



fast facts

advancing safety, health, and workplace rights in the legislative branch

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Lockout/Tagout

Employers must establish and implement an energy control program whenever an employee services or maintains machinery, equipment, or systems whose unexpected energizing, start up, or release of energy has potential to injure them. All forms of energy are covered by the Occupational Safety and Health Administration (OSHA) standards, including the Control of Hazardous Energy (Lockout/Tagout) and the Electrical Safety-Related Work Practices. The most common type is electrical energy, whether from generated power, storage devices (batteries and capacitors), or static. However, the program must also protect against injury from thermal energy (high or low temperature). Sources of kinetic energy (mechanical energy from moving parts), as well as potential energy (stored in pressurized vessels, hydraulic and pneumatic systems, and springs), must also be addressed.

The energy control program requires that an authorized person must disconnect the machinery or equipment from its energy sources and block it as necessary to prevent any unexpected movement before

service or maintenance work is performed. Additionally, the program requires that authorized employees either lock or tag its energy-isolating device(s) to prevent the release of hazardous energy and take steps to verify effective isolation of the energy.

Energy-isolating devices prevent the transmission or release of energy. They include items such as electrical switches, circuit breakers, disconnect switches, line valves, slide gates, slip blinds, and mechanical blocks. Because procedures are required for applying lockout or “tagout” devices to energy-isolating devices, these programs are often referred to as lockout/tagout (LOTO) programs.

It is crucial that personnel developing the LOTO program identify every energy source and energy-isolating device for each piece of machinery or equipment included in the program. The steps to be followed to provide absolute control of each source and isolating device must be incorporated into the specific procedures developed for each piece of machinery or equipment.

As the name implies, lockout devices are items such as locks that are used to keep energy-isolating devices in safe positions. Their function is to secure energy-isolating devices in positions that prevent machines from becoming energized during servicing and similar activities.

Tagout is used when it is not possible to apply a lockout device. It involves attaching a danger tag on or as close as possible to an energy-isolating device. The tag must indicate that the machine being serviced



Figure 2: A Plug LO/TO on Metal Working Lathe

cannot be operated until it is removed by the person who applied it. The tag must identify who applied it and indicate when the tag was applied. It may only be removed by the authorized person who applied it. Use of tagout alone creates potential for premature activation of an energy-isolating device, so it is less safe than using a lockout procedure.

Locks and tags used in the LOTO program must be standardized in color, shape, or size so they are readily recognizable by anyone in the work area. Additionally, all employees with access to the area where they are applied must be trained to recognize these items and their purpose.

Locks and tags used in LOTO programs must also be durable and unable to be removed without excessive force or unusual techniques. Nylon tie-wraps may be easily cut off, so they may not be used as lockout devices.

Authorized personnel must verify that all energy sources are effectively controlled before servicing work begins. When the work is finished, they must remove their control devices.



Figure 1: A Proper Circuit Breaker Lock and Tag

All authorized employees must be provided with training that allows them to understand the purpose and function of the energy control program. Their training must also allow them to develop the knowledge and skills needed for safe implementation of the program. Mere distribution of lockout/tagout procedures is not adequate.

An employee other than the one using the individual energy control procedure must evaluate and certify it at least annually. Each evaluation must include a review by the inspector and each employee authorized to implement the program, and include a review of the employee's responsibilities. Any identified deviations from the procedure or inadequacies in it must be corrected.



Figure 3: An Untagged LO Device on a Pipe Valve Handle

Going Beyond the Basics

When multiple workers must simultaneously service a machine, each should be assigned a separate lock and key. If work is not completed before the end of a shift and new workers are to continue the work, the new arrivals should apply their locks before the departing ones remove theirs. Each worker must move away from the machine before it is re-energized.

Though a combination lock may be used in a LOTO program, it is possible for many people to know its combination. This enables multiple people to remove it prematurely, potentially injuring anyone still working on the machine. Instead, key-operated locks are more controllable lockout devices. By providing one copy of the key to the user and one to the program's coordinator for use only during unusual circumstances after confirming that the person assigned to the lock is safely away, the opportunity to remove the lock prematurely is much more limited.

Whenever an outside contractor or employees from other divisions or jurisdictions are involved with the work, all affected groups must inform each other of their LOTO procedures. Further, if a program for entry of confined spaces is needed, the hazardous energy control



Figure 4: ALO/TO Device Prevents Use of Plug Shown in Figure 2

program must be integrated with it when needed.

OSHA also has a similar standard mentioned above that primarily concentrates on electrical energy. Specifically, OSHA requires the de-energization and disconnection of electrical equipment. This includes removal of isolating circuits and the opening of extra power disconnect devices. It also includes minimum safe distances for approach to high voltage. Steps to safely re-energize during maintenance and the removal of LOTO devices are also addressed.

fast stats

- OSHA requires employers to develop and implement procedures and practices to protect employees during servicing and maintenance of machines and equipment. (29CFR§1910.147 and 1910.333(b)(2)).
- OSHA Accident Investigation Summaries from OSHA-170 forms for 2000-2002 on Lockout lists a total of 355 incidents investigated. This includes 63 killed workers and 121 amputated. Death and amputation account for 52% of the Lockout incidents investigated, indicating severe trauma where machines or equipment started unexpectedly.



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