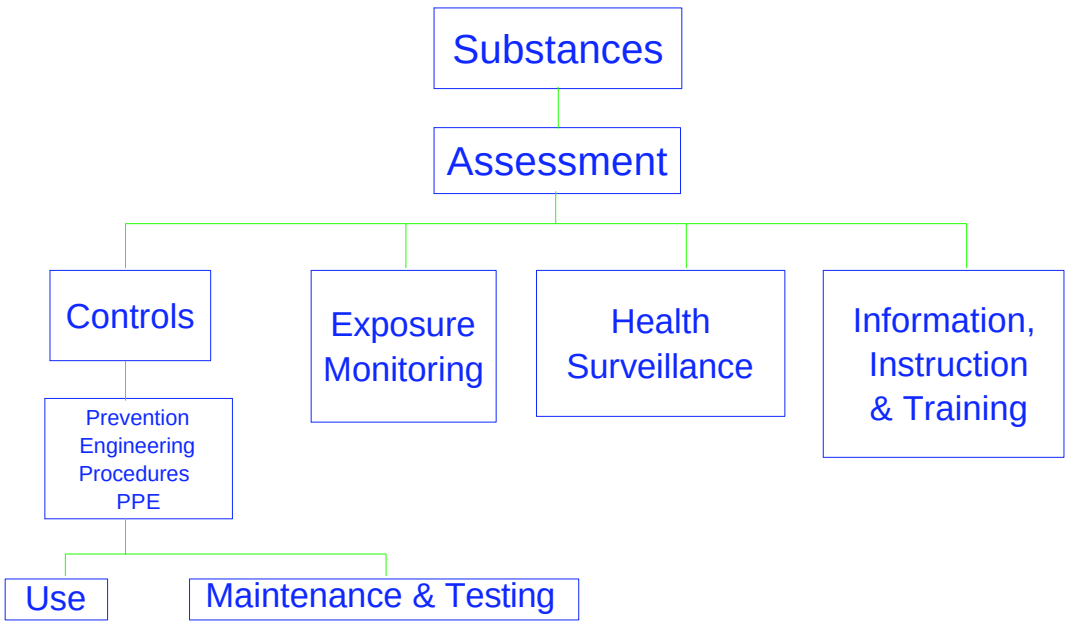
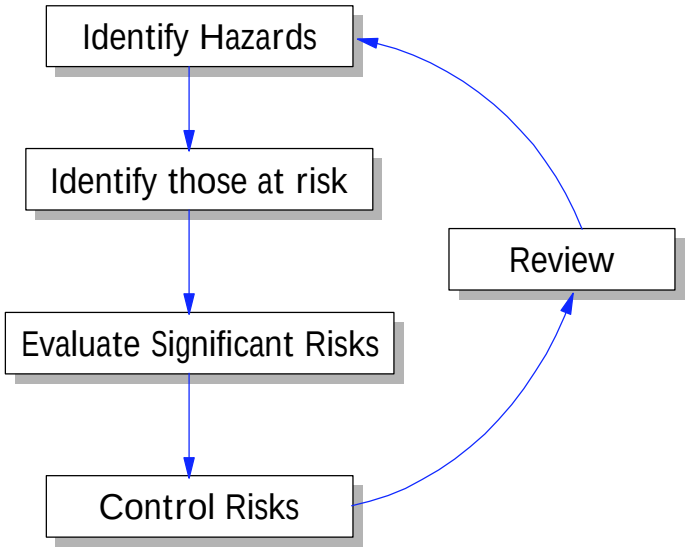
Evaluating Risks to Health



Risk Assessment



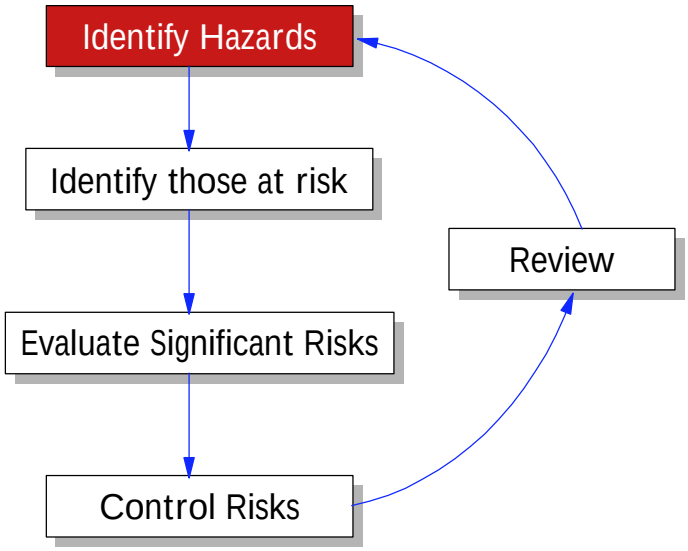
Health Risk Assessments

- What can we be exposed to?
- What harm can it cause?
- Is exposure significant?
- What are we doing to control it?
- Is that good enough?
- What do we need to do to improve control?
- What else do we need to do?

Hazard and Risk

- Hazard
  - the potential of a substance to cause harm
- Risk
  - the liklihood harm will occur in practice

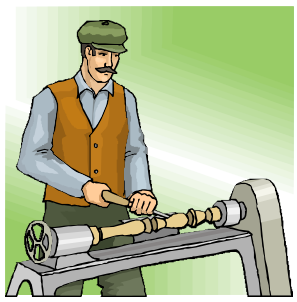
Risk Assessment



Hazards

- Substances used
- Substances generated by the process:
  - breakdown products
  - intermediates
  - reaction products
  - dust/fumes/vapours

What can we be exposed to during these operations?



Routes of Exposure

Hazards

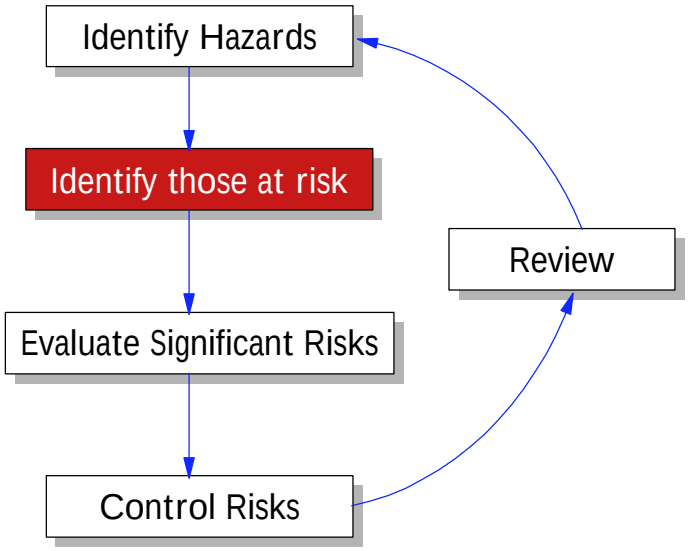
For each operation / task, and for all "reasonably foreseeable occurrences", consider:

- what can be inhaled?
- what is in contact with or can be absorbed through the skin?
- what can be ingested?

And in each case

- what harm can it cause?

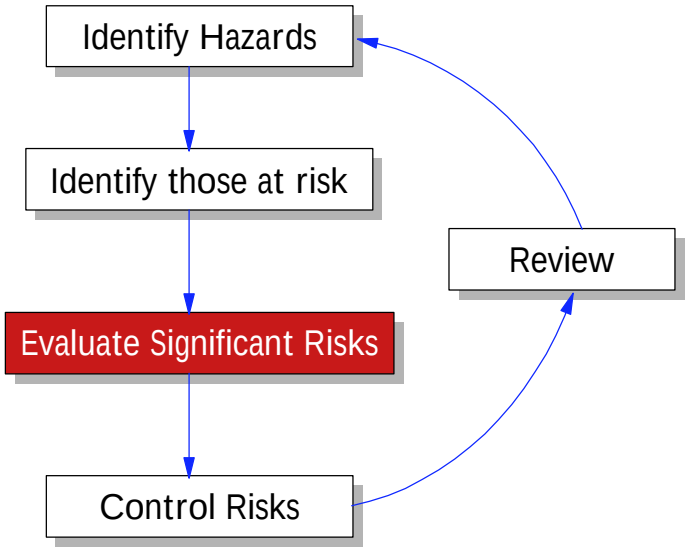
Risk Assessment



Identify Those at Risk

- Those working in area
- Other people who could be affected
  - maintenance staff
  - cleaners
  - contractors
  - visitors
- High risk groups
  - young workers
  - disabled personnel
  - pregnant women

Risk Assessment



Health Risk Assessments

- What can we be exposed to?
- What harm can it cause?
- Is exposure significant?

Risk

- The likelihood of harm occuring under the actual circumstances of use

RISK = Hazard x Exposure

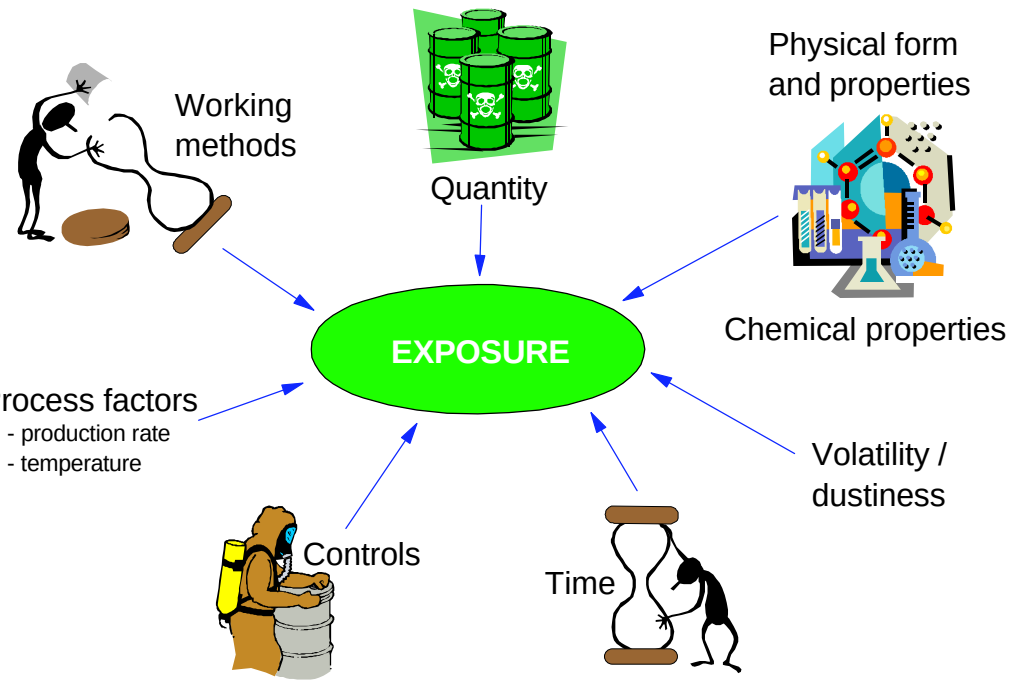
Dose

Time

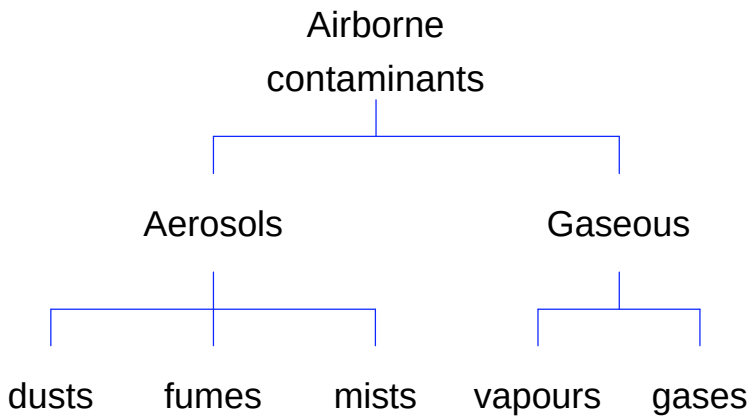
Is exposure significant?

Depends on amount and time

- amount
  - quantities used
  - concentration (for airborne substances)
  - amount in contact with skin
  - amount ingested
- time
  - period of exposure
  - frequency



Physical Forms of Airborne Contaminants



Sources of Exposure - Dust

- Powder handling
  - e.g. bag emptying, container filling, mixers, conveyers
- Abrasion
  - e.g. grinding, cutting, drilling, blasting
- Disturbing friable materials

Dust Exposures

- "dustiness" of materials
  - particle size
  - density
- Friability
  - i.e. how easily they break up

Sources of Exposure - Fumes

fine particulate matter evolved by heating metal and polymers

- Welding
- Metal refining and casting
- Rubber and plastic processing
- Combustion processes

Fume Exposures

- Temperature
- Other factors
  - welding current

Sources of Exposure - Mists

- Sprays
  - e.g. paint spraying, pesticides, pressure hosing
- Rotating machinery
  - e.g. oil cooled drilling and turning
- Gas carry-over
  - e.g. plating

Sources of Exposure - Vapours

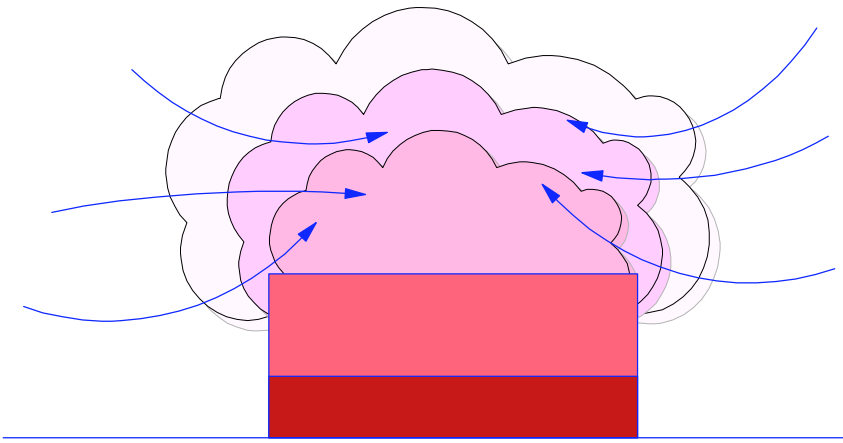
Evolved by evaporation of a liquid

- Handling volatile solvents
  - e.g. painting, adhesives, degreasing
- Heating less volatile substances

Vapour Exposures

- Volatility
- Temperature
- Vapour density

Solvent Vapours



Sources of Exposure - Gases

- Leaks from pipes, cylinders etc.
- Combustion products
  - e.g. CO_2, CO, NOx
- Reaction products
  - e.g. ozone during welding

Skin Contact

- Direct effects on skin
- Penetration
- Absorption

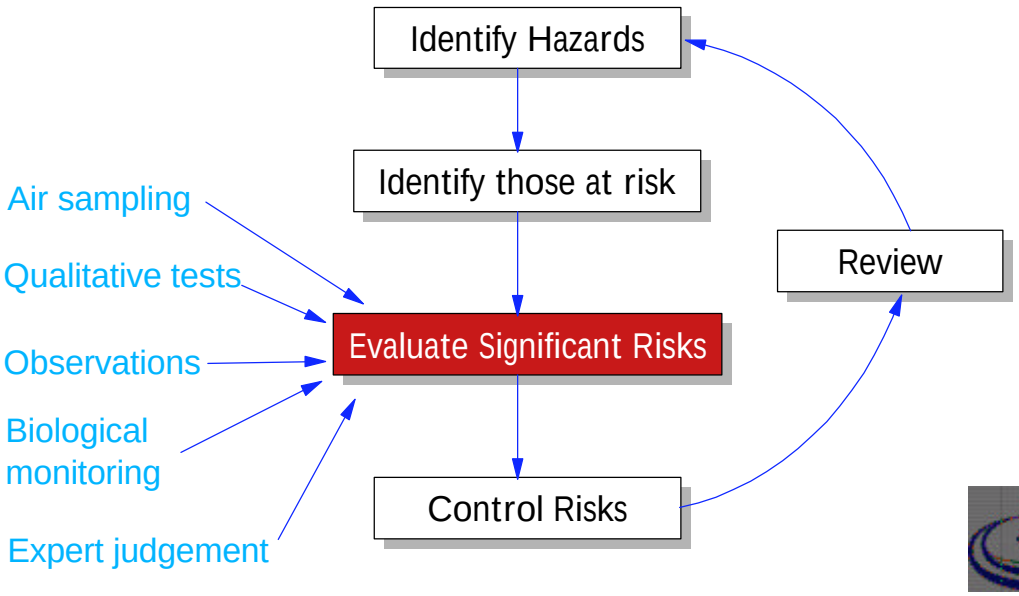
Ingestion

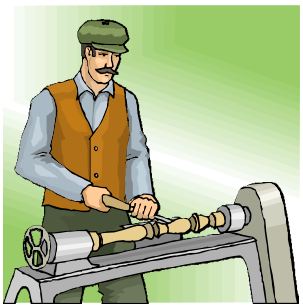
- Contaminated surfaces
- Foodstuffs
- Clothing
- Eating, drinking and smoking

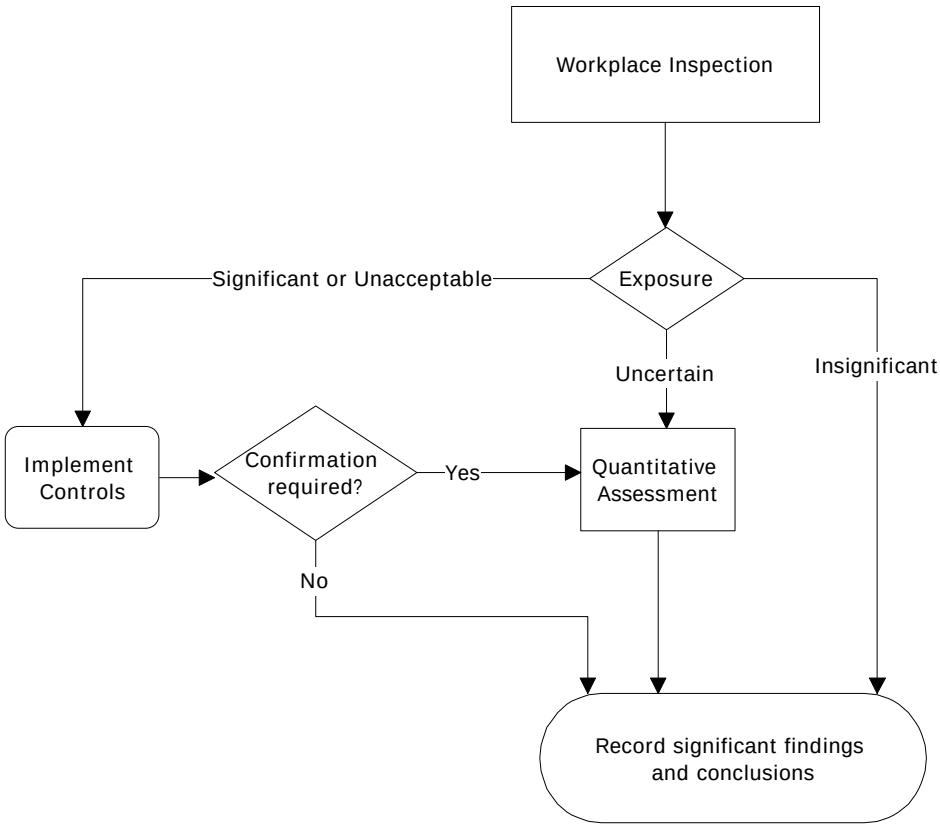
"Reasonably foreseeable" risks

- Occassional or intermitent events
  - known to occur or
  - predictable
- Examples
  - machine breakdown
  - cleaning
  - intervention to free trapped material
  - spillage
  - leaking valves

Risk Assessment



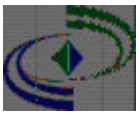



Workplace Inspection
Exposure
Significant or Unacceptable
Uncertain
Insignificant
Implement Controls
Confirmation required?
Yes
Quantitative Assessment
No
Record significant findings and conclusions

Workplace Inspection

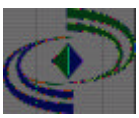
- Obtain information
- Observe process
- Simple qualitative tests
  - dust lamp
  - smoke tubes
  - indicator tubes etc.

Use experience and judgment to evaluate risks

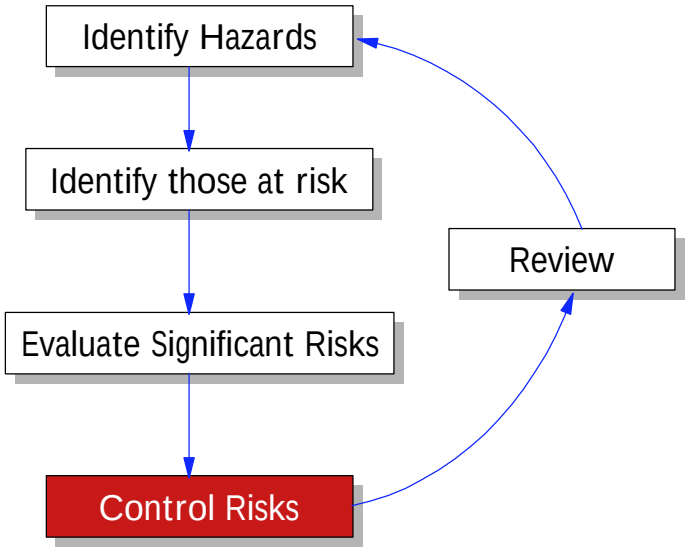


Sampling During Assessments

- When unsure of exposure
- To check compliance with an OEL
- To check effectiveness of controls
- To determine degree of control required



Risk Assessment



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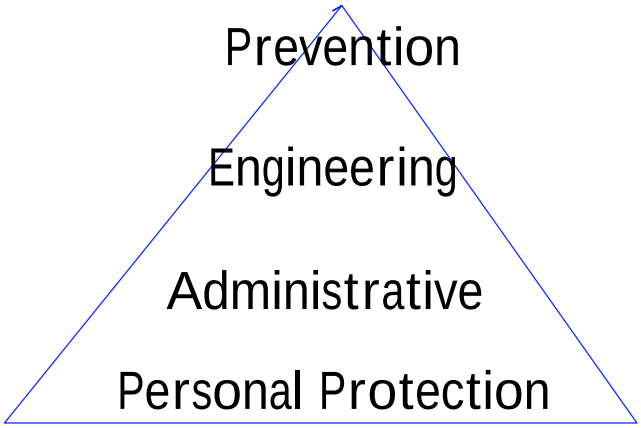
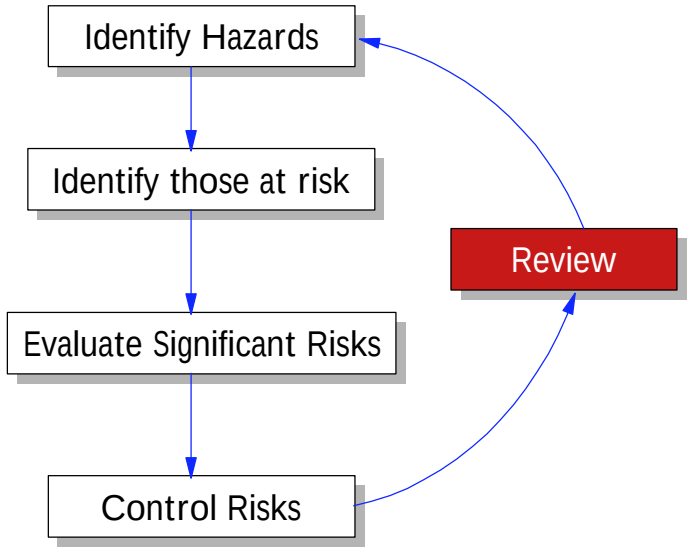
Hierarchy of Control



What else do we need to do?

- Testing of controls
- Air monitoring
- Health surveillance
- Information, instruction and training

Risk Assessment



Reviewing Assessments - How Often?

- Significant change
- Assessment suspect
- At least every 5 years
- More frequent
  - highly hazardous substance
  - exposure could be significant
  - controls could fail