The Impact of Asbestos in Soil on Construction Projects

Greater Boston ASSP Chapter Meeting
January 9, 2019

Will Wade, CIH, Senior Scientist
Lauren Arcement, Staff Scientist
Introduction to Asbestos
What is Asbestos?

- Naturally occurring mineral
- When processed, becomes a fluffy fibrous material with many uses
- Breaks down into the smallest fibers known to man
- Fibers can stay airborne for days
What is Asbestos?

- Chrysotile (white): 95%
- Amosite (brown/off-white): 2-3%
- Crocidolite (blue): 1-2%
- Tremolite: <1%
- Actinolite: <1%
- Anthophyllite: <1%

Image source: "Anthophyllite Asbestos Scanning Electron Microscopy (SEM)" by Asbestorama is licensed under CC BY 2.0
Can separate into very thin fibers (microscopic)

Fiberglass Insulation
~ 10 um diameter
(~100 fibers / 1 millimeter)

Asbestos fiber
~ 0.1 um diameter
(~10,000 fibers / 1 millimeter)
Health Affects of Asbestos

- Fibers deposit into air-sacs of lung
- Interact with cells, causing respiratory disease
- Slow acting (chronic) toxin
- Asbestos diseases
  - Asbestosis
  - Lung cancer
  - Mesothelioma
  - Others
Potential Hazard For

- Production workers
- Abatement workers
- Maintenance workers
- Demolition workers
- Auto mechanics
- Others

Not hazardous in good condition
Properties of Asbestos

- Fibers virtually indestructible
- Chemical resistant
- Heat resistant
- Do not evaporate or dissolve
- Do not break down over time
- Extreme resistance to wear and friction

*Image Source:*
Harry Rowed. National Film Board of Canada. Photothèque. Library and Archives Canada, PA-115069 /
Asbestos Containing Products

• Miracle Mineral
• 3,000 different uses/products
• Usually mixed with other materials to:
  – Modify existing properties
  – Binding agent
  – Filler (cheap and plentiful)

Image Source:
Canada. Department of National Defence. Library and Archives Canada, PA-063766 /
Asbestos Containing Materials (ACMs)

- OSHA/EPA - materials containing greater than 1% asbestos
- MassDLS/MassDEP - materials containing greater than or equal to 1% asbestos

Image source: "Anthophyllite Asbestos Scanning Electron Microscopy (SEM)" by Asbestorama is licensed under CC BY 2.0
Thermal Systems Insulation
Other Insulation Applications

- Spray-on fireproofing
- Electrical contact insulators
- Electrical wiring
- Vermiculite
Flooring Materials

• Floor tile
• Linoleum
• Sheet flooring
• Mastic/adhesives
Wall and Ceiling Materials

- Plaster
- Acoustical/textured finishes
- Joint compound
- Transite
- Pyrobar
- Ceiling tiles
Other Products

- Brake pads
- Caulking
- Sealants
- Valve packings
- Gaskets, etc.
- Many others …
Non-ACM’s

Materials NOT Considered ACM:*

- Glass (including fiberglass)
- Wood
- Metal
- Most plastics

*When not coated (some paints and coatings may contain asbestos)
Asbestos Bans (1973-1978)

- Corrugated paper
- Rollboard
- Commercial paper
- Specialty paper
- Flooring felt
- Pipe insulation
- Block insulation
- Spray-applied surfacing materials
- Artificial fireplace embers
- Wall patching compounds
- New uses
Example Asbestos Products Not Banned

- Cement sheet
- Clothing
- Pipeline wrap
- Roofing felt
- Vinyl floor tile
- Cement shingle
- Millboard
- Cement pipe
- Automatic transmission components
- Clutch facings
- Friction materials
- Disk brake pads
- Drum brake linings
- Brake blocks
- Gaskets
- Coatings (roof and non-roof)
Asbestos Regulations

- Protect people
  - Children
  - Workers & building occupants
- Protect environment
- Restrict manufacturing
- Restrict waste disposal
Asbestos Regulations

• Requirements for:
  – Identifying
  – Managing

• Special precautions for:
  – Disturbance
  – Abatement/handling
  – Transport
  – Disposal
OSHA (1910.1001 and 1926.1101)

- Exposure limits
- Exposure assessment
- Engineering controls
- PPE (respirators/protective clothing)
- Medical exams
- Signs and labels
- Recordkeeping
EPA

• Toxic Substances Control Act (TSCA)
• Asbestos Hazard Emergency Response Act (AHERA)
• Model Accreditation Plan (MAP)
• National Emission Standards for Hazardous Air Pollutants (NESHAPs)
Prior to building demolition or renovation, requires identification, removal, and disposal of friable ACMs or ACMs that will become friable as a result of work.
Asbestos Regulations – Massachusetts

**DLS**: Department of Labor Standards
- Licensing
- Specific work practices

**DEP**: Department of Environmental Protection
- General requirements (NESHAPs)
- Enforcement
Asbestos Compliance – Demolition/Renovation*

- Pre-demolition inspection (licensed inspector)
- 10-day notification to EPA (and state)
- Licensed contractor and workers
- Isolation/containment
- Proper packaging and disposal
- Methods to minimize dust and keep wet
- Proper transport and disposal
- Post-abatement clearance by licensed Project Monitor

*Typical requirements. Varies by situation and location.
Managing Asbestos in Soil During Construction in Massachusetts
Asbestos in Soil

• Present at many sites
• Often contains asbestos at “trace” (less than 1%) amounts
• Can be naturally occurring
MassDEP Asbestos Regulation Changes – 2014

• Defines trace (<1%) asbestos materials as Asbestos Containing Waste Materials (ACWMs)

• Broadened abatement definition to include ACMs or ACWMs

• Non-Traditional Asbestos Abatement Work Practice Approvals process (NT Plan)
NT Plans Apply to

1. Demolition of structurally unsound buildings
2. ACM/ACWM disturbed but not previously accessible for testing
3. Abatement during emergency renovation
4. Abatement necessary due to:
   – Previous activities not in compliance
   – ACM deterioration
5. Wetting would damage equipment or present hazard
6. Bulk loading ACM and/or ACWM
NT Plans Require

- Preparation by licensed Asbestos Project Designer
- Written plan
- Application form and fee ($600)
- MassDEP approval
  - No timeline for approval
NT Plans for Asbestos Contaminated Soil

- Require input from multiple parties
- Different for every project and must be negotiated and approved by the MassDEP
- Depending on the project, may need to include solutions for the following
Roles and Responsibilities

- Owner
- Contractor(s)
- Waste hauler
- Disposal facility
- Air monitoring
- Others
Worker Health and Safety

- Training
- Exposure monitoring
- Work practices
- Decontamination
- PPE
Materials Involved

- Work sequence/layout
- Volume (cubic yards)
- Locations
  - Work site
  - Public
- Sample results
Material Handling and Disposition

- Coordination with MCP requirements
- Offsite disposal
- Reuse onsite
- Stockpiling
- Processing
- Treatment
Decontamination

- Vehicles
- Equipment
- Personal
- Non-porous materials
Dust Control

- Watering
- Covering
- Other site controls
Packaging, Transport, Disposal
Perimeter Asbestos Air Sampling

- Every day, each work zone
- Compared to action level
- Immediate MassDEP notification of exceedance (and stop work)
- Results provided to MassDEP daily
Completion and Final Inspection
MassDEP Inspections and Notifications

• Inspections
  – Before work
  – After work
  – Unannounced

• Immediate notification/stop work
  – Visible dust
  – Air sample exceedance
  – Changes
Additional Resource: EH&E Blog

- Managing Asbestos Contaminated Soil During Construction in Massachusetts
- PCBs on Campus
- Construction Air Quality Monitoring for Higher Education

https://www.eheinc.com/blog
For more information:
www.eheinc.com
800-825-5343