Basic Principles of Safety – LOTO

Lesson Objectives:

At the end of this lesson, you should be able to explain what a LOTO system involves and which procedures to follow.

"Lockout – tagout", or LOTO, is one of several types of maintenance safeguard procedures for hazardous technical systems and devices. It is designed to hold a technical system's **actuators**, or effectors (e.g. switches, locking or ball valves, etc.), in a desired secured position, particularly during maintenance and repair work. It is used to not only to protect against unauthorized access but also to prevent unintentional activation.

Maintenance safeguards are often implemented using a **lead** or **seal** that, once broken, will allow the device to be re-actuated. A lead or seal is mainly used when actuation must be made available principally for safety reasons. Other systems of LOTO may be reusable safeguards, in which case it is often secured with one or more locks. In any event, such safeguards are used so that unauthorized access may be prevented or when work must be carried out only once the said technical system has been verily shut down as, for example, when having to replace **drive belts**.

Those aids which guarantee a definite shutdown of the energy usually consist of a mechanism for both blocking switches, valves or effectors, by using a valve shut-off, locking chamber or switching lock (etc.) as well as a combination lock for extra security. This doubly secure method prevents any device from being switched on again before maintenance work is completed.

Additionally, a discernable marking, such as a maintenance tag or sticker, must be attached to these two blocking systems to indicate that certain machines and devices have been deliberately switched off. That way, all employees are made aware of maintenance &/ repair work so as to prevent premature restart of a given machine. A broken seal or lead would alarm workers of a breach and they should immediately report it.

Workers need to study the official documentation for correctly employing the maintenance safeguards, and for handling hazardous energy sources, ad hoc.

Applying LOTO follows a strict order:

- **Examine procedures**

Ensure that you have determined the correct steps for shutting down and restarting the equipment/machinery. Prepare the equipment for shutdown and highlight any potential hazards which may occur. Memo all employees that a lockout procedure is to take place and for how long it will affect work tasks.

- **Shut down equipment properly**

Adhering to the manufacturer's shut-down instructions to the letter and in the given sequence will ensure the equipment is safely shut off. Explain in detail, to all involved, the shutdown instructions and write these down to avoid damaging any equipment while keeping everyone safe. Make sure the shutdown instructions are in the correct sequence and clearly write out the steps for other workers to check off. ☑

- **Isolate equipment**

Ensure that equipment **isolation points** are identified, labelled, and disconnected from all primary and secondary power supplies. Be sure to disconnect all energy sources, including water, steam, electricity, and gas. If required, identify the process that will relieve any remaining pressure or energy in the machine itself.

- **Apply lock-out devices**

Apply lock-out devices to all energy isolation devices, making sure they are tagged according to Biogen's safe working procedures. Use the appropriate lock-out device along with a tag-out device—it can be used on the **energy control** as a secure lock-out device.

- **Control energy system**

Inspect the system thoroughly to ensure all moving parts have stopped and take steps to guard against residual energy. Releasing tension in springs, bracing parts which could fall off, and blocking any moving parts in hydraulic systems, are both illustrations of how to control stored energy at this stage.

- **Verify lockout (= try-out)**

Once you have disconnected primary and secondary sources of energy, attempt to start the equipment to verify that lockout has been successful. Inspect the system again to ensure it cannot re-start. Once a lockout has been achieved, return all switches to their off positions.

- **Assume prescribed duties**

At this stage, you may safely carry out the required maintenance or cleaning work on the equipment/machinery, all the while staying watchful of areas of equipment which could accidentally be re-started.

- **Reactivate**

Once the work has been completed, the final stage of lockout—tagout (LOTO) can take place, whereby the equipment is restarted. Solely the person responsible for effectuating the original lockout is entitled to remove them; this ensures further safety and prevents any premature re-energisation. Once the final lock-out device has been removed, the equipment can be re-energised and started up again, according to manufacturer's instructions.

Lock-out devices in use