Lockout/Tagout

Sudden reactions in machinery or equipment can hurt service or repair workers. To stop this from happening, the workers must follow the Lockout/Tagout rules given by their employer.

OSHA Standard for the Control of Hazardous Energy, 29 CFR 1910.147

Establishes the minimum performance requirements for preventing the release of potentially hazardous energy during the servicing or maintenance of machinery or equipment.

To lockout a piece of equipment:

Put a lock on a device that keeps energy out of the equipment being serviced, such as a disconnect switch or mechanical valve. The lock stops the energy-isolating device from accidentally turning on. This is the preferred method.

To tagout a piece of equipment:

Put a special tag on the energy-isolating device. This warns other workers not to use the equipment. Tagout does not keep the worker as safe as a lockout. Only use tagout instead of lockout if lockout will not work on the equipment. The employer must write and continue to use a workable Energy Control Program, which gives the lockout/tagout rules to follow when checking equipment. The program must state the correct method for turning the equipment on and off, and how to use the locks and tags.

Definitions

Hazardous Energy: any energy, including mechanical, pneumatic, hydraulic, electrical, chemical, nuclear and thermal energies, that could cause injury to employees. Danger is only present when energy may be released in a quantity sufficient to affect the safety of employees.

Water Hammer: a pressure surge or wave that results when a fluid or a gas in motion is forced to stop or change direction suddenly.

Lockout: the placement of a lockout device on an energy-isolating device, in accordance with an established procedure. This ensures that the energy-isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Written Procedures: explains the correct way to safely turn off a piece of equipment or a system before checking it.

A good written procedure should at least include:

- what the procedure is for,
- specific steps to shut down, block, or isolate the energy sources,
- how to use and then remove the lockout/tagout
- devices and
- a description of the correct testing procedure to make sure the energy control measures work.

Training Requirements

The standard lists three different types of employees and three different levels of training.

Authorized Employee: the persons who perform maintenance or repairs on equipment covered by the standard.

- have the ability to begin lockout/tagout program,
- must know how the equipment or system is powered,
- can recognize hazardous energy sources and
- have the ability to cut off the equipment from the energy sources and turn it off.

Affected Employees: people whose job requires them to operate machinery or equipment that is under lockout/tagout.

Other Employees: those who work in the area where the work is being performed but are not involved in the maintenance or servicing process.

- must be able to recognize a piece of equipment under lockout/tagout and
- know not to get in the way of that process.

Retraining

Employees need new guidelines whenever:

- procedures change,
- new job assignment,
- the machinery or equipment changes,
- there are new hazards created by the equipment or process,
- an employee demonstrates that they do not fully understand the employers policy or their role within the plan.

Piping Systems

Give special thought to any work on piping systems. Often work is done in small or narrow areas (manholes, valve pits, steam tunnels, an excavation, etc). If some-thing goes wrong, the worker can quickly lose their ability to save themselves.

Regular upkeep to prevent problems and regular system checks can help find hidden problems. In a system that is poorly set up or fixed, some parts can weaken over time and be unable to hold a surge or water hammer condition.

When setting up a lockout/tagout procedure on an old system, the mechanic should know the system very well. For example:

- working pressures
- how well the system is maintained
- the pipe configurations
- the hazards associated with such a system

Methods that Offer Added Protection

- use the double block and bleed method,
- physically disconnect the pipe, line or duct (known as Line Breaking).

Program Effectiveness

Once a year the employer must check how well their program works. This assures that everyone is following the energy control rules correctly. Retraining will help with any problems.

High Pressure Steam Systems

People who work near high pressure steam or condensate lines should be fully aware of the system dangers. Whenever possible, do not work on live high pressure steam/condensate systems. Isolate the area where work is to be performed either by system shut down, blow down or by properly locking and tagging out the section.

If you have to work on live high pressure steam/ condensate systems, plan out your work first. Have a pre-work meeting to talk about ways to make the work place as safe as possible. Be aware of what is around you, know what your exit path is, and be careful of cast iron fittings and valves and sagging unsupported lengths of pipe.

If you hear water hammer banging or popping noises, move to a safe area and tell your supervisor. Water hammer can have devastating effects on equipment. It can create stresses that crack system components and cause a steam or liquid leak.

Only mechanics with experience should turn on cold steam piping. Slowly open valves at low pressures and bring the system up to working temperature. Keep draining any condensate during the process.

References

OSHA 29 CFR 1910.147
The Control of Hazardous Energy

Steam Plant Operation by E.B. Woodruff and H.B. Lammers

Department of Energy EH-95-1
Averting Water Hammers and Other Steam/ Condensate System Incidents

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