

SUPPORT MATERIALS

LEARNING MATERIALS

Asbestos removal

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IMPORTANT PLEASE NOTE

These materials have been adapted from learning resources developed for superseded National Training Package BCG98. The amendments are essential to meet requirements for the current packages BCC03 and BCG03.

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INTRODUCTION

This learning package is intended for use by those completing the Competency Unit **CPCCE3014A - Bonded Asbestos Removal**

The theoretical components of this package will enable you to complete the practical requirements of this module. All set tasks, including the activities and demonstrations, will show how the theory or content can be applied in a practical manner in on-site or simulated on-site conditions

The competency unit deals with the knowledge and skills required to safely remove and seal asbestos and decontaminate workers involved in these operations and so includes specific details on:

- Hazards of asbestos;
- Decontamination chamber, assembling and testing;
- Personal protective equipment;
- Methods to remove various types of asbestos;
- Methods to remove waste from site;
- Transportation and disposal requirements;
- Procedures to demobilise removal equipment and cleaning of tools;
- Decontaminating workers;
- Maintenance and storage of personal protective equipment; and

Two Assessment Tasks meet the requirements of the *Elements* in this competency unit:

Assessment Tasks – Refer to separate document

SECTIONS 1 & 4: These contain learning resource material, self-checks required for the successful completion of the Assessment Criteria as shown in the Assessment Specifications for Task 1.

SECTIONS 2, 3, 5 & 6: In a similar manner, these sections contain the information as well as practical work that will help you successfully complete Assessment Task 2.

As well as self-check exercises and practical activities, your instructor will schedule additional oral and/or written tests which may be similar to the self-check exercises. These tests will satisfy specific Assessment Criteria in the Assessment Tasks and will apply to your work environment.

When you have achieved all the Assessment Criteria in Assessment Tasks 1, 2 and 3 and your work has been checked and certified by your instructor, you will have successfully completed the *Elements* which make up the competency unit

WHAT IS PROVIDED?

You will be provided with the essentials to successfully complete this competency unit:

- a learning package;
- materials, tools and equipment;
- sets of relevant plans and specifications;
- access to a skill bay; and
- appropriate protective equipment.

WHAT YOU PROVIDE?

- appropriate personal protective clothing etc - to be advised by your instructor

HOW TO USE THIS PACKAGE

This package has been designed so that you can work and learn at your own pace, incorporating into your own learning program.

- demonstrations of practical skills by your instructor or experienced tradesperson;
- planned and supervised practical application of your knowledge and skills;
- instruction in, and application of, safe working practices; and
- personal progress indicators through self-check exercises and practical activities.

It is suggested that you work through the sections of the package in the order they are presented.

At times you will find a *diagram on a facing page* opposite the text. Such Figures will be referred to in the text.

By all means, *fast-track* through any aspects/areas of these notes where you feel confident.

Self-Check Exercises have been included so that you can measure your own progress. These exercises, however, are not part of the formal assessment of competency.

GETTING TO “KNOW THE PACKAGE”

Here is a strategy which may help you become familiar with the contents of this package.

- **Survey** Scan the whole package

Read the *contents* page and the *introduction*, then flip through the pages - glance at the headings.

Notice that there are set *tasks* to be completed. The *content* relates to these tasks.
- **Ask** Ask about any topics, terms or details that are not clear to you at this stage.
- **Read** Read through the material, but do it *actively*. *Jot* down points, *underline* or *highlight*.

Link the information with what you know already.

Let the *headings* and *sub-headings* help you organise information.

Remember *that you will need the content to complete the tasks*.
- **Review** At various stages, you will be directed to review the main points or complete a *Self-Check Exercise* to indicate how you are progressing.

Make your own *notes* as well.
- **Instructor** Throughout this package, you will be required to attend practical *demonstrations* and receive instruction in the use of materials, tools and equipment.

Ask your instructor if you have any *problems* with:
 - interpretation of content;
 - procedures or processes; or
 - availability of resources

KEY TO SYMBOLS

Symbols are placed in the left hand margin to draw attention to the type of information commencing at that point.

The symbols used in this package are:

READ	Read	<i>This is the essential information for the module.</i>
DEMONSTRATION	Instructor Demonstration	<i>At times, your instructor will give practical advice and demonstrate the use of tool/equipment.</i>
ACTIVITY	Written Activity	<i>These are your progress indicators. Typical answers are also included.</i>
PRACTICAL ACTIVITY	Practical Activity	<i>The two activities allow for the application of the theory components.</i>
SITE VISIT	Site Visit	<i>Your instructor will schedule visits to appropriate sites, when appropriate.</i>

SUMMARY OF TRAINING SPECIFICATIONS

Unit Number And Title **CPCCE3014A Bonded ASBESTOS REMOVAL**

Pre-requisites Concurrent assessment and pre-requisite relationship for this unit are:

Pre-requisites:
CPCCOHS1001A Construction Induction

Elements of Competency

- Plan and prepare
- Prepare asbestos removal site
- Encapsulate asbestos area
- Remove asbestos material
- Carry out decontamination process
- Clean up

Delivery/Assessment Delivery methods must provide for the demonstration of competence in skills specified in all elements of competency, either in on-site or simulated on-site conditions.

Competency in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role

Note: Please refer to National Training Package for full details for this unit of competency

Section Overview

Section 1: Identifying Asbestos Types and Health Hazards

Encapsulate and Remove Asbestos

In this section you will find learning resources to support the underpinning knowledge and skills relating to:

1. Plan and prepare

SECTION 1 - IDENTIFYING ASBESTOS TYPES AND HEALTH HAZARDS

READ

INTRODUCTION

The first section of the package deals with two main aspects:

- **Identifying asbestos types; and**
- **Health hazards of various asbestos products.**

These two areas include the essential information you will need to partly complete Assessment Task 1 which addresses:

1. **Identify asbestos types from occupational Competent Person reports.**

The information presented in this section will allow you to cover two specific operations:

- the ability to identify various forms of Asbestos from Competent Persons reports and samples provided; and
- an understanding of the health hazards of various asbestos products.

The details required for these operations will be presented under *three topics*:

- Asbestos Types
- Uses and Applications
- Health Hazards.

NOTE: Local Authority and individual State/Territory Regulations may vary. Therefore, the appropriate authority must be consulted before commencing any asbestos removed and disposal work.

TYPES AND HEALTH HAZARDS OF ASBESTOS PRODUCTS

Asbestos is a naturally occurring mineral that has excellent insulating properties. As such, it was used extensively for all kinds of insulation, pipe insulation, brake drums, boiler fire boxes as well as structural insulation on steel beams.

During the 1950's and through to the mid 1970's, asbestos was used extensively for the fire proofing, thermal or acoustic insulation of non domestic buildings in a sprayed form where a paste could be made up and the mixture applied through a hose. In addition, there were manufactured products which contained a proportion of asbestos (such as Hardiflex) which were used extensively in panelling of one kind or another.

Asbestos separates into fibres when processed, fibres that will not burn, break down or decompose. Fibres, when magnified, have a tube-like structure and appearance and vary quite considerably in length.

1. ASBESTOS TYPES

In Australia, there were 3 types of asbestos in common use:

- Chrysotile - White asbestos
- Amosite - Grey asbestos
- Crocidolite - Blue asbestos

The colour identification relates more to the mining source rather than the installed material. While the colour as installed is some guide it isn't foolproof. There is some evidence that Crocidolite is more likely to affect workmen, (it has smaller fibres) however, all asbestos must be considered dangerous.

Chrysotile

Chrysotile fibres appear to be transparent or whitish in colour. They will turn brown when exposed to heat. The body of the fibre has a herring-bone effect, while the ends of the fibres are similar to frayed rope.

Amosite

Amosite fibres are brown in colour and the body of the fibre has a smooth spear-like appearance, while the ends have a broken type similarity.

Crocidolite

Crocidolite, other than being bluish in colour, fibres are almost identical to amosite. Amosite and crocidolite fibres, commonly occur together in natural form. It is the presence of these two fibres that warrant the main concerns.

2. USES AND APPLICATIONS

Due to its accessibility, excellent structural qualities and resistant factors, it was one of the most widely used minerals. Asbestos was spun, woven into fabrics, curtains, compressed into blocks, hot pads, tiles, brake linings, filters and various insulation, construction and household products.

Asbestos was used quite extensively as a sprayed on application for fire protection and insulation purposes. Schools, factories, warehouses, industrial complexes, airport hangers, ships, shopping centres and residential complexes are some of the areas where it has been applied. It was also used in the wrapping of boilers, hot water and steam pipes, to protect and reduce the hazard created by them. This is called lagging material.

3. HEALTH HAZARDS

The health hazard resulting from asbestos comes from the ability of the substance to form a dust and the dust formed consists of minute fibres whose shape is hooked.

Everyone has been subjected to dust of one kind or another, has inhaled it and the particles have been deposited on the lining of the lung. The lung tissue has a mechanism where it moves the particles out, sweeping them towards the mouth, wrapping them in mucous. That is why you cough or clear your throat occasionally. However, the hook of the asbestos fibre allows some of the asbestos fibres to stick in the lining of the lung. When that happens the lung tissue reacts against the foreign matter and in some cases, damage occurs.

The damage results in disease, there are two diseases recognised as being caused by asbestos:

- **Asbestosis**
- **Mesothelioma**

It should be noted that other forms of lung cancers are also caused by asbestos dust. Other studies have shown that cancers of the digestive system, kidneys and lymph glands are more common amongst asbestos workers than in the general population. Exposure to Asbestos fibres is the only known cause of these diseases, which generally develops 15 to 50 years after initial contact. This is known as the **LATENCY PERIOD**.

- **Asbestosis**

Asbestosis occurs when the lung has reacted to a lot of asbestos over time and trying to protect itself forms scar tissue on the lining of the lung, (in the same way as if you have a burn, it forms a scar). As the area of scar tissue grows, the ability of the lining of the lung to exchange gases and therefore the ability to breathe is impaired. This is the same mechanism of disease as silicosis in quarry workers, or siderosis in welders and pneumoconiosis in mine workers.

- **Mesothelioma**

Mesothelioma is a cancer that occurs in the lining of the lung. Where the lung tissue has reacted to the prolonged presence of foreign matter, it may start to grow malignant tissue which, when it has its origin in the lining of the lung, is known as mesothelioma

SUMMARY

So far you have covered **Identifying Asbestos Types** and also gained an overview of different **Health Hazards Associated with Asbestos Products**.

The knowledge you have gained so far will be used each time you begin an Asbestos Removal Project.

The importance of this information will become more evident as you begin the practical exercises later in the module.

Self-Check Exercises and practical activities, in this package, have been designed to test your understanding of the information you have covered so far. *Remember that the self-check exercises are not part of the formal assessment of competency for this unit.*

Answers to the self-check exercises are at the end of this package.

You may find it useful to make your own brief summary/notes below of the three topics in Section 1.

Asbestos Types:

- **Chrysotile**
- **Amosite**
- **Crocidolite**

Uses and Application:

Health Hazards:

- **Asbestosis**
- **Mesothelioma**

Section Overview

Section 2: Personal Protective Equipment

In this section you will find learning resources to support the underpinning knowledge and skills relating to:

2. Plan and prepare

SECTION 2 - PERSONAL PROTECTIVE EQUIPMENT

READ

INTRODUCTION

In Section 1, you completed the steps required to identify asbestos in its various forms and health hazards associated with its use.

This section follows on the process by examining personal protective equipment, its correct use and how to maintain and store this equipment.

In general terms, Section 2 deals with:

- **The selection and maintenance of personal protective equipment required for Asbestos Removal.**

Section 2 addresses:

3. **Select and fit personal protective equipment required for specific asbestos removal tasks.**

These components include essential information required to partly complete Assessment Task 2.

The details required for these operations will be presented under *three* separate *topics*:

- Respirators
- Protective Clothing
- Laundering of Protective Clothing

1. RESPIRATORS

When the use of respiratory equipment and protective clothing is required, adequate rest breaks should be provided for, taking into account the physical strain caused by the use of such equipment.

Accordingly, consultation between employers and employees should establish a normal work/rest regime to be followed in the particular circumstances depending on factors such as the type of protective equipment and method of work.

The respirator is the most important piece of equipment needed to keep you safe on an asbestos abatement project. Safety depends on keeping your lungs clean and this is done through the use of respirators, and understanding their limitations, differences and how they operate. The checking and testing of the equipment is equally as important as wearing the respirator.

Face Mask

This type of protection should never be used in asbestos removal due to its “loose fit” and filtering limitations. Asbestos fibres can easily be inhaled through and beneath the sealing edge of the mask.

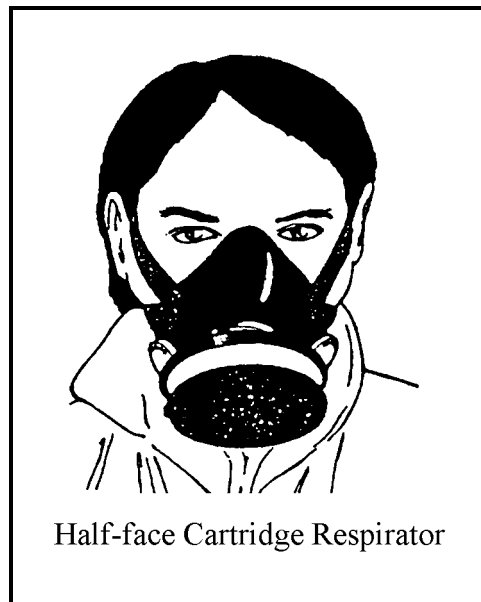


Figure 1 HALF FACE MASK

Respirator Maintenance And Protection

Respirators are only useful when there is a combined knowledge of purpose, maintenance, fitting, testing and their relationship to various fibre concentrations.

If the user is not clean shaven, wearing a respirator will provide little or no protection due to the air movement around and under the sealing surface of the mask.

Respirators come in 3 sizes; small, medium and large. When selecting a respirator, make sure it's the right size, it fits properly and feels comfortable, this is mainly done by adjusting the head and neck straps.

The selection, maintenance, testing and quality of supplied air must comply with appropriate State or Territory Regulatory requirements.

DEMONSTRATION

CHECKING PROCEDURES

Inhalation Valves

These valves are located on the sides of the face mask and consist of a light rubber material. These diaphragm valves are held in place over their openings by small plastic studs. Check to see if they are in good condition and operate freely.

Exhalation Valve

This valve is located in the bottom of the face mask. Remove the exhalation valve protector and check the valve for wear, deterioration, distortion and for particles that could restrict the operation of the valve. This can be done by gently rotating the valve with your fingers.

This valve should be checked every time you put on your respirator. Your health and safety depend on this valve working correctly. If the valve sticks open all your air will come through the opening instead of through the filters and you might as well not even have the respirator on.

Filter Holders

The two large discs on the side of the face mask are called the filter holders. Inside the filter holders there is a rubber gasket that must be laying perfectly flat around the inside edge of the

holder. Check to see that this gasket is not crimped or damaged and that it is seated correctly to ensure a good seal with the filter cartridge.

Face Mask And Straps

Check around the sealing area of the mask for cuts, cracks or excessive wear that could possibly prevent a good seal. Check straps accordingly to ensure they are in good shape.

Fit Testing Of Respirators

After checking the respirator's parts, sealing edges and straps, a fit test must be performed to ensure maximum protection is provided to the user.

Positive Pressure Test

Close the exhalation valve and blow into the respirator. If the mask is sealed correctly it will have a tendency to bulge.

If the mask does not collapse or bulge as it should, the air is entering or escaping from the sealing edges of the mask. When this happens, adjust the mask and straps then re-test. There is also the possibility that the valves are malfunctioning.

Australian Standards

All respiratory protective equipment used in asbestos removal work must conform to the requirements of Australian Standards, refer to page 10, and be approved by the relevant State Authority for this purpose.



READ

2. PROTECTIVE CLOTHING

Asbestos does not enter the body through the skin, and has no harmful effect on the skin. Thus removal of asbestos itself does not call for the wearing of any special skin covering, although any asbestos deposited on the skin and in the hair must be scrubbed off before leaving the decontamination area.

The selection of protective clothing is therefore determined not by asbestos exposure but by climate, degree of physical exertion required, the other hazards involved in the work, and ease of decontamination.

Closely woven, disposable or washable coveralls without pockets or cuffs, but including an integral head covering, in combination with disposable overshoes, greatly assist in personal

decontamination; however, these synthetic garments may make a substantial contribution to the heat stress of the individual in some environments. Trousers and coverall cuffs should be worn outside of boots and gloves. Where specific decontamination facilities are not available, the use of disposable coveralls is recommended.

As several variables influence the type and amount of clothing worn in asbestos removal, decisions on what is appropriate in the particular circumstances should always be based on consultation between employers and employees.

3. LAUNDERING OF PROTECTIVE CLOTHING

All clothing worn in an asbestos removal area shall be regarded as potentially contaminated with asbestos.

As such, it is important that care is taken to ensure that the contractor, or other persons handling the clothing, fully understand the precautions necessary for handling asbestos-contaminated clothing. It is generally considered preferable that, where possible, all laundering be done on-site or in a facility provided and operated by the asbestos removalist.

Contaminated clothing may be safely laundered in a conventional washing machine separate from other laundry, provided the clothing is thoroughly wetted when discarded by the worker and not allowed to dry out until it is washed. Contaminated clothing to be laundered by a commercial laundry shall be despatched in a thoroughly wetted state in an impermeable container clearly marked Asbestos Contaminated Clothing.

Where clothes dryers are used to dry work clothes and/or overalls, the exhaust air from the unit should either pass through a filter or be discharged to the outside atmosphere. Random air monitoring may be carried out in the laundering facility to ensure laundry workers are not being exposed to asbestos dust.

The laundering of protective or work clothing in a worker's home shall be strictly prohibited. Approved launderers only must be used.

SUMMARY

In this section you have covered the selection of **personal protective equipment**, its use and how to maintain and store this equipment.

As stated in this section, the respirator is the most important piece of equipment needed to keep you safe in the process of asbestos removal. Safety depends on keeping your lungs clean and this is done through the use of respirators. Understanding their limitations, differences, how they operate, the checking and testing of the equipment is equally as important as wearing the respirator.

Self-Check Exercise 2 should now be completed to gauge your understanding of the information you have covered in this section.

A space has been provided below for you to make your own summary/notes on the three topics in **Personal Protective Equipment**.

Respirators:

Protective Clothing:

Laundering of Protective Clothing:

Section Overview

Section 3: Decontamination Chamber

In this section you will find learning resources to support the underpinning knowledge and skills relating to:

3. Prepare asbestos removal site

SECTION 3 - DECONTAMINATING CHAMBER

READ

INTRODUCTION

In the previous two sections you have covered:

- **Identifying Asbestos Types**
- **Health Hazard**
- **The selection of Personal Protective Equipment**
- **Maintenance and Storage of Personal Protective Equipment**

As you progress through the training sections, the knowledge you gain is building into a structured approach to Asbestos Removal.

In this section, you begin to set up an asbestos removal work area with the assembly of a **decontamination chamber**.

This section incorporates:

4. **Set up and test a decontamination chamber including locating, assembling and connecting to services.**

The content of Section 3 deals with:

- Preparation of the removal site.
- The correct position for the decontamination chamber is established and chamber is assembled.
- Connecting services to the decontamination chamber and tested for operation by full decontamination procedure.

These three components include essential information you will need to partly complete Assessment Task 2.

The details required for the assembly of a decontamination chamber will be presented under *three topics*:

- Site Preparation
- Decontamination Facilities
- Decontamination Procedures and Inspection of Enclosure

Section Overview

Section 3: Decontamination – N/A

Section Overview

Section 4: Establish an Enclosure Around the Asbestos to be Removed

In this section you will find learning resources to support the underpinning knowledge and skills relating to:

3. Encapsulate asbestos area

SECTION 4 - ESTABLISH AN ENCLOSURE AROUND THE ASBESTOS TO BE REMOVED

READ

INTRODUCTION

In the first three sections you have been acquiring the knowledge required to conduct a safe area for the removal of asbestos. In Section 4 you will use that knowledge to:

- **establish a removal enclosure.**

Section 4 contains the essential information you will need to complete the remainder of Assessment Task 1, which addresses:

2. **Establish an enclosure around the asbestos to be removed.**

The information presented in this section will allow you to cover four specific operations:

- location of the area to be enclosed from the job specification;
- establishment of a removal enclosure in accordance with a removal plan;
- maintenance of negative air pressure if required by the removal plan; and
- approval for removal to commence.

The details required to establish the enclosure will be presented under *one topic*

- Removal Plans
 - Asbestos Cement Materials (Internal)
 - Asbestos Cement Materials (External)
 - Asbestos Cement Flues;

ESTABLISH A REMOVAL ENCLOSURE

1. REMOVAL PLANS

Where more than one of you have been given the same removal plan, you are advised to work together in your set-up as this would be the case in a real site situation.

Removal of Asbestos Cement Products (Internal)

The contractor should carry out this removal wet (using fine water spray of PVA) unless not practicable, for example, where an electrical hazard may be created.

A P2 or P3 filter with a half face piece respirator should be minimum respiratory protection used for this work. Decontamination procedures should be followed at every work break.

During any work in the work area prior to clearance, coveralls worn should be made from either 100% synthetic material or a mixed natural/synthetic fabric capable of providing adequate protection against fibre penetration. All fabrics must be capable of preventing the penetration of asbestos fibres down to a diameter of 0.5 micron and to a maximum 1% penetration of all airborne asbestos fibres. Once worn, disposable overalls are not to be reused or laundered.

Air locks should be placed on entrance doors to the work area comprising at least three sheets of plastic.

In addition, a protective layer of plastic woven poly vinyl (200 micron minimum thickness) should be taped over any carpeted areas within the work area.

The decontamination unit is to be attached to the work area. Where this is not practicable, the decontamination unit is to be positioned as close as practicable to the work area and air locks are to be placed at all entrances to the work area.

These air locks should be used for preliminary decontamination (vacuuming of overalls) prior to proceeding to the decontamination unit.

Under conditions where the decontamination unit cannot be attached to the work area, the route of access from the work area to the decontamination unit should be suitably sign posted and roped off

in order to restrict public access. Air monitoring is to be conducted in the immediate vicinity of the access route together with other suitable locations outside the work area.

Where asbestos cement is behind ceramic tiles, sufficient tiles are to be removed to give access to the fixings of the asbestos cement sheets. This work is to be performed such that minimum damage to the sheet occurs.

Sheeting should be thoroughly wetted down with a fine spray of water before commencing removal. Nails should be cut with a cold chisel under the edge of the sheet or cut around the head using a punch, causing minimum damage to the sheet. If necessary, nails are to be punched through the sheeting to facilitate effective removal.

Nails should be removed from the timber frame work following this procedure, using pliers/nippers or similar device. Small sections of contaminated timber around the nail should be chiselled out and disposed of as asbestos waste.

No power tools or oxyacetylene cutting equipment should be used unless permission to do so is granted by the superintendent following discussion with the supervising Competent Person.

Sheets should be removed with minimal breakage. Unnecessary smashing of asbestos cement sheeting shall not be permitted.

Once removed, the back of the sheet should be wetted using fine water spray.

Following this removal process, the sheets should be wrapped in 200 micron minimum thickness polythene sheeting and taped prior to removal from the work area (placement into a waste skip which has been lined with double layer of 200 micron thick polythene).

The external surface should be wet wiped to remove any adhering dust before the bags are removed from the work area.

Smaller pieces of sheeting and asbestos cement debris should be placed in heavy duty 200µm (minimum thickness) clear polythene bags. These bags should be labelled with an appropriate warning to the effect that the bags contain asbestos and that dust creation and inhalation should be avoided.

Bags which have contained asbestos material should not be reused.

Bags marked for asbestos waste should not be used for any other purpose. Bags should be twisted tightly, folded over and the neck secured in the folded position with adhesive tape, or any other effective method.

Once the wrapping and bagging of asbestos cement sheets and debris has been completed, the work area, with particular emphasis on the timbers where these are to remain from which asbestos cement sheet has been removed, should be thoroughly vacuumed in order to remove any residual traces of

asbestos debris and contaminated dust. This process is to be followed by the application of a tinted PVA or similar acrylic emulsion using low pressure spray equipment.

Where timbers are to be removed and recycled these are to be vacuumed and wet wiped to remove any residual asbestos contamination.

Under normal removal conditions, this form of work does not carry a recommendation for extraction ventilation.

The work area should be roped off and sign posted in order to restrict public access.

Removal of Asbestos Cement Products (External)

With the exception of asbestos cement roofing, contractors should carry out this type of removal wet using fine water spray unless not practicable. Roofing is to be sprayed with PVA prior to the removal process. PVA must be dry before commencing sheet removal in order to avoid a slip hazard.

Before any removal is undertaken, the areas should be roped off at a distance of ten (10) metres clear of the work site or as arranged and approved by the superintendent.

The roped off areas should contain the decontamination unit and skip for the storage of all asbestos contaminated waste. The skip should be emptied at regular intervals and when left overnight, should be sealed up and secured to the satisfaction of the superintendent. No asbestos waste should be allowed to remain on site over weekends or holiday periods.

Roped off area should display an adequate number of warning signs and a supervisor should be on hand at all times to see that all personnel inside the work area are wearing protective clothing and respirators and should prohibit all unprotected personnel from entering the work area.

A P2 or P3 filter with a half face piece respirator should be the minimum respiratory protection used for this operation. Decontamination procedures should be followed at every work break during work.

During any work in the work area prior to final clearance, coveralls worn should be made from 100% synthetic material or a mixed natural/synthetic fabric capable of providing adequate protection against fibre penetration. All fabrics must be capable of preventing the penetration of asbestos down to a diameter of 0.5 micron and to a maximum 1% penetration of all airborne asbestos fibres. Once worn, disposable overalls are not to be reused or laundered.

A decontamination unit should be available at all times during removal for personnel to decontaminate as required. The decontamination unit is to be inside the roped off work area.

Vacuuming down of protective clothing and respirators, as a substitute method of decontamination should not be allowed. No contaminated protective clothing should be worn under any circumstances other than in the work area.

Where necessary to access building eaves, scaffolding in compliance with the statutory regulation and codes or mobile equipment such as a “cherry picker” should be used.

Where roof sheeting is to be removed, this is to be performed using scaffolding, or mobile equipment where removal is to take place from the underside of the roof.

NOTE: The removal of asbestos cement products from roof areas is to be performed in accordance with all aspects of the CODE OF PRACTICE FOR SAFE WORK ON ROOFS and relevant STATUTORY LEGISLATION. This code is to be seen as a minimum requirement for safe work at heights and on roof areas.

Where moss is encountered on roof sheeting, caution should be exercised in the use of water and to the workers footwear. In these instances, the contractor should confer with the superintendent prior to commencing the work.

Roofing sheets suspected to be present in inaccessible locations such as wall cavities and removal cannot be achieved without structural damage to the building, such areas are to be documented for future reference and the locations sealed and labelled to prevent any waste escape.

Roof sheeting should be lowered to the ground with the use of slings and lifting equipment, such as a crane. Once lowered to the ground, sheets should be wrapped in 200 micron polythene sheeting and placed into the waste skip. The skip should be double lined with 200 micron minimum thickness polythene.

Dropping of sheets or the use of ramps, chutes or similar gravity dependent devices should not be allowed under any circumstances.

This removal process should be conducted in accordance with the Code of Practice for Safe Work on Roofs.

Once the sheet removal has been completed, the contractor should clean up all debris and loose dust from structural items including the sheeting framework, safety mesh, sisalation, etc., wetting down and vacuuming as is found necessary until completely clean. Where debris has been deposited onto top soil, the top layer of soil should be skimmed clean to the satisfaction of the Superintendent.

Cleaning Up of Asbestos Cement Debris

The contractor should carry out this work wet except where not practicable.

Thoroughly wet the debris with fine water spray.

Shovel into asbestos waste bag. Small amounts of debris may be placed into bag, gloves being worn.

If debris is present in top soil, remove upper layer of top soil, such that negligible asbestos remains and dispose of this material with the asbestos cement debris.

All visible debris should be removed from the contaminated area such as that any risk of fibre inhalation has been effectively eliminated.

A P2 or P3 filter with a half price respirator should be the minimum respiratory protection used for this work. Decontamination procedures should be followed at every work break during this work.

During any work in the area prior to final clearance, coveralls worn should be made from either 100% synthetic material or a mixed natural/synthetic fabric capable of providing adequate protection against fibre penetration of asbestos fibres down to a diameter of 0.5 micron and to a maximum 1% penetration of all airborne asbestos fibres. Once worn, disposable overalls are not to be reused or laundered.

A decontamination unit should be available at all times for personnel to decontaminate as required. This unit should be positioned adjacent to the work area.

The work area should be roped off and sign posted in order to restrict public access.

Where excavations are involved all work should cease if it becomes obvious that friable asbestos waste has been buried on the site or if asbestos cement products are uncovered. Under such conditions, the area should immediately be assessed and appropriate precautions implemented for the protection of all personnel.

SUMMARY

So far you have covered the **procedures to establish an enclosure ready for the removal of asbestos products** and also gained an overview of the safety requirements involved with the disposal of asbestos waste.

The knowledge you have gained so far will be used each time you begin work involving the removal of asbestos based materials.

You may find it useful to make your own brief summary/notes below on the ten units in the one topic in **Establish a Removal Enclosure**.

Removal Plans:

- **Asbestos Cement Materials (Internal)**
- **Asbestos Cement Materials (External)**
- **Asbestos Cement Debris**

Section Overview

Section 5: Removal of Asbestos

In this section you will find learning resources to support the underpinning knowledge and skills relating to:

4. Remove asbestos material
5. Carry out decontamination process

SECTION 5 - REMOVAL OF ASBESTOS

READ

INTRODUCTION

In the Practical Activity project you completed in Section 4 you:

- **Recognised the type of asbestos to be removed and understood the health hazard involved;**
- **From your removal plan, established an enclosure including decontamination facilities;**
- **Selected personal protective equipment required; and**
- **Simulated decontamination procedures.**

Section 5 continues your Practical Activity by **simulating actual asbestos removal**. Your removal plan started in Section 4 will remain as your work project and you will be required, as part of a team, to remove and seal a range of simulated asbestos containing products.

As part of the simulated removal of asbestos materials, you will be required to cover six specific operations:

- select tools and equipment for removal;
- select, fit and use personal protective equipment;
- simulate asbestos removal;
- place simulated asbestos in asbestos bags or appropriate container and seal for removal from site;
- follow decontamination procedures; and

- clean tools and equipment and store.

These areas include the essential information you will need to partly complete Assessment Task 2 which addresses:

5. Remove simulated asbestos from a structure, place into an approved container and seal for removal from site.

The details required for the removal of asbestos will be presented under *five topics*:

- Signs and barriers
- Equipment for asbestos removal
- Removal techniques
- Waste removal

SIMULATE ASBESTOS REMOVAL AND DISPOSAL

1. SIGNS AND BARRIERS

The work area should be defined by barriers and appropriately placed signs.

The signs should be labelled:

“ASBESTOS WORK AREA - NO UNAUTHORISED ENTRY”.

The signs at entry points to an asbestos work enclosure should contain the words:

“RESPIRATORY PROTECTION ESSENTIAL”.

Signs should conform with Australian Standard 1319 - 1983 - Safety Signs for the Occupational Environment.

The signs should incorporate a visual reference to the presence of asbestos hazard.

The signs should be weatherproof and constructed of light weight material.

Where tapes are used to act as a temporary barrier for asbestos removal zones they should be printed with the words **“ASBESTOS HAZARD”** or equivalent.

2. EQUIPMENT FOR ASBESTOS REMOVAL

Cutting Tools

Breaking through the finishing compound and cutting the reinforcing wire in the lagging are operations which can liberate considerable quantities of dust. Care should therefore be taken in the selection of tools and in keeping the dust levels in the removal area to a minimum.

Power, telephone and fire alarm cables may lie underneath asbestos insulation. These cables must be clearly identified prior to the commencement of any cutting, as severe damage and/or hazard to the worker could result.

Service lines under insulation, particularly on turbines, are vulnerable to damage from cutting tools. Alternative routing, cabling or deactivation of such lines is suggested.

The use of any power tools in asbestos removal requires caution since not all types are suitable, particularly in regard to internal dust collection and electrical safety in wet conditions. In general, compressed air driven power tools are preferable. Where doubt exists, reference should be made to the State regulatory authority.

Spray Equipment

Surface soaking from a spray jet is useful for small areas and where a total saturation is not practicable. The spray could be from an adjustable, pistol-grip, garden hose spray, fed from a mains supply or, where no supply is readily available, from a portable pressurised vessel, such as a pump-up garden sprayer. A constant water pressure is desirable.

Total Saturation

Total saturation equipment is useful for large areas of insulation where time can be allowed for the water to soak in. The equipment consists of an injection head with its own shut-off control. These heads have numerous side holes through which water is fed into the insulation. The water flow is stopped during transfer of the head from one position to the next.

3. REMOVAL TECHNIQUES

The removal techniques of asbestos-based materials from buildings and other structures shall be carried out by methods which will minimise the release of asbestos dust into the atmosphere, both during and after the removal operation. The choice of method is determined by the nature of the asbestos material, the quantity of insulant and its location.

The spray techniques used for the removal of sprayed thermal insulation from buildings are not dissimilar from those used for removal from steampipe and boilers. The following removal methods may equally be adapted to the removal of asbestos from industrial plant and machinery.

Spray Method

This method shall be used only where relatively small quantities of asbestos-based materials are to be removed and where the following conditions apply to the material:

- The asbestos-based material is not covered with other materials such as calico or metal cladding which require prior removal;
- There is no reinforcing wire or other similar restrictions to removal;
- The asbestos-based material is not coated with paint or mastic;
- Where rapid temperature drop due to excessive water could cause damage to heated metal components;
- Where no live electrical conductors are present and where no damage to electrical equipment can arise from the ingress of water.

The spray shall be applied in such a manner as to ensure that the entire surface of asbestos-based materials is wet, but minimal run-off occurs.

In many instances, it would be helpful if a wetting agent (surfactant) is added to the water to facilitate more rapid wetting of the insulation material.

It is desirable for the asbestos-based material to be wetted through its full depth and maintained in a wet condition. It is recommended that a manually controlled, consistent low pressure, coarse spray such as from an adjustable, pistol-grip garden hose be used for this purpose. The design of the spraying equipment will be dependent on availability of water supply and access to the area to be sprayed.

It is important that the spray should be copious, but not such that the water droplets generate dust from impact with the surface of the insulation. When using cutting equipment to remove asbestos, the water spray should be directed at the site of the cut and the wetted material removed as the cut progresses.

The wetted asbestos-based material should be removed in sections and immediately placed in suitably labelled containers and properly sealed,. Any small sections which may be dislodged should be collected and properly disposed of.

4. WASTE REMOVAL

Asbestos waste should not be allowed to accumulate excessively within the work area, but should be bagged or placed in appropriate receptacles as the work proceeds.

Controlled wetting of waste should be employed, to reduce asbestos dust emission during bag sealing or in case of subsequent rupture of the bag.

Solid asbestos waste should be collected in heavy duty 200 micron (minimum thickness) clear polythene bags of a maximum size 1200 millimetres in length by 900 millimetres in width. The bags should be labelled with an appropriate warning statement to the effect that the bag contains asbestos and dust creation and inhalation should be avoided.

Asbestos waste bags should not be filled more than half full, in order to minimise the risk of bag tearing/splitting and also to assist in manual handling of the bags. The Manual Handling Regulations and Code of Practice should be consulted on this regard.

Bags which have contained asbestos material should not be reused.

Bags marked for asbestos waste should not be used for any other purpose.

Bags should be twisted tightly, folded over and the neck secured in the folded position with adhesive packaging tape or any other effective method. The external surface should be cleaned to remove any adhering dust before bags are removed from the working area. All asbestos insulation should be double bagged outside the enclosure immediately following the decontamination process.

Hard and sharp asbestos waste will require preliminary sealing or protective covering prior to placement in asbestos waste bags, in order to minimise the risk of bag damage.

The bags, once removed from the work area should be either:

- (a) Placed in a solid (appropriately lined) waste bin or skip which should be secured at the completion of each days work;
- (b) Removed from site by an approved E.P.A. licensed carrier. Asbestos waste should not be stored on site.
- (c) Routes of removal from the work area to the waste skip should be designated prior to the commencement of each removal contract. In occupied buildings, movement of bags from the work area to the waste skip should be performed out of normal working hours. The means of movement of waste bags through the building should be made at the discretion of the superintendent following discussions with the contractor.

The removal of waste bags from the work area through the decontamination unit should involve a “production line” operation as detailed below:

- One worker is to be located in each section of the decontamination unit.
- Waste bags are to be passed from cubicle to cubicle and “showered out” to remove any asbestos residue.
- Once removed from the decontamination unit the waste bags are to be double bagged prior to disposal.
- Wherever practicable, a tunnel type (straight) decontamination unit should be used for the decontamination and removal of waste bags due to the problems associated with moving waste bags through a caravan type decontamination unit.

Clearance testing

All clearance testing should be High Flow rate and of a duration satisfactory to the Competent Person.

The maximum fibre concentration for preliminary and final clearances shall not exceed 0.01 fibres per millilitre of air sampled.

SUMMARY

At this point, you've covered all the necessary steps and procedures required for the **removal of asbestos**.

You should now be ready to complete the practical activity on simulated asbestos removal.

The package contains the relevant information you will need to perform Practical Activity 2.

You may find it useful to make some brief notes on the five topics in **Removal of Asbestos**.

Signs and Barriers:

Equipment for Asbestos Removal:

Removal Techniques:

Waste Removal:

Air Monitoring:

Section Overview

Section 6: Final Cleaning, Inspection and Dismantling of Asbestos Removal Area

In this section you will find learning resources to support the underpinning knowledge and skills relating to:

7. Remove asbestos removal equipment

SECTION 6 - FINAL CLEANING, INSPECTION AND DISMANTLING OF ASBESTOS REMOVAL AREA

READ

INTRODUCTION

Your practical Assessment Task 2 is nearing completion. In Section 5 you:

- **selected tools and equipment for removal;**
- **selected, fitted and used personal protective equipment;**
- **simulated asbestos removal;**
- **placed simulated asbestos in asbestos bags or appropriate container and sealed for removal from site;**
- **followed decontamination procedures; and**
- **cleaned tools and equipment.**

In Section 6, you will finalise your Practical Activity. This will include the essential information you need to complete Assessment Task 2. This section will address:

6. Demobilising removal equipment and disposal of encapsulation material.

In the remaining part of your simulated asbestos removal you will cover six specific operations:

- final clean;
- obtain inspection;
- dismantle enclosure;
- store equipment including personal protective equipment;
- remove waste; and
- ensure workers are decontaminated.

The details required for the final cleaning, inspection and dismantling of asbestos removal area will be presented under *four topics*:

- Visual Inspections
- Dismantling of Removal Area
- Clearance to Reoccupy
- Transport and Disposal of Asbestos Waste

CLEANING AND DISMANTLING OF ASBESTOS REMOVAL AREA

1. VISUAL INSPECTIONS

This standard practice establishes the procedures for performing visual inspections of asbestos removal projects.

Definition

Visual inspection is the process of examining the work area for evidence that the project has been successfully completed, as indicated by the complete absence of residue, dust and debris.

Standard Required

The presence of any debris, dust or residue on surfaces in areas where asbestos material has been placed indicates that the required standard has not been reached.

Visual Inspections and Air Sampling

Visual inspection is not intended as a substitute for air sampling at any stage of the project and is particularly not suggested in lieu of final air sampling for building re-occupancy following an asbestos removal project. The basic premise of this Standard Practice is that an area where residue or debris visible to the naked eye is still present, is not sufficiently clean for subsequent stages of work, including application of sealer, removal of plastic sheets, and final air sampling. Final air samples should not be taken until the final visual inspection is passed.

Inspections for Completeness of Removal

The Competent Person should enter all spaces where asbestos removal has been performed in order to inspect the work at close range. This may require the use of a ladder or scaffold to reach elevated locations, or entering areas of restricted mobility, such as service shafts and access openings.

If any asbestos containing debris is found, it shall be noted and reported without interrupting the inspection. The debris so identified should be removed before subsequent clearance inspection is undertaken.

Completion of Removal

All surfaces from which asbestos-containing materials have been removed are to be examined for the presence of residue. Where the asbestos-containing material has similar appearance to the substrate, even gross removal cannot be satisfactorily determined at a distance of more than a metre. A strong narrow beamed torch should also be used to assist in detection of dust/debris.

Pay special attention to areas that are difficult to reach or see. Use a small screwdriver or other sharp, pointed tool for poking into such places as the spaces between steel beams and the roof or ceiling frames if left in place, or air duct flanges. Give special care to elbows, valves and tees on mechanical systems, as insulation usually adheres to these fittings more tightly AND becomes trapped in their crevices more readily than on the straight runs of pipe.

- (a) One sampling run per shaft (unoccupied buildings) the sampling period should be at least 6 hours duration.
- (b) Two sampling runs per shaft (occupied buildings) two monitoring periods of approximately equal duration.

In both cases (a) and (b), the results should be notified to all relevant parties immediately they are available preferably via fax or failing that, by phone or pager.

The final report should record details of start time, sample duration, location of pump and stage of project in addition to the result.

Sampling Locations

Sampling shall be performed at the following locations at all jobs:

- clean side of decontamination unit;
- change area;
- lunch room;
- laundry;
- surrounds of work area; and

Where the Competent Person deems it appropriate or the client, contractor, or the worker representative requests it, sampling should be carried out in other locations such as adjacent occupied areas and the floor above and below the work area.

Where residual asbestos is known or suspected to be present in inaccessible locations such as wall cavities and removal cannot be achieved without structural damage to the building, such areas are to be documented for future reference and the locations sealed and labelled to prevent any possibility of fibre release.

If debris or residue is found during visual inspection, recleaning and reinspection should be conducted until all residue, dust and debris have been removed. Any residue debris that absolutely cannot be removed should be securely adhered to the substrate so that it may not be rendered airborne by any conceivable future building operations, renovations, maintenance or demolition of the building.

The application of a sealer should not be allowed until after cleaned surfaces have passed visual inspection for completion of removal. Conduct another inspection after the sealer has dried to confirm that all surfaces have been completely covered.

The sealer should be readily visible against the pipe or substrate so that complete coverage of the surface is apparent to the supervisor and subsequent occupants of the space.

A visual inspection should occur prior to clearance sampling and should be performed with the work enclosure intact. If airborne asbestos dust levels exceed 0.01 fibres/ml, another visual inspection may be made after recleaning by the contractor.

Completeness of Clean-Up (Final Inspection)

No residue, dust, dirt or debris should be visibly detectable on the final inspection of a work area. Carefully examine all permanent fixtures of the work area, such as walls, ducts, conduits, pipes and ceiling tile grid bars, as well as the contractor's equipment including scaffolding.

Folds, creases and crevices in plastic isolation barriers may have fallen away from the walls during the course of a removal project. Asbestos-containing materials that fall between the sheeting and the wall should have been cleared up immediately and then the plastic reattached, so that the wall does not become contaminated. Carefully check such locations on final inspection to ensure that no residue remains.

Debris and contaminated water frequently seep under the plastic covering the floor and onto the actual floor surfaces underneath, necessitating further clean-up. In such case, make a thorough visual inspection of the area to determine if:

- debris has run underneath floor tiles loosened by water;
- debris is lying on, or has been ground into carpets; or
- debris has run under the doorways or barriers at the perimeter of the work area.

Such situations require very close scrutiny to determine that no debris or loose fibre is present.

The final inspection should occur prior to a final air clearance and should be performed with all the seals on windows, door and vents intact and the isolation barriers separating the work area from the adjacent areas in place.

Crawl Spaces and Ceiling Spaces

Crawl spaces merit special concern because most have a dirt floor which may contain pulverised or impacted asbestos debris. There are practical limitations to the amount of soil that can be removed.

For an inspection of a crawl space after dirt and contaminated soil have been removed, make a close examination of the entire area. Use a small screwdriver or other pointed tool to dislodge pieces of impacted material from the soil as they are found. Excessive amount of debris are cause for terminating the inspection and directing a recleaning.

Protective Measures During Inspection

The Competent Person performing the visual inspections must comply with all applicable regulatory and contractual requirements for personal respiratory protection and decontamination. The type of respirator required for visual inspections may depend upon the stage of removal when the inspection takes place. The supervisor should always follow the appropriate decontamination procedure. He/she should comply with safety standards and other requirements to ensure physical safety.

Inspection during removal will require the same protective clothing and respiratory protection procedures for the Competent Person that are used by the personnel performing the removal work.

Summary Points

Visual inspection of asbestos removal projects is an essential process in determining whether the work has been acceptably performed. The main points of this standard practice may be summarised as follows:

- The visual inspection process is the responsibility of the supervising Competent Person.
- The contractor has his own unique responsibilities for visual inspection.
- The visual inspection procedures and criteria for acceptance have been clearly stated in the specification.
- The Competent Person requires the assistance and cooperation of the removal contractor in order to perform an effective visual inspection.
- The fundamental criterion for completeness of removal and clean-up is the total absence of visible residue and debris (an Air Monitoring reading of less than 0.01 fibre/ml).
- Protective measures, including barriers and enclosures, decontamination units protective clothing and respirators, must remain in place until visual inspection is completed and air samples are taken and cleared.

2. DISMANTLING OF REMOVAL AREA

On completion of the asbestos removal job, all tools and equipment not used for cleaning should be removed from the removal area so that efficient vacuuming of the inside of the removal area can be carried out. Appropriate decontamination procedures must be observed.

By spraying the internal surfaces of the plastic containment around the removal area with polyvinyl acetate (PVA) or similar water based paint, any asbestos adhering by electrostatic attraction is effectively encapsulated. Personnel involved in this spraying operation should wear an airline respirator or a half face respirator fitted with combined organic vapour/dust cartridges. Plastic surfaces may become very slippery while the paint is wet, so unnecessary movement within the enclosure should be avoided until the paint has dried.

The plastic enclosure surrounding the removal area may only be dismantled if a thorough inspection reveals no visible traces of asbestos contamination and air samples taken within the enclosure indicate a result below the level specified by the relevant statutory authority. The visual assessment may, in some circumstances, include analysis of settled dust within the enclosure by optical microscopy. Air monitoring should only be undertaken once the PVA has dried, as the airborne mist will adversely affect the ability to detect fibres in the sample.

It should be stressed that visual inspection and air monitoring are complementary techniques and dismantling may only proceed after both techniques give clearances.

The sealing plastic may then be dismantled, folded and placed in appropriate disposal bags and sealed. The sealing plastic should not be re-used, but treated as asbestos waste (see section 13 of the NOHSC Guide to the Control of Asbestos Hazards in Buildings and Structures). Safety barricades and warning signs should not be removed until the complete area has been thoroughly cleaned.

Prior to resumption of normal work in the area by unprotected personnel, a comprehensive visual inspection shall be undertaken to ensure removal has been satisfactorily completed and that no source of asbestos dust remains in the area. Particular attention should be paid to the examination of ledges, tops of air-conditioning ducts, cracks in the floor, folds in plastic sheet and crevices or areas which may have been overlooked during the initial clean-up.

The asbestos removal job shall only be considered to have been completed when a visual inspection reveals no further evidence of asbestos contamination and static air samples give a clear result.

3. CLEARANCE TO REOCCUPY

When a satisfactory airborne fibre level has been achieved, protective screening may be removed by the contractor to enable a final clean-up of the area.

It must be noted that any protective barrier between the work area and public area should remain intact until completion of all work.

All walls, ledges, fittings and furnishings still in place should be cleaned as required by the Competent Person using approved vacuum cleaners and damp cloths.

After cleaning has been completed as described in the preceding clauses, the Competent Person should carry out dust monitoring to ensure that fibre levels are below the prescribed maximum levels.

The job will not be considered complete until a fibre level of less than 0.01 fibres/ml has been achieved when tested in accordance with the Worksafe Code of Practice and Guidance Notes for Asbestos and until a visual inspection by the Competent Person indicates that the area has been cleared satisfactorily.

4. TRANSPORT AND DISPOSAL OF ASBESTOS WASTE

Asbestos waste transported to a disposal site must be packaged in the following manner:

(a) Asbestos sheeting

Asbestos sheeting must be bundled securely and the bundles must be double wrapped in 200 micron plastic sheeting, with each bundle of sheeting sealed with adhesive tape along every lap prior to placement into the skip.

The wrapped material may be transported in a roll on roll off skip. The skip must be lined with one layer of 200 micron plastic before loading to assist the packaged asbestos to safely slide to the designated area at the disposal point.

If a roll off bin is not used, the asbestos must be double wrapped and taped as before. If unloaded manually or by mechanical means, eg. crane, truck, etc., it must be placed into the excavation in a manner that does not allow damage or puncturing of the plastic.

Unloading the Tip Site

The transporter should carefully reverse into position at the designated disposal point, lower the skip and carefully tilt the skip to allow the asbestos to fall into the excavation, care should be taken to ensure that no damage or puncturing of the plastic occurs.

The driver should ensure that all necessary documentation is in order before leaving the disposal site.

All contamination waste is to be transported in EPA licensed vehicles only.

SUMMARY

In this section you covered the final clearing, inspection and dismantling of an asbestos removal area.

You should now be able to perform all the following:

- final clean;
- obtain an inspection;
- dismantle an enclosure;
- store equipment, including personal protective equipment;
- remove waste; and
- ensure workers are decontaminated.

You may find it useful to make some brief notes on the four topics in **Final Cleaning, Inspection and Dismantling of an Asbestos Removal Area**.

Visual Inspections:

Dismantling of Removal Area:

Clearance to Re-occupy:

Transport and Disposal of Asbestos Waste:

CONCLUSION

This learning package has combined the theoretical and practical components required for the competency unit **CPCCE3014A - Bonded asbestos Removal**.

Having successfully completed the requirements of this competency unit you now understand the procedures for setting up removal zones, removing asbestos, dismantling removal zones and disposal of asbestos waste. In addition, you have applied the knowledge and skills in a number of real life situations.

You can expect to apply your knowledge and skills again and again on a range of construction sites.

The developers of this package hope that you have found its style and presentation easy to use.