

# **East Carolina University CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT) TRAINING PROGRAM**

**Presented by the Office  
of Environmental  
Health and Safety**





# LOCKOUT/TAGOUT

- 🔑 The **OSHA Standard for the Control of Hazardous Energy (Lockout/Tagout) 29 CFR 1910.147** covers the servicing and maintenance of machines and equipment in which the unexpected start-up or the release of stored energy could cause injury to employees.

# LOCKOUT/TAGOUT

## Definitions




- 🔑 **Authorized employee** – An employee who performs servicing or maintenance on machines and equipment. Lockout or tagout is used by these employees for their own protection.

# LOCKOUT/TAGOUT

## Definitions









-  **Affected employee** – An employee who performs the duties of his or her job in an area in which the energy control procedure is implemented and servicing or maintenance operations are performed.

# LOCKOUT/TAGOUT

## Types of Energy



-  Mechanical
-  Hydraulic
-  Pneumatic
-  Chemical
-  Thermal
-  Other

# LOCKOUT/TAGOUT

## Scope and Application



### Covered Activities

- ❏ Constructing, installing, setting up, adjusting, inspecting, modifying, maintaining and/or servicing machines or equipment where employees could be exposed to the unexpected energization or release of hazardous energy

# LOCKOUT/TAGOUT

## Scope and Application



**Lockout/Tagout rules apply** (the equipment must be de-energized and locks or tags must be applied to the energy-isolation devices) to servicing and maintenance activities **when:**

- ✎ The employee must either remove or bypass machine guards or other safety devices, resulting in exposure to hazards at the point of operation.

# LOCKOUT/TAGOUT

## Scope and Application



**Lockout/Tagout rules apply** (the equipment must be de-energized and locks or tags must be applied to the energy-isolation devices) to servicing and maintenance activities **when:**

- ✎ The employee is required to place any part of his or her body in contact with the point of operation of the operational machine or piece of equipment.



# LOCKOUT/TAGOUT

## Scope and Application



**Lockout/Tagout rules apply** (the equipment must be de-energized and locks or tags must be applied to the energy-isolation devices) to servicing and maintenance activities **when:**

- ✎ The employee is required to place any part of his or her body into a danger zone associated with a machine operating cycle.

# LOCKOUT/TAGOUT

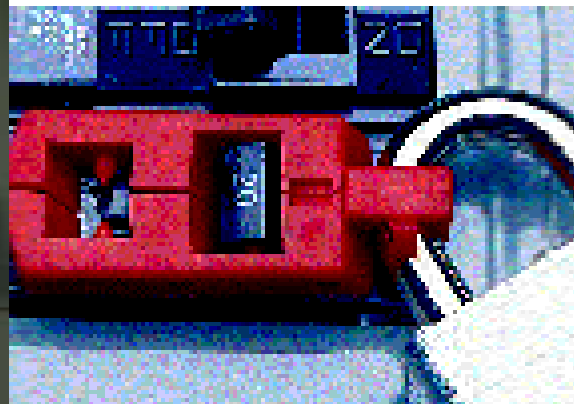
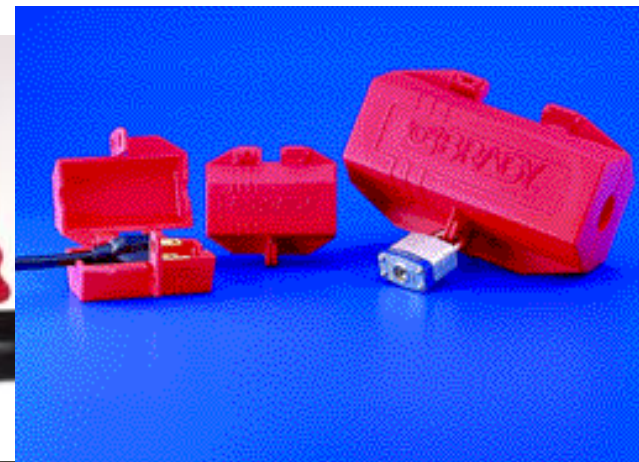
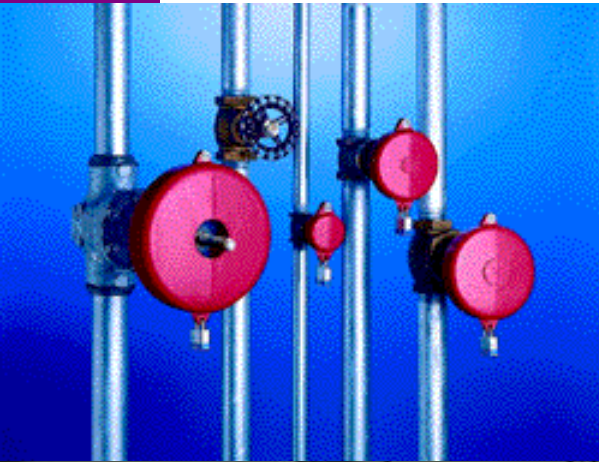
## Lockout vs. Tagout



- ❗ If an energy-isolating device is capable of being locked out, it must be locked out unless it can be shown that a tagout system provides full employee protection.

# LOCKOUT/TAGOUT

## Types of Devices



# LOCKOUT/TAGOUT Written Procedures



- ❏ Must identify the information that authorized employees must know in order to control hazardous energy during service or maintenance.

# LOCKOUT/TAGOUT Written Procedures



- 🔒 Preparation for shutdown
- 🔒 Shutting down the equipment
- 🔒 Equipment isolation
- 🔒 Application of Lockout/Tagout devices
- 🔒 Release of stored energy
- 🔒 Verifying equipment isolation

# LOCKOUT/TAGOUT

## Preparation for Shutdown



- 🔑 Know the types and amounts of energy that power it.
- 🔑 Know the hazards of that energy.
- 🔑 Know how the energy can be controlled.



# LOCKOUT/TAGOUT

## Shutting Down the Equipment

- ✿ Shut the system down by using operating controls.
- ✿ Follow whatever procedure is right for the equipment to avoid endangering anyone during shutdown.

# LOCKOUT/TAGOUT

## Equipment Isolation



- ❗ Operate all energy-isolating devices so that the equipment is isolated from its energy sources.
- ❗ Be sure to isolate all energy sources (secondary power supplies as well as the primary supplies).
- ❗ Never remove a fuse instead of disconnecting.



# LOCKOUT/TAGOUT

## Application of Devices



- ❗ All energy-isolating devices are to be locked, tagged or both.
- ❗ Only standardized devices can be used and they are not to be used for anything else.
- ❗ Use a lockout device if your lock cannot be placed directly on the energy control.
- ❗ When lockout is used, every employee in the work crew must attach his personal lock.

# LOCKOUT/TAGOUT

## Release of Stored Energy



- ❗ Inspect the system to make sure all parts have stopped moving.
- ❗ Relieve trapped pressure.
- ❗ Block or brace parts that could fall due to gravity.
- ❗ Bleed lines and vent valves open.
- ❗ If stored energy can reaccumulate, monitor it to make sure it stays below hazardous levels.



# LOCKOUT/TAGOUT

## Verifying Equipment Isolation

- ❗ Make sure all danger areas are clear of personnel.
- ❗ Verify that the main disconnect switch or circuit breaker can't be moved to the on position.
- ❗ Press all start buttons and other activating controls on the equipment itself and return controls to the off position when the testing is complete.

# LOCKOUT/TAGOUT

## Performing the Work



- 🔒 Look ahead and avoid doing anything that could reactivate the equipment.
- 🔒 Don't bypass the lockout when installing new piping or wiring.



# LOCKOUT/TAGOUT

## Removing Lockout/Tagout

- ❗ Make sure the equipment is safe to operate by removing all tools from the work area and making sure the system is fully assembled.
- ❗ Safeguard all employees by conducting a head count to make sure everyone is clear of the equipment. Also notify everyone in the work area that lockout/tagout is being removed.
- ❗ Remove the lockout/tagout devices. Each device must be removed by the person who put it on.

# LOCKOUT/TAGOUT Contractors



- 🔒 The outside contractor and the on-site employer must exchange lockout/tagout information.
- 🔒 Employees on site must understand rules used by the contractor.
- 🔒 Be alert for new types of lockout or tagout devices.

# LOCKOUT/TAGOUT

## Shift Changes



- 🔑 If servicing lasts more than one shift, lockout/tagout protection must not be interrupted.
- 🔑 When the employee who applied device is not there to remove it, it can be removed only in an emergency and only under the direction of the supervisor.

# LOCKOUT/TAGOUT

## Lockout/Tagout Devices



- ❗ **Durable** – Lockout and tagout devices must withstand the environment to which they are exposed for the maximum duration of the expected exposure. Tagout devices must be constructed and printed so that they do not deteriorate or become illegible, especially when used in corrosive or wet environments.



# LOCKOUT/TAGOUT

## Lockout/Tagout Devices



- ❗ **Standardized** – Both lockout and tagout devices must be standardized according to either color, shape, or size. Tagout devices must also be standardized according to print and format.

# LOCKOUT/TAGOUT

## Lockout/Tagout Devices



- ❖ **Substantial** – Lockout and tagout devices must be substantial enough to minimize early or accidental removal. Tag means of attachment must be non-reusable, attachable by hand, self-locking and non-releasable, with a minimum unlocking strength of no less than 50 pounds (one-piece nylon cable tie).

# LOCKOUT/TAGOUT

## Lockout/Tagout Devices



- 🔑 **Identifiable** – Locks and tags must clearly identify the employee who applies them. Tags must also warn against hazardous conditions if the machine or equipment is energized and must include a legend such as: DO NOT START, DO NOT OPEN, DO NOT CLOSE, DO NOT ENERGIZE, DO NOT OPERATE.

# LOCKOUT/TAGOUT

## Periodic Inspections



- 🔑 Inspections must be performed at least annually to assure that the energy control procedures continue to be implemented properly and that the employees are familiar with their responsibilities.

# LOCKOUT/TAGOUT

## Periodic Inspections



- ❖ Supervisors are responsible for conducting this annual inspection and they must certify that the inspections have been performed. The certification must identify the machine or equipment, the date of the inspection, the employees included, and the name of the person performing the inspection. Must identify any deficiencies or deviations and correct them.

# LOCKOUT/TAGOUT



 QUESTIONS

# LOCKOUT/TAGOUT

## Scope and Application



### Activities Not Covered

- ❏ Minor tool changes and adjustments, and other minor servicing activities that take place during normal operating production operations which are routine, repetitive, and integral to the use of that production equipment, as long as workers are effectively protected by alternative measures

# LOCKOUT/TAGOUT

## Scope and Application



### Activities Not Covered

- 🔑 Work on cord and plug connected equipment **if** the equipment is unplugged from the energy source and the authorized employee has exclusive control of the plug.



# LOCKOUT/TAGOUT

## Scope and Application



### Activities Not Covered

- Hot tap operations that involve transmission and distribution systems for gas, steam, water, or petroleum products on pressurized pipelines **if** continuity of service is essential, shutdown of the system is impractical, documented procedures are followed, and employees are effectively protected by special equipment.