MACHINE SAFETY STARTS WITH YOU.

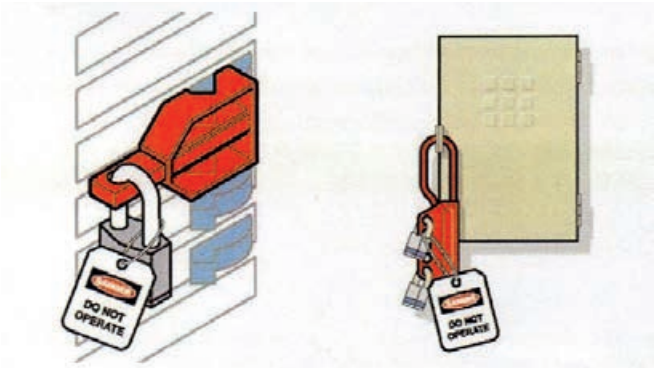
ISOLATION OF PLANT - LOCK-OUT / TAG-OUT

Machine Isolation is an integral process to ensure that workers who are required to provide Maintenance and Repair of plant are safe as possible to carry out their work.

Clause 210 – Operational controls (1) (d) of the Work Health and Safety Regulation 2017 requires a Person Conducting Business or Undertaking (PCBU) at a workplace must ensure that any operator controls are, "able to be locked into the "off" position to enable the disconnection of all motive power".

For a detailed explanation on what is good practice for a PCBU to have in the workplace, read clause 4.5 "Isolation of energy sources" of the SafeWork NSW's *Code of Practice – Managing the risk of plant in the workplace* (SW03838)

Figure 1: Locking off methods incorporating danger tags



Danger tagged circuit breaker locking off devices

Danger tagged locking off hasp

An isolation procedure is a set of predetermined steps that should be followed when workers are required to perform tasks such as maintenance, repair, installation and cleaning of plant.

The procedure also should include the steps used to check and finalise/validate the completion of the work and the removal of tags and locks.

Safe isolation procedures (including the use of locks and tags) should be developed in consultation with relevant workers.

Isolation procedures involve the isolation of all forms of potentially hazardous energy so that the plant does not move or start up accidentally. Isolation of plant also ensures that entry to a restricted area is controlled while the specific task is being carried out.

THE LOCKOUT PROCESS

The lock-out process is the most effective isolation procedure. The process is as follows:

- shut down the machinery and equipment;
- identify all energy sources and other hazards;
- identify all isolation points;
- isolate all energy sources;
- control or de-energise all stored energy;
- lock out all isolation points;
- tag 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; and
- steps used to check and finalise/validate the completion of the work and the removal of tags and locks.

In, order for the isolation procedure to be effective, you should identify all energy sources likely to activate the plant or part of it and isolate or de-energise these to avoid the plant being inadvertently powered. Energy sources include:

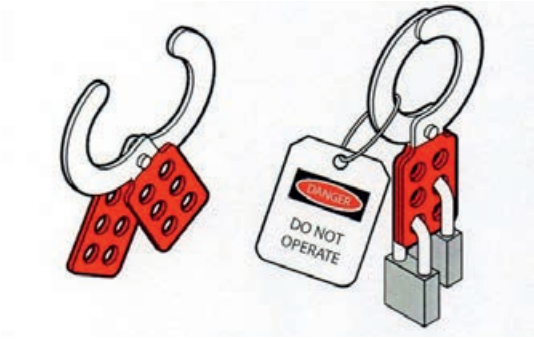
- electricity (mains);
- battery or capacitor banks;
- solar panels;
- fuels;
- heat;
- steam;
- fluids or gases under pressure (water, air, steam or hydraulic oil);
- stored energy (e.g. compressed springs);
- gravity; and
- radiation.

Appropriate instruction, information, training and supervision must be provided to everyone who may be affected at the workplace to ensure that the plant has been isolated from all types of supply such at electrical, hydraulic and pneumatic and is not inadvertently re-energised.

In, order to, isolate plant, you should use a device that effectively locks out the isolation points. These devices include switches with built-in locks and lock-out circuit breakers, fuses and valves. Other devices include chains, safety lockout jaws (also known as hasps) and safety padlocks.

When isolating an energy source, you should use a lock that allows one or more padlocks to be fitted. If more than one person is working on the plant at the same time, you should ensure that each worker is able to attach a padlock to the device (see Figure 2). This will prevent access to the energy sources while the work is being carried out.

Figure 2: Example of lock-out hasp with a tag and the padlocks of two workers



Another way to allow multiple locks to be used is to have one padlock on the isolation point, with the keys locked in a box that has been locked separately by each worker.

Each worker involved in the maintenance, cleaning or repair of the plant should have a lock, tag and key for each isolation point. There should be no duplicate key for any lock, except a master key that is kept in a secure location and should only be used in an emergency.

If more than one energy source needs to be isolated to enable safe shut-down of the plant, the single key to each lock-out device should be held by the same person.

Tags should only be used as a means of providing information to others at the workplace. A tag should not be used on its own as an isolation device; only a lock is effective at isolating the energy source.

Figure 3: Example of a danger tag and out of services tag

DANGER TAGS

Isolation involves using suitable warning or safety signs such as Danger Tags, as well as locks or other controls to secure the isolation.

Where possible, a tag should be attached with the padlock to normal locks (as shown in Figure 1) at all points of isolation used to isolate the plant.

The danger tag should be durable and securely fixed to the point of isolation; clearly state the warning, including any warning about the specific hazards relating to the isolation; be dated and signed by the worker or workers involved in the carrying out of the work or, where appropriate, by the supervisor in charge of the workers; be attached in a prominent position on each isolation point (or one of many points used to isolate) the machine.

When work is finally completed, the padlocks and tags may only be removed by the signatories to the tag. If unavailable and unable to return, measures must be put in place to manage risk associated with removing the lock or tag (e.g. through investigation to ensure all workers and others at the workplace are safe).

OUT OF SERVICE TAGS

Out of services or caution tags are used to identify plant that is not safe to use or fit for purpose. The out of service or caution tag should be durable and securely attached; clearly state the nature of the defect or reason why the plant is unsafe; be attached on a prominent position on each isolation point; only be removed by a competent person after fixing or rectifying the defect and making the plant safe, or replacing with a danger tag in preparation to work on the plant; only to be removed by the signatories to the tag. If unavailable and unable to return, measures must be put in place to manage risks associated with removing the lock or tag.

REFERENCES

Work Health and Safety Regulation 2017; clause 210.

For further information refer to:

- *SafeWork NSW Code of Practice – Managing the risk of plant in the workplace (SW03838); 4.5 Isolation of energy sources*
- *SafeWork NSW Code of Practice – Managing Electrical risks in the workplace (SW08288); 6 Low voltage isolation and access; 6.1 Securing the isolation.*

Relevant Australian Standards:

- *AS/NZS 3000:2018 Electrical installations "Wiring Rules"; 2.3.2.2 Devices for isolation – 2.3.2.2.1 General*
- *AS/NZ 4024.1201:2014 afety of machinery – General principles for design - Risk assessment and risk reduction - 6.3.5.4 Measures for isolation and energy dissipation*
- *AS 60204.1:2005 Safety of machinery – Electrical equipment of machines; Part 1 – General requirements - 5.3 Supply disconnecting (isolating) device; 5.3.1 General; 5.3.2 Type*