Purpose

This section establishes important minimum requirements for those persons responsible for the maintenance, repair, cleaning, servicing, and/or inspecting of energized machines and equipment.

On the Carroll Community College campus, the County Facilities Maintenance personnel, along with licensed contractors, are the authorized employee types to perform Lockout/Tagout procedures. College employees are affected by Lockout/Tagout and as such must be aware of the minimum requirements defined in this section.

College employees at times are required to tag plug-in types of equipment as “Out of Service,” as defined in Section 8 of the Procedures below.

Definitions

1. Affected Employee - An employee whose job requires them to use or operate a machine or equipment in which servicing, or maintenance, is being performed under lockout and tagout, or whose job requires them to work in an area where such servicing or maintenance is being performed. All employees in the facility are affected employees.

2. Authorized Employee - An employee who locks out and tags out machines or equipment in order to perform the servicing or maintenance on that machine or equipment.

3. Clear - To prepare equipment by isolating and placing it in a safe condition to avoid injury or damage if equipment should unexpectedly start during the "Try" step. This includes removing and warning personnel.

4. Energized - Connected to an energy source or containing residual or stored energy.

5. Energy Isolating Device - A mechanical device that physically prevents the transmission or release of energy. The term does not include a push button, selector switch, or other control circuit type devices.

6. Energy Source - Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

7. Fixed Electrical Equipment and Circuits - Any equipment which is fastened in place or connected by permanent wiring methods.

8. Hot Tap - A procedure used in the repair, maintenance, and services activities that involves welding on a piece of equipment under pressure in order to install connections or appurtenances. If hot tap operations are performed at a location, a Supervisor for the hot tap must be appointed and an instruction sheet for the hot tap prepared.

9. Lockout and Tagout - The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated without removal of the lockout device.

10. Lockout Device - A device that uses a positive means such as a lock, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. This device shall:

    a. Be used only for controlling energy, not other purposes;

    b. Be durable;

    c. Be standardized by color, shape, or size;

    d. Be substantial enough to prevent removal absent excessive force; and

    e. Indicate the identity of the employee applying the device(s).

11. Procedures - The document specifically prepared for specific types of equipment containing such information as the energy isolating devices and their identification, type of energy isolating devices, presence and location of any stored energy, any appropriate procedure for lockout, Supervisor's name, authorized employees' job titles, and equipment location. A procedure will be prepared for each type of machinery or equipment at the location covered under this Lockout/Tagout section. Preparation of the procedures will be the responsibility of the Supervisor who has been assigned responsibility for the machinery or equipment.

12. Servicing and/or Maintenance - Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. This includes lubrication, cleaning, or unjamming of machines or equipment and making adjustments or tool changes where the employee may be exposed to the unexpected energization or start-up or release of hazardous energy.

13. Supervisor - The supervisory or management person appointed with responsibility for the specified machine(s) or equipment.

14. Try - To test equipment to ensure the effectiveness of the lockout and the removal of stored energy.

References

29 CFR 1910.147	The Control of Hazardous Energy (Lockout/Tagout)
29 CFR 1910.333	Selection and Use of Work Practices (Electrical)

General Overview

1. There are two basic types of energy, kinetic and potential. Kinetic energy is the actual movement or force behind a machine or a piece of equipment, found in blades, belts, rotating flywheels, and also in air, gas, steam, or water pressure. Potential energy is stored energy such as overhead-suspended loads, springs in air brake cylinders, and elevated machine parts.

2. Most energy in the workplace occurs in one of the following forms:

    a. Electrical energy is present in circuit breakers, transformers, motors, etc. It is probably the most common energy source which employees encounter.

    b. Hydraulic potential energy is fluid under pressure, such as found in lift trucks and hydraulic cylinders.

    c. Pneumatic potential energy is air under pressure, such as found in air compressor tanks and air operated tools.

    d. Pressurized liquids and gases can include steam; chemicals; or water present in pipes, supply lines, storage tanks, and vessels.

    e. Mechanical energy is stored or built-up energy in springs or other mechanical devices.

3. Lockout/Tagout Failures - Most lockout/tagout injuries are caused by failure to properly follow procedures. The following are generally the causes that can be traced to most incidents. This program is written to address these areas:
    a. Failure to stop equipment.
    b. Failure to disconnect at the power source.
    c. Accidental restarting of equipment.
    d. Not clearing work areas before reactivation.

4. Follow Lockout/Tagout procedures whenever:
    a. An unexpected start-up or release of energy could cause injury.
    b. Repairs are being made.
    c. Maintenance is being performed.
    d. Clearing a jammed or blocked machine.
    e. Guards or other safety devices are removed or bypassed.
    f. A body part can be caught or trapped by moving machinery.

5. Lockout versus Tagout - Locks and tags are used for similar reasons, but each has its own specific uses and set of procedures.

    a. Lock out means actually placing a padlock or other type of locking device on a disconnect switch, circuit breaker, valve handle, etc., to lock it in the "off" position. Only the employee who placed the locking device should have the key to open it. Employees must always use their own locks. If a co-worker's lock is used, the co-worker would be able to remove the lock, leaving the employee unprotected. Only one key should exist for each lock. Master keying is not allowable. In an emergency situation, locks may be cut off or torched off.

        The employer will provide all locks and keys, tags, and other lockout/tagout materials. These materials must be durable and unable to be easily removed. Tags shall be made and printed in such a way that weather, wet conditions, or corrosive environments will not ruin the tag or make it illegible. Tags must indicate the name of the employee, department, time and date work began, and a description of the work that is being done. Tags should warn against hazardous conditions if the machinery or equipment is energized and include one of the following warnings:

        i. Do Not Start
        ii. Do Not Open
        iii. Do Not Close
        iv. Do Not Energize
        v. Do Not Operate

b. Tag out is not as effective as a locking device; therefore, do not use tags alone unless locks cannot be physically installed. The best option is to have both a lockout and tagout device in place. In situations where locks are not feasible or simply cannot be used, the employee must comply with the provisions of the lockout/tagout procedures, and the Full Employee Protection Procedure must be followed.

c. Full Employee Protection Procedure includes complying with all tagout related provisions plus implementing additional safety measures that can provide the level of safety equivalent to that obtained by using lockout. This might include removing and isolating a circuit element, blocking a controlling switch, opening an extra disconnecting device, or removing a valve handle to reduce the potential for any inadvertent energization.

   All newly purchased equipment must be lockable.

Procedures

Effective control can be maintained only by constant supervision and training. Only authorized employees using appropriate procedures are permitted to use the following procedures. If the machine or equipment is capable of being locked out, the lockout procedure shall be followed, otherwise, tagout only may be used.

1. Standard Lockout/Tagout Procedures

   a. Step 1 – Preparation for Shutdown

      i. Notify everyone in the affected area that a lockout/tagout procedure is beginning, identifying who, when, where and why.

      ii. Identify the type of energy system about to be shut down. Determine if there is more than one type of energy involved. Know the hazards associated with the particular type of system being worked on and the best methods for controlling those hazards.

      iii. Locate and identify all switches, valves, and other devices that will have to be locked and/or tagged.

b. Step 2 – Shut Down the Equipment

   i. Use normal stopping procedures to shut down the machine or equipment. Pull the plug, flip the power switch, break the circuit, pull the fuse, close the valve, or otherwise neutralize stored energy. Turn off the equipment and disconnect the energy source. It is important that whoever is working on the machines knows the machines, as some machines can be damaged if you pull disconnect switches while they are under a load.

   ii. Isolating the equipment goes beyond simply turning the power off. Isolate the system from every energy source feeding it, which may include closing valves, throwing main disconnects, and disconnecting or capping any auxiliary power sources, such as steam, hydraulic, or pneumatic systems. It is not enough to isolate equipment by simply pulling fuses. Disconnect at the source. Do not use control circuit devices, such as push buttons, selector switches, and interlocks, as the sole means for de-energizing circuits or equipment.

c. Step 3 – Lockout/Tagout the Energy Sources

   i. Attach lock and/or tag to the energy control switches in the "off" or "safe" position to prevent accidental start-up or energy release.

   ii. Test the disconnect to ensure it cannot be moved to the "on" position.

   iii. Do this procedure at all disconnect switches, valves, and other energy isolating devices.

   iv. If tags only are used, place them at the same point where locks would be attached. A tag should clearly indicate that removing it and reactivating the flow of energy is absolutely prohibited.

   v. Group lockout is used when more than one employee services the same equipment at the same time. Each employee must use their own lock and key. Larger jobs that involve a number of workers or a whole crew may require special procedures, including a special lock box that may be used to keep all the keys.

d. Step 4 – Release Stored Energy

i. Machines and equipment must be in "zero mechanical state." Zero mechanical state means the machine has been put in a state in which the possibility of an unexpected mechanical movement has been reduced to a minimum or eliminated. Do not overlook releasing residual energy by discharging capacitors, grounding circuits, or releasing built-up pressure.

ii. Check that all moving parts have stopped moving. Release trapped pressure, blank pipe flanges, install ground wires to discharge electrical capacitors, block or support elevated equipment, etc. Secure loose and moveable parts. Do not overlook remote control switches and timers.

iii. Take chemicals and vapors into consideration. Wear the required personal protective equipment.

iv. In some cases, stored energy can build up again after release. To prevent dangerous incidents during maintenance and repairs, check the status of stored energy throughout the process.

e. Step 5 – Test Equipment to Verify Isolation

i. Make sure no other employee is close enough to the equipment to be injured.

ii. Press all start buttons or other activating controls to make sure no power comes on and the equipment cannot operate.

iii. Return controls to the "off" position.

iv. Verify isolation periodically during maintenance.

v. Work is now ready to be performed.

f. Step 6 – Restoring Energy to Equipment and Machinery

i. When work is finished, make sure all tools have been removed, all lines reconnected or unblocked, all guards replaced, and the area is cleared.

ii. Verify that all controls are in neutral. Notify employees in the area that the lockout/tagout devices are being removed.

iii. Once all other employees are safely out of the way, remove lock and tag and turn machine or equipment on, testing to make sure it is working safely.

1. Never permit one employee to remove the lock of another employee.

2. Store locks in a safe place and keep in good condition.

iv. Sign tags and turn them in to the area Supervisor.

2. Temporary Removal of Lockout Device during Servicing - In the event a lockout device must be temporarily removed, and the machine or equipment energized to test or position the machine, the authorized employee shall ensure safety in the following manner:

a. Clear the machine or equipment of tools or materials and clear employees from the area.

b. Remove the lockout device.

c. Energize the machine or equipment and proceed with testing or positioning.

d. De-energize all systems and reapply energy control devices following the lockout/tagout procedures.

3. Compliance of Outside Personnel

a. When outside servicing personnel are involved in activities covered by this procedure, the outside employer shall be informed of this procedure and shall inform Carroll Community College of its own lockout and tagout procedure. If such personnel do not have lockout/tagout procedures as effective as the lockout-tagout procedures of the College, they shall follow the College's procedures.

b. Failure to follow safe and proper lockout/tagout procedures will result in a stop-work order and may include possible removal of personnel from the work site.

4. Removal of the Lockout Device in the Absence of the Authorized Employee

a. If the authorized employee is not available to remove their lock and/or tag, the devices may be removed under the direction of the Supervisor or their designee only after all of the following steps have been completed:

i. Certify that the authorized employee is no longer at the site.

ii. Make reasonable efforts to contact the authorized employee to inform them of the need to remove the devices.

iii. Ensure the authorized employee has knowledge of the removal before that employee resumes work.

5. Exceptions to the Lockout Procedure – Follow the lockout procedure for work on any machinery, except in the following conditions:

   a. Normal production operations, as long as guards or other protective devices are not deactivated or bypassed. If a guard or protective device is removed or deactivated, lock out the machinery before any work is performed.

   b. Work on cord and plug controlled equipment where energization is controlled by unplugging the equipment and the plug remains under the exclusive control of the employee performing the work.

   c. Hot tap operations involving gas, steam, or water lines where continuity of operation is essential, and shutdown is impractical. In this case, follow established procedures for the specific hot tap operation and use special equipment that is designed to protect employees from the zone of danger.

6. Types of Lockout:

   a. Individual Lockout - The employee will retain the key to the lock in their possession. Only the employee locking the machine is authorized to remove the lock, except under the special circumstance noted earlier.

   b. Group Lockout - If more than one individual is required to lock out equipment, follow one of the following group lockout procedures:

      i. Group Lockout of the Energy Isolating Device - The authorized employee in charge of the group is responsible for ensuring lockout/tagout procedures are followed. The authorized employees in the group are responsible for verifying the procedures are followed. Each person performing work on the equipment shall place their own personal lockout device on the energy-isolating device. When an energy-isolating device cannot accept multiple locks, a multiple lockout device (hasp) may be

used. As each person completes work and no longer needs lockout protection, they shall remove their lockout device.

ii. Group Lock Box - The authorized employee in charge of the group is responsible for ensuring lockout/tagout procedures are followed. The authorized employees in the group are responsible for verifying the procedures are followed. The only lockout device(s) affixed to the energy-isolating device(s) will be that of the authorized employee in charge. The authorized employee in charge shall place the key(s) to all lockout device(s) affixed to the energy isolating device(s) into a group lock box. The authorized employee in charge of the group shall place their personal lockout device onto the box. Each authorized employee involved in the servicing or maintenance task, will then place their personal lock onto the group lock box. As each person completes work and no longer needs lockout protection, they shall remove their lock from the group lock box.

c. Shift-Change Lockout - During shift changes, ensure the continuity of lockout protection. Any time a machine needs to be locked out across a shift-change the oncoming authorized supervisor shall secure their lockout device to the equipment before the leaving supervisor's is removed. In the event this sequence is not followed, and the lockout device is removed before the oncoming employee arrives, the oncoming employee must follow the entire lockout procedure before beginning work.

7. Fixed Electrical Equipment and Circuits:

a. Energized Fixed Electrical Equipment and Circuits – College employees are not permitted to work on energized equipment.

b. De-Energized Fixed Electrical Equipment and Circuits – College employees are not permitted to work on de-energized equipment which has not been properly locked out and tagged out.

8. "Out of Service" Procedure for Portable Equipment (i.e. appliances, vehicles, cleaning equipment, tools, etc.):

a. An "Out-of-Service" tag is different from a "Danger – Do Not Operate" tag. "Out of Service" tags are used to identify and remove from service, faulty and/or unsafe portable equipment. They are not to be used for Lockout/Tagout. "Danger – Do Not Operate" tags are used during lock-out, tagging and isolation of fixed

electrical equipment, for the purposes of cleaning, servicing, repairing or alteration.

b. Supervisors must ensure that employees have access to out-of-service tags, for implementation of this procedure.

c. Employees who become aware of equipment which is faulty or unsafe to use MUST:

    i. Turn off or de-energize equipment, if safe to do so.

    ii. Complete an out-of-service tag, ensuring that the tag describes:

        1. The equipment that is out of service,

        2. The reason the equipment is out of service,

        3. The name of the person completing the tag,

        4. The date.

    iii. Place the completed out-of-service tag on the equipment at:

        1. the point of isolation from the energy source; or

        2. the main control panel; or

        3. a prominent position.

    iv. Notify their direct supervisor immediately that the equipment was tagged out-of-service.

    v. Make arrangements (directly or through their supervisor) the equipment to be removed from the work area.

d. No person may use equipment that has been tagged with an out-of-service tag or remove the tag.

e. Returning to service:

    i. The authorized person returning the equipment into service MUST:

1. Review the reason why the equipment was removed from service; and

2. Verify that repair work is complete, and the equipment is safe to return to service; and

3. Return the equipment to the supervisor or their designee to be returned to service.

f. Removing the tag

i. An Out-of-Service tag may only be removed under the following conditions:

1. The authorized person has confirmed that the equipment has been repaired and is safe to use; and

2. The supervisor, after consulting with the person who initially placed the tag, confirms the equipment is safe to use.

Responsibilities

To facilitate compliance with the requirements of this Lockout/Tagout section, the following levels of responsibility have been established:

1. Coordinator of Environmental Safety and Health (ESH)

a. Responsible for ensuring this section meets all requirements of 29 CFR 1910.147

b. Responsible for management of employee Lockout/Tagout training and training records

c. Responsible for the maintenance and retention of records for the periodic inspection of Lockout/Tagout procedures

2. Departmental Supervisors

a. Responsible to ensure Lockout/Tagout procedures are written and available for any machine or equipment in which unexpected startup or release of stored energy could harm employees.

b. Responsible to ensure "Authorized Employees" are fully trained on Lockout/Tagout procedures specific to the machine or equipment being service, repaired, or maintained.

c. Responsible to ensure periodic inspection of Lockout/Tagout procedures are performed and given to the Coordinator of Environmental Safety and Health for retention.

3. Authorized Employees

    a. Responsible to receive and understand training on step-by-step Lockout/Tagout procedures.

    b. Responsible to follow all Lockout/Tagout procedures.

4. Affected Employees

    a. Responsible to receive and understand training on their role in the Lockout/Tagout process.

    b. Responsible to understand they are not allowed to interfere with the Lockout/Tagout process.

Training

Carroll Community College will train employees in the Lockout/Tagout procedure applicable to their job duties. This training shall be completed before an employee performs related tasks and shall be conducted by a person competent in the subject matter. The training will be refreshed at intervals stipulated by the current and applicable OSHA standard.

All third-party contractors are responsible to ensure their employees are trained, certified, and/or licensed as required by the industry standards and all applicable OSHA standards related to the scope of work.

Record Keeping and Certification

1. Safety Training records for Carroll Community College employees shall include the following:
    a. Names of training attendees.
    b. The dates of the training sessions.
    c. The contents or a summary of the training sessions.
    d. The name(s) and title(s) of person(s) conducting the training sessions.

2. Safety Training records shall be maintained for a length of time in accordance with industry and OSHA standards.

3. All third-party contractors are responsible to maintain safety training records for their employees in accordance with industry and OSHA standards.

4. Records for the periodic inspection of Lockout/Tagout procedures followed by Carroll Community College will be maintained in the Office of the Coordinator of Environmental Safety and Health.

5. Records for the periodic inspection of Lockout/Tagout procedures will be kept for the length of ownership of the associate equipment by Carroll Community College.