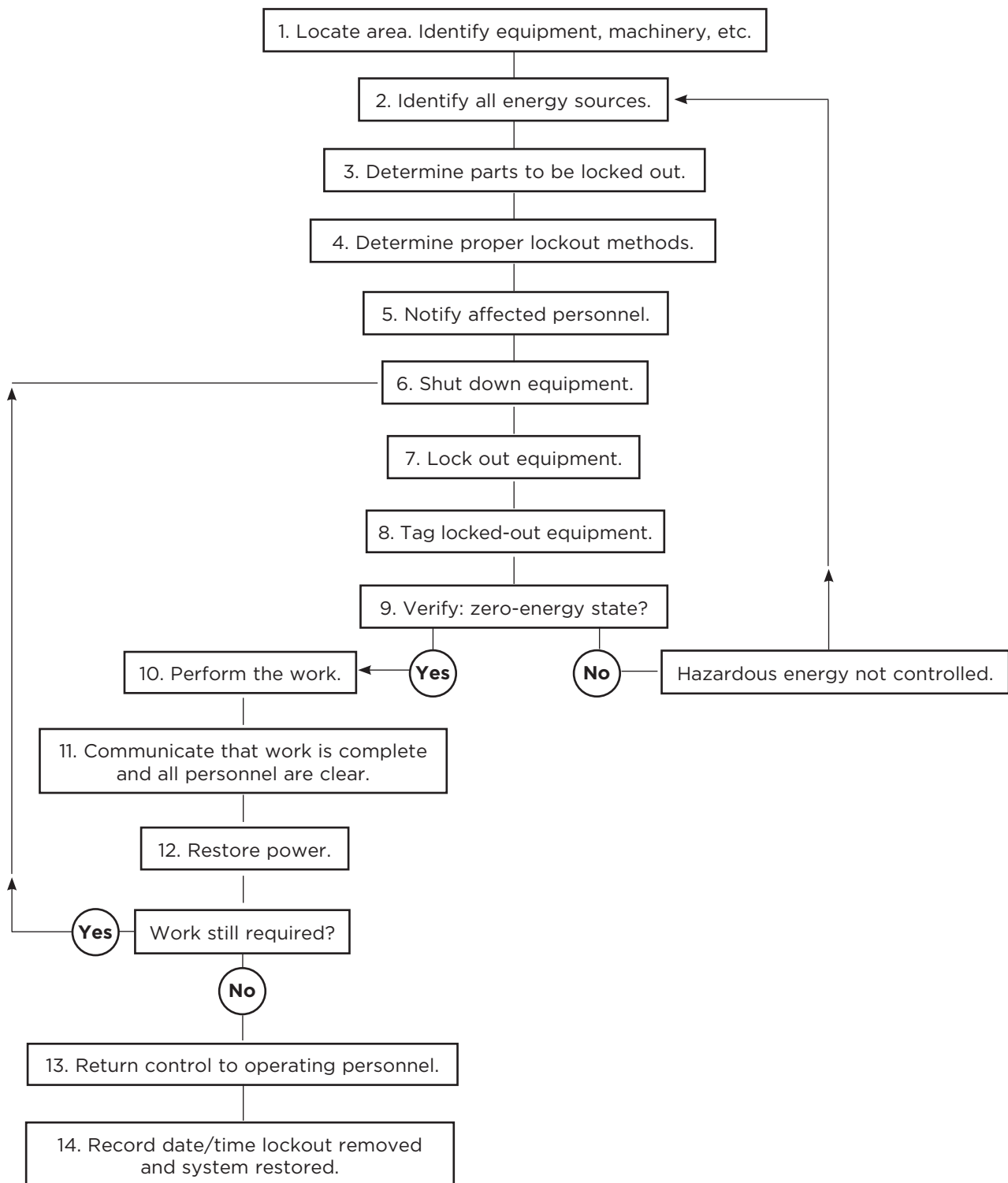


## Planning Steps

Specific lockout procedures will vary depending on the work and the processes which must be shut down. The following chart can help you develop specific procedures.



**Explanation of Steps**

**STEP 1: Locate Work Area And Identify Equipment, Machinery, Or Other System Components To Be Worked On**

Identify the area with references such as floor, room name, elevation, or column number. Identify the equipment that is the subject of the work.

**STEP 2: Identify All Energy Sources**

Identify all energy sources affecting the equipment or machinery. Identify the various energy forms to be locked out such as electrical, momentum, pneumatic, hydraulic, steam, and gravity.

**STEP 3: Identify The Parts To Be Locked Out Or Isolated**

Identify systems that affect, or are affected by, the work being performed. These may include primary, secondary, backup, or emergency systems and interlocked remote equipment.

Review the current system drawings for remote energy sources and, where required, identify and confirm with the client or owner the existence and location of any switches, power sources, controls, interlocks, or other devices necessary to isolate the system.

Remember that equipment may also be affected by

- time restrictions for completing the work
- time-activated devices.

**STEP 4: Determine Lockout Methods**

Confirm that the lockout of all energy sources is possible.

Some equipment may have to be kept operational to maintain service to other equipment that cannot be shut down. Take appropriate steps to provide protection for workers while working near operating equipment.

Equipment that can be locked out should be locked out by the methods most appropriate to the hazards.

**STEP 5: Notify All Personnel Affected**

Shutting down equipment may affect operations in other locations, incoming shifts, or other trades who may be planning to operate the locked-out system. Before proceeding with the lockout, inform all personnel who will be affected.

At construction sites with a large workforce or at relatively large factories, you may need to have special communication methods and permits or approvals.

**STEP 6: Shut Down Equipment And Machinery**

Qualified personnel must shut down the equipment, machinery, or other system components, placing them in a zero-energy state. Trace all systems to locate and lock out energy sources. The main source may be electrical, for instance, but pneumatic and other forms of energy may also be present. Always look for other possible energy sources.

All equipment capable of being energized or activated electrically, pneumatically, or hydraulically must be de-energized or de-activated by physically disconnecting or otherwise making the apparatus inoperable.

Always ensure that the client and operators are aware of the plan to shut down and lock out equipment, machinery, or other system components. In some cases, operations personnel or equipment operators may be required to shut down components because of their special qualifications or knowledge of the system.

In determining what needs to be shut down and locked out, consider the different energy sources that may be found in the system.

**STEP 7: Install Lockout Devices**

**After the circuit has been de-energized and locked out by the person in charge, each worker involved in the lockout must be protected by placing his or her personal lock on the isolating device.**

*Remember*—even though the disconnect is already locked out, you are not protected until you attach your own personal safety lock.

Each worker must retain his or her key while the lock is in place. Only the worker in charge of the lock should have a key.

**Locks**

Locks should be high-quality pin-type, key-operated, and numbered to identify users (Figure 27-1).



**Figure 27-1: Lockout Devices**

## Multiple locks and lockout bars

When several workers or trades are working on a machine, you can add additional locks by using a lockout bar or multi-lock adapter (Figure 27-2). You can add any number of locks by inserting another lockout bar into the last hole of the previous bar.

Figure - Don't forget lockout and tagging  
Safe Methods for Machine Guarding



Figure 27-2: Multi-lock Adapter

## Other lockout devices

**Scissors**—have holes for locks and should be made of hardened steel (Figure 27-3).



Figure 27-3: Scissors

**Chains**—should be high quality and snug fitting (Figure 27-4).

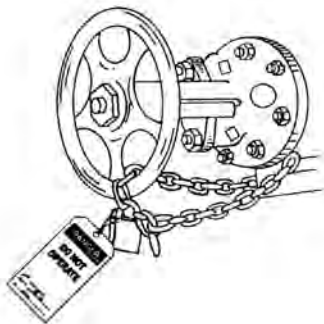


Figure 27-4: Chain

**Blocks or cribbing**—prevent or restrict movement of parts.

**Blanks or blinds**—are solid metal plates inserted at flanged connections to prevent the flow of liquids or gases (Figure 27-5).

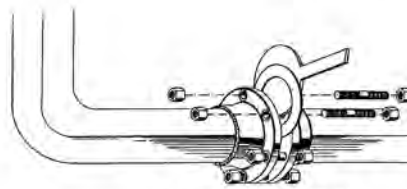


Figure 27-5: Blank or Blind

**Pins and clamps**—should be of high-quality materials and designed to fit the system.

## Remember . . .

- Merely removing a fuse doesn't constitute lockout. The fuse could be easily replaced. The fuse should be removed and the box locked out.
- The lockout devices attached to one system should not prevent access to the controls and energy-isolating devices of another system.

## STEP 8: Tagging

Section 190 of the Construction Regulation (O. Reg. 213/91) requires each worker involved in a lockout operation to attach a tag made of non-conducting material in a conspicuous location and secure it to prevent inadvertent removal. The tag must identify the worker's name, the worker's employer, the date of lockout, and the reason for the lockout.

A tag in itself offers no guarantee that a machine or system is locked out. It simply provides information (Figure 27-6).



Figure 27-6: Tags

Signs must be placed on the system indicating that

- it must not be energized or operated
- guards, locks, temporary ground cables, chains, tags, and other safeguards must not be tampered with or removed until
  - a) the work is complete, and
  - b) each worker has removed his or her personal lock.

A record must be kept of all equipment locked out or otherwise rendered inoperable so that all of these devices can be reactivated once the work is complete.

### STEP 9: Verify Zero-Energy State

After any power or product remaining in the equipment has been discharged or disconnected by qualified personnel, verify that all personnel are clear of the equipment. Then try, with extreme caution, to start the equipment manually. Look for any movement or functions. If none are observed, confirm that all energy sources are at a zero-energy state.

Test the system to ensure that all electrical components are de-energized and de-activated, including interlocking and dependent systems that could feed into the system, either mechanically or electrically.

### STEP 10: Perform The Task

Carry out and complete the work assignment.

### STEP 11: Communicate That Work Is Complete And That All Personnel Are Clear

- Ensure that personnel are clear of the locked-out equipment, machinery, or system.
- Remove only **your** tags and locks.
- Tell personnel that were originally informed of the lockout that the equipment, machinery, or system is no longer locked out.

### STEP 12: Restore Power

Return systems to operational status and the switches to power ON. Have qualified personnel restart machinery or equipment.

### STEP 13: Return Control To Operating Personnel

When all work is completed, the person in charge of the lockout operation should formally return control of the equipment or system to plant personnel.

### STEP 14: Record Date/Time Lockout Removed And System Restored

This last step is important. It saves valuable information that may be lost if not recorded. Staff involved in the shutdown may not remain at the same jobsite. Owners or operators may require this information to help plan future shutdowns.

### Summary

Lockout can ensure the safety of a single mechanic working alone or of hundreds of workers in a factory. In either situation, a procedure for safe lockout and tagging must be written, implemented, and followed step by step.

Lockout and tagging procedures help to ensure that

- all energy sources are identified and locked out
- energy is not inadvertently restored while work is proceeding
- maintenance, repair, installation, and other jobs can be carried out safely
- records are kept.

IHSA has a pocket-sized booklet available that outlines step-by-step methods and procedures for de-energizing equipment, machines, and devices. The Pocket Lockout Guide (B011) was developed for the Aggregates sector, but it can be used by any industry to help them meet the legal requirements for written procedures to control sources of hazardous energy. Visit the **Products** section of the **ihsa.ca** website to order a copy.

