Overview

- Why is chemical safety at work important?
- Key requirements under the OSH legislation
- GHS
- Emerging issues

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Chronic effects

- 11% of cancers in men and 2% of cancers in women are estimated to be caused by occupational exposures (equates to 5,000 p.a. in Australia, 550 in WA)
- 1.5 million Australians (165,000 in WA) are potentially exposed to carcinogens at work, some of which are chemicals
- 652 new mesothelioma cases annually (2012)
- Occupational asthma, dermatitis and cardiovascular disease

Legislation

- Occupational Safety and Health Act 1984
- Occupational Safety and Health Regulations 1996
- Codes of Practice
- Guidance Notes
- Australian Standards
- Jurisdiction

Manufacturers, importers, suppliers

Classify
Review
MSDS
Disclose
Label

Workplaces using hazardous substances

Identify
Review
Assess
Train
Control

Identification

- Site audit
- Talk to workers
- Review processes – raw materials, intermediates, products, emissions, by-products, fumes, odours etc
- Review Codes of Practice, Guides relevant to the industry
- Search the internet for hazards in relation to the process

Identification

Safety and health alert

14/02 Worker overcome by toxic gas in well

Incident

A contractor was engaged to repair a pump situated at the bottom of a 12 metre deep well used for garden reticulation at a manufacturing workplace. Another contractor was engaged to test the atmosphere and provide emergency back-up and first aid, at site with certified呼吸 apparatus.

Department of Commerce
Register of hazardous substances

- List of hazardous substances
- Material safety data sheets (MSDS) (< 5 years old)
- Reference to risk assessment
- Accessible (hard/electronic)
- Online form: WorkSafe website

Terminology: MSDS / SDS

Material safety data sheets (MSDS)
- This is the current WA terminology
Safety data sheets (SDS)
- This is the terminology used in the Work Health and Safety (WHS) legislation

SDS compliant under WHS legislation are acceptable in WA.

Is it hazardous?

WA accepts hazard classifications in accordance with either:

- HSIS & The Approved Criteria for Classifying Hazardous Substances [NOHSC: 1008(2004)] or
- The Globally Harmonised System of Classification & Labelling of Chemicals (3rd edition) ("the GHS")

The hazard classification information is usually in section 2 of the MSDS and may be in the form of a hazard identification (eg "Skin irritation (Category 2)") or general statement "Classified as Hazardous according to (criteria)".

HSIS

- GHS covers health, physical and environmental hazards
- Risk phrases → Hazard statements
- Safety phrases → Precautionary statements
- Physicochemical hazards → hazardous chemicals
- Specific target organ toxicity (STOT) (new)
- Has been adopted differently in different countries (eg Australia does not use Acute Toxicity Category 5)
- Categories vary depending on the hazard

GHS hazard classes
MSDS & labels: Looking forward

- WA currently accepts two classification systems and there is no requirement to adopt a particular system
- States using WHS legislation are phasing in the GHS system by 2017
- WA may review its position in due course
- Companies who export to other states must comply with the relevant laws
- Transport will continue to use the ADG Code

Labels

Key information

Either GHS based or Approved Criteria based (as below) – match MSDS.

- Signal words/dangerous goods class
- Product name
- Risk & safety phrases
- Directions for use
- First aid & emergency procedures

Risk Assessment

- Assess the likelihood & seriousness of injury or disease
- Consult
- Check controls
- Record
- Report – where significant
- Sample risk assessment record form
- Guidance note: on WorkSafe and Safe Work Australia websites

Risk Assessment

Air monitoring

The risk assessment helps you to work out if you need to do air monitoring (Reg. 5.22). Indicators may include:

- frequent or long duration use of a chemical or process which generates hazardous vapour, dust, mist or fume; and
- efficiency of ventilation is not known or no mechanical ventilation; and/or
- health concerns that may be related; and/or
- potential for serious health effects if controls inadequate; and/or
- it is a complex work environment and it is difficult to estimate exposure.

Exposure standards and health surveillance

- Exposure standards represent airborne concentrations of substances in a person’s breathing zone, which should neither impair the health of nor cause undue discomfort to nearly all workers.
- Listed on the Hazardous Substances Information System on the Safe Work Australia website
- People must not be exposed above the exposure standard (Reg. 5.19)
- Health surveillance may be required – where there is a health risk from exposure to certain substances
Risk Assessment Records

- Where risk is not significant — a record in the register is ok
- Where risk is significant — an assessment report is required (Reg. 5.16)
- Format is up to the duty holder

Controls

Duty holder must reduce risks from hazardous substances (as far as practicable):
(a) by preventing exposure; and
(b) by means other than the provision of PPE; and
(c) to the extent that it is not practicable to reduce the risk by the means referred to in paragraph (a) or (b), through PPE

Controls must be maintained in good order.
Reg. 5.11

Consultation prior to starting to use a hazardous substance:
• Duty to consult with people who may be exposed to a hazardous substance;
• Review the MSDS; and
• Determine the safest method of use

— before using the substance

Ventilation

Dilution ventilation
• Less toxic substances
• Gas/vapour (not particulate)
• Multiple low level sources

Local extraction ventilation (LEV)
• More toxic
• More particulate
• Large emissions
• Point source/s

Ventilation

• Both general and LEV ventilation require make-up air from clean location
• Without make-up air — doors are hard to open, dirt/pollutants are drawn into the building, and negative pressure in the building reduces ventilation performance
• Air intakes should be away from carparks, smoking areas, exhaust ducts
• Sometimes non-routine work affects air intakes (eg painting the building next door) — air intakes should be identified during risk assessments

LEV – get what you need

Inform the supplier about the process, contaminant/s, hazards & sources
Request:
• Specifications for LEV system
• Commissioning report
• Indicators (means to check system is working)
• Easy to use, check, maintain, clean & empty
• Training in system use
• Users’ manual
• Log book
PPE

- Remember that PPE is the lowest in the hierarchy of controls for good reasons
- Select to suit the substance and the task
- Refer to MSDS and PPE supplier’s information (e.g. Ansell Chemical Resistance Guide, online) – use the chart specific to the brand you use
- Even with straightforward PPE such as gloves, instruction is required e.g. in how to remove without contaminating hands and whether the gloves are re-usable
- Relevant AS/NZS apply

RPE is either
- Air purifying or
- Air supplied

RPE Program

- Managerial support
- Knowledge of respiratory hazards
- Assessment of respiratory hazards at workplace (define areas/tasks)
- Selection of suitable RPE (consultation)
- Training in correct use and fitting
- Inspection, maintenance and repair
- Medical checks (some workers)
- Review

Controls – common problems

- Lack of hazard identification → controls not in place
- No specifications on how the system should perform
- Lack of indicators to show the system is working
- Lack of inspection & maintenance
- Lack of training
- Poor storage and maintenance of PPE

Training

Reg. 5.21 – person who is likely to be exposed to a hazardous substance must be informed and trained in relation to:
- Potential health risks of the substance
- Correct use of controls
- Correct care and use of PPE
- Health surveillance (where required)

Records must be kept.
Emerging issues

Nanoparticles - Perspective

- Nanomaterials can behave differently than the larger (macro) form of the same material.
- Eg nano gold is toxic, red, non conductive and magnetic.
- Nanomaterials can move differently through the body and have different toxic effects than the macro form (eg absorption through olfactory/nasal bulb into brain)
- Limited research on health effects

Nano issues

- May be more reactive and flammable than the macro form
- Labels and MSDS often don't inform correctly of the hazards (only 18% of MSDS ok in 2010 survey)
- Many applications - eg cosmetics, paints, medical, concrete additives, coatings.
- Much research occurring.
Control

- Hierarchy of controls applies
- Elimination
- Isolation
- Engineering
  - Ventilation – how effective? How is it maintained/emptied?
- Administrative
  - Wet systems of work
  - No dusty systems
  - Info/training

Control cont.

- PPE
  - Minimum respirator is non-disposable P2; PAPR, full face P3 and air supplied are also suitable
  - Skin contact must be eliminated unless it has been demonstrated to be non-hazardous
  - Double gloving is more effective

Carbon Nanotubes

- Carbon nanotubes have many possible uses, eg catalysts, biosensors, medication delivery
- Multi-walled carbon nanotubes have been shown to cause mesothelioma (rats – intraperitoneal)
- Classified as “suspected of causing cancer” and “may cause damage to lungs through prolonged or repeated exposure”
- This should be on MSDS and labels
- Control – isolation, local extraction ventilation

Nano questions

- Have all nanomaterials at the workplace been identified?
- Are labels, MSDS & training relevant to the nano-form?
- Have employees been informed & trained about potential hazards?
- Does the risk assessment consider the form of the material and the different toxicological behaviour in identifying suitable controls?

Nano questions cont.

- Is the process isolated?
- Is local extraction ventilation used and maintained? How is it cleaned/emptied?
- Are wet handling methods used where practical?
- Are there any high risk tasks eg mixing, dusty tasks, spraying?
- How is waste disposed of?
- What PPE is used?

Ototoxicants

Ototoxicants are chemicals that can cause or exacerbate hearing loss.
- May damage cochlea in inner ear or neurological pathways
- More problematic where there is also noise exposure
- Precautionary approach – keep exposure to ototoxicants to less than half the exposure standard
- Consider use of audiograms where exposure is significant
Some ototoxicants include:
- n-hexane
- Perchloroethylene
- Styrene
- Toluene
- Xylenes
- Lead
- Arsenic
- Manganese
- Carbon monoxide