

Introduction and purpose of report

This report is intended to provide building owners and companies engaged in building works, or handling of asbestos-containing materials, with an understanding of their responsibilities and liabilities under law to prevent the release of asbestos to the environment and to protect the health and safety of their workforce and building users.

The report initially involves a question and answer format to specifically answer common questions asked by Aspec clients. Following sections of the report provide further details on asbestos legislation in Hong Kong and guidance on the actual working practices for handling asbestos-containing materials.

EXECUTIVE SUMMARY

The handling or removal of asbestos containing materials is strictly regulated in Hong Kong by means of various Government Legislation. Both the use of asbestos materials in the workplace and the handling or removal of asbestos-containing materials from buildings and ships is included. Importation and use of all types of asbestos has been banned. Penalties (for example, fines up to HK\$200,000 and/or imprisonment up to 6 months) are imposed for offences committed under the Ordinances.

The Hong Kong Government Labour Department is responsible for overseeing the implementation of the Factories and Industrial Undertakings (Asbestos) Regulation in order to ensure the safe use and handling of asbestos containing materials in the workplace and to protect the health of persons at work in industrial undertakings. Assessments of worker exposure and protective measures to ensure worker safety are required.

The Hong Kong Government Environmental Protection Department (EPD) is responsible for enforcing the Air Pollution Control Ordinance and its subsidiary regulations. The Ordinance is used to protect the environment from asbestos emissions. This Ordinance empowers EPD to impose licensing control on air pollution sources, such as asbestos, and issue legal notices to abate asbestos emissions. The Ordinance also provides a registration system to control asbestos removal work. Asbestos workers have to be trained and registered and on-site inspections of their working practices are carried out by EPD.

Asbestos waste is classified as a chemical waste under the provisions of the Waste Disposal Ordinance which is enforced by EPD. The asbestos waste has to be sealed in containers and applications for disposal to landfill made to EPD by licensed waste disposal companies. A trip ticket system is used to monitor the transfer of waste from site of production to final disposal.

Both Labour Department and EPD require advance notification from building owners and contractors of intended work with asbestos materials and have the power to vet working methods and abatement procedures.

Both Government Department provide guidance notes and codes of practice to help people understand their responsibilities under these Ordinances and to outline best working practices.

Q6. What are the names of the various asbestos regulations and when were they established?

The Air Pollution Control Ordinance, Chapter 311 applies to control of release of asbestos to the environment. It came into force in June 1997. EPD have issued “A Concise Guide to the Air Pollution Control Ordinance”, which explains this ordinance. This ordinance is relevant to all building owners and contractors who may have to disturb asbestos containing materials as part of their renovation/demolition of buildings.

The use of asbestos materials in the workplace is controlled by The Factories and Industrial Undertakings (Asbestos) Regulation, Chapter 59AD. It came into force in September 1997. The Occupational Safety and Health Branch of the Labour Department has issued a code of practice “Safety and Health at Work with Asbestos” which explains the operation of this ordinance. This ordinance is relevant to companies that employ workers to handle asbestos-containing products in the workplace - including employers of asbestos removal workers.

Anyone who wishes to dispose of an asbestos-containing material must comply with the requirements of the Waste Disposal Ordinance, Chapter 354. Asbestos is classified as chemical waste. The Waste Disposal (Chemical Waste) (General) Regulations were enacted in March 1992, and in January 1993 EPD produced a “Code of Practice on the Handling Transportation and Disposal of Asbestos Waste”. This ordinance is relevant to building owners and companies that need to dispose of asbestos waste. The control of asbestos waste is subject to further regulations - such as packaging and labelling - as detailed in the code of practice.

Q7. What responsibilities does a building owner have according to asbestos laws?

The responsibilities of a building owner are fully detailed in the Air Pollution Control Ordinance Chapter 311 Part IX Section 69. If a building owner - or anyone taking possession of a site - who suspects that asbestos containing materials are present and that they may be disturbed by renovation or demolition work - must employ a registered asbestos consultant to carry out an asbestos investigation. If no disturbance to asbestos materials is planned, and they are in good condition, then the building owner need take no further action. However, EPD does recommend the implementation of asbestos management plans to safely manage in-situ asbestos materials. Asbestos management plans are not currently a legal requirement - just recommended good practice.

If a building owner intends to disturb asbestos materials then two options are available depending on the nature of the asbestos material.

- Removal of low risk asbestos materials do not need the submission of an asbestos abatement plan to EPD for approval. A building owner can directly appoint a registered asbestos removal contractor to remove the material. If an asbestos containing material is extremely low risk, then a specialist contractor need not be appointed at all. For example, lift motor brakes which contain asbestos can be removed by a lift engineer (but must be disposed of as asbestos waste). Low risk asbestos materials which require no abatement plan are detailed in the Government Gazette No. 25/1997 GN 3021. Asbestos materials which do not require a specialist asbestos removal contractor for their removal are detailed in the Government Gazette No. 25/1997 GN 3022.
- The removal of high risk asbestos materials require the submission of an asbestos investigation report and asbestos abatement plan to EPD for approval. A registered asbestos consultant must be employed to produce these reports and supervise any subsequent asbestos removal by a registered asbestos removal contractor.



Q8. What are the penalties for non-compliance with asbestos laws?

A building owner or contractor with possession of a site who causes the release of asbestos to the environment through non-compliance with the various asbestos regulations may have committed various offences as follows:

- Failure to carry out asbestos investigations of premises. Penalty fine up to HK\$200,000 with further fines if offence continues.
- Failure to notify the authorities 28 days in advance of any planned asbestos abatement work. Penalty fine up to HK\$200,000.
- Failure to appoint specialist registered personnel to handle asbestos materials. Penalty fine up to HK\$200,000 and imprisonment up to 6 months with further fines if offence continues.
- Failure to comply with an abatement notice issued by EPD to prevent the release of asbestos to the environment, eg. removal of damaged asbestos materials or failure to stop renovation/demolition work which release asbestos. Penalty fine up to HK\$500,000 and imprisonment up to 12 months and with further fines if offence continues.

EPD publishes details of enforcement of the Air Pollution Control Ordinance on its web site, and conviction details for asbestos offences can be viewed at the following web site address:

http://www.epd.gov.hk/epd/english/laws_regulations/enforcement/convictions_list.html

Although the maximum penalties for offences are high, the actual fine levels currently imposed by the courts are very low - of the order of HK\$2,000 to 10,000.

2.0 Asbestos Legislation in Hong Kong

2.1 The Factories and Industrial Undertaking (Asbestos) Regulations

As described in the Question and Answer section at the start of this report, the Factories and Industrial Undertakings (Asbestos) Regulation is mainly of concern to businesses that still have asbestos products in the workplace. This is also relevant to asbestos removal companies who also have to ensure that their employees comply with the Regulation requirements.

The best document to read to gain an understanding of this Regulation is the code of practice "Safety and Health at Work with Asbestos" issued by the Labour Department.

The code of practice helps detail the responsibilities of a business - and its employees - if they wish to handle asbestos products in their workplace. The employer has to meet the following requirements:

- Carry out an assessment of worker exposure to asbestos. This has to be done by an experienced and competent person such as a registered asbestos consultant or occupational hygienist. The assessment must identify the type of asbestos to which workmen are exposed and the degree of exposure. Remedial measure must be detailed to prevent exposure or reduce it to the lowest practical level. New assessments must be carried out whenever any circumstances change in the workplace. The basis of the assessment is whether worker exposure exceeds stipulated control limits and action levels defined in terms of exposure to concentrations of fibres in the air over a time period. Remedial measures to reduce exposure usually include: segregation of work area; respiratory protective equipment; protective clothing; segregation of work areas; monitoring of fibre levels; personal hygiene measures and provision of washing facilities etc.
- Notification must be made to the Labour Department if certain high risk types of asbestos products are to be handled or if control limits and action levels are likely to be exceeded.



- Hygiene and safety requirements as required by the assessment must be fully implemented by employers and employees trained in their use. The aim of all these measures is to reduce levels of asbestos fibres in the air and prevent employees breathing fibres or having their clothing contaminated by asbestos. Typical measures include : suppression of dust at source by wetting or vacuum/ventilation techniques; total or partial enclosure of the work area to prevent escape of fibres to other areas. Specialist filter equipment is necessary to retain asbestos fibres and reference is made to HEPA filters which have to be used in vacuum cleaners or exhaust ventilation to trap asbestos fibres.
- Cleanliness of premises and plant must be maintained by cleaning all areas regularly and providing washing and changing facilities. Protective clothing and respirators have to be provided to workmen and employees must be trained in their use.
- In asbestos work areas no smoking, eating or drinking is allowed.
- The performance of all the precautionary measures must be checked by regular air monitoring to check fibre-in-air levels.
- All staff must be trained and given adequate information about the risks of asbestos. Young persons cannot be employed in asbestos work.
- All asbestos products and waste from the workplace must be properly stored in sealed containers with warning labels.

Compliance with all the requirements of the code of practice is a comprehensive and costly exercise involving a lot of planning and time for assessments/monitoring and significant capital outlay for protective systems. Aspec recommend that any employer considering working with asbestos products seek early advice from an asbestos consultant and both Labour Department and Environmental Protection Department before committing to such work. The possibility of using non-asbestos substitute materials should be thoroughly researched prior to deciding to work with asbestos containing materials.

Details of asbestos-substitute suppliers can be found at the EPD web site address :

http://www.epd.gov.hk/epd/english/environment/nhk/air/guide_ref/abestos.html

2.2 The Air Pollution Control Ordinance

As described in the Question and Answer section at the start of this report, the Air Pollution Control Ordinance (APCO) is relevant to building owners or building contractors who encounter asbestos containing products in their buildings. If the asbestos products are likely to be disturbed by building works/demolition, or if the condition of the material is poor, then they must comply with the requirements of this Ordinance.

Chapter 311 of the APCO, Part IX, sections 69 to 80 clearly details a building owners responsibilities and liabilities and should be read prior to implementing any asbestos work.

To control asbestos work in Hong Kong the Government has set up a system whereby only registered competent persons or contractors can carry out asbestos work. Asbestos consultants are registered to carry out asbestos survey work, prepare asbestos investigation reports and abatement plans and supervise certain types of asbestos removal work. Asbestos Removal contractors are registered to carry out approved abatement plans and must have registered asbestos supervisors to be in charge of site work. Registered asbestos laboratories take air tests before, during and after completion of asbestos removal work to check fibre-in-air levels. The administration of this system is described in Part VIII of the APCO.

The content of asbestos investigation reports, abatement plans and management plans has to comply with codes of practice issued by EPD. For high risk asbestos materials the reports have to be submitted to EPD for their acceptance before removal work can commence. EPD have the power to insist on amendments to these plans and to reject methods of working if they consider them insufficient to prevent release of asbestos to the environment.

Section 69 details a building owners responsibility to employ an asbestos consultant to carry out an asbestos investigation of areas that may contain asbestos materials prior to any disturbance. A building owner can also mean the building contractor who has possession of the site to carry out building works. Therefore, building contractors must not assume that they are exempt from this requirement of the APCO.



Sections 70 and 71 detail what has to be included in asbestos investigation reports, asbestos abatement plans and asbestos management plans (for in-situ management of asbestos materials). EPD have produced a series of codes of practice for asbestos work which provide good practice guidance to asbestos professionals in their work. These codes of practice are:

- “Code of Practice on Preparation of Asbestos Investigation Report, Asbestos Management Plan and Asbestos Abatement Plan”. This provides guidelines for asbestos consultants to produce their reports.
- “Code of Practice on Asbestos Work Using Full Containment of Mini-Containment Method”. This provides guidance for removal of moderate to high-risk asbestos materials such as from air-conditioning systems and pipe insulation.
- “Code of Practice on Asbestos Work Using Glove Bag Method”. This provides guidance for removal of small-scale plant insulation.
- “Code of Practice on Safe Handling of Low Risk Asbestos Containing Materials”. This provides guidance for removal of low-risk asbestos materials such as corrugated asbestos cement roof sheeting and asbestos containing vinyl floor tiles. A leaflet specifically for low risk materials in illegal building structures is available.

Section 73 details the requirement for EPD to be notified 28 days in advance of any asbestos work taking place. This allows them time to assess the abatement plans and plan site surveillance.

Sections 74, 75 and 76 detail the duties and responsibilities of asbestos consultants, contractors and laboratories respectively. As detailed in the Question and Answer section of this report - Q.7, a building owner has the option not to employ an asbestos consultant for removal of low risk materials and can directly employ an asbestos removal contractor to remove the material without submission of an asbestos investigation report and abatement plan. However, the requirement for 28 days notice of works to EPD is still required. A building owner also has the option not to employ a asbestos removal contractor for removal of very low risk materials. The Government Gazette notices detail which classes of asbestos materials fall into these categories.

Section 77 details the offences committed and penalties imposed if a building owner or registered asbestos professional does not comply with the requirements of the APCO. Q.7 of the Questions and Answers section of this reports gives details on the fines and imprisonment that can be imposed - typically HK\$200,000 fines with additional fines for each day that offences continue and also up to 6 months imprisonment for some offences.

Section 78 of APCO allows a person to defend a prosecution if they can show that the work was necessary in an emergency situation to avoid risk to human life or serious disruption to public service and also if they can show they could not reasonably have known of the presence of asbestos containing materials at the time of work.

EPD also have the power to force a building owner to take remedial action if it is thought that asbestos materials in a building are in such a poor condition through deterioration or damage that asbestos fibre release may take place. Section 79 of the APCO details the issue of these “abatement notices” and what a building owner must do if issued with such a notice. An asbestos consultant must be employed to provide advice on remedial options and prepare an asbestos abatement plan for submission to EPD. The building owner must then employ a registered asbestos removal contractor and laboratory to remove the materials in accordance with the agreed abatement plan.

Section 80 of the APCO details the banning of the import and sale of products containing asbestos.

Summary

In summary, the Air Pollution Control Ordinance details what measures a building owner must take to prevent the release of asbestos to the environment from asbestos containing materials in their premises. It describes how registered asbestos professionals must firstly be employed to identify asbestos material, and then employed to carry out abatement measures on most asbestos containing materials.

EPD is responsible for enforcing this Ordinance, and they carry out numerous prosecutions each year of people who do not comply with the legislation requirements.



2.3 The Waste Disposal Ordinance

Asbestos is defined as chemical waste in Hong Kong and has to be disposed of in a proper manner. EPD have produced a “Code of Practice on the Handling Transportation and Disposal of Asbestos Waste” which provides guidelines on asbestos disposal. Whilst it is useful for building owners to be aware of the requirements of this Ordinance and code of practice, it is usual working procedure in Hong Kong for the appointed asbestos removal contractor to make all arrangements for complying with asbestos waste disposal regulations. The code of practice details how asbestos waste is divided into various types as follows:

- Type 1 : waste containing bonded chrysotile, such as corrugated asbestos cement sheeting or asbestos vinyl floor tiles.
- Type 2 : waste containing unbonded chrysotile such as asbestos cloth/rope products or plant insulation.
- Type 3 : any waste which contains amosite or crocidolite asbestos.

Under the Regulation, producers and collectors of chemical waste have to be registered with EPD before engaging in production and transportation of such waste.

Asbestos waste has to be packaged and labelled so as to identify the type of waste and its producer. Standard warning labels for asbestos have to be prominent on the package. Sharp materials must be stored in suitable receptacles to prevent puncture.

During an asbestos removal contract, asbestos waste is steadily produced and is usually stored at the working site in a temporary waste store which has to meet certain guidelines about security and amount of waste stored. It takes about 10 days for an application to dispose of waste to be granted.

Transport to a landfill site for final disposal is regulated by a “cradle to grave” trip ticket system whereby the asbestos removal contractor applies to EPD to dispose of the waste and then the trip tickets are certified by the waste producer, collector, and landfill operator upon receipt. EPD receive details of all asbestos waste received by landfill operators and can check against received asbestos removal work notifications.

3.0 Asbestos Abatement in Hong Kong Actual Working Procedures for the Building Owner

This section of the report provides details on how asbestos removal work takes place in Hong Kong and what a building owner has to do if they suspect they have asbestos containing materials in their buildings.

Owners of buildings do not have to carry out an asbestos survey unless they suspect that asbestos will be disturbed during building renovation or demolition work or unless they suspect that they have damaged asbestos materials in their building. If a building owner needs to remove asbestos materials then the following procedures should be followed:

1. Appoint a registered asbestos removal consultant to carry out an asbestos investigation and prepare an asbestos abatement plan. Asbestos may be removed or repaired/sealed and left in-situ dependent on the circumstances and the type of building work that is to take place.

Contact details of asbestos professionals are provided at the EPD web site address:

http://www.epd.gov.hk/epd/english/environment/hk/air/guide_ref/reg_asbestos.html

Alternatively, building owners/contractors commonly directly appoint a registered asbestos removal contractor who then arranges sub-contract appointment of a consultant and laboratory. However, conflict of interest can occur with this approach.

2. The asbestos consultant or removal contractor will provide advice on whether the type of asbestos material to be removed requires the formal submission of a report to EPD or not. This is dependent on whether the material is regarded as low or high risk.
3. After the decision to remove or repair/seal asbestos material has been taken, the next step is to notify Government about the proposed work. This can take one of two paths dependent on the asbestos material:



- Low risk materials such as corrugated asbestos cement do not require submission of an asbestos abatement plan. The building owner is only required to submit a 28 day notification to EPD giving details of the intended removal work. The appointed asbestos removal contractor must also inform Labour Department that his employees are undertaking work with asbestos. This notification must also be submitted 28 days before commencement of asbestos work.

It is common that the consultant or contractor arranges for submission of the notification form to EPD. The building owner must sign the form along with all other parties. EPD only accept the original signed form - not a faxed copy.

The notification form to Labour Department must be submitted by the asbestos removal contractor. Faxed copies are acceptable.

The building owner is advised to satisfy himself that the forms have been submitted on time and that asbestos removal does not start before the 28 days notice period.

- Moderate to high risk materials such as pipe insulation require submission of an asbestos investigation report and asbestos abatement plan to EPD. This must be submitted at least 28 days before asbestos removal work takes place. It is common that EPD require additional information in support of an abatement method or require additional protection for adjacent sensitive receivers. This period of liaison and negotiation with EPD takes place during the period before work commences and does not usually affect the 28 day notice period which starts from the date of initial submission. EPD usually approve an abatement plan within 21 days of submission. The 28 day notification forms to both EPD and Labour Department must also be submitted - typically at the same time as submission of the abatement plan.

4. The building owner should be aware that any delay in submission of an asbestos abatement plan or the notification forms means a delay to starting asbestos removal. Both the 28 day notice forms and the abatement plan all have to be submitted 28 days before commencement. If time is not a constraint, then the abatement plan can be issued and approved before hand and the 28 day notification forms submitted at a later date once removal dates have been arranged.

Tendering for asbestos removal work

Arranging asbestos removal work usually takes one of two forms:

- i) Appointment of an asbestos consultant and preparation of an asbestos investigation report and abatement plan, and approval gained from EPD. Removal contractors then tender for the contract based on the asbestos quantities and methods of removal detailed by the consultant. This has the advantage of clear pricing and building owners being able to prepare budgets, based on consultant advice, for the work before tendering.
- ii) Asbestos removal contractors are invited to quote for removal of all asbestos materials from a building - including pricing for asbestos survey work. Tenderers have to estimate asbestos quantities from site visits and their experience on what methods EPD will accept for removal. Advantages to the building owner is that tender prices can be cheaper as contractors often take a risk on the actual quantities that will be present. Problems for the building owner can occur if a contractor tenders too low a price for the work. Another disadvantage is if the actual quantities of asbestos materials turn out to be very low and then the building owner may pay more for the works than if option (i) had been used.



5. Once an asbestos removal contractor has been appointed, and the 28 day notification period been completed, then asbestos removal work can commence. The emphasis on asbestos removal is segregation of the work area from other building users. Work zones are typically sealed-off by the erection of polythene sheet screens. The work is labour intensive and the set-up of a work zone can take a few days whilst actual asbestos removal only takes a few hours. To give an example of the time that has to be allowed for asbestos removal, detailed below is a work programme for removal of an asbestos cloth flexible joint from air conditioning trunking - a typical small-scale asbestos job:

- Asbestos survey and preparation of report - including sample analysis times - and submission of report to EPD (7 days).
- Appointment of asbestos removal contractor. For small works a few days tender period is sufficient.
- 28 day notification forms sent to EPD and Labour Department (28 days).
- EPD respond to submitted asbestos abatement plan typically within 21 days. Asbestos consultant makes any changes required by EPD and report is approved before end of 28 day notification period.
- Asbestos removal contractor arrives on site. Set-up works involving building a polythene sheet "tent" around the flexible joint and building of washing and decontamination facilities for workers. Asbestos laboratory takes air tests to determine background fibre levels (1 to 2 days).
- Asbestos consultant inspects work zone and carries out smoke tests to check the integrity of the containment. Asbestos removal work commences by workers wearing protective respirators and clothing. Air monitoring is carried out by laboratory around work area to ensure no release of asbestos fibres (0.5 days).
- Two sets of air tests are taken in the work zone by the asbestos laboratory and the asbestos consultant inspects the work and certifies the area satisfactory for return to normal use. Work zone is dismantled (1 day).

- Replacement of flexible joint by new non-asbestos joint is required (0.5 days).

Obviously, larger-scale work, such as removal of all asbestos pipe insulation from a large commercial building, can take many months.

6. Asbestos removal on site

The preparation and set-up of a work zone to remove asbestos materials differs according to whether the asbestos material to be removed is a low risk or high risk material. The emphasis is on segregation of the work zone, and the more hazardous the asbestos, the more comprehensive the segregation measures. Examples of what the building owner should expect to see on-site for removal of various asbestos materials is detailed below.

Note that the details given below are not meant to be a comprehensive account of asbestos removal. A premises owner should refer to the relevant EPD code of practice if they wish to read a comprehensive step-by-step account of what should happen during asbestos removal.

For removal of low-risk asbestos materials such as corrugated asbestos cement sheeting the following works should be carried out:

- The asbestos occurrence will be surrounded by polythene sheeting. This is usually supported by timber frames or scaffold. The usual height of the barrier sheeting is 2m. The polythene sheeting should be fixed with duct tape to provide a sealed impermeable barrier between the work zone and adjacent areas.
- Personnel from the asbestos laboratory will take air tests to check background fibre-in-air levels before commencement of work. Air tests are taken using a small battery operated pump (about the size of a thick paperback book). Attached to the pump will be a length of flexible tubing on the end of which is a small metal cylinder containing the filter paper which traps dust from the air. This filter paper will then be taken back to the laboratory for inspection under a microscope. The pumps usually run for 2 hours to collect the required volume of air for analysis.



- The contractor will attach a decontamination unit to the polythene barrier sheeting. This is a 3 stage cubicle made of polythene sheet and supported on a timber frame. It is used as the entrance and exit from the work site. The middle section of the decontamination unit should have a shower tray and shower head for personnel to wash after work shifts. The removal contractor needs a water supply for washing and a hose pipe should lead to the shower tray. The waste water should be sent through a filter container - similar to large fish tank filters - to trap asbestos fibres before disposal of the dirty water to the drains. The entrance to the decontamination unit should have a warning notice attached to prevent people entering the work zone. Similar labels should be stuck to the polythene sheet barrier walls around the work zone.
- The contractor should provide a viewing panel, made of clear perspex, and fixed in the barrier sheeting to allow a clear view of the work within the work zone.
- During asbestos removal all workers inside the work zone should be wearing white disposable overalls with hoods and wearing half-face masks which cover mouth and nose. No eating, drinking or removal of protective equipment should take place.
- During removal of the asbestos sheeting the workmen should soak the material with water from pressurised water sprayers to minimise dust levels. The sheeting should be removed with the minimum of breakage and carefully wrapped in polythene sheeting for disposal. After all asbestos sheeting has been removed the workmen should thoroughly clean the work zone with vacuum cleaners and wet wiping.
- During asbestos removal the removal contractor must have a registered asbestos supervisor permanently on-site to supervise the workmen. He will also make a final inspection of the work to ensure that the work zone is dust-free and no visible asbestos debris remains.

The asbestos laboratory will then take air tests to determine if fibre in air levels are below the clearance acceptance level of 0.01 fibres per millilitre of air.

- Once air tests are satisfactory, all the polythene sheeting will be removed and wrapped for disposal as asbestos waste. All waste should have asbestos warnings labels fixed on them - also displaying the contractors name and address.
- The asbestos removal contractor will usually have to store the asbestos waste on-site for a few days until transfer to landfill. This may take up to ten days. The contractor should store the waste in a secure lockable area and have asbestos warning labels displayed on the outside.
- A few days after completion of the work the asbestos removal contractor should supply the building owner with a copy of the laboratory air test results. The reassurance air tests taken on completion of work should show a reading of <0.01f/ml. Also provided should be a copy of the asbestos waste disposal certificate - the waste trip ticket - duly signed by the waste producer, the waste collector and the receiving landfill site.
- At any time during the asbestos removal process, Government Inspectors from EPD or the Labour Department may turn up on site and inspect the works for compliance with their codes of practice on asbestos work.
- If the building owner has any concerns about the asbestos removal process, or suspects that the work is being done incorrectly, he should contact EPD for advice at the following address:

Environmental Protection Department
Territorial Control Office
Asbestos Management and Control
24/F Southorn Centre
130 Hennessy Road, Wanchai
Hong Kong

Tel. 2755 3554



For removal of high-risk asbestos materials such as asbestos cloth flexible joints or asbestos pipe insulation, the following works should be carried out:

- The removal contractor will segregate the work zone from adjacent areas by erecting a 'full containment' area. This means that the work zone should be fully sealed using polythene sheeting and duct tape sealing to make an air-tight enclosure with no leakage of air between inside and outside. The full containment area will have a decontamination unit attached to it - the same as described in the preceding section on removal of low risk asbestos material. The removal work is carried out with the work zone under a slight negative pressure. This ensures that if there is a hole in the protective sheeting, then fresh air flows inwards rather than asbestos contaminated air escaping from the work zone. This is achieved by attaching a negative pressure unit to the containment area. It is a large air extraction fan with specialised filters to trap asbestos fibres - a large metal box ~1m in dimensions.
- Prior to asbestos removal commencing the laboratory will take background air tests and an asbestos consultant will witness a smoke test of the full containment area to check containment integrity. This involves filling the work zone with thick white smoke from a portable smoke generator. A check is made that no smoke is leaking out of the full containment area. Any smoke leaks should be identified and sealed with polythene sheet and duct tape.
- During asbestos removal all workers inside the work zone should be wearing white disposable overalls with hoods and wearing full-face powered respirators which cover mouth, nose and eyes. No eating, drinking or removal of protective equipment should take place.
- During removal the workmen should soak the asbestos material with water from pressurised water sprayers to minimise dust levels. The material

should be removed with hand tools and placed in polythene bags for disposal. After all asbestos has been removed the workmen should thoroughly clean the work zone with vacuum cleaners and wet wiping. All surfaces which were covered with asbestos should be cleaned with wire brushes etc. During asbestos removal the negative pressure unit should be running constantly. The level of negative pressure should be continuously monitored by a negative pressure monitor - usually located by the decontamination unit. This monitor sounds an audible alarm should negative pressure levels drop too low.

- The contractor should provide a viewing panel, made of clear perspex, and fixed in the barrier sheeting to allow a clear view of the work within the work zone.
- During asbestos removal in a full containment area the laboratory will take air tests around the outside of the work zone to ensure that no fibres are being released. All leak air test results should be below 0.01 fibres per millilitre of air.
- Upon completion of asbestos removal and thorough cleaning of the full containment area the laboratory will take penultimate clearance air tests inside the work zone. These tests check that fibre in air levels inside the full containment area are below 0.01 f/ml. After these air tests are taken there is a waiting period of 12 hours before a second set of final clearance air tests are taken. If all air test results are satisfactory, the asbestos consultant will make a final inspection of the work to ensure that the work zone is dust-free and no visible asbestos debris remains. Once the asbestos consultant certifies that the work has been completed satisfactorily, then the full containment area can be dismantled and all polythene sheeting disposed of as asbestos waste.
- During the removal process the asbestos consultant should make regular site inspections. If the removal work is particularly complicated or if problems may occur, EPD can insist that the building owner employ the asbestos



consultant full time on-site. The contractors asbestos supervisor should be based permanently on site, and both EPD and Labour Department could make site inspections.

- The asbestos removal contractor will usually have to store the asbestos waste on-site for a few days until transfer to landfill. This may take up to ten days. The contractor should store the waste in a secure lockable area and have asbestos warning labels displayed on the outside.
- A few days after completion of the work the asbestos removal contractor or asbestos consultant should supply the building owner with a copy of the laboratory air test results and waste disposal certificates.
- For large-scale asbestos removal work Aspec advise that the building owner require the asbestos consultant to provide a final report on the asbestos removal works which includes a description of all work carried out, air test results, records of inspection visits, waste disposal certificates and certificates of final completion.

Aspec also advise that records of asbestos removal work from a building should be permanently kept by the building owner.