

The Physical Environment Occupational Hygiene

Mike Slater



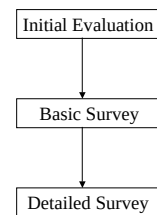
Mike Slater

- occhygiene@tiscali.co.uk
- www.users.globalnet.co.uk/~diamondw

Occupational Hygiene

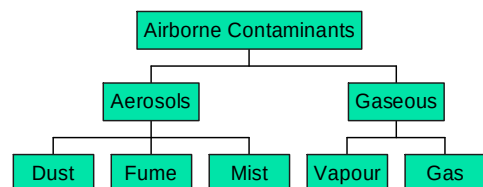
- Anticipation / Recognition
- Evaluation
- Control

OH Surveys

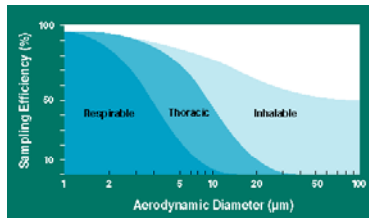


Sampling for Chemical Agents

Airborne Contaminants



Aerosol Sampling



Total Inhalable Dust



Operate at 2 litres/minute

Respirable Dust

- Crystalline silica, talc, cadmium sulphide
- Cyclone elutriator
- Membrane filter
- Flow rate
 - 2.2 litres/minute
- Analysis
 - gravimetric
 - XRD



Fibre Sampling

- Cowled, open face sampling head
- Flow rate
 - 1 to 4 litres /min (personal)
 - Up to 16 litres/min (clearance)
- Gridded cellulose ester filter
- Filter cleared with acetone vapour
- Fibres counted under microscope



Analytical Methods - Particulates

Contaminant	Method
Total inhalable or respirable	■ gravimetric (MDHS 14)
Metals and metal compounds	■ atomic absorption spectroscopy (AA) ■ inductively coupled plasma - atomic emission spectroscopy (ICP-AES) ■ X-ray fluorescence (XRF)
Crystalline silica (and some other minerals)	■ X-ray diffraction (XRD)
Asbestos and MMMF	■ optical microscopy ■ electron microscopy

Sampling for Gases and Vapours

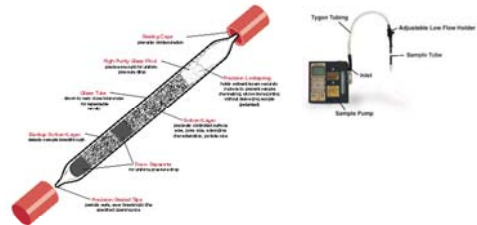
- Adsorption
- Absorption
- Treated filters
- Diffusive sampling
- Direct reading instruments
- Indicator tubes

Colorimetric Indicator Tubes

- Advantages
 - quick
 - easy
 - instant result
- Disadvantages
 - accuracy
 - not personal sampling
 - specificity



Adsorption Tubes



Passive Sampling

- Does not use pump
- Uptake by passive diffusion



Absorption

- Bubblers / impingers
- Gas dissolves or reacts with liquid sorbent
- Difficult to use for personal sampling





Interpreting Results

Occupational Exposure Limits

Occupational Exposure Limits

- COSHH
 - MEL
 - OES
- CLAW
 - Lead in air standard
- Asbestos
 - Control limits
 - Action levels

Occupational Exposure Standard (OES)

- "The concentration of an airborne substance averaged over a reference period, at which, according to current knowledge, there is no evidence that it is likely to be injurious to employees if they are exposed by inhalation to that concentration day after day"

Occupational Exposure Standard (OES)

- Reduce exposure to meet the limit
- If limit exceeded, must be met "as soon as reasonably practicable"

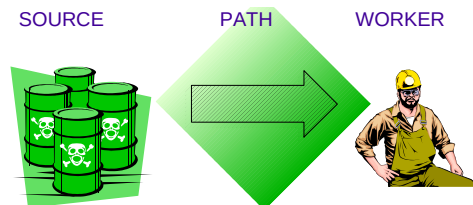
Maximum Exposure Limit (MEL)

- "the maximum concentration of an airborne substance, averaged over a reference period, to which employees may be exposed under any circumstances"

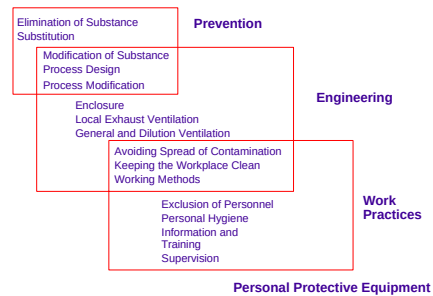
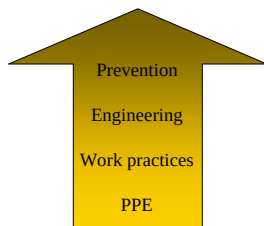
Maximum Exposure Limit (MEL)

- Must not normally be exceeded
- Short term MEL must NEVER be exceeded
- Further duty to reduce exposure "so far as is reasonably practicable"

Control Approach



Hierarchy of Control



Personal Protective Equipment

- Should only be used where other techniques are "not reasonably practicable"
- Last line of defence
- Careful selection required

