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Hazardous Energy Control

The Importance of Controlling Hazardous Energy

Introduction:

Equipment and machinery within the work environment play a critical role in industry. They are instrumental in ensuring productivity and facilitating the production of goods and services. Their use can also lead to serious and fatal accidents to workers when not properly operated during regular use, maintenance and repair activities.

To prevent potential life threating accidents, effective implementation and execution of Hazardous Energy Control Procedures (HECP), such as a Lockout – Tagout (LOTO) program, are essential.

This resource guide has been developed to help employers understand the significance of Lockout Tagout in protecting employees and machinery. This includes the development of an Energy Control Program, its procedures for controlling hazardous energy, and the importance of understanding and staying compliant with regulations.

Hazardous energy can be applied to, as well as generated and stored by, different types of machinery and equipment across many industries. Manufacturing, Utilities, Oil and Chemical Production, Construction, Food Processing, and Trucking are but a few of the industries where this exposure exists. When assessing hazardous energy exposures, ALL potential sources of energy must be evaluated.

Overview:

What is hazardous energy? Hazardous energy are energy sources such as electrical, mechanical, hydraulic, pneumatic, chemical, thermal or others applied to or created by machines and equipment that can be hazardous to workers. During the servicing and maintenance of machines and equipment, the unexpected startup or release of stored energy can result in serious injury or death to workers.[1]

What are the harmful effects of hazardous energy? Workers servicing or maintaining machines and equipment may be seriously injured or killed if hazardous energy is not properly controlled. Injuries resulting from the failure to control hazardous energy during maintenance activities can be serious or fatal and result in electrocution, burns, crushing, cutting, lacerating, amputating, or fracturing body parts, and others. Examples of such accidents could include:[1]

- A steam valve is automatically turned on, burning workers who are repairing a downstream connection in the piping.
- A jammed conveyor system suddenly releases, crushing a worker who is trying to clear the jam.
- Internal wiring on a piece of factory equipment electrically shorts, shocking a worker who is repairing the equipment.

What can be done to control hazardous energy:

Employers must develop and implement energy control procedures to control potentially hazardous energy and render equipment inoperative whenever employees perform activities covered by the Lockout/ Tagout standard. The energy control procedure provides the authorized employee with written instructions specifying how to eliminate the potential for unexpected activation or start-up of machinery or equipment or release of stored energy.

Proper lockout/tagout (LOTO) practices and procedures safeguard workers from the release of hazardous energy. The OSHA standard for the Control of Hazardous Energy (lockout/Tagout) 29 CFR 1910.147) requires employers to train each worker to ensure they know, understand, and are able to follow the applicable provisions of the hazardous energy control procedures. Workers must be trained in the purpose and function of the energy-controlled program and have the knowledge and skills required for the safe application, usage and removal of the energy control devices.[1]

All employees who work in an area where energy control procedures are utilized need to be instructed in the purpose and use of the energy control procedures, especially prohibition against attempting to restart or reenergize machines or other equipment that are locked or tagged out.[1]

All employees authorized to lockout machines or equipment and perform the service and maintenance operations need to be trained in recognition of applicable hazardous energy sources in the workplace, the type and magnitude of energy found in the workplace, and the means and methods of isolating and/or controlling the energy.[1]

Employers are also required to retrain employees to maintain proficiency or introduce new change control methods.

The energy control procedures must outline the scope, purpose, authorization, rules and techniques that will be used to control hazardous energy, and the means that will be used to enforce compliance.

The energy control procedures must identify the type and magnitude of the hazardous energy and the means and methods that will be used to protect employees during servicing or maintenance operations. The energy control procedures must identify the machine(s) or equipment on which the procedure is to be used. This will ensure that the authorized employee implements the appropriate energy control procedures for the equipment or machine to be serviced or maintained.

Employers are required to address within the energy control procedures the sequential steps necessary to shut down,

isolate, block, and secure machines or equipment. Sequential steps for placing, removing, and transferring lockout/tagout devices are also required.[2]

Procedures for De-energizing Machines or Equipment:[2]

To properly deenergize and eliminate all sources of potential hazardous energy during servicing and maintenance operations and to prevent an employee from omitting an important step in the energy control procedure, the following procedural steps should be implemented:

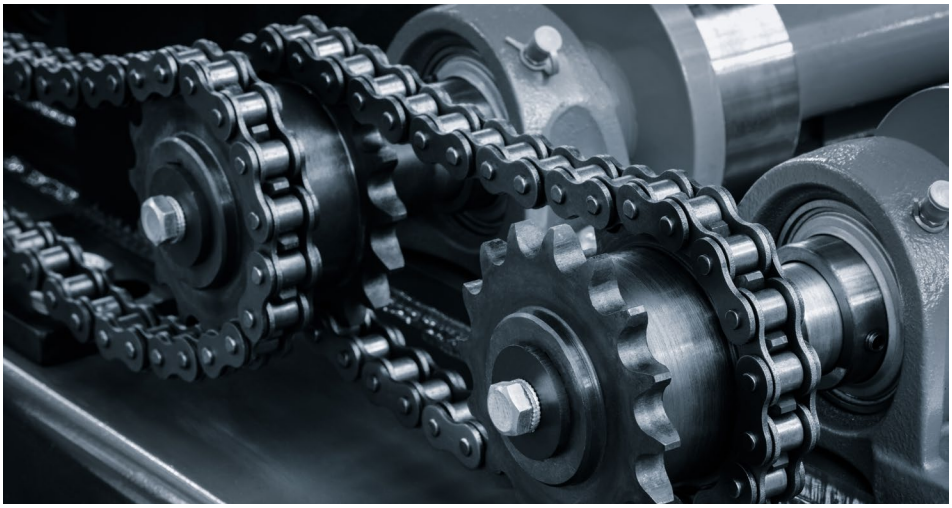
- Prepare for shutdown. Before an authorized or affected employee turns off a machine or equipment, the authorized employee must have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.
- Shut down the machine(s) or equipment. The machine(s) or equipment must be turned off or shut down using normal stopping means, such as using the stop button(s) at the production control center. An orderly shutdown must be conducted to avoid any additional or increased hazards to employees as a result of equipment deenergizing. To ensure that the work will be accomplished safely, only authorized employees are permitted to deenergize and lockout/tagout the machine or equipment which is being serviced or maintained.
- Disconnect the energy isolating device(s). All energy isolating devices used to control the energy to the machine or equipment must be physically located and placed in the "off" position to disconnect the machine or equipment from its energy source and deenergize it.
- Apply the lockout or tagout device(s). Once the equipment or machine energy isolating device has been disconnected, the lockout or tagout device shall be affixed.
- Render all stored and/or residual energy safe. Once the lockout or tagout devices have been applied, all potentially hazardous stored or residual energy must be relieved, disconnected, restrained, and rendered safe before servicing or maintenance can be conducted. If stored energy is present in the machine or equipment after it has been isolated from the energy source(s), the energy must be controlled before servicing and/or maintenance work can be performed. However, if stored energy could reaccumulate while servicing and/or maintenance work is being performed, the employer must continue to verify the isolation of the machine or equipment to assure that it cannot reaccumulate and present a hazard to the servicing and/or maintenance employee. The presence of hydraulic or pneumatic systems may necessitate the use of bleed values to relieve pressure.
- Verify the isolation and de energization of the machine or equipment prior to starting work. Employees must verify that the machine or equipment have been isolated and de energized before they

begin service or maintenance activities. This step may involve a deliberate attempt to start up the equipment, which should be impossible to activate because of the isolation of the machine or equipment from its energy sources.

Procedures for Placement, Removal, and Transfer of Lockout/Tagout Devices:[2]

The energy control procedures must include specific information concerning the placement, removal, and transfer of the lockout/tagout devices. Employees must be familiar with and able to perform these steps in the appropriate order.

- Placement of lockout/tagout device(s). The procedure must address whether lockout or tagout devices, or a combination of lockout and tagout devices, will be applied by the authorized employee to the energy isolating device(s) to control hazardous energy. At times, the sequencing and placement of energy isolating, and lockout devices can be intricate depending on the complexity of the equipment. It is important to ensure that all energy isolation points have been identified, isolated, and the appropriate lockout/tagout device(s) has been applied to provide protection against release of hazardous energy.
- Removal of lockout/tagout device(s). Once the servicing and/or maintenance operations have been completed, specific procedures must be used before the energy isolating devices may be removed and the machine or equipment reenergized. This includes:
  - Replacement of safeguards, machine or equipment inspection, and removal of all non-essential tools and equipment. This procedure is designed to ensure that employees are not exposed to hazards from normal production if a guard is not replaced, or a tool is left in a location where the startup of the machine would cause the tool to injure the employee or damage the equipment.
  - Safe positioning of employees. This procedure is to ensure that employees are not in a location where they are exposed to unexpected energization, startup, or release of hazardous energy when the lock(s) or tag(s) are removed from energy isolating devices.



  - Removal of lockout/tagout device(s). This is only to be performed after the first two steps have been accomplished. Removal of the lockout/tagout device(s) may only be performed by the authorized employee who has placed the lock on the energy isolating device, unless the authorized who has placed the device is unavailable to remove it or in an emergency. Under those limited circumstances, the employer may direct the removal of a lockout or tagout device (s), provided the energy control program incorporates specific procedures and training for that purpose.
  - Notification of affected employees that servicing and maintenance is completed. The notification procedure is intended to inform the affected employees that the servicing and maintenance operation has been completed, and it is now safe to operate the equipment or machine.
  - Transfer of lockout/tagout devices during shift or personnel changes. Many servicing and maintenance operations may extend across one or more work shifts. In such cases it is crucial that energy control procedures and work permits, if used, ensure that all hazardous energy is continuously maintained in a safe, deenergized condition. Therefore, specific procedures must be used to ensure continuation of lockout or tagout protection for employees during shift or personnel changes. These specific procedures for shift or personnel changes must address the transfer of lockout/tagout devices between outgoing and incoming employees in order to provide for an orderly transfer of control measures, and to be certain that the machine or equipment is continuously maintained in a safe condition.

Best Practices – How to Develop Your Hazardous Energy Control Procedures (HECP):[3]

Step 1:
State the purpose and use of your HECP.

Step 2:
Name the Authorized Employee(s) responsible for carrying out the HECPs and restoring equipment, machines, and prime movers back to service.

Step3:
Develop specific procedures for the transfer responsibilities.

Step 4:
State the rules that apply to your HECPs and how you will enforce compliance.

Step 5:
List all equipment, machinery, prime movers, and ALL their source(s) of hazardous energy that your HECPs apply to.

Step 6:
For each piece of equipment, machinery or prime mover, describe the specific techniques and steps to follow in order to control all hazardous energy sources, and how to safely restore the machinery and equipment to service.

- Consider work activities
- Specify hazardous energy control steps
- Secure hazardous energy control points
- Test for effectiveness
- Restore equipment, machines and prime movers back to service

Benefits of Lockout-Tagout[4]

- Keeping People Safe – The foremost advantage of implementing a robust Lockout-Tagout program is its ability to significantly enhance workplace safety. Heavy machinery and industrial equipment pose severe dangers to workers if they inadvertently come into contact with moving parts or hazardous energy sources during maintenance or repair. Lockout-Tagout measures help mitigate these risks, reducing the likelihood of severe injuries or even fatalities.
- Keeping Machinery Protected – Beyond safeguarding workers, Lockout-Tagout procedures also play a critical role in protecting expensive machinery and equipment. Accidents involving machinery can cause extensive damage, leading to costly repairs and replacements. By effectively implementing Lockout-Tagout protocols, businesses can prevent accidental activation of machinery, preserving valuable assets and reducing operational downtime.

References:

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2. US Department of Labor – OSHA eTool Lockout-Tagout – Hot Topics Energy Control Program – Specific procedures for energy control and control circuitry
3. Lockout/Tagout Employer Hazardous Energy Control Procedures dir.ca gov/ dosh/etools/08-003/hecps-htm
4. The importance of Lockout Tagout/ EasySafe