

# An Effective approach for the Control of Hazardous Energy: Lockout and Tag-out (LOTO) Program

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## Abstract

Approximately 3 million workers service equipment and face the risk of injury if LOTO is not performed. An estimated 120 fatalities and 50,000 injuries occur each year from exposure to hazardous energy. LOTO procedures implemented properly will prevent employee injury from hazardous energy.

Lock-out and tag-out (LOTO) is a critical part of a strong all-around safety program. In LOTO, maintenance employees work with production employees to positively prevent all forms of hazardous energy from causing harm. This energy can be deadly dangerous if not control during the maintenance, cleaning and disassembly of the machine. An effective means of controlling the hazardous energy is important in order to prevent because of unauthorized and accident operation of the equipment. Lock-out & Tag-out (LOTO) program if effectively implemented can prevent the serious workplace accidents.

**Keywords:** Safety, lockout Safety, Control of Hazardous Energy & LOTO Management.

## 1. Introduction

Isolation of a source of hazardous energy, including releasing any residual hazardous energy that might be present, and securing an isolation point by locking it “Lockout/tagout” refers to specific practices and procedures to safeguard employees from the unexpected energization or startup of machinery and equipment, or the release of hazardous energy during service or maintenance activities.

Hazardous energy comes in many forms. Electrical energy can cause electrocution and burns, provide ignition to flammable atmospheres, and activate mechanical equipment. Steam can cause burns or initiate hazardous reactions. Nitrogen can cause asphyxiation. Chemical flow can cause uncontrolled reaction and injury. When a piece of equipment is being worked on, all sources of hazardous energy must be securely and positively locked out until the equipment is operational. Untold numbers of major process safety incidents and individual injuries have been caused by failure of LOTO.

This requires, in part, **that a designated individual turns off and disconnects the machinery or equipment from its energy source(s)** before performing service or maintenance and that the authorized employee(s) either

lock or tag the energy-isolating device(s) to prevent the release of hazardous energy and take steps to verify that the energy has been isolated effectively. If the potential exists for the release of hazardous stored energy or for re-accumulation of stored energy to a hazardous level, the employer must ensure that the employee(s) take steps to prevent injury that may result from the release of the stored energy.

## 2. New Approach in Lockout & Tag-out Program

New concept of the group LOTO is very effective in isolating the energy with minimum required hardware.

### 2.1 Group LOTO Elements

A supervisor or authorized employee must notify the affected employees before LOTO devices are applied and after they are removed.

**Affected person**—Any person who operates or maintains or works on a machinery or equipment that is subjected to lock out/ tag out.

**Authorized person** —An employee or contracted employee or contractor or a contractor employee trained and authorized in the lockout/tag out procedure to make and verify isolations.

**Complex lockout** —Lockouts that may involve multiple Agencies/Functions, Employers, Hazardous energy sources, Lock out points, People, Shifts etc.

**Control device**—A device used to execute a system change by manual, remote, automatic, or partially automatic means (e.g., push buttons, emergency buttons or stops, selector switches, and other control-circuit type devices).

Both the approaches of an effective LOTO program has been shown in the fig.1 and fig.2 with their advantages.

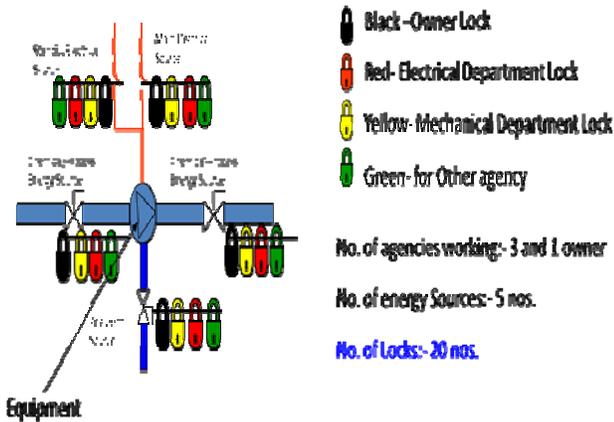


Figure 1 Older LOTO Model

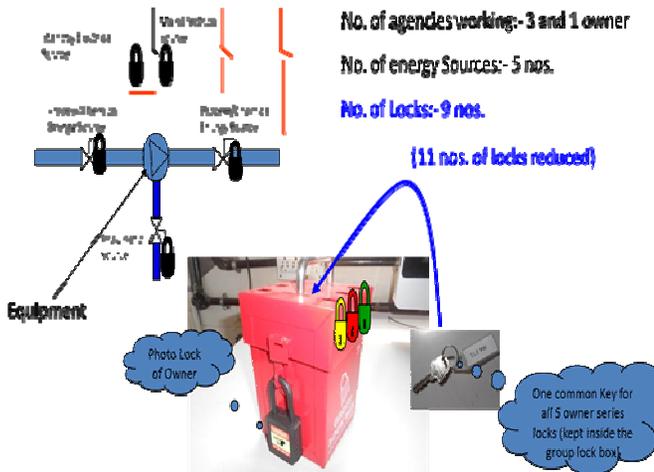
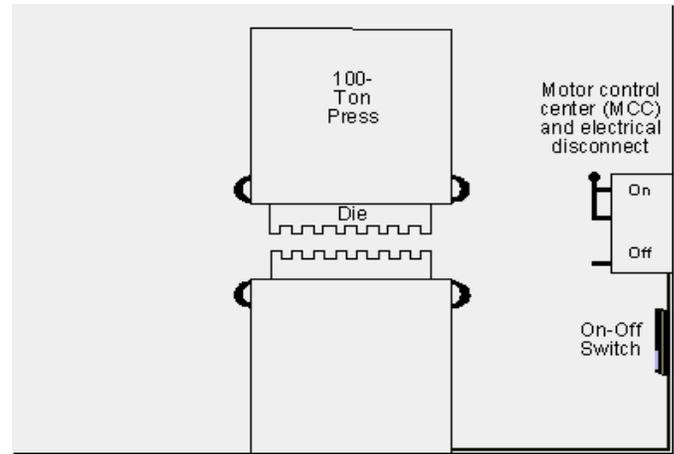


Figure 2 Implementation of Group LOTO Program

**Answer: Steps to be followed**

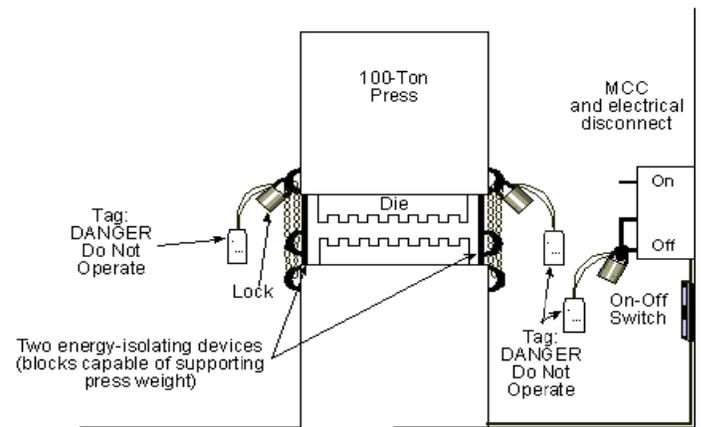
- Turn electrical disconnect switch OFF at MCC and attach lock/tag.
- Install lockable blocks in the press and lock/tag.
- CLEAR personnel from press, and TRY to start equipment by pressing ON switch.

**3. Energy flow diagram**

Energy flow diagram is main key for the success of LOTO program. Energy flow diagram should be machine specific and clearly indicate the types of energy associated with the equipment or machine and what kind of LOTO hardware is needed to isolate the hazardous energy. Release of hazardous energy is important part of the LOTO program in order to make it effective. It should be taken care during the implementation of LOTO program for the machines.

**Example of LOTO:-**

**Task:** Replacement of die by mechanical Energy sources: Hydraulic, mechanical.



Total number of points to be provided with lock and tag  
**TOTAL: Minimum 2 (assuming minimum 1 lockable block is used).**

**4. Training**

Initial training must be provided for all authorized and affected associates, repeated annually and documented. Additional retraining for all authorized and affected associates must be provided whenever there is a change in equipment, machinery, procedures or whenever there is

evidence that this procedure is being violated. Training should include the following:

Ensure that all associates know the details of this procedure and that they know what to do and what not to do when they encounter a lock or a tag on a switch or a device they wish to operate.

Associates must be aware that a tag is not a physical restraint. They must be aware of the false sense of security that tag out systems can present.

## 5. Conclusion

The effectiveness of the any safety implementation program such as LOTO is depends upon the proper hazard identification.

All essential elements of the program shall be implemented to make health and safety more effective.

Regular enforcement & assessment audits is important for the success of any safety initiatives

## References

- [1] OSHA Standard for the Control of Hazardous Energy
- [2] UNC Environmental Health and Safety  
[http://ehs.unc.edu/training/self\\_study/lotto/container.php?page=5](http://ehs.unc.edu/training/self_study/lotto/container.php?page=5)
- [3] “Lock out and Tag out Standard” Tata Motors Limited.
- [4] Reliable Plant  
<http://www.reliableplant.com/Read/10907/lockout-tagout-procedure>
- [5] <http://www.training.dupont.com/dupont-stop>
- [6] <http://www.dupont.com/industries/safety-protection.html>
- [7] <http://www.dupont.com/products-and-services/consulting-services-process-technologies/brands/sustainable-solutions/sub-brands/safety-resources.html>