LOCK &TAGOUT

LEADER'S LESSON GUIDE: LOCKOUT AND TAGOUT TRAINING

1. PRESENTATION MEDIA OPTIONS

This is an overview of the lesson topic you will give. The lesson option you choose will determine the format, time and materials required for your training

PRESENTATION MEDIA OPTIONS

- Overhead Presentation using PowerPoint
- Computer-Based Training (CBT)
- Video

2. DISCUSSION

LEADER'S ROLE IN PRESENTATION

- Present/Personalize information
- Encourage questions
- Solicit responses to instructor questions
- Redirect questions to group for group consideration
- Answer questions that group cannot correctly answer
- Encourage participation and discussion

3. PERFORMANCE DEMONS TRATION

LEADER'S ROLE IN PERFORMANCE DEMONSTRATIONS

- Participants will demonstrate LOTO procedures using mock-up device
- Instructor verifies that procedure is followed correctly
- Instructor asks performance related questions to ensure comprehension

4. KNOWLEDGE TEST

LEADER'S ROLE IN KNOWLEDGE TEST:

- Administer test
- Review answers with audience

- Collect and turn in
  - **AUDIENCE: (Insert Company Name) employees (full-time, part-time, temporary, exempt, non-exempt)**
  - **TIME REQUIRED: 15 to 60 minutes based on selected format**

5. SUGGESTED MATERIALS:

1. Training sign-in sheet
2. LOTO Presentation slides/overheads
3. Overhead projector
4. LOTO Quizzes (if applicable)
5. Copies of lockout/tagout performance test
6. LO/TO Training board
7. Copies of plant specific Lockout/Tagout written Program for handout
8. LEADER training cards for each employee attending the training.
9. Examples of locks and tags
10. Related LO/TO diagrams
11. Leader's presentation note pages.

6. SCOPE (BACKGROUND INFORMATION FOR LEADER)

Our goal, of zero accidents, we believe, is obtainable and realistic. We have built this program around changing behaviors, starting with management and ending with the newest employee of any facility at any time. Our desired outcome is to improve our training process by creating an impactful training approach that results in effective employee use of judgment, understanding of personal risk and control behaviors and consequences. We also want to motivate employees into creating a positive safety culture, and to maintain that culture throughout their life, both at work and at home.

When you leave here you WILL follow lockout tagout procedures overall and for specific machines. You WILL instill in your fellow employees a respect for LOTO, a respect for a placed TAG, respect for a placed LOCK and an understanding that this respect WILL protect you and your coworkers.

YOU WILL NOT REMOVE A PLACED TAG OR LOCK without finding the affected employee, finding management, and clearing and gaining control of the affected machine area prior to changing the state of the device tagged or locked.

1. LEADER'S ACTION STEP:

SIGN-IN

- Hand out Training sign-in sheet
- Have employees sign and date the sign in sheet for Lockout/Tagout training.

OBJECTIVES: What specifically the employees should be able to do, understand, and be concerned with as a result of the lesson

LOCK &TAG OUT

7. LEADER'S ACTION STEP:

- Read/Present these learning objectives to Audience
- After reviewing this program, the employee will be able to:
  1) Understand and be able to apply the lessons to avoid personal risk and danger associated with non-compliance.
  2) Explain the definition of energy control.
  3) Understand who is authorized to perform a Lockout.
  4) Identify and comprehend the 7 steps to LO/TO.
  5) Explain what is required for a correct LO/TO.
  6) Understand that there are LO/TO procedures for all equipment in the facility.
  7) Understand the information that must be in place on a tag when using LO/TO.
  8) Properly identify the correct way for removal of a lock of an employee who is no longer at the facility and who is authorized to remove that lock. And to understand that the same procedures applies to a TAG without a lock. Even a TAG only shall never be removed without the full respect of a LOCK. When removing a LOCK remove the associated TAG to avoid people ignoring TAGs.
  9) Demonstrate the seven steps of LO/TO successfully on a piece of equipment in that employees department.

"Hook" to grab employees' attention

8. LEADER'S ACTION STEP:

LEADER SHARES CASE STUDIES, GIVES PERSONAL EXAMPLES ETC.

- Use one or more case studies in addendum to review with audience.
- Discuss events that led up to incidents in case studies
- Relate any incidents from your own facility/experience.

PRESENTER REINFORCES CASE STUDY BY SHARING THE FOLLOWING:

Personal Impact

Talk about loss of life or limb if you do not follow LO/TO procedures

Company Policy & Procedures

Injuries and fatalities can be prevented if comprehensive hazardous energy control procedures are followed.

Employee Discipline

Corrective action for failure to follow the Lockout/Tagout procedures will be taken.

OSHA Citations

OSHA fines for each violation may range from $7,000 to $70,000

LOCK &TAG OUT

9. LEADER'S ACTION STEP:

KEY MESSAGE: LEADER MUST EMPHASIZE THESE KEY MESSAGES THROUGHOUT PRESENTATION.

- Don't risk your life for convenience, Lock Out and Tag equipment for personal safety – yours and your co-workers.
- Your family is relying on you to follow safe work practices.
- When you see a TAG or a LOCK think "Could my actions Kill a man?" and "Do I want to tell his family it is my fault?"
- Livesare more valuable than productivity – Take the extra measures to be safe.

TEACHING / PRESENTATION: Input: The Leader provides the information needed for employees to gain the knowledge or skill through lecture, film, video, pictures, etc.

10. LEADER ACTION STEP:

- Engage audience in discussion along the way – do not read slides verbatim – unless highlighting specific procedural steps.
- Summarize slides where applicable.
- Group activities where appropriate.

11. LEADER ACTION STEP:

- Leader demonstrates locks
- Show locks with only one key
- Tags should contain appropriate information
- Hasp device should be shown to demonstrate LOTO

The locks should be shown with only one key, and the tags should have the appropriate information when demonstrated. A hasp device can also be shown to inform employees how group LO/TO can be accomplished.

CHECK FOR UNDERSTANDING: Determination of whether employees have "got it" before proceeding.

NOTE: The employee at this point should be able to answer the previously stated objectives.

QUESTIONING STRATEGIES: Ask questions to probe for understanding.

1. INSTRUCTOR ACTION STEP:

INSTRUCTOR ACTION STEP:

- Instructor Action Step:

1. **Question:** What are the seven steps of lockout/tagout?

Answer: (Preparing for shutdown, Equipment Shutdown, Equipment isolation, Applying lock and tag, Control of stored energy, verifying isolation)

2. **Question:** What information should appear or a tag for lockout tagout?
   Answer: (Name, type of work being done, time and date, energy source and hazard)

3. **Question:** Who can remove a padlock after an employee has gone home and the equipment needs to be accessed?
   Answer: (A supervisor using a padlock removal form)

4. **Question:** What equipment do we have written lockout procedures for?
   Answer: (All equipment has lockout procedures)

5. **Question:** Is a lock without a tag acceptable for your facility?
   Answer: (No, all locks must be accompanied with a tag)

6. **Question:** Does your facility use tags only in some areas or on some equipment especially older? How should you treat a TAG only
   Answer: With exactly the same procedures as a LOCK.

7. **Question:** What should you do if you encounter half a TAG, an unreadable TAG, or an unlocked LOCK without an indication as to the owner?
   Answer: Contact the LOCKOUT control supervisor and determine if this is a legitimate LOTO procedure or if it may be removed. Establish control of the area or machine before changing the state of the machine with the LOTO supervisors' supervision.

GUIDED PRACTICE: An opportunity for each employee to demonstrate grasp of new learning by working through an activity or exercise under the leader's direct supervision.

2. INSTRUCTOR ACTION STEP:

- Leader demonstrates the LOTO using the mock-up, or hands on demo.
- Leader has each student demonstrate the procedure, asking other audience members to verify correct steps along the way.

At this point the LO/TO board can be used to show an example of how to LO/TO properly. As an authorized employee the individual should be able to show the instructor how to properly achieve a successful LO/TO on a specific piece of

equipment. The information is then captured on a specific LO/TO form, which shows that the individual had completed the training.

CHECK FOR UNDERSTANDING: Once employees have mastered the content or skill.

1. LEADER ACTION STEP: (IF APPLICABLE, NOT ALL FACILITIES USE QUIZZES)

- Passes out LOTO quiz to all participants
- Gives [x] minutes for employees to complete quiz
- Reviews answers to quiz with class to reinforce message
- Collects quizzes with participant's names on each

2. LEADER ACTION STEP:

- Leader reminds audience that they are responsible for being able to accurately perform the procedure.
- Bulletin boards are put to help the employees to retain knowledge; signs are posted to incorporate the seven steps of LO/TO within the facility so employees can have a constant reminder of what they have learned. General lost control tours completed on a monthly basis by the management group will also test the employees learning by asking employees the questions: where LO/TO procedures are kept, what the seven steps of LO/TO are and how employees individually LO/TO a specific machine within the employees department.
- Leader reminds audience that they will be given performance-based tests during loss control tours throughout the year.

SUMMARY

Did you meet the training objectives?

1. Understand personal risk
2. Explain the definition of energy control.
3. Understand who is authorized to perform a Lockout.
4. Identify and comprehend the 7 steps to LO/TO.
5. Explain what is required for a correct LO/TO.
6. Understand that there are LO/TO procedures for all equipment in the facility.
7. Understand the information that must be in place on a tag when using LO/TO.
8. Properly identify the correct way for removal of a lock of an employee who is no longer at the facility and who is authorized to remove that lock.
9. Demonstrate the seven steps of LO/TO successfully on a piece of equipment in that employees department.

Instructor Action Step:

- Thank employees and encourage feedback for improvement.
- Releases employees back to work
- Turns in quizzes to safety office for record keeping
- Turns in sign-in sheet to safety office for record keeping
- Return training materials

LOCK &TAG OUT

FIVE FATAL CASES

About three million workers who service equipment face the greatest risk. These include craft workers, machine operators, and maintenance crews. Accident reports show that packaging and wrapping equipment, printing presses, and conveyors account for a high proportion of the accidents associated with lockout/tagout failures. Typical injuries include fractures, lacerations, contusions, amputations, and puncture wounds with the average lost time for injuries running 24 days.

SELECT A CASE TO REVIEW WITH THE GROUP.

Case No. 1—Uncontrolled Kinetic Energy

A 25-year-old male worker at a concrete pipe manufacturing facility died from injuries he received while cleaning a ribbon-type concrete mixer. The victim's daily tasks included cleaning out the concrete mixer at the end of the shift. The clean-out procedure was to shut off the power at the breaker panel (approximately 35 feet from the mixer), push the toggle switch by the mixer to make sure that the power was off, and then enter the mixer to clean it.

No one witnessed the event, but investigators concluded that the mixer operator had shut off the main breaker and then made a telephone call instead of following the normal procedure for checking the mixer before anyone entered it. The victim did not know that the operator had de-energized the mixer at the breaker. Thinking he was turning the mixer off, he activated the breaker switch and energized the mixer. The victim then entered the mixer and began cleaning without first pushing the toggle switch to make sure that the equipment was de-energized. The mixer operator returned from making his telephone call and pushed the toggle switch to check that the mixer was de-energized. The mixer started, and the operator heard the victim scream. He went immediately to the main breaker panel and shut off the mixer.

Within 30 minutes, the emergency medical service (EMS) transported the victim to a local hospital and then to a local trauma center. He died approximately 4 hours later.

What was wrong?

- Though it was not a problem in this case -- the first worker did not clear the area and gain control first time. Subsequently he did not do it either.
- First worker did not tag or use a LOCK. He did not maintain control of the energy control devices, machine, or area when he left.
- Second worker did not verify that his control procedure locked out the system properly.
- Second worker did not LOCK or TAG energy control devices
- Second worker did not use some method to indicate he was working in the area in an unseen protion of the machine a flag or something
- First worker returned and did not clear and gain control of the area before restarting the LOTO procedure.
- First Worker did not pay attention to switch positions or use LOCKS or TAGS
- First worker again did not check, clear and gain control of area/machine prior to starting the machine.
- Neither employee followed LOTO procedures. Were they trained did management have a policy or procedures? Who knows?

Case No. 2—Uncontrolled Electrical Energy

A 53-year-old journeyman wireman was electrocuted when he contacted two energized, 6.9 -kilovolt buss terminals. The victim and two coworkers (all contract employees) were installing electrical components of a sulfur dioxide emission control system in a 14-compartment switch house.

The circuit breaker protecting the internal electrical buss within the switch house had been tripped out and marked with a tag—but it had not been secured by locking. This procedure was consistent with the hazardous energy control procedures of the power plant.

The victim and his coworkers were wiping down the individual compartments before a pre-startup inspection by power plant personnel. Without the knowledge of the victim and his coworkers, power plant personnel had energized the internal buss in the switch house. When the victim began to wipe down one of the compartments at the south end of the switch house, he contacted the A-phase buss terminal with his right hand and the C-phase buss terminal with his left hand. This act completed a path between phases, and the victim was electrocuted.

A coworker walking past the victim during the incident was blown backward by the arcing and received first-degree flash burns on his face and neck. A second coworker at the north end of the switch house heard the explosion and came to help. He notified the contractor's safety coordinator by radio and requested EMS. The EMS responded in about 15 minutes and transported the victim to a local hospital emergency room where he was pronounced dead.

While a LOCK may have prevented this it is not known if a LOCK was able to be used on this equipment, It is possible that the distances in the switch will not allow a LOCK to be placed on the HIGH VOLTAGE disconnect.

Powerplant personel should have seen the TAG and respected it.

They should have cleared and gained control of the affected area, circuit, or machine prior to switching the disconnect.

They should have contacted the supervisor in charge of lockout.

If the powerplant workers saw and had knowledge of the Tagout who is responsible for the dead workers? Would you want to be responsible for that?

LOCK &TAG OUT

Case No. 3—Uncontrolled Kinetic Energy

A 38-year-old worker at a county sanitary landfill died after falling into a large trash compactor used to bale cardboard for recycling. The cardboard was lifted 20 feet by a belt conveyor and fed through a 20-inch by 44-inch opening into a hopper. The hopper had automatic controls that activated the baler when enough material collected in the baling chamber. When the baler was activated, material in the chamber was compressed by a ram that entered the chamber from the side. Excess material above the chamber was trimmed by a shearer.

On the day of the incident, cardboard jammed at the conveyor discharge opening. Without stopping, de-energizing, or locking out the equipment, the victim rode the conveyor up to the discharge opening to clear the jam. He fell into the hopper and the baling cycle was automatically activated, amputating his legs. The victim bled to death before he could be removed from the machine.

Did the worker follow LOTO procedures?

Do you understand that control systems can't see the difference between material and you the worker? When the control system receives a signal to actuate it actuates unless it has something to prevent it. This had nothing to allow this operation to be performed this way.

Was there any sane reason to perform this task this way?

Would you do this to save time or perform better?

Do you think management wants you to do this? Of course not.

Do you this person saved the company money or helped somehow to keep jobs at the plant? No. The costs outweigh any savings.

Do you ever think the system here wants you to perform this way?

Case No. 4—Uncontrolled Potential Energy

The 32-year-old owner of a heavy equipment maintenance business died after a wheel and tire assembly exploded during repair work. The victim was removing the assembly from a test roller when it exploded and struck him with the flying split rim of the wheel.

The test roller was a large, two-wheeled cart that carried about 60,000 pounds of concrete weights. The roller was used in highway construction to test road surfaces for proper compaction.

The victim had been working as a subcontractor to repair the wheel and tire assembly, which had been smoking earlier in the day and was believed to be rubbing against the concrete weights. The assembly consisted of a two-piece outside rim and an inside ring retainer that was held together and mounted on the axle by 20 wheel bolts and nuts. Normal air pressure for the mounted tire was 70 psi.

The victim raised and blocked the roller. Without discharging the air from the tire he began to remove the wheel nuts using a pneumatic impact wrench. He had no training or experience with this type of work or in the servicing of this type of wheel. He did not realize that only some of the bolts held the wheel tire assembly to the axle. The remainder held the outer half of the rim to the inside half, securing the tire to the wheel. As the victim removed the nineteenth wheel nut, the pressurized air in the tire caused the now released outer split rim to fly off the axle and inner split rim and strike him. The pressure buildup on the area of the rim created a great amount of force. He died from cerebral contusions and lacerations.

Comments and Questions

The force acting on the pressurized object in this case a rim but could be a flange, pipe, tank etc is significant. Consider a 4" diameter plate being acted on by 70 PSI. That is 12.56 square inches and at 70psi a resultant force of about 880 lbs. Now consider it is about 16"diameter with a 12" opening kind of like a wheel which is about 88 square inches resulting in 6150 lb of force. But even 5 psi on a large surface is a lot of pressure say 12 diameter is 113 square inches and at 5 psi that is a resultant force of 565 lbs.

Is it important to be trained and understand the equipment or devices that need energy control?

Would you be embarrassed to ask how something works if there was no procedure? Would you look for a manual? Would you discuss it with someone?

Should you respect pressurized energy? What pressure is a safe pressure to uncontrollably release? Zero.

What would have been an acceptable way to release the air pressure? Release the air from the tire with the inflation valve and then remove the valve core when it is low enough.

With a tire for a 60,000 pound load what would be another hazard not mentioned? The weight of the tire and controlling it coming off the axle. It is likely to heavy for one man alone.

Case No. 5—Uncontrolled Kinetic and Thermal Energy

A 33-year-old janitorial worker died after he was trapped inside a linen dryer at a hospital laundry while cleaning plastic debris from the inside of the dryer drum. The cleaning task (which usually took 15 minutes to an hour) involved propping open the door to the dryer with a piece of wood and entering the 4- by 8-foot dryer drum. The melted debris was removed by scraping and chiseling it with screwdrivers and chisels. The dryer was part of an automated system that delivered wet laundry from the washer through an overhead conveyor to the dryer, where it was dried during a 6-minute

cycle with air temperatures of 217° to 230°F. The system control panel was equipped with an error light that was activated if the dryer door was open, indicating that the dryer was out of service.

On the night of the incident, the victim propped the door open and entered the dryer drum without de-energizing or locking out the dryer. He began to clean the inside of the drum. Although the error light had been activated when the door was propped open, the signal was misinterpreted by a coworker, who restarted the system. When the system was restarted, the overhead conveyor delivered a 200-pound load of wet laundry to the dryer—knocking out the wooden door prop, trapping the victim inside, and automatically starting the drying cycle. The victim remained trapped inside until the cycle was completed and was discovered when the load was discharged from the dryer. He died thirty minutes later of severe burns and blunt head trauma.

Was the prop a lock? Do you think they tested the prop?

Would you feel safe with only a light?

Would an interlocked key or a set of trapped keys made a good system? For instance a trapped key in the door of the dryer that is required to restart the dryer in the control panel but is stuck in the dryer door until the dryer door is closed may have been sufficient. Probably.

Did this require lockout? Yes.

Would you feel safe knowing someone could just hit the reset and start the machine? No.