls/suits (impermeable)
 - [Safety footwear](#)
 - Gloves
 - [Eye and face protection](#)
 - [Hearing protection](#)
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