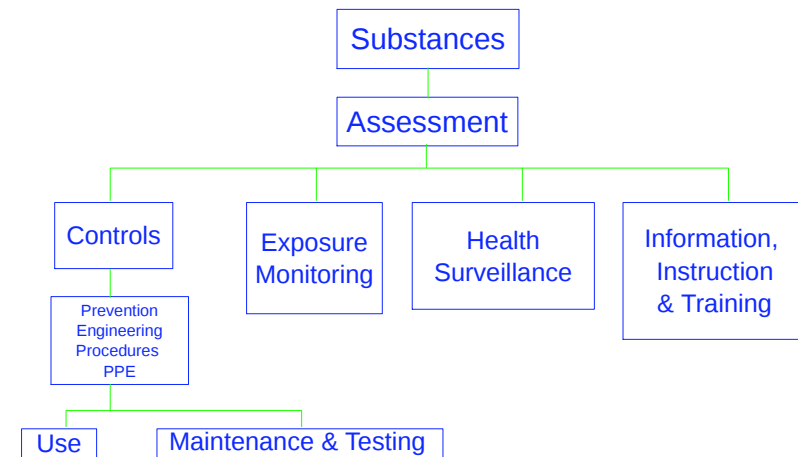
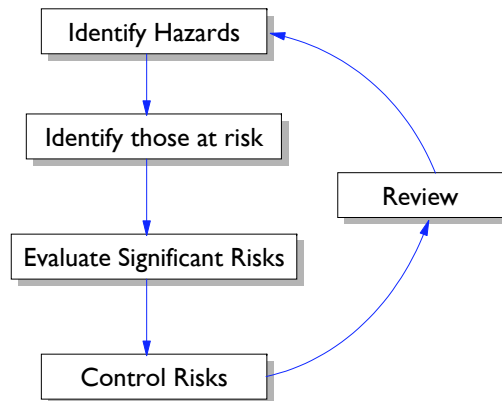


# Evaluating Risks to Health



## 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?

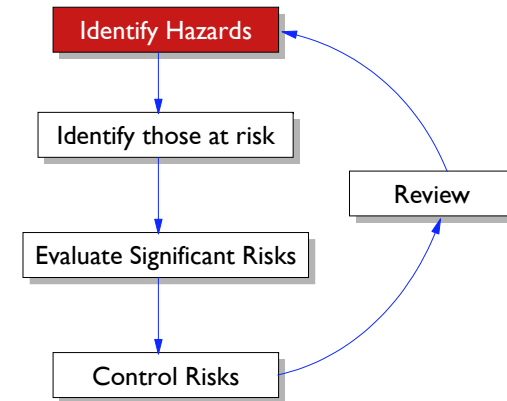


## Hazard and Risk

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



## Risk Assessment



## Hazards

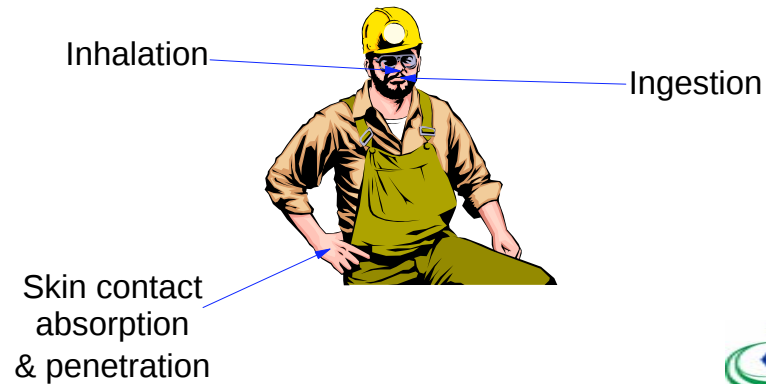
- Substances used
- Substances generated by the process:
  - breakdown products
  - intermediates
  - reaction products
  - dust/fumes/vapours



What can we be exposed to during these operations?



## Routes of Exposure



## Hazards

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

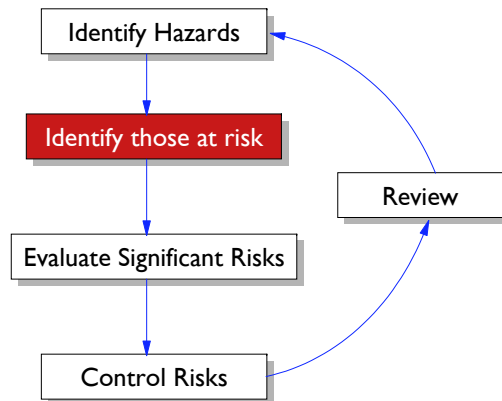
- what can be inhaled?
- what is in contact with or can be absorbed through the skin?
- what can be ingested?

And in each case

- what harm can it cause?



## Risk Assessment

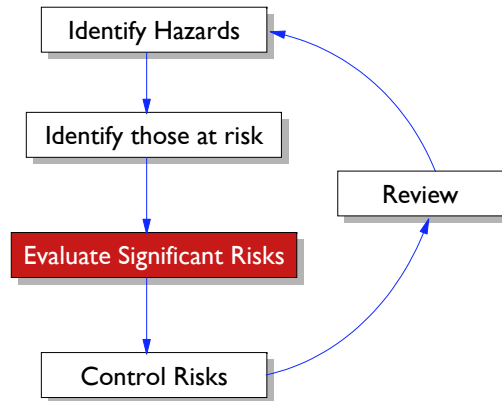


## Identify Those at Risk

- 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 occurring under the actual circumstances of use



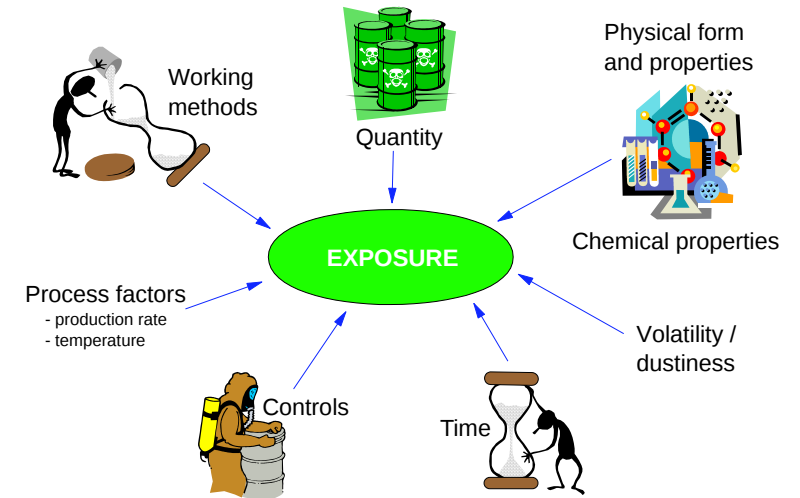
$$\text{RISK} = \text{Hazard} \times \text{Exposure}$$



## 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



## Skin Contact

- Direct effects on skin
- Penetration
- Absorption



## Ingestion

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

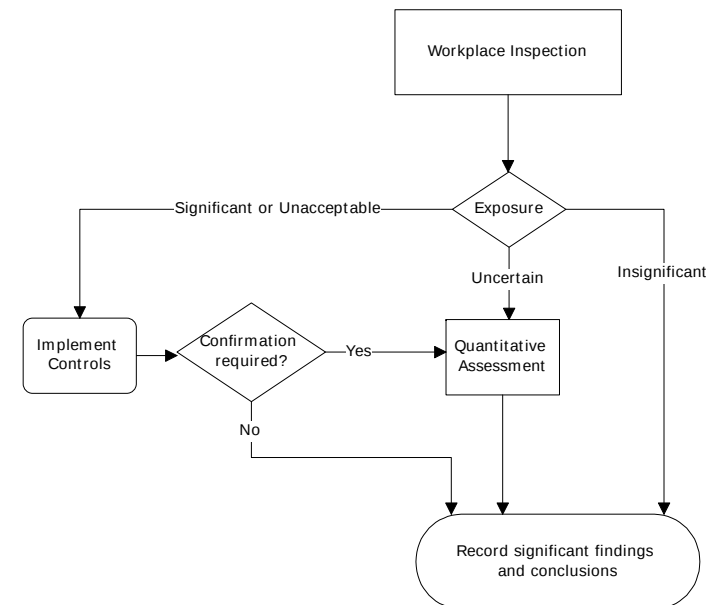
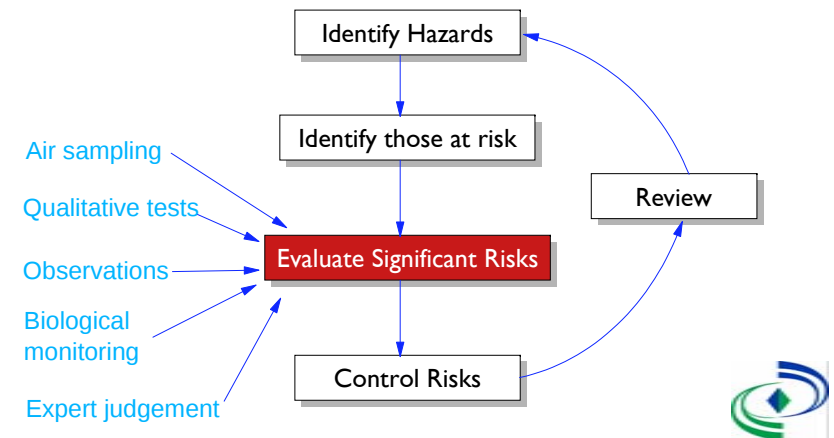


## "Reasonably foreseeable" risks

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



## Risk Assessment



## Workplace Inspection

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

Use experience and judgment to evaluate risks



## Sampling During Assessments

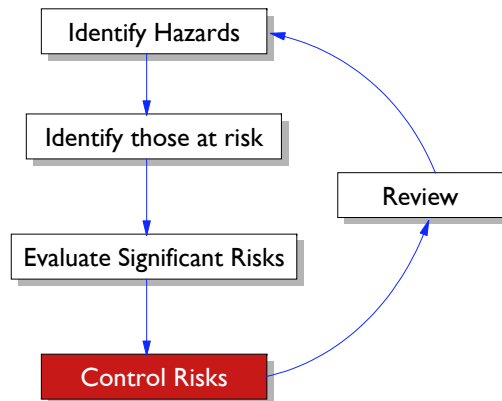
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- When unsure of exposure
- To check compliance with an OEL
- To check effectiveness of controls
- To determine degree of control required



## Risk Assessment

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## Health Risk Assessments

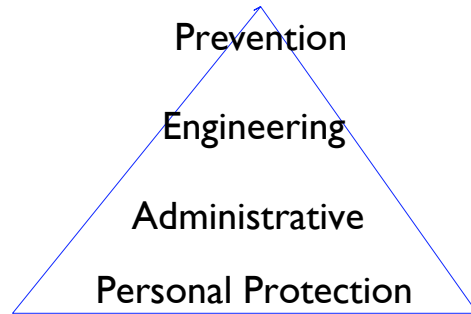
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- What can we be exposed to?
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- Is that good enough?
- What do we need to do to improve control?
- What else do we need to do?



## Hierarchy of Control

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## What else do we need to do?

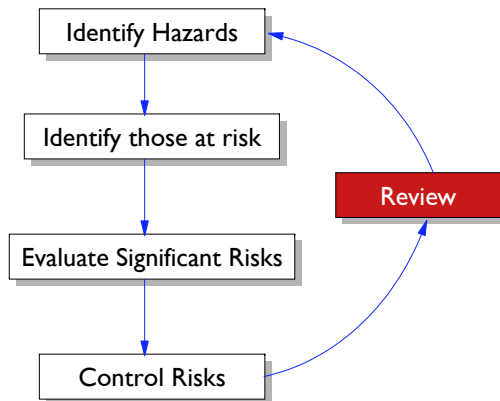
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- Testing of controls
- Air monitoring
- Health surveillance
- Information, instruction and training



## Risk Assessment

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## Reviewing Assessments - How Often?

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

