Exposure to Occupational Hygiene

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Managing and Controlling Workplace Health Risks

Occupational Hygiene - Perceptions
- Dental
- Nurses
- Just monitoring
- Legal compliance with standard

NZ Occupational Hygiene Society (NZOHS)
- Network of occupational hygiene professionals
- Supports and promotes professionalism, practice and recognition of the profession in NZ
- Launched in 1994
- Society members exist of professional Occupational Hygienists
  - Companies
  - Private consultants
  - Government organisations
  - Welcomes other H&S professionals, with an interest, to join

Occupational Hygiene
‘The discipline of anticipating, recognizing, evaluating and controlling health hazards in the working environment with the objective of protecting worker health and well-being and safeguarding the community at large.’

**Occupational Hygienist**

- Observe workplace processes, procedures, operations
- Develop strategies to evaluate work site
- Assess potential worker exposure
- Use direct reading instruments, sampling techniques to measure levels
- Assess/determine airborne exposure of contaminants
- Evaluate effectiveness of control strategies
- Work in multidisciplinary teams
- Advise, educate and train managers or employers and employees

**Occupational Health**

- Dual nature of occupational health

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Work Activity
\arrow{Exposure}
\arrow{Occupational Hygiene}
\arrow{Occupational Medicine}
\arrow{Disease}
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**Holistic approach to Occupational Health**

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1 Qualitative occupational health risk assessment
2 Occupational Health Policy
3 Occupational Health Procedures
4 Occupational health education programme
5 Medical surveillance system
6 Occupational health education programme
7 Quantitative occupational health risk assessment
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**Anticipation and Recognition**

- Understand the process – what do they make, how, with what products, what sort of finishing?
- Have a look
- Discuss
- SDSs, research processes and hazards, previous monitoring, health monitoring, incident reports, employee feedback

**Hazards and Risk Terms**

- **Hazard** = Something that has the potential to cause harm (if not controlled).
  - Example: Welding = Fumes, heat, noise and UV radiation
- **Outcome/Consequence** = Harm that results from an uncontrolled hazard.
  - Example: Lung cancer, Acute and chronic respiratory disease
- **Exposure** = Analysis of how often and for how long employee(s) are or have been exposed to the hazard.
  - Example: Work 5 days a week for 8 hours a day

**Examples of Risk Assessment Models**

Health Risk and Hazardous Substances

Recognition of health risks

Toluene in a workplace

Health Related Hazards

2.1 Chemical agents

2.2 Physical agents

References:
- https://www.oshatrain.org/courses/mods/705m2.html
- https://bainbridgeelearning.co.uk/what-is-asbestos/

References:
- http://lte-4g.info/work-pressure-clipart-43108/
- https://www.wsj.com/articles/arcelormittal-to-launch-3-billion-capital-increase-1454653228
- http://howellrefrig.com/cold-storage-warehouses/3043802
2.3 Biological agents

References:
- http://www.secondwindairpurifier.com/bioaerosols.htm
- http://davisheat.com/indoor-air-quality/

2.4 Ergonomic and psychological factors

References:
- https://wolfelawtampa.com/workplace-fatigue/

Evaluation

- Qualitative
- Or measure exposure (concentration of airborne contaminant in air that may be inhaled)
  - Techniques
  - Equipment
  - Interpretation/expertise (Occupational Hygiene)
  - Worst case vs statistically based
  - Legal requirements under GRWM

Exposure Potential

- Liquids – volatility
- Solids – dustiness
- Quantity
- Frequency and duration of use
- Controls in place
  - UK COSSH control banding, exposure predictor band
  - MOSHH, qualitative risk assessment

Health Risks

3. Evaluation

3.1 Personal Monitoring

References:
- https://www.youtube.com/watch?v=wlfAuiuVWYg
- http://www.pinsdaddy.com/personal-breathing-zone_3bfpzRVYuGgqev%7CVPGKM5RH*NggW1d8vvo*JcqpkaeY/
Some gear

3.2 Environmental/Static Monitoring

References:
http://www.dynamicehs.com/
http://dpstechnical.com/content/field-logistics/environmental-sound-monitoring/

3.3 Special Monitoring

References:
http://www.keison.co.uk/tsi_dusttrak.shtml
https://www.iom-world.org/services/hospital-ventilation/system-testing/
https://www.tecomak.com/services/research-laboratories-universities/
http://www.rimbach.com/scripts/Article/PEN/Number.idc?Number=124

3.4 Medical Surveillance

Measure Exposure?
- WES
  - If monitoring done
  - If relevant WES established
  - If monitoring provides valid comparison (duration, representative of normal/worst case, statistically valid)
  - If WES current and reflects international knowledge re health impacts
- Other health based criteria

3.5 WES & BEIs

- Workplace Exposure Standard (WES)
  Values that refer to the airborne concentration of substances at which it is believed that nearly all workers can be repeatedly exposed day after day without coming to harm.
  The values are normally calculated on work schedules of five shifts of eight hours duration over a 40-hour work week.

- Biological Exposure Index (BEI)
  Guidance values for assessing biological monitoring results. It indicates a concentration below which nearly all workers should not experience adverse health effects from exposure to a particular substance.
**Assessing exposure – common errors**

- Not identifying the real risks/substances (just monitoring things that are easy to monitor)
- Ignoring some tasks/exposure scenarios
- Not accounting for exposure duration
- Assuming similar or same exposure for similar tasks
- Just considering NZ WES
- ASSUMPTIONS (non specific, blanks, accuracy)

**Legal stuff**

- Why assess exposure?
- “what is the limit” “if exceed WES, we will be prosecuted”
- Just manage it – control it, don’t need numbers
- Is monitoring required in new legislation?

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**Example 1**

**Elimination**

Reference: [Follow the hazards control hierarchy to reduce welding risks](https://www.ishn.com/articles/107699-follow-the-hazards-control-hierarchy-to-reduce-welding-risks)

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**Example 2**

**Elimination**

Reference: [Welding precautions](https://www.hsimagazine.com/article/welding-precautions-349)

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**Example 3**

**Substitution**


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Example 4
Substitution

87 – 93 dBA

Substitute metal with plastic

Example 5
Engineering Controls

> Isolate (at the source)

Example 6
Engineering Controls

> Isolate (the worker)

Example 7
Engineering Controls

> Automation

Example 8
Engineering Controls

> Local Exhaust Ventilation

Example 9
Administrative Controls

References:

http://www.siloextractionsystem.com/belt-bucket-elevator-2358580.html
https://www.doubrava.at/en/conveying-technology/components/bucket-elevators/

References:

http://www.pharmaceuticalonline.com/doc/pharmaceutical-isolators-0001
https://www.terrauniversal.com/glove-boxes/photoresist-deposition.php

References:

https://eagletechnologies.com/factory-automation-a-german-example/

References:

http://broker.aviva.co.uk/engineering-inspections/equipment/lev-coshh.html
http://www.robovent.ca/applications/ventilation/engine-exhaust-hose-reels/
http://www.rsvents.co.uk/

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http://www.rsvents.co.uk/
Example 10

PPE