

9.0 **Equipment Safety**

Departments purchasing new or used equipment are responsible for ensuring that all required and necessary safety guards and systems are in place and properly functioning before using the equipment. The fact that a piece of equipment is new is no assurance that it meets MIOSHA requirements for operator protection and guarding or is safe to operate.

Employees and students are responsible for replacing any guards that have been removed for maintenance or adjustments before operating the equipment and for reporting any missing guards to their supervisor so they can be replaced before the equipment is put back into operation.

Students and employees who operate equipment subject to the lockout provisions of the University Hazardous Energy Control Program must receive training in those procedures prior to operating the equipment.

9.1 **Grounds Keeping and Heavy Equipment**

Grounds keeping and heavy equipment including lawn tractors, end loaders, dump trucks, and road graders must be operated and maintained according to the manufacturer's instructions. Operators must be trained according to the manufacturer's operating instructions as well as any applicable equipment-specific MIOSHA standards before operating the equipment unsupervised. Applicable personal protective equipment such as hand, foot, eye, and hearing protection must be selected by the supervisor with assistance from Occupational Safety and Health Services and worn at all times by the equipment operators.

9.2 **Forklifts and Powered Pallet Jacks**

Forklifts and powered pallet jacks must be maintained according to the manufacturer's instructions and meet the requirements of the applicable MIOSHA standards. Forklift operators must be trained in the operation of the equipment under the direct supervision of a qualified trainer. The employee must receive safety training within 30 days of the start of operator training. Occupational Safety and Health Services provides forklift safety training by request.

Pallet jack operators must be trained in the safe operation of the equipment before operating unsupervised. Training shall be provided by a qualified supervisor or designated person.

9.3 **Cranes**

Cranes shall be operated, inspected, and maintained according to the manufacturer's instructions as well as the MIOSHA safety standard applicable to the particular crane. Operators shall be trained in the safe operation of each type of crane they will operate by a qualified supervisor or designated person before operating the crane unsupervised. No crane shall be installed or used without a capacity certification label attached and visible from the floor. User manufactured cranes must be rated and certified by a qualified professional engineer.

9.4 Metal- and Woodworking Machinery

Employees who work in metal or wood shops must be qualified by education and/or apprenticeship in the operation of the equipment and must also be trained according to the applicable requirements of MIOSHA General Industry Safety Standards Parts 26 and 27. Operators should also be familiar with and follow the manufacturer's operating and maintenance instructions.

Adequate space must be provided for aisles, layout, material handling, and machine setup and maintenance.

9.5 Welding and Cutting

Only employees who have been properly trained and authorized by their supervisor may perform welding and cutting operations using electrical or fuel gas operated equipment. In addition, authorized employees must also be trained in the safe operation of the equipment, and the MTU Confined Space Entry and Hot Work programs. Equipment must meet the requirements of MIOSHA General Industry Safety Standards Part 12. In addition the supervisor shall select and provide personal protective equipment according to the requirements of MIOSHA General Industry Safety Standards Part 33 for welding and cutting operations.

The principle hazards to welders are: fire, burns, electric shock, metal vapor poisoning, bruises, and explosions of compressed and/or flammable gases.

The welder's clothing should be non-flammable, have no pockets, cuffs, or folds, and must completely cover all skin areas. A long leather apron with a high bib is desirable for outer clothing. Gloves with long gauntlets prevent metal from burning the welder's wrists. Shoes should have tops high enough to extend up inside the trouser leg. Ears should be covered only when goggles are worn.

Appropriate eye protection must be worn at all times. All faculty, staff, students, and visitors are required to wear eye protection in areas classified as eye-hazardous, including protection from welding flash. Detailed requirements are outlined in the MIOSHA Face and Eye Protection Standard (Part 35) available from OSHS.

Be sure the arc welder is insulated and transformers are grounded. Dry leather gloves and non-conductive flooring are standard.

Metals with coatings of lead, zinc, cadmium and other toxic metals offer fume hazards in welding operations. Other noxious fumes, depending upon the base metal being welded and the welding rods used, can include the oxides of nitrogen and carbon, copper, manganese, selenium, silica, arsenic, titanium, and fluorine. Proper ventilation must be provided.

9.6 Department-Specific Equipment

Departments are responsible for establishing safe operating and emergency response procedures and training for students and employees who operate or work near hazardous equipment. Examples of hazardous equipment include high energy magnets, robots, injection molding machines, power presses, pressure vessels (see Pressurized System Safety Guide), lasers (see Laser Safety Guide), cryogenic gas storage and delivery systems, etc.

9.7 Lockout of Hazardous Energy Sources

Employees authorized by the University to perform maintenance or repairs on machines and equipment in which the unexpected energization or startup could cause injury must be trained in accordance with the provisions of the University written Hazardous Energy Control Program for authorized employees. All other employees who operate or work near such machines or equipment must be trained in accordance with the provisions of the University written Hazardous Energy Control Program for affected employees.

Each department responsible for the operation of machines or equipment which could cause injury due to unexpected energization or startup during maintenance or repairs is responsible for establishing a written lockout procedure for each machine. Either the written lockout procedure or directions to its location must be posted where it will be visible from the point of operation of the equipment.