



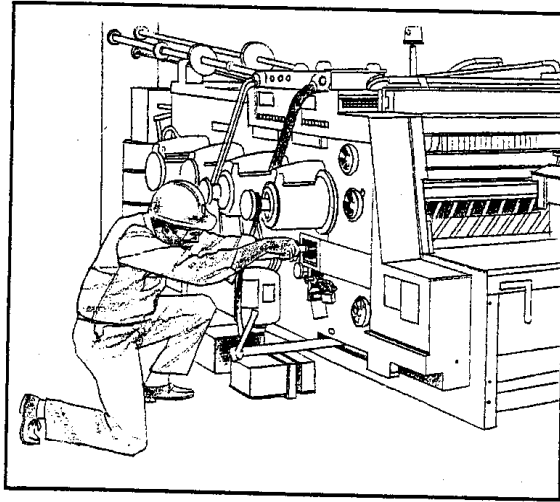
LOCKOUT TAGOUT



Why Lockout/Tagout is Necessary

Industry relies on many types of energy to power the machines and equipment that manufacture goods. That energy may be in the form of . . .ELECTRICAL, CHEMICAL, THERMAL, HYDRAULIC, MECHANICAL, AND/OR GRAVITY. When machines or equipment need to be serviced or maintained, this energy must be isolated so authorized personnel can safely perform the work.

Unlike small appliances or hand tools, industrial machinery requires more than turning off a switch and unplugging. They get their power from multiple energy sources that interact with each other. If all energy sources are not isolated before servicing or maintenance is performed, an accidental release of energy could occur which may result in injury or even death.



The goal of lockout and tagout procedures is to prevent energy from accidentally being released while machines and equipment are being maintained and serviced. Locks and tags help to prevent equipment or machinery from accidentally being started up while work is being performed. Locks prevent switches from being activated or valves from being turned on. Tags warn that machinery or equipment has been de-energized so work can be performed.

Failure to safely control energy can lead to severe injuries and even death. By understanding and following the proper procedures for LOCKOUT and TAGOUT, you are helping to protect your safety and your co-workers'.

Lockout/Tagout Procedures

Seven Simple Steps

Lockout and tagout procedures can only be performed by authorized employees who have received the proper training. Authorized employees are trained to recognize the types of hazardous energy sources in the work place and know how to isolate and control that energy. Yet, it is also important that all affected employees who work in the area understand the purpose of LOCKOUT/TAGOUT at their facility. By following the steps for lockout and tagout procedures, you can avoid accidents caused by failure to properly lockout and tagout hazardous energy sources. These steps include . . .

Step 1
Proper Planning

Step 2
Notify All Affected Personnel

Step 3
Shutdown at Operating Controls

Step 4
Isolate All Energy Sources

Step 5
Lock and Tag All Isolating Devices

Step 6
Dissipate All Stored or Residual Energy

Step 7
Verification of Isolation

REVIEW

1. Are you an affected or an authorized employee?

Affected employee: An employee who operates or uses a machine or equipment that is under lockout or tagout while it is being serviced or maintained. Or, an employee who works in an area where servicing or maintenance is being performed. An affected employee is not authorized to perform lockout/tagout procedures.

Authorized employee: A person who locks or implements a tagout system procedure on machines or equipment to perform servicing or maintenance. An authorized employee has received the proper training to perform lockout and tagout.

An authorized employee and an affected employee could be the same person if the affected employee's duties also include performing maintenance or service on a machine or equipment that must be locked or tagged.

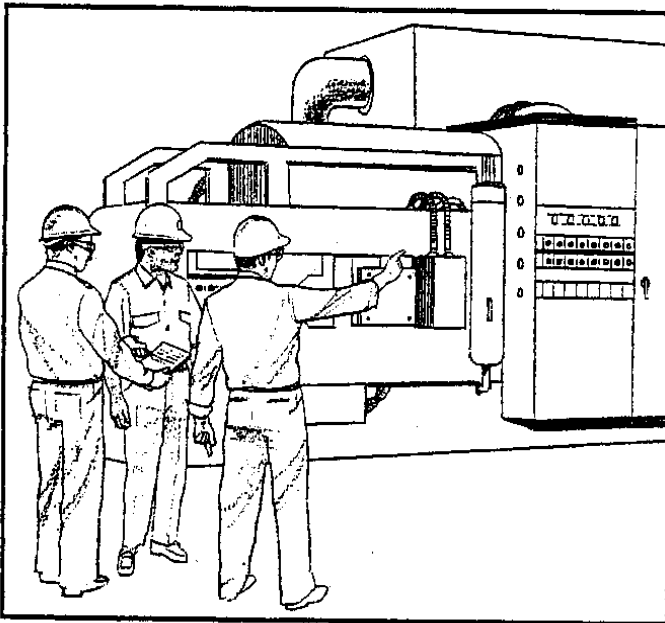
Lockout/Tagout Procedures

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Step 1 -- Proper Planning

Proper planning is key to the success of a lockout/tagout procedure. Authorized personnel need to consult with written procedures or the proper personnel to determine the types and magnitude of energy involved, the hazards of the energy to be controlled, and how to control the energy. The more information gained by authorized personnel involved in the job, the fewer chances of an incident occurring. All energy sources to the equipment or machinery must be identified before lockout/tagout procedures begin.

Planning should help the authorized personnel to answer questions such as the following:



What equipment is needed besides locks?

Are there any hazardous substances that need to be drained?

Should protective equipment be worn?

Could energy re-accumulate while work is being performed?

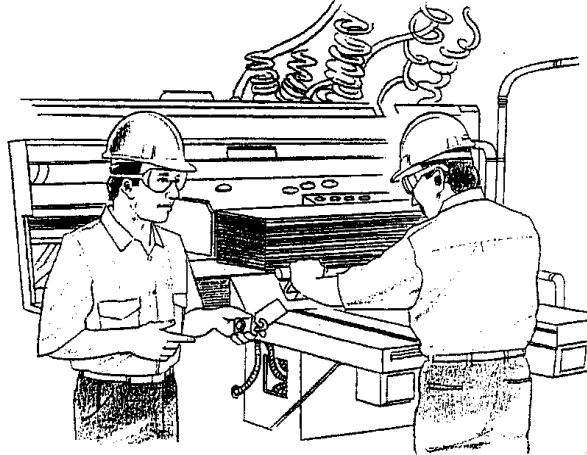
How many locks do I need?

REVIEW

1. What types of energy sources does your facility contain?

Step 2 -- Notify All Affected Personnel

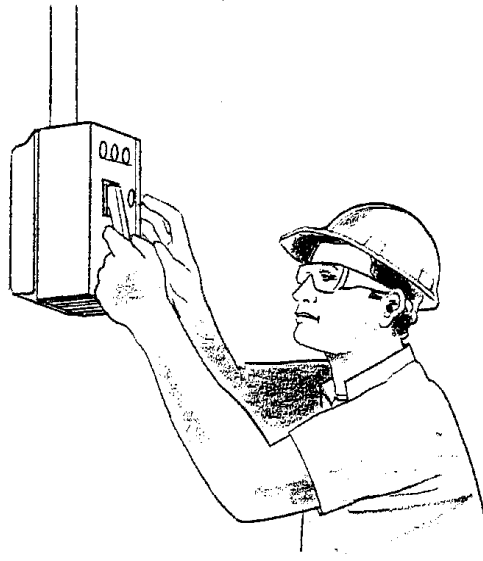
After this, all affected personnel need to be notified. This lets personnel know that lockout/tagout procedures are going to be performed and prevents the chances of someone accidentally starting up machinery or equipment.



It is important that affected personnel understand the situation and do not participate in or interfere with the process.

Step 3 -- Shutdown at Operating Controls

The next step is to turn off the machine at the operating controls. But shutting down at the machine is only the first step. It does not bring the machine to a "zero energy state." Startup could occur if a co-worker accidentally hit the start button.



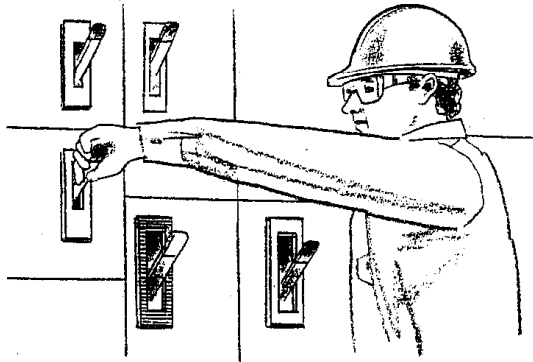
Lockout/Tagout Procedures

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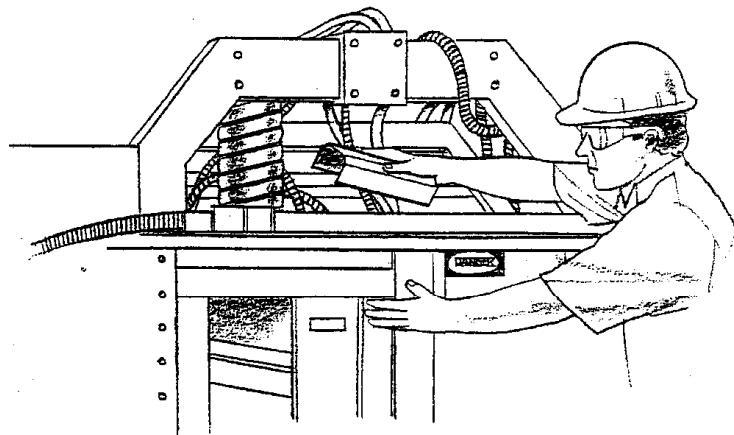
Step 4 – Isolate All Energy Sources

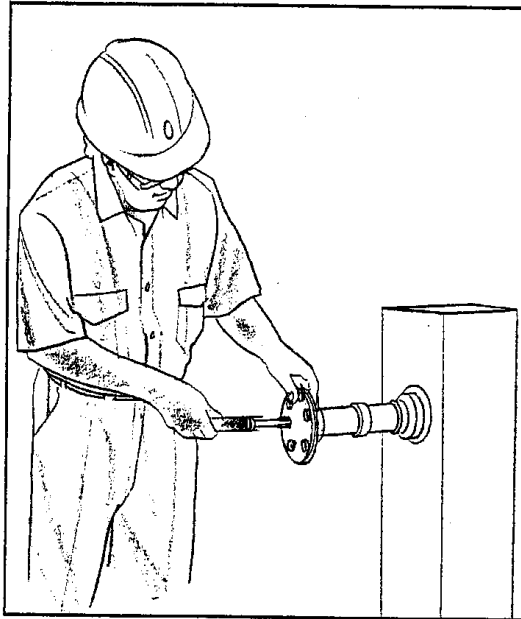
You must then isolate all energy to the equipment as close to the source as possible. This means taking steps to make sure energy has no way to reach the machine or equipment.

Some equipment may have more than one energy source -- one for the controls and one for the motor. All energy sources must be isolated to prevent the operating controls from being re-energized. Energy isolating devices include circuit breakers, disconnect switches, line valves, blocks, and more.



Block springs, equipment that could fall due to gravity, or machine parts that operate with hydraulic or pneumatic energy. Blocks should be strong and durable enough to prevent the movement of any part. Blocks and pins prevent the movement of machine parts caused by pressure from hydraulic and pneumatic energy as well as the force of gravity.





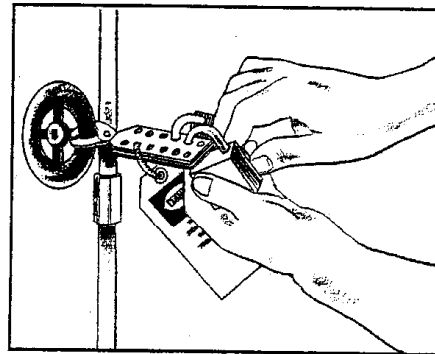
Blank or Blind a pipe, line, or duct by fastening a solid plate or "cap" over it after the supply lines have been depressurized and disconnected.

Slip gates and slip blinds are used in piping systems to isolate chemical energy when the line cannot be closed off by valves. First bleed the line to relieve any fluid pressure. Remove the flange bolts to separate the pipes, then insert the slip blind -- which is sometimes referred to as a pancake -- between the two pipes and replace the flange bolts.

Step 5 -- Lock and Tag Each Isolating Device

As each energy source is isolated, a lock must be applied to the energy isolating device by an authorized employee to prevent it from being operated. The lockout device should identify the employee applying the lock; or locks can also be identified with tags.

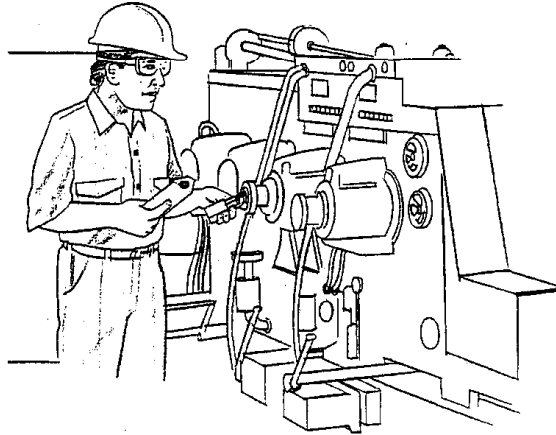
If more than one person will be involved in the procedures, each person will place a personal lock on a hasp. If 10 people work on the job, then there will be 10 locks on the hasp.



Lockout/Tagout Procedures

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This "one person -- one lock" system is needed so that everyone is accounted for before the machine or equipment is re-energized. This prevents the switch from accidentally being thrown by someone who may not be aware that work is being performed on that machine or equipment.



The purpose of tags is to warn others not to operate or move energy isolating devices from the "safe" or "off" position. Tags used with locks should identify the employee applying the tag and warn against energizing the machine or equipment. If tags are not used, the authorized worker's identification should be on the lock or a work permit.

Never touch or interfere with equipment or machinery that is tagged. If you find a tag lying on the floor, contact your supervisor immediately.

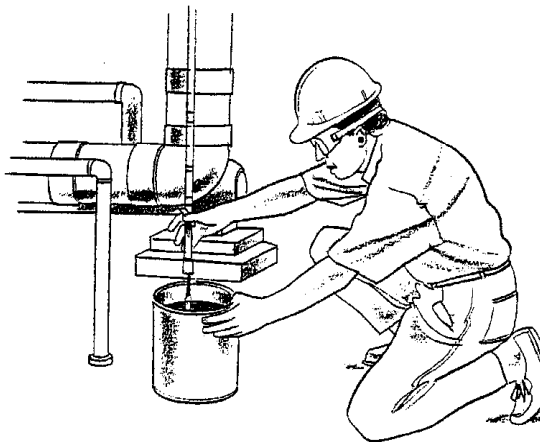
Tags should also include the following information:

- The Date
- Names of the Workers Involved
- Supervisor's Name
- Equipment Being Worked On.

Step 6 – Dissipate All Stored or Residual Energy

After locks have been placed on the main isolating devices, all downstream energy identified in the planning stage must be released so the system reaches a “zero energy state.” A machine is in a zero energy state when residual -- or leftover -- energy has been released. Methods for releasing residual energy include the following:

- Opening drains
- Relieving pressure
- Blocking from energy or gravity
- Bleeding lines and leaving all vent valves open
- Cycling the system to make sure all energy is dissipated



REVIEW

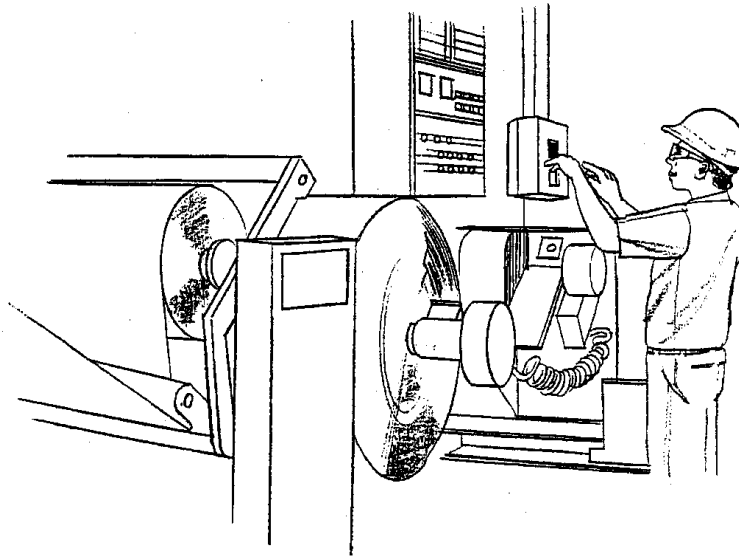
1. What procedures are used at your facility to isolate energy?



Lockout/Tagout Procedures (continued)

Step 7 -- Verification of Isolation

The final step before maintenance or servicing can be performed is to verify that all steps have been followed and all energy has been locked out or dissipated. This final check must be performed to release any stored energy and to make sure you have isolated the correct energy source.



This involves a deliberate attempt to start the machine or equipment to make sure that all energy is isolated.

Check all start buttons or other controls to see if the machine starts. The machine is cycled through to verify that all energy is released. Make sure all start switches have been returned to the "neutral" or "off" position after checking them.

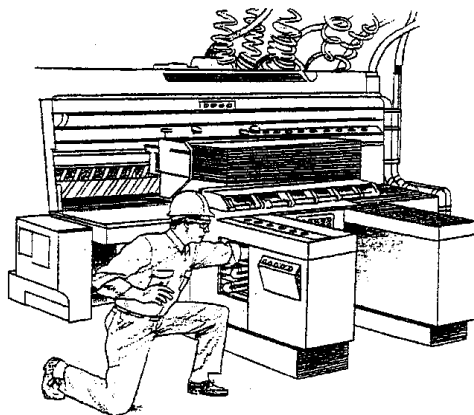
The machine or equipment is then tested. With electrical components, measurements may need to be taken with a voltmeter to make sure there is no electrical energy in the machine.

Special Situations

Lockout situations can range from a twenty-minute job that one person can perform to a team procedure that takes two weeks and involves many employees and contractors. Special situations can sometimes call for different procedures to be followed than those already mentioned. But no matter what the situation, it is important that you respect the potential hazards of the energy you work with.

Not Able to Be Locked Out

In rare cases, a machine or equipment is not able to be locked out due to its design. Tags must be used in these cases. However, tags are only warnings that are placed on isolating devices. They do not lock out isolating devices like locks do. Never interfere with a piece of equipment or a machine that is tagged.



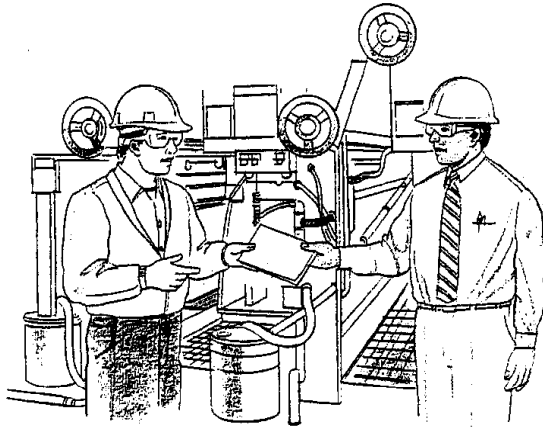
Lockout/Tagout Exceptions

Some repetitive, routine tasks may not require lockout/tagout procedures if the proper safeguards are used. Tasks such as unjamming, lubricating, or cleaning can be done if the operator uses the proper tools and does not bypass machine guards. If you must bypass machine guards and place any part of your body near the point of operation, lockout/tagout procedures must be used.

If a machine needs to be energized to test or position it, locks or tags can be temporarily removed from the energy isolating device. The area should be cleared of all tools and materials before locks and tags are removed. After the procedure is completed, all systems must be de-energized and locks and tags reapplied.

Lock Box

An alternative example to a group lockout situation is to put the keys to the locks on the isolating devices in a box. This box is then locked with a departmental lock by the person assigned to oversee the lockout procedure. A personal lock for each authorized employee involved in the procedure is then attached. The departmental lock assures that the system is locked out during a shift change. It may not be removed until all personal locks are removed. Whatever the lockout method used, it must assure that no single employee could re-energize the system while others are still working on it.



Contractors

Outside contractors may have procedures that differ from your facility. Before any work is done, both the employer and contractor need to coordinate their procedures. A contractor's procedures must be as safe as those established at the facility.

Shift or Personnel Changes

A system being worked on must remain locked out during a shift or personnel change. The person leaving the job site should not remove his/her lock until the arriving worker has locked out.

REVIEW

1. What special LOCKOUT/TAGOUT situations does your facility have?



Equipment Startup and Operation

When maintenance or servicing is completed, steps must be taken to insure the safety of others before locks and tags are removed. Make sure all tools and other unnecessary items have been cleared away from the machine or equipment and that all machine guards have been reattached. Make sure all employees stay clear of the area. Affected employees should be notified after locks and tags are removed and before the system is re-energized.

Each authorized employee involved in the process must then remove his or her lock. If a lock has been left on by an employee who is no longer working on the system, all possible efforts must be made to locate the owner of the lock. The lock can only be removed under the direction of the employer and the owner of the lock must be made aware of the situation before he/she resumes work at the facility.

You must take responsibility for your lock. Keep the key with you at all times. Never give your key to another employee. And always remove your lock when you are finished.

Your Role in Prevention

A study by the National Institute for Occupational Safety and Health (NIOSH) found that 63 percent of workers injured by the release of hazardous energy were production workers. They were not authorized personnel who maintain and service equipment.

If you are not an authorized person, it is important that you stay clear of the area. Do not try to bypass or defeat locks. Never interfere with locks or any other devices used to block energy. Locked out machines or equipment must remain de-energized. Never attempt to help in the procedure if you are not authorized.

Know the machinery you work on, including the different energy sources involved. And know your company's policy for lockout and tagout procedures. Communicate any problems you come across with authorized personnel who are to perform the lockout and tagout procedure.

Authorized personnel are responsible for removing locks and tags after a machine or equipment has been re-energized. If an open lock is left on a latch or a tag is on machinery or equipment that is working, notify your supervisor.

If you come across a situation that you are unsure of, do not attempt to power up a machine or equipment. If you do not see anyone around, don't assume that no one is near the machine or equipment. A person could be behind equipment or machinery or some distance away from the operating controls.

If you find a tag lying on the floor, contact your supervisor immediately. Again, do not power up a machine if you suspect maintenance activities are taking place.

As an affected employee, you need to understand your facility's LOCKOUT and TAGOUT procedures and know what role you play in helping to prevent incidents. If you have any questions about lockout/tagout procedures at your facility, check with your supervisor. As an authorized employee, it is extremely important that you follow the proper procedures for LOCKOUT and TAGOUT, and communicate your intentions to all affected employees.



An effective LOCKOUT/TAGOUT program requires your cooperation. No matter what your role in the procedures, a respect and awareness of the potential hazards is necessary to prevent incidents from occurring at your facility.