ASBESTOS CONTAINING BUILDING MATERIALS SURVEY REPORT

TIO building

24 Mitchell Street

Report Number 680.10191

10 September 2015

Knight Frank

Level 2, 46 Smith Street

Darwin, NT 0800

Version: Revision 0

ASBESTOS CONTAINING BUILDING MATERIALS SURVEY REPORT

TIO building

24 Mitchell Street

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680.10191	Revision 0	10 September 2015	Hayley Fletcher	Paul Turyn	Paul Turyn

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1 SCOPE

SLR Consulting Australia Pty Ltd (SLR Consulting) was requested by Luke Hunter of Knight Frank to undertake asbestos building materials surveys of the TIO building located at 24, Mitchell Street, Darwin.

The purpose of the survey was to ascertain the location, extent, type and condition of Asbestos Containing Materials (ACMs). Upon completion of the on-site assessment, this report presents the results of the inspection.

2 INSPECTION DETAILS

2.1 Site Descriptions

The survey was undertaken on the 3rd of September by Liam Munro and Hayley Fletcher with detailed inspections carried out on the ground floor, levels 3, 7 and 12.

The following information is known about the building:

- The building was reportedly constructed in 2003, so it is unlikely to contain asbestos construction materials
- The building is used for a mix of commercial and government offices/businesses
- The building was occupied at the time of inspection.

Figure 1 Site Location – 24 Mitchell St

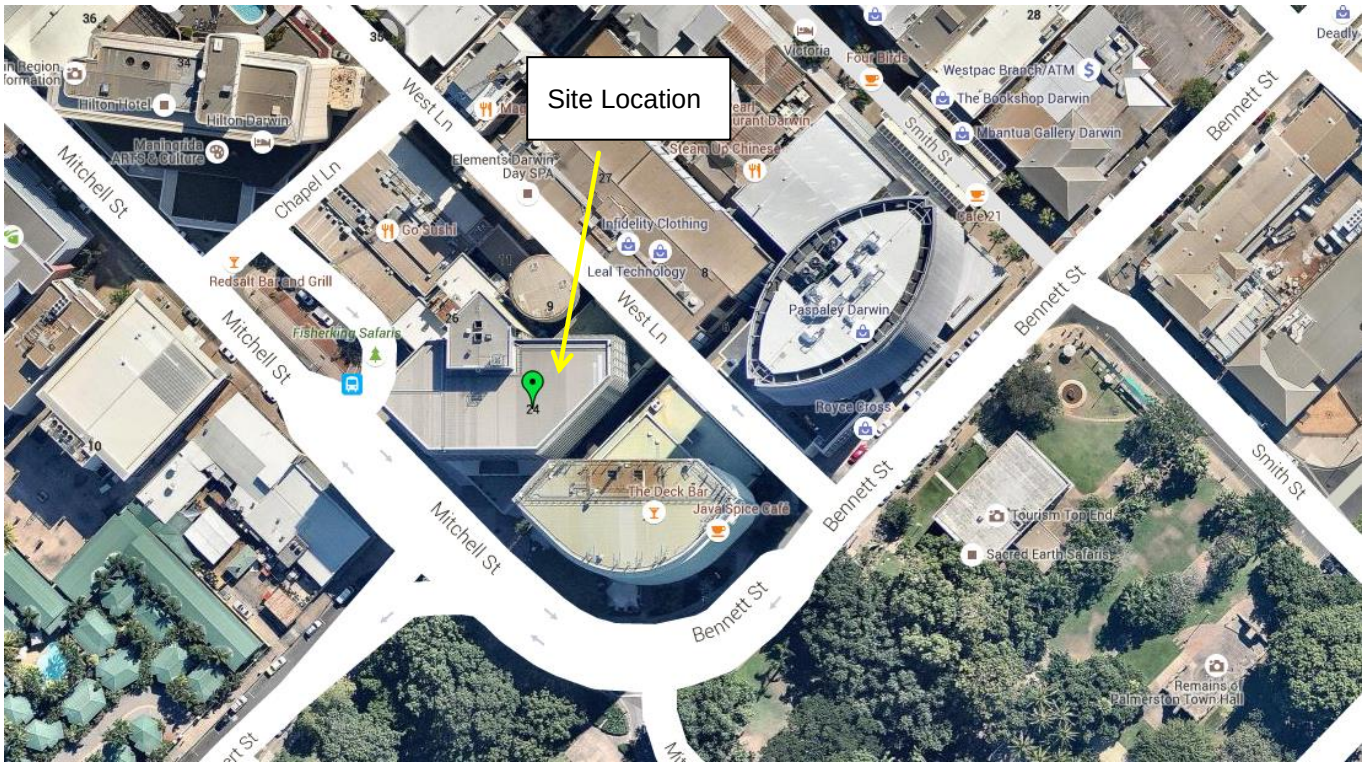

Image courtesy of Nearmap

3 LIMITATIONS

Surveys are conducted in a conscientious and professional manner. The nature of the task and the likely disproportion between any damage or loss which might arise from the work or reports prepared, and the cost of our services, is such that SLR cannot guarantee that all asbestos building materials have been identified and/or addressed.

Due to the possibility of renovations and additions to the building(s) over time, ACMs may have been concealed (for example behind new walls, flooring, ceilings, within boxing, etc), such areas were inaccessible during the inspection. It is recommended that prior to any refurbishment/demolition works at the site that a full destructive asbestos building materials refurbishment/demolition survey is undertaken by a suitably qualified and experienced consultancy, such as SLR. If any materials reasonably suspected of containing asbestos are found on site, which are not identified within this report, the client's independent consultant, SLR, should be contacted to complete additional confirmatory sampling and analysis as required.

A change in building use/nature of activities could affect the control actions recommended within this report and a re-survey may be required.

Thus, while we carry out the work to the best of our ability, we totally exclude any loss or damages which may arise from services we have provided to Knight Frank and/or associated parties.

Where potential ACMs are identified these are reported on to the best of the consultant's ability. Analysis is not normally included and there is no guarantee that all ACMs have been identified and/or addressed.

All work conducted and reports produced by SLR are prepared for a particular Client's objective and are based on a specific scope, conditions and limitations, as agreed upon between SLR and the Client. Information and/or report(s) prepared by SLR may therefore not be suitable for any use other than the intended objective. No parties other than the Client should use any information and/or report(s) without first conferring with SLR.

Before passing on to a third party any information and/or report(s) prepared by SLR, the Client is to inform fully the third party of the objective and scope, and all limitations and conditions, including any other relevant information which applies to the information and/or report(s) prepared by SLR.

It is the responsibility of third parties to investigate fully to their satisfaction if any information and/or report(s) prepared by SLR are suitable for a specific objective.

The report(s) and/or information produced by SLR should not be reproduced and/or presented/reviewed except in full.

4 SURVEY STRATEGY

The purpose of these surveys is to locate, as far as reasonably practicable, the presence, type and extent of any suspect ACMs in the building(s), to assess their condition, provide a suitable risk assessment/rating and recommended control actions based on the condition of the materials at the time of the surveys.

The surveys consisted of a visual inspection with limited sampling/analysis of materials undertaken by a trained and experienced surveyor. Materials are assumed to contain asbestos where:

- Laboratory analysis has confirmed the presence of asbestos in a visually similar material; or
- Materials visually appear to be asbestos containing but no sample was collected, for example due to access restraints.

Samples are typically collected using a hand tool or core borer. Hand drills and other tools are used where required. Power tools were not used during the survey.

It is noted that not all floors/areas of the building were included in the survey. The survey focussed on representative floors (ground floor, third floor, seventh floor and the plant room (twelfth floor) as agreed with Knight Frank. These representative floors were observed to be constructed of similar non-asbestos materials and were of a similar floor plan/plate.

4.1 Sample Analysis

Samples obtained from materials suspected to contain asbestos were analysed by an external, NATA accredited laboratory using a combination of stereo microscopy, polarised light microscopy and dispersion staining techniques.

Due to the limited extent of asbestos fibres within certain manufactured or installed materials, including but not limited to, vinyl floor tiles and decorative sprayed coatings (such as vermiculite); and where the aforementioned analytical methods determine that asbestos was not detected, it may be advisable that additional analysis be considered using Scanning Electron Microscopy (SEM) or X-ray diffraction.

4.2 Exclusions

Unless specifically noted, the survey did not cover:

- Wall/ceiling panelling behind laminations/coverings.
- Concealed floor coverings beneath carpet or superficial floor coverings.
- Fuses within “live” electrical panelling. Fuses of a certain age may contain asbestos containing flashgun
- ards.
- Hidden and/or inaccessible locations such as in or under concrete slabs, in or under vinyl/linoleum/carpet, wall cavities, hidden storage areas and the like. If the vinyl or linoleum is tested, this does not necessarily mean that the resin/glue is included in the analysis.
- Lift wells and inaccessible/unidentified shafts, cavities and the like.
- Air conditioning, heating, mechanical, electrical or other equipment.
- General exterior ground surfaces and subsurface areas eg asbestos in fill/soil.
- Materials dumped, hidden, or otherwise placed in locations which one could not reasonably anticipate.
- Materials other than normal building fabric, materials in laboratories or special purpose facilities and building materials that cannot be reasonably and safely assessed without assistance.

Materials other than asbestos are generally outside the scope as identification can require specialised analysis/inspection techniques.

Settled dust is generally not sampled or commented on. Settled dust may contain asbestos, particularly if it is in the vicinity of ACMs or areas where ACMs have been removed.

4.3 Risk Assessment, Control Actions and Asbestos Classification

4.3.1 Material Assessment

In order to assess the potential for fibre release from an ACM a Material Assessment is undertaken for each identified (sampled or assumed) material noted during the survey inspection.

The four principle parameters determining the amount of fibre released from an ACM when subject to disturbance are:

- Product type;
- Extent of damage or deterioration;
- Surface treatment; and
- Asbestos type.

Each of these variables are given a score of between 0 and 3 which can then be added together to obtain a Material Assessment Rating of between 2 and 12. A low Material Assessment Rating indicates a low potential for fibre release and a high Material Assessment Rating indicates a high potential for fibre release. Please note that all assumed ACMs are scored as crocidolite (ie Asbestos Type score = 3) unless there is strong evidence to show otherwise to indicate a worst case scenario. Non-asbestos containing materials are not scored.

The Material Assessment Algorithm used during the survey is provided in **Table 1**

4.3.2 Risk Assessment Rating

The purpose of a Risk Assessment Rating is to allow informed decisions to be made about ACMs, including control measures or required remedial actions, induction and training, air monitoring, health surveillance requirements, etc. It also assists in the prioritisation of the implementation of management actions.

Further to the positive or assumptive identification of an ACM and the completion of the Material Assessment (**Section 4.3.1**), a Risk Assessment Rating is compiled for each item. The Risk Assessment Rating categories as detailed in **Table 2** have been compiled in order for appropriate ACM management procedures to be implemented.

The Risk Assessment Rating categories are described as “High”, “Medium”, “Low”, or “Very low” and have been assigned to each positive or assumptive identification of ACMs during the survey. A “High” Risk Assessment Rating indicates a material that will more readily release airborne fibres if disturbed.

Table 1 Asbestos Risk Assessment (Material Assessment) Algorithm

Sample Variable		Score	Examples of Scores
A	**Product Type (or debris from product)**	1	Asbestos-reinforced composites (plastics, resins, mastics, roofing felts, vinyl floor tiles, semi-rigid paints or decorative finishes, BEBB, asbestos cement etc).
		2	AIB, millboards, other low-density insulation boards (LDB), asbestos textiles, gaskets, ropes and woven textiles, asbestos paper and felt.
		3	Thermal insulation (eg pipe and boiler lagging), sprayed asbestos, loose asbestos, asbestos mattresses and packing.
B	**Extent of Damage/Deterioration**	0	Good condition: no visible damage.
		1	Low damage: a few scratches or surface marks, broken edges on boards, tiles etc.
		2	Medium damage: significant breakage of materials or several small areas where material has been damaged revealing loose asbestos fibres.
		3	High damage or delamination of materials, sprays and thermal insulation. Visible asbestos debris.
C	**Surface Treatment**	0	Composite materials that are sealed by nature (plastics, resins, mastics, roofing felts, vinyl floor tiles, semi-rigid paints or decorative finishes, BEBB), or Encapsulated FCS, AC.
		1	Unsealed FCS, AC, or Encapsulated AIB, millboard, other LDB (with exposed face painted/encapsulated), asbestos textiles, gaskets, ropes and woven textiles, asbestos paper, card. Enclosed Insulation (lagging, sprays, loose asbestos, mattresses, packing).
		2	Unsealed AIB, millboard, other LDB, asbestos textiles, gaskets, ropes and woven textiles, asbestos paper and card, or Encapsulated Insulation (lagging, sprays, loose asbestos, mattresses, packing.
		3	Unsealed Insulation (lagging, sprays, loose asbestos, mattresses, packing).
D	**Asbestos type**	1	Chrysotile.
		2	Amphibole asbestos excluding crocidolite.
		3	Crocidolite.
Total			

Table 2 Risk Assessment Rating Based upon Materials Assessment Algorithm

Score	Potential to Release Asbestos Fibres
10 or more	High
7-9	Medium
5-6	Low
4 or less	Very Low

4.3.3 Control Actions

Based upon a combination of our surveyors judgment on site and the Risk Assessment Rating for each identified/assumed ACM noted on site, recommended Control Measures as detailed in **Table 3** have been applied to each occurrence in the Asbestos Containing Materials Register in **Section 5**.

4.3.4 ACM Classification

ACMs are classified as friable or non-friable in accordance with the Work Health and Safety Regulations 2011. SLR has classified all identified/assumed ACMs noted on site as friable or non-friable in accordance with the criteria set out in the Regulations (as noted in the Asbestos Containing Materials Register in **Section 5**). This will assist the Client with the on-going management of ACMs and any necessary abatement works.

Generally, asbestos abatement works require a license issued by a regulator. The requirement for an asbestos licence to undertake asbestos abatement works are as follows:

Class A (or friable) licence is required for works involving:

- Friable asbestos;
- Asbestos contaminated dust associated with the removal of friable asbestos.

Class B license (or bonded) (or Class A (or friable)) licence is required for works involving:

- More than 10 m^2 of non-friable asbestos;
- Asbestos contaminated dust associated with the removal of more than 10 m^2 of non-friable asbestos.

No license is required for works involving:

- Up to 10 m^2 of non-friable asbestos;
- Asbestos contaminated dust:
    - That is associated with the removal of up to 10 m^2 of non-friable asbestos.
    - That is not associated with the removal of friable/non-friable asbestos and is only a “minor contamination”.

Table 3 Recommended Control Measures

Control Number	Action
C1	Manage in-situ
C2	Incorporate into a current/develop an Asbestos Management Plan
C3	Label as asbestos containing in accordance with Australian Standard 1319-1994 *Safety Signs for the Occupational Environment*
C4	Re-inspect conditions every 5 years or sooner if deemed necessary in accordance with the *Work Health and Safety Regulations 2011 & Code of Practice "How to Manage and Control Asbestos in the Workplace" [Safe Work Australia (2011)]*
C5	Consider further sampling/analysis to establish whether asbestos is present within the material
C6	Consider further sampling/analysis to establish whether asbestos is present within the associated dust
C7	Consider further sampling/analysis to establish whether asbestos is present within the sub-soil
C8	Seal damaged edges with an appropriate sealant such as Emerclad paint
C9	Encapsulate/enclose in accordance with the *Work Health and Safety Regulations 2011 & Code of Practice "How to Safely Removal Asbestos" [Safe Work Australia (2011)]*
C10	Seal-off area and erect appropriate warning signage in accordance with Australian Standard 1319-1994 *Safety Signs for the Occupational Environment*
C11	Undertake a suitable and sufficient Risk Assessment prior to access, which may include the use of appropriate PPE & RPE
C12	Restrict access to maintenance/service personnel
C13	Restrict access to all personnel
C14	Remove in accordance with the *Work Health and Safety Regulations 2011* and Code of Practice *"How to Safely Remove Asbestos" [Safe Work Australia (2011)]*
C15	Remove in accordance with the *Work Health and Safety Regulations 2011* and Code of Practice *"How to Safely Remove Asbestos" [Safe Work Australia (2011)]* prior to any works in the area that may disturb the material
C16	Undertake a dust sampling regime within the area in accordance with the *Work Health and Safety Regulations 2011* and Code of Practice *"How to Manage and Control Asbestos in the Workplace" [Safe Work Australia (2011)]*
C17	Undertake airborne fibre monitoring within the area in accordance with the *Work Health and Safety Regulations 2011,* Code of Practice *"How to Manage and Control Asbestos in the Workplace" [Safe Work Australia (2011)] and* Code of Practice *"How to Safely Remove Asbestos" [Safe Work Australia (2011)]*
C18	A detailed roof inspection by a competent person, such as SLR, is recommended to investigate the potential for contamination in areas such as gutters, drains/pipes and air conditioning systems. Subsequent to this detailed inspection, recommendations can be made about the condition of the roof and an appropriate course of action detailed.

5 ASBESTOS CONTAINING MATERIALS REGISTER

The following tables are a register of all identified hazardous materials on site, confirmed through analysis or assumed materials deemed to be homogenous or consistent in appearance and manufacture to similar samples collected/analysed. This Summary of Hazardous Materials should be read in conjunction with all sections of this report.

Item Location and Material Type	Sample No./ Assumed	Photo No.	Approx Extent	Non-Friable/ Friable	Product Type (A)	Extent of Damage/ Deterioration (B)	Surface Treatment (C)	Asbestos Type (D)	Risk Assessment (Material Assessment) Score and Rating (A+B+C+D)	Recommended Control Actions	Comments
Within the Scope and Limitations of the Survey, no ACMs were Identified or Assumed throughout the sites During the Investigation											

Refer to related notes on **Page 12**.

Notes:

- The Asbestos Containing Materials Register should be read in conjunction with all sections of this report.
- Sample analysis/test results are detailed in **Section 6** of this report.
- Any actions taken to control asbestos materials subsequent to this report are to be recorded in the Asbestos Materials Control Log attached in **Appendix A**.
- Refer to the General Information attached in **Appendix C**.

6 SAMPLE ANALYSIS/TEST RESULTS

Table 4 Asbestos Sample Analysis Results

Sample Number	Sample Type	Sample Location	Analysis Result
680.10191.00000/1 (TIO-001)	FCS	Toilet partitions to ground floor male toilets	No asbestos detected (organic fibres detected)
680.10191.00000/2 (TIO-002)	Resinous Board	Backing board to level 3 switch board	No asbestos detected (organic fibres detected)

Notes:
FCS = Fibre Cement Sheeting.

7 CONCLUSION

As previously detailed in the Scope (**Section 1**), SLR Consulting were appointed to complete a survey and assessment of the nominated building described above with regards to the identification of ACMs. The extent of the inspection and samples collected for subsequent analysis was completed in order to confirm, as far as reasonably practicable, the location, condition and risk presented by ACMs remaining in-situ (and was based on the level of access available).

- Within the scope and limitations of this report, no ACMs were identified in the building surveyed at the time of inspection.
- This document should be held as an Asbestos Materials Register of the buildings inspected and updated where a risk assessment indicates the need for re-assessment. All occupiers of the workplace are to be provided with a copy of this register and all updates to it.
- If any material that may be asbestos containing is found on site the material should be sent for identification and expert advice sought. The material should be assumed to be asbestos containing in the interim.
- In order to comply with the *Work Health and Safety Regulations 2011*, any action taken to control ACMs in the place of work, or in plant at the place of work, is to be recorded in this register. These details are to be recorded in the Asbestos Materials Control Log attached in **Appendix A**.

8 LEGISLATION, GUIDELINES AND REGULATIONS

- Work Health and Safety Act 2011
- Work Health and Safety Regulations 2011
- Code of Practice for How to Safely Remove Asbestos [Safe Work Australia (2011)]
- Code of Practice for How to Manage and Control Asbestos in the Workplace [Safe Work Australia (2011)]
- Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [National Occupational Health and Safety Commission: 3003 (2005)]
- AS/NZS 1716-2003 - Respiratory Protective Devices
- AS/NZS 1715-1994 - Selection, Use and Maintenance of Respiratory Protective Devices
- AS 2601-2001 - The Demolition of Structures
- AS 1319-1994 Safety Signs for the Occupational Environment

ASBESTOS MATERIALS CONTROL LOG

To comply with the *Work Health and Safety Regulations 2011*, all actions taken to control asbestos and asbestos containing materials are to be recorded in the table below. It is recommended that similar details also be recorded for any other asbestos materials identified.

NAME	COMPANY	DATE	ASBESTOS MATERIAL RELATED WORK UNDERTAKEN (Include any assessment concerning asbestos that took place before the work was carried out)	REFERENCE NUMBER (Include sample numbers, report numbers, quote number and/or purchase order number etc)
Liam Munro	SLR Consulting Australia Pty Ltd	02/09/2015	Asbestos Building Materials Survey	Report No 680.10191.00000 ASR 1

Laboratory Analysis Report

OCTIEF PTY LTD
ABN: 82 163 772 478
Base Site: Unit 34 53-57 Link Dr Yatala, QLD 4207
Branch Site: Unit 12 16 Charlton Ct Woolner NT 0820
Enquiries: 1800 628 433
Fax: (07) 3382 6895
corporate@octief.com.au
www.octief.com.au

Asbestos Bulk Sample Analysis Report
Certificate No NT1509031404

Client:	SLR Consulting	**Sampled By:**	Liam Munro
Client Contact:	Liam Munro	**# of Samples Submitted:**	2
Telephone:	0421 482 953	**Sampling Date:**	03/09/2015
Email:	ldmunro@slrconsulting.com	**Date Received:**	03/09/2015
Project:	680.10191.00000	**Identification Date:**	03/09/2015
Site Location:	-	**Issue Date:**	03/09/2015
Test Methodology:	Polarized light microscopy examination including dispersion staining techniques for the presence of asbestos in accordance with the methodology outlined in the In-House Procedure QP-930-001 which is based on Australian Standard (AS4964-2004)		
Branch Site:	Darwin Laboratory		

Sample ID	Sample Location	Sample Description	Size or Weight	Asbestos Detected (Yes/No)	Fibre Types Detected
T10-01	-	Fibre cement sheeting	4x3x1mm	No	NAD-ORG
T10-02	-	Resinous board	3x2x1mm	No	NAD-ORG

Approved Identifier: John Quinones

Report Approved By: John Quinones

Fibre Types

CHR	*Chrysotile (white asbestos) fibres detected*	*ORG*	*Organic fibres detected*
AMO	*Amosite (brown / grey asbestos) fibres detected*	*SMF*	*Synthetic mineral fibres detected*
CRO	*Crocidolite (blue asbestos) fibres detected*	*UMF*	*Unidentified mineral fibres detected*
NFD	*No fibres detected*	*NAD*	*No Asbestos Detected*

Notes: *Hand-picked refers to small discrete amounts of asbestos distributed unevenly in a large body of non-asbestos material.*
Detection limit (AS 4964) – 0.1 g/kg.
Due to their nature, confirmation using another independent analytical technique is recommended if no asbestos is detected in samples of vinyl tiles, bituminous materials, mastics, adhesives, paints, sealants, resins or ore.
The results contained within this report relate only to the sample(s) submitted for analysis and OCTIEF accepts no responsibility for the collection, packaging and transportation of sample submitted by external parties. Sample descriptions, sizes and weights are approximate only. NATA does not accredit sampling.

ASBESTOS

Asbestos: Description, Properties and Uses

Asbestos is the generic term given to a group of naturally occurring fibrous minerals, based on hydrated silicates, which are found in various rock formations. Differing ratios of oxygen, hydrogen, sodium, iron, magnesium and calcium elements account for several different types of asbestos minerals, the most common varieties being Amosite (brown asbestos), Chrysotile (white asbestos), Crocidolite (blue asbestos). Other types include Anthophyllite, Actinolite and Tremolite.

The immense popularity of asbestos as a building material is attributed to its near unique properties of fire resistance, high abrasion resistance and superb acoustical characteristics coupled with its relatively low cost. Prior to 1973, asbestos was the material of choice for fire proofing, thermal insulation, sound insulation and abrasion resistance. It was used as a spray-on insulation of ceilings and steel girders; as a thermal insulation of boilers, pipes, ducts, air conditioning units, etc; as an abrasion resistant filler in floor tiles, vinyl sheet floor coverings, roofing and siding shingles; as a flexible, though resistant joining compound and filler of textured paints and gaskets; as the bulking material with the best wear characteristics for automobile brake shoes and in countless domestic appliances such as toasters, grills, dishwashers, refrigerators, ovens, clothes dryers, electric blankets, hair dryers, etc.

Asbestos: Health Effects

Many asbestos bearing materials or products are of no significant health risk whatsoever when used in the normal course of events. A health risk exists when asbestos fibres are released into the air and when that air is inhaled into the lungs. Even then, it appears that most people exposed to relatively small amounts of asbestos do not develop any related health problems. There is however no "safe" level of asbestos exposure since the risk is dependent on numerous factors including the time since exposure, exposure duration and concentration, asbestos type, the attributes of the particular individual and environmental factors such as exposure to cigarette smoke and other airborne pollutants.

There are three main diseases associated with airborne asbestos fibres:

Asbestosis - A fibrosis (or scarring) of the lung associated with relatively massive exposure to asbestos.

Lung Cancer - Indistinguishable from that caused by smoking and a common cause of death. The risk of lung cancer is much higher when there is exposure to both cigarette smoking and to airborne asbestos.

Mesothelioma - A cancer of the chest and abdominal lining, it is specific to asbestos exposure.

A feature of these diseases is that symptoms take a long time to appear, generally 5 to 40 years. Once symptoms are evident the disease progresses rapidly.

There is some evidence that Chrysotile asbestos is less carcinogenic than Amosite, and that Amosite is less carcinogenic than Crocidolite in causing mesothelioma, but the evidence is less clear for lung cancer.

Measurement of Airborne Asbestos Fibres

The *Work Health and Safety Regulations 2011* and the Safe Work Australia Asbestos Codes of Practice & Guidance Note set the maximum allowable time weighted average for all forms of asbestos at 0.1 fibre/mL of air.

Air monitoring is used to determine airborne fibre levels. SLR is NATA certified for Asbestos Fibre Counting and Volume Measurement to carry out such monitoring.

The Safe Work Australia Code of Practice *How to Safely Remove Asbestos 2011* states that air monitoring should be performed whenever Asbestos Containing Materials (ACMs) are being removed, to ensure the control measures are effective.

The onus to provide a safe environment rests with persons in control of a business or undertaking, persons with management or control and persons carrying out demolition or refurbishment work. To meet these obligations it is recommended that SLR be engaged by the site controller, or their representative, and not an asbestos removal contractor as there could be a conflict of interest in the latter arrangement.

Asbestos Survey

Asbestos surveys are undertaken to identify any asbestos materials/hazards and assess the risk associated with the material/hazard.

Surveys are conducted through visual inspection by experienced personnel. During the inspection material samples are taken as appropriate for analysis.

Limitations

Due to the nature of the task all asbestos surveys are limited. Since asbestos can occur in so many forms and in so many locations, and as there is no instrument to detect asbestos, it is never possible to guarantee all asbestos has been identified. Access is usually restricted, and there may be asbestos hidden behind walls or other structures. Building plans are of great assistance to consultants undertaking surveys.

Asbestos Register

An asbestos register is a record of the location, type and condition of all asbestos containing products identified in a building. Under the Safe Work Australia Codes of Practice and the *legislation,* any place of work constructed prior to 31 December 2003 must have an Asbestos Register. A SLR Asbestos Survey Report includes an asbestos register.

Registers must be maintained and changes in the condition or extent of any asbestos present should be recorded. Registers should also detail the next review date, at present annually since the condition of asbestos materials, legislation, guidelines and standards change.

Management Plan

An asbestos management plan is required where asbestos materials have been identified and are to remain on site. The plan would normally be a component in the overall Hazard Management Plan for the site.

Control Options

Asbestos judged to constitute a health risk should be removed, enclosed or encapsulated by an approved asbestos contractor.

Enclosure

This involves the installation of a permanent, solid, non-porous, impervious barrier between the asbestos material and the surrounding environment. Examples include building boxes around steam pipes etc. A suspended ceiling is not permanent and, since occasional access is necessary above a suspended ceiling, enclosure is negated. Furthermore, many suspended ceilings act as return air plenums so enclosure is impossible.

Encapsulation

Encapsulation involves coating the material with a sealant. Good sealants penetrate through the asbestos material to the substrate. The encapsulating substance then hardens and binds all the asbestos fibres into a solid matrix. This is usually a short to medium term management option.

Removal

Removal is not without hazards to the occupants of the building. If not strictly controlled, the removal process can result in increased fibre counts in other areas. Technical competence, experience and integrity are of prime importance in evaluating asbestos removal plans.

We advise clients to work within the usual practised time frames of the experienced asbestos removal companies under strict supervision by a qualified person. Pressing for quicker turnaround times may result in low quality workmanship and unnecessary asbestos risk. Building owners may be in part responsible for risks created by the removal Contractor due to carelessness or negligence.

An independent consultant such as SLR, experienced in the supervision of asbestos removal, should be retained to act on the client's behalf.

Clearance Inspection

A clearance inspection must be conducted at the completion of asbestos removal works. The clearance inspection may include airborne asbestos monitoring and/or sampling/analysis of materials and should be completed by a suitably qualified and experienced consultant, such as SLR.

ASBESTOS CEMENT SHEETING

A large number of building products used in the building and construction industry have been made with asbestos and cement. Products include:

- Flat or corrugated, compressed sheeting
- Pipes for water, drainage, flues
- Roof shingles
- Building boards eg Villaboard, Hardiflex, Wundaboard, Flexiboard
- Cable trays for electrical wiring
- Numerous preformed items such as cisterns, protective housings, etc

Provided these products are maintained in good condition, they present no health risk, however precautions must be observed during demolition, refurbishment etc.

Licensing Requirements

Asbestos-containing products are classified as **non-friable** or **friable**. **Asbestos cement** (AC) is classified as **non-friable asbestos** however once it is significantly broken, crushed or otherwise damaged WorkSafe NT may consider it to be friable asbestos. The rules governing friable asbestos are far more stringent.

A WorkSafe NT asbestos licence is required to remove 10 square metres or more of non-friable asbestos and there must be WorkSafe NT notification.

Anyone wishing to carry out friable asbestos removal must obtain a friable asbestos removal licence from WorkSafe NT. A friable asbestos removal permit must be obtained for all friable asbestos jobs.

Removal Procedures

The following procedures are recommended for demolition work involving non-friable asbestos cement sheeting in order to reduce the potential health risk to workers and to building occupants.

All asbestos removal and/or decontamination should be undertaken by a competent person working in accordance with the requirements specified in the Safe Work Australia Asbestos Codes of Practice and the *Work Health and Safety Regulations 2011.* A licensed, experienced asbestos removal contractor is required to remove friable asbestos and >10m^2 of non-friable asbestos.

1. Prior to commencement of asbestos removal works, suitable warning signs must be erected. All windows and doors etc in the occupied areas of these buildings should be closed so as to prevent the spread of contamination.
2. All asbestos removal operatives to wear half-face particulate filter (cartridge) respirators and approved disposable coveralls.
3. The bolts fixing the asbestos cement sheets to the main frame must be cut out and removed. Abrasive cutting or sanding discs shall not be used on asbestos cement products. Only approved power tools may be used.
4. The asbestos cement sheets should be wetted or PVA coated (polyvinyl acetate). **High water pressures should not be used**.
5. All asbestos cement sheets should be removed with minimal breakage and be **lowered** to ground level, not dropped.
6. All asbestos cement dust and residues should be cleaned from the work area using an approved vacuum cleaner.
7. All asbestos containing waste must be removed from the site as soon as possible. The bins should be plastic lined, covered and taped secure prior to removal.
8. The asbestos waste shall be disposed of in accordance with the existing regulations.

9. Prior to engagement in the work, all asbestos operatives must be trained in safe working practices. These training aspects include:
   - Health hazards of asbestos
   - Safe working procedures
   - Wearing and maintenance of protective clothing and equipment

ASBESTOS CONTAINING VINYL TILES

Vinyl tiles which contain asbestos are considered to be of minimal risk whilst undisturbed and in good condition. The asbestos contained within vinyl tiles is well bound in the parent matrix and fibre release is virtually impossible provided the tiles are not ground, drilled, or otherwise abraded. Normal floor cleaning operations will not release asbestos fibres.

If the tiles are intact and not abraded or drilled etc it is safe to leave them *in-situ*. However, prior to demolition and/or refurbishment all asbestos containing vinyl tiles in the work area must be removed in accordance with the *Work Health and Safety Regulations 2011* and the Safe Work Australia Asbestos Codes of Practice.

Removal Procedures

The following procedures are recommended for the removal of asbestos containing vinyl tiles in order to avoid potential asbestos health risks to workers and building occupants.

If 10 m^2 or more of vinyl tiles are to be removed the work should be completed by a licensed, experienced asbestos removal contractor with notification to WorkSafe NT.

1. Prior to commencement of removal works, suitable warning signs must be erected. All windows, doors and vents etc in the occupied areas of the buildings should be closed to reduce the potential for cross-contamination/exposure.
2. All vinyl tile removal operatives are to wear appropriate personal protective equipment (PPE) including respiratory protection, safety glasses/goggles, disposable coveralls, hearing protection and gloves. Steel capped boots, hi-visibility vests and hard hats should also be worn as per the normal requirements for work on construction sites.
3. The tiles can be removed by heating the surface to loosen them or by use of a mechanical chisel to wedge them up. Care should be taken when heating tiles and the glues holding them in place to avoid the generation of toxic fumes. Do not grind, drill or otherwise abrade the tiles in any fashion that generates unnecessary dust/debris.
4. All waste is to be double bagged or placed in lined bins, sealed, and disposed of as asbestos waste in accordance with the Asbestos Codes of Practice and existing guidelines and regulations.
5. The removal area should be detailed clean using an approved vacuum cleaner fitted with a High Energy Particulate (HEPA) filter, and by wet wiping. A detergent should be used when wet wiping as this improves cleaning efficiency.
6. Obtain a clearance inspection and report from an independent, suitably qualified and experienced consultant such as SLR.
7. Upon satisfactory clearance inspection spray the area with a dilute PVA emulsion at low pressure. Multiple applications may be required to provide adequate coverage.
8. Prior to engagement in the work, all asbestos operatives must be trained in safe working practices. These training aspects include:
   - Health hazards of asbestos
   - Safe working procedures
   - Wearing and maintenance of protective clothing and equipment

Air Monitoring

The Safe Work Australia Code of Practice How to Safely Remove Asbestos 2011 states that air monitoring should be performed whenever Asbestos Containing Materials (ACMs) are being removed, to ensure the control measures are effective.

All air monitoring must be completed by a NATA accredited organisation as specified in the *Work Health and Safety Regulations 2011*.

Asbestos fibres are generally well bound in the vinyl matrix and fibre release is unlikely provided the tiles are not ground, drilled or similarly disturbed.

Note:

These are general recommendations. In all cases the asbestos removalist should be familiar with, and comply with, the relevant Codes of Practice and the *Work Health and Safety Regulations 2011*. There may also be site specific requirements which should be complied with.

CORRUGATED ASBESTOS CEMENT (AC) ROOFING

Deterioration Mechanisms

Asbestos cement (AC) roofs deteriorate slowly over time. The upper surface exposed to the elements slowly loses cement binder and asbestos fibres become increasingly exposed. This may result in excessive fibre loss and a general weakening of the roof materials which will eventually become porous.

The process of natural weathering may be compounded by exposure to steam, acid fumes and other agents from industrial processes, resulting in accelerated deterioration of the roof.

Hail, heavy rain and other storm activity can cause also significant problems including:

- Cracks and/or penetrations in asbestos cement panels, and resultant generation of asbestos cement dust/debris.
- Shedding of asbestos fibres which may contaminate runoff and enter gutters and drains etc.
- Blocking of gutters with hail and other debris resulting in overflow and asbestos contamination of surrounding areas.

In most situations the underside of AC roofs exhibit very little deterioration however asbestos containing dust can accumulate on the roof support structure and other exposed locations below/around the roof.

If an asbestos cement roof becomes significantly damaged, weathered and or produces visible dust or significant debris it is likely that health and safety management works will be required. A suitably qualified and experienced consultant, such as SLR, can advise and assist in carrying out such works.

Life Expectancy and Maintenance

AC roofs in good condition may remain in place indefinitely providing certain precautions are taken.

- On no account may high pressure water be used to clean AC roofs. This is forbidden under the Safe Work Australia asbestos codes of practice as it can result in widespread contamination.
- AC roofs may not be drilled, ground, cut or otherwise damaged as this may result in the release of airborne asbestos fibres.
- In general, roofs are best left undisturbed if in good condition. There are however several sealing compounds which may be used on AC roofs. The underside of AC roofs may be encapsulated, shielded with sarking or enclosed with a fixed ceiling or other materials. Enclosures are fixed, permanent, non-porous barriers that prevent fibre penetration. All barriers need to be maintained.
- The roof including internal support structure should inspected regularly (eg at least once a year) by a suitably qualified and experienced consultant such as SLR to assess the condition and extent of the asbestos materials present.
- Gutters and down pipes should be kept clean and in good condition. Some gutters may accumulate a build up of debris which contains asbestos; this is best removed by an experienced licensed asbestos removal contractor.
- Down pipes etc should be protected from damage by forklifts and other vehicles via the installation of appropriate barriers.
- Damaged sections of asbestos containing material should be removed as soon as possible by an experienced licensed asbestos removal contractor. It is illegal to re-use asbestos containing materials.
- As a precautionary measure any exposed broken edges of asbestos material temporarily remaining in place should be sealed with an appropriate sealant such as Emerclad paint.

Demolition

Demolition of AC roofs should only be undertaken by an experienced licensed Asbestos Removal Contractor.

It is recommended that asbestos removal supervision, air-monitoring and clearance inspections be undertaken by an independent, suitably qualified and experienced asbestos consultant such as SLR.

ASBESTOS CONTAINING FIRE DOORS

The cores of older fire doors frequently contain asbestos materials. Such doors may remain in place provided certain precautions are taken. These include:

- Labelling the doors with appropriate warning signs that advise of the asbestos risk.
- Not drilling or otherwise disturbing the doors so as to release airborne asbestos fibres.
- Recording the location, extent and condition of the doors in the site Asbestos Register and addressing them in the site Asbestos Management Plan. A copy of the Asbestos Register and Management Plan should be held by the Building Manager who is to ensure that no work is carried out on the doors without their prior knowledge and the implementation of adequate health and safety precautions.
- Regular inspection and reporting of the condition of the doors.

If the fire doors are damaged then access to the area is to be appropriately restricted and advice sought from a suitably qualified and experienced consultant such as SLR.

Any asbestos removal and/or remediation/decontamination work should be undertaken by a licensed Asbestos Removal Contractor.