Lock Out Tag Out: When It Is and Isn’t Required

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Gemini, Inc.

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Molds: 1,000 lbs
Average 800° F outside surface temperature
workcenter Generates $15,000/ hour revenue
Why Didn’t You Lock It Out?

• Downtime Cost:
  • Re-start takes 2 hours. $15,000 x 2 hours = $30,000 downtime cost

• Nothing was moving,

• A trained operator was manning the controls to prevent the machine from activating

“Don’t worry, I’ve got your back”
What Did That Injury Cost?

>$300,000
What we’ll Cover

• Define what a Hazard Zone is
• When Lock Out and/or Block Out is and isn’t Required
• Exceptions to Lock Out
• Proper steps to conduct an effective lock out
• Group Lock Out
• Shift Transfer of Lock Out
• Removal of Locks
Potential Hazardous Energy In Machines

**Electrical**: Alternating Current, Direct Current (batteries & capacitors) and Static

**Pneumatic**: air lines, air cylinders, reservoir tanks

**Rotating Equipment**: shafts, flywheels, fans, saws, gears, chucks & arbors

**Gravity**: suspended objects, air & hydraulic cylinders loosing pressure

**Springs**: under compression or tension that may move objects

**Hydraulic**: Pressurized hoses or cylinders

**Heat**: Ovens, cutting tools, welding

**LASERS**: cut or burn

**Chemicals**: valves opening or pumps pushing them out
What is a “HAZARD ZONE”? 

A “HAZARD ZONE” is ANY part of the machine or process that can cause a serious injury to a person. Consider.....

Spinning Arbors, Blades, Belts, Collets, Cutters, Drill Bits, Shafts Clasping, Clamping & Crimping mechanisms and Compactors Pneumatic Cylinders & Vices Hydraulic cylinders Rollers that can pinch Dies that cut or form parts Shears Hot Surfaces LASERS Chemicals and Chemical Processing Tanks
Video: Lock Out Example
The HAAS Mill
If You Can’t lock Out the Energy, Block the Energy
If You Can’t lock Out the Energy, Block the Energy

Lift Table NOT blocked

Table shown in the BLOCKED position
If You Can’t lock Out the Energy, Block the Energy
If You Can’t lock Out the Energy, Block the Energy

Blocking clamp

Jamb Bar
Block Out Example:
The 1,000 Ton Press VIDEO
If You Can’t lock Out the Energy, Block the Energy

Fully extended air cylinder

Blocking Device

Blocking device turned 180°, installed & pinned
If You Can’t lock Out the Energy, Block the Energy
Production Tasks and Non-production tasks

For the purposes of the Lock Out program, it’s important that we understand the difference between production tasks and non-production tasks as we interact with equipment.

**Production Tasks** are actions that directly affect or change the **product**. (examples: cutting, drilling, sanding, forming, polishing, painting)

**Non-production Tasks** are actions that support the production tasks. (examples: machine set-up, tool changes, cleaning, maintenance and repairs) Think of them as **preparing the machines** to do the work.
### Production Tasks Vs Non-production tasks

**Production tasks include things such as:**
- Loading & unloading product to a machine
- Sawing, cutting, milling, shearing
- Drilling & tapping
- Forming & Bending
- Sanding and Polishing
- Painting
- Assembling product
- Packaging the product

**Non-production tasks include things such as:**
- Un-jamming a machine
- Tool holder changes in a carrousel
- Servicing a machine
- Maintaining a machine
- Repairing equipment
- Cleaning inside a machine

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**Product focused**

**Machine or equipment focused**
Which Machines or Tasks must be Locked Out?

It would be easy to say that any machine that has a Lock Out procedure attached to it must be locked out.

Unfortunately, history has shown us that over time, some of the LOTO procedures have removed or fell off a machine, but were not put back.
Which Machines or Tasks must be Locked Out?

We need you to understand the reasoning behind answers to the following questions so that even if a procedure is missing from a machine, you still make the correct decision about protecting yourself.

➢ Which TASKS require me to lock out? (and why?)

➢ Which tasks am I allowed to do without locking out? (and why?)
### Working INSIDE a HAZARD Zone

**Lock out not required**

Routine, Repetitive & Integral to **PRODUCTION**

(Safety devices must be in place and fully functional: Interlocks, Light Curtains, Pressure Mats and Presence Sensing Devices)

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**LOCK OUT, BLOCK OUT REQUIRED**

During the tasks below: **Lock out is required** whenever you
1) by-pass a safety device,
2) remove a guard,
3) place any part of your body inside the hazard zone

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**Making final adjustments to set-up.**
If you are NOT reaching your body into a hazard zone, the machine can’t hurt you.

Locking the machine out or blocking the hazardous energy is NOT required.

Being OUTSIDE the hazard zone does NOT require locking, blocking or tagging the machine.
If you are reaching your body into a hazard zone, the machine *might* hurt you if it were to suddenly cycle, activate, move or shift.

Locking the machine out or blocking the hazardous energy may be required depending on the conditions.
### Working INSIDE a HAZARD Zone

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**Routine, Repetitive & Integral to PRODUCTION**

(Safety devices must be in place and fully functional: **Interlocks**, **Light Curtains**, **Pressure Mats** and **Presence Sensing Devices**)

- **Safety Umbrella**

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**UN-JAMMING**

- Tool Holder Changes
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- Cleaning

**SET UPS or CHANGE-OVER**

- Lock Out
- Manual, Jog, or Pendant mode?

**Making final adjustments to set-up.**
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Routine, Repetitive & Integral to PRODUCTION
(Safety devices must be in place and fully functional: Interlocks, Light Curtains, Pressure Mats and Presence Sensing Devices)

Safety Umbrella

Load and Unload parts to/from machine
Changing cutting tool INSERTS

MINOR Cleaning:
(done while standing at the point of loading the part into the machine)

MINOR Servicing:

* Single Cord or Plug Exception
Working INSIDE a HAZARD Zone

Lock out not required
Routine, Repetitive & Integral to PRODUCTION
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| Load and Unload parts to/from machine |
| Charging cutting tool INSERTS |
| MINOR Cleaning: (done while standing at the point of loading the part into the machine) |
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* Single Cord or Plug Exception
Single Cord Exception to Lock Out

IF all 4 of these conditions exist, then locking out that machine is NOT required, but the machine must still be un-plugged

1) The machine has only one source of hazardous energy

2) The source of energy is a “plug” style or manual coupler (air hose)

3) You can maintain complete control over the end of that cord/hose while doing your work on the machine

4) The machine has no capacity to store hazardous energy such as reservoir air tank, air cylinders, electrical capacitors, springs or where gravity is a factor
Single Cord Exception to Lock Out

IF **all 4** of these conditions exist, then locking out that machine is **NOT** required, but the machine must still be **un-plugged**

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Do these machines qualify for the Single Cord Exemption?

• A Drill Press with a single 120 volt flexible power cord and plug
• A Stroke Sander with a flexible power cord and plug & an air line
• A Band-saw that’s hardwired to 120 volts
• A portable Hand Drill with a power cord
• A Bead-blasting cabinet supplied with 120 volt power and an air line
• A Table-saw hardwired to 120 volts
• An electric box taping machine that incorporates air cylinders
Do these machines qualify for the Single Cord Exemption?

• A Drill Press with a single 120 volt flexible power cord and plug **YES**
• A Stroke Sander with a flexible power cord and plug **No**, 2 sources of power
• A Band-saw that’s hardwired to 120 volts **No**, hardwired... no plug
• A portable Hand Drill with a power cord **YES**
• A Bead Blasting Cabinet **No**, 2 sources of power, Electric and Air
• A Table-saw hardwired to 120 volts **No**, it’s hardwired... no plug
• A box taping machine that incorporates air cylinders **No**, 2 sources of power
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### Safety Umbrella

- Load and Unload parts to/from machine
- Changing cutting tool INSERTS
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* Single Cord or Plug Exception

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**Lock Out Required??**
### Working INSIDE a HAZARD Zone

#### Lock out not required

- Routine, Repetitive & Integral to PRODUCTION
- (Safety devices must be in place and fully functional: Interlocks, Light Curtains, Pressure Mats and Presence Sensing Devices)

#### LOCK OUT, BLOCK OUT REQUIRED

During the tasks below: **Lock out is required** whenever you
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#### SET UPS or CHANGE-OVER

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**Working OUTSIDE a HAZARD Zone**

Lock out not required

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**Safety Umbrella**

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Working INSIDE a HAZARD Zone

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Making final adjustments to set-up.
Working INSIDE a HAZARD Zone

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**SET UPS or CHANGE-OVER**

- **Lock Out**
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**Making final adjustments to set-up.**
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Working INSIDE a HAZARD Zone

UN-JAMMING

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| Load and Unload parts to/from machine |
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(Safety devices must be in place and fully functional: **Interlocks**, **Light Curtains**, **Pressure Mats** and **Presence Sensing Devices**)

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*Safety Umbrella*
Working INSIDE a HAZARD Zone

LOCK OUT, BLOCK OUT REQUIRED

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Making final adjustments to set-up.

(where the operator CAN be exposed to hazardous energy or motion)
Working INSIDE a HAZARD Zone

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#1  Working INSIDE a HAZARD Zone

LOCK OUT, BLOCK OUT REQUIRED

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#3

Making final adjustments to set-up.

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<tr>
<td>Repair Work</td>
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<td>Cleaning</td>
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#### UN-JAMMING
- During the tasks below: **Lock out is required** whenever you
  1. by-pass a safety device,
  2. remove a guard,
  3. place any part of your body inside the hazard zone

#### SET UPS or CHANGE-OVER
- Manual, Jog, or Pendant mode?
- **Lock Out**
- Making final adjustments to set-up.
Lock Out, Block Out Steps

**STEP 1**: Review the Lock Out procedure, gather the tools you’ll need

**STEP 2**: Notify affected employees of shut down (operators or area personnel)

**STEP 3**: Go through the normal shutdown procedures for equipment before attempting to lockout, tagout and/or block & power sources

**STEP 4**: Disconnect or block each of the power sources, apply a lock and tag (before beginning maintenance or servicing test to verify there is no electrical current flowing)

**STEP 5**: Bleed away any stored energy within the system or block its motion (air cylinders, air tanks, capacitors, springs, objects lifted up that could come down)

**STEP 6**: Attempt to restart machine and activate motion to verify that it’s inoperable
Releasing a Machine from Lock Out

**STEP 1:** Review the procedure for the correct sequence of steps

**STEP 2:** Notify affected employees that the machine is being restored to service

**STEP 3:** Remove all tools, supply items and blocking devices that may have been left in the machine

**STEP 4:** Replace and secure all required machine guarding

**STEP 5:** Remove all locks and tags and reconnect the machine to the various power sources in the proper sequence

**STEP 6:** Restart the machine using the normal start-up procedure
Transfer of LOTO at Shift Change:

If you’ve applied a Lock Out lock to a machine and you need to leave because your shift is ending, then you must “hand-Off” or transfer your responsibility to another qualified employee.

They must apply THEIR lock to the machine or box **FIRST** and then you remove yours.
Assuming Ownership of a LOTO

• Before you accept ownership of a machine that has been locked out by someone else, you must;
  • Review the lock out procedure
  • Verify that each energy source has been locked out or effectively blocked
  • Ensure that any residual energy has been released
  • Verify the machine is harmless by attempting to re-start it
Transferring from 2\textsuperscript{nd} to 1\textsuperscript{st} shift creates a challenge since there is no face to face exchange.

1) Deposit your key(s) in the “Lock Out Key Dropbox” located in the Maintenance shop and

2) Fill out the transfer form and leave it right on the clipboard so that Maintenance will see it.
• Date: 12/1/2018
• Owner of LOTO Lock: John Doe
• Location of the Machine: D-5 Shake Out-area
• LOTO Machine: Shake Out
• Issue/Reason for LOTO: The main bearing needs replacing
Group Lock Out

• **Before** applying your own lock to an existing LOTO, you must first **VERIFY** that the LOTO was done effectively.

• **DO NOT ATTEMPT TO VERIFY** while someone else is in or working on the machine.

• Ensure everyone is **CLEAR** before verifying, that is, by attempting to re-start it.

• * Each person working on a locked out machine MUST apply their own lock.*
Removing the Lock of Another Person

Before authorization may be granted we MUST:

• Make every effort to contact the lock owner before cutting the lock.

• Warn all affected personnel that the lock will be cut.

• We’re required to tell the lock owner that his/her lock has been removed prior to returning to work.

• Retain the completed form in the Plant Managers office as a record.
Removing the Lock of Another Person

Prior to removing the lock of another person,
The “Lock Cutting Authorization” form must be completed and signed
The form can be found on our intranet at;
Safety/Environmental/SOPs/LOTO SOP

- Make every effort to contact the lock owner before cutting the lock.
- Warn all affected personnel that the lock will be cut.
- It is mandatory that the lock owner knows that his/her lock has been removed prior to returning to work.
What We Covered:

• Defined what a Hazard Zone is
• When Lock Out and/or Block Out is and isn’t Required
• Exceptions to Lock Out
• Proper steps to conduct an effective lock out
• Group Lock Out
• Shift to Shift Transfer of Lock Out
• Removal of Locks

https://www.youtube.com/watch?v=iCqDRJYkq0Q