MACHINE SAFETY

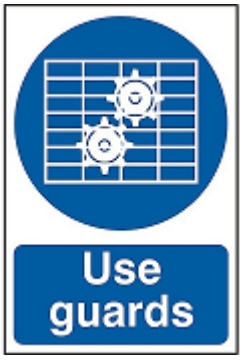
1. Normal Operation

The normal operation of powered machinery, irrespective of whether it is part of a research project, requires that:

- The operator is trained and where necessary supervised.
- The machine is used correctly and maintained.
- The machine has been assessed and fitted with guards such that access to moving parts is controlled and flying debris is contained.

Where, as part of normal operation, it is necessary that movable parts are accessed then adequate procedures must be in place to prevent accidental energising of equipment. The procedures are dependent on the hazards identified during any risk assessment and the type of operations being performed. For example, it is normal practice in workshops to have to change tool bits on lathes or other machines and therefore any risks are identified during an extensive training but in research equipment where no standard practice has been established then the procedures may need to be determined and written in to a procedure which operators must follow.

2. Guards and Interlocks



Guards must be fitted to machines such as lathes, mills, drill, saws where there is a risk of serious injury from rotating or moving parts. Guards should be linked, wherever possible to an electrical interlock so that the machine cannot operate unless the guards are in place. In some cases, it may be necessary to remove the guards in order to machine an object which cannot be accommodated otherwise. In this case a risk assessment is required before the guards are removed and once the job is finished the guards must be restored before the next job. CNC machines are designed with interlocked guards for normal operation.

3. Machine Maintenance

During maintenance of any powered machinery it is often necessary to open it up and work on the motors, belts, gear wheels etc. In this case hands are in close proximity with the moving parts which could accidentally start up if nothing is done to prevent it.

To prevent a machine from being accidentally energised lockouts are available in most laboratories and in the workshops. Lockouts are means by which the electricity can be prevented from being accidentally switched on by having padlocks or padlocked devices fitted around the machine switch or isolator. Advice on the most appropriate method can be obtained from the Local Safety Advisor.

4. Test and Experimental Machines

Many test and experimental machines used in load and compression testing, often to destruction, have the potential to cause harm from crushing injuries or flying materials.

The operation of any test and experimental machines is not normally permitted without academic or technical supervision. Users must undertake appropriate training and observe precautions identified in risk assessments and/or standard operating procedures protection.

5. Noise

Equipment (e.g. machine tools, shakers, air lines, compressors) which exposes people to harmful levels of noise needs to be controlled. Generally, if you need to regularly raise your voice to be heard over equipment noises, a risk assessment should determine what control, if any, are necessary.

Anyone who has any concerns regarding noise levels should contact the LSC who can arrange for noise levels to be measured and advise on suitable methods to minimise exposure to harmful levels.

6. Metal Working Fluids (MWF)

Metal Working Fluids (MFLs), often referred to as coolant, are used in machines such as lathes, mills and grinders to aid the cutting process. The fluids is supplied in 20L drums for dilution before being added to the machine. Contaminated waste is normally pumped or drained out to be stored awaiting disposal MWF is disposed of through the University's waste chemical uplift.

The risk to health from MWFs include dermatitis (through regular skin contact) and asthma or lung disease (through inhalation of MWF mist).

These risks to health increase as the composition of the MWF deteriorates in-use becoming contaminated by tramp oil, soluble metals, metal fines, and microorganisms (bacteria, yeast and fungi). Overuse of biocides to inhibit microorganisms in MWF may also present health risks to operators.

An early indication of dermatitis is itching and red patches in the skin. Other symptoms which may later develop include dry cracking skin, swelling, pain, and in some cases blisters and open sores.

Actions to minimise these risks:

- The main concern should be for 'wet work' as a cause of dermatitis.
- Refer to the MWF supplier's safety data sheet (SDS) to check for ingredients classified as substances causing irritation or an allergic skin reaction. In these circumstances either use alternative products or take appropriate measures to prevent skin contact and contamination of clothing.
- Use suitable control measures to minimise skin contact with the MWF before using suitable personal protective equipment.
- Close-fitting disposable gloves may be required to prevent MWF and chemicals from contaminating the skin. If disposable gloves (e.g. disposable nitrile) are required, they must easily tear to minimise risk of entanglement in moving machinery.
- Wash hands, arms and any other exposed skin before taking a break and at the end of a shift. It is essential to dry the skin well e.g. between the fingers where moisture can be retained.
- Use a good skin care regime which includes regular use of moisturising cream.
- Employers can encourage good practice by providing soap/moisturiser dispensers, disposable paper towels and hand cleaning charts.

Early indications of asthma or lung disease are unexplained coughing, recurrent chest infections, breathing difficulty and weight loss. The sooner the illness is recognised and the operator removed from exposure, the less likely permanent lung damage will occur. Those who already have asthma before working with MWF may be at risk of aggravating this condition if they inhale MWF mist.

Exposure to MWF mist should be minimised by enclosing the work processes where reasonably practicable and by using LEV and mist filtration units. These controls need to be maintained and checked on a regular basis

Revision Record			
Issue	**Name**	**Date**	**Reason for review**
1	ES	31/5/2022	Transfer from main handbook
	ES	26/8/2022	Added alt text for images