

## **Mechanical Workshops**

### **Introduction**

There are a number of mechanical workshops located within the Department of Physics. Most of these are staffed by, and may only be used by, authorised technical personnel. Heads of these workshops should be consulted about the required standard of technical drawings for any proposed work and current waiting times before such work can commence. The relevant research group head must sign all technical drawings submitted to the workshop.

In addition to the mechanical workshops mentioned above there is a Research Workshop in the Clarendon Laboratory that may be used by members of staff and students under supervision after suitable training.

### **General Safety Precautions in Mechanical Workshops**

- Proper maintenance and training can prevent many accidents due to the incorrect or careless use of tools, the failure of equipment and defects in power supplies and services.
- Electric cables, gas, water and compressed air lines should be inspected regularly and kept in good repair. They should not be allowed to trail across the floor where they can trip passers-by or be severed by falling objects. Where a cable or pipe has been temporarily laid across the floor, a strip of angle iron can be placed over it as protection.
- Never use files or deburring tools that have missing or damaged handles.
- Check that hammerheads are tight and handles undamaged.
- Use ring spanners whenever possible and discard open ended spanners if the jaws are spread or damaged.
- Keep hand tools, especially sharp or pointed ones, in racks.
- Metal is heavy. Stores racking must be of adequate strength and large pieces or sheets of metal must not be stacked where they can fall and cause injury.
- Laboratory coats (or coveralls), safety eyewear with side shields and safety footwear must always be worn in the workshop.
- Always use the installed fume and dust extraction systems when hard or soft soldering, welding, using a circular saw etc.

### **Machine Tools**

- Loose clothing, rings, gloves, bandages and especially long hair are very serious potential hazards when using rotating machines.
- Ensure that the correct guards are fitted to all machinery and that all safety devices are working.
- Make sure that you know how to switch the machine off in an emergency. Emergency controls should be conspicuously labelled.
- Machine tools should never be left running unattended, unless they are designed to do so.
- Allow machine tools to stop completely before changing gears or lubricating. Remove drills, lathe tools and cutters etc. before cleaning down. Lower mechanical saw blades when not in use.
- Steer swarf with a stick and wear leather gloves to clear it. Never attempt to handle moving swarf with bare hands.
- Do not leave chuck keys in lathe or drill chucks.
- Use a vice or clamps to secure the work piece when drilling.
- Use steadies and proper fixings when turning long work pieces.

- Support long lengths of rod protruding from the headstock and arrange a conspicuous barrier around the moving metal.
- Fit counterweights to out of balance work on a faceplate.
- Ensure that the material with which you are working does not present a fire or toxic hazard.
- Compressed air must not be used to clean swarf from machines. Always use an industrial vacuum cleaner or brush.

### **Grinding Wheels**

Grinding wheels are a particular hazard and must only be changed and dressed by authorised persons whose names should be displayed in the workshop.

- NEVER operate a grinding wheel or rotary wire brush without eye/face protection.
- Do not clog grinding wheels with soft material as this may later cause them to shatter.

### **Lifting Appliances**

- Cranes, power hoists, forklift trucks etc. must only be used by authorised staff. The safe working load (SWL), which should never be exceeded, must be indicated in a conspicuous position. Remember that serious damage can be caused by trying to pick up a load which is bolted down!
- Ropes, slings, eyebolts etc. must be registered, inspected and marked with the safe working load (SWL).
- Floor loading should be checked with the University Surveyors before installing heavy equipment in upstairs rooms.
- Lightweight trolleys should not be used for transporting heavy loads. The combination of a light trolley, a heavy load and a high centre of gravity is a common source of accidents.

### **Working in the Research Workshop within the Department of Physics**

All the safety precautions detailed above apply. There are, however, additional Departmental rules applicable to all intended users of the Research Workshop. These are given below:

- Staff and students must always consult with the Research Workshop supervisor prior to commencing work.
- Only authorised personnel may enter the Research Workshop.
- Two people must be present at all times when using machine tools. There are two levels of authorisation for carrying out work within the Research Workshop –

Level one:            Use of hand tools only

Level two:            Use of both hand and machine tools.

For your level of authorisation please consult the list displayed in the Research Workshop.

NB. If you are not on the list – you are not authorised to work in the Research Workshop.

- Unauthorised personnel who are members of the Department may apply to the Research Workshop supervisor to be taken under instruction or included on the authorised list.

NB. The supervisor's assessment of competency is final.

- Personnel from departments outside of the Physics Department wishing to use the Research Workshop facilities must initially apply to the Head of Services (responsible for management of the workshops) for ad hoc consideration of their needs.
- Personnel under training and instruction must only use the hand and/or machine tools as instructed by the workshop supervisor or deputy.

- All work activities must comply with the requirements of the Health and Safety at Work etc. Act 1974, the Management of Health and Safety at Work Regulations 1992, the University Safety Policy, University Policy Statements and the Department of Physics Statement of Safety Organisation.
- Materials used on private work are chargeable to the user.  
NB. Laboratory insurance does not cover personnel engaged on private work.
- The Research Workshop is not a garage. Work connected with motor vehicles will be restricted to components of reasonable size and proper standards of cleanliness.
- Machine tools must be left in a clean condition and hand tools put away after use.