

**EEE WORKSHOP SAFETY HANDBOOK**

This handbook provides generic guidance for people who run and work in the workshop at EEE.

**General Rules**

- Safe working practices must be observed and adhered to by all workshop users and enforced by the person in charge of the area.
- Due to high-risk activities taking place, access to the workshop is restricted to authorised personnel only.
- Visitors, contractors, and other staff should enter only via prior arrangement and under supervision. Estates & Security may access in an emergency unsupervised but where possible, should contact department technical/safety staff for advice before entry.
- No person shall use machinery when tired, taking medication or under the influence of drugs or alcohol.
- Food and drink must not be consumed or brought into the workshops.
- All staff in the workshop will be made aware of local emergency procedures in the event of serious physical injury in the area. Emergency contact information must be displayed at emergency phone points together with contact details for local first aiders.

**Risk assessments**

- All supervising workshop staff must complete the eLearning course 'Principles of Risk Assessment' and attend the 'Risk Assessment for Workshop Users' training course.
- All workshop activities must be assessed for risks using UCL [riskNET](#)
- Risk assessments (including CoSHH assessments) should be reviewed annually, or whenever new machinery or techniques are introduced.
- Working practices and risk assessments must be reviewed whenever new safety notices are issued by equipment manufacturers.

**Training and Competency****Competent persons**

- The Workshop Manager is responsible for all aspects of safety within the workshop.
- A competent authorised person(s) list should be displayed at the entrance to the workshop.
- Only competent authorised persons are permitted to use machines and equipment unsupervised.
- Competence is ensured through:
  - a) Employment of staff with professional mechanical engineering experience and knowledge of safe working practice, determined through the application & interview process. New staff will also receive a workshop induction to familiarise them with local practice from the Workshop Manager.

- b) In-house safety training to UCL standards for operation of workshop equipment and safe hand tool techniques, for all workshop staff, wherever available. This training is refreshed every three years.
  - c) Whenever new machinery is installed or new techniques required, training in safe operation will be organised with the manufacturer, or specialist outside training agencies as part of continuous professional development.
- Whenever a person who is not yet considered by the workshop manager to be fully competent, has need to use a particular machine, then the workshop manager shall arrange for the operator to be supervised and ensure that only safe methods of working are followed.

## **Training**

- Only those staff members who have received appropriate technical training in relation to workshop machinery will be allowed to operate machinery unsupervised.
- Workshop training should include,
  - I. Workshop induction: basic skills and knowledge common to all machines. This will include aspects of good housekeeping plus knowledge of the relevant legislation.
  - II. Machine specific training: basic skill in the operation of the specific machine, including the position and function of emergency stops; basic safety rules related to the operation of a machine or class of machines; the use and adjustment of guards and safety devices.

## **Workshop practices and personal protective equipment**

- Appropriate clothing must be worn when in the workshop. The Workshop Manager will determine what is deemed appropriate.
- Loose clothing, for example ties, necklaces, chains, etc. present a danger when using rotating machinery are prohibited. Long hair must be covered or tied back as appropriate.
- [Personal Protective Equipment \(PPE\)](#) is supplied and must be used where necessary.
- All staff are provided with safety spectacles or prescription safety glasses as appropriate, and these are mandatory in the workshop. Safety goggles are also available where appropriate. Work gloves and workshop coats are required for work with exposed tooling and hand tools.

## **Hazards & Controls**

### **A. Physical injuries: minor cuts/abrasions/bruising, through to major lacerations/crush injuries & amputations/serious abrasions**

- All staff should receive training in the safe use of cutting & grinding equipment via in-house safety training 'Safe Use of Abrasive Wheels'
- Lighting in the workshop should be of sufficient brightness and does not present a strobing risk with moving machinery.

### **Hand tools, blades, and portable power tools:**

- Power tools should not be left unattended.
- Both hand & power tools should store safely and securely when not in use

**Machine tools** have interlocked enclosures or guards as far as is practicable. All machine tools have guarding- all dangerous movements, not only tool elements, are guarded.

All machine tools have emergency stops. Power e-stops are positioned on each wall. The power for the workshop is key controlled. Before inspection, cleaning, maintenance and repair, machines must be switched off and isolated.

### **Sharps:**

- Sheet metal and other sharp-edged items should not leave or stored in walkways.
- Cut materials not left unattended in bench vices.

### **B. Inhalation of dusts & particles**

- The workshop has a dedicated area for dusty work, with local extraction to exterior. All work that may cause large amounts of dust and particulates should be carried out in this area. Staff are provided with respirators (appropriate for the work) when doing dusty work.
- All open cutting machinery that generates dust should have local extraction and filtration.
- Sand blasting should take place in a filtered enclosure.

### **C. Eye injuries**

- Machine tools have interlocked enclosures or guards as far as is practicable. All machine tools have guarding. Machines are not cleaned using compressed air to blow material away – industrial vacuum cleaners or brushes are used.
- Eye protection equipment are mandatory in the workshop.
- Eye wash should be available in the workshop.
- Welding masks – with appropriate filtering- should be worn during welding. These provide protection against flying sparks and eye damage.
- Lasers used in laser cutting are fully enclosed and effective class 1. Alignment is done using low power lasers of class 2 or below. All lasers used in laser level devices and similar tools shall be restricted to class 2 or below.

### **D. Fire**

- No flammable gases are used in the workshop.
- Staff must keep aware of the ignition point of materials while using heat sources.
- Flammable material or waste should not be stored or accumulated within the workshop, particularly near to doorways and fire exits.
- Flammable chemicals are stored in fire-safe, clearly labelled cabinet in ‘dirty’ part of the workshop. This is kept locked, and the key kept in the workshop key safe. The fire hazards of any chemicals used must be considered in COSHH assessments.
- The workshop has automatic fire detection (heat).
- A CO<sub>2</sub> Fire extinguisher is provided near the main entrance and a second CO<sub>2</sub> cylinder is located near to the main 3D printer.
- All staff should complete mandatory UCL’s fire safety eLearning module and receive a local fire safety induction.

### **E. Burns**

- Staff should follow safe work practice when handling hot tools, e.g., soldering irons and blow torches. Soldering irons should not be left unattended while hot. Blow torches should be handled with care, should not be left active and users should wear appropriate PPE e.g., Safety glasses and heatproof gloves while handling them.
- Welding gloves and protective coats are worn while doing welding work.

- Laser cutters should be class 1 enclosed type only.

## **F. Noise and vibration**

- Ear defenders or ear plugs should be used where significant noise can't be avoided.
- Use of powered hand tools is the only significant exposure to vibration and their use is too limited to cause long term effects.

## **G. Trips, slips, and falls.**

Trips, slips and falls can be avoided by:

- Keeping walking routes around workshop clear of materials, equipment, and waste.
- Keeping entrances and exits clear, especially fire exits.
- Keeping a working distance of at least 1m+ from other workstations when operating equipment/machine tools- e.g. avoiding 'back to back' working
- No trailing cables unless covered by an anti-trip cover.
- Cleaning up any spills of liquids
- Limiting the use of high-level storage
- Step stools/ladders are to be for working at height. Where heavy items are to be retrieved, this should be done by two persons.

## **H. Manual handling & lifting**

- Staff doing manual handling tasks should complete UCL 'Manual Handling and Lifting' training course.
- Manual lifts are limited to 25kg per person and Dual lifts are limited to 50kg.
- Sack barrows are available for moving items (or groups of items) up to 50kg. Skates may be used for moving heavier single items.
- Staff involved in moving heavy goods should wear suitable foot ware/safety shoes.

## **I. Mechanical lifting and handling**

- Heavier items should be handled using mechanical or powered lifting equipment.
- Pallet trucks are used for moving palleted goods. A lifter/manual forklift is available for raising or lowering heavy items. The weight limits and tip limits of equipment should be followed.
- Moving heavy items by mechanical means should not be carried out as lone working activity. A spotter should be always available to assist.

## **J. Electrical hazards**

- Portable mains electrical equipment should be regularly visually or electrically checked to ensure it is safe to use. Power tools should be visually inspected before and after each use.
- Workspaces should be checked for cabling that may be accidentally cut before work with power tools takes place.
- Trailing electrical cables (which may be damaged easily) should be avoided where at all possible. If necessary, they should be covered by an anti-trip cover.
- Three phase equipment (generally large and fixed in place) should undergo an electrical safety check when installed.
- Department emergency plans & guidance should be followed for procedures dealing with electrical shock casualties.

**K. Chemical hazards**

- All hazardous chemicals should be subject to an appropriate COSHH assessment. Use of these chemicals must comply with controls required by these assessments.
- An inventory of any hazardous chemicals in use should be maintained.
- An appropriate storage location should be maintained for chemicals, with appropriate security and fire resistance for the materials stored.
- Appropriate hazard signage should be displayed in areas where hazardous chemicals are used and/or stored.
- Hazardous chemical waste must be disposed according to UCL and departmental procedures.

**L. Pressure systems**

- Compressed air is used in the workshop at 6 bar / 100psi pressure.
- Safety points should be installed on compressed air guns to avoid accidental injection.