

OBJECTIVE

To provide guidance on developing safe systems of work that will minimise the risk of injury to people from potentially hazardous energy sources during repairing, maintaining (servicing, cleaning) or commissioning – collectively known as “work”. This will be achieved by:

- Identifying hazardous energy sources (primary and secondary)
- Controlling hazardous energy sources
- Ensuring no work is carried out on plant, equipment or installations without applying isolations in accordance with this process.

BACKGROUND

SCOPE

This procedure applies to all staff, students, researchers and third parties, globally.

WHAT MUST GO RIGHT?

Should this process be implemented appropriately by RMIT, the expected outcomes – known as ‘what must go right’ – will be that:

- Colleges and Portfolios identify installations, plant and equipment which require Lock Out/Tag Out (LOTO) and isolation prior to any work being undertaken.
- Schools and departments develop and implement local, documented LOTO and isolation procedures
- No person is permitted to carry out any work on plant, equipment and/or installations without firstly isolating and de-energising all energy sources.
- Red, white and black personal “DANGER” tag and a personal red LOTO lock is used when any plant, equipment and/or installations is isolated for repairs or maintenance.
- Yellow and black “OUT OF SERVICE” tag is used to identify damaged or unsafe plant, equipment and/or installations.
- Blue “COMMISSIONING” tag used to identify plant, equipment and/or installations where live commissioning, testing and adjustment work is being carried out.

1. PROCEDURE

Plant or equipment that can be fully isolated

The Senior Leader must ensure that plant, equipment and/or installations, in their area of responsibility, have the capability to be fully isolated by local physical separation from energy sources. Plant, equipment and/or installations that cannot be fully isolated may need to be modified so that full isolation may be applied when required. Refer to **HR – HSW-PR37 – Plant and Equipment Safety** for further guidance around modifications to plant, equipment and installations.

Plant or equipment that can be fully isolated by local physical separation from the energy source

The Operational Leader must ensure that local area procedures are documented and available for plant, equipment and/or installations that can be fully isolated by local physical separation from energy sources. These procedures must include a requirement to:

- identify and isolate energy sources
- de-energise and stored energy
- test plant, equipment and/or installations to ensure effective isolation prior to any work on them.
- Lock out all identified isolation points

Isolation of energy sources external to local area

If isolation of energy sources and services impact on areas external to the local area - that is, the activities outside of the immediate room where the plant, equipment or installation is located, for example, if power is isolated to multiple rooms a Service Request is to be made to Property Services Group (PSG) for any permits that may apply.

If electrical isolation impact on IT services, ITS must be contacted and authorisation provided (if required) prior to isolation.

Consultation with other impacted stakeholders of the isolation must occur prior to isolation.

Safe work procedure

Senior Leaders must ensure that, for all repairing, maintaining (servicing, cleaning) or commissioning work carried out on installations, plant or equipment under their control, documented safe work procedures are developed, maintained and / or available.

In addition to the safe work procedures, each plant, equipment or service line must have attached a placard showing the location of lock out, isolation and de-energising locations (where practicable).

Safe work procedures must consider:

- shutdown
- identifying all energy sources, including uninterruptible power supplies (UPS) and generators
- identifying all other hazards (for example, confined space entry, working at heights)
- identifying all isolation points
- isolating energy sources (including stored energy)
- de-energising all energy sources
- confirm all energy sources are de-energised (including chocking, if required)
- locking out all isolation points
- tagging machinery controls, energy sources and other hazards
- test by 'trying' to reactivate the plant without exposing the tester or others to risk. Failure to reactivate the plant means that the isolation procedure is effective and that all stored energies have dissipated. This may require further measures to safely release these energies, for example hydraulic or pneumatic pressure, suspended weight or compressed springs.
- where applicable, apply exclusion zones and/or restricted access
- documentation and records, and
- returning to service.

The Operational Leaders shall ensure that prior to working on the installations, plant, services or equipment, all authorised persons are:

- fully briefed on the safe work procedures; and
- competent to carry out the work.

Note - Following an interruption to any work, the authorised person must confirm the energy source is still isolated and de-energised before resuming work. Locks must not be removed until the work is complete.

An example of a local LOTO plan is available in **APPENDIX 1**. Senior and Operational Leaders may utilise **HSW-PR52-TM01 – LOTO Plan Template** for developing their local safe work procedures.

Lock-out devices

Senior Leaders must ensure that for all work carried out on installations, plant or equipment under their control, lock-out devices are available for authorised persons where lock-out and isolation is required.

All lock-out devices must meet minimum safety requirements and possess the following characteristics:

- instant visual identification as a safety device, for example, marked "**Danger: Lock-out**"
- prevent accidental energisation at the point of attachment
- single issue of each lock-out device (i.e., its locking mechanism is unique and has only one key)
- where a padlock is used, the key can only be removed when the padlock is in the locked position
- where a padlock is used, the key profile is exclusive to safety lock-out applications, and
- tamper-proof

Examples of suitable lock-out devices are in **APPENDIX 2**.

NOTE - keys are assigned to an individual and never to be shared. i.e., a person must never accept somebody else's key to manage or remove the lock on their behalf.

NOTE – Schools / departments may utilise Lock-out devices, outside of this process, to control unauthorised access to plant, equipment, installations and work and learning environments.

Tagging

The authorised person must ensure that a red, white and black personal "DANGER" tag and a personal LOTO lock is used when any equipment is isolated for repairs or maintenance and it is:

- used in conjunction with a lock-out device; and
- attached to the installation, plant or equipment as a visual warning that the energy source has been isolated.

The authorised person must ensure that the tag describes the:

- installation, plant or equipment that is isolated
- reason the installation, plant or equipment is isolated
- name of the authorised person undertaking the work, and
- date of the isolation

A yellow and black “OUT OF SERVICE” tag is a notice that distinguishes plant or equipment out of operation for repairs or alteration (unsafe to use). Do not operate equipment whilst this tag is in use.

A blue “COMMISSIONING” tag is a notice that identifies plant, equipment or installations which are “live”, are being commissioned, tested or adjusted and are restricted for use. The commissioning of plant, equipment or installation may require the immediate area to be restricted/isolated from general use. An example may be plant which has external moving parts (such as “arms”) which extend outside the footprint of the plant or a series of individual plant that form an installation.

Note: An “OUT OF SERVICE” or “COMMISSIONING” tag must not be used during LOTO and isolation. Therefore, if a “OUT OF SERVICE” tag was attached due to breakdown or faulty equipment, it should be removed and replaced with a “DANGER” tag while the installation, plant or equipment is isolated for the purpose of repair.

Example of tags are in **APPENDIX 2**

Group Lock Out/Tag Out Process

Whenever more than one individual is involved in a task or activity including third parties, it should be considered a group LOTO activity.

In most cases, use of group lockout devices such as a multiple lock adaptor (hasp or scissors) allows each person involved in the task to place their lock(s) and tag(s) on each energy-isolating device.

The first RMIT personnel who applies their lock or tag becomes the group LOTO leader for the task and oversees or leads that group to ensure compliance with this procedure.

Under standard group LOTO, each individual or third party in the group applies their personal lock and tag to the multiple lock adaptor that is attached to each energy-isolating device controlling a piece of plant or equipment.

The group LOTO leader is the first to apply and the last to remove their lock or tag from the plant or equipment.

De-isolating and removing the lock-out device

The lock-out device may only be removed under the following conditions:

- the authorised person has determined that it is safe to de-isolate by:
 - > ensuring the installation, plant or equipment is safe to re-energise
 - > notifying all relevant persons that the installation, plant or equipment is about to be re-energised, and
 - > completing a visual inspection to determine that all tools, surplus materials and wastes have been removed or
- there has been appropriate hand-over from the authorised person to another authorised person in accordance with the above bullet points.

Where there is hand-over to another authorised person, all personal lock-out devices and “DANGER” tags must be replaced to identify the new authorised person.

Where the authorised person cannot remove the lock-out device or cannot hand over to another authorised person, the Operational Leader may remove the lock-out device only after:

- confirming that the authorised person is not available

- ensuring that no one is working on the installation, plant or equipment
- ensuring that de-isolation is safe, and
- confirming this with a suitably competent person.

Lock Out/Tag Out register

Senior Leaders must ensure that a LOTO Register of isolations exceeding one shift duration is established and maintained, and includes the following information:

- the installation, plant or equipment that is isolated;
- the reason the installation, plant or equipment is isolated;
- the name of the authorised person who conducted the isolation; and
- the date of the isolation.

The LOTO register may comprise a noticeboard, a hard copy table, electronic record system or other suitable method.

The Operational Leader of the authorised person performing an isolation exceeding one shift duration must ensure that the authorised person completes the register.

When isolations recorded in the LOTO register are re-energised, the authorised person must remove or close out the entry in the LOTO register.

An example of a local LOTO register is available in **APPENDIX 3**. Senior and Operational Leaders may utilise **HSW-PR52-TM02 – Lock Out/Tag Out Register Template** for developing their local registers.

Third parties

As a condition of work all third parties working at RMIT sites must comply with this procedure.

Third parties are expected to provide all locks, tags, and other devices required for LOTO except for specialty items unique to RMIT plant or equipment.

Third parties involved in an activity that requires LOTO and who lack the necessary locks, tags, and other devices, may not participate in the work on plant or equipment until they have obtained and applied the required devices.

Lock Out/Tag Out Purchasing Requirements

Senior Leaders must ensure that LOTO requirements are incorporated into purchasing specifications for new plant and equipment. This includes consideration of the appropriate isolation points for all energy sources to enable any work on the plant or equipment to be carried out safely. Where relevant, plant or equipment specific LOTO instructions will be determined on new plant and equipment through the undertaking of a risk assessment – **HR-HSW-PR09 – HSW Risk Management** and **HR-HSW-PR09-TM01 – HSW Risk Assessment Template**.

Training

The Operational Leader must ensure that Authorised Persons are competent to carry out lock-out, tagging and isolation procedures. Training will include:

- identifying energy sources

- controlling energy sources
- complying with this procedure, and
- complying with the relevant local procedures

The Operational Leader must undertake a verification of competency for each Authorised Person and record the verification, including the date of verification and the plant/equipment/installation involved.

Records

All records shall be kept and maintained by the School / Department in accordance with **HR-HSW-PR04 – HSW Records Management**.

Monitoring

Control Measures

The effectiveness of control measures implemented to minimise the risk of identified HSW hazards are to be monitored as per the **HR-HSW-PR09 – HSW Risk Management**. This includes:

- post implementation follow-up of corrective actions
- scheduled workplace inspections and testing by local units
- review of incident and hazard reports
- HSW verification audits.

Reporting

Any hazards which impact on the effectiveness with any local LOTO procedures need to be reported P.R.I.M.E., or equivalent, as detailed in **HR-HSW-PR10 – Incident Management and Investigation**.

2. RESPONSIBILITIES

Senior Leaders

- Ensure suitable resources are allocated for the implementation of this process
- Ensure suitable resources are allocated for the implementation of local isolation processes
- Ensure mechanisms are in place for effective and meaningful consultation regarding matters relating to this process of RMIT employees, students, researchers and third parties
- Ensure staff and students and researchers are provided with necessary information, instruction, supervision, and training relating to this process
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Operational Leaders

- Ensure this process is implemented at the local level
- Ensure that isolation procedures are developed and implemented for installations, plant and equipment in their areas of responsibility
- Maintain applicable records regarding this and local isolation processes
- Ensure mechanisms are in place for effective and meaningful consultation regarding matters relating to this process of RMIT employees, students, researchers and third parties
- Ensure staff and students and researchers are provided with necessary information, instruction, supervision, and training relating to this process

Authorised person

- Follow the local isolation requirements
- Follow the requirements of this process

HSW Team

- Provide advice on LOTO to RMIT stakeholders
- Periodically audit Colleges / Department / portfolios to determine level of implementation of this process
- Periodically review and maintain this process

3. DEFINITIONS

Defines any key terms and acronyms relating to the process where they apply

Term / acronym	Definition
Authorised person	A person, authorised by the local Operational Leader, who is sufficiently competent to lock out/tag out and isolate installations, plant or equipment for the purposes of cleaning, servicing, repairing or alteration.
Competent	Having acquired through training, qualification, experience, or a combination of these, the knowledge and skills to carry out a task.
Danger tag	A label/sign that identifies that cleaning, servicing, repairing or alteration is being undertaken on isolated installations, plant or equipment
Energy-isolating device	A device that physically prevents the transmission or release of energy, including the following: <ul style="list-style-type: none">• manually operated electrical circuit breaker• disconnect switch• manually operated switch by which the conductors of a circuit can be disconnected• line valve• block, or• any similar device used to block or isolate energy.
Energy source	A source of power including electrical, mechanical, hydraulic, pneumatic, chemical, thermal, gas and other. Note: energy sources may include stored energy that may be released as kinetic energy, such as an object suspended above the work area.
Isolation	Removing or disconnecting an energy source to prevent the inadvertent restoration of energy, either through activation/ start-up of installations, plant or equipment, or release of stored energy.
Lock-out device	A device that prevents the inadvertent energising of an energy source on installations, plant or equipment.
Out-of-Service tag	A label attached to equipment that indicates the installation, plant or equipment is faulty and is currently out of service.

4. SUPPORTING DOCUMENTS

Lists the supporting and related Processes and Guidance Material, Legislative references, Australian and International Standards etc. that may be useful references for process users

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- HR - HSW-PR52-TM01 – LOTO Plan Template
 - HR - HSW-PR52-TM02 – Lock Out/Tag Out Register Template
 - HR - HSW-PR04 – HSW Records Management
 - HR - HSW-PR09 – HSW Risk Management
 - HR - HSW-PR09-TM01 – HSW Risk Assessment Template
 - HR - HSW-PR10 – Incident Management and Investigation
 - HR – HSW-PR37 – Plant and Equipment Safety

APPENDIX 1

Template available *HR-PR52-TM01 – LOTO Procedure Template*

Lock Out / Tag Out Plan				
Plant / Equipment Name:		MAZAK QTV250 CNC LATHE #1501		
Asset Tag / No.	Q1501	LOTO#	LOTO-NPH-7452, Rev. 0	
Location:	Bxx Fyy Rzz West Machine Shop	Lock & Tag Requirements:	2	



Procedure for locking out Mazak QTV250 CNC Lathe #1501 in Bundoora East Machine Shop (253.01.001)



ALWAYS PERFORM A MACHINE STOP BEFORE LOCKING OUT DISCONNECTS

ENERGY SOURCES

ENERGY SOURCE	DEVICES	LOCATION	METHOD	CHECK	
E1	Electrical - 480 VAC	Lock	Main Disconnect switch E-1	Open Disconnect and Lock Out	Attempt Restart at CP-1
P1	Pneumatic - 120 PSI	Lock	Main Air Supply Valve P-1	Close Valve and Lock Out	Verify Pressure is Bled Off
CP1	Control Panel On/Off	N/A	Control Panel	Press	Attempt Restart

	Shutdown, Lockout/Tryout Steps
	<ol style="list-style-type: none">1. Notify the affected employees and identify the energy sources.2. Press the E-Stop button on the control panel.3. Press the Control Power OFF (CP1) button on the control panel.4. Turn the Main Disconnect Switch OFF (E1). Apply lock and tag.5. Close the main air supply valve (P1). Apply lock and tag.6. ELECTRICAL ISOLATION ONLY – use standard work practices to remove residual or stored voltages from capacitors and components.7. Verify isolation by doing the following<ul style="list-style-type: none">• Pull out the E-Stop button on the control panel.• Press the Control Power ON (CP1) button.• Verify that unit does not power up.
	Restore to Operation Steps
	<ol style="list-style-type: none">1. When the servicing or maintenance is completed, and the machine or equipment is ready to return to normal operating condition, the following steps shall be taken:2. Check the machine or equipment and the immediate area around the machine to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact.3. Verify that the controls are in proper position prior to re-energizing equipment.4. Remove the lockout devices and reenergize the machine or equipment in the reverse order in which they were applied.5. Notify affected employees that servicing is complete and the equipment is ready for operational test.

APPENDIX 2

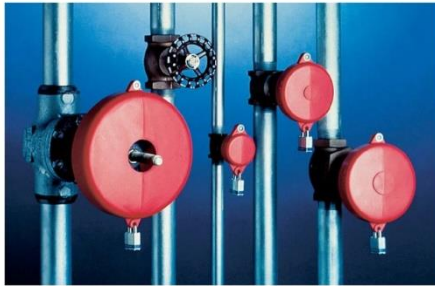
Safety Padlock



Lock Out Hasp



Valve Lock Out



Electrical Lock Out



Tags



APPENDIX 3

Template available HR-PR52-TM02 – LOTO Register Template

Lock Out / Tag out (LOTO) REGISTER										
College / Portfolio		School / department			Operational Leader Name		Contact			
Lock / Tag No.	Plant / Equipment / Installation / Service Line Name:	Reason for LOTO	Initiated				Released			
			Time	Date	Name	Initials	Time	Date	Name	Initials
		<input type="checkbox"/> ...Repair <input type="checkbox"/> ...Maintenance <input type="checkbox"/> ...Commissioning								
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