



TAMUCC LOCKOUT TAGOUT Training



LOCKOUT TAGOUT TRAINING

OUTLINE

- Rules & Regulations
- Terms & Definitions
- Different sources of hazardous energy
- Procedures for locking and tagging out
- Multiple Energy Sources (MES) notification
- Safe Operating Procedures (SOP's) for MES
- Quiz (required 100% correct to pass)

LOCKOUT TAGOUT TRAINING

RULES & REGULATIONS

- Federal
 - 29 CFR 1910.147 *The Control of Hazardous Energy*
- TAMUCC
 - Physical Plant Rules & Regulation Manual 34.07
 - EH&S Mission



**To avoid electrical
hazards, before
working on a piece of
equipment,
install LOCKOUT AND
TAGOUT**

LOTO Definitions

Lockout: 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 until the lockout device is removed

(Blocking the flow of energy from a power source to a piece of equipment)

LOTO Definitions

- **Tagout**: The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed

(A warning tag attached to a power source together with the lock to warn others)

A TAG ALONE IS NOT APPROPRIATE FOR LOCKOUT/TAGOUT. ITS USE IS LIMITED TO ONLY A FORM OF COMMUNICATION.

LOTO Definitions

- Authorized employee: A person who is **trained**:
 - to work on a specific electrical task and
 - to perform the lockout process on a system or equipment on which he works

IF YOU ARE ASSIGNED TO WORK ON A TASK THAT HAS POTENTIAL HAZARDOUS ENERGY, MAKE SURE:

- **YOU HAVE BEEN TRAINED TO DO THAT SPECIFIC TASK**
- **YOU HAVE RECEIVED LOTO TRAINING**

WHEN IN DOUBT, ASK !!!!

LOTO Definitions

- Affected employee: An employee who will be working in or near the lockout area, or an employee who operates the system or equipment that is locked out
- Zero Energy State: Condition of a system or equipment after the hazardous energy source has been isolated and all residual energy has been released

Potential Hazardous Energy Sources

- Electrical – greater than 50 volts
- Hydraulic – any pressurized liquid
- Pneumatic – any pressurized gas, vacuum
- Mechanical – includes gravity, suspended parts, moving parts, etc.
- Chemical – toxic, flammable, corrosive, etc.
- Thermal – parts or products hotter than 120° F or colder than 39° F

Note: Equipment may have multiple energy sources (MES).

Potential Hazardous Energy Sources

- **Electrical – greater than 50 volts**

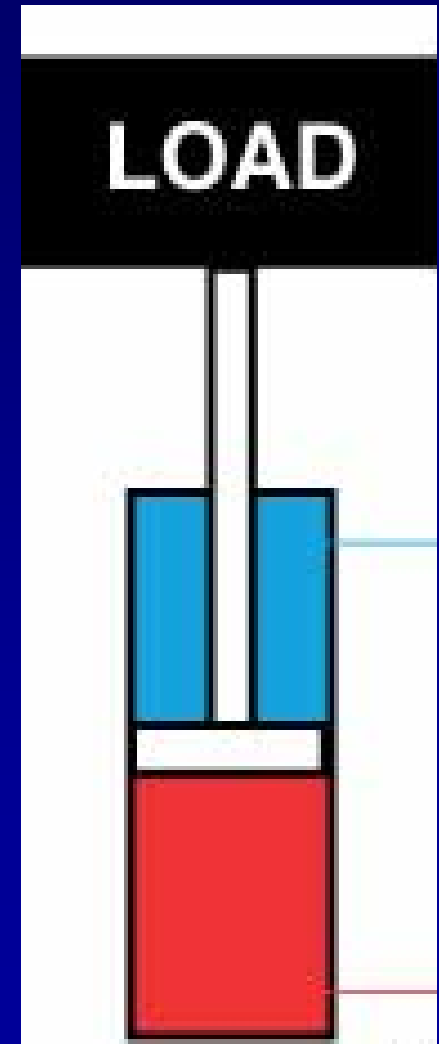


Potential Hazardous Energy Sources

- **Electrical** – greater than 50 volts
- **Hydraulic** – any pressurized liquid



Here is a picture of an operator who was burned when a hydraulic hose, which had been neglected during maintenance, burst, and spewed hydraulic oil - at normal operating temperature (130F) - over his entire body.



Potential Hazardous Energy Sources

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Pneumatic nailer operates at ~120 psi

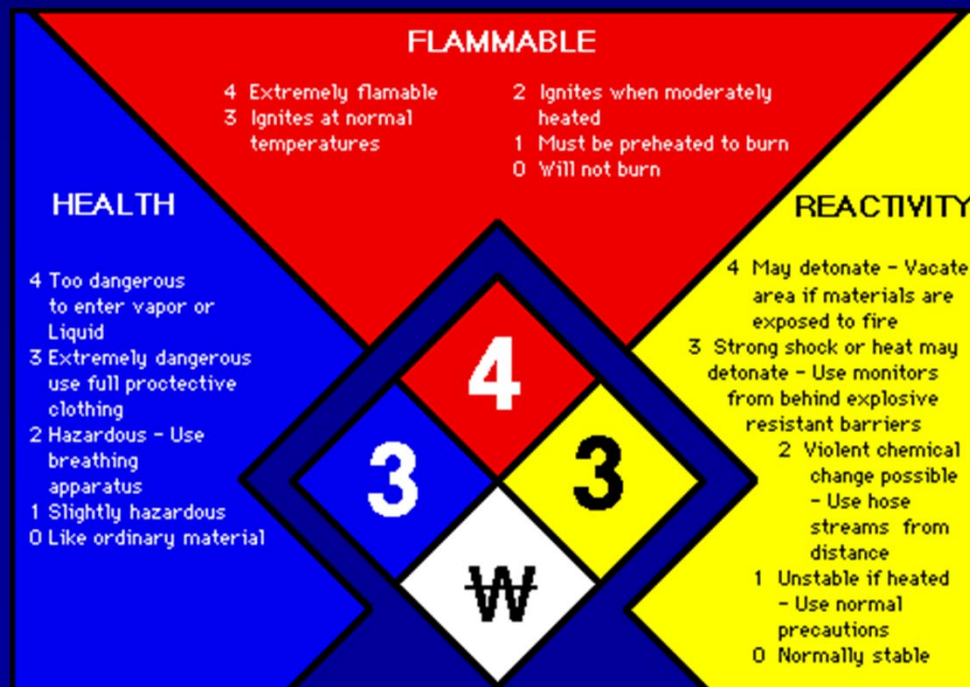
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TYPES OF LOCKOUT/TAGOUT

- **Simple Lockout Tagout: Only one source of energy**
- **Complex Lockout tagout:**
 - **More than one sources of energy**
 - **More than one workers working on the same piece of equipment**

Examples of Simple Lockout/Tagout

Equipment with only one source of energy:

- Some lighting fixtures have only one on/off switch each



- Some pieces of equipment such as vacuum cleaners, fume hood, may be fed from only a single source of energy

MAKE SURE TO FIND ALL SOURCES OF ENERGY FEEDING TO A PIECE OF EQUIPMENT, LOCK AND TAG THEM OUT BEFORE SERVICING/REPARING

Examples of Complex Lockout/Tagout

Equipment with more than one sources of energy:

- Some lighting fixtures have two on/off switches each



- Some pieces of equipment such as boiler, chiller, etc.. may be fed from multiple energy sources: electrical, gas, and pneumatic energies

MAKE SURE TO FIND ALL SOURCES OF ENERGY FEEDING TO A PIECE OF EQUIPMENT, LOCK AND TAG THEM OUT BEFORE SERVICING/REPARING

Multiple Energy Source (MES) Equipment

- Safe Operating Procedures (SOP's) for a specific equipment shall be created
- Electrical workers must follow the SOP when servicing/repairing a piece of equipment
- Electrical worker must maintain the hard copy of the SOP at job site
- Supervisor will receive a LOTO folder which include all relevant SOP's

Note: Yellow MES sign & SOP containing pictures of equipment identifying specific energy control points and procedures will be posted on or near the equipment.

A Form of MES: Stored Energy

Stored energy in any form must also be included as one of the MES and must be released by:

- **Bleeding**
- **Draining**
- **Discharging**
- **Residual heat dissipation**
- **Lower mechanism to a point where gravity is not a factor**

Lock & Tag

Standardized Personnel Safety Padlock and tag



Lock & Tag



To maintain lockout devices are under **exclusive control** of the authorized employee:

- Individual lock shall be labeled with user's name
- No duplicate key
- No master key
- No other uses
- Tag: The hasp can be used as a tag

Lock & Tag



- Personnel Safety Padlock must be used on an energy isolation device that is in “Off” position
- **IF THE TASK IS NOT COMPLETED BY THE END OF YOUR SHIFT, YOUR SUPERVISOR MUST BE NOTIFIED TO APPROVE THE EXTENDED LOTO**

Energy Isolation Devices

- **Electrical disconnect switch**
- **Fuse / circuit breaker**
- **Valve**
- **Block, brace or pin**

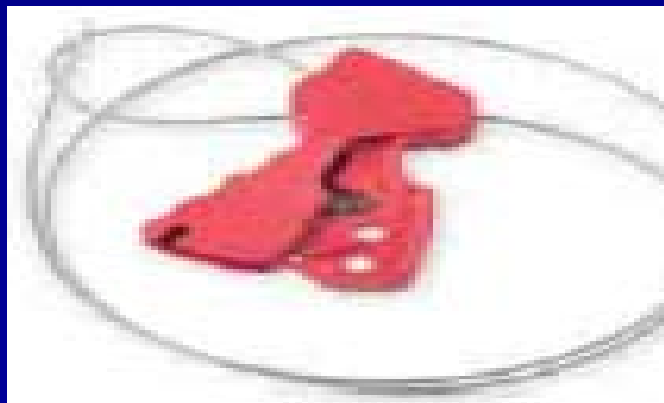
Examples of LOTO Mechanical Devices



Gate valve locking device



Ball valve locking device

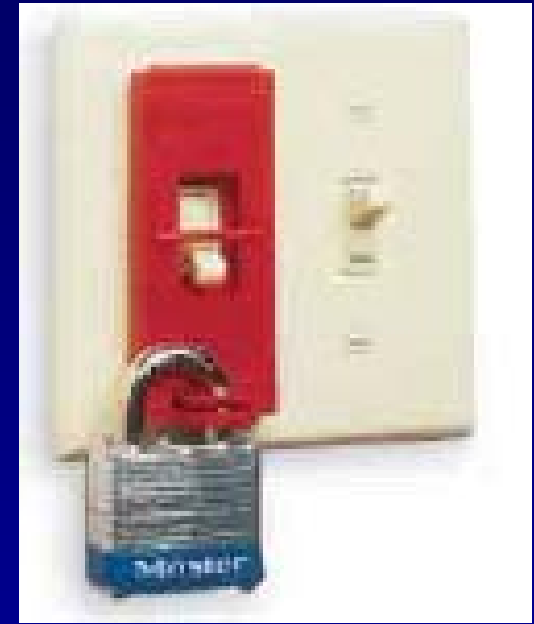


Cable lockout

Example of LOTO Electrical Devices



Power cord lockout



Wall switch lockout



Circuit breaker lockout



Plug lockout

Lockout is not required when:

- Equipment operates at less than 50 volts
- Hot tap operations providing continuity of service is essential and shut down is impractical, and safety procedures are followed to protect the workers
- Cord and plug remain in the electrical worker's control at all times
- Working on or troubleshooting while energy must be applied
 - **MUST use appropriate level of PPE (refer to Electrical Safety Program)**
- Power disruption creates a greater hazard (i.e. exhaust fans in hazardous locations)
 - **MUST use appropriate level of PPE (refer to Electrical Safety Program)**

Verifying “Zero Energy State”

To verify the “Zero Energy State”, after turning off the main power source:

- Attempt to turn on the machine or equipment, or
- Use of a voltage tester, pressure gauge, or temperature gauge

Emergency Procedures

- For all **life-threatening emergencies**, contact University Police at ext. 4444
- For all other incidents, contact your supervisor and/or EH&S at ext. 5555

LO/TO Procedures for Shut down

1. Identify all hazardous energy sources
 - “Multiple Energy Sources” documentation
 - Yellow Warning sign
 - SOP
2. Notify all affected personnel that you are about to lock and tag equipment out
3. Shut down equipment & de-energy power sources in proper sequence
 - Use appropriate level of PPE and tools
 - Isolate & release all energy sources in proper sequence
4. Verify “zero energy state”
5. Lock and tag the energy isolation device(s)
6. Now you are safe to work on equipment

LO/TO Procedures for Start Up

- 1. Check to make sure equipment is safe to operate**
- 2. Remove Tools - Verify all tools are accounted for**
- 3. Clean up debris**
- 4. Replace guards if needed**
- 5. Notify all affected personnel**
- 6. Remove all locks, tags**
- 7. Restore energy & reactivate the system in proper sequence**

LO/TO Procedures: “Control Lock”

Shift Change (ongoing project):

■ “Clocking-Out” Employee

- Removes his own padlock and tag



■ “Clocking-In” Employee

- Verifies Zero Energy State
- Attaches his own lock and tag



LO/TO Procedures: “Seasonal Shutdowns or Decommissioned Equipment Control Lock”

–LOTO padlock and tag are not to be used for seasonal shutdowns or decommissioned equipment

–Procedure

- Use regular Physical Plant padlock**
- Yellow tags marked with information including:**
 - Either “Seasonal Shutdown” or “Decommissioned Equipment”**
 - Name and ext. number of employee who locked and tagged the equipment**

LO/TO Procedures: Removal of lock/tag

while authorized employee is not available

THE SUPERVISOR IS REQUIRED TO FOLLOW THESE STEPS:

1. Verify that the authorized employee who applied the lock/tag is not at TAMUCC
2. Ensure that the equipment is safe to start up
3. Cut the lock using a bolt lock cutter and remove tag
4. Authorize the start up
5. Fill out the “*Personal Lock Removal Notification*” form
6. Inform the authorized employee that the lock/tag were removed before he/she resumes work
7. Request authorized employee to sign the form before starting work the next day
8. Retains form for a year

LO/TO Procedures: Energy-Isolating devices cannot be locked out

When the energy-isolating devices cannot be locked out:

1. Submit a work request to Physical Plant for the design, fabrication, and installation of an energy-isolating device

2. If an energy-isolating device cannot be fabricated or until it is installed, use the following procedure:

- Supervisor must personally oversee the operation. Supervisor must:
 - isolate the energy source
 - tag it out
 - assign an employee to be a **safety-watch** person to ensure that the energy remains isolated for the duration of service or maintenance
- Authorized employee then proceeds with the service or maintenance

***THE SAFTY-WATCH PERSON SHALL HAVE NO OTHER DUTIES.
HE/SHE SHALL NOT LEAVE THE STATION, EXEPT WHEN
FORMALLY RELIEVED FROM DUTY OR FOR PERSONAL SAFETY***

Group LO/TO Procedures: More Than One Servicing Employees

- **Before starting the project, group leader must discuss LO/TO procedures with all personnel involved**
- **Use multi-lock hasp**
- **Each electrical worker must determine “zero energy state” for himself**
- **Each electrical worker must install his own lock and tag on the multi-lock hasp**
- **Before re-energizing equipment, each electrical worker must remove his own lock and tag**

LOTO Safety Practices

- Do not remove another person's lock & tag
- Do not lend lock&tag to or borrow from anyone
- Tags must be filled out clearly and legibly
- When locking out cord and plug equipment, disconnect plug and lock out (using device) **or** maintain constant control of plug.
- Do not work on equipment using another person' s lock
- Ask for help, if needed
- Contact your supervisor if you have any questions or for deviations from these practices

**YOU ARE RESPONSIBLE FOR YOUR OWN SAFETY;
VERIFY ZERO ENERGY STATE AND
APPLY YOUR LOCK(S) & TAG(S)**

Authorized Employees' Responsibilities

- Every employee who works on equipment with a source of hazardous energy must have appropriate **training** and **understanding of the system and the tasks he/she is assigned to**
- He/she must be able to:
 - Recognize hazardous energy sources
 - Recognize type and magnitude of energy from machines/equipment he services
 - verify equipment is at **Zero Energy State** before working on it
- Employee must assist in incident report if there are any

Supervisors' Responsibilities

- Ensure employees have sufficient LOTO devices
- Ensure employees follow procedures
- Perform annual LOTO inspection and review on each authorized employee
- Take disciplinary actions against employees who do not follow lockout tagout procedures
- Update and document all Multiple-energy-source machines/equipment, extended LOTO, lock removal
- Approval of extended LOTO (more than a shift)
- Require new pieces of equipment or systems to have lockout capability in specifications and/or purchasing orders

EH&S' Responsibilities

- **Reviewing program at least annually and facilitate corrective actions**
- **Conduct or organize training courses**
- **Keep records of compliance**
- **Update SOP's at least biennially**

RECAP

- **LOTO changing shift**
- **Seasonal or decommissioned equipment**
- **LOTO removal when employee is not available**
- **LOTO when disconnect cannot be locked out**
- **Group LOTO**

RECAP

- **Procedures for shut down**
 1. ID all energy sources
 2. Notify affected employees
 3. Shut down equipment & de-energy power source
 4. Verify Zero energy state
 5. Lock & tag
 6. Now it is safe to work on equipment
- **Procedures for start up**
 1. Inspect equipment
 2. Remove & verify tools
 3. Clean up
 4. Replace guards if needed
 5. Notify affected employees
 6. Remove all locks/tags
 7. Restore energy
& reactivate system

QUIZ

- Click on the following link to take the online quiz.
- Call E,H&S @ Ext. 5555 for questions.
- You must pass with 100% correct.
- Good luck!

- <http://www.jotform.com/form/12765758233>