OH&S, WHS, EHS, A+G…

Overview

- Introduction
- OHS Law
- Risk management
- MSDS
- Dangerous goods code
- Giftklasse
- EU labelling
- Laboratory specifics

Introduction

- OHS, WHS, EHS, AG, … what does it mean?
- Basic concept: An employer has a duty-of-care towards the health and safety of her employees. Not only to provide safe work place, but also appropriate training.
- Employees have a reciprocal duty to follow the regulations set out by their employer, and a duty to not place themselves or their co-workers knowingly in danger.

Verordnung über die Verhütung von Unfällen und Berufskrankheiten

Na und???

How does this affect you?

- The moral aspect…
- One day you'll have a REAL job…
- You have a legal responsibility…

2003:

Versicherungszweig	1. Quartal	2. Quartal	3. Quartal	4. Quartal	Total
Berufsunfälle	62 751	62 215	66 525	65 978	257 469
Nichtberufsunfälle	126 266	119 409	130 427	101 016	477 118
Unfälle von Stellensuchenden	4 047	4 526	5 077	4 436	18 086
Total	**193 064**	**186 150**	**202 029**	**171 430**	**752 673**

OHS Law

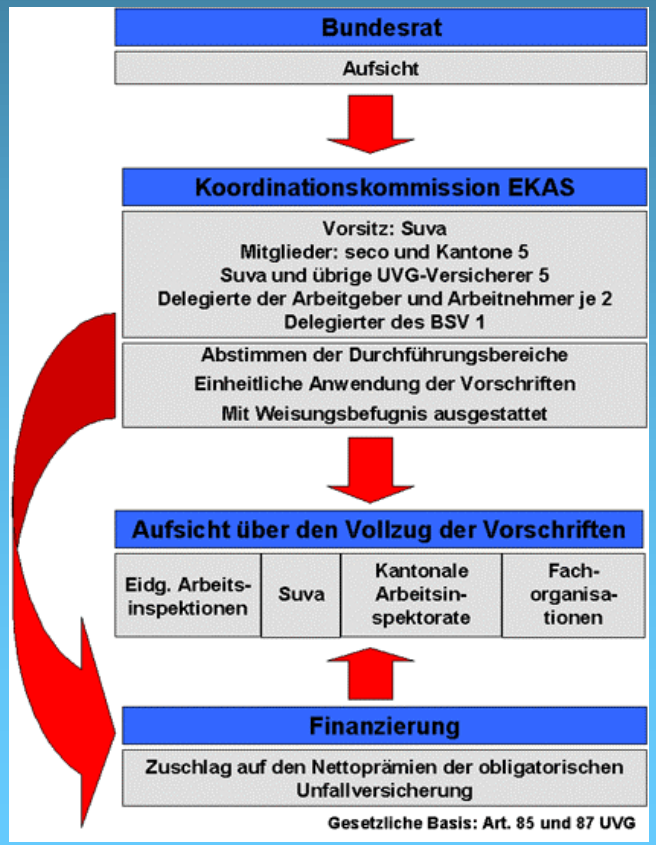
Verordnung über die Verhütung von Unfällen und Berufskrankheiten

- Die Vorschriften über die Arbeitssicherheit gelten für alle Betriebe, die in der Schweiz Arbeitnehmer beschäftigen.

Eidgenössische Koordinationskommission für Arbeitssicherheit (EKAS)

EKAS
Eidgenössische Koordinationskommission für Arbeitssicherheit

suva



Suva

Beraten und Beaufsichtigen von rund 60'000 Betrieben mit speziellen Betriebsgefahren in Fragen der Berufsunfallverhütung.

Beratung aller Betriebe und Branchen in der Schweiz betreffend:

- Betriebsarten, Anlagen und Arbeitsmittel mit hohem Gefährdungspotential, welche besonderes Fachwissen erfordern
- Durchführung der Berufskrankheiten-Verhütung und der abeitsmedizinischen Vorsorge

Kantonale Arbeitsinspektorate

Beraten und Beaufsichtigen von rund 220'000 Betrieben des Klein- und Mittelgewerbes in Fragen der Verhütung von Berufsunfällen.

Eidgenössische Arbeitsinspektionen

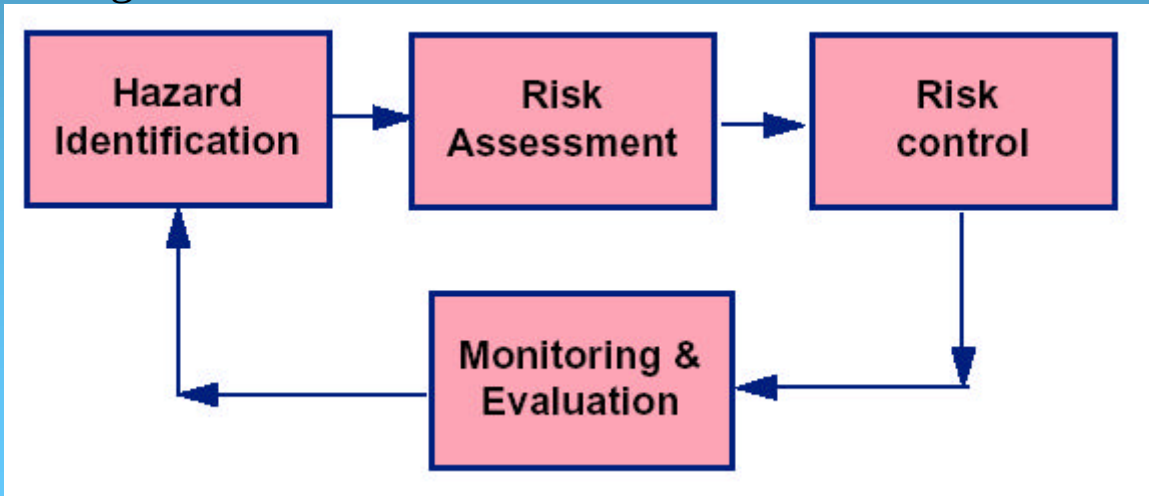
Beaufsichtigen der Bundesbetriebe.
Mitwirken im Durchführungsbereich der Kantone und der Suva.

Fachorganisationen

Betreuen spezieller Vollzugsgebiete wie Landwirtschaft, Elektrobereich, Schweissen, Druckbehälter, sicherer Umgang mit Gasen.

Risk Management

- What is risk? The chance of a negative out-come
- Risk = frequency x (probability of control failure) x (severity of injury/damage) eg...
- What is a hazard? Something with the potential to cause harm.
- Why do a risk assessment? Money, damage to infrastructure, employees, public perception, legal, moral…
- 4 steps:



1. Hazard Identification

What types of hazards are there?

- Chemical
- Biological
- Radiation
- Mechanical
- Sound
- …

Examples:
Bottle of compressed oxygen gas

Primary source of chemical hazard information:
MSDS

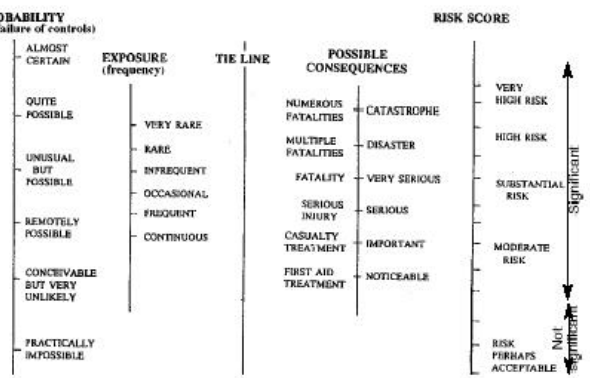
Resources

- http://www.msdssearch.com links to many MSDS databases
- Inhouse programs ie Chemwatch, Gefahrlich Rxn
- http://www.sigmaaldrich.com etc …
- http://www.snv.ch Schweizerische Normen-Vereinigung, also DIN, BSI, ASA, ANSI
- Printed ie SAX
- Your brain…

2. Risk Assessment - Nomogram

Substances	MSDS obtained	Hazards *1																						Exposure											Risk calculation				Actions arising from assessment			
		Form		Health effects											Hazardous reactions							Routes of exposure						Evidence of exposure				Current controls *2				Risk factors *3			Risk result *4				
		Liquid, powder, gel, gas ...	Concentrated, dilute	Acute toxicity	Chronic toxicity	Corrosive	Irritant	Sensitiser	Carcinogen	Cytotoxic	Mutagen	Teratoge	Asphyxiant	Explosive	Flammable	Spontaneous reactivity	Water reactive	Oxidiser	Other dangerous reactions	Inhalation	Ingestion	Skin absorption	Ey contact	Injection/needle stick	Presence of dusts/odours	Leaks, spills, residues	Worker symptoms	Direct contact with subs ance	Engineering (eg ventilation)	Administrative controls	Personal protective equipment	Training	Exposure	Probability	Possible consequences	Not significant	Significant but controlled	Significant inadequately controlled	Uncertain	Adequate controls	Improve controls required *5	Air monitoring required	Health surveillance required

Notes:
*1 Where possible mark severity of hazard as VH, H, M, L (leave blank if not applicable)
*2 ✓ control measure in-place, effective & maintained
✕ control measure in-place, but not effective or not maintained
*3 Select the appropriate description for *probability* (of failure of controls), *exposure* (frequency) & *possible consequence* from the adjacent nomograph
*4 Use the nomograph to estimate risk based on *probability*, *exposure* & *possible consequence*
*5 Write details of required control measures in the space indicated below



Details of required control measures (to be filled in)

Elimination or substitution of hazardous chemical(s)

Required engineering controls

Isolation | General ventilation | Inert atmosphere
Containment | Local exhaust | Remove ignition
Blast protection | Fume cupboard | Other

Use of administrative measures to reduce duration of exposure

Use of appropriate personal protective equipment (record type of PPE for each item)

Gloves | Coat/apron
Eye protection | Boots
Respirator | Other

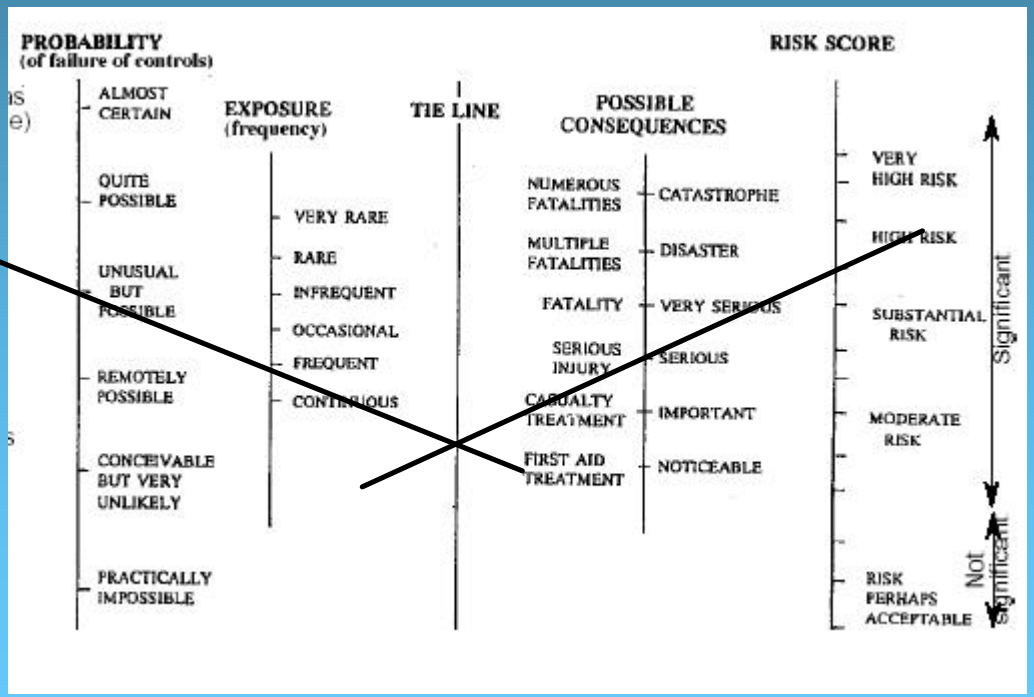
Implement required training

OH&S Unit U of Q 5/98

RA – Using a Nomogram

Example: smoking in the stair wells

Leaking gas bottle, dropped winchester: unusual but possible
Naked flame: frequent Consequences: serious => **High risk**



RA – Chart SUVA

Consequence

Kategorie	Schadenausmass	Definition der Folgen
I	sehr gross	Tod
II	gross	schwerer bleibender Gesundheitsschaden
III	mittel	leichter bleibender Gesundheitsschaden
IV	klein	heilbare Verletzung mit Arbeitsausfall
V	gering	leichte Verletzung ohne Arbeitsausfall

Tabelle 2: Bestimmen des Schadenausmasses und der möglichen Folgen.

Probability

Kat.	Definition der Wahrscheinlichkeiten W (Kenngrösse)	
A	häufig	≧ 1 mal pro Monat
B	gelegentlich	≧ 1 mal pro Jahr ≦ 1 mal pro Monat
C	selten	≧ 1 mal pro 5 Jahre ≦ 1 mal pro Jahr
D	unwahrscheinlich	≧ 1 mal pro 20 Jahre ≦ 1 mal pro 5 Jahre
E	praktisch unmöglich	≧ 1 mal pro 100 Jahre ≦ 1 mal pro 20 Jahre

Tabelle 3: Wahrscheinlichkeiten W (Variante1).

Kat.	Definition der Wahrscheinlichkeiten W (Kenngrösse)
A	häufig
B	gelegentlich
C	selten
D	unwahrscheinlich
E	praktisch unmöglich

Tabelle 4: Wahrscheinlichkeit W (Variante 2).

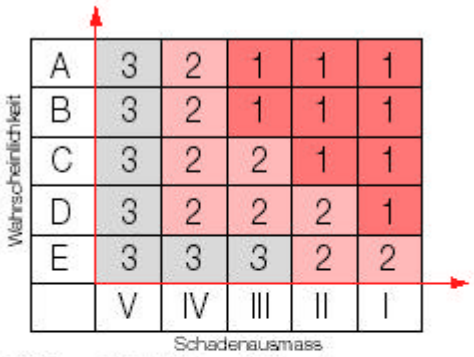


Abbildung 6: Beispiel einer Risikomatrix.

Zone 1	Grosse Risiken: Sicherheit nicht gewährleistet
Zone 2	Mittlere Risiken: Sicherheit nicht gewährleistet
Zone 3	Kleine Risiken: Sicherheit grösstenteils gewährleistet

Tabelle 9: Definition der Zonen.

3. Risk Control

In order of priority:

- Eliminate – stop doing it!
- Substitution – change solvents,…
- Modify process – use a different method
- Engineering controls – interlocks, fume cupboards,…

- Administrative controls – tag out
- PPE (PA) – gloves, masks
- Training – inductions, fire
- Personal hygiene – washing hands

“Its ok… you just have to be carefull!!”

Wrong!! Given time people will always make mistakes!

4. Evaluation / Monitoring

Risk assessments need to be reviewed:

- Changes in volume, process or control measures
- If ill health is reported
- Accidents or near misses
- New information on hazards
- Improved control technology is available
- At regular intervals to identify unnoticed changes

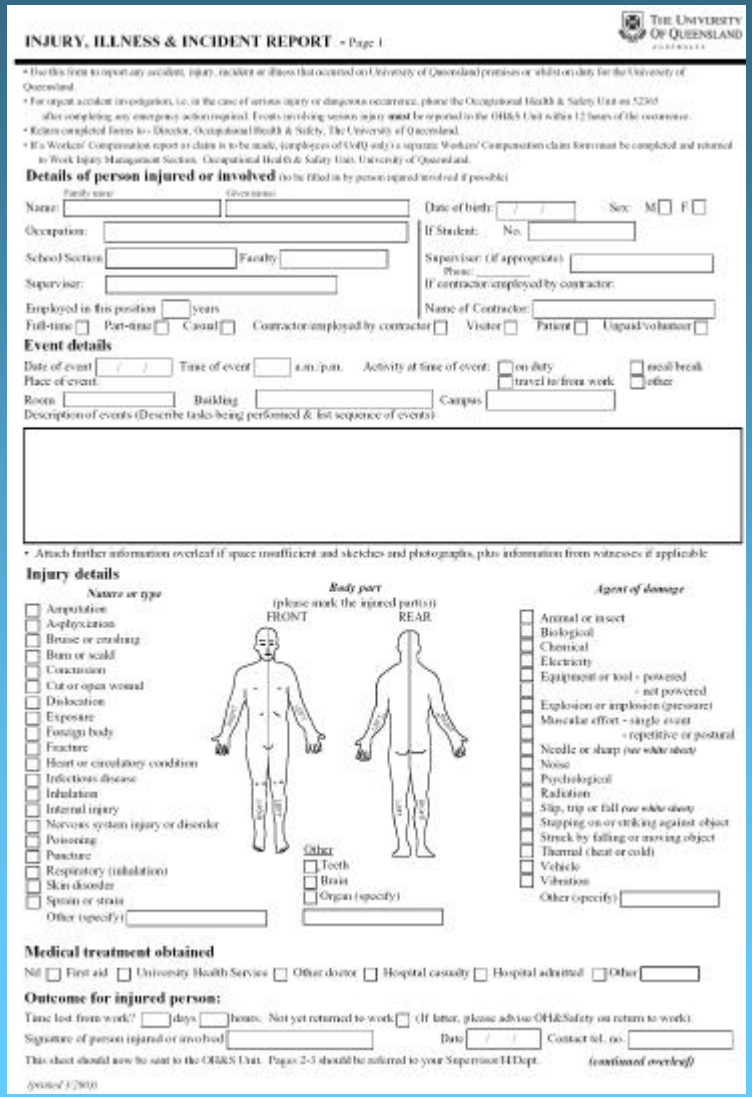
Records of all RA must be kept!

Long term health monitoring for:

- Asbestos
- Cadmium
- Radiation
- …

Accidents - reporting

- Very important for legal reasons
- Very important for spotting trends and potential future problems



INJURY, ILLNESS & INCIDENT REPORT - Page 1

THE UNIVERSITY OF QUEENSLAND

• Use this form to report any accident, injury, incident or illness that occurred on University of Queensland premises or whilst on duty for the University of Queensland.
• For urgent accident investigation, i.e. in the case of serious injury or dangerous occurrence, phone the Occupational Health & Safety Unit on 52365 after completing any emergency action required. Events involving serious injury **must** be reported to the OH&S Unit within 12 hours of the occurrence.
• Return completed forms to - Director, Occupational Health & Safety, The University of Queensland.
• If a Workers' Compensation report or claim is to be made, (employees of UofQ only) a separate Workers' Compensation claim form must be completed and returned to Work Injury Management Section, Occupational Health & Safety Unit, University of Queensland.

Details of person injured or involved (to be filled in by person injured/involved if possible)

Family name / Given names
Name: Date of birth: / / Sex: M F
Occupation: If Student: No.
School/Section: Faculty: Supervisor: (if appropriate) Phone:
Supervisor: If contractor/employed by contractor:
Employed in this position years Name of Contractor:
Full-time Part-time Casual Contractor/employed by contractor Visitor Patient Unpaid/volunteer

Event details

Date of event / / Time of event a.m./p.m. Activity at time of event: on duty travel to/from work recall break other
Place of event:
Room Building Campus
Description of events (Describe tasks being performed & list sequence of events):

• Attach further information overleaf if space insufficient and sketches and photographs, plus information from witnesses if applicable

Injury details

Nature or type
Amputation
Asphyxiation
Bruise or crushing
Burn or scald
Concussion
Cut or open wound
Dislocation
Exposure
Foreign body
Fracture
Heart or circulatory condition
Infectious disease
Inhalation
Internal injury
Nervous system injury or disorder
Poisoning
Puncture
Respiratory (inhalation)
Skin disorder
Sprain or strain
Other (specify)

Body part
(please mark the injured part(s))
FRONT REAR

Other
Teeth
Brain
Organ (specify)

Agent of damage
Animal or insect
Biological
Chemical
Electricity
Equipment or tool - powered
- not powered
Explosion or implosion (pressure)
Muscular effort - single event
- repetitive or postural
Needle or sharp *(see white sheet)*
Noise
Psychological
Radiation
Slip, trip or fall *(see white sheet)*
Stepping on or striking against object
Struck by falling or moving object
Thermal (heat or cold)
Vehicle
Vibration
Other (specify)

Medical treatment obtained

Nil First aid University Health Service Other doctor Hospital casualty Hospital admitted Other

Outcome for injured person:

Time lost from work? days hours. Not yet returned to work (If later, please advise OH&Safety on return to work).
Signature of person injured or involved Date / / Contact tel. no.
This sheet should now be sent to the OH&S Unit. Pages 2-3 should be referred to your Supervisor/Dept. *(continued overleaf)*

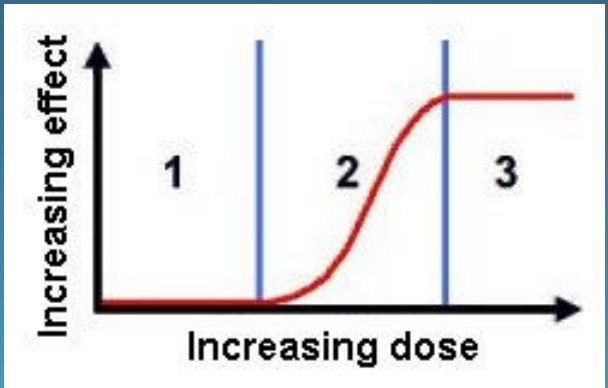
(revised 1/2003)

MSDS

- By law all chemical suppliers have to have MSDS
- Ensures chemicals used as intended
- Key tool for risk assessment
- Information to select appropriate safety equipment
- TWA, STEL, auto ignition temps, and lots more

http://www.msdssearch.com/

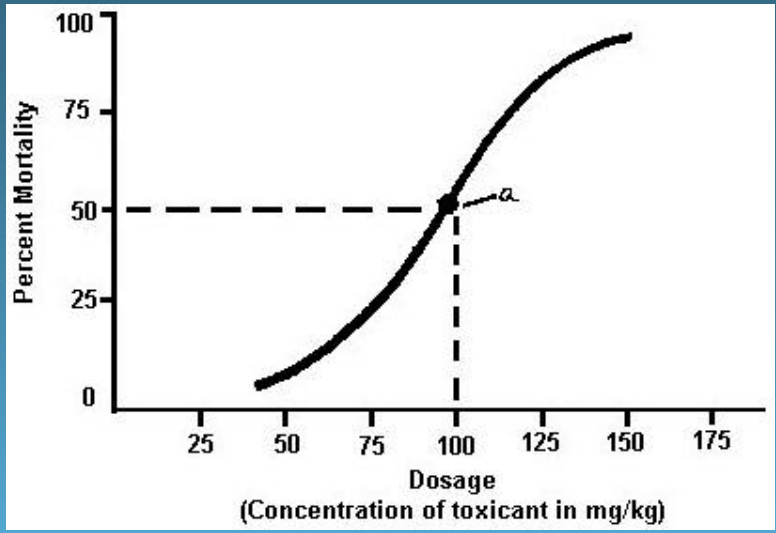
Toxicology



1- No-effect range (Safe region)

2- Range of increasing effect with increasing dose

3- Maximum effect range



PEL = TWA (8hr) or STEL (15min)

- Carcinogens – cause cancer
- Sensitisers – become allergic
- Mutagens - damage to the genes, heritable mutations, abnormalities in offspring: nicotine
- Teratogens – harm fetus, mother shows no toxic signs: ethanol

Substance	LD_{50} (mg/kg, oral, rat)
Vitamin C	11 900
Ethyl alcohol	7 060
Bromine	2 600
Osmium tetroxide	162 (mouse)
Nicotine & salts	50
DDT	100

It says nothing about levels at which other acute toxic, but non-lethal effects might occur.

Dangerous Goods Code

33
1203

= Petrol (Benzin)

- Bottom number is specific to the chemical (UN-number)
- Top number, 2-3 characters, 1st 2-9, 2nd/3rd 0-9

2 Gas	0 No meaning
3 Flammable liquid	1 Explosive
4 Flammable solid	2 Evolves gas
5 Oxidising material	3 Flammable
6 Toxic	5 Oxidising properties
7 Radioactive	6 Toxic properties
8 Corrosive	8 Corrosive properties
9 Other	9 Self reactive

Giftklasse

- CH Giftklasse has been replaced by EU chemical labelling code
- Giftklasse based primarily on oral toxicity, and other factors such as carcinogen
- Says nothing about reactivity, fammability etc

EU-Labelling

(F) Flammable
(F+) Extremely Flammable

Environmentally damaging

(C) Corrosive

(O) Oxidising

(E) Explosive

(Xi) Irritating, (Xn) Harmful

(T) Toxic, (T+) Extremely toxic

Risk phrases (R) R1 Explosive when dry.

Safety phrases (S) S1 Keep locked up.

Laboratory Specifics – PPE

Clothing:

- Shoes
- Pants
- Clothing material
- Underwear… ☺

Long hair tied back… (Roland!?)

Safety Glasses

- Many styles… different level of protection ie splash proof, projectiles, full face shields
- “But I’m not doing anything”… NO EXCUSE!!!
- Contact lenses – can concentrate vapours, become irremovable / hinder washing
- Corrective glasses – these are not safety glasses!
- On the face when you walk through the door
- Includes visitors to the lab – even Professors!
- Buy comfortable safety glasses!
- Problem with mixed lab / offices

Gloves

- Different types for different chemicals
- Break through time, mechanical strength, permeation rate
- Latex has pretty much the worst break-through time
- Basically useful for preventing contact with dry chemicals
- Nitrile, …

Fume Cupboards

- Sash height determines face velocity – only works below a specific height
- Make up air – windows, open doors etc
- Turbulence – walk ways, crowding
- All equipment ~10cm from front, held off the floor
- Alarmed for drop in flow
- Not for storage
- Tested for face velocity (meter), turbulence (smoke)
- Remember ours are not controlled, often don’t work: don’t trust them!

Cryogens

- Use full face shield – at **least** safety glasses
- Use gloves
- Dewars should have handles – “getting through the door problem”

Face masks

- You should not need one!
- If used, must be the correct type for the hazard
- Clean shaven
- Paper masks are useless! They do not seal adequately

Eyewash / Showers

- <u>We don't have any</u>
- Hold lids open and flush 15min
- Problems with rubber hose – 2 eyes, hot water, not easily turned on, contaminated, missing…
- Contact lens problem

- Misconception: they are not for fire – "stop, drop, roll"
- Removal of spilled chemicals
- Be aware of electrical equipment in the corridors

Compressed Gases

- Always move with a trolley – with the safety cap on!
- Always attached to the wall – even when empty
- Use the correct regulator – oil + oxygen!
- Toxic gases stored in ventilated cupboards

General chemical hazard reduction

- Substitute whenever possible less hazardous materials
- Use as little material as possible
- Handle inside a fume cupboard
- Minimize contact with the use of PPE
- Read the MSDS before you use every new chemical

Storage

- Storage are labelled with contents
- Chemical should not be above shoulder height or crushing strength of containers
- >1L flammables should be in fireproof cupboard
- Fume cupboards are not storage areas – why?
- Store by compatibility – not alphabetically – why?
- Separation of risks – ie flammables and energy sources
- Avoid several layers deep

Personal view:

- Moral duty to your colleagues: the law is just the big stick
- Doing things “safely” is usually the slightly longer way – without constant supervision people will revert to the route with the least effort – human nature
- As long as you are never given the chance to do otherwise, the “safe” way becomes habit – get them when they are young!!!
- Demo!