LOCKOUT / TAGOUT TRAINING

PFW Annual Training

Training Objectives

- What is lockout/tagout?
- Why is hazardous energy a problem?
- How lockout/tagout can protect employees
- What procedures are involved

What is lockout/tagout?

- Industrial equipment and machinery is typically large and complex, when this equipment is shut down to be serviced, maintained, or repaired, there are typically multiple people from different trades involved
- It is imperative to everyone involved that the equipment be stopped and remain still while the work is being performed

What is lockout/tagout?

- Lockout/tagout refers to
  "specific practices and procedures to safeguard all workers from the unexpected startup of machinery and equipment or the release of hazardous energy during service or maintenance"

What is lockout/tagout?

- In a study conducted by the United Auto Workers of fatalities between 1973 and 1995, 20% of the fatalities that occurred were attributed to inadequate hazardous energy control procedures
- Workers who were injured on the job during to exposure to hazardous energy lose and average of 24 work days for re-cooperation

What is lockout/tagout?

- Lockout/tagout refers to one part of an energy control program that employers are required to establish to safeguard employees.
- In addition to the physical locks and tags, there must be established procedures for the use of those locks and tags.
- Workers must be trained in those procedures.
- The system of procedures must be periodically reviewed and inspected, at least annually by someone out side of the system.
- This combination of technics work to prevent injuries and deaths from hazardous energy sources.

What is lockout/tagout?

- The goal of the lockout/tagout program is to protect workers from exposure to hazardous energy.
  - This is accomplished by moving all energy isolation devices such as valves and switches to a "safe" position, closed, or off – THEN placing a physical lock on the device so that it cannot be moved.
  - In cases where a lock cannot be applied to an energy isolation device, a tag stating that the "device may not be operated" may be used.

What is lockout/tagout?

- Devices that could mistakenly re-engage or fail:
  - Local on/off switches
  - Check valves
  - Built-in interlocks

Why is hazardous energy a problem?

- Hazardous energy can take many forms.
- Consider the simple task of removing a pump and motor unit from a process
  - Most people would realize that the electricity to the motor needs to be interrupted and locked out before removal
  - There is another source of energy that represents a hazard which is less obvious – the pump is connected to process piping which probably has pressure in it
  - Before the pump can be removed, workers must be protected by closing valves or inserting blanks to isolate the pump of upstream or downstream fluid pressure and draining the associated piping

Why is hazardous energy a problem?

- Sometimes the source of hazardous energy is difficult to identify and isolate.
- Consider the case of changing a leaky fitting on the hydraulic arm of a backhoe
  - The arm has potential energy as a result of its height and position
  - If the pressure of the hydraulic system which holds it in place is released, its position will unexpectedly shift, possibly with dire consequences
  - Lockout in this situation would involved bracing the arm or placing it in a position where it cannot shift when pressure is removed

Why is hazardous energy a problem?

- Hidden energy can be retained in equipment in the form of a stretched spring, compressed gas, a charged capacitor, or the force of gravity.
  - These situations need to be identified and dealt with prior to working on machinery in order to avoid injury
- Hidden hazardous energy sources and multiple energy sources are examples of reasons why lockout should always be done by an “authorized person”

Authorized Person

- "Authorized Person"
  - This is someone who is familiar with the equipment in question and capable of locking it out properly

Steps to proper lockout/tagout

- There are six steps to an effective energy control program

1. Preparation
2. Shutdown
3. Isolation
4. Lockout
5. Check
6. Verification

Preparation

1. Preparation
   - This involves the authorized employee to have a complete knowledge of the type and magnitude of energy, the hazards of the energy to be controlled, and the method or means to control the energy
   - It is at this point that all of the sources of energy and the best ways to isolate them are identified

Shutdown

2. Shutdown
   - All employees affected by the shutdown should be informed, even if they will not participate in the maintenance or service
   - The machine is stopped in the normal and safe manner

Isolation

3. Isolation
   - All energy isolating devices that are needed to control the machines energy sources must be located
   - These devices must then be used to isolate the machine or equipment from its energy source

Lockout

4. Lockout
   - Lockout or tagout devices must be affixed to each energy isolating device by "authorized employees"
   - Lockout devices where used, must be affixed in a manner which will hold the energy isolating devices in a "safe" position
   - Where tagout devices are used, it must be affixed in a manner that will clearly indicate that the operation or movement of energy isolating devices from the "safe" position is prohibited
     - If the tag cannot be affixed to the energy isolating device, the tag must be located as close as safely possible to the device in a position that will be immediately obvious to anyone attempting to operate the device

Check

5. Stored Energy Check
   - After all of the energy isolating devices have been locked or tagged out, potentially hazardous stored or residual energy must be relieved, disconnected, strained, or otherwise rendered safe

Verification

6. Isolation Verification
   - Before any work begins on machines that have been locked or tagged out of service, an "authorized employee" must verify that the machine or equipment has been properly isolated and de-energized

Locks and Tags

- Federal guidelines specific that the locks and tags used for lockout/tagout be durable and used only for the purpose of lockout/tagout
  - Within a facility, the locks and tags must be standardized in at least one of the following criteria
    1. Color
    2. Shape
    3. Size
  - Each lock or tag must be uniquely identified with an employees name
    - When more than one person works a machine, the energy isolating devices are to be disabled with a hasp, which is in turn able to be locked by multiple locks

Work extends over one shift

- If work is to extend over a shift break, it is important that continuity of coverage be maintained
  - The incoming person should place his/her lock on the hasp before the outgoing person removes theirs

Important aspects

- Important aspects of an energy control program
  1. Concept of personal responsibility - an individuals lock is to protect him/her
  2. Communication
  3. Employees must understand how the system works
  4. Responsibility to other

❖Training is crucial to the overall success of the program

Contractors

- If an outside contractor is working on site, their employees should adhere to the procedures of lockout/tagout established by the onsite employer

Start up of equipment

- Once service and maintenance has been completed, there is a procedure to properly restart the equipment
  1. The work area should be inspected to ensure non-essential items such as tools or spare parts have been removed and that all of the machine or equipment components are operationally intact
  2. The work area must be checked to ensure that all employees have been safely positioned or have cleared the area
  3. All effected employees must be notified that the equipment is to be restarted
  4. Each lockout or tagout device must be removed from the energy isolating devices by the SAME employees who applied the locks
  5. Once all lock outs have been removed, the effected equipment can be restarted

Conclusion

- Large equipment and process machinery is safest when it is running constantly and smoothly.
- When this kind of capital is shutdown, there are always pressures to repair it as soon as possible and return it to production.
- It is under these high stress situations where accidents CAN occur.

Questions?

If you have any questions, contact

Radiological & Environmental Management (REM)

260-481-4193 or 260-481-5744

steels@ipfw.edu or justja01@ipfw.edu