##

**X-CARVE CNC ROUTER**

## Scope

This document is intended to estimate potential human health and environmental risks posed by current and potential future conditions at **State Library of Queensland (State Library) Fabrication Lab** Facility. The risk assessment describes the approach to the risk assessment and facilitates appropriate ways to evaluate current and future risks.

Refer to the **Safe Operating Procedures** (**SOP**) for information regarding the safe usage and check list for this equipment.

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| Plant/Equipment Description: **X-Carve CNC Router** |
| Leaders:  **Daniel Flood** |
| Locations:  **The Edge Fabrication Lab** |
| Assessment Date:  **02/03/2020** | Review Date:  **02/03/2021** |

*N.B. This assessment can remain active for up to 5 years. However, an annual monitoring and review process should be undertaken and recorded – refer to the last page of this document.*

*Below are the details of the manufacturing or production processes attributed to this item of equipment categorised by their assessed inherent risk levels (refer to the Equipment/Process Risk Matrix). The actions required for approval for each level of inherent risk are mandatory.*

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| **Inherent Risk Level** | **Details of Processes** |  **Action Required/Approval** |
| 🗹 | **Medium** | * When cutting and/or engraving sheet materials such as ply and acrylic in 2D under direct formal supervision of a trained and experienced supervisor.
* When cutting in 3D using sheet materials such as foam, rubber and plywoods under direct formal supervision of a trained and experienced supervisor.
 | * Document controls in planning documents and/or complete this *Plant Risk Assessment*.
 |

Minimum standards

| Minimum qualifications and experience *Listed below are the general “minimum” recommendations for the Supervision and management of this Plant/Equipment.*🗹 *Indicate the minimum management controls.*  |
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| X State Library staff member with experience, ability and competency in the safe use of this plant/equipment  *(indicate one or more of the following):*X Specific knowledge of the safe and correct use of this plant/equipment (i.e. Industry training)X Experience (i.e. previous involvement and familiarity) in the safe use of this plant/equipmentX Demonstrated expertise, ability and competency with this plant/equipment[ ]  Documented qualifications relating to the use of this plant/equipment (i.e. Trade Certificate or manufacturers formal training) **OR**X A Contractor, other than a State Library staff member, with:[ ]  Expertise in the safe and correct use of this plant/equipment (i.e. Industry training)X Documented qualifications that demonstrate experience, ability and competency in the safe use of this plant/equipment. (i.e. Trade Certificate or manufacturers service representative.) |
|  X Will any Edge staff require initial and/or ongoing training for the safe use of this plant/equipment?If yes, give details:  **If use of different materials and procedures from current standard operating procedures.**  |
|  X Will members be operating this plant/equipment?If yes, state how members use of this plant/equipment will be managed (e.g. Workshop Safety Induction)Give details:  **Safety induction and limited use of operational machine functions** |
|  Further information if required: **All members must complete a CNC router safety induction. Members have limited use of operational machine function under direct supervision of a trained and experienced staff member.** |
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|  Minimum control requirements  |
|  Supporting documentation available in the school on this plant/equipment includes: X Operators ManualX Safe Operating Procedures (SOP)X Equipment Maintenance Records (EMR)X A process for recording members safety induction e.g. Member induction register X A process for recording staff training and experience, e.g. Staff induction register |
|  X All guards are in place and in good working order for this plant/equipment  |
|  X Safe Working Zones are defined for this plant/equipment (e.g. yellow lines and/or appropriate signage)  |
|  X Suitable personal protective equipment (PPE) is available to be used by all operators |
|  X This plant/equipment complies with relevant safety standards |
|  Further information if required: **The CNC Router is situated in a lockable cage to restrict usage to direct supervised bookings only.**  |

Hazards and control measures

*Listed below are indicative hazards/risks and suggested control measures. These are by no means exhaustive lists. Add details of any other hazards/risks or additional controls you intend to implement.*

🗹 *Indicate the control measures adopted. Detail their implementation and any additional controls required.*

| **Hazards/Risks** | **Hierarchy of Recommended** **Control Measures** | **Yes** | **No** | **Details of how this will be implemented***(and any additional controls)* |
| --- | --- | --- | --- | --- |
|  **Exposure to Rotating** **or Moving Parts:*** **Entanglement and**

**Entrapment**Could hair, clothing, ties, jewellery or other materials become entangled with moving parts of plant or materials in motion?* **Striking**

Could anyone be struck by moving objects such as the work piece being ejected, or by the unexpected or uncontrolled movement of the plant or work piece? * **Crushing and**

**Pinching**Could anyone be crushed or pinched due to falling uncontrolled or unexpected movement of plant or its load tipping or rolling over, or contact with moving parts during testing, inspection or maintenance?* **Cutting, Stabbing and**

**Puncturing**Can anyone be cut, stabbed or punctured by coming into contact with moving plant or parts, or objects such as ejected work piece or waste? | 1. Where possible, potentially hazardous plant, machinery and processes, would be substituted or replaced to control hazards.
 | X | [ ]  | **Strict supervision included pre-flight checks and only the supervisor to preform operational functions (i.e. tool changes)**  |
| 1. All necessary CNC router table guards and safety devices are in place protecting workers from all moving parts.
 | X | [ ]  | **As per Australian standards** |
| 1. Micro switches are fitted that cut off power when covers or guards are opened.
 | X | [ ]  | **As per manufactures standards.**  |
| 1. “Lock Out” or warning “Danger” tags are affixed to the CNC router table when under repair or maintenance preventing workers from using the equipment.
 | X | [ ]  | **Maintenance & repair controlled by manufacturers representative**  |
| 1. Staff and member training is provided to minimise exposure to these hazards.
 | X | [ ]  | **Mandatory safety inductions** |
| 1. Safe operating procedures (SOPs) for the CNC router table are available and clearly displayed.
 | X | [ ]  | **On wall next to machine and in the SOP folder**  |
| 1. “Safe Working Zones” around the CNC Multicam router table is clearly defined by yellow safety lines (or similar).
 | X | [ ]  | **Marked user zones** |
| 1. Emphasis is placed on the requirement for plant operators to remove all jewellery, tuck in loose clothing and tie back long hair.
 | X | [ ]  | **Pre-flight PPE check** |
| 1. All appropriate and approved personal protective equipment (PPE) is used where required.
 | X | [ ]  | **All PPE supplied. Push to listen headsets for safe communication during machine operation**  |
| **Slips, Trips, Falls** **and Abrasions:**Can anyone using the plant or in the vicinity of the plant, slip, trip or fall due to the working environment or other factors?e.g. Poor housekeeping, dust on floors, slippery or uneven work surfaces, power cables across work areas causing injuries and abrasions? | 1. Slip resistant flooring is encouraged. Regular checks are made for unsafe wear and damage. Inspections are made for any power leads or hoses, etc.
 | X | [ ]  | **Slip resistant mats in user zones.** |
| 1. Procedures are in place for the disposal of all waste materials around the CNC router table.
 | X | [ ]  | **Storage, waste disposal & clean-up procedures** |
| 1. Staff training is provided to minimise exposure to these hazards.
 | X | [ ]  | **General induction training and housekeeping procedures**  |
| **Environmental:*** **Noise**

Is it likely that the normal operation of this plant will produce excessive noise levels?* **Dust, Fumes and Vapours**

Is it likely there will be airborne dust particles, toxic fumes or volatile vapours produced and therefore be present in the workspace?* **Lighting**

Is there insufficient lighting to operate this plant in a safe manner? Is there a possible strobe lighting effect caused by faulty fluorescent tubes in the workspace? | 1. The CNC router table is regularly maintained to help reduce exposure to these hazards.
 | X | [ ]  | **Manufacturer servicing & monthly maintenance** |
| 1. All CNC router table maintenance is documented in a register (EMRs).
 | X | [ ]  | **Service records folder** |
| 1. Exposure to noisy workshop environments is monitored and evaluated regularly for all members and staff.
 | X | [ ]  | **Sound level testing and PPE requirements**  |
| 1. Engineering controls (or physical changes) such as mandatory machinery guarding or any protective safety screens and enclosures are in place in all workspaces and all in good working condition.
 | X | [ ]  | **As per manufacturers standards. Dust & vacuum pump enclosure.** |
| 1. Staff and member training is provided to minimise exposure to these hazards.
 | X | [ ]  | **Safety induction training** |
| 1. All ducted dust, waste and fume extraction systems are fully maintained, cleaned and emptied, connected and operational.
 | X | [ ]  | **Monthly maintenance**  |
| 1. Good lighting is provided to all workspaces and this is maintained on a regular basis. Fluorescent tubes are checked and replaced as required.
 | X | [ ]  | **Specific overhead machine lighting** |
| 1. All appropriate and approved personal protective equipment (PPE) is used where required.
 | X | [ ]  | **All PPE is provided** |
| **Electrical:**Can the operator be injured by electrical shock due to working near or contacting with damaged or poorly maintained live electrical conductors such as power outlets, extension leads, safety switches, starters and isolators or casual water on the floor near plant and machinery?  | 1. The CNC router table has a wall or machine mounted isolating switch that disconnects all motive power.
 | X | [ ]  | **As per manufacturers standards** |
| 1. The CNC router table is fitted with a Direct on Line (DOL) Start/Stop switch (red and green buttons).
 | X | [ ]  | **Handheld controller** |
| 1. Emergency stop buttons are mounted prominently where necessary.
 | X | [ ]  | **On Machine**  |
| 1. “Lock Out” or warning “Danger” tags are affixed to the CNC router table when under repair or maintenance preventing workers from using the equipment.
 | X | [ ]  | **Machine under Maintenance signage**  |
| 1. Visually checks are made of all electrical switches and power leads, etc.
 | X | [ ]  | **Monthly maintenance checks** |
| 1. Electrical safety inspections, testing and tagging, etc. are completed regularly as per guidelines for the CNC router table.
 | X | [ ]  | **As per QLD WHS standards** |
| 1. Electrical maintenance on all plant and equipment, including the CNC router table, is documented in EMRs.
 | X | [ ]  | **As per QLD WHS standards** |
|  **Exposure:*** **Friction**

Is the plant likely to generate heat by friction? Could the plant operator accidentally come into contact with moving materials or machinery components resulting in friction burns to the skin, particularly hands?* **Hazardous**

 **Substances**Is it likely that the plant operator or others nearby in the workspace could be exposed to hazardous or toxic chemicals such as oils, cutting fluids and coolants, greases, volatile vapours, fumes or airborne particulates? | 1. The CNC router table is regularly maintained to help minimise the risk of exposures to these hazards.
 | X | [ ]  | **Monthly Maintenance Checks** |
| 1. All CNC router table maintenance is documented in a register (EMRs).
 | X | [ ]  | **Service records** |
| 1. Any hazardous waste material or toxic dust and gases resulting from this machining process are monitored and managed.
 | X | [ ]  | **Dust extractor and air filter installed and maintained**  |
| 1. Staff and member training is provided to minimise exposure to these hazards.
 | X | [ ]  | **Safety induction** |
| 1. “Safe Working Zones” around the CNC router table are clearly defined by yellow safety lines.
 | X | [ ]  | **Yellow safety tape defined user zone**  |
| 1. All appropriate and approved personal protective equipment (PPE) is used where required.
 |  |  | **All PPE is provided** |
|  **Ergonomics and** **Manual Handling:**Can the plant be safely operated, in a suitable location, providing clear and unobstructed access? Poorly designed work stations often necessitate Staff and members performing manual tasks involving heavy lifting and lowering, pushing, pulling or carrying, etc. Such tasks then contribute to a range of musculoskeletal sprains and strains for workers.  | 1. The CNC router table and work benches are planned and adjusted to a comfortable work height (where possible) thus minimising any unsafe or excessively strenuous manual tasks.
 | X | [ ]  | **Manual task procedures i.e. two-person lift** |
| 1. Sufficient workspace is provided in all practical workshops to help ensure unobstructed, safe operation.
 | X | [ ]  | **Defined floor plan** |
| 1. “Safe Working Zones” are clearly defined around all fixed plant including the CNC router table. Floors are free of excessive wood dust, waste materials and other extraneous objects.
 | X | [ ]  | **As per QLD WHS standards and general housekeeping** |
| 1. Staff training is provided with regard to manual handling techniques and procedures to minimise exposure to these hazards.
 | X | [ ]  | **Staff induction** |
|  **Explosion and Fire:**As a consequence of using this particular item of plant and equipment, could anyone be injured by the release of stored energy triggered by volatile, explosive substances such as stored gasses, vapours or liquids?  | 1. Fire extinguishers of the correct type are readily available in all workspaces and positioned near exit doorways.
 | X | [ ]  | **As per Australia Standards** |
| 1. Staff training is provided regarding procedures for the correct and appropriate use of fire safety equipment.
 | X | [ ]  | **Staff induction** |
| 1. Exits from buildings and other work areas are defined and access to them kept clear of obstructions.
 | X | [ ]  | **As per Australian building code** |
| 1. Safety signage is posted clearly denoting the location of all fire safety items and emergency exits.
 | X | [ ]  | **As per Australian building code** |

| **Other Hazards/Risks** | **Additional Control Measures***These would relate to the specific members needs, locations and conditions in which you are conducting your activity.* |
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| **Approval** |
| Submitted by: Simon McKellar | Date: 02/03/2020 |
| **[ ]**  | Approved as submitted. |
| **[ ]**  | Approved with the following condition(s):      |
| **[ ]**  | Not Approved for the following reason(s):      |
| By:       | Designation:       |
| Signed: | Date:        |

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| Staff members involved in the use of this risk assessment and the associated plant and equipment: |
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 | *Signature:*  ……………………………….. *Date:**Signature:*  ……………………………….. *Date:* *Signature:*  ……………………………….. *Date:* *Signature:*  ……………………………….. *Date:* *Signature:*  ……………………………….. *Date:* *Signature:*  ……………………………….. *Date:* *Signature:*  ……………………………….. *Date:* *Signature:*  ……………………………….. *Date:*  |

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| **Monitoring and Review***This Plant and Equipment Risk Assessment is to be monitored and reviewed annually for a further four (4) years.* |

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| **Review 1:** | **Yes**  | **No** |
| * Are allocated risk levels and “Actions required” unchanged over the past 12 months?
* Are Minimum Standards and Recommended Control Measures unchanged over 12 months?
* Staffing details have remained unchanged over the past 12 months?
 | [ ] [ ] [ ]  | [ ] [ ] [ ]  |
| If the responses are “NO” for any question, record current details here, and list all staff changes *(with signatures)* |
| Reviewed by:  | Designation:  |
| Signed: | Review Date :  |

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| **Review 2:** | **Yes**  | **No** |
| * Are allocated risk levels and “Actions required” unchanged over the past 12 months?
* Are Minimum Standards and Recommended Control Measures unchanged over 12 months?
* Staffing details at this school have remained unchanged over the past 12 months?
 | [ ] [ ] [ ]  | [ ] [ ] [ ]  |
| If the responses are “NO” for any question, record current details here, and list all staff changes *(with signatures)* |
| Reviewed by:  | Designation:  |
| Signed: | Review Date :  |

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| **Review 3:** | **Yes**  | **No** |
| * Are allocated risk levels and “Actions required” unchanged over the past 12 months?
* Are Minimum Standards and Recommended Control Measures unchanged over 12 months?
* Staffing details at this school have remained unchanged over the past 12 months?
 | [ ] [ ] [ ]  | [ ] [ ] [ ]  |
| If the responses are “NO” for any question, record current details here, and list all staff changes *(with signatures)* |
| Reviewed by:  | Designation:  |
| Signed: | Review Date :  |

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| **Review 4:** | **Yes**  | **No** |
| * Are allocated risk levels and “Actions required” unchanged over the past 12 months?
* Are Minimum Standards and Recommended Control Measures unchanged over 12 months?
* Staffing details at this school have remained unchanged over the past 12 months?
 | [ ] [ ] [ ]  | [ ] [ ] [ ]  |
| If the responses are “NO” for any question, record current details here, and list all staff changes *(with signatures)* |
| Reviewed by:  | Designation:  |
| Signed: | Review Date :  |

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