MONASH University

Risk Management Worksheet

June 2010

Occupational Health and Safety
AS/NZS 4801 OHS20309
SAI Global

Description of Task / Project / Activity					
Automated/Remote Laboratory over dark fiber FYP					
Campus	**Clayton**	**Faculty**	**Engineering**	**School / Department**	**ECSE**
Building	**16 Alliance**	**Room No**	**213**	**Date**	**11/03/2019**

Persons Completing Worksheet

Name	Signature	Name	Signature
Anthony Baudinette			
Jarred Paola			

HOW TO USE THIS WORKSHEET

1) Identify the general task/process at the top of the worksheet
2) Briefly list the hazards associated with the task or process (**Description of hazard)**
3) Classify each **hazard type** as manual handling, physical, chemical, biological, or radiation
4) Use the specific reference sheet for the hazard type
5) Use either Method 1:**Risk Assessment** or Method 2:**Control Banding** that applies to each hazard.

Risk Assessment -

i) Estimate the consequence and likelihood based on controls in place
ii) Use the matrix to determine risk
iii) Assess the acceptability of the risk and add additional controls if deemed too high

Control Banding -

i) Identify variables in process
ii) Use Control Level Reference Table to determine control band
iii) Identify appropriate controls from control level reference table

6) List:
   - The hazard controls that are already in place
   - The hazard controls yet to be implemented
7) Nominate the person responsible implementing further controls
8) Provide a date for implementation of controls and, thus, work/study to commence

Review of hazard controls

Whenever new hazards are identified and/or additional hazard controls are required, add the additional information to the existing risk assessment, sign and date.

NOTE

- All controls listed for the hazard control band in the reference sheet **must be in place** before work/study commences.
- If **any** of the controls listed for the hazard control band in the reference sheet are **not** to be used, a full risk assessment using the Monash University Risk control program must be completed, documented; and held in the area(s) where the work/study is undertaken.

Task / Process / Procedure								
Method 1: Risk Assessment		**Conseq'nce & Likelihood**	**Risk Score**					
Method 2: Control Banding **Description of hazard**	**Hazard Type**	**Hazard Variables**	**Control Band**	**Controls Currently in Place**	**Controls to be Implemented**	**By Who**	**By When**	**In Place (Sign)**
Repetitive strain from typing	Manual Handling	D2	E3	Taking frequent breaks to avoid strain	Use of good posture	Jarred Paola	Now	AB JP
Injury as a result of moving equipment	Manual handling	C5	D5	Interfaces of equipment used are mostly front facing removing the need to re-arrange equipment	When moving heavy/bulky equipment ensure 2 people perform the task	Anthony Baudinette	Week 5 or before using lab	AB JP
Eye damage from lasers	Physical - Lasers	B4	E5	Max 100mW laser power	Exclusion zone of 5 cm based on divergence angle of laser from device. Cover/obstruct laser sources not in use, do not leave ports empty.	Anthony Baudinette	Week 5 or before using lab	JP AB
Electrical Shock	Physical - Electrical	E4	E4	All devices above 5V operate in enclosures		Jarred Paola	Week 5 or before using lab	JP AB
Injury as a result of falling tools	Physical - general	D2	E3	Closed shoes in lab environment as per Monash guidelines	Ensure Tools are kept away from edges of the Lab bench top to avoid being knocked off.	Anthony Baudinette	now	JP AB

Revision history

Date	Changes/Notes	Initial
19/3/2019	Initial version	AB
20/3/2019	Revised risks	AB
21/3/2019	Added 'injury as a result of falling tools' , published as draft	AB
26/3/2019	signed and submitted as final version	AB

Table of Contents

Risks:

Repetitive strain from typing

Method: Control banding

Hazard class: Manual handling

Risk before controls: Typing is a low effort task with a minor consequence (D) ranking with poor posture and negligible consequence (E) with good posture. Due to this project involving large amounts of programming the likelihood ranking is 2.

Actions to be taken: Reinforce the importance of good posture and take breaks throughout the day

Risk after controls: Good posture gives negligible consequence rating (E), regular brakes improves the likelihood ranking to 3 through decreased activity duration.

Is the risk after controls acceptable: Yes

Are emergency measures required: No

Injury as a result of moving equipment

Method: Control banding

Hazard class: Manual handling

Risk before controls: Moderate effort for one person, small-moderate between 2 people (C-D consequence rating). Moving of equipment will be a very infrequent task (5 likelihood ranking

Actions to be taken: Ensure that any awkward bulky or heavy equipment is moved by 2 people, especially when the equipment is heavy enough to pose a risk when dropped (as stated later)

Risk after controls: Using 2 people will reduce the effort required reducing the Consequence rating to D/E

Is the risk after controls acceptable: Yes

Are emergency measures required: No

Eye damage from lasers

Method: Risk Assessment

Hazard class: Physical – Lasers

Risk before controls: optical communications lasers used can be up to 100mW in power, this is enough to cause instant and lasting eye damage making it the most significant risk of this document despite it being an unlikely event. Hence the consequence rating of this risk is severe.

Actions to be taken:

Firstly all laser devices must be off before changes made and covered when disconnected to ensure no stray beams are present.

Secondly as per laser safety class 2 [1], we will consider safe levels to be <1mW. Thus when making changes the following safe distance calculation to laser sources should be adhered to;

Assuming uniform power spread from beam divergence we will require a spot area at a safe distance to be 100 x the cross section of the fibre with an additional safety factor of 10.

Thus spot diameter is required to be 56 x the fibre diameter ($\sqrt{100 \times 10 \times \pi}$)

Using the gaussian divergence from here [2], the safe distance can be found from:

$$w(z) = w_0 \sqrt{1 + \frac{z}{\frac{\pi}{\lambda} w_0^2}^2}, where\ w_0 = 5.25, and\ \lambda = 1550nm$$

$$since\ w(z) = 56w_0 \therefore\ z = \frac{\pi}{\lambda} w_0^2 \sqrt{56^2 - 1}$$

$$\therefore z = 3cm$$

Risk after controls: If distance to optical sources is followed the exposure level will be at minor to negligible levels and the risk of any exposure will be very unlikely.

Is this risk acceptable: when procedure is followed this risk is acceptable

Are emergency measures needed to be taken: In the event of a laser transmitting when disconnected/into air the device must be shut down immediately.

Electrical shock

Method: Control Banding

Hazard class: Physical – Electrical

Risk before controls: Devices used for project operate at voltages low enough to not pose a direct risk

Action to be taken: Voltages required are low risk and do not require additional safety measures

Risk after controls: N/A

Is this risk acceptable: yes power levels used pose no direct safety risk

Are emergency measures needed to be taken: Lab power cut-off buttons are in place in the case on an electric shock

Injury as a result of falling tools

Method: Control Banding

Hazard class: Physical-general

Risk before controls: worst case scenario of falling equipment is lacerations or crushing injury's to feet. To prevent this there is a closed shoes policy in place, this reduces the consequence of such an event with small weighing equipment.

Action to be taken: when working at the laboratory benches tools should be kept away from edges of the benchtop to reduce the likelihood of an accident, Also as previously stated bulky equipment heavy enough to injure despite closed shoes shall be moved by 2 people

Risk after controls: These controls reduce the consequence of an accident to a discomfort and reduce its likely hood

Is this risk acceptable: yes

Are emergency measures needed to be taken: no

References

[1] "Laser safety - Limits," [Online]. Available: http://www.optique-ingenieur.org/en/courses/OPI_ang_M01_C02/co/Contenu_08.html.

[2] J. F. B. Andrew M. Kowalevicz, "Beam Divergence from an SMF-28 Optical Fiber," Naval Research Laboratory, 6 October 2006. [Online]. Available: https://pdfs.semanticscholar.org/0dc8/fd04ab67b2c5b7deb525437d5d2031bffb7d.pdf.