



WARREN

THE WARREN GROUP, INC. FORENSIC ENGINEERS & CONSULTANTS
7805 ST. ANDREWS ROAD | PO BOX 1608 | IRMO, SOUTH CAROLINA 29063
TEL 803.732.6600 FAX 803.732.7576 ⚡ WARRENFORENSICS.COM

Can an Interlocked Guard take the Place of LockOut/TagOut?

Yes, if the Requirements of the Minor Servicing Exception are Met

Jeffery H. Warren, PhD, PE, CSP

A forge operator's right hand and arm had to be amputated when a coworker jogged a forge press causing the dies and punches to close on them while he had his hands in the press checking the dies for burrs. A successful products liability suit was filed against the press manufacturer. A summary of the issue of interlocked guards versus lockout/tagout is provided.

A forging press containing a set of 5 dies and punches was being used at a manufacturing facility to produce the ends on "sucker rods". Sucker rods are used in the oil industry to tie together the above ground mechanism with the underground reciprocating piston pump that is going to "suck" the oil out of the ground.



The end of a "sucker rod"



A "sucker rod" as used in the oil industry

Two third-shift forge operators were working together to perform startup tasks on the forge press. These tasks included tightening the punches, adjusting the dies, and checking the dies for burrs that would adversely affect the product. The tasks were routine and repetitive and were part of the normal production operation. They were performed multiple times per shift. It was the policy of the plant not to lockout and tagout the press for these tasks.

The press had an emergency stop plug. When the plug was inserted the press would operate; and when removed, the press could not operate. When the two workers first began their work, one of the workers took the emergency stop plug out and placed it on top of the machine. Both men knew the machine could not operate at that time.

The two workers assisted each other in tightening four of the five punches with one of two T-handle wrenches. At this point the lead worker walked off. Without the worker knowing it, the lead worker replaced the emergency stop plug. The lead worker then went to the jog control on the wall where he could not see the other operator checking the dies and pressed the inch-jog button on the side of the wall mounted control box.

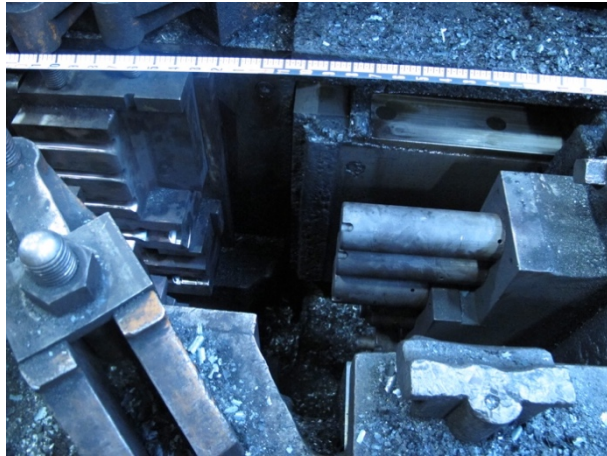


The Emergency Stop Plug and Socket



The Stop Plug on top of the machine





The dies and punches. The top four dies had been tightened.



They had finished tightening four of the punches with one of these T-handle wrenches when the lead worker walked off.

While the lead worker was gone, the injured worker had been using his gloved hands to check the dies for burrs. The dies and punches came together and created a pinch point that severely crushed the worker's right hand and arm, causing it to be amputated midway between the wrist and elbow. After the injury, the employer added an interlocked, hinged, expanded metal guard over the area where the worker had reached in to check the dies for burrs. The press could not operate any time the guard was opened.

A products liability case was filed against the forge press manufacturer for, among other things, failing to install an interlocked guard. The press manufacturer's defense was the press should have been locked out and tagged out.

29 CFR 1910.147 The Control of Hazardous Energy is the applicable OSHA code regarding lockout/tagout while the complimentary ANSI/ASSE Z244.1 Control of Hazardous Energy- Lockout/Tagout and Alternative Methods is the applicable American National Standard.



The OSHA code is applicable to employers and provides guidance regarding when a machine needs to be isolated from sources of energy during service and maintenance. The code requires the following be done to properly lockout and tagout a machine.

- Notify all affected employees
- If the machine is operating, shut it down
- Deactivate the energy isolating device
- Lockout with an individual lock and tag
- Dissipate or restrain any stored energy
- Verify isolation by operating Push-button
- The machine is now locked out



While the coworker was gone, the injured worker used his gloved hands to check the dies for burrs.



The Jog Control is on the wall where the man with the hardhat is located.

The problem is that this lockout/tagout relies on a procedure while an interlocked guard does not. An engineered guard is always preferred over a procedure per the well-established safety hierarchy.

A deeper look at the OSHA code indicates there is a minor servicing exception that allows a worker to not have to lock out and tag out a machine. The OSHA code reads:

1910.147(a)(2)(i)

This standard applies to the control of energy during servicing and/or/maintenance of machines and equipment.

1910.147(a)(2)(ii)

Normal production operations are not covered by this standard (See Subpart O of this Part). Servicing and/or maintenance which takes place during normal production operations is covered by this standard only if:

1910.147 (a)(2)(ii)(A)

An employee is required to remove or bypass a guard or other safety device; or

1910.147(a)(2)(ii)(B)

An employee is required to place any part of his or her body into an area on a machine or piece of equipment where work is actually performed upon the material being processed (point of operation) or when an associated danger zone exists during a machine operating cycle.

NOTE: Exception to paragraph(a)(2)(ii): Minor tool changes and adjustments, and minor servicing activities, which take place during normal production operations, are not covered by this standard if they are routine, repetitive, and integral to the use of the equipment for production, provided that work is performed using alternative measures which provide effective protection (See Subpart O of this Part).



A review of OSHA interpretation letters indicates that OSHA does not require lockout/tagout when tasks can be safely accomplished by employees where extensive disassembly is not required. If an employee bypasses a guard required by 1910.212 or 1910.219..., lockout/tagout is required.

If no such exposure occurs (either because of the methods in which minor servicing is performed or because special tools, techniques, or other protection is used) lockout/tagout is not required, provided the employer is using alternative measures that enable an employee to perform minor servicing without being exposed to a hazard.

Under no circumstances “is an employee ever permitted to place any part of his or her body within a hazardous area, such as the point of operation, while the equipment is running or energized (and alternative measures have not been taken), or around power transmission apparatus.”

Effective alternative protection may include:

- Special tools or techniques
- Remote oilers or other remote devices
- Two hand safety control devices
- Control devices located at a safe distance from the hazardous energy source
- Interlocked barrier guards.

Servicing must be conducted when the machine or equipment is stopped. Each servicing employee must have continuous, exclusive control of the means to start the machine or equipment, and safeguarding must be provided to each servicing employee to prevent exposure from the release of harmful stored, or residual energy.



The interlocked guard installed after the injury on the forging press by the employer is “effective alternative protection” per the “minor servicing exception”. The tasks were routine, repetitive and part of the normal production process. Had the manufacturer designed the machine with an interlocked guard the incident would not have occurred.



The Interlocked Guard installed after the injury is
“Effective Alternative Protection”

If you have a case involving lockout/ tagout and interlocked guards, we encourage you to contact us.

Jeffery H. Warren, PhD, PE, CSP, is the chief engineer and CEO at Warren specializing in mechanical, machine design and safety. His deep expertise in machine design and safety analysis makes him a frequent presenter, trainer and expert witness. In addition to investigating more than 2000 claims involving property damage and injuries related to machinery and equipment since 1987, Jeff has an undergraduate degree in Mechanical Engineering from the University of North Carolina as well as a Master of Science and a Doctorate in Mechanical Engineering from Virginia Polytechnic Institute and State University — both with machine design emphasis.

