Using Case Studies to Train Workers

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> "We can tell people abstract rules of thumb which we have derived from prior experiences, but it is very difficult for other people to learn from these. We have difficulty remembering such abstractions, but we can more easily remember a good story. Stories give life to past experience…We are more persuasive when we tell stories. For example we can simply state our beliefs, or we can tell stories that illustrate them." (Roger Schank, 1990. *Tell me a story: A new look at real and artificial theory.* New York: Charles Scribner's Sons, p. 10).

The attached stories illustrate how case studies can be used effectively in safety training. Stories give context and help workers apply knowledge to realistic situations. Instead of lecturing to workers about abstract safety rules, use stories of injuries to engage learners in meaningful discussions about safety on the job. There are many ways injury stories can increase the effectiveness of training. For instance, you can:

1. Share an introductory story to focus attention and get participants engaged in the training process.
2. Ask trainees to share their own stories to increase the training's personal relevance.
3. Assign learners to solve problems based on injury scenarios that are relevant to their jobs.

Some stories are more effective than others:

1. A good story is one that clearly illustrates how a preventable injury can occur. A good story will also demonstrate a clear cause/effect relationship between an injury and an unsafe behavior that will be under the trainee's control.
2. The setting of the story should be similar to the work environment of your trainees. In other words, don't use stories about large manufacturing equipment to train workers who operate small office machines.
3. The story should be free from distracting side issues. For instance, experienced trainees may dismiss a story about a young, inexperienced worker by attributing the accident to immaturity, rather than unsafe behavior.
4. The theme of the story should not be inflammatory; otherwise, unproductive blaming may ensue. For instance, if you are training line workers, don't use a story about a supervisor whose actions led to a line worker's death.
5. Good stories have suspense. Try telling the first half of the story, and then ask participants to predict what's going to happen next. Let participants discuss what the story's character *should* do to avoid injury before telling them what actually happened.

Sources of injury stories for training:

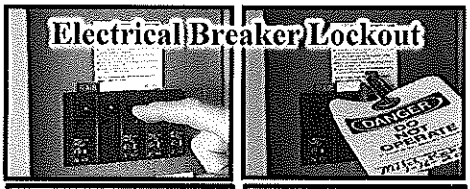
1. National Institute for Occupational Safety and Health (NIOSH) Fatality Assessment and Control Evaluation (FACE) reports: http://www.cdc.gov/niosh/face/
2. Occupational Safety and Health Administration (OSHA) accident investigations: https://www.osha.gov/pls/imis/accidentsearch.html

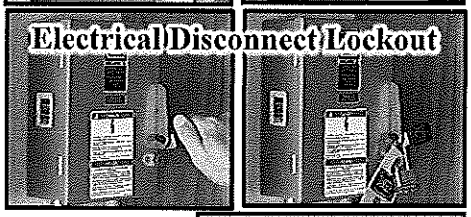
For more information, see the following book chapter (free online access): Ricketts, M. (2014). "Making Health Information Personal: How Anecdotes Bring Concepts to Life." http://krex.k-state.edu/dspace/bitstream/handle/2097/16397/RickettsIGI2014.pdf?sequence=1

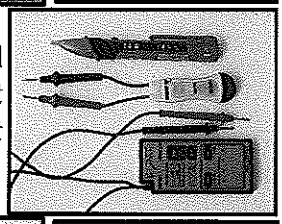
Standard Lockout/Tagout Procedures for Equipment Maintenance and Installation

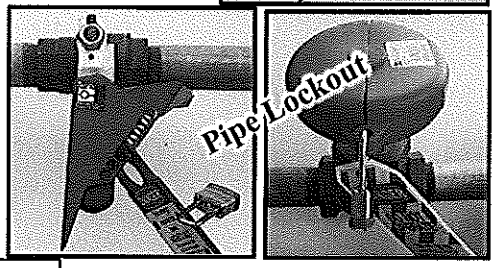
1. Notify other workers the equipment is being shut down and locked/tagged out. Also inform workers that no one should remove the lock/tag or try to start the equipment.
2. Make sure you know the hazards of the equipment and its power source. Consult the repair manual, ask your supervisor, or contact the manufacturer if necessary. Hazardous power and energy include electricity; hydraulic/pneumatic pressure; pressurized liquids/gases; toxic/flammable/corrosive/asphyxiating materials; steam; extreme heat/cold; mechanized machine parts; falling weights; elastic parts under tension; radiation; etc.
3. Shut down the equipment (push the stop button, flip the switch, close the valve, etc.).

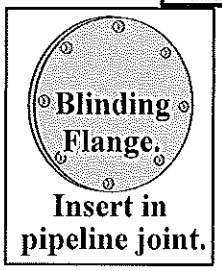
4. Shut off the power at its source (circuit breaker, manual disconnect switch, valve, etc.) and apply the lock/tag.
5. Relieve or restrain any stored power (discharge capacitors, block suspended parts, let hot parts cool, restrain flywheels, relieve air or hydraulic pressure, release or block springs, etc.).
6. If tags are being used instead of locks, take an additional safety measure (block a controlling switch, close an additional valve, etc.).
7. Make sure everyone is out of the way. Then try to start the equipment (e.g., push the "on" button) to see if all power is locked out.
8. Test electrical circuits and electrical parts of the equipment to make sure the power is off.
9. Return all operating controls to "neutral" or "off."
10. Repair the equipment.
11. Once equipment is repaired, make sure tools have been removed and equipment has been properly put back together.
12. Make sure everyone is out of the way.
13. Verify equipment controls are in the neutral or "off" position.
14. Remove locks/tags and restore power to equipment.
15. Notify other workers the repair is finished and equipment is ready for use.

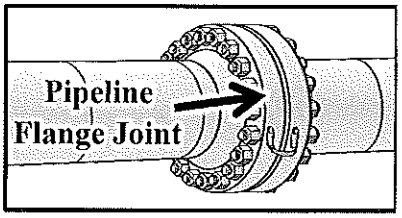


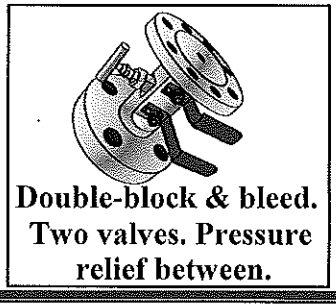












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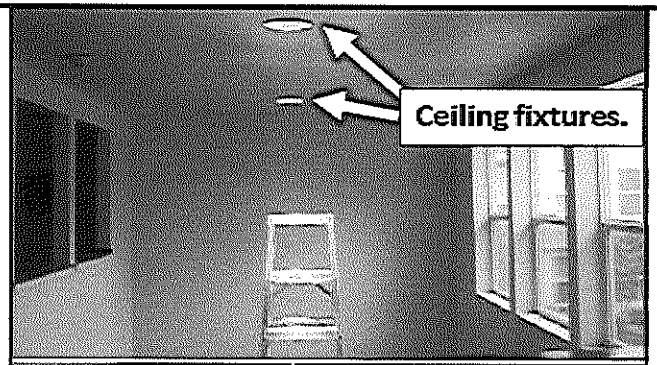
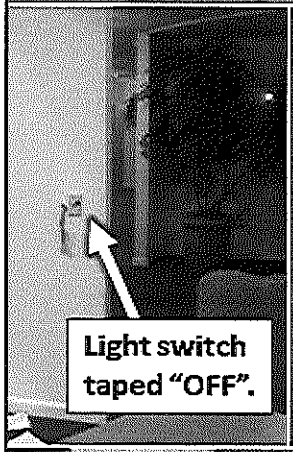
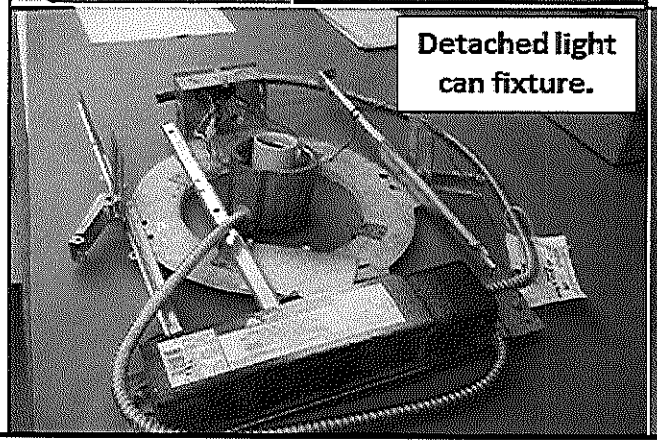
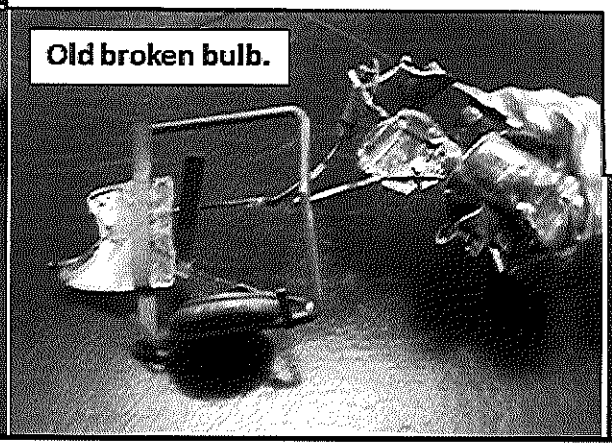
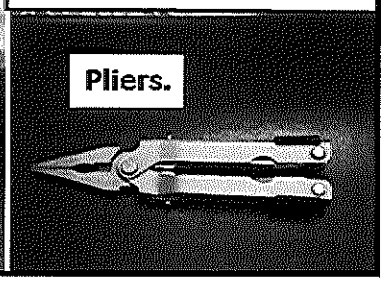
Lockout/Tagout Case 1











NIOSH Fatality Assessment and Control Evaluation (FACE) Program
Washington Case Report: 04WA080
http://www.cdc.gov/niosh/face/stateface/wa/04wa080.html

A maintenance worker was changing a broken metal halide bulb in a ceiling fixture. The worker turned off the wall light switch and taped the switch in the "off" position. He then climbed into the attic space and detached the "light can" fixture to remove the broken bulb. While holding the fixture, he used pliers to remove the bulb by its base.

Discuss the following:

1. What form(s) of hazardous energy may be present in this situation?
2. What do you think will happen to the worker? List possible outcomes in order, from most- to least-likely.
3. Refer to the lockout/tagout procedures on p. 2 of this handout. List what you believe are the FIVE MOST IMPORTANT PRECAUTIONS in this situation. Defend each of your five choices with a "because" statement.
4. How does this situation relate to maintenance tasks at your workplace? What types of electrical work are performed? Are current precautions adequate? Are any changes needed?

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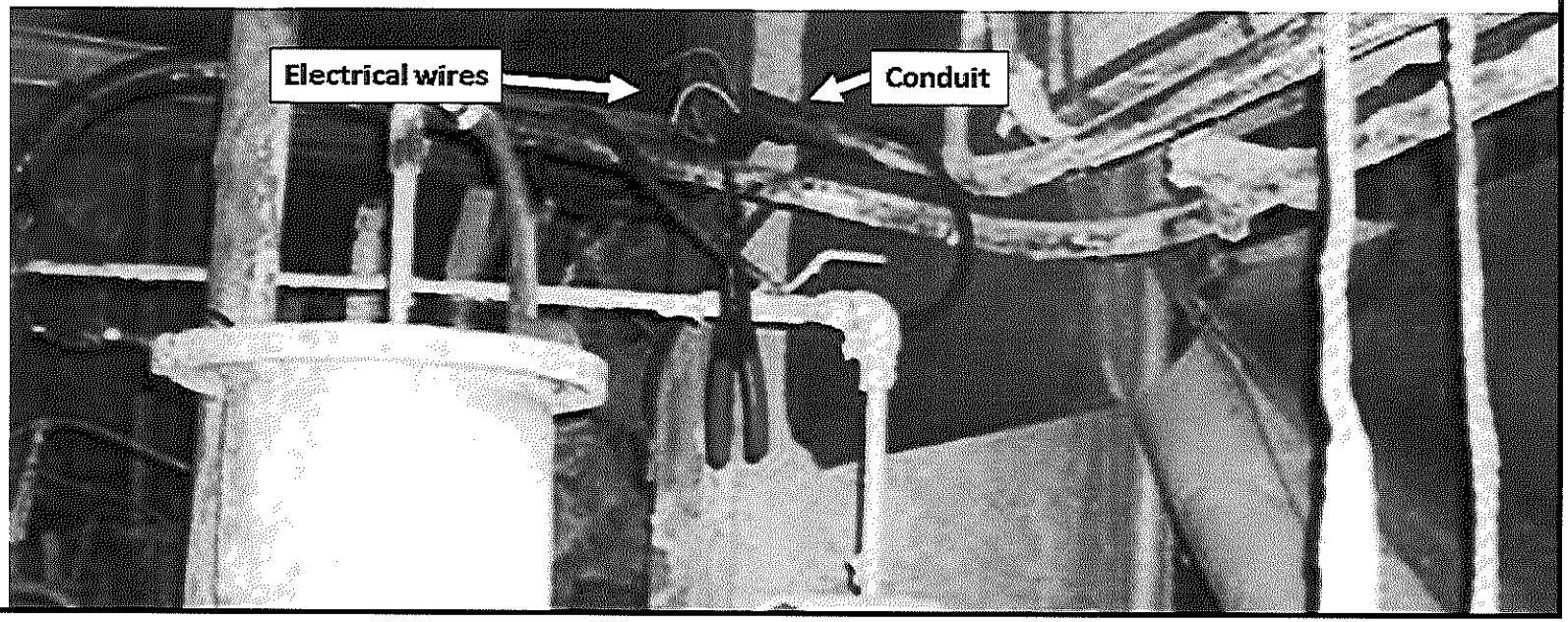
Lockout/Tagout Case 2

NIOSH Fatality Assessment and Control Evaluation (FACE) Program
California Case Report: 06CA007
http://www.cdc.gov/niosh/face/stateface/ca/06ca007.html

An experienced electrician was replacing wires in a lighting circuit in the ceiling of an industrial mill where newsprint is made from recycled paper. He climbed from a scaffold platform to the top of an industrial machine so he could reach the wiring. He pulled out his wire-stripping pliers and began to work on the circuit.

Discuss the following:

1. What form(s) of hazardous energy may be present in this situation?
2. What do you think will happen to the worker? List possible outcomes in order, from most- to least-likely.
3. Refer to the lockout/tagout procedures on p. 2 of this handout. List what you believe are the FIVE MOST IMPORTANT PRECAUTIONS in this situation. Defend each of your five choices with a "because" statement.
4. How does this situation relate to maintenance tasks at your workplace? What types of electrical work are performed? Are current precautions adequate? Are any changes needed?



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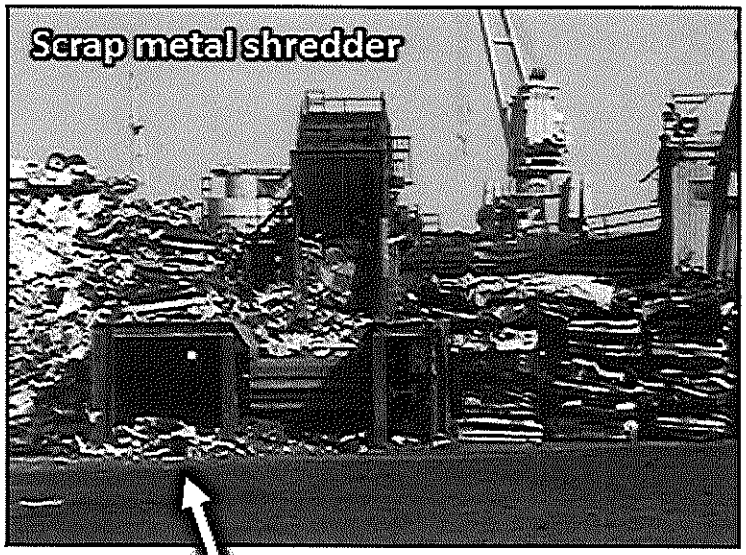
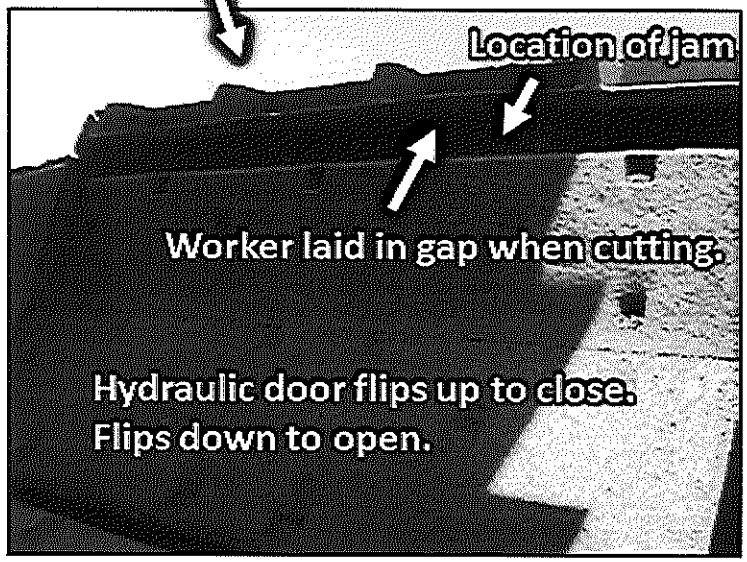
Lockout/Tagout Case 3





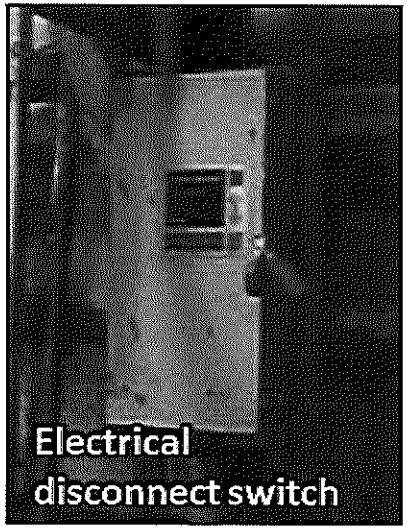
NIOSH Fatality Assessment and Control Evaluation (FACE) Program
California Case Report: 02CA004
http://www.cdc.gov/niosh/face/stateface/ca/02ca004.html

A piece of scrap metal became jammed in a large *hydraulic* door on a scrap metal shredder. The jam prevented the door from closing. an experienced 52-year-old welder was sent to cut the jammed scrap metal with a torch.

First, he shut down and locked out *electricity* at an electrical disconnect switch. Next, He climbed a ladder to the top of the hydraulic door. He then laid across the top of the door and cut the jammed metal with a torch as he had often done before.

Discuss the following:

1. What forms of hazardous energy may be present? List all you can think of.
2. What do you think will happen to the welder? List possible outcomes in order, from most- to least-likely.



3. Refer to the lockout/tagout procedures on p. 2 of this handout. List what you believe are the FIVE MOST IMPORTANT PRECAUTIONS in this situation. Defend each of your five choices with a "because" statement.
4. How does this situation relate to tasks at your workplace? Do any maintenance tasks involve multiple energy sources? Are current precautions adequate? Are any changes needed?

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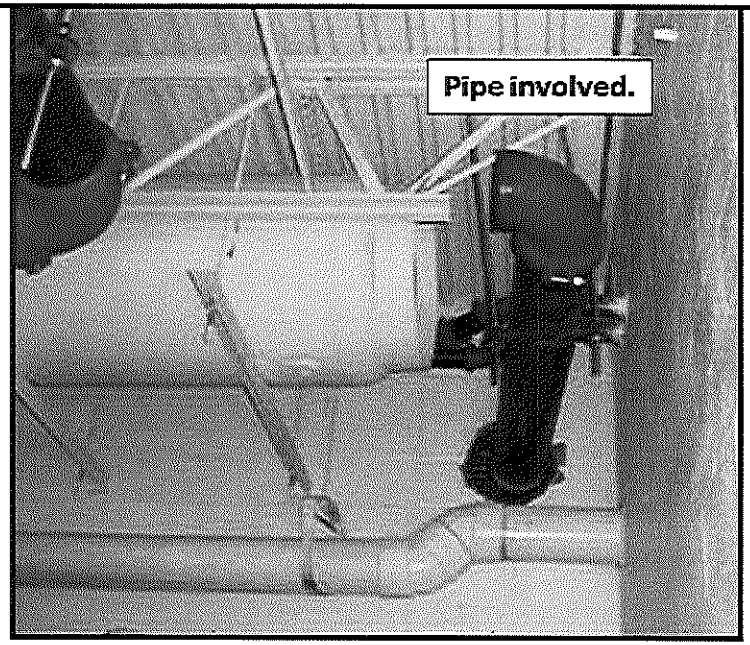
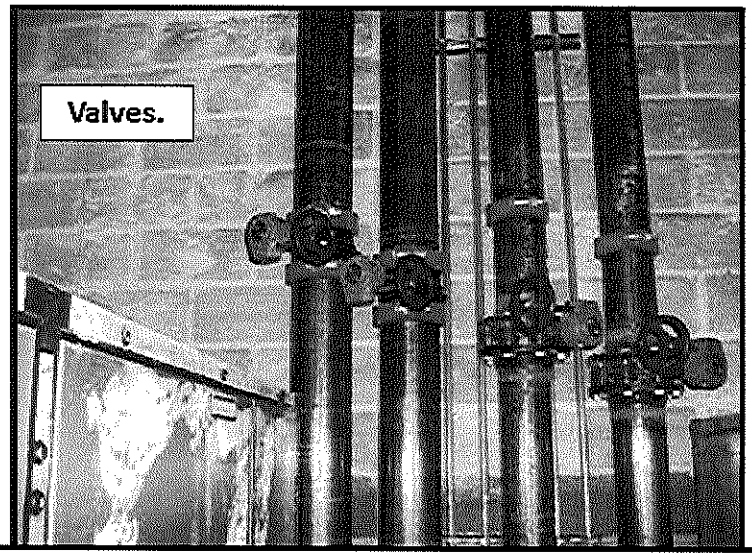
Lockout/Tagout Case 4



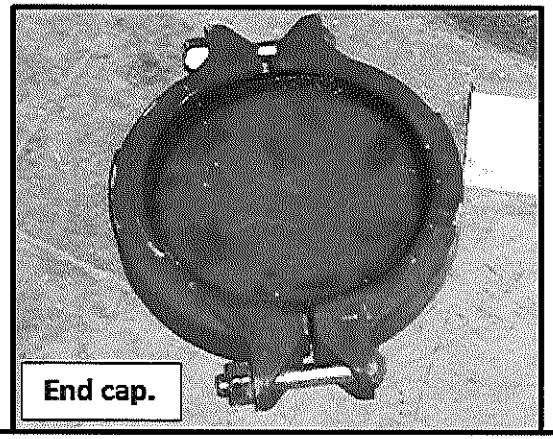


NIOSH Fatality Assessment and Control Evaluation (FACE) Program
Michigan Case Report: 06MI201
http://www.cdc.gov/niosh/face/stateface/mi/06mi201.html

A plumber was removing an end cap from a pressurized eight-inch water line in a boiler room. Leak checking was underway. Upstream valves had been closed, and this section of pipe was pressurized to 80 pounds per square inch (psi).

Discuss the following:

1. What forms of hazardous energy may be present in this situation? List all you can think of.
2. What do you think will happen to the plumber? List possible outcomes in order, from most- to least-likely.
3. Refer to the lockout/tagout procedures on p. 2 of this handout. List what you believe are the FIVE MOST IMPORTANT PRECAUTIONS in this situation. Defend each of your five choices with a "because" statement.
4. How does this situation relate to tasks at your workplace? Do maintenance workers open piping with hazardous contents? What are the hazards? Are current precautions adequate? Are any changes needed?



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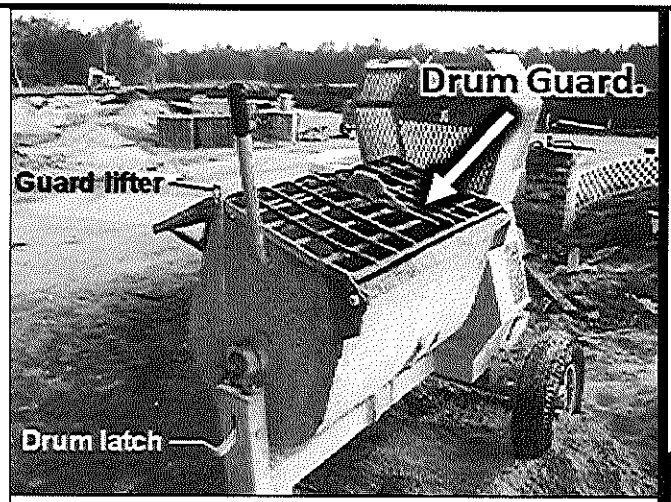
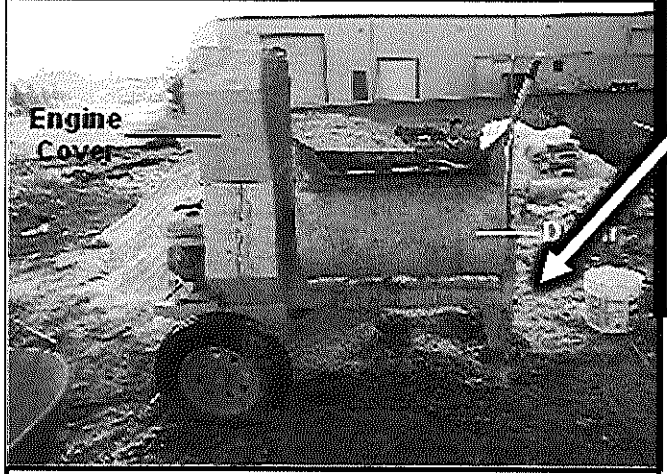
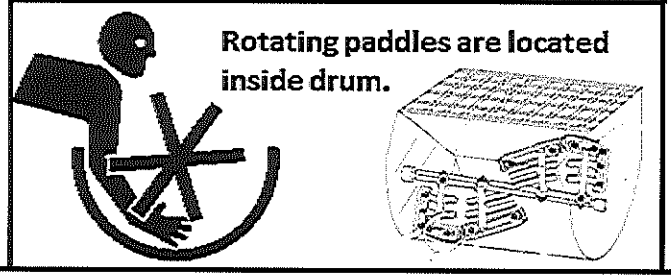
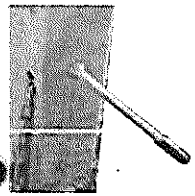
Lockout/Tagout Case 5









Clutch lever engages mixing blades

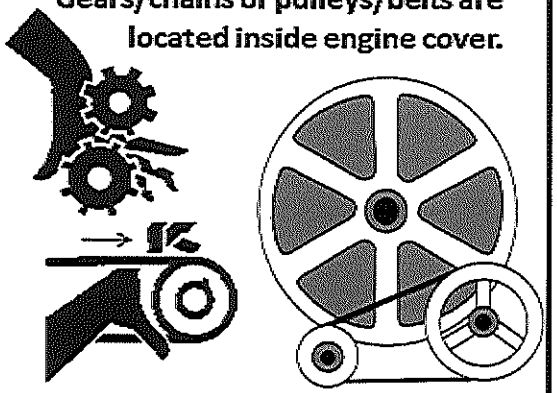
NIOSH Fatality Assessment and Control Evaluation (FACE) Program
http://www.cdc.gov/niosh/face/In-house/full200313.html

A worker was cleaning a gasoline-powered mortar mixer at a construction site. With the engine running, drum guard open, and mixing-blades rotating, the worker used a water hose to clean the inside of the drum.

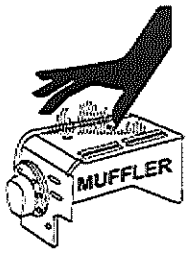
Discuss the following:

1. What forms of hazardous energy may be present in this situation? List all you can think of.
2. What do you think will happen to the worker? List possible outcomes in order, from most- to least-likely.
3. Refer to the lockout/tagout procedures on p. 2 of this handout. List what you believe are the FIVE MOST IMPORTANT PRECAUTIONS in this situation. Defend each of your five choices with a "because" statement.
4. How does this situation relate to jobs at your workplace? Do any maintenance tasks involve similar hazards? Are current precautions adequate? Are any changes needed?

Gears/chains or pulleys/belts are located inside engine cover.



Muffler is hot for some time after shutdown.



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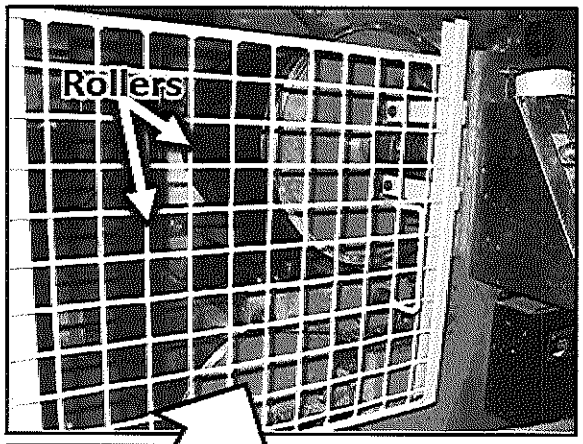
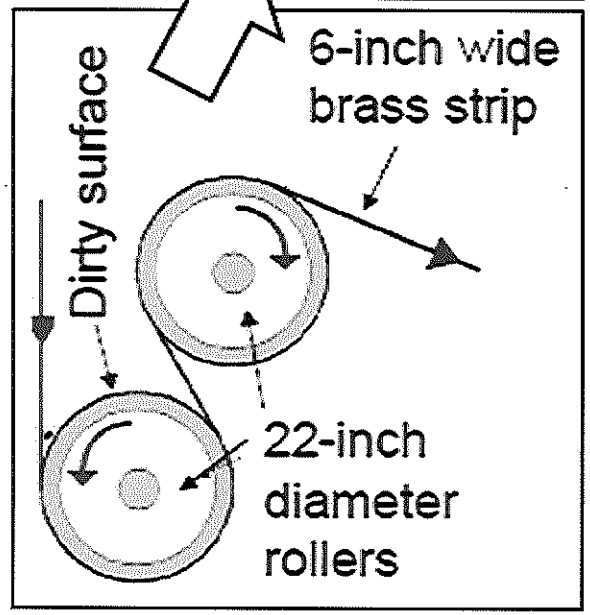
Lockout/Tagout Case 6 Outcome





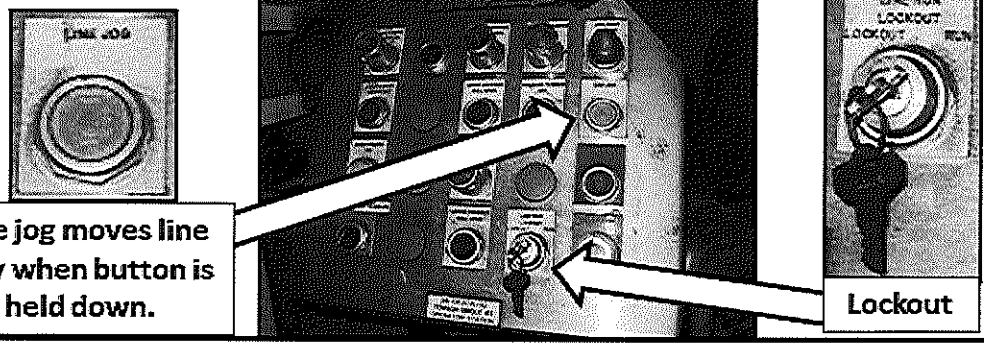
NIOSH Fatality Assessment and Control Evaluation (FACE) Program
New York Case Report: 02NY026
http://www.cdc.gov/niosh/face/stateface/ny/02ny026.html

A worker was operating a coating machine. A strip of brass moved through the machine—passing over rollers which maintained tension on the strip at 1,000 psi. One of the rollers was dirty and began making dents in the brass strip. The worker decided to clean the roller.

To clean the roller, the worker reached in and held sandpaper against the roller as the machine ran at slow speed (50 feet per minute, fpm).

Discuss the following:

1. What forms of hazardous energy may be present in this situation? List all you can think of.
2. What do you think will happen to the worker? List possible outcomes in order, from most- to least-likely.
3. Refer to the lockout/tagout procedures on p. 2 of this handout. List what you believe are the FIVE MOST IMPORTANT PRECAUTIONS in this situation. Defend each of your five choices with a "because" statement.
4. How does this situation relate to jobs at your workplace? Do any maintenance tasks involve similar hazards? Are current precautions adequate? Are any changes needed?



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