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## Asbestos in the Modern Built Environment


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## Topics

- Asbestos history and toxicity
- Asbestos regulatory history and bans
- What's not banned
- Asbestos surveys and managing asbestos in buildings
- Management considerations
- LEED standards
- Closing thoughts




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## History of Asbestos

- Asbestos is a group of naturally occurring minerals and is mined like coal
- Unlike most rocks, asbestiform minerals are soft and pliable similar to cotton and wool
- Pliability and resistance to heat and fire resulted in many uses including woven cloth, insulation, gaskets, and more.....
- Has been used since ancient times



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## Last Asbestos Operation in US

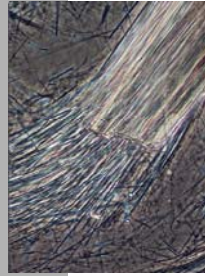


Figure 1. Photograph taken in 1998 of KCAC mine, Joe Pit, in the Coalinga asbestos district of San Benito and Fresno Counties, west-central California. This large chrysotile mine was the last asbestos operation in the United States; the mine closed in 2002. Photograph by California Geological Survey.




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## Asbestos Toxicity



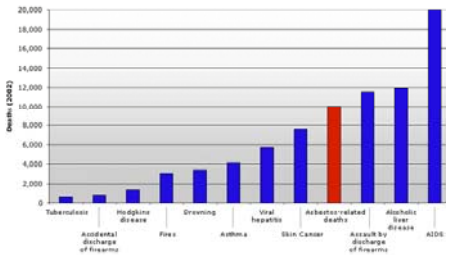
- Discovered in early 1900s
- The first diagnosis of asbestosis was made in the UK in 1924
- By 1930, asbestos was strictly regulated in Great Britain which regulated ventilation and made asbestosis an excusable work-related disease
- US was slow to follow




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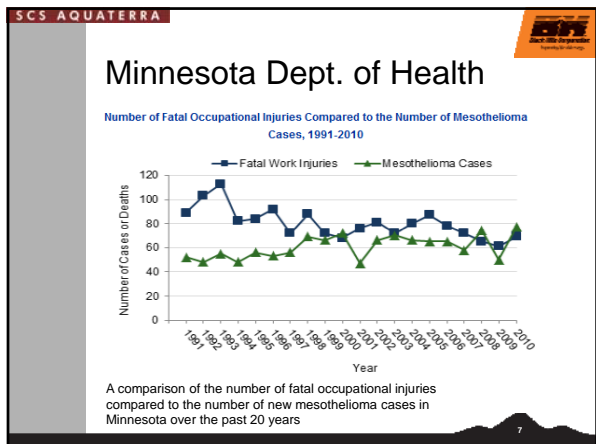
## Asbestos Toxicity

### Asbestos-related deaths at an epidemic scale in the United States



Source: EPA Action Fund estimate for asbestos deaths (2002), Center for Disease Control and Prevention, NIOSH, National Vital Statistics Reports, Deaths: Preliminary Data for 2002, Volume 82, Number 13, February 2004.





- ### Regulatory History of Asbestos
- AHERA/ASHARA
    - A building inspection involves:
      - Investigation of records for the specification of ACM
      - Inspection of the building for suspect materials
      - Sampling and analyzing suspect materials to test for asbestos
      - Assessing the condition and location of the ACM and other characteristics of the building.
      - Use a systematic approach to determine the hazard posed by any ACM
      - Evaluate and select control/response options
  - NESHAP
  - OSHA

### History of Asbestos Bans

The EPA banned...

- 1973 - *spray-applied surfacing* asbestos-containing material for fireproofing/insulating purposes.
- 1975 - installation of *asbestos pipe insulation and asbestos block insulation on facility components*, such as boilers and hot water tanks, if the materials are either pre-formed (molded) and friable or wet-applied and friable after drying
- 1978 - *spray-applied surfacing materials* for all other purposes
- See [40 CFR Part 61, Subpart M](#)

- ### History of Asbestos Bans
- The Consumer Product Safety Commission (CPSC) banned...
    - 1978 - the use of asbestos in *wall patching compounds\** and *artificial fireplace embers*
    - See 16 CFR Part 1304 and 1305
  - \*Products such as:
    - *Spackling compounds*
    - *Tape joint compounds*
    - Other mixtures used to patch or seal cracks, holes, or other imperfections in drywall and other surfaces
    - May be in dry form, ready to mix with water or may be an already-mixed paste

### History of Asbestos Bans

- In 1989, the EPA issued a final rule under Section 6 of Toxic Substances Control Act (TSCA) banning most asbestos-containing products.
- Then in 1991, this rule was vacated and remanded by the Fifth Circuit Court of Appeals.

*Most of the original ban on the manufacture, importation, processing, or distribution in commerce for the majority of the asbestos-containing products originally covered in the 1989 final rule **was overturned.***

See [40 CFR 763 Subpart I.](#)

- ### History of Asbestos Bans
- As of 1991 *after the TSCA ban was overturned*, the following uses were banned:
    - *Spray-applied asbestos-containing surfacing material*
      - All uses
    - *Asbestos pipe insulation and asbestos block insulation*
      - Either pre-formed (molded) and friable or wet-applied and friable after drying
    - *Artificial fireplace embers*
    - *Wall patching compounds*


### What's Not Banned

Examples of asbestos-containing products **not banned**.  
 The manufacture, importation, processing and distribution in commerce of these products, as well as many others not listed, are not banned.

- Troweled-on surfacing material
- Cement sheet, corrugated or flat
- Cement shingles
- Cement pipe
- Clothing
- Pipeline wrap
- Roofing felt
- Vinyl floor tile
- Millboard (drywall)
- Gaskets
- Automatic transmission components
- Clutch facings
- Friction materials
- Disk brake pads
- Drum brake linings
- Brake blocks
- Non-roofing coatings
- Roof coatings

...as well as some others not listed

### North American Free Trade Act



Because of the NAFTA, products that are made for use in Canada and Mexico, neither of which have banned the used of asbestos in products, are available today in the United States.

### Countries that Ban Asbestos

- 54 Countries (out of 196) ban asbestos

National Asbestos Bans <sup>1</sup>				
Algeria	Czech Republic*	Iceland	Malta*	Seychelles <sup>4</sup>
Argentina	Denmark	Ireland	Mozambique	Slovakia*
Australia	Egypt	Israel	Netherlands	Slovenia
Austria	Estonia*	Italy	New Caledonia	South Africa
Bahrain	Finland	Japan	Norway	Spain
Belgium	France	Jordan <sup>3</sup>	Oman	Sweden
Brunei	Gabon	Korea (South)	Poland	Switzerland
Bulgaria	Germany	Kuwait	Portugal*	Turkey
Chile	Greece*	Latvia	Qatar	United Kingdom
Croatia <sup>2</sup>	Honduras	Lithuania*	Romania	Uruguay
Cyprus*	Hungary*	Luxembourg	Saudi Arabia	


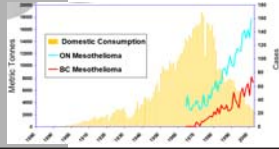
- 10 more in 2013 than in 2011

### Major Producers of Asbestos (Chrysotile)

Ranking	Country Name	Est. Production* (metric tons)
1	Russia	1,000,000
2	China	380,000
3	Brazil	288,000
4	Kazakhstan	230,000
5	Canada	150,000
6	India	19,000
7	Colombia	10,000
8	Others (including Mexico)	138,000
Total		2,215,000

United States Geological Survey (USGS) Minerals Resources Program, 2009  
 Asbestos Cement Products Manufacturers Association (ACPMA), 2008

### Canada's Asbestos Industry

- Canada is closing its asbestos industry
  - International pressure
  - Rising cancer rates
- Last 2 active mines closed in 2011
- Continues to export a large amounts of asbestos to developing countries

### Mexico's Asbestos Industry




- Mexico imported 17,000 tons in 2007 mostly from Canada
  - More than 10X used in US that year
- Nearly 2000 Mexican companies use asbestos (2010)
- Since 2011, Mexico continues to import asbestos from Russia

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### U.S. Asbestos Trends

- Between 2006 and 2011 the use of asbestos in the U.S. is the lowest since 1909
- Based on current trends, U.S. asbestos consumption is likely to remain in the 1,000 ton level for the near future
- All asbestos used in the U.S. is now chrysotile.
- In 2011, most asbestos was imported from Canada, with a small amount from Brazil
- Roofing products are estimated to account for about 60% of U.S. consumption
- The chloralkali\* industry accounts for 35%
- Unknown applications account for the remaining 5%

\*Chloralkali process is the electrolysis of NaCl solution to produce chlorine and sodium hydroxide

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### NESHAP Subpart M

#### National Emission Standard for Asbestos

§ 61.145 – Standard for Demolition and Renovation

(a) Applicability

- To determine which requirements... of this section apply to the *owner or operator of a demolition or renovation activity*
- ...*prior to the commencement of the demolition or renovation*
- ***thoroughly inspect the affected facility or part of the facility where the demolition or renovation operation will occur for the presence of asbestos***



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### How to Comply with NESHAP

- The only way to know with absolute certainty if a material contains asbestos *or not* is to have the material tested by an accredited microscopist
- The only way to know where asbestos-containing material is *or is not* located in a home or any other building is to have an inspection by a trained asbestos inspector
- **OR...** Have documents certifying that the materials used do not contain asbestos

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### How to Comply with NESHAP

- **Sample** prior to *all* renovations or perform a full facility survey
- **Track** all renovations
- **Require** all new materials installed be asbestos-free
- **Obtain** manufacturer's product information documenting the asbestos-free status of all new materials used, or test
- **Maintain** all records for life of facility

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### Asbestos Sampling and Documentation

- Sampling considerations
  - Homogeneous materials and areas
  - Multi-layer materials
  - Wall systems
  - Non-friable materials
  - Materials < 1%
- Documentation
  - Facility maps
  - Sampling locations
  - Renovation areas
  - Material specifications and use areas

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## Asbestos Sampling and Documentation

- Know where you are!
  - Multi-layer materials (composite samples)
  - Wall systems (not in Texas)
  - Non-friable materials (i.e. Kansas)
  - Materials < 1% (OSHA matters)
  - Project reporting (i.e. Nebraska)
- Plan ahead!
  - Specifications for new buildings and renovations
  - Due diligence for property acquisition

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## Asbestos Sampling and Documentation

- Head in the sand – not an advisable approach
  - Fiber release episodes
  - Increased abatement costs
  - Regulatory scrutiny
  - Offsite impacts and damages
- Leased / shared space
  - Lack of control
  - OSHA vs. EPA considerations

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## Asbestos Management Considerations

- No survey, sampling documentation missing
- Renovations not documented
  - Original survey no longer represents conditions at the facility after multiple renovations
  - EPA / States require testing or documentation before renovation / demolition
- Cost estimates to retest and assess:
  - Partial survey, 20 samples - \$1K
  - A simple facility, 1 building - \$10K
  - Multiple facilities - \$10K x # buildings
  - Complex facility (hospital) - \$100K

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## Asbestos Management Considerations

- Materials installed during renovations are not documented asbestos-free
- **Best Case Scenario**
  - Original survey no longer represents conditions at the facility after multiple renovations
  - EPA / States require documentation
  - You retest and document that none of the materials contain asbestos.
  - Costs:
    - Survey costs as previously described

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## Asbestos Management Considerations

- Materials installed during renovations are not documented asbestos-free
- **Worst Case Scenario**
  - Original survey no longer represents conditions at the facility after multiple renovations
  - EPA / States require documentation...
  - You retest and find newly installed asbestos-containing building materials at your facility!
  - Costs:
    - Sampling costs as previously described
    - Abatement of newly installed materials: \$50K+

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## Do LEED Standards Protect You?

- LEED 2009
  - Addresses existing asbestos-containing building materials brownfield redevelopment
  - Does not prohibit use of asbestos
- LEED v4 will prohibit the use of asbestos
  - v4 approved by membership on July 10, 2013
  - Responding to concerns about changes, the USGBC announced that it would ease into v4
    - Until June 1, 2015, project teams will be allowed to register for either LEED v4 or LEED 2009
    - After June 1, 2015 only LEED v4 will remain open

USGBC = US Green Building Council

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### New to LEED v4

- Cradle to Cradle Certified Product Standard addresses five quality categories relating to human and environmental health
  - **Material Health** - *Products are made with materials that are safe and healthy for humans and the environment*
  - Material Reutilization
  - Renewable Energy and Carbon Management –
  - Water Stewardship
  - Social Fairness

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### Final Thoughts

- Progress is being made
- More countries are banning asbestos
- Canada is banning asbestos mining
- USGBC LEED v4 prohibits the use of asbestos
- None of this removes a facility owner's responsibility to:
  - Test for asbestos, even in new facilities without written documentation
  - Document renovations and new materials used
  - Maintain documentation

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