OVERVIEW OF SIMPLE RISK ASSESSMENT AND CONTROL FOR CHEMICALS (SiRAC)

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SCOPE

- Legal Requirements
- Types of Assessments
- Types of chemicals not covered
- Who to conduct SiRAC?
- SiRAC Methodology
- Concept of SiRAC
- Conclusion

LEGAL REQUIREMENTS

USECHH REGULATIONS 2000 OR AS AMENDED

- "An employer shall not carry out any work which may expose or is likely to expose any employee or any other person to any chemical hazardous to health unless he has made a written assessment of the risks created by the chemical to their health."

CHEMICALS HAZARDOUS TO HEALTH: DEFINITION

Chemical hazardous to health means any substances or mixtures which -

- Listed in Schedule I and II of the USECHH Regulations 2000;
- Classified in any hazard class specified under health hazard of the First Schedule of CLASS Regulations 2013;
- Pesticides as defined under Pesticides Act 1974; and
- A scheduled waste listed in the First Schedule to the Environmental Quality (Scheduled Waste) Regulations 2005.

REGULATIONS 11, USECHH 2000

- "The employer shall ensure that any assessment carried out by an assessor"

TYPES OF ASSESSMENT

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- Full Assessment
  - Chemical Health Risk Assessment (CHRA)
  - Generic Assessment (GCHRA)
- Simple Assessment
  - Simple Risk Assessment and Control (SiRAC)

TYPES OF CHEMICALS NOT COVERED BY SIRAC:

- (a) Chemical classified as carcinogenicity category 1, mutagenicity category 1 or

  respiratory sensitization category 1 under CLASS

  Regulations 2013

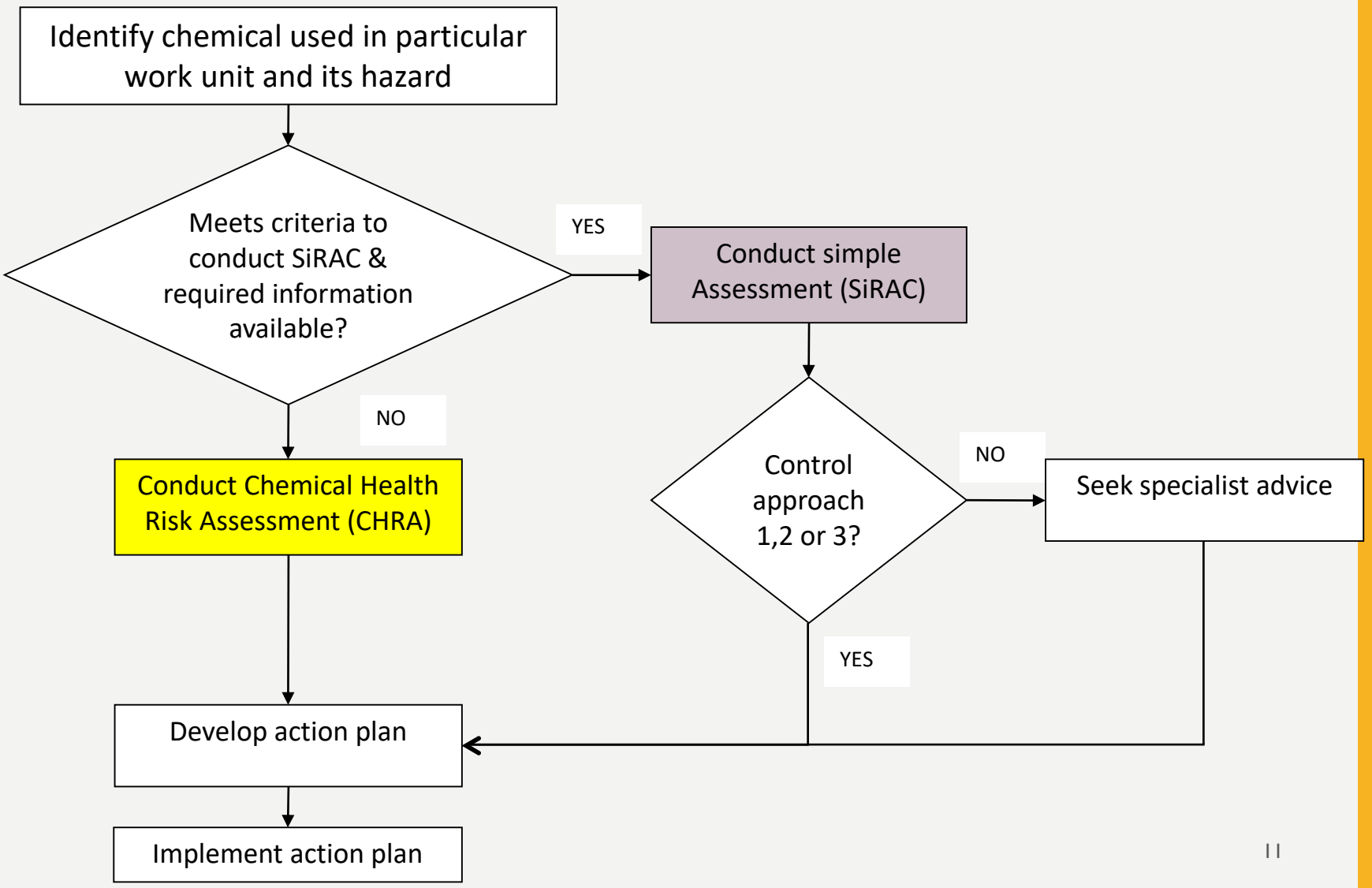
(b) Process generated dusts and fumes (e.g. wood dusts, fume released from molten metal);

- (c) Organic dust, e.g. grain dust, cotton dust and paddy husk dust;

TYPES OF CHEMICALS NOT COVERED BY SIRAC:

- (d) Gases, e.g. hydrogen sulphide, ammonia, etc.; and
- (e) Scheduled waste as listed in the First Schedule under the Environmental Quality (Scheduled Wastes) Regulations 2005 or as amended.

SELECTION OF ASSESSMENT : CHRA OR SIRAC



ASSESSMENT STRATEGY

- Full Assessment
  - First approach
  - To be done for each and every workplace where chemicals hazardous to health are used
- Simple Assessment
  - A simplified methodology to be used by trained person to assess risk for certain situations not requiring specialized knowledge

WHO TO CONDUCT SIRAC?

WHO TO CONDUCT SIRAC?

- Under USECHH Regulation 2000 an employer may appoint a CHRA Assessor to carry out a simple assessment (SiRAC).
- The necessary knowledge, experience and skills for the trained person who will be conducting the SiRAC can be extracted from the manual. (Para 1.5)
- **New Revision of USECHH Regulation will enable assessment by Trained Person

PERSON TO CONDUCT SIRAC

1. Knowledge, training and expertise in understanding hazard and risk;
2. Ability and authority to collate all necessary and relevant information;
3. Knowledge, skills and experience to make the right decisions about risks and the necessary precautions;
4. Knowledge on the SiRAC manual;
5. How the work activity uses chemicals hazardous to health;
6. How to interpret SDS; and
7. Know basic requirements of OSHA, USECHH, relevant guidelines
8. undergone SiRAC training programme by approved training providers

SIRAC METHODOLOGY

SIRAC METHODOLOGY

- SiRAC is based on the control banding approach
- Other control banding approaches:
  - COSHH Essentials (HSE of United Kingdom)
  - ILO Control Toolkit (ILO)
  - KOSHA Toolkits (Korea)
  - Stoffenmanager (Dutch)

CONTROL BANDING (CB)

- CB uses information that is readily available to users from chemical suppliers taking the users through a series of simple steps allowing them to choose practical control solutions that should reduce exposures to levels which present no danger to health.
- Since not possible to assign a specific OEL to every chemical in use, a chemical is assigned to a 'band' for control measures, based on its hazard classification according to international criteria, the amount of chemical in use, and its volatility/dustiness.
- Outcome is one of four recommended control strategies.

CONCEPT OF SIRAC

WHAT ?

RISK, HAZARD AND EXPOSURE

CHEMICAL RISKS?

- Probability of harm, injury, illness or disease from overexposure to chemicals
- **Risk = Hazard x Exposure**
  - Hazard is determined from **chemical classification**
  - Exposure is determined by the **quantity of chemical used** and its **ability to become airborne**
  - Routes of exposure considered in SiRAC is
    - **inhalation, dermal contact and absorption**
    - **Ingestion and injection NOT considered in SiRAC**

H-CODE

H-code or the **hazard statement code** describes the nature of the hazards of the chemicals as specified in First Schedule of the CLASS Regulations

Grouping of chemicals in the hazard group are based on its health effect and hazard classification

It is assigned to each of the hazard statement	used for reference purposes
	not part of the hazard statement text and shall not be used to replace it.
Examples of H-code:	*H331: Toxic if inhaled*
	H335: May cause respiratory irritation
	H310: Fatal in contact with skin
	H317: May cause an allergic skin reaction

HAZARD DETERMINATION

Chemicals causing harm when airborne

+

Chemicals capable of causing harm if in contact with skin *or* eyes

Group A
Group B
Group C
Group D

Group S

HAZARD DETERMINATION

Group S

chemicals capable of causing harm if in contact with *eyes or skin*

EXPOSURE DETERMINATION

Magnitude of Exposure

+

Frequency & Duration

Scale of Use
&
Ability to Become Airborne

Per Operation/Batch
Or
Per Day

Total Duration >
15 minutes per day

EXPOSURE DETERMINATION

1. **Scale of use**
   - Determine the way chemical is handled and how much employees are exposed
   - Amount used per batch/operation or per day (continuous operation) can be described as

     SMALL, MEDIUM, LARGE

Quantity	Solid		Liquid	
	Weight	Typically received in	Volume	Typically received in
Small	Grams	Packets or bottles	Millilitres	Bottles
Medium	Kilograms	Kegs or drums	Litres	Drums
Large	Tonnes	Bulk	Cubic metres	Bulk

EXPOSURE DETERMINATION

2. Ability to become airborne

Physical form of the chemical affects how likely it is to get into the air.

- For solids - determined by its *dustiness*
  - Depends on its physical form-the finer the solid the more likely for it to become airborne
- For liquids-determined by its *volatility*
  - Volatility depends on its *vapour pressure* - the higher the vapour pressure, the more volatile the chemical
  - Volatility also depends on the *operating temperature* - the higher the operating temperature, the more easily vapour will be formed and become airborne

VAPOUR PRESSURE

Pressure exerted by a vapour.

- Describes tendency of a chemical to form vapour
- Useful (with evaporation rate) in estimating how quickly a substance becomes airborne within the workplace (estimation of the inhalation or fire hazards)
- High vapour pressure => volatile(easily vapourised)

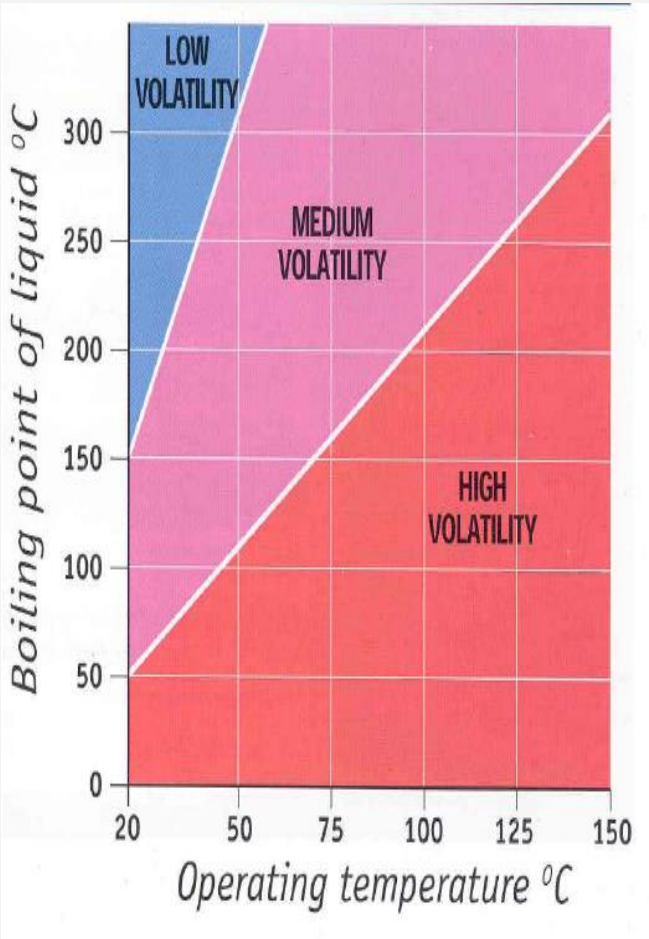
Volatility band	*Vapour pressure*
Low	*Less than 500 Pa*
Medium	*500 to 25 000 Pa*
High	*More than 25 000 Pa*

BOILING POINT

- Temperature at which vapour pressure of liquid equals total pressure
- Temperature at which a liquid changes into its' gaseous form
  - ***e.g. 100ºC for water***
- Material with high boiling point *usually* have a lower vapour pressure - hence safer
  - ***Exceptions such as Sarin which has very high boiling point but release toxic vapours at room temperature***
- High vapour pressure ➔ low boiling point

OPERATING TEMPERATURE

- The degree of volatility for liquids are based on tasks carried out at room temperature of 25ºC
- For task carried out above room temperature, the degree of volatility is determined based on the chemical's *process/operating temperature*
- The lower the boiling point and the higher the operating temperature, the higher is the degree of volatility



CONTROL APPROACH

TRADITIONAL → **CONTROL BANDING**

TRADITIONAL		CONTROL BANDING
Elimination Substitution Modification		Special- Expert Advice
Containment		Containment
Ventilation		Engineering Control
Work Practices		General Ventilation
Personal Protective Equipment		PPE for Respiratory, Skin & Eyes protections

CONTROL APPROACH

The risk controls are divided into 4 bands or approaches:

CA 1	• General ventilation
CA 2	• Engineering control
CA 3	• Containment
CA 4	• Special

CONTROL APPROACH 1 CA 1

For *low risks* CA1 will be recommended

Give the *least reduction* in exposure; consists of general ventilation and good work practices

CONTROL APPROACH 2 CA 2

For *moderate risks* CA2 will be recommended

CA2 will give *moderate reduction* in exposure and consists of using local exhaust ventilation and other engineering methods of control but not complete containment

CONTROL APPROACH 3
CA 3

For *high risks*

Give *greatest reduction* in exposure where the hazard is contained or enclosed.

Use for *highly toxic chemicals* or moderately toxic chemicals at *high airborne* concentrations

CONTROL APPROACH 4

CA 4

For control of high risks, where *very toxic* chemicals and the airborne concentration is very high

Need to *seek specialist advice* in selecting appropriate control measures

e.g. Occupational Hygienist, Chemical Risk Assessor, engineer in the design and installation of engineering control equipment.

CONTROL APPROACH ADJUSTMENTS

CA is adjusted for a very short total duration of exposure:

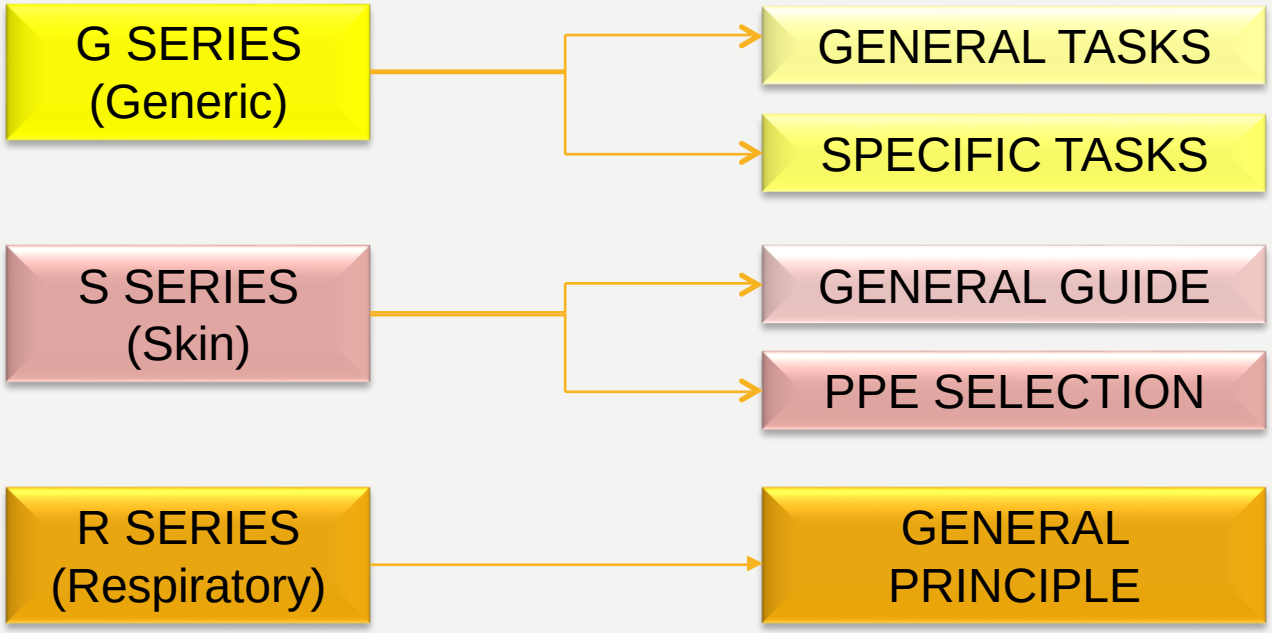
1. Adjustment for Frequency & Duration
   - *For very short exposure duration (less than 15 minutes per day) CA drop by 1 level except if CA is 4.*

SPECIFIC CONTROL GUIDANCE SHEETS

Specific CGS (based on task performed)
for work activities or industries covered are :

- Pest Control
- Cleaning Services
- Lithography Printing

Generic Control Guidance Sheets



Thank You