HIRAC Report

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1. Hazard Management Details – General	
This form relates to OHS Procedure – *Hazard Identification, Risk Assessment and Control (HIRAC)*	
School / Work Location:	**Ballarat Tech School (Fed College)**
Name of Person(s):	Liam Mudge
Date Conducted:	01/02/2024
Last Reviewed:	10/11/2022
Next Review Due:	October 2024

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Description of Use:	Summary of Key Risks: (Refer to appropriate subsections)
The Ballarat Tech School (BTS) delivers a range of STEM curriculum projects, some of these activities may be hazardous to user's health if safety procedures and lab etiquette are not followed. Laser Cutting is a technology that uses a focused laser to cut or etch materials and is typically used for industrial manufacturing applications. Laser cutting works by directing the output of a high-power laser most commonly through optics. Industrial laser cutters are used to cut/etch fine detail onto a work piece and will be used by authorised persons at the Ballarat Tech School to deliver projects and programs to partner schools and participants.	**ENTANGLEMENT** **IMPACT & CUTTING INJURIES** **ELECTRICITY** **ERGONOMICS** **LASER RADIATION** **NOISE** **MAINTENANCE** **SLIPS / TRIPS / FALLS** **FIRE & EXPLOSION** **TEMPERATURE / MOISTURE** **TOXIC GASES OR VAPOURS**

Laser Cutting Equipment used at the Ballarat Tech School			
Epilog Fusion M2 32-50W CO2	Trotec Speedy 300 80W	Makeblock Pro	Makeblock Rotary

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2. Documentation		
Relevant Legislation/Standards	**Y / N**	**Comments**
Key reference material:		• AS 2397-2015: Safe Use of lasers in the building and construction industry. • AS/NZS IEC 60825.14-2011 Safety of Laser Products • LASER Safety Standard, Deakin University • LASER Safety Guidelines, university of Wollongong • AS/NZS 3760:2022 In service safety inspection and testing of electrical equipment.

LIKELIHOOD

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Risk Assessment Matrix

		Very Unlikely Could happen, but probably never will	Unlikely Could happen, but very rarely	Likely Could happen sometime	Very likely Could happen any time
SEVERITY	Death or permanent disability	MEDIUM	HIGH	EXTREME	EXTREME
	Long-term illness or serious injury	LOW	MEDIUM	HIGH	EXTREME
	Medical attention and short-term incapacity	VERY LOW	LOW	MEDIUM	HIGH
	First aid needed	VERY LOW	VERY LOW	LOW	MEDIUM

Assessing OHS Risks

Risk assessments in matters of Occupational Health and Safety* are based on 2 key factors:

- The severity of any injury/illness resulting from the hazard(s), and
- The likelihood that the injury/illness will actually occur.

**Assessment of risk level based on likely severity and probability of harm*

3. Hazards				
Hazards Inspected	**Initial Risk**	**Description of Risk**	**Control Measures**	**Residual Risk**

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ENTANGLEMENT Can anyone's hair, clothing, gloves, cleaning brushes, tools, rags, or other materials become entangled with moving parts of the tools or materials?	Medium	• Long hair, loose clothing, rags, cleaning brushes and jewellery could become entangled in the moving parts of the equipment.	• Ensure hair, loose clothing, rags, and jewellery is kept clear of moving parts when in use. • Hair ties/hair nets can be used to secure long hair. • Ensure inappropriate jewellery and accessories (e.g. bracelets) are not worn when operating equipment.	Low

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Hazards Inspected	Initial Risk	Description of Risk	Control Measures	Residual Risk
IMPACT & CUTTING INJURIES Can anyone be crushed/cut/struck etc. due to: • Material falling off the workspace? • Uncontrolled/unexpected movement of tools /workspace?	Medium	• Material that becomes dislodged may foul the mechanism and flick out of place unexpectedly.	• Ensure operator's hands and body parts are kept clear of moving parts during use and maintenance. • Ensure operators receive appropriate instruction before attempting to use any equipment. • Ensure work pieces are appropriately secured prior to operation. • Ensure the guard or transparent safety door on the machine is closed before operation and interlock switch is working. • Machines to be supervised at all times when operating. • Use of emergency cut off switch/job pause as appropriate to holt movement as necessary. • Ensure work bed free from obstacles/scrap material.	Low

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Hazards Inspected	Initial Risk	Description of Risk	Control Measures	Residual Risk
• Parts of the tool disintegrating or collapsing? • Contact with moving parts during testing, inspection, operation, maintenance, cleaning, or repair? • Inappropriate parts and accessories being used?	Medium	• Failure of mechanical parts may result in exposure of operator/bystanders to laser anergy or mechanical impact. • Laser gantry moves at speed, could result in collision and injury. • Mays cause collision or unexpected contact to bystanders if parts become dislodged etc • Metal mesh of the Material bed in the Trotec laser cutter is thin and sharp. May result in cutting of operator when placing/removing material.	• Ensure operators receive appropriate instruction before attempting to use any equipment. • Ensure unit operated in accordance with manufacturer's instructions. • Ensure workpiece appropriately secured while unit operating	Low

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Hazards Inspected	Initial Risk	Description of Risk	Control Measures	Residual Risk
ELECTRICITY Can anyone be injured or burnt due to:	Medium	• Damaged or poorly maintained electrical leads, cables, or switches?	• Operator to check for damaged electrical cables prior to use. • Ensure equipment is regularly serviced, tested and tagged (if not hardwired) and appropriate isolation procedures (e.g. lock out tags) are in place.	Low

Hazards Inspected	Initial Risk	Description of Risk	Control Measures	Residual Risk
ERGONOMICS Can anyone be injured due to:	Medium	• Poor arrangement of the physical layout of the laser cutter and associated equipment. • Large job loads may require repeated loading/unloading of material, with potential for repeated bending to pick up stock material.	• Use of proper manual handling operations. • Relocate material to a position that doesn't require excessive twisting etc.	Low

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Hazards Inspected	Initial Risk	Description of Risk	Control Measures	Residual Risk
LASER RADIATION laser sources, such radiation can be extremely hazardous to the eyes and the skin and a number of cases of serious injury, including loss of sight, have been documented	Medium	• Exposure to radiation from a laser whose emission are potentially hazardous – usually a laser of any class other that 1 or 2. • Direct exposure to the eyes or skin to laser radiation.	• Materials with highly reflective surfaces NOT to be used in “Face up” orientation with laser cutting equipment. • Eliminate by enclosing the radiation at the source. Use flame retardant screens to isolate users and bystanders from the radiation. • Use of built in interlock safety systems to cut off laser if opened. • Training and induction to Laser cutting operations with specific equipment.	Low

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Hazards Inspected	Initial Risk	Description of Risk	Control Measures	Residual Risk
NOISE Can anyone using the tool, or in the vicinity of the plant, suffer injury due to exposure to noise?	Medium	• The noise levels of the extraction unit could be excessive over a long period of time (1hr+) • Accumulated noise from multiple systems may increase the noise in the work environment.	• If operating for an extended period of time, use hearing protection and turn off extraction systems when not required.	Low

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Hazards Inspected	Initial Risk	Description of Risk	Control Measures	Residual Risk
MAINTENANCE Can anyone be injured as a result of the plant not serviced appropriately and/or maintained in line with manufacturer's recommendations?	Medium	• Failure to maintain unit may result in exposure to hazardous fumes, laser/heat sources etc • A missing or faulty interlock guard switch can expose 'flying' pieces of sharp/hot material and present a risk to an operator's hands and body parts.	• Routine maintenance to be carried out by appropriately trained persons with annual servicing completed by recommended service provider.	Low

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Hazards Inspected	Initial Risk	Description of Risk	Control Measures	Residual Risk
SLIPS / TRIPS / FALLS Can anyone using the tool, or in the vicinity of the plant, slip, trip or fall due to: • Poor housekeeping, e.g. spillage in the vicinity? • Obstacles being placed in the vicinity of the tool?	Medium	• Poor housekeeping practices allowing the build-up of waste materials or failure to immediately clean up spills could result in a slip hazard. • Inappropriate placement of objects (e.g. spare materials, bags etc) in the immediate vicinity of the plant equipment may result in a trip hazard	• Ensure appropriate cleaning and housekeeping practices are maintained to minimise the risk of a slip, trip or fall. • Workspace inspected and cleared of any debris/ unnecessary objects before and after use. • Workspace to be kept clear of all obstacles//objects as part of good housekeeping procedures	Low

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Hazards Inspected	Initial Risk	Description of Risk	Control Measures	Residual Risk
FIRE & EXPLOSION Can anyone be injured by fire?	Medium	• Laser emission from high power laser can ignite target materials. • Laser emissions from lower class lasers can cause ignition of combustible. gases or high concentrations of airborne dust. • Faulty equipment can cause flammable components to catch fire.	• Train laser user to use firefighting equipment. • Always supervise work operation to monitor for signs of fire • Have suppression equipment available	Low

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Hazards Inspected	Initial Risk	Description of Risk	Control Measures	Residual Risk
TEMPERATURE / MOISTURE Can anyone come into contact with objects at high or low temperatures?	Medium	• Internal parts of some laser cutter can be hot. • Workpieces may be hot after cutting operation.	• Engineer laser design to isolate the user from hot and cold hazards.	Low
• Can anyone suffer ill-health due to exposure to high or low temperatures?	Medium	• Contact with workpiece immediately after cutting operation may be hot	• Training and induction in safe work practices.	Low

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Hazards Inspected	Initial Risk	Description of Risk	Control Measures	Residual Risk
TOXIC GASES OR VAPOURS Can anyone be injured or suffer ill-health from exposure to: • Toxic gases or vapours?	Medium	• Dust and vapours generated from the work process may be hazardous to health. • Laser operations on materials such as vinyl or MDF may release hazardous chemical gasses such as Chlorine gas.	• Ensure appropriate control measures are implemented (e.g. local exhaust system, face masks, good housekeeping practices etc). • Adopt stringent storage, handling and disposal precautions. • Assess MSDS of materials being cut and do restrict use of any which produce hazardous by products. • Training and induction in safe work practices.	Low
• Can anyone be injured by explosion of gases, vapours, liquids, dusts, or other substances?	Medium	• Fumes produced from operation can be hazardous to health.	• Ensure correct use of extraction system is operating nominally to eliminate fumes from workpiece environment.	Low

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4. Risk Assessment Signoff		
Authorised By: Albert Ferguson	Signature: AFerguson	Date: 21/02/2024