



DEPARTMENT OF OCCUPATIONAL SAFETY AND HEALTH  
MINISTRY OF HUMAN RESOURCES

GUIDELINES FOR  
**ASBESTOS  
REMOVAL**  
2017

# GUIDELINES FOR ASBESTOS REMOVAL 2017

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## PREFACE

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These Guidelines are cited as the Guidelines for Asbestos Removal. These guidelines describe the principles to be followed when selecting the most appropriate techniques for the safe removal of asbestos-containing materials (ACMs). The guidelines also present basic information on asbestos, sources and uses, health effects, asbestos removal procedure, and work practice control for those persons involved in removal activities.

Work practices and precautions vary considerably with the type of material being removed, the amount of asbestos it contains, its condition, and location. The objective of these guidelines is to present best practices in asbestos removal. Alternative practices are acceptable if they provide workers with the level of safety that is equal to or greater than the practices presented in these guidelines.

Employers and workers must understand the rationale for and the importance of managing asbestos in their workplaces as this will minimise and eliminate the associated occupational diseases due to asbestos.

These guidelines will be reviewed from time to time. Employers and workers are welcome to give any comment and recommendation to DOSH at any time so that improvements can be made to these guidelines.

Director General  
Department of Occupational Safety and Health Malaysia  
Ministry of Human Resources  
2017



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## ACKNOWLEDGEMENT

The Department of Occupational Safety and Health (DOSH) would like to thank and acknowledge the following Technical Committee and distinguished individuals for their contributions towards the development of these Guidelines.

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## 1-INTRODUCTION

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Asbestos is the common name given to a group of naturally occurring mineral silicates that can be separated into flexible fibres. The name asbestos comes from the Greek word meaning unquenchable or indestructible. There are two main mineralogical classifications of asbestos—serpentine and amphiboles—based on the rock types which form the asbestos. Each classification is further sub-divided as serpentine asbestos (chrysotile) and amphibole asbestos (amosite, crocidolite, fibrous tremolite, fibrous anthophyllite, fibrous actinolite).

The serpentine family consists of only chrysotile or white asbestos. It is a hydrated magnesium silicate having long wavy fibres that are white or off-white. Within the amphibole family, only amosite and crocidolite have significant commercial use. Amosite is often called brown asbestos and has much straighter and shorter fibres than chrysotile. Crocidolite is referred to as blue asbestos and has long straight fibres much like amosite. Asbestos is found in veins in the host rock and is produced in a commercially useful form by open pit mining and successive stages of crushing and aspiration of the ore. The fibres are then sealed in plastic bags for use in the manufacture of products containing asbestos. The chrysotile form accounts for approximately 90 percent of current world consumption. According to World Health Organisation (WHO), about 125 million people in the world are exposed to asbestos at the workplace<sup>1</sup>.

Asbestos-containing material (ACM) means any material or article that, as part of its design, contains asbestos. Many old buildings in Malaysia contain asbestos or have ACMs. Special precautions are needed in the removal, repairing, dismantling, demolition, renovation, maintenance, and alteration of structures in buildings containing asbestos. These guidelines are prepared for the guidance of those who undertake such work.

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<sup>1</sup>World Health Organisation. (2014). Chrysotile Asbestos.

Available: [http://www.who.int/ipcs/assessment/public\\_health/chrysotile\\_asbestos\\_summary.pdf](http://www.who.int/ipcs/assessment/public_health/chrysotile_asbestos_summary.pdf).

Last accessed 13th Feb 2017.



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## 2-PURPOSE

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The Guidelines provide guidance and best technical practice on how to manage asbestos removal in compliance with the Occupational Safety and Health (Use and Standards of Exposure of Chemicals Hazardous to Health) Regulations 2000 (USECHH Regulations) or as amended by the latest version. USECHH Regulations stipulate the duty of an employer to take actions required to eliminate or reduce the actual or potential exposure of a worker to chemicals hazardous to health.

## 3-SCOPE AND APPLICATION

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These guidelines apply to any asbestos removal at the workplace.

## 4-SOURCES AND USES OF ASBESTOS

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Asbestos has, in the past, been widely used in a variety of building materials and automotive parts. It may also be present in piping system mostly which were installed in factories or heat insulation materials.

The potential for an ACM to release respirable fibres depends largely on its degree of friability. Friable means that the material can be crumbled with hand pressure and is therefore likely to release fibres. The fibrous sprayed-on materials used for fireproofing, insulation or sound proofing is considered to be friable, and they readily release airborne fibres if disturbed. Materials such as vinyl asbestos floor tiles and roofing corrugated sheets are considered non-friable if intact and generally do not emit airborne fibres unless subjected to sanding, sawing or other aggressive operations. Asbestos-cement pipes or sheets can liberate airborne fibres if the materials are cut or sawed, or if they are broken.

Generally, the ACMs containing chrysotile are still being used in Malaysia. However, ACMs are no longer in use for the government building in accordance with the instruction from Public Works Department. The example of usage of asbestos in Malaysia is shown in the following table.

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**Table 4.1:** Usage of asbestos in Malaysia<sup>2</sup>

No.	Product	Usage
1.	Asbestos-cement	Widely used in roofing and ceiling of buildings, especially in rural area houses, water tanks, sewerage pipes, supply water pipes, drainage, pipes, refuse chutes, and chimney hoods
2.	Air conditioner duct insulation	Insulation
3.	Adhesive	Industrial adhesive
4.	Bituminous membrane	Used for water -proofing rooftops (usually flat rooftop) and floorings
5.	Cooling towers	Asbestos material was once used on the outer surface of cooling towers
6.	Exhaust pipe insulation	Insulation
7.	Pipe	Water delivery and drainage
8.	Vinyl floor tiles and sheeting	A supporting layer to the surface of which is made of tile or vinyl
9.	Brake and clutch pad	Numerous vehicles
10.	Gasket	Industrial uses (e.g. sealant)
11.	Blackboard	Painted asbestos cement sheets
12.	Fire blanket	Fire and heat insulation
13.	Glove	Hand protection
14.	Shoes and helmet	Foot and head protection
15.	Fire curtain	Fire protector in cinema between the stage and seats
16.	Fire door	Fire protection
17.	Fire insulator	Bag used for fire protection

<sup>2</sup>RMA-Perunding Bersatu Sdn. Bhd. (2011). *Kajian Profil Penggunaan Asbestos di Malaysia*.

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## 5-HEALTH EFFECTS

Asbestos fibres enter the body by inhalation of airborne dust or by ingestion and can become embedded in the tissues of the respiratory or digestive systems. Exposure to asbestos dust can cause numerous disabling or fatal diseases<sup>3</sup>. Inhaling or ingesting fibres from contaminated clothing or skin can also result in such diseases<sup>4</sup>. How far asbestos fibres penetrate into the lung tissue depends on their length, diameter, and shape. Longer fibres are screened more effectively by the nasal hairs. Inside the upper respiratory tract, fibres are deposited either by simple gravity or through impact at points where the air stream changes direction. The size of the deposits depend on both fibre diameter and fibre length.

There are four main diseases associated with inhalation of asbestos fibres<sup>5</sup>.

- Mesothelioma - a form of cancer mainly affecting the lining of the lungs
- Asbestos-related lung cancer
- Asbestosis - a non-malignant scarring of the lung tissue
- Non-malignant pleural disease (diffuse pleural thickening and pleural plaques)

### 5.1 Mesothelioma

Mesothelioma is a cancer which affects the lining of the lungs (pleura) and the lining surrounding the lower digestive tract (peritoneum). It is almost exclusively related to asbestos exposure and by the time it is diagnosed, it is almost always fatal<sup>6</sup>. Most deaths occurring now are a consequence of the lung latency period (i.e. the time between initial exposure to asbestos and the manifestation of the disease), which is typically between 30 to 40 years<sup>7</sup>.

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<sup>3</sup> Occupational Safety and Health Administration. (1995). Asbestos Standard for General Industry.

Available: <https://www.osha.gov/Publications/OSHA3095.html>. Last accessed 13 Feb 2017.

<sup>4</sup> Occupational Safety and Health Administration. (1995). Substance Technical Information for Asbestos-Non-Mandatory.

Available: [https://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=10002](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10002).

Last accessed 13 Feb 2017.

<sup>5</sup> British Lung Foundation. (2015). Asbestos-related conditions.

Available: <https://www.blf.org.uk/support-for-you/asbestos-related-conditions/what-is-asbestos>.

Last accessed 13th Feb 2017.

<sup>6</sup> Health and Safety Executive. Why is asbestos dangerous?

Available: <http://www.hse.gov.uk/asbestos/dangerous.htm>. Last accessed 13 Feb 2017.

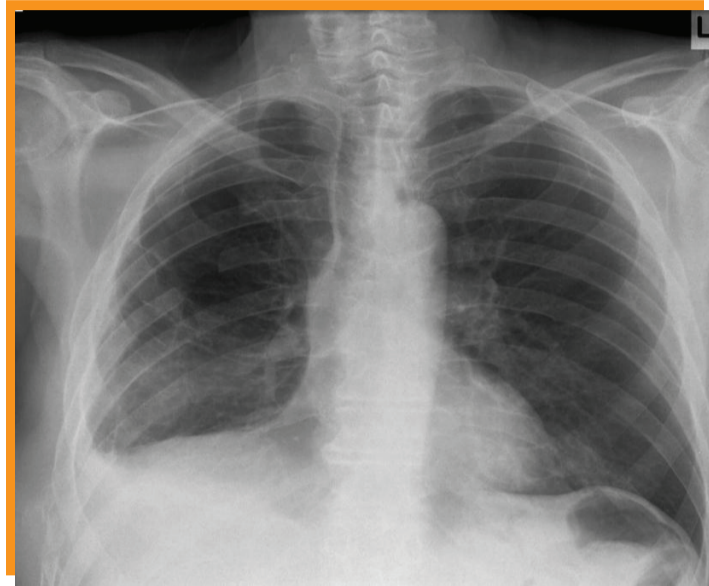
<sup>7</sup> Mills & Reeve. (2014). The Mesothelioma Act 2014.

Available: <http://www.mills-reeve.com/the-mesothelioma-act-2014-02-21-2014/>. Last accessed 13 Feb 2017.



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**Figure 5.1** : Chest X-ray demonstrates opacification of the right costophrenic angle with potentially behaviour of mesothelioma<sup>8</sup>

## 5.2 Asbestos-related Lung Cancer

Asbestos-related lung cancer is the same as (looks the same as) lung cancer caused by smoking and other causes. Individual cases usually have no specific clinical signs to suggest a particular cause, and factors such as asbestos exposure and smoking often act together to increase the risk. The overall scale of asbestos-related lung cancer deaths has to be estimated rather than counted. Research suggests there are probably about as many asbestos-related lung cancer deaths each year as there are mesothelioma deaths<sup>9</sup>.

## 5.3 Asbestosis

Asbestosis is a form of pneumoconiosis defined as lung fibrosis (a serious scarring condition) caused by the inhalation of asbestos fibres. The disease is characterised by scarring and inflammation of the lung tissue. It is an irreversible condition with no cure. Symptoms include shortness of breath, persistent cough, fatigue, laboured and rapid breathing, and chest pain. These can seriously affect normal daily activities and lead to various complications which can be fatal. It is generally recognised that heavy asbestos exposures are required in order to produce clinically significant asbestosis within the lifetime of an individual. Current trends, therefore, still largely reflect the results of heavy exposures in the past<sup>10</sup>.

<sup>8</sup> Radiopaedia.Org. Mesothelioma. Available: <https://radiopaedia.org/cases/mesothelioma-3>. Last accessed 13 Feb 2017.

<sup>9</sup> Health and Safety Executive. Asbestos related lung cancer.

Available: <http://www.hse.gov.uk/Statistics/causdis/lungcancer/index.htm>. Last accessed 13 Feb 2017.

<sup>10</sup> Health and Safety Executive. (2016). Asbestosis in Great Britain 2016.

Available: <http://www.hse.gov.uk/statistics/causdis/asbestosis/asbestosis.pdf>. Last accessed 13 Feb 2017.

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**Figure 5.2:** Asbestosis-occupational history of exposure to asbestos<sup>11</sup>

## 5.4 Non-malignant Pleural Diseases

Non-malignant pleural disease is a non-cancerous condition affecting the outer lining of the lung (the pleura). It includes two forms of disease: diffuse pleural thickening and the less serious pleural plaques a problem that happens after heavy asbestos exposure many years ago<sup>12</sup>. The lining of the lung (pleura) thickens and swells. If this gets worse, the lung itself can be squeezed, and can cause shortness of breath and discomfort of the chest<sup>13</sup>.

<sup>11</sup> Radiopaedia.Org. Asbestosis. Available: <http://radiopaedia.org/articles/asbestosis>. Last accessed 13 Feb 2017.

<sup>12</sup> Health and Safety Executive. Non-malignant pleural disease.

Available: <http://www.hse.gov.uk/Statistics/causdis/pleural/index.htm>. Last accessed 13 Feb 2017.

<sup>13</sup> Health and Safety Executive. Why is asbestos dangerous?

Available: <http://www.hse.gov.uk/asbestos/dangerous.htm>. Last accessed 13 Feb 2017.

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## 6-ASBESTOS REMOVAL PROCEDURE

Asbestos removal involves hazards and risks either to the removal workers or other workers and the public who are exposed to the environment during the disposal. Therefore, the removal of asbestos should be carried out by well-trained workers using the right tools and equipment to perform such work. The processes involved in the work of asbestos removal are shown in Figure 6.1.

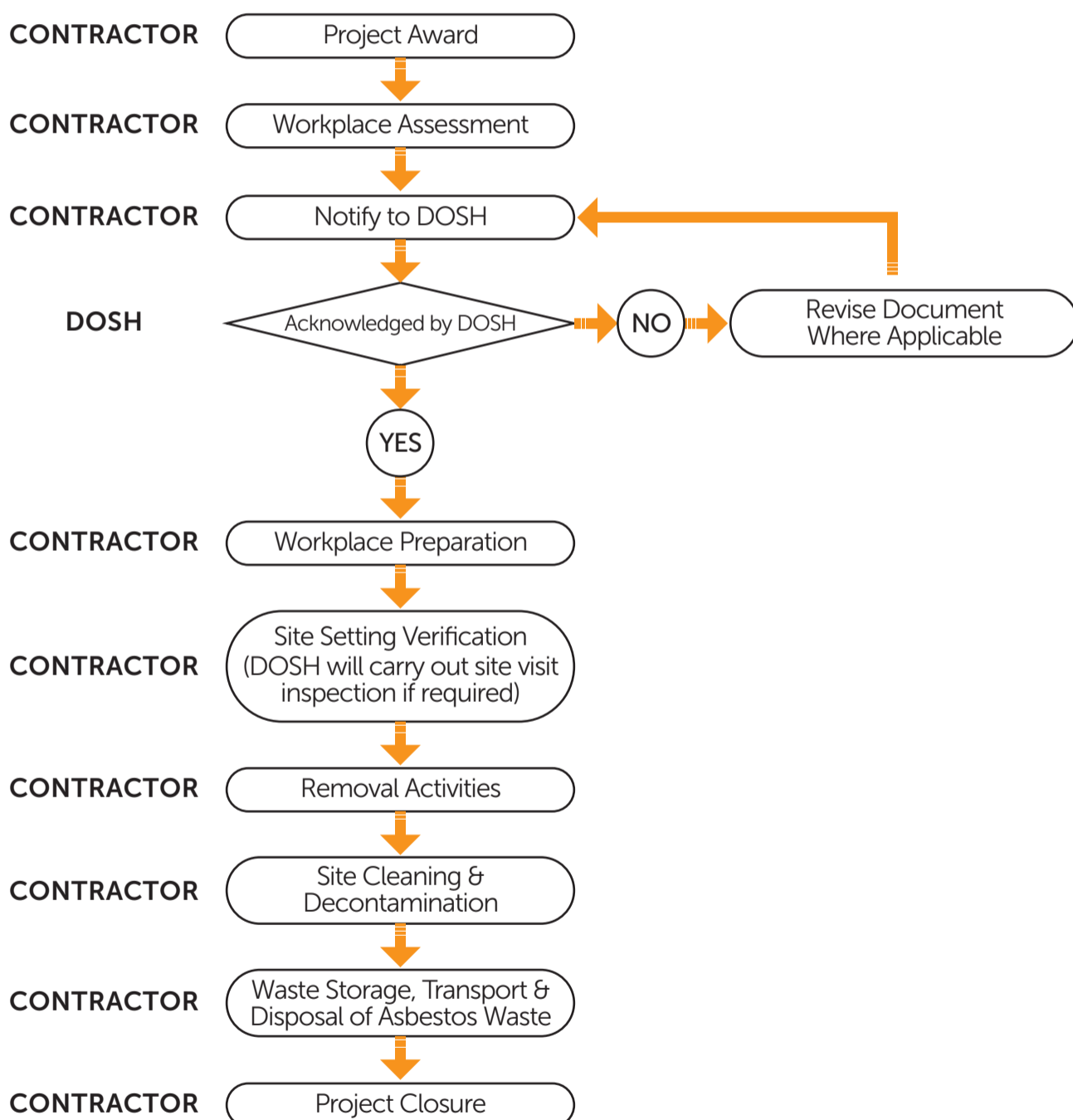


Figure 6.1: Flow chart for asbestos removal work procedure



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## 6.1 Preliminary Process

The employer which needs to carry out asbestos removal work will award the project to a suitable selected contractor. The selection of the contractor is based on the capability of the contractor to do the job, experience, and equipment.

## 6.2 Workplace Assessment

Before any activities relating to asbestos removal can begin, a workplace assessment must be conducted. The assessment includes:

- a) Hazard identification, risk assessment and risk control (HIRARC); and
- b) Chemical health risk assessment (CHRA)

For HIRARC, the assessment needs to follow the Guidelines for Hazard Identification, Risk Assessment and Risk Control (HIRARC) established by DOSH. For CHRA, the assessment needs to be conducted by an assessor. As asbestos is categorised as a chemical hazardous to health, the CHRA is to be conducted according to the USECHH Regulations 2000 or as amended by the latest version.

## 6.3 Acknowledgement from DOSH

The asbestos remover or appointed contractor must submit a number of documents for DOSH's acknowledgement at least two weeks before the workplace preparation activity. The documents which need to be submitted include:

- a) Cover letter;
- b) Project background;
- c) Work flow;
- d) Method of identifying asbestos (if any);
- e) HIRARC and CHRA reports;
- f) Safe operating procedure;
- g) Information on ACM disposal;
- h) Latest annual medical surveillance record for workers;
- i) Training records; and
- j) Information on trained persons.

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## 6.3.1 Roles and responsibilities of the contractor

The contractor should appoint a supervisor among trained persons to supervise the asbestos removal. The appointed supervisor should:

- a) Prepare an asbestos removal plan of work and ensure that it is adequate, suitable, and effective;
- b) Carry out site setting verification;
- c) Advise on all methods and measures related to asbestos removal;
- d) Ensure that the asbestos removal is carried out in accordance with the asbestos removal plan of work;
- e) Co-ordinate, manage, and supervise the asbestos removal; and
- f) Ensure that only trained persons carry out the asbestos removal.

The contractor should take action on the recommendations of the HIRARC and CHRA reports.

## 6.3.2 Trained person

Workers involved in asbestos removal should be adequately trained before they can be deemed as a trained person. The training programme must include information on the following:

- a) Harmful properties of asbestos and their hazardous effects on health;
- b) Materials, substances, products, and articles which contain or are likely to contain asbestos;
- c) Work, processes or operations which may result in exposure to asbestos and preventive measures to minimise such exposure;
- d) Safe work procedure and use of PPE;
- e) Asbestos decontamination procedure;
- f) Asbestos waste handling procedure;
- g) Purpose and requirements of medical surveillance; and
- h) Action to be taken during accident, incident or emergency related to unplanned release of asbestos fibres.

Training and the training programmes must be reviewed periodically at least once every two years to update knowledge and capabilities, taking into account any significant changes and/or improvements in the type of work, work methods and/or equipment available for use.

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## 6.4 Workplace Preparation or Site Set-up

Workplace preparation or site set-up includes preparation of work practice control, isolation of asbestos removal area, and changing facilities.

### 6.4.1 Preparation of work practice control

- a) An asbestos removal area should be established within which there is expected to be exposure to airborne asbestos fibres during the asbestos removal.
- b) Only trained persons should be allowed to enter the asbestos removal area.
- c) Barriers or barricades should be erected to prevent unauthorised persons entering the asbestos removal area.
- d) Any ventilation system serving the asbestos removal area should be disabled and the ventilation ducts leading to and from the asbestos removal area should be sealed.
- e) All movable objects should be removed from the work area to prevent these from being contaminated with asbestos.
- f) Immovable objects should be covered completely with suitable material, preferably with double layer polyethylene sheet, and this material should be treated as asbestos contaminated material and dispose of as an ACM at the end of the project.
- g) If objects have already been contaminated, they should be thoroughly cleaned with an industrial vacuum cleaner equipped with a HEPA filter or wet wiped before they are removed or covered.
- h) There should be no eating, drinking or smoking in the asbestos removal area.
- i) Warning signs should be displayed at each asbestos removal area, and posted at all approaches to the asbestos removal area. Signs should give warning of the hazards, written in national and English languages, and printed in dark red against white background.



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CANCER AND LUNG DISEASE HAZARD  
BAHAYA KANSER DAN PENYAKIT PARU-PARU

AUTHORISED PERSONNEL ONLY  
KAKITANGAN YANG DIBENARKAN SAHAJA

RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THE AREA  
RESPIRATOR DAN PAKAIAN PERLINDUNG DIPERLUKAN DI KAWASAN INI

**Figure 6.2:** Example of a warning sign

## 6.4.2 Preparation of isolation of asbestos removal area

- Where walls, floors, and ceilings do not completely enclose the asbestos removal area, the asbestos removal area should be isolated from the surrounding environment by means of impermeable cover materials such as polyethylene sheeting or other suitable materials.
- The cover materials should be secured to the ceiling and floor using adhesive tape.



**Figure 6.3:** Isolation of asbestos removal area

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- c) Isolated asbestos removal area should be maintained at a negative pressure of at least 5 pascals, and supplied with an air exchange rate of at least 8 air changes every hour. Air that is removed from the asbestos removal area should pass through a HEPA filter (Figure 6.4).



**Figure 6.4:** Air pump to maintain air change per hour

- d) On completion of the asbestos removal, the cover materials should be cleaned either by vacuuming or damp wiping, after which it should be placed in a dust-tight, appropriately labelled container. Please refer to Para 6.8.



**Figure 6.5:** Equipment used are wrapped in polyethylene bags

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## 6.4.3 Preparation of changing facilities

- a) Changing rooms should be provided for workers to remove asbestos-contaminated work clothing. This room should be supplied with impermeable, labelled bags and containers for the containment and disposal of contaminated work clothing and equipment. Use of these changing rooms prevents the spread of asbestos beyond the contaminated area. An additional decontamination facility should be attached to the containment for waste transfer. The facility is divided into three distinct rooms:
  - (i) Dirty room
  - (ii) Shower room
  - (iii) Clean room
  
- b) The dirty room should have provision for:
  - (i) Hosing down contaminated clothing and footwear or cleaning it with a vacuum;
  - (ii) Cleaner fitted with a HEPA filter;
  - (iii) Storage for contaminated clothing and footwear;
  - (iv) Bags and containers for waste materials; and
  - (v) Air flow towards the removal area.
  
- c) Compressed air must not be used to clean up or remove dust from work surfaces or clothing. Cleaning must be done with a vacuum cleaner fitted with a HEPA filter, by wet wiping or by damp mopping.
  
- d) The shower room should be equipped with air flow towards the dirty decontamination area.



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**Figure 6.6:** Example of shower facilities

- e) The shower room is to allow workers to wash themselves after asbestos removal.
- f) The clean room should have provisions for:
  - (i) Storage of individual respirators in containers or lockers;
  - (ii) A mirror to assist in donning respiratory protective equipment;
  - (iii) Storage and change of personal clean clothing; and
  - (iv) Separate storage of clean and used towels.
- g) All water from the decontamination facility should meet the specification required by the relevant authority before it can be discharged into the drain.
- h) The changing room and shower room should be contiguous, and isolated from each other by a double curtain of polyethylene sheeting or other suitable material. They should be located as near as reasonably practicable to the asbestos removal area.
- i) Disposable coveralls should be used as protective clothing.



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j) Procedures for entering and leaving the workplace are as listed below:

(i) Entering the workplace (from 1 to 3)

<b>(3) Dirty Room</b>  - Put on other required PPE based on the condition of workplace;  e.g. safety helmet, goggle, gloves, safety boots, etc.	<b>(2) Shower Room</b>  Pass by (no shower required)	<b>(1) Clean Room</b>  - Remove clothes and personal belongings - Put on the protective clothing - Put on respirator *respirators must always be donned in the clean room - Carry out fit test for respirator
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ii) Leaving the workplace (from 3 to 1)

<b>(3) Dirty Room</b>  - Before entering the dirty room, remove the asbestos material on the worker or their protective equipment with a vacuum cleaner fitted with a HEPA filter. - Remove all protective clothing and equipment except the worker's respirator *any waste material must be placed in appropriate bags for disposal.	<b>(2) Shower Room</b>  - Worker must shower while wearing their respirator. - Rinse the respirator's face piece and associated harness thoroughly. - Removed the respirator after the shower completed.	<b>(1) Clean Room</b>  - Put on personal clothing. - Clean and disinfect the respirator thoroughly and stored in designated container.
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- (iii) Hand tools and supplies are kept in an equipment transfer room associated with the dirty room. This room is also used when transferring asbestos waste containers or any equipment that has been decontaminated.
  
- (iv) A final decontamination, including wash down and cleaning of the enclosure area with a vacuum cleaner fitted with a HEPA filter, removes all visible signs of asbestos contamination from the enclosure and equipment. This decontamination must be completed before dismantling the enclosure barriers.

## 6.5 Site Setting Verification

Verification must be conducted to ensure that there is no release of asbestos fibre and possibility of cross-contamination at the site. Cross-contamination may happen when asbestos fibres attached to a person's skin or underwear are carried to uncontaminated places, released and then inhaled. This verification must include, but is not limited to:

- a) Cross-examination of changing facilities, isolation sheet, and ventilation systems, if any;
  
- b) Check all equipment – sampling pump, HEPA filter and vacuum, air pump and powered air respirator (if applicable) are all working correctly;
  
- c) Where negative pressure is required, test the air flow in that area to ensure that the appropriate equipment is working correctly; and
  
- d) If using wet method, ensure that all work areas have been thoroughly wet down.

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## 6.6 Removal Activities

Workers must comply with all procedures relating to safety and health at the workplace. Safe operating procedure must be followed and suitable personal protective equipment must be worn to prevent exposure from any accidental release of airborne asbestos.

### 6.6.1 Tools and equipment

- a) Power-operated tools should not be used to remove ACM except for the removal of screws (unless they are incorporated with dust suppression or dust extraction attachments with a HEPA filter).
- b) Compressed air tools should not be used to remove ACM (unless they are used in conjunction with a ventilation system designed to capture the dust cloud created by the compressed air).
- c) Asbestos-containing sheets or panels should be removed with minimal breakage. The removed sheets or panels should be lowered to the ground to minimise dust generation.
- d) All tools and equipment must be left in the removal area until the completion of the removal job. All accessible surfaces must be wiped over and vacuumed thoroughly before equipment is removed.



**Figure 6.7:** Example of a personal air sampling device

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## 6.6.2 Removal methods

Methods carried out should minimise the release of asbestos fibre to the atmosphere during and after the removal process. Selection of the appropriate method for asbestos removal is usually determined by the nature of the ACMs and their location.

### a) Wet method

- i) This method is suitable for ACMs that are not covered with other material (e.g. coated with paint or metal cladding). The purpose is to ensure that asbestos fibres do not become airborne.
- ii) A wetting agent, e.g. water or polyvinyl acetate, should be applied by means of an airless sprayer to the entire surface and depth of the ACMs.
- iii) The water spray should be directed at the point of removal or breakage of the ACMs.
- iv) Wetting should be done at the beginning of the asbestos removal as well as continually throughout the duration of the removal work.
- v) High pressure water or other fluids should not be used to clean up or remove asbestos dust from any surface.
- vi) The ACMs which have been removed should also be wetted down until disposal.
- vii) These materials should not be left lying about the site where they may be crushed.



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## **b) Dry method**

The dry method is not preferred and it can only be used if there is no practicable alternative method. For example, if there are live electrical conductors or electrical equipment at the workplace, the wet method cannot be used because the conductors or equipment could be permanently damaged or become dangerous when in contact with water. The dry removal method must be justified by the work place assessment and clearly detailed in the safe operating procedure.

If the dry method is used, the following controls should be implemented:

- i) Enclose the asbestos removal area as far as is practicable.
- ii) Fully enclose the asbestos removal area with impermeable material. Ensure all workers involved in the removal operation wear full personal protective equipment at all times.
- iii) Wherever reasonably practicable, a HEPA-fitted vacuum cleaner should be used to minimise the generation of airborne asbestos fibres as much as possible.
- iv) The waste material should be immediately placed in appropriate wetted containers to control fibre release in the asbestos removal area.

## **c) Glove bag method**

- i) This method is suitable for the removal of asbestos-containing gaskets.
- ii) The glove bags are made from strong clear plastic material, e.g. heavy duty polyethylene, and are designed to provide a temporary enclosure for small removal work. The bag must not be reused.
- iii) The wetting agent must be applied through an entry port (pre-cut port) as provided in most glove bags. Asbestos that fall into the bag must be thoroughly saturated with wetting agent.
- iv) Decontamination of personnel and tools after job completion must be in accordance with the site cleaning procedure.
- v) Asbestos waste in the bag must be sealed and disposed of accordingly with the ACM disposal procedure.

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## 6.6.3 Personal protective equipment

### 6.6.3.1 Respirators



**Figure 6.8:** Respirators for asbestos fibre

- a) Workers carrying out asbestos removal or any persons entering the asbestos removal area should wear a respirator with a HEPA filter.
- b) Respirators should be properly maintained and regularly cleaned. The filters should be changed whenever an increase in breathing resistance is detected.
- c) Every asbestos worker should be instructed and trained in the use of respirators.
- d) Workers wearing respirators should be allowed to wash their faces and respirator face pieces whenever necessary to prevent skin irritation. This should be done outside the asbestos removal area.
- e) Respirators should be issued to workers on a personal basis. The respirators should be tested for correct size and fit.

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## 6.6.3.2 Protective clothing



**Figure 6.9:** Asbestos removal worker wearing a full PPE and respirator

- a) Disposable coveralls or similar full-body protective clothing, including snug-fitting wrist, ankle and neck cuffs, head coverings, gloves, and foot coverings, should be worn by all asbestos workers. Such protective clothing should not have pockets and should be made of a material which does not readily retain or permit penetration of asbestos fibres.
- b) On completion of the asbestos removal, the work clothing should be vacuumed or wet wiped before removal to minimise the dispersion of asbestos fibres. Blowing or shaking should not be allowed to remove asbestos fibres from work clothing.
- c) The removed work clothing should be disposed of in closed and labelled containers that prevent the dispersion of the asbestos fibres into the surrounding environment.
- d) The removed work clothing should be disposed on-site.
- e) Contaminated work clothing taken out of the changing room or the asbestos removal area should be transported in sealed impermeable bags or other closed impermeable containers. These containers should be appropriately labelled.

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## 6.7 Site Cleaning And Decontamination

At the end of an asbestos removal related activity, the contractor must ensure the area is clean and safe for people to enter (as well as decontaminating themselves) before leaving the asbestos removal area.

Any asbestos-contaminated dust and debris must be collected in a safe manner and the area must be decontaminated (paying particular attention to walls, ledges, fittings and furnishings). An industrial vacuum cleaner fitted with a HEPA filter can be used for this purpose, but workers must be trained in the safe use of the vacuum, including how to empty and dispose of the contents as asbestos waste. An alternative method is to use wet rags to wipe dust from surfaces. Any used rags must be disposed of as asbestos waste. The following are items to be considered after completion of asbestos-related activities:

### a) Decontamination of tools and equipment

All tools and equipment used during the asbestos-related activity need to be decontaminated using the HEPA vacuum or wet rags or rubber or plastic dustpans, squeegees or shovels before they are removed from the asbestos removal area. HEPA vacuums shall be used to clean all surfaces after gross clean-up.

In some cases, solvent-based cleaning products may assist in cleaning and extending the life of the tools and equipment but prior to using such cleaning products, appropriate controls need to be in place. If tools and equipment, such as the vacuum, cannot be decontaminated in the asbestos removal area and are to be re-used for an asbestos-related activity, they should:

- i) Be tagged to indicate asbestos contamination.
- ii) Be double bagged in clearly labelled asbestos bags with an appropriate warning statement (the bag must be decontaminated before being removed from the area).
- iii) Remain sealed until they have been decontaminated or the commencement of the next asbestos-related activity (where the equipment can be taken into the next asbestos-related activity area and re-used under controlled conditions).

PPE should be worn when opening the bag to clean or reuse the tools and equipment. In some circumstances, it may be better to dispose of the contaminated tools and equipment depending on the extent of contamination, the difficulty of decontamination, and the ease of replacement.



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## **b) Personal decontamination**

Personal decontamination must be undertaken before workers leave the asbestos removal area at any time. Asbestos-contaminated PPE must not be taken out of the asbestos removal area except for disposal purposes where it is double bagged, sealed, and labelled. These practices help to prevent contamination of other areas in the workplace.

Before leaving the asbestos removal area, workers should remove all visible dust from their protective clothing and footwear using an asbestos vacuum cleaner and/or wet wiping with a damp rag. Use damp rags with a gentle patting action (rubbing can disturb fibres) or spray overalls with a fine mist to suppress the dust. Where there are two workers, they can help each other.

While still wearing their respirators, workers should carefully peel off the coveralls inside out and then place them into an asbestos-waste container for disposal. Respiratory protective equipment must be worn until all contaminated coveralls and clothing has been vacuumed and/or removed and bagged for disposal, and personal washing has been completed. After removing their respirator, workers need to wash their face and hands and clean under their fingernails. Wash all exposed skin surfaces prior to removing respirators. All persons in the work area must properly decontaminate themselves prior to leaving the work area. This is to be done under all circumstances, including prior to drinking, eating, using a bathroom, etc.

## **c) Dust**

During and after the asbestos removal, the asbestos removal area and all other asbestos contaminated surfaces should be kept as free as possible from accumulation of asbestos-containing waste or dust by using industrial vacuum cleaners equipped with HEPA filters or by the wet cleaning method. Accumulated dust shall be vacuumed and/or wet cleaned off in the case of all surfaces on a daily basis, using HEPA vacuum and/or wet cleaning methods. Drop sheets must be wetted, folded in on themselves to contain dust, properly bagged, and disposed off as asbestos waste.

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## 6.8 Storage, Transport, and Disposal of Asbestos Waste

### 6.8.1 Storage

ACM waste, debris, bags, containers, equipment, and asbestos-contaminated clothing and sheeting consigned for disposal should be consolidated and stored in a designated asbestos waste area.

### 6.8.2 Transport and disposal

- a) Prior arrangement must be made with a licensed contractor to deliver asbestos containing waste to assigned dump sites. Transport drivers must be informed on the precautions that must be taken.
- b) Containers of asbestos waste should be loaded onto the transport vehicle in a careful manner so as to prevent damage to the sealed containers.
- c) The vehicles used to transport containers of asbestos waste should have enclosed compartment or canvas sheets to prevent damage to the containers and also to prevent fibre release.

The details of the waste storage, transport, and disposal of ACM wastes (SW 201) must refer and comply with the relevant regulatory requirements, including the Environmental Quality (Scheduled Wastes) Regulations 2005 and Guidelines for Packaging, Labelling and Storage of Scheduled Wastes in Malaysia published in 2014 or as amended by the latest version enforced by the Malaysia Department of Environment (DOE).

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ISBN 978-983-2014-89-8



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