Asbestos: Strategies for the identification and remediation of asbestos-contaminated materials

Presented by Hydrock

James Macfarlane
Asbestos Manager

Richard Yarnold
Operations Manager

What is asbestos

Numerous ground sources;

• Asbestos by-products from manufacturing processes or factories;

• Arising from poor historic asbestos removal activities prior to demolition;

• Building demolition where asbestos was not removed/partially removed;

• Underground asbestos (lagged pipes/duct linings etc.);

• Fire damaged property where debris has spread onto land;

• Legal asbestos waste cells;

• Illegal asbestos waste dumps (Fly-tipped waste).
Risk of Exposure

Disturbance of asbestos contaminated soil can potentially cause fibres to be released into atmosphere.

Factors affecting potential fibre release:

- Type of asbestos material;
  - Insulation, lagging, AIB, free fibres - higher potential
- Condition/Degradation of ACM;
  - Damaged/well broken up
- Soil moisture content;
  - Wet/damp or dry
- Buried or not;
  - Soil cover, depth, vegetated, hard standing
- Soil type;
  - Clay, sand, gravel or made ground
- Spatial distribution;
  - Hot spots or well disperse
- Intensity of disturbance activity
  - Screening, excavation, crushing etc.

Key Industry Guidance

- The following bodies are looking at the issue of asbestos in soils and made ground.
  - Association of Geotechnical Specialists: Lead to laboratory screening soils routinely for asbestos fibres.
    (Released: February 2013 - Interim guidance)
    (Released: March 2011)
  - CIRIA – Asbestos in soil and made ground: a guide to understanding and managing risks (C733): A guide to good practice and a summary of contemporary Information. It has no legal standing per se.
    (Release March 2014)
    (Expected Mid 2015)
CAR 2012 & L143 (ACoP) are relevant to all “work” with Asbestos containing materials (ACM’s):

- Walkovers / Site Reconnaissance
- Site investigation
- Remediation
- Ground works
- Construction

All work with asbestos does require experienced and trained staff. Hydrock staff training is determined by ‘Training Needs Analysis’. Usually working in conjunction with a licensed contractor depending on asbestos type.

‘Right people for the right job’

Abundance of Regulations and Guidance on asbestos in relation to buildings.
But a lack of guidance specifically relating to asbestos in soils.

Regulatory – Control of Asbestos Regulations 2012 & L143 ‘Managing and Working with Asbestos’
- CAR2012 - Focuses on asbestos still in-situ within buildings, only a minor mention of the ‘curtilage’ of the surrounding land;
- L143 - The main source of approved code of practice for ALL work related to asbestos;
- L143 (Paragraph 13) – If debris contains raw asbestos, asbestos insulation, asbestos coating or asbestos insulating board (AIB), even where it is not fulfilling its original purpose, a licensed asbestos contractor is required to carry out the work.
Control of Asbestos Regulation 2012

Licensable work:
- Exposure is not sporadic and of low intensity; or
- Control limit likely to be exceeded; or
- Work on asbestos coating; or
- Work on AIB or asbestos insulation which is NOT short duration: “Short duration” work = <2hrs in 7days

Identification
Is Asbestos liable to be present?

- A thorough desk top study should give a basis to decide if Asbestos is likely to be a major contaminant of concern (CoC);

- Collection and review documentary evidence;
  - Asbestos Register
  - Service plans (Heating pipes);
  - Location of boiler houses (Very important)
  - Historic Demolition Asbestos Surveys;
  - UKAS Clearance certificates;
  - H&S File / Validation reports;
  - Bulk and Gravimetric Analysis data;
  - Details of fly tipped waste;
  - Any landfill or buried waste licenses.

- Compile a suitable Risk Assessment and Methodology and perform a thorough site reconnaissance.
Identification
Difficulties

- Does not leach;
- Only UKAS Polarised Light Microscopy (PLM) can accurately confirm asbestos presence (No site based tests);
- >4000 of different products;
- Even the best surveyor can be caught out with something they have never seen.
- Non-Asbestos look-a-likes (Calcium based insulation)
- Once binding material is degraded fibres will remain;
- Asbestos is very difficult to spot in the ground;

Identification
Difficulties

- Needs to be carried out by a trained/competent team that has experience with asbestos identification in soils (BOHS - P402) and brownfield sites;
- Systematic walk of the site to visually inspect the surface, vegetated areas difficult to inspect;
- P402 surveyor with experience of asbestos in soils is critical to identify the product and sample accordingly;
- Excavation is a high disturbance activity: Ensure training, experience and competency is adequate to the task;
- Training Needs analysis: In this case UKATA Category C machine operators.
Asbestos and Non-Asbestos Areas must be delineated ‘so far as is reasonably practicable’ (finding asbestos by accident should be avoided as far as possible);

Therefore supplementary investigation may be required before remediation mobilisation or as part of initial site works;

Known areas of asbestos impacted ground delineated by:
- Surface inspection
- Core sampling
- Trial pitting
- Trial trenching

Method determined by asbestos type/quantity

Only trained, experienced and qualified operatives permitted in areas expected to contain asbestos.

Gaining a representative and homogenous sample is a skill and requires significant agitation of potentially contaminated soils;

Must be undertaken by suitably trained operatives with appropriate RPE & PPE (in accordance with CAR2012);

Training needs analysis allowed Hydrock to compile a bespoke ‘Asbestos in soils safe sampling’ course;

All Hydrock geoscience staff are carrying out this training.
Criteria for remediation Options

The most suitable remediation option depends on:

- **Type, quantity & distribution** of asbestos present;
- **Area / volume / depth** of asbestos containing soil relevant to development size;
- **Current / proposed land use** – residential, industrial, commercial;
- **Programme / timescale**;
- Interaction with other contaminants, **other remediation processes** being adopted;
- **Clients attitude to asbestos** (risk & liability);
- **Regulators attitude to asbestos** (risk & liability);
- **Local interest groups**;
- **Health and Safety implications**;
- **Cost**

Site layout & segregation of works

- Prevailing wind direction;
- Welfare set-up upwind of area;
- Fence off asbestos impacted areas;
- Allow for ‘buffer zone’ if possible;
- Consider traffic management (esp. waste);
- Consider neighbours;
- Remediation before construction!
Mitigation Measures

Water suppression

• Dust suppression shall always be required. Methods include:
  – Bulk sprays
  – Handheld sprays
  – Mains connected Hose pipes
  – Atomiser units
  – Linear boundary spray lines
  – Use of existing ground water
  – Surfactant addition (15:1)

Management of used water!

Mitigation Measures

Air Monitoring

• Air monitoring is a valuable line of evidence to show compliance and can be used:
  – Boundary monitoring
  – Personal monitoring
  – Inside adjacent buildings
  – Under the covers of disposal vehicles
  – At the receiving landfill
Remedial options

Excavation

- Pre-excavation:
  - Delineation;
  - Check staff competence;
  - Staff induction;
  - Method statement briefing;
  - Check for services.

- Install asbestos controls:
  - Single point of access via decontamination unit(s);
  - Set-up primary decontamination bays;
  - Set-up dust suppression equipment;
  - Erect signage;
  - Set-up air monitoring strategy.

- Excavate into stockpiles:
  - Likely to be suitable for reuse;
  - Likely to be unsuitable for reuse;
  (Visual assessment by Experienced Asbestos Operatives)

- Stockpile testing:
  - Soil sampling and testing to demonstrate compliance with the remedial strategy;
  - Sufficient time for analysis must be allowed for within remediation programme (~10 days).

Remedial options

Onsite Segregation/Processing - Handpicking

Handpicking from a picking line:
- Only suited to bonded asbestos (High Disturbance)
- Use in conjunction with a screener with variable speed belt & water suppression;
- Takes up a lot of space;
- Not very mobile (take soil to the line);
- Needs lots of staff;
- Will not remove 100% ACM's.

Hand picking from the ground:
- Suited to all asbestos material types where removal of gross visible contamination is applicable;
- Generally suitable for small soil volumes;
- Clearly will not remove free fibres;
- Balance cost v's disposal essential;
- H&S implications: man v's machine;
**Remedial options**  
**Onsite Segregation/Processing - Screening:**

- Generally suited to bonded products
- Takes up a small amount of space;
- Is relatively mobile around the site;
- Fibre release potential will be exaggerated so intensive air monitoring & dust suppression will be required;
- Will not remove 100% ACM's.

**Remedial options**  
**Off-site disposal**

- Reliable approach obviating any 'blight' issues;
- Sometimes there is no other option;
- Hydrock have developed a robust risk based disposal approach for our asbestos disposal projects.

**Minimising disposal cost**

- Segregation
- Characterisation
- Landfill tax classification
Remedial options
On-site Reuse

- Materials with some ACM can be reused in accordance with an agreed remedial strategy and Materials Management Plan providing the principles are agreed with the regulators;
- Detailed acceptance criteria to be satisfied including:
  - Waste Acceptance Criteria
  - Geotechnical parameters
  - Soil chemistry
  - Gravimetric analysis for Asbestos

Remedial options
Leave in-situ

- The presence of asbestos containing materials does not necessarily require them to be removed or treated, especially where they pose low risk at depth;
- Regulatory approval will be required;
- Confidence that subsequent works shall not disturb the ACM’s is essential;
- Marker membrane and cover system may be required depending upon works above;
- Accurate survey co-ordination to permit transfer of information in the Health and Safety File.
Conclusions

- Many other issues to consider;
- CAR 2012 – Focuses on buildings; industry guidance is seeking clarification for asbestos in soils;
- CAR 2012 – Applies to all work with asbestos. When deciding licensing position seek professional/regulatory advice if unsure;
- ACM are unpredictable in soil, asbestos surveyors with experience of contaminated land are key to a quality investigation;
- Asbestos should be delineated SFARP – Forward planning is key (No surprises!);
- Limited remediation options – but remember, it does not necessarily have to be removed;
- The moisture content of the soil is key to reducing potential for fibre release;
- Air Monitoring is an important ‘Line of evidence’ to demonstrate control measures are effective;
- Asbestos Management Plans and Registers are critical for the ongoing safe use of the site.