

## Asbestos, Asbestos-Related Health Effects, and What is Known about the Potential for Asbestos Exposure at the Boulder Justice Center and Risk of Health Effects

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### Outline

- Informational Talk
  - What is asbestos?
  - What are asbestos-related health effects?
  - What is known about the asbestos exposure of workers who have developed asbestos-related lung disease?
  - What is known about the potential risk of asbestos exposure at the Justice Center
    - What is the potential risk of asbestos-related health effects
- Question and Answer Session

### What is asbestos?

- Group of naturally occurring fibrous minerals
  - Amphibole
  - Serpentine
    - Chrysotile
    - Form most commonly used in buildings



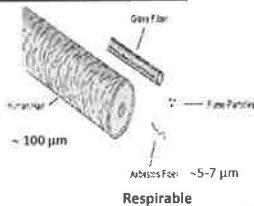
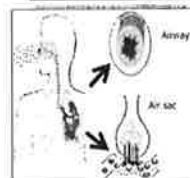
### Where was asbestos used?

- Properties
  - Heat resistant
  - Fire resistant
  - Absorbs sound
  - Mechanically strong
- Commonly used in buildings from 1900-1980s
  - Use in new construction stopped in 1989
- Uses in buildings
  - Insulation
  - Fireproofing
  - Roofing
  - Acoustic finishes
  - Siding
  - Cement
  - Coatings
  - Ceiling tile
  - Vinyl flooring (9x9)
  - Dry wall joint compound
  - Boilers, steam pipes

### Where else was asbestos used?



### Is all asbestos hazardous?



### Why is asbestos hazardous?

- High aspect ratio
  - Long, thin needlelike
- Injury
- Inflammation
- Repeated exposure
- Persistence in the lung
- Scarring
- DNA damage



### What symptoms does asbestos cause?

- None
- Asbestos has no warning properties
  - No smell or taste
- Asbestos-related health effects develop slowly over decades

### What determines health effect risk?

#### Dose

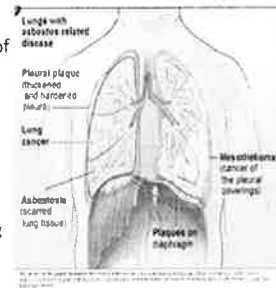
1. Intensity
  - Concentration of respirable asbestos fibers in the air
  - **Friable:** Fibers release with no to minimal contact, such as hand pressure
  - **Nonfriable:** Fibers will not release unless disturbed, such as during a demolition project
2. Frequency - Hours/day
3. Duration - Years

#### Type of asbestos

– Risk from amphibole >mixed >chrysotile

### What are Asbestos Health Effects?

- Fluid in the lung
- Thickening of the lining of the lung
  - Pleural plaques
- Asbestosis
  - Scarring in lungs
- Lung cancer
  - Synergistically increased risk with tobacco smoking
- Mesothelioma

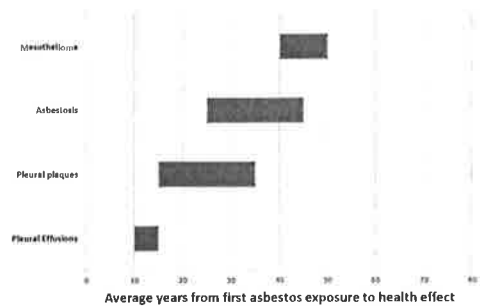


### What are the symptoms?

- Fluid and thickening of the lung lining
  - Typically none, marker of asbestos exposure
- Asbestosis
  - Shortness of breath, gradually progressive
- Lung cancer and mesothelioma
  - Cough, shortness of breath
  - Chest pain, weight loss, night sweats

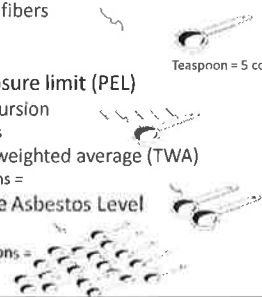


### When do asbestos-related health effects begin?



### Concentration of respirable asbestos fibers in the air

- Measured in fibers per cubic centimeter of air
  - f/cc
  - Number of respirable fibers
  - Per cubic centimeter
    - 1 cc= 1 milliliter
- OSHA Permissible exposure limit (PEL)
  - 1 f/cc: 30-minute excursion
    - 5 fibers in 5 teaspoons
  - 0.1 f/cc: 8-hour time weighted average (TWA)
    - 5 fibers in 10 teaspoons =
- Co Maximum Allowable Asbestos Level
  - $\leq 0.01$  f/cc
    - 5 fibers in 100 teaspoons =



Teaspoon = 5 cc


### Who gets asbestos-related disease and what was the "dose"?

- **Intensity:** Levels have decreased over time
- Insulators: 2-10 f/cc (Late 1960s to 1970s)
- Shipyard workers: 2-5 fold higher
- Construction craftsmen: <0.1 - 1 f/cc
  - Higher levels: Power tool use, mixing or sanding drywall cement, cleanup of insulation and lagging
  - Bystander exposure
- **Frequency:** Most of the work day
- **Duration:** Years to decades

Williams PR et al. A review of historical exposures to asbestos among shipyard craftsmen (1940-2006). Tox Env Health 6 Crit Rev 2007

### What about workers with lower "dose"?


- Automobile mechanics
  - Repair asbestos-lined brakes and clutches
  - Chrysotile
  - Mean: <0.1- 0.54 fiber/cc
  - Peak: 30 fibers/cc
    - Compressed air
  - Variable frequency
  - Years to decades
- Study of auto mechanics
  - Pleural plaques: 5%
  - Asbestosis: 1 case
  - Duration of exposure: 36-42 years



Annals: Asbestos related diseases in automobile mechanics. Ann Occ Hyg 2012; Hessel PA Mesothelioma among brake mechanics. Risk Anal 2004; David H Mesothelioma among motor vehicle mechanics, updated review and meta-analysis. Annals Occ Hyg 2014

### What is known about the potential for asbestos exposure?


- Asbestos
- Asbestos sampling results
- Past remodel projects
  - 1989-2016
- Answers to frequently asked questions



https://www.bouldercourty.org/departments/administrative-services/asbestos/justice-center/8150913748086-86d5842e-2433

### Routine Pre-Demolition Asbestos Testing Has Been Performed Before Demolition

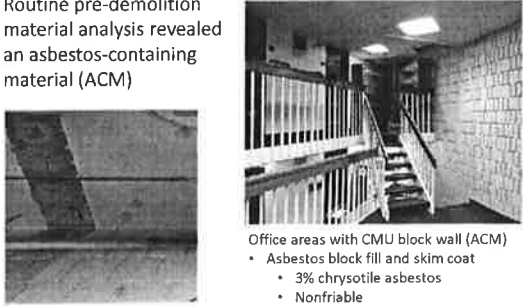
- Asbestos abatement has been done in the past
- Justice Center was built in the 1970s
  - Insulation
  - Fireproofing
  - Roofing
  - Acoustic finishes
  - Siding
  - Cement
  - Coatings
  - Ceiling tile
  - Vinyl flooring (9x9)
  - Dry wall joint compound
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### What was different this time?

- Routine pre-demolition material analysis revealed an asbestos-containing material (ACM)




Office areas with CMU block wall (ACM)

- Asbestos block fill and skim coat
  - 3% chrysotile asbestos
  - Nonfriable

### Questions about potential exposure and health effects

1. What was the potential risk of asbestos exposure?
  - Recent occupants
  - Building occupants from prior CMU block wall demolition work
  - Workers who did the prior demolition work
2. What is the potential risk of asbestos-related health effects?



Architectural block walls with paint over ACM filler

### Potential Risk of Asbestos Exposure: Recent Occupants

- Nonfriable asbestos in the CMU block walls
  - Layer of paint above the block fill and skim coat
- Offices vacated before demolition began
- In my medical opinion, to a reasonable degree of medical probability, the general risk of asbestos exposure and associated health effects from recent work in these offices is low.

### Remodel Projects at the Justice Center (1989 to 2016)

- Past remodel projects at the Justice Center Project
- Lists details of what is known about all projects that involved CMU block removal
  - 2011-2016
  - 1989-1991

- Clerk of Courts remodel (2015-16)
  - o Phase 2 Demo March, 2016 = 306 LF X 8.66 FT TALL = 2,650 SF. of CMU wall removed
  - o Phase 1 Demo Sep. 2015 = 295 LF X 8.66 FT TALL = 2,555 SF. of CMU wall removed

- Nonfriable asbestos was released during demolition, but building occupant exposure limited by:
  - Dust containment used
  - Limited duration of demolition
  - 3% chrysotile in the block fill and skim coat
    - Lower concentration of the total demolition dust

https://www.bouldercounty.org/departments/administrative-services/asbestos-justice-center/#1509137248088-86d5842e-2431

### Potential Risk of Exposure: Building Occupants from Prior Remodels

- Limited risk of exposure during past demolition operations
- HVAC testing
  - No detectable asbestos
  - 1<sup>st</sup> floor, 2<sup>nd</sup> floor; roof, basement
- Air Sampling
  - <0.001 f/cc to 0.01 f/cc
  - Co maximum allowable asbestos level
    - 0.01 f/cc
  - PCM – standard method
    - Can't distinguish any asbestos fibers from nonasbestos fibers
  - TEM analysis
    - No detectable asbestos
    - LOD: ~0.004
- In my medical opinion, to a reasonable degree of medical probability, the general risk of asbestos exposure and asbestos-related health effects is low.


https://www.bouldercounty.org/departments/administrative-services/asbestos-justice-center/#1509137248088-86d5842e-2431

### Potential Risk of Asbestos Exposure: Workers who did the demolition work

- They worked inside of containment barrier
- Required asbestos-specific personal protective equipment was not used
- In my medical opinion to a reasonable degree of medical probability, these workers likely had asbestos exposure and while overall at low risk, there is potential risk of asbestos-related health effects
  - Limited duration of demolition
  - 3% chrysotile in the block fill and skim coat
    - Lower concentration of the total demolition dust
- I recommend a baseline OSHA- compliant asbestos medical evaluation and at minimum an exit medical evaluation

### Resources for Personalized Exposure and Health information

- Boulder County Website: Asbestos at the Justice Center
- Asbestos Comment Form
- Workers' Compensation
- Employee Assistance Program (EAP)



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