

Published: March 2003



Department of labour

# **Guide**

## **DEMOLITION WORK**

### **(REGULATION 21 ASBESTOS REGULATIONS)**

**Chief Directorate: Occupational Health and Safety**

NO: OHC 6

## FOREWORD

The purpose of this document is to provide guidance notes for the safe handling of asbestos containing material that may be disturbed by the demolition of or structural alterations to buildings or structures, and to explain regulation 21 of the Asbestos Regulations, 2001 which were promulgated under the Occupational Health and safety Act, 1993.

The inhalation of regulated asbestos fibres can cause serious lung diseases, including asbestosis, cancer of the lungs and mesothelioma. These diseases usually become apparent only some years after exposure to asbestos and sometimes not until 40 or more years after the first exposure.

Cigarette smokers who are occupationally exposed to asbestos exhibit a marked increase in the incidence of lung cancer when compared to non-smokers.

The way to prevent these diseases is to limit the creation of asbestos dust and avoid inhalation of asbestos fibres. The fewer asbestos fibres inhaled the less danger there is to health.

## A. INTRODUCTION

This regulation applies to any person who intends to have demolition work to be carried out.

**“demolition work” - includes demolition, alteration, stripping, removing, repair, gleaning any spilt asbestos or high-pressure water jetting of any structure containing asbestos lagging or insulation, but excluding work performed on asbestos cement sheeting and related products, and asbestos cement products that form part of the structure of a workplace, building, plant or premises**

It is the responsibility of the person, who intends to demolish or altered a ship, an installation or a building that contains asbestos insulation or asbestos lagging, to ensure that before demolition or alteration commences that all asbestos and asbestos-containing materials during demolition work that may release airborne asbestos fibres are identified.

Persons conducting or intending to conduct demolition work must ensure the following:

1. Before commencing with demolition work:
  - The person carrying out the work must be registered as Asbestos Contractor with the Department of Labour
  - Asbestos material likely to become airborne must be identified
  - Plan of work is developed, approved by an Approved Asbestos Inspection Authority and submitted to the Provincial Director/ Provincial Executive Manager.
  
2. During and after the completion of demolition work
  - Asbestos and asbestos containing materials are handled and disposed in accordance with

- Persons likely to be exposed to asbestos are provided free of charge with personal protective equipment. It should be noted that the personal protective equipment (PPE) must be effective to reduce the level of exposure to below the OEL for asbestos. Persons must be trained and informed on how to use the PPE's and the benefits thereof.
- Upon completion of the work the premises, structure or area must be checked to ensure that all asbestos waste is removed.

## **B. Notification of intent**

### **(i) General**

If the result of the material identification is positive, a plan of work shall be drawn up describing the measures necessary to ensure the health and safety of the persons at the workplace and to prevent the emission of fibres in to the air.

At least 30 days prior to the commencement of the demolition task, the written plan of work is submitted to an approved asbestos inspection authority for approval; the approved plan work which has been signed by the AIA is at least 14 days prior to commencement of such work send by registered mail or delivered by hand to the Provincial Director.

The approved inspection authority may at its own discretion allow a shorter period of time for such submission. If an approved inspection authority draws up the plan of work, in which case the stipulated time period shall not apply i.e. the 30-day period.

For some routine operations, such as maintenance work on thermal insulation in factories and power stations, a standardised plan of work for such workplace may be submitted for approval. Once approved, all routine work covered by the standardised plan of work must be executed at such workplace without submitting further plans. An approved inspection authority may approve

standardised procedures for routine alterations or repairs and the approved inspection authority that approved the procedures will be responsible for the correctness of that plan.

A copy of the approved plan of work or standardised procedures (For some routine operations, such as maintenance work in factories and power stations involved asbestos-containing lagging or insulation), signed by the approved inspection authority, the employer and, if the person performing such work is not the employer, the mandatory of the employer, must be submitted to the provincial director at least 14 days prior to commencement of demolition work.

Please note that the inspector does not approve the plan but AAIA does. An inspector may stop the work if he/she deems it necessary.

**(ii) Contents of the Plan of work**

The plan of work should contain the following information:

1. Name and addresses of the person who intends to conduct the demolition work to be carried out, the name and contact details of the person that is in charge of the work. Also the name and contact details of any mandatory as well as the approved inspection authority that approved the plan of work and will take charge of air monitoring.
2. The address and description of the building, machinery, equipment or structure, including size and age.
3. Location and amount of asbestos-containing lagging and insulation present, e.g.:
  - Type of surfaces, e.g. pipe sections, panels, etc.
  - Interior or exterior
  - Approximate mass or volume

4. Nature of work to be executed, e.g.
  - Alteration
  - Removal
  - Demolition
5. Scheduled commencement and completion dates.
6. Site preparation plans with special reference to:
  - Demarcation of the workplace
  - Safety notices
  - Temporary transit site for asbestos waste
  - Access control measures
  - Means of draining run-off water
  - First-aid
  - Fire-escapes
7. Procedures that will be employed to collect and dispose of asbestos-containing waste with specific reference to the collection, transport and disposal procedures as well as procedures with respect to the protection of employees.

The name and address of the disposal contractor and the name and address of the disposal site must be furnished. Disposal certificates should be available for inspection purposes.
8. Basic approach to control and minimise personal exposure with reference to:
  - Engineering control
  - Equipment used
  - Work practices
  - Hygiene facilities and practices
  - Air sampling
  - Approved Inspection Authority
  - Education and training
  - Emergency procedures

## **C. METHODS FOR THE HANDLING OF ASBESTOS AND ASBESTOS-CONTAINING MATERIAL DURING DEMOLITION WORK**

It must be stressed that the removal of asbestos containing material may sometimes be ill-advised if this is done for no reason other than that it contains asbestos. Where adhesion to the substrate is good and the exposed surface is also in a good condition and sufficiently compacted, sealing with a suitable polymeric or bituminous coating maintenance may be regarded as reasonable as long as exposure does not occur and the condition of the asbestos-containing material is kept in a good condition. Sometimes, as a result of impact, a portion of the surface may become exposed, thus releasing asbestos fibres. In such a case it may be more effective to repair the damage and seal/encapsulate the surface to prevent further releases rather than to attempt removal.

To ensure that asbestos fibres are contained during and after re-pairs or alterations to, or the removal of asbestos-containing material, the following methods can be used under controlled conditions as outlined below.

- Sealing/encapsulation
- Wet removal
- Dry removal
- Removal by high-pressure water jets
- Combination of the above methods

### **(i) Sealing/encapsulation**

Encapsulation refers to the coating of asbestos-containing materials with a bonding or sealing agent or to the creation of a permanent casing covering the affected area (e.g. false ceilings and walls).

This is not considered to be a permanent solution because the sealing agent used may deteriorate or become damaged; and when the building is renovated or demolished, the containment and/or removal of the asbestos fibres will require careful attention.

Selection of the encapsulation method depends on—

- the degree of protection required (e.g. is the area vulnerable to impact or abrasion);
- the toughness and flexibility required (e.g. does the surface require to be decorated).
- the temperature to which it will be exposed

- whether the adhesion of the asbestos containing material to the substrate is adequate; and
- whether the surface of the insulation or lagging is suitable for adhesion of the sealing agent.

**(ii) Wet removal**

Wet removal, i.e. the suppression of dust with water containing a wetting agent, is the most commonly used method for the removal of asbestos.

The asbestos containing material must be wetted throughout its entire depth and maintained in a wet condition. The most effective means of controlling asbestos dust is by completely saturating the asbestos with water, using a special device. This water-injection device, which one can make oneself, is inserted into the asbestos material beforehand. Water that has been treated with a wetting agent is allowed to seep into the material at low pressure. Once the material is thoroughly saturated, the device is moved to the next point. Several injection devices may be used simultaneously to save time. A garden spray is useful as a supplementary means of wetting the asbestos if it has not been saturated properly by the first method or if there are smaller jobs to be done. Once again, the water must be treated with a wetting agent beforehand and the spray must be directed straight onto the work. The saturated asbestos-containing material should be lifted off in sections and immediately placed in properly labeled containers and sealed. Abrasive techniques such as sanding should not be used because this will allow regulated asbestos fibres to become airborne.

During the removal process, all power to electric circuits shall be isolated and plugs, switches and other sources of electric current should be covered with waterproof protection so that water cannot penetrate to them. A means of draining run-off water from the workplace into containers for safe disposal is also necessary.

**(iii) Dry removal**

Dry removal should only be considered when wet removal is impractical (e.g. in workplaces where water can damage equipment). This type of removal releases excessively high concentrations of regulated asbestos fibres and may contaminate "clean" areas. Because of this, very strict protection and decontamination measures are necessary.



The following measures are recommended:

1. Fully isolate the workplace where the material removed is to be removed.
2. Keep the workplace under a slightly negative pressure by means of local air extraction, filtration and dust collection to minimise the release of regulated asbestos fibres to surrounding areas outside the isolated workplace.
3. Remove material in small pre-cut sections.
4. It is not recommended that power tools be used, SEE REGULATION 15 (1) (f) but if they are used, dust extraction, filtration and collection systems are necessary. Angle grinders or similar high-speed cutting tools should not be used because of the large quantities of dust created by equipment of this nature.
5. For general cleaning, use vacuum-cleaning equipment with a filtration efficiency of 99% for particles of one micrometer in size.

The removal procedure consists of pre-cutting and then lifting the small pre-cut sections of asbestos-containing lagging/insulation off the surface of the structure. This waste is then enclosed in two impermeable bags, one inside the other, or similarly effective containers properly sealed to prevent the escape of dust during handling.

**(iv) Removal by high-pressure water jets**

This method employs water jets operating at high pressures and is usually used for large-scale operations and at work-places where other techniques are not likely to be satisfactory. The workplace must be fully isolated and very strict protection and decontamination measures are necessary.

**NB: Asbestos fibres can be carried by water mist.**

It is important that the asbestos-containing material be soaked through its entire depth by the introduction of water through appropriate applicators before applying the water jets.

Since the use of high-pressure spraying is dangerous, a manual pressure control valve should control the jet so that the pressure is shut off on release.

A means of draining run-off water and slurry from the work- place into containers for safe disposal is required. Run-off water must be diverted from drains.

## **E. EXECUTION OF WORK**

Whether the nature of the work involves repairs or alterations to, or the removal of, asbestos-containing materials, the employer shall take the following precautions.

### **(i) Regulations**

The employer shall comply with the requirements of the Occupational Health and Safety Act, 1993, and the relevant regulations.

### **(ii) Respirators**

The employer shall—

- (a) provide employees with respirators approved by the chief inspector for use when working with asbestos. A sufficient quantity of respirator filters approved for asbestos shall be provided so those employees can change filters during the workday. A filter should preferably not be used for a period longer than one workday. The respirators shall be issued on a personal basis and arrangements shall be made for the regular inspection and servicing of the respirators;
- (b) instruct and train employees in proper respirator use and ensure that filters and respirators are protected from exposure to asbestos prior to use; and
- (c) ensure that employees wear respirators in the workplace at all times, and that respirators are properly fitted.

### **(iii) Protective clothing**

The employer shall-

- (a) provide suitable protective clothing for his employees. Suitable clothing comprises overalls or similar full-body protective clothing with head

covering and gumboots. Such clothing may be disposable, washable for re-use or may alternatively be suitable wet weather gear that can be hosed down;

- (b) undertake or arrange for the disposal or laundering of protective clothing. Where a contract laundry is employed, care shall be taken that the contractor fully understands the precautions necessary for handling asbestos-contaminated clothing; and
- (c) ensure that protective clothing is removed from the premises only for laundering or disposal and then only if suitably packed in a sealed impermeable container, and that it is clearly labelled with a warning label as containing asbestos-contaminated clothing.

**(iv) Decontamination facilities and personal hygiene**

- (a) The employer shall set up decontamination facilities outside the workplace for the exclusive use of employees exposed to asbestos. These facilities shall consist of a "clean" change-room, toilet/shower facilities and a "dirty" decontamination change-room with vacuum-cleaners for the preliminary de-dusting of protective clothing.
- (b) All employees without exception shall—
  - (i) remove personal clothes in the "clean" change- room and put on clean protective clothing, gum-boots and respirators before entering the work- place; and
  - (ii) use the vacuum-cleaning to re-dust before the protective clothing and gumboots are removed in the “dirty” decontamination change room when leaving the workplace. While still wearing their respirators, the employees should proceed to the showers and only remove their respirators while showering. All showering must be done using soap and water.
- (c) Employees shall not eat, drink or smoke in the workplace. Before eating, drinking or smoking, employees shall first comply with paragraph (b)(ii), and before re-entering the workplace employees shall comply with paragraph (b)(i).

- (d) All other persons entering the workplace shall wear approved respirators for asbestos as well as protective clothing and footwear. Before leaving the workplace they must comply with paragraph (b)(ii).
- (e) All contaminated clothing and footwear shall be left in the decontamination change-room and should be immediately stored in suitable containers prior to disposal or laundering. Contaminated respirators that are removed in the showers must be removed after being washed down and stored for disposal or made good for re-use. The collection of protective clothing, footwear and respirators shall be strictly controlled.

(v) **Workplace isolation and preparation**

The employer shall—

- (a) where practicable, isolate the workplace for the duration of the work by completely sealing off all openings to and fixtures in the workplace, such as doors, windows, ventilation ducts and lighting. Strong plastic sheeting, with all joints carefully sealed, which is taped securely in place, provides an effective form of isolation.
- (b) provide double barriers of plastic sheeting or other suitable means (air locks) at all entrances and exits to the workplace so that the workplace is always closed off by one barrier when employees enter or leave;
- (c) post signs conspicuously, prohibiting people from and warning them against entering the workplace;
- (d) before work is begun, vacuum-clean all removable items and equipment that are not attached to asbestos-containing material, remove them from the workplace, and only return them to the workplace after the work has been completed and the workplace has been decontaminated;
- (e) vacuum-clean and then cover all non-removable items and equipment in the workplace with plastic sheeting that is taped securely in place or by other suitable means;

- (f) after complying with paragraphs (a), (b), (c), (d) and (e), remove all detachable equipment as well as other items that are attached to asbestos-containing material and clean them before enclosing them with plastic sheeting. Such items and equipment shall be returned to their proper place only when the work has been completed and the workplace has been decontaminated;
- (g) remove all air filters from air-conditioners and ventilation equipment and place them in impermeable bags or similarly effective containers that are sealable for disposal (the outside of all containers shall be cleaned before leaving the workplace); and
- (h) establish emergency and fire exits from the workplace and ensure that employees are informed of emergency procedures, which procedures shall have priority over all other procedures.

(vi) **Disposal of waste**

- (a) Work procedures shall be applied to small sections of the workplace at a time. Before beginning the next section all asbestos waste shall be collected from the section where work is currently in progress and placed in impermeable plastic bags or similarly effective containers. Before leaving the workplace all containers shall be cleaned on the outside and labeled, and, in the case of bags, the bag containing the waste shall be placed in another clean bag, sealed and labeled.
- (b) All plastic sheeting, tape, cleaning material, clothing and all other disposable items used in the workplace shall be placed into impermeable plastic bags or similarly effective containers, Before leaving the workplace all containers and bags containing asbestos-contaminated materials or items shall be dealt with as in paragraph (a) above,
- (c) The detailed arrangements for asbestos disposal shall be agreed upon with the appropriate local authority. The waste shall be disposed of only on waste disposal sites specifically designated for this purpose in terms of the Environment Conservation Act, 1989 (Act 73 of 1989). Waste shall be deposited in such a manner as to minimise dust dispersal as well as the need for further disturbance of the waste. The waste should be covered with at least 200 mm of sand or other suitable material capable of forming a seal to prevent the dispersal of dust. No waste should be left uncovered at the end of a workday.

- (d) Liquids or sludge containing asbestos shall be collected in collecting-tanks from where it may be pumped into sealable drums or closed type tanker for transit to the waste disposal site. Transport and disposal must take place in such a way that there is no risk of the material drying out before it has been disposed of and covered as provided for in (c) above.
- (e) High density materials such as asbestos cement, plastic materials containing asbestos, etc are not likely to release asbestos dust when tipped. However, a hazard may arise if the waste is subjected to pounding by vehicles passing over it, and the waste should therefore also be covered as described above, although the requirement for daily covering may be dispensed with.
- (f) All vehicles, re-usable receptacles and covers, which have been in contact with asbestos waste, shall be cleaned by a dust-free method.
- (g) The employer concerned with the collection, transport and disposal of asbestos waste is responsible for complying with the provisions of the Occupational Health and Safety Act, 1993, and the regulations.

**(vii) Decontamination of the workplace**

- (a) The employer shall clean all surfaces in the workplace, preferably by first using vacuum cleaning equipment with a filtration efficiency of 99% for particles of one micrometre in size and then wet mops. After cleaning the workplace, 24 hours shall be allowed for the settlement of dust before repeating the wet cleaning of all surfaces. If the clean-up seems satisfactory, the employer shall take two static air samples 48 hours after completion of the clean-up to ascertain whether the workplace is clean.
- (b) If the workplace is still found to be contaminated, the employer shall repeat the cleaning and air sampling until the concentration of regulated asbestos fibres is less than or equal to the background concentration + 0,01 fibres per millilitre of air.
- (c) If the workplace is found to be in compliance with paragraph (vii) (b), all isolation sheeting, tape, barriers and other debris shall be carefully placed in impermeable plastic bags and dealt with as set out in paragraphs (vi) (a) and (b)

**(viii) Air sampling**

- (a) Air sampling must be conducted throughout the entire operation to ensure that the operation does not cause a hazard inside or outside the workplace.
- (b) Air sampling must be conducted to provide the following samples:

<b>SAMPLE POINT</b>	<b>TYPE</b>	<b>MINIMUM NUMBER OF SAMPLES PER DAY</b>	<b>MINIMUM VOLUME OF SAMPLES (LITRES)</b>
Inside workplace (area where asbestos is being removed)	Personal or static	1	240 ℓ
Outside workplace	Static	2	480 ℓ

- (c) The employer must keep a record of all air samples taken. These records, which must be available for inspection by an inspector, must be kept for a period of not less than three years.
- (d) If the concentration of regulated asbestos fibres inside the building just outside the workplace for two consecutive days is more than background concentration + 0,01 fibres per millilitre of air—
- (i) all removal or encapsulation work shall be discontinued and not resumed until such time as the concentration on two consecutive days is less than or equal to 0,01 + background concentration fibre per millilitre of air;
  - (ii) remedial measures shall immediately be instituted; and
  - (iii) the situation shall immediately be reported to the AAIA and the Provincial Executive Manager/ Provincial Director.