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Special Report

10 Tips to Implementing a Lockout/Tagout Program

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TABLE OF CONTENTS

Lockout/Tagout: You've Got the Power!

Your LOTO program must address the hazards that workers face when they place any part of their body near a machine's point of operation, power transmission apparatus, pinch points, or other moving parts during maintenance and servicing activities. If the machine is not properly shut down and secured, it could unexpectedly start up, release stored energy, move, or cycle, causing crushing injuries, amputations, or even fatal injuries. A well-designed LOTO program can prevent these injuries.

Here are 10 tips for ensuring that your LOTO program is well-designed and effective, and that it avoids some of the more common failure points found in LOTO programs.

1. Understand Where Lockout/Tagout Fits in Your Overall Safety Program

A well-designed lockout/tagout (LOTO) program does not exist in isolation. Workers performing maintenance activities may be at risk from other hazards in the work area not covered by the LOTO program. Whenever workers plan to shut down machinery or equipment, consider whether they also need protection from:

- C***onfined space hazards.*** Does your confined space permit program cover all entry hazards, including LOTO?
- ***Machinery hazards.*** Is other machinery in the area that will continue operating? Is it adequately guarded?
- ***Hazards requiring personal protective equipment (PPE).*** A machine whose energy hazards are controlled may pose other hazards, like hot or sharp surfaces, for which workers will need appropriate PPE.
- ***Pipe breaking hazards.*** LOTO addresses some piping-related hazards, but not necessarily all hazards of pipe breaking.
- ***Process safety hazards.*** If you have a process safety management (PSM) program, your LOTO program is an important piece of your total program.

2. Understand the 'Minor Tool Changes and Adjustments' Exception

The LOTO standard covers "servicing and maintenance" operations. It specifically excludes "normal production operations," unless the worker is required, during normal production operations, to bypass a guard or place any part of his body into the machine's point of operation or other hazardous area.

There is an exception that allows "minor tool changes and adjustments, and other minor servicing activities, which take place during normal production operations" to be performed without LOTO. The "exception" has led some employers to think that they don't have to provide any protection to workers during minor tool changes and adjustments and other minor servicing activities that take place during normal production operations. But don't make the mistake of missing the end of the exception—what it actually says is that you don't have to lock or tag out the equipment "provided that the work is performed using alternative measures that provide effective protection," like enabling switches, inch/jog settings, or extension tools.

3. Write Machine-Specific Procedures

In Appendix A of the LOTO standard, the Occupational Safety and Health Administration (OSHA) helpfully provides a generic LOTO procedure. Just fill in your company name and the name of the piece of equipment the procedure applies to, and you're done—right?

Not so fast! There's no such thing as a "generic" LOTO procedure. LOTO procedures must be *machine- or equipment-specific.* Under the standard, your procedure for *each machine or piece of equipment* must include:

- A statement on how to use the procedures;
- Specific procedural steps to shut down, isolate, block, and secure the machine;
- Specific steps designating the safe placement, removal, and transfer of lockout/tagout devices and identifying who has responsibility for the lockout/tagout devices; and
- Specific requirements for testing machines to determine and verify the effectiveness of lockout devices, tagout devices, and other energy-control measures.

4. Identify *All* Hazardous Energy Sources

One common mistake in LOTO programs is to identify a machine's main power source—generally, its electrical power source—but

neglect to identify other potential sources of hazardous energy that can cause the equipment to move unexpectedly or that could suddenly release energy while workers are in the danger zone.

When you write your LOTO procedures, make sure to identify all sources of potentially hazardous energy, including:

- ***Mechanical energy.*** Energy created by a machine's moving parts, like wheels, springs, or elevated parts.
- ***Hydraulic energy.*** The energy of pressurized, moving liquids, usually water or oil, in accumulators or lines.
- ***Pneumatic energy.*** The energy of pressurized, moving gas, as found in air in tanks and lines.
- ***Chemical energy.*** Energy created by a chemical reaction between two or more substances.
- ***Thermal energy.*** Heat energy; most commonly, steam energy.
- ***Stored energy.*** Energy stored in batteries and capacitors.

5. Control All Hazardous Energy Sources

You must provide instructions in your written LOTO procedures that will enable workers to systematically de-energize each energy source.

- ***Steam, air, and hydraulic lines*** are de-energized by bleeding, draining, and cleaning out so that no pressure remains in lines or reservoir tanks.
- ***Mechanisms under load or pressure,*** such as springs, are de-energized by releasing and blocking them.
- ***Raised dies, lifts, or any equipment that could slide, fall, or roll*** are de-energized by securing them with blocks, special brackets, or special stands.
- ***Pipes*** that could carry air, steam, or hazardous substances must be blinded (covered with a metal disk to ensure that no substance will pass through that point if the system is accidentally activated).
- ***Electrical circuits*** must be checked by qualified persons with proper and calibrated electrical testing equipment to ensure that the equipment could not become energized with the switch in the "off" position.
- ***Stored energy*** in electrical capacitors should be safely discharged.

Notice that securing many of the above-mentioned energy sources is done with a piece of equipment other than a lock (e.g., a blind, a block). Ensure that you provide all of the equipment needed for safe LOTO.

6. *Always* Verify the Lockout

After equipment has been shut down and de-energized, with all locks, tags, and other securing devices applied—and *before* work begins!—workers must make absolutely certain that the lockout has been effective and that the machine will not unexpectedly start up, cycle, or release energy. To verify lockout, workers should:

- Clear all personnel from the danger zone.
- Verify lockout by attempting to operate the equipment.
- Return all controls to the "off" or de-energized position.

If stored energy could reaccumulate, procedures and equipment must be available for continued verification until the work is completed and the lockout removed.

7. Protect *All* Workers

LOTO typically involves more than a lone employee working on an unmanned piece of equipment. There may be more than one person working on the equipment, and some or all of them might be contractors and an operator or other workers may be present in the area.

Each of these groups of workers must be protected:

Affected workers and other workers. Workers in the area who are not participating in the LOTO procedure must still be aware of it and know how to avoid interfering with LOTO in ways that put them or other workers in danger, like attempting to start up equipment.

Contractors. Whenever contractors, including temporary employees, service or maintain the employer's machines or equipment, the on-site employer and the contractor or other outside employer must inform each other of their respective lockout or tagout procedures. The on-site employer must ensure that his or her employees understand and comply with the restrictions and prohibitions of the contractor's or outside employer's energy control program.

Group LOTO participants. Whenever a group of workers will perform LOTO activities, make sure that:

- A *single authorized employee* is responsible for coordinating LOTO under the protection of a group lockout or master tagout device.
- When more than one crew, craft, or department is involved, *a primary authorized employee* is assigned overall hazardous energy control responsibility to coordinate impacted workforces and ensure continuity of employee protection.
- *Each employee participating in the group LOTO* places his or her own lock or tag to the group lockout device or group lockbox

when he or she begins work, and must remove the device when he or she stops working on the machine or equipment being serviced or maintained.

Workers during shift or personnel changes. Make sure that you have specific procedures in place to ensure the continuity of lockout or tagout protection during shift or personnel changes, so that there is an orderly transfer of lockout or tagout device protection between leaving and arriving employees.

8. Protect Workers at *All* Times

In fall protection, a common mistake is to believe that workers do not need to be tied off if their exposure to a fall hazard will be very brief. The same mistake is often made with LOTO: Employers and employees may believe that if the job is "quick" or the exposure is "brief," it is not necessary to follow full LOTO procedures. But it only takes a second for a worker to fall or to become fatally entangled in a machine. Even brief exposures require precautions.

Likewise, workers may not feel that full protection is necessary when the entire facility is shut down for maintenance and no production is occurring. However, if LOTO procedures are not followed, unexpected energization can occur, causing harm to workers.

Whenever workers will be placing any part of their bodies in a danger zone, ensure that equipment and machinery are secured against unexpected start-up or the release of hazardous energy.

9. Train *All* Workers

Obviously, workers who will be performing servicing and maintenance operations using LOTO procedures require thorough training in the knowledge and skills necessary for the safe application, use, and removal of energy-isolating devices. These employees, called "authorized" employees in the standard, must also be trained in:

- Recognizing hazardous energy sources;
- The type and magnitude of the hazardous energy sources in the workplace; *and*
- Energy-control procedures, including the methods and means to isolate and control those energy sources.

But workers who perform LOTO are not the only ones who need to be trained. Workers who operate machinery that is subject to LOTO or who work in areas where LOTO procedures apply, but who do not themselves participate in LOTO, are called "affected" employees under the standard, and must receive specific training. All other

employees whose work operations are or may be in an area where energy-control procedures are used must receive basic instructions regarding the energy-control procedure so that they will know not to remove a lockout or tagout device or attempt to restart, reenergize, or operate the machinery.

10. Review Your Program Regularly

It would be nice to think that you could put a LOTO program in place and be finished with it. Unfortunately, just like the machines it applies to, your LOTO program requires periodic maintenance, including:

Annual inspections. Each year, for each LOTO procedure in your facility, an authorized employee must observe another employee or group of employees performing the procedure. The purpose of the inspection is to ensure that the procedure and the requirements of the lockout/tagout standard are being followed. If any deviations are observed, the employer must correct them.

Periodic inspections. For energy control procedures used less frequently than once a year, inspections should be conducted only when the procedures are used.

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