

Asbestos In Soil:

An Analytical & Occupational Hygienist View

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Hazard - *potential to cause damage*

Risk - *likelihood to cause damage*

Asbestos is a hazard, however asbestos may not pose a risk.

A risk assessment for asbestos depends on three things:

- route of entry (asbestos is an inhalation hazard only)
- level of exposure (high airborne fibre concentrations)
- duration of exposure (many years of high fibre concentrations)

*Only people exposed to high airborne fibre concentrations over many years of working life may be **at risk** of an asbestos related disease.*

Bonded – fibres locked into matrix, e.g. asbestos cement

Friable – crushed in fingers, e.g. pipe lagging



If friable, likelihood of 'free' or 'respirable' fibres is possible (respirable fibres are $>5 \mu\text{m}$ long, $<3 \mu\text{m}$ wide).

Asbestos Analysis - Identification

- Important to use laboratories that hold NATA accreditation for asbestos identification analysis
- AS 4964 2004 – Australian Standard for asbestos identification
- Soil is a non-homogeneous (or heterogeneous) material
- Check with lab regarding sample size and other sampling requirements
- Sub sampling methods used must be validated



Asbestos Analysis - Identification

- Asbestos identification analysis uses polarized light microscopy (i.e. visual method)
- Fibres meeting certain criteria can be unequivocally identified as chrysotile (white), amosite (brown) or crocidolite (blue) asbestos
- Organic and synthetic mineral fibres can also be reported
- Trace analysis **must** be conducted on all soil samples
- Ensure results of trace analysis are included on report

AS 4964 Detection Limits

- Detection limit of the method for soils is: -
 - 1 in 1,000 to 1 in 10,000 parts, *or*
 - 0.1 to 0.01%, *or*
 - 1 to 0.1 g/kg
- AS 4964 states that 'trace asbestos detected' implies a detection limit of 0.1 g/kg
- The Reporting Limit of 0.1 g/kg should be used for soils that do not contain asbestos (i.e. no A/C fragments, asbestos bundles or free/respirable asbestos fibres)

Asbestos Analysis - Airborne

- Respirable fibres are $>5 \mu\text{m}$ long & $<3 \mu\text{m}$ wide
- Used to measure fibres in air = risk to health
- Air sampling is generally not required, unless true friable ACM contaminated soil is being removed
- Important to use laboratories that hold NATA accreditation for airborne asbestos sampling & analysis.

Asbestos in Soil

- Asbestos contaminated soils require a assessment by an occupational hygienist
- Management or Remediation options available
- Appropriate methodology/management plan is required

Asbestos in Soil - Management

- Methodology/management plan must be agreed upon
- May involve: -
 - Regular site inspections (i.e. walkover or clearance)
 - Regular airborne monitoring
 - Procedures for handling small amounts when found on site
- Local example: -
 - Bonded AC is present in loose soil
 - 441,000 sqm Council owned park in Sydney
 - Yearly inspections and ACM removal conducted as required
 - Regular airborne monitoring is conducted
 - Covering soil with hard surfaces as required (e.g. high traffic areas)

Asbestos in Soil - Remediation

- Remediation includes complete removal of soil or removal of ACM contamination only
- Remediation options based on: -
 - Amount and type of contamination (e.g. low/high, friable/bonded)
 - Environmental concerns (e.g. retain of native seed stock)
 - End use considerations (e.g. domestic, commercial/industrial, leisure)
- For on site removal of ACM contamination:
 - Emu pick over site to manually remove ACM
 - Sieving or trommelling soil to remove ACM
- When either is completed, a visual clearance inspection is necessary (note soil sampling is optional)

References

- NOHSC Codes of Practice for Asbestos Removal and Management (www.safeworkaustralia.gov.au)
- NOHSC Membrane Filter Method (www.safeworkaustralia.gov.au)
- Australian Standard for asbestos identification (AS 4964-2004)
- NATA website for accredited laboratories www.nata.asn.au
- NSW WorkCover Authority document 'Working With Asbestos' (2008) (www.workcover.nsw.gov.au)