

Fiber counting and Asbestos fiber in bulk sample analysis in Thailand

Assoc. Prof. Wantanee Phanprasit
Dept. of Occupational Health and Safety
Mahidol University

BAN or Not BAN.

TOTALLY BAN or PARTIALLY BAN



Capacity Building on Evaluation & Control of
Asbestos Exposure in Thailand

Asbestos and ACMs Uses in Thailand

- ▶ Industries: raw materials, parts, insulation
- ▶ Construction and Demolition
- ▶ Household equipment
- ▶ Others: Laboratory, SME

Industries

- ▶ Asbestos cement: Roof tile, Cement pipe, Sidings, etc.
- ▶ Friction materials: Brake, Clutch; as parts of automobiles.
- ▶ Insulations: Boiler

Construction and Demolition

- ▶ New buildings: Roof, Sidings, floor tile, ceiling tile, etc.
- ▶ Old buildings: demolition - above materials.

Replace ACMs roof with non-ACMs



Household equipment and others

- ▶ Hair drier.
- ▶ Insulation pad during electrical hair perm ?
- ▶ Insulation pad in Laboratory work.
- ▶ SME

Based on current information

- ▶ Asbestos is mostly used in industrial sector.
- ▶ Nearly all ACMs in Thailand is NON-FRIABLE.

Prevention & Control

Industrial Hygiene aspects:

- ▶ Evaluation
- ▶ Prevention & Control
 - ▶ Engineering control - Substitution
 - ▶ Management control - Work procedure
 - ▶ PPE

Prevention & Control

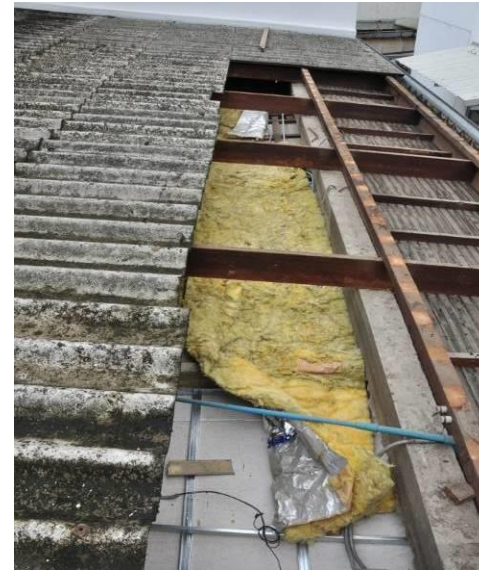
- ▶ Management
 - ▶ Law & Regulation
 - ▶ Education
 - ▶ Safety procedures
- ▶ Capacity building
 - ▶ Knowledge on asbestos issues: health hazard, uses, prevention and control
 - ▶ Sampling and Analysis

A study was conducted to obtain work procedure

Roof tiles



Roof



Ceiling & Siding



Ceiling & Siding



Ceiling & Siding



Ceiling & Siding



Ceiling & Siding



Vinyl floor tile



Evaluation.



Air Sampling & Analysis

- ▶ There are at least 3 methods of analysis:
 - ▶ Air borne concentration of fiber: air sampling using membrane filter and analysis using phase contrast microscope, PCM
 - ▶ Distinguish asbestos from non-asbestos fibers:
 - ▶ Scanning Electron Microscopy (SEM) and
 - ▶ Transmission Electron Microscopy (TEM)

Capabilities and limitations of analytical techniques used for asbestos analysis.

Parameter	PCM	SEM	TEM
1. Range of magnification	400-450	2000-10000	5000-20000
2. Particle counted	Fibrous structure	Fibrous structure	Fibrous structure
3. Minimum diameter visible	0.3 μm	0.1 μm	<0.01 μm
4. Resolved internal structure	No	May be	Yes
5. Distinguish mineralogy	No	Yes	Yes

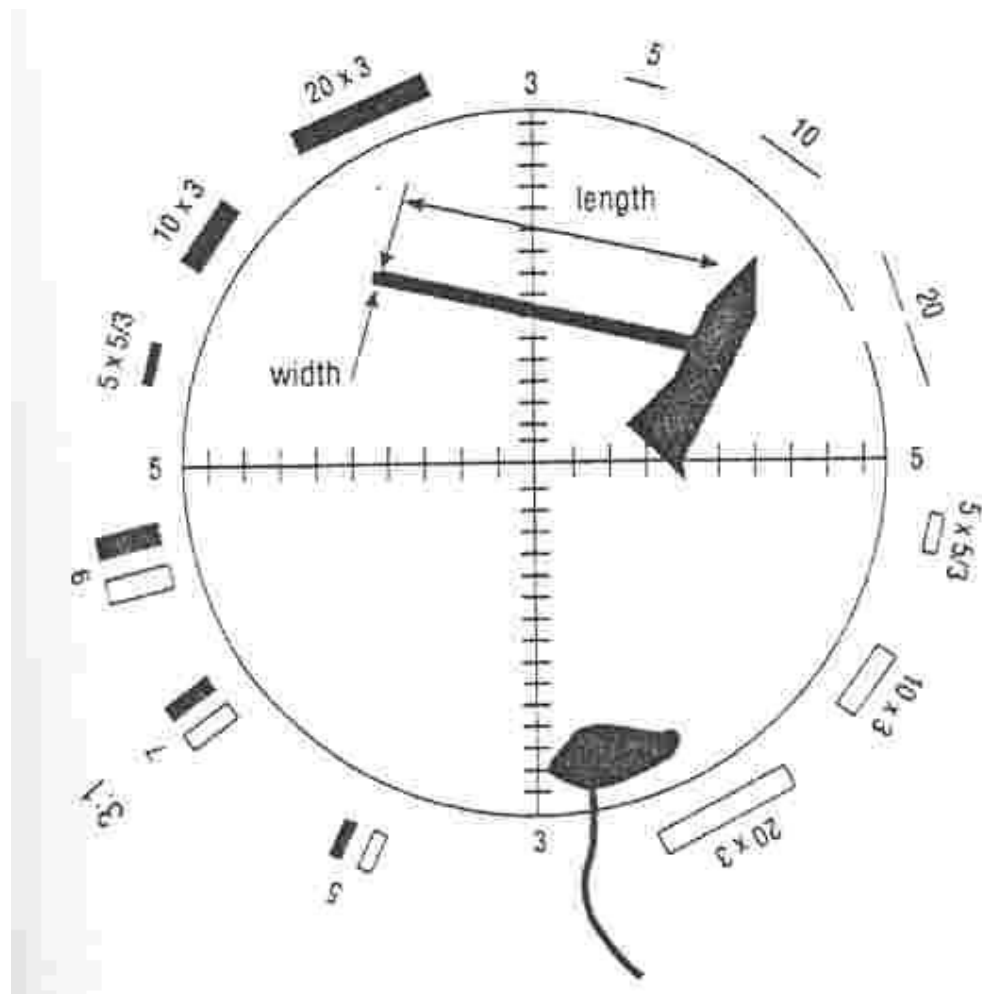
Fiber counting: Air sampling instrument.





Phase Contrast Microscope

Walton-Beckett Graticule type-22



Fiber counting using NIOSH method #7400

- ▶ At least 15 set of the phase contrast equipped with graticule.
- ▶ > 100 people can count the fibers

Bulk sample

- ▶ NIOSH #9002: qualitative identification of asbestos and the semi-quantitative determination of asbestos content of bulk samples.

Identify asbestos fiber in bulk samples



Polarize light microscope

- ▶ Many microscopes are available but a few has been used for identifying asbestos.
- ▶ < 10 experienced people

Capacity building needed.

- ▶ Knowledge and skills on:
 - ▶ ACMs demolition and disposition procedure
 - ▶ Verify ACMs
 - ▶ Fiber counting (air sample analysis)

Tools:

- ▶ Expertise and man powers.
- ▶ Equipment
- ▶ List of ACMs
- ▶ Budgets

Problems

- ▶ No ACMs disposal regulation.
- ▶ No designated Landfill Site for ACMs.

Thank you