HEALTH & SAFETY
RISK ASSESSMENT METHODOLOGY

This document is a supplement to the *OHS risk management procedure*. For further information, refer to http://safety.unimelb.edu.au/implementation/risk-management or contact your Local Health & Safety

1. RISK SCORING/ANALYSIS

Health and safety risk assessments use one of the following methodologies for risk scoring/analysis:

- the **two variable risk matrix** (see last page);
- the **three variable risk calculator** (see last page); or
- a methodology of equivalent standard.

Health and safety risk assessments must consider the likelihood and consequence of injury, illness or incident occurring, based upon:

- relevant legal requirements;
- evaluation of available information;
- records of incidents, illness and disease; and
- potential for emergency situations.

2. RISK CONTROL MEASURES

Health and safety risk assessments must use the **hierarchy of control** (see Section 6) to formulate the most effective control method to eliminate or reduce the risk so far as is reasonably practicable.

Control measures must be implemented in accordance with the risk control priorities established during the risk assessment.

Control measures should include one or more of the following actions:

- eliminate or control the risk by applying an established control from an existing risk assessment;
- partially control the risk (including isolation) and refer to a more senior manager;
- request advice from a Local Health & Safety contact; and/or
- refer to the local Health & Safety Committee for further assessment.

Risk control priorities can be established based on the level of risk, available resources, timelines associated with

Date: May 2016 **Version**: 1.1 **Authorised by**: Associate Director, Health & Safety **Next Review**: May 2019

the implementation of controls and so on. Where risk control prioritization is required a Health & Safety Action Plan must be used (Section 3.)

3. HEALTH & SAFETY ACTION PLANS

Proposed/required control measures must be prioritised and documented in a Health & Safety Action Plan.

Health & Safety Action Plans are likely to include:

- hazards identified
- risks associated with the hazards identified
- existing risk controls
- proposed short-term controls (including proposed completion dates)
- proposed medium-term controls (including proposed completion dates)
- proposed long-term controls (including proposed completion dates)
- person(s) responsible for implementation of controls
- resources required for implementation of controls
- proposed review date

Health & Safety Action Plan

4. TWO VARIABLE RISK MATRIX

This section explains how to use the two variable risk matrix. Refer to the Health & Safety: Two Variable Risk Matrix and Three Variable Risk Calculator at the end of this document.

Definitions

- **Likelihood** is the probability that something might happen.
- **Consequence** is defined as the most probable result of the potential incident.

4.1. Calculating the risk score using the Two-Variable Risk Matrix

Step 1: Consider the likelihood of the exposure to the hazard occurring. Using the table "Definitions of likelihood labels", determine the likelihood of exposure to the hazard. Consider the how frequently the activity is conducted in determining the likelihood.

Step 2: Consider the consequence of exposure to the hazard. Using the table "Definitions of consequence labels", determine as realistically as possible the consequence resulting from exposure to the hazard.

Step 3: Using the two-variable "Risk rating matrix", determine the risk rating from the likelihood and consequence descriptors.

To use the Risk rating matrix:

- In the column “Likelihood label” of the risk rating calculator, locate the likelihood descriptor that was determined in the Step 1.
- In the row “Consequences label” of the risk rating calculator, locate the consequence descriptor that was determined in Step 2.
- The risk rating is providing in the box where the likelihood column and consequence row meet.

5. THREE VARIABLE RISK CALCULATOR

This section explains how to use the three variable risk calculator. Refer to the Health & Safety: Two Variable Risk Matrix and Three Variable Risk Calculator at the end of this document.

Definitions

- **Exposure** is defined as the frequency of contact/interaction to the hazard.
- **Consequence** is defined as the most probable result of the potential incident.
- **Likelihood** is the probability that something might happen.

5.1. Calculating the risk score using the Three-Variable Risk Calculator

Step 1: Consider the frequency of exposure to the hazard. Using the “Definitions of exposure variables” determine how often exposure to the hazard occurs.

Step 2: Consider the likelihood of the exposure to the hazard occurring. Using the table “Definitions of likelihood variables”, determine the likelihood of exposure to the hazard. Consider the how frequently the activity is conducted in determining the likelihood.

Step 3: Consider the consequence of exposure to the hazard. Using the table “Definitions of consequence variables”, determine as realistically as possible the consequence resulting from exposure to the hazard.

Step 4: Using the three variable “Risk score calculator”, determine the risk rating from the exposure, likelihood and consequence descriptors.

To use the Risk score calculator:

- For the determined exposure (Step 1), likelihood (Step 2) and consequence (Step 3) match against the corresponding number/value.
- These are located in column “E” for exposure, column “L” for likelihood and column “C” for consequence.
- Multiply exposure by likelihood by consequence to determine the “Risk score” in the “Risk score calculator. **E x L x C**
- Match the “Risk score against the “Risk rating” in the “Risk score calculator.

6. HIERARCHY OF CONTROL

Hierarchy of control describes the ranking of methods for controlling risks from the highest level of protection and reliability to the lowest.

It is listed on the next page in order of effectiveness.

Level 1 (highest effectiveness)

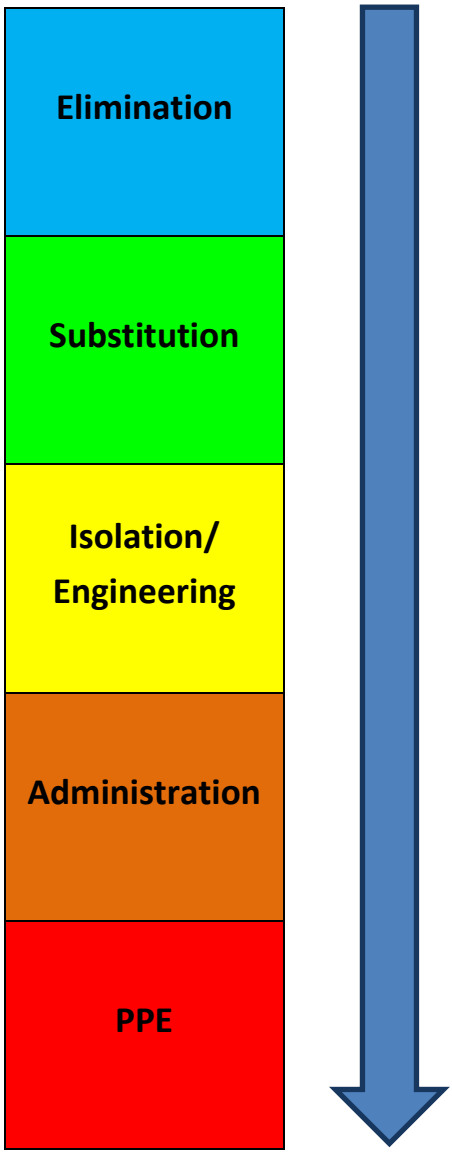
a. Elimination Remove the hazard. e.g. eliminating a requirement to carry out the task, use a piece of equipment or utilise a chemical.

Level 2

b. Substitution Substitute the hazard for something safer. For instance, replace solvent-based paints with water-based ones. Replace the material, plant or work practice with a less hazardous one – such as replacing a hazardous chemical with a less hazardous one.

c. Isolation Isolate the hazard from people. This involves physically separating the source of harm from people by distance or using barriers. For instance, install guard rails around exposed edges and holes in floors, use remote control systems to operate machinery, or store chemicals in a fume cabinet.

d. Engineering Change the workplace, equipment or work process. For instance, use mechanical devices such as trolleys or hoists to move heavy loads, place guards around moving parts of machinery, install residual current devices (electrical safety switches), or set work rates on a production line to reduce fatigue.



Level 3 (lowest effectiveness)

e. Administration Use administrative controls. For instance, develop procedures on how to operate machinery safely, limit exposure time to a hazardous task by job rotation, carry out preventative maintenance on machinery and equipment, provide training and instruction on safe handling for a manual task or use signs to warn people of a hazard.

f. PPE Use personal protective equipment (PPE). This also includes protective clothing. Examples of PPE include breathing protection, hard hats, gloves, aprons and protective eyewear. PPE limits exposure to the harmful effects of a hazard but only if workers wear and use the PPE correctly.

7. HAZARD-SPECIFIC & GENERIC CONSIDERATIONS

7.1. Hazard-specific risk assessment templates

Hazard-specific risk assessment forms have been created to provide guidance for assessing many common hazard categories. These forms provide detailed prompts about the hazards typically encountered during a specific activity.

Hazard-specific risk assessment forms available include:

- Chemical Risk Assessment Form
- Engineered Nanoparticles Risk Assessment Form
- Confined Space Identification and Risk Assessment Form
- Field Work Risk Assessment Form
- First Aid Risk Assessment Form
- Manual Handling Risk Assessment Form
- Noise hazard Identification Form
- Computer Workstation Ergonomic Self-Assessment Checklist
- Home-Based Workstation Assessment Checklist
- Laboratory Note Book
- Plant Risk Assessment Form
- Radioactive Material Risk Assessment Form
- Health & Safety Pre-Purchase Checklist
- Traffic Management Risk Assessment
- Travel to High Risk Destinations Risk Assessment Form
- Non-Travel Portal Risk Assessment Form

Hazard-Specific risk assessment forms are updated from time to time. The most current forms are located on the Safety website "Risk Assessment" at:

http://safety.unimelb.edu.au/tools/risk/assessment/

CHOOSING A RISK ASSESSMENT FORM:

A **hazard-specific risk assessment** is suited to activities/tasks that predominately consist of one hazard category. For example sorting and shelving books comprises of mainly manual handling exposures. Therefore a manual handling risk assessment would suit the assessment of this activity.

A **generic risk assessment** is suited to activities/tasks that include a number of hazard categories, where none appear to predominate. For example injecting a horse with technetium-99m for diagnostic purposes. In this activity there are hazard exposures associated with chemicals, radioactive materials, manual handling live animals, biological substances and so on.

Additionally in the above example a separate hazard-specific risk assessment could be completed for each hazard category. However the nature of hazards/risks can alter or require different prioritisation when assessed together. This means you may not achieve the best outcome from assessing these hazards in isolation.

7.2. Generic risk assessment templates

Risk assessment templates that can be used for activities without an associated hazard-specific assessment form (generic risk assessments) include:

- Task Risk Assessment Form (TRA)
- General Risk Assessment Form

7.3. Manufacture of plant and equipment, including regulated plant

Before manufacturing plant, equipment or regulated plant, the staff involved must ensure that a design risk assessment has been completed. The risk assessment should be completed in consultation with HSRs and employees where reasonably practicable. The risk assessment must consider:

- the need for a functional risk assessment
- installation
- decommissioning
- storage
- breakdown maintenance
- preventive maintenance and inspection
- competencies, qualifications and training for users/operators
- availability, suitability and quality of operating procedures
- cleaning
- electrical hazards and compliance
- legislative requirements (including registration and licenses)
- conformance with relevant standards
- environmental sustainability (energy consumption, water usage, energy rating).

7.4. High consequence operations

Permit-to-work procedures are incorporated into certain University-wide health and safety procedures governing high consequence operations. These include:

- hot work
- confined space entry.

When establishing potentially high consequence operations in a local area, the person responsible for the activity should consider permit-to-work procedures as a risk control measure. Elected employee health and safety

representatives (HSRs) and employees should be consulted about risk control measures where reasonably practicable.

Examples of potentially high consequence operations include:

- working at heights
- diving
- remote field work

7.5. Design of new buildings or structures, and building refurbishments

During the design of new buildings, structures or building refurbishments, the Director, Project Services or Director Infrastructure Services (or other person responsible for the requisition of the project) shall ensure that the designer undertakes a risk assessment for all proposed work environments in the building or structure.

The risk assessment should seek to ensure that the building or structure is designed to be safe and without risks to the health of persons using the building or structure as a workplace. The risk assessment must consider:

- requirements of the University's Project Management and Design Standards
- requirements of the Building Code of Australia, including fire protection, emergency exits and lighting, workplace facilities, and access and egress
- requirements of AS/NZS 3000: Electrical installations, for electrical safety, including building wiring and switchboards
- requirements of the *Environment Protection Act 1970* (Vic), including trade waste and underground storage tanks
- requirements of the *Public Health and Wellbeing Act 2008* (Vic) and *Public Health and Wellbeing* Regulations *2009* (Vic), regarding air conditioning cooling towers
- site of buildings or structures
- high consequence hazards
- systems of work
- workplace environment (for example, lighting, ventilation, workplace facilities)
- incident mitigation
- access and egress to roof and other work areas where there is a risk of falling more than two metres
- environmental sustainability (energy consumption, water usage, energy rating).

Before commencement of the refurbishment or construction, the Director Project Services or Director Infrastructure Services (or other person responsible for the project) must ensure that the designer provides evidence of having developed, documented and budgeted for suitable controls for the risks identified in the risk assessment.

7.6. Acquisition and leasing of buildings and operational entities

Persons responsible for acquisition or leasing of buildings, or acquisition of operational entities, must ensure that a risk assessment for all proposed new and altered work environments is completed before the acquisition or lease commences. The following matters may need to be considered in the risk assessment:

- plant or equipment (including lifts, compressors and air conditioning units), unless a risk assessment already exists for the plant or equipment
- requirements of the Building Code of Australia (for example, fire protection, emergency exits and lighting, workplace facilities, access and egress)
- structural integrity
- fixtures and fittings
- requirements of AS/NZS 3000: Electrical installations, for electrical safety, including building wiring and switchboards
- hazardous materials registers, including asbestos, polychlorinated biphenyls (PCBs) and synthetic mineral fibres (SMF)
- requirements of the *Environment Protection Act 1970* (Vic), including trade waste and underground storage tanks
- requirements of the *Public Health and Wellbeing Act 2008* (Vic) and *Public Health and Wellbeing Regulations 2009* (Vic), regarding air conditioning cooling towers
- hazardous substances stored and used (including refrigeration systems)
- dangerous goods stored and used
- confined spaces
- lighting
- workplace design and its impact on proposed systems of work
- access and egress to roof and other work areas where there is a risk of falling more than two metres
- environmental sustainability (energy consumption, water usage, energy rating)

Before the acquisition or lease commences, the person responsible must ensure that suitable controls for the risks identified in the risk assessment have been developed, documented and budgeted for.

8. REFERENCES

AS/NZS 3000: Electrical installations

Building Code of Australia

Environment Protection Act 1970 (Vic)

SA/SNZ HB 436: Risk management guidelines - Companion to AS/NZS ISO 31000

Public Health and Wellbeing Act 2008 (Vic)

Public Health and Wellbeing Regulations 2009 (Vic)

University of Melbourne, Project Management and Design Standards

TWO VARIABLE RISK MATRIX AND THREE VARIABLE RISK CALCULATOR

TWO VARIABLE RISK MATRIX

(1) Definitions of likelihood labels			
	Likelihood (Probability)		
Level	**Descriptor**	**Description**	**Expected to occur**
A	Almost certain	The event will occur on an annual basis	Once a year or more
B	Likely	The event has occurred several times or more in your career	Once every three years
C	Possible	The event might occur once in your career	Once every 10 years
D	Unlikely	The event does occur somewhere from time to time	Once every 30 years
E	Rare	Heard of something like the event occurring elsewhere	Once every 100 years

(2) Definitions of consequence labels	
Severity level	**Consequences**
V Catastrophe	One or more fatalities and/or severe irreversible disability to one or more people
IV Major	Extensive injury or impairment to one or more persons
III Moderate	Short term disability to one or more persons
II Insignificant	Medical treatment and/or lost injury time <2 weeks
I Negligible	First aid treatment or no treatment required

(3) Risk rating matrix					
Likelihood	**Consequences label**				
label	**I**	**II**	**III**	**IV**	**V**
A	Medium	High	High	Very high	Very high
B	Medium	Medium	High	High	Very high
C	Low	Medium	High	High	High
D	Low	Low	Medium	Medium	High
E	Low	Low	Medium	Medium	High

THREE VARIABLE RISK CALCULATOR

(1) Definitions of exposure variables	
Exposure	**E**
Continuously or many times daily	10
Frequently: Approximately once daily	6
Occasionally: Once a week to once a month	3
Infrequently: Once a month to once a year	2
Rarely: Has been known to occur	1
Very rarely: Not known to have occurred	0.5

(2) Definitions of likelihood variables	
Likelihood	**L**
Almost certain: The most likely outcome if the event occurs	10
Likely: Not unusual, perhaps 50-50 chance	6
Unusual but possible: (e.g. 1 in 10)	3
Remotely possible: A possible coincidence (e.g. 1 in 100)	1
Conceivable: Has never happened in years of exposure, but possible (eg 1 in 1,000)	0.5
Practically impossible: Not to knowledge ever happened anywhere (e.g. 1 in 10,000)	0. 1

(3) Definitions of consequences variables	
Consequence	**C**
Catastrophe: Multiple fatalities	100
Disaster: Fatality	50
Very serious: Permanent disability/ill health	25
Serious: Non-permanent injury or ill health	15
Important: Medical attention needed	5
Noticeable: Minor cuts and bruises or sickness	1

(4) Risk score calculator	
Risk Score = E x L x C	
Risk Score	**Risk Rating**
> 600	Very high
300 - 599	High
90 - 299	Medium
< 90	Low

Date: June 2015 **Version**: 1.0 **Authorised by**: Associate Director, Health & Safety **Next Review**: June 2018