

Annex 1

Code of Practice on the Preparation of Asbestos Investigation Reports, Asbestos Management Plans and Asbestos Abatement Plans - Issued Pursuant to Section 37 of the Air Pollution Control Ordinance (CAP 311)

This Code of Practice is issued by the Secretary for Planning, Environment and Lands under Section 37 of the Air Pollution Control Ordinance (Chapter 311) after consultation with the Advisory Council on the Environment. This Code is intended to give guidance and advice to Registered Asbestos Consultants on conduction of asbestos investigations, and subsequent formulation of overall asbestos management and abatement strategies. It also sets out the specifications of Asbestos Investigation Reports, Asbestos Management Plans and Asbestos Abatement Plans for submission to the Authority.

Although this Code is not legally binding, compliance with the advice given could be used as evidence of good practice in the course of legal proceedings.

Air Management Group
Environmental Protection Department
33/F, Revenue Tower
Wanchai, HONG KONG

Tel. 2594 6232

}}

Introduction

1. This Code of Practice provides guidance and advice to Registered Asbestos Consultants on conduction of asbestos investigations and subsequent formulation of overall asbestos management and abatement strategies. Factors to be considered in selecting the appropriate corrective measures to control the release of asbestos dust from in-situ asbestos containing materials in buildings and ships are also given.
2. This Code also sets out the specifications, scope and type of information that should be included in an Asbestos Investigation Report, an Asbestos Management Plan and an Asbestos Abatement Plan for submission to the Authority.
3. The measures and procedures described in this Code are considered to be the minimum requirements necessary for safeguarding the environment and the health of occupants of areas where asbestos work has been carried out. Additional precautions may be necessary for certain operations and this Code should not be interpreted as precluding the adoption of such measures. The requirements of the Factories and Industrial Undertakings Ordinance for worker safety are particularly relevant in this regard.

Definitions

4. **'Amended water'** means water with an approved wetting agent, for example, 50% polyoxyethylene ester and 50% polyoxyethylene ether, added to it to achieve a specific concentration in accordance with the manufacturer's instructions.

'Abatement' means any and all procedures physically taken to control fibre release from asbestos containing material. This includes removal, encapsulation, enclosure and transport of asbestos containing material.

'Asbestos' means any of the minerals, and substances including the minerals, crocidolite, amosite, chrysotile, fibrous actinolite, fibrous anthophyllite and fibrous tremolite.

'Asbestos containing material' means any material, substance or product which is made with or contains more than 1% asbestos by weight.

'Encapsulation' means treatment of asbestos containing material with another material that surrounds or embeds asbestos fibres in an adhesive matrix to prevent the release of fibres, as the encapsulant creates a membrane over the surface, penetrates the asbestos containing material and binds its components together.

'Enclosure' means the construction of an airtight, impermeable barrier around asbestos containing material to control the release of asbestos fibres into the adjacent environment.

'Non-friable asbestos containing material' means any asbestos containing material which when dry cannot be crumbled, pulverised or reduced to powder by hand pressure (for practical reasons, non bonded, asbestos containing textile fabrics should

be considered as friable).

'**HEPA-filtered appliance**' means an appliance such as an air mover, vacuum cleaner or a respirator fitted with a high efficiency particulate air filter capable of trapping and retaining 99.97% of particles (asbestos fibres) greater than 0.3 micron mass median aerodynamic equivalent diameter.

'**Removal**' means the stripping of any asbestos containing material from surfaces or components in a building or ship.

Planning an Asbestos Investigation

5. A Registered Asbestos Consultant should plan and lead the investigation to provide an accurate inventory of all asbestos containing materials and suspect materials (say, in inaccessible areas) on the premises or ship, or part thereof affected by the intended abatement work. The investigation team, headed by a Registered Asbestos Consultant, should normally comprise the following members:
 - a) a representative of the owner of the premises or ship;
 - b) maintenance staff of the premises or ship; and
 - c) staff from a Registered Asbestos Laboratory appointed to perform asbestos sampling, identification and measurement.

6. Every effort should be made to have all materials on the premises or ship, or part thereof affected by the intended work, visually examined and where appropriate sampled and tested by a Registered Asbestos Laboratory to ascertain the presence or otherwise of asbestos containing material. As a general rule, the following areas should be thoroughly examined:
 - a) insulation lagging and gaskets on steam and hot water pipes, flues, boilers and autoclaves;
 - b) friable materials (all friable materials should be treated as asbestos containing unless proved otherwise);
 - c) acoustic boards, sprayed- or trowelled-on materials, decorative plastering and panels;
 - d) fireproofing materials such as fire doors, blankets, curtains and fire-stop for cable penetrations;
 - e) friction materials; and
 - f) heat insulation materials in electrical and ventilation systems.

7. Collection and analysis of bulk samples should be carried out by a Registered Asbestos Laboratory on the advice and under the supervision of a Registered Asbestos Consultant. Collection of bulk samples should be done in a statistically random manner in order to help eliminate any inadvertent bias.

8. For surface materials, at least 3 bulk samples (full-depth and minimum 25mm x 25mm each) should be collected from each homogeneous area of 100 sq.m. or less; 5 bulk samples from an area of between 100 and 500 sq.m.; and at least 7 bulk samples from areas that are larger than 500 sq.m. For thermal insulation, a minimum

of 3 bulk samples from any homogeneous run of pipe; at least 2 bulk samples from each pipe elbow, valve and flange suspected of having different insulation material; and at least 2 bulk samples from any patched insulation of less than 2m in length. Bulk sampling, however, may be waived if objective data documenting a material's content are available.

9. The location, estimated quantity, friability, condition, use, accessibility and potential for damage should be recorded and mapped for all asbestos containing materials and suspect materials. Suitable personal protective equipment such as protective clothing and respirator should be worn when any asbestos containing material or suspect material may be disturbed during the inspection and under such circumstances, the area must be adequately segregated.

Asbestos Hazard Assessment

10. When the presence of asbestos containing material is confirmed, the Registered Asbestos Consultant should proceed to make an assessment on the likelihood of users of the premises or ship being exposed to an excessive amount of asbestos contaminant. The demographics of the exposed population as well as the potential for release of asbestos fibres are two major factors to be considered.
11. A physical assessment of the airborne fibre generation potential could be done by visual inspection of the asbestos containing material. The following parameters influencing fibre release or re-entrainment should be considered:
 - Asbestos type, percentage content and quantity:- Is the more dangerous amosite or crocidolite involved? What percentages and quantities are present?
 - Friability of the material:- Does the material flake, powder, or crumble easily by hand pressure and readily emit fibres?
 - Existing condition:- Is the material damaged or deteriorated? If so, how severe?
 - Accessibility and exposed surface area of the material giving a potential for physical damage by vandalism, impact, mechanical or vibration.
 - Extent of occupant activity:- What is the potential for continued suspension of airborne fibres and for settled, previously released fibres to become airborne again (re-entrainment)?
 - Frequency of repairs to asbestos containing material-covered items.
 - Potential for water damage (water damage often loosens the matrix binding the asbestos fibres in place and to the underlying substrate).
 - Potential for air erosion:- Is there a direct air stream or plenum opening likely to wear out the material?

- Population at risk:- What is the size and age distribution of the exposed population? What is the duration of exposure? How likely is it that asbestos dust on personal clothing might be brought home and exposed to family members?
12. In addition to bulk sampling and visual inspection, the Registered Asbestos Consultant should consider whether air quality measurements should be taken to support a specific remedial course of work. It should be borne in mind, however, that air measurements are episodic in nature. As such, low air sampling results do not necessarily indicate low hazard, but high air sampling results are always indications of imminent hazard.

Types of Corrective Action

13. Corrective action alternatives fall into four main categories:-

a) Removal

Asbestos containing material should be separated in a controlled environment from the underlying surface, collected and placed in approved containers for burial in a designated government landfill. The situation in terms of material damage, friability and exposure potential will determine whether removal should be:

- immediate,
- as soon as possible - not waiting for the normal repair and maintenance cycle and that access to that part of the premises should be controlled prior to actual removal, or
- planned to have the removal taking place as part of the normal maintenance and repair cycle thus minimising costs and disturbance.

b) Encapsulation

Asbestos containing material should be coated with a sealant. This may be a penetrant, which penetrates and hardens the asbestos containing material; or a bridging sealant, which covers the surface of the material with a protective coating. Sealants should normally be applied over the surface of the material using airless spray equipment at low pressure in order to reduce fibre release during application. The surface to be encapsulated should first be cleaned with a HEPA-filtered vacuum unit to remove all loose debris to ensure good adhesion of the coating to be applied. Only encapsulants specially designed for the control of asbestos fibre should be used.

c) Enclosure

A barrier should be installed between the asbestos containing material and the surrounding environment thus confining any dust inside the enclosure, e.g. a suspended ceiling constructed between the asbestos containing material in the plenum and the indoor environment. Since fibre release and fallout can

continue, a combination of encapsulation and enclosure may be required for adequate protection.

d) Deferred Action

Action can be deferred when the exposure risk is considered negligible or the asbestos containing material is well-protected so that fibre release is very unlikely. However, a continuing effort in the form of an operation and maintenance programme should be set up to monitor the situation by regular surveillance to make sure no disturbance would be made to the asbestos containing material during normal use/repair/refurbishment, and to lay down a course of action in case deterioration of the asbestos containing material is observed.

14. The advantages and disadvantages of these four options are summarised in appendix 1. The choice of the most appropriate option depends largely on circumstances and the criteria to be considered are given in appendix 2. It is only by conducting a cost-benefit analysis of the different options (e.g. comparing 'immediate removal' with 'phased removal plus operation and maintenance programme' with 'removal just before demolition plus lifetime operation and maintenance programme') that it is possible to determine which option is the most suitable. Asbestos containing material not required to be immediately removed should be labelled with an approved warning sign (see appendix 3) to ensure that it is not inadvertently disturbed or worked upon without correct precautions.

Different Levels of Protection

15. All the direct abatement options, namely encapsulation, enclosure and removal, require precautionary measures to be taken to control dust release during the abatement process in addition to requirements of safe practice for normal construction work. The level of protection required depends on the nature of the asbestos containing material involved, the type of abatement and the degree of disturbance to the asbestos containing material.
16. General guidelines are drawn up for various situations which can be grouped into four categories according to the level of protection.

Category

- | | | |
|---|---|---|
| 1 | : | Total containment with 3-chamber decontamination unit and under negative air pressure. |
| 2 | : | Segregation between asbestos work and external area using plastic sheeting, and some form of air flow control using HEPA-filtered appliances. |
| 3 | : | Basically no containment required, only physical barrier to the outside environment with warning signs posted prominently and asbestos containing materials removed intact. |

- 4 : Completely open-air asbestos work with proper worker protection, wetting and appropriate warning signs.

| Material | Friable (Sprayed-on, powdery) | Woven (cloth, rope) | Friable Board | Cementitious | Vinyl Bonded |
|---|-------------------------------------|---------------------------|------------------|--------------|-----------------|
| Abatement Option | | | | | |
| | Category | | | | |
| Removal | 1 | 1 | 1 | 3 | 3 |
| Encapsulation | 1 | 2 | 2 | 4 | 4 |
| Enclosure - direct disturbance | 1 | 2 | 2 | 4 | 4 |
| Enclosure - no direct disturbance | 2 | 4 | 4 | 4 | 4 |

These guidelines apply only to major abatement activities. Small-scale abatement which can be completed within one work shift may be conducted with different approaches giving effectively the same level of protection - an example would be the use of glove bags in delagging small sections of asbestos pipe insulation.

Means of Dust Suppression during Asbestos Abatement Work

17. The following methods of dust suppression should be adopted as far as practicable in asbestos abatement activities:-
- a) Containment or segregation of work area.
 - b) Use of negative pressure filtering equipment to control air flow between the work area and the outside environment.
 - c) Decontamination facilities for cleaning of workers, equipment and bagged waste before leaving the work area.
 - d) Wetting of asbestos containing material before and during disturbance, using amended water where appropriate.
 - e) Minimising the breakage and dropping of asbestos containing material, and packing of debris and waste immediately after it is produced.
 - f) Cleaning of work area by wet wiping and vacuuming with HEPA-filtered vacuum cleaner.
 - g) Coating on any surfaces previously in contact with or contaminated by asbestos with a proper sealant .

- h) Proper bagging, handling and disposal of asbestos waste or asbestos-contaminated waste.

Asbestos Investigation Report

18. An Asbestos Investigation Report should be signed by a Registered Asbestos Consultant to certify that, to the best of his knowledge and belief, the materials contained therein are real and up-to-date, and the investigation was conducted without bias.

19. As a minimum, the following information should be included.

a) Particulars of the owner:

This includes the owner's identity including name, passport or identity card number, address and telephone number. If the owner of premises or ship is a company, the name, business registration number, number of certificate of incorporation, address and telephone number of the company as well as the identity of the proprietor, partners, directors or person having control of the company should be provided.

b) Particulars of the premises or ship:

This includes detailed description of the location, age, structure, occupancy, usage pattern and main activities of the premises or ship in question. A brief description of the immediate neighbourhood in terms of their occupancy and activities should also be given.

c) Particulars of the Registered Asbestos Consultant and Registered Asbestos Laboratory:

This includes the names, registration numbers and the respective scope of duties of the Registered Asbestos Consultant and the Registered Asbestos Laboratory appointed for the investigation.

d) Method of Investigation:

While the method of investigation may vary from case to case, the following approach should normally be followed. The report should be so written as to reflect fully the scope and depth of work performed by the investigation team:

. Record review:- All building records and drawings, records of maintenance and renovation should be screened to identify all asbestos containing materials and suspect materials.

. Field inspection:- A thorough inspection of all materials on the premises or ship to

i) confirm the validity of the records and drawings,

ii) locate any asbestos containing material or suspect material not revealed in the records and drawings, and

iii) form an overall view of the condition of the asbestos containing material and suspect material, and of the population at risk. Any suspect material should be assumed to contain asbestos and treated accordingly.

- . Sample collection:- Unless justification can be given to disregard an air or bulk sampling exercise, the Registered Asbestos Consultant should develop an overall sampling strategy and methodology to be implemented under his supervision by the Registered Asbestos Laboratory. Details of the sampling criteria adopted, type and number of samples collected, their locations and means of access, any inaccessible area with presence of suspect material, type and number of samples analyzed should be provided.
 - . Laboratory analysis:- Collected air or bulk samples must be analyzed by a Registered Asbestos Laboratory with the results presented in a HOKLAS (Hong Kong Laboratory Accreditation Scheme) endorsed report appended to the Asbestos Investigation Report.
- e) Interpretation of results:
The Registered Asbestos Consultant should interpret the findings of the investigation and conclude, in terms of statistical significance where appropriate, whether or not asbestos containing material is present. Additional samples or follow-up inspections may sometimes be required before a definitive statement can be made.
- f) Hazard assessment:
Detailed assessment on the hazard of any identified asbestos containing material or suspect material with particular reference to:
- the quantity, type and composition;
 - the friability;
 - the physical condition and likelihood of future fibre release;
 - the accessibility;
 - the location in relation to the path of natural and artificial ventilation; and
 - the population and activities in the immediate vicinity.

Given there exists a latency period of some 10 to 40 years between first exposure to asbestos and onset of symptoms of diseases, particular attention should be given to infants and school-age children who are more vulnerable to asbestos-related diseases.

The Registered Asbestos Consultant is encouraged to include in the report any other information considered to be useful and relevant.

Asbestos Management Plan

20. An Asbestos Management Plan should be so written that it can be used as a self-contained document, and signed by a Registered Asbestos Consultant to confirm authenticity of the materials contained therein.
21. The mere presence of asbestos containing material does not necessarily imply that the health of users of the premises or ship is being jeopardised. The Registered Asbestos Consultant should determine, with due regard to the results of the investigation,

whether asbestos abatement work is required. If the situation does not warrant asbestos abatement to be pursued, an Operation and Maintenance Plan should be provided. If asbestos abatement is deemed necessary, however, an Asbestos Abatement Plan should be prepared. Therefore, an Asbestos Management Plan should comprise an Operation and Maintenance Plan for asbestos containing material and other suspect material not requiring abatement and an Asbestos Abatement Plan for any asbestos abatement work or work involving the use or handling of any asbestos containing material.

Operation and Maintenance Plan

22. The objective of an Operation and Maintenance Plan is to set out work practices to:
- maintain any asbestos containing material and suspect material in good condition;
 - ensure proper clean-up of asbestos fibres previously released;
 - prevent further release of asbestos fibres;
 - monitor the condition of asbestos containing material and any suspect material; and
 - safely handle accidental release of asbestos fibres.
23. An Operation and Maintenance Plan should state clearly the operation and maintenance policies and procedures tailored for the premises or ship in question, be regularly updated when necessary and made available to and understood by all personnel involved. It should include the following information as a minimum.
- a) Detailed description of the premises or ship:
This includes a detailed description of the location, age, structure, occupancy and activities. A brief description of the neighbourhood in terms of their occupancy and activities should also be given.
 - b) Organization of people for implementing the Operation and Maintenance Plan:
This includes an organization chart showing the administrative line of authority (with names and positions) and defining the responsibilities of key participants such as the owner, the Registered Asbestos Consultant, custodial and maintenance supervisors and staff and the Registered Asbestos Contractor should be provided.
 - c) Details of any identified asbestos containing material and suspect material:
This includes the characteristics, type, quantity and physical condition of all identified asbestos containing materials and suspect materials should be given in a tabulated form and depicted clearly on building plans or sketches to indicate their exact locations.
 - d) Condition of the identified asbestos containing material and suspect material:
This includes a description of the condition of all identified asbestos containing materials and suspect materials, and a detailed account of any damaged material with dimensions, potential for further damage and air quality measurements where appropriate. Any clean-up of previously released

asbestos contaminant should be described in detail. When the damaged asbestos containing material is located in the path of natural or artificial ventilation which may cause fibres to be transported, the clean-up may need to be extended to the whole of the premises, including possibly the ventilation system itself.

e) Reasons why any asbestos containing material or suspect material should not be removed:

In-situ asbestos containing material or suspect material can often be left in place and effectively managed but the reasons for adopting other abatement techniques such as deferred action, encapsulation or enclosure should be provided. Such reasons should be based on the findings of the investigation.

f) Method of labelling the asbestos containing material:

All identified asbestos containing material not requiring removal should be labelled to the specifications given in Appendix 3. Details of the method of labelling and maintenance of labels should be provided.

g) Method of informing all people who may be affected:

It is always advisable to take an honest and open approach to keep workers, tenants and other users of the premises or ship fully informed of the location and physical condition of the asbestos containing material which they might disturb, and to encourage them to report any evidence of disturbance or damage of asbestos containing material to the owner for corrective action. Any structured communications to that effect should be described in detail.

h) Surveillance scheme:

A comprehensive reinspection of all the asbestos containing materials and suspect materials should be carried out by a Registered Asbestos Consultant at least once every two years. Meanwhile, a carefully designed programme of airborne asbestos fibre monitoring may be useful to give early warning of deterioration or disturbance of the asbestos containing material. Compiling a set of colour photos on the condition of the material over time can be of great value. Details of a surveillance scheme to that effect should be provided.

i) Method to avoid disturbing the asbestos containing material:

Workers, tenants and other users of premises or ship should be encouraged to notify the owner of even small planned maintenance and renovation before any work is carried out. In addition, an authorization system should be adopted to

- i) monitor any operation and maintenance activities,
- ii) prevent accidental disturbances of asbestos containing material or suspect material and
- iii) discourage the introduction of new asbestos containing material.

Sample work forms are given in appendices 4 and 5 for reference. Details for the administration of such a notification and authorization system should be submitted.

- j) Record keeping scheme:
Details of a record keeping scheme for all asbestos management documents should include investigation and assessment reports, operation and maintenance plan, policies and work procedures, workers training and medical records, fibre release reports, airborne fibre monitoring reports, maintenance and renovation notifications, authorizations issued, evaluation of work affecting asbestos containing material and reinspection and surveillance of asbestos containing material.
- k) Actions for handling deteriorating asbestos containing material:
Special operation and maintenance practices for handling deteriorating asbestos containing material as well as under what circumstances a major clean-up operation would be required, should be fully explained.

Asbestos Abatement Plan

24. The objective of an Asbestos Abatement Plan is to set out:
- the method of abatement of asbestos containing material;
 - the performance criteria for protection of workers and the environment; and
 - any emergency procedures and contingency measures required.
25. The Asbestos Abatement Plan should include the following information as a minimum.
- a) Detailed description of the premises or ship:
This includes a detailed description of the location, age, structure, occupancy and activities, and a brief description of the immediate neighbourhood in terms of their occupancy and activities. The exact location and boundary of the abatement work site should be described and shown clearly on building plans or sketches.
- b) Particulars of the Registered Asbestos Consultant, Contractor and Laboratory:
This includes the names, registration numbers, and respective scope of duties of the Registered Asbestos Consultant, Registered Asbestos Contractor, and Registered Asbestos Laboratory appointed for the abatement work. When available, the name and registration number of the Registered Asbestos Supervisor(s) to be deployed should also be included.
- c) Reasons why any asbestos containing material or suspect material should not be removed:
This includes any reason given for the asbestos containing material or suspect material to remain. Such should be based on the findings of a comprehensive asbestos investigation. Any preventive measures to be taken during abatement to avoid disturbing the material inadvertently should be described in detail.
- d) Programme for asbestos abatement work:
This includes presentation in a chart form to show the critical path of the abatement project and date for the various stages of work including site

possession, delivery of specialised equipment and consumables, site preparation, preliminary decontamination of work area, background air test, construction of containment, leak test, asbestos abatement, air monitoring, final clean-up, penultimate air test, visual inspection by a Registered Asbestos Consultant, final clearance air test, removal of containment, reassurance visual inspection by a Registered Asbestos Consultant and removal of asbestos waste and decontaminated equipment from site.

e) Method of abatement and performance criteria:

This includes justification for the choice of a particular abatement technique and detailed description of the method(s) of abatement including site preparation, construction of containment, air monitoring strategy and programme and work acceptance procedures. A description of methods, measures, steps for checking the performance (for the reduction or elimination of exposure to the asbestos workers, other users of the premises or ship, and the environment) before, during and after the abatement work or work involving the use or handling of asbestos containing material should also be provided.

f) Amount of asbestos waste and method of disposal:

An estimate on the amount of asbestos and asbestos-contaminated waste to be generated from the abatement work, any arrangement for temporary storage of waste on site and their packaging and method of disposal at government landfill should be described in full.

g) Emergency procedures and contingency measures:

Emergency procedures and contingency measures tailored for the premises or ship in question should be supplied to cater for mishaps such as fire, explosion, vandalism, typhoon, bursting of pipe and industrial accidents.

Implementation of an Asbestos Management Plan

26. The success of an Asbestos Management Plan hinges on key personnel understanding the asbestos management programme and committing themselves to implementing it effectively. To that end, it is important that a Registered Asbestos Consultant is authorized to oversee all asbestos-related activities on the premises or ship, including inspections, operation and maintenance activities and other abatement actions. He should also be responsible for ensuring the maintenance and custodial staff have received proper training in operation and maintenance techniques which may include wet methods, use of HEPA-filtered vacuum unit and avoidance of certain activities such as sawing, sanding and drilling asbestos containing material.
27. The appointed Registered Asbestos Consultant should also endeavour to establish clear lines of communication with users of the premises or ship regarding asbestos issues to maintain their confidence in the effective implementation of the Asbestos Management Plan.

Supervision and Monitoring of Abatement Work

28. For asbestos abatement activities other than those exempted under Sections 69(2) and 75(4) of the Air Pollution Control Ordinance, the owners of premises should engage a Registered Asbestos Consultant to supervise and monitor the performance of the appointed Registered Asbestos Contractor for the entire abatement period in the following manner:
- a) At least 1 Registered Asbestos Supervisor per 15 workers engaged in asbestos abatement work must be present on site full-time.
 - b) All workers directly involved in handling asbestos must have received proper training.
 - c) All equipment used for dust control must be properly maintained, tested and where appropriate certified to be in good working condition by a recognized laboratory on a regular basis.
 - d) All working procedures including decontamination must be in accordance with the agreed abatement plan and follow sound principles for dust control.
 - e) No visible emission from the work area is allowed.
 - f) All effluent from the work area should be pre-treated before discharging.

The Registered Asbestos Consultant should ensure the above through inspection, interview and consultation with the Registered Asbestos Contractor, air monitoring and other appropriate methods on a regular basis.

29. It is the duty of the Registered Asbestos Consultant to notify the Authority of any modification of the content of the Asbestos Management Plan or Asbestos Abatement Plan before implementing the modifications. For effective supervision of work, any deviation of work on site from the Plan should be supported by written confirmation from the Registered Asbestos Consultant, otherwise the Registered Asbestos Contractor shall bear full responsibility.

Related Publications

30. Further information on the requirements for undertaking asbestos work are available in the following publications issued by the Environmental Protection Department:
- a) Guide to the Air Pollution Control Ordinance Relating to the Control of Environmental Asbestos.
 - b) Code of Practice on Asbestos Work Using Full Containment or Mini Containment Method.
 - c) Code of Practice on Asbestos Work Using Glove Bag Method.
 - d) Code of Practice on Safe handling of Low Risk Asbestos Containing Material.
 - e) Code of Practice on the Handling, Transportation and Disposal of Asbestos Waste.

| <u>Options</u> | <u>Advantages</u> | <u>Disadvantages</u> |
|----------------|---|--|
| Removal | Asbestos source eliminated. No further action required. | Often highest cost, most complex and time-consuming method. Removal creates major disturbance and may increase fire risk within building. Possible contamination of whole building if removal done poorly. Higher potential for worker exposure. Substitute material required. |
| Encapsulation | Usually a quick and economical method for repair to damaged areas. May be an adequate technique to control release of asbestos dust. | Asbestos source remains. If material is damaged or deteriorating, additional weight of the sealant may cause delamination. Cost for large areas may be near removal cost. Management system required to check regularly for damage to encapsulated surface. Eventual removal may be more difficult and costly. |

Appendix 1 (Cont.)

| <u>Options</u> | <u>Advantages</u> | <u>Disadvantages</u> |
|-----------------|--|--|
| Enclosure | <p>May be an adequate method of control for some situations.</p> <p>May minimise disturbance to occupants.</p> | <p>Asbestos source remains and fibre fallout continues behind enclosure.</p> <p>Management system required to provide continuous maintenance to enclosure.</p> <p>May be costly if enclosure disturbs functions or requires relocation of other systems.</p> <p>Precautions necessary for entry into enclosure for maintenance or renovation.</p> <p>Need to remove enclosure before eventual removal of asbestos.</p> |
| Deferred Action | <p>No initial cost.</p> | <p>Potential for exposure may increase with time.</p> <p>Management system required. Precautions necessary to prevent damage during maintenance or renovation.</p> <p>Continuing inspection and re-evaluation necessary.</p> |

Appendix 2

| <u>Options</u> | <u>When Appropriate</u> | <u>When Inappropriate</u> |
|-----------------|---|--|
| Removal | Material severely damaged or liable to further damage or deterioration. Material friable or poorly bonded to substrate. Prior to building or ship renovation or demolition. | Material located on complex and inaccessible surfaces. Removal extremely difficult and other techniques offer better alternative. |
| Encapsulation | Removal not feasible. Material still retains firm bonding to substrate. Damage to material unlikely. Limited accessibility of material. Short remaining life of structure. Economic or time advantage. | Material does not adhere well to substrate. Weight of sealant may cause delamination. Material is deteriorating or damaged. Water damage likely. Continuing inspection and maintenance of encapsulated material doubtful. |
| Enclosure | Removal not feasible. Fibres can be completely contained within enclosure. Disturbance or entry into enclosed area unlikely. Economic advantage. | Damaged or deteriorating material causing high levels of fibre fallout. Water damage likely. Damage to enclosure likely. Entry into enclosure probable for repairs and maintenance. Continuing inspection and maintenance of enclosure doubtful. |
| Deferred Action | Negligible exposure potential. Material inaccessible and fully contained. Material in stable condition and not liable to damage. | Definite or questionable exposure potential. Possibility of deterioration or damage. Continuing inspection doubtful. |

Labelling of Asbestos-containing Material

It is the owner's responsibility to label all exposed asbestos-containing material in a building or ship with the following warning sign so as to ensure that the material is not inadvertently disturbed or worked upon without correct precautions. Durable and weather-resistant material should be used for the sign in question.



Appendix 4

Application Form for Maintenance or Renovation Work (SAMPLE)

Person-in-charge of work : _____ Telephone No. : _____

Commencement Date : _____ Completion Date : _____

Address of premises or ship (or description of area) where work is to be performed :

Description of work :

Description of any asbestos-containing material that might be affected or used, if known (including location and type):

Name and telephone no. of applicant: _____

Address: _____

Signed : _____ Date : _____

(Applicant)

NOTE: An application must be submitted for all maintenance or renovation work whether or not asbestos-containing material might be affected. An authorization must then be received before any work can proceed.

_____ Granted (Application No. _____)

_____ With Conditions*

_____ Denied

*Conditions: _____

Remarks (Follow-up visit and observations) :

Signed : _____ Date : _____

(Registered Asbestos Consultant)

Authorization Form for Maintenance or Renovation Work (SAMPLE)

AUTHORIZATION

Authorization is given to _____ (Person-in-charge of work) to proceed with the following maintenance or renovation work at the specified location:

This authorization will expire at _____ hrs. on _____

PRESENCE OF ASBESTOS-CONTAINING MATERIALS

- _____ Asbestos-containing materials (ACM) not present in the vicinity of the maintenance/renovation work.
- _____ ACM is present, but its disturbance is not anticipated; however, if conditions change, the Registered Asbestos Consultant will re-evaluate the work request prior to proceeding.
- _____ ACM is present, and may be disturbed.

Work Practices if Asbestos-Containing Materials are Present

The following work practices shall be employed to avoid or minimize disturbing asbestos.

Personal Protection if Asbestos-Containing Materials are Present

The following equipment/clothes shall be used/worn during the work to protect workers.

Special Practices and/or Equipment Required

Signed : _____ Date: _____
(Registered Asbestos Consultant)