

TOOLBOX TALK: Lockout/Tagout (LOTO) Fundamentals

RATTLIR Safety Series – “Strike Before It Bites”

Purpose

Lockout/Tagout (LOTO) is a critical control used to prevent the unexpected energization of machines or equipment during maintenance, inspection, or repair. This toolbox talk provides an overview of LOTO requirements, energy control procedures, verification of zero-energy state, and common mistakes to avoid.

Top 10 Lockout/Tagout Violations



Figure 1 – The 10 Most Common Lockout/Tagout Violations.

What Is Lockout/Tagout?

Lockout/Tagout refers to the process of controlling hazardous energy during servicing or maintenance. A lock provides physical restraint to prevent activation, while a tag communicates who placed the lock and why.



Lockout/Tagout (LOTO) Fundamentals

Types of Hazardous Energy

LOTO protects against multiple forms of energy, including:

- Electrical (primary and stored)
- Mechanical (springs, moving parts)
- Hydraulic & Pneumatic
- Thermal (hot surfaces, steam)
- Chemical
- Gravity & Potential Energy
- Capacitors & Induction

The Six Fundamental Steps of LOTO

1. Prepare for Shutdown – Identify all energy sources and required isolations.
2. Shut Down Equipment – Turn equipment off using normal stopping procedures.
3. Isolate Energy Sources – Open disconnects, close valves, block mechanical motion, etc.
4. Apply Lock and Tag – Each authorized worker applies their personal lock and identification tag.
5. Release or Restrain Stored Energy – Bleed off pressure, block moving parts, discharge capacitors.
6. Verify Zero-Energy State – Test equipment using appropriately rated test instruments before work begins.

Key LOTO Rules

- Only authorized workers may apply or remove locks.
- One lock per worker—no group locks without proper procedures.
- Never operate, remove, or bypass another worker's lock.
- Tags alone do NOT provide physical protection unless used where locks cannot be applied.
- Always re-test for energy after breaks, shift changes, or system disturbances.

Common LOTO Mistakes

- Failure to identify secondary or hidden energy sources.
- Not verifying zero-energy state after lockout.
- Inadequate communication during shift or crew changes.
- Removing locks prematurely.



Lockout/Tagout (LOTO) Fundamentals

- Assuming equipment is safe because it is “off”.
- Not locking valves or mechanical isolations properly.

LOTO for Electrical Systems

- Always test-before-touch using a properly rated meter.
- Use NFPA 70E-compliant procedures.
- Remember: opening a disconnect does NOT remove stored energy.
- Verify each phase, including neutral and grounded conductors.
- For high-voltage systems, apply grounds using proper sequence.

Restoring Equipment to Service

- Inspect the work area and remove tools.
- Ensure all guards and covers are reinstalled.
- Notify workers of lock removal.
- Remove locks in reverse order of application.
- Re-energize equipment following proper startup sequence.

Emergency Response

- Do not energize equipment in an emergency without confirming the safety of all personnel.
- For electrical shock: call 911, begin CPR/AED if trained.
- For stored-energy release injuries: maintain spinal precautions and stop bleeding.

Discussion Questions

- Have all energy sources been identified for today’s task?
- Do we have the correct locks, tags, and devices on hand?
- Who is the authorized worker responsible for LOTO today?

RATTLIR Takeaway

LOTO saves lives by preventing unexpected energization. Precision, discipline, and verification ensure we strike before it bites – every time hazardous energy is involved.