THE HARTFORD

Loss Control TIPS

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Safeguarding Power Presses: A Special Emphasis

Introduction

Every so often, OSHA will target specific industries for inspection, due to significant injuries that are occurring. This is accomplished by a concerted effort that OSHA refers to as a National Emphasis Program (NEP). On a smaller/regional scale and a more narrow industrial band, local emphasis programs (LEP) can also be developed (e.g., for textiles, refineries).

Recently, a NEP was proposed for at least ten industry types (e.g., metal and sheet metal stamping operations, hardware producers, motor vehicle part and accessories, etc.) for possible inspection. In general, these industries have metal fabrication processes that use power presses. In addition, area OSHA offices have been instructed to add any establishments where serious injuries or fatalities related to power presses have occurred in the last three years. Essentially, any user of power presses could be inspected under this program directive. Large companies, and companies with ten or fewer employees could be affected. Power presses are used on a large scale (at least one million workers and more than 300,000 presses).

At minimum, the inspections will cover safeguards provided at the point of operation, inspections and recordkeeping, and training. What follows is information about the most commonly reviewed and cited compliance areas.

Safeguarding The Point Of Operation (POO)

It is the responsibility of the employer to provide and insure the use of Point of Operation (POO) guards or properly applied and adjusted devices on every operation performed on a mechanical power press. (Guards prevent entry to the POO.) The OSHA regulation at 29 CFR 1910.217 (c) states: "Every point of operation guard shall meet the following design, construction, application, and adjustment requirements:

a) It shall prevent entry of hands or fingers into the POO by reaching through, over, under, or around the guard;

b) It shall conform to the maximum permissible openings of Table O-10 (below);

Table O-10

Distance of opening from the point of operation hazard (in inches)	Maximum width of opening (in inches)
1/2 to 1 1/2	1/4
1 1/2 to 2 1/2	3/8
2 1/2 to 3 1/2	1/2
3 1/2 to 5 1/2	5/8
5 1/2 to 6 1/2	3/4
6 1/2 to 7 1/2	7/8
7 1/2 to 12 1/2	1 1/4
12 1/2 to 15 1/2	1 1/2
15 1/2 to 17 1/2	1 7/8
17 1/2 to 31 1/2	2 1/8

c) It shall, in itself, create no pinch point between the guard and moving parts of the machine;
d) It shall use fasteners not readily removable by an operator, so as to minimize the possibility of misuse or removal of essential parts;
e) It shall facilitate inspection, and
f) It shall offer maximum visibility of the POO consistent with other requirements.

The basic types of guards that are allowed for the above application are fixed barrier, interlocked, or adjustable.

29 CFR 1910.217 (c)(3) states: POO devices [i.e., devices to control POO entry.] shall protect the operator by:

a) Preventing and/or stopping normal stroking of the press if the operator's hands are inadvertently placed in the POO; or
b) Preventing the operator from inadvertently reaching into the POO; or withdrawing his hands if they are inadvertently located in the POO, as the die closes; or
c) Preventing the operator from inadvertently reaching into the POO at all times; or;
d) [Reserved];
e) Requiring application of both of the operator's hands to machine operating controls and locating such controls at such a safety distance from the POO that the slide completes the downward travel or stops before the operator can reach into the POO with his hands; or
f) Enclosing the POO before a press stroke can be initiated, and maintaining this closed condition until the motion of the slide has ceased; or
g) Enclosing the POO before a press stroke can be initiated, so as to prevent an operator from reaching into the POO prior to the die closure or prior to cessation of the slide during the downward stroke.

The basic types of devices that are allowed for the above application are gates, presence sensing, pullouts, restraints, two hand controls, and two hand trips.

Guard And Device Functions

What follows is a brief overview of the kinds of guards and devices that can be used on mechanical power presses. Presses that can stop midstroke are termed *part revolution presses*. Presses that, by design, must run a complete stroke before stopping are called *full revolution presses*. Set back distances (from POO hazards) for safeguard devices will be determined by the kind of press and its stopping capability. Guidance for the set back determinations can be found in 29 CFR 1910.217 (c)(3)(vii) and (c)(3)(viii).

Fixed Guards

A fixed guard is a rigid enclosure that is designed to suit any work piece placed into the POO. Gaps in the guard must restrict fingers/limbs form entering the POO.

Adjustable Guards

An adjustable guard can vary, on demand, as the parts change, or it may require tailored adjustment in accord with the work piece dimensions.

Interlocked Guards

An electrical interlock is integrated into the control system to disengage a critical function (e.g., clutch engagement). When the interlock is open, the equipment stroke cycle/motion cannot be initiated.

Gates

A gate is a door-like device that must be closed, following part placement, in order for the stroke to be initiated. An “A” type gate remains closed during the full cycle of the press. A “B” type gate can be opened mid-stroke. When this occurs, the press (part revolution only) will stop.

Presence Sensing

Light curtains are placed at the proper set-back distance (determined from stop time measurements) from the POO. An operator cannot move his or her hands through the light curtain and into the POO before the press stops.

Alternatively, a capacitance field can be generated by running an insulated wire carrying current around (in conduit) the POO. When the field is grounded by the presence of an operator and registered by the detection system, the press stops. Only part revolution presses may be equipped with either type of presence sensing device.

Pullouts

Using cables (attached to the slide or die of the press), pulleys, and a hand harness for each hand, an operator's hands are literally pulled from the POO upon stroke initiation (usually by a foot pedal which needs to be covered on three sides). A tool for part placement is required because the hands must not enter the POO. Supervision must verify proper adjustment and sign off for each operator on each shift. Either type of press may use pullbacks.

Restraints

Restraints are tethers that do not move. The operator's restraint cables are tied off at a rigid, fixed point behind the operator. A tool for part placement is required. Supervision must verify proper adjustment and sign off for each operator on each shift. Either type of press may use restraints.

Two Hand Controls

Part revolution presses are capable of stopping during midstroke. Two hand controls (at the proper set back distance determined from stop-time measurements) can be used to occupy the operator's hands. When hands are removed, press motion stops.

Two Hand Trips

Full revolution presses are not capable of stopping midstroke. In this case, two hand trips can be used. The set back distances (determined by the number of clutch engagement points and the strokes per minute) for two hand trips will be farther from the POO than two hand controls.

Inspection and Maintenance Records and Reporting

It is the responsibility of the employer to establish and follow a program of *periodic and regular inspections* (OSHA indicates 90 days) of power presses to insure that all their parts, auxiliary equipment, and safeguards are in safe operating condition (e.g., metal fatigue cracks, adequate spring tension, brake system function, electrical continuity, power transmission apparatus) and adjustment. The employer shall maintain a certification record of inspections, which includes the date of the inspection, signature of the person who performed the inspection, and serial number (identifier) of the press. Essentially, this is an examination of the entire press.

On a weekly basis, each mechanical power press must be inspected and tested. This inspection will determine the condition of the clutch/brake mechanism, anti repeat feature and single stroke mechanism. Necessary repair and maintenance work will be performed before the press is operated. Records of the inspection must be maintained, to include date of the inspection, tests and maintenance work accomplished, signature of the inspector, and serial number (identifier) of the press.

On part revolution presses, when hands in die feeding is practiced and two hand controls, presence sensing or a type B gate device are used; the employer shall provide *control reliability and brake monitoring systems*. The control systems must be constructed so that a control system failure (either air or electrical) does not prevent the normal stopping action from being applied to the press when required. Initiation of the next stroke will be prevented until the failure is corrected. The failure shall be detectable by a simple test or indicated by the control system (usually a set of rotary cam limit switches or pop up indicators). The requirement does not apply to the elements of the control system which have no effect on protection against POO injuries.

The *brake monitor* shall be constructed to automatically prevent the action of a successive stroke if the stopping time gets longer or the braking distance increases. Either of these circumstances will affect the set back distances and the safeguard effectiveness of two hand controls, presence sensing or type B gate devices. Presses with brake monitoring will have an indicator (usually a light) that highlights the failure. When the light comes on, the press will not operate.

If a press has both control reliability and brake monitoring, then the mandated, weekly inspection is not required. This is because the press self-inspects with each and every stroke. These features will only be found on part revolution presses. Full revolution presses must have a weekly inspection and records as described above.

Smaller presses that have punch stems present a single point attachment for the upper die. Provision must be made to secure (chain or steel tether) the die to the upper slide. This will prevent the die from falling into the POO should the punch stem break.

Power press motors shall be protected against accidental start up, which can occur when facility power fails (as in a lightning strike). When power returns, the press must not start up, but instead requires a deliberate reset. This is usually accomplished with a magnetic motor drive starter.

Employers shall report injuries to employees operating mechanical power presses within thirty days of the occurrence. The report must be made to the Director of the Office of Standards Development in Washington, DC (see 29 CFR 1910.217 (g) for address and details) or the state agency administering the OSHA program. This report pertains only to point of operation injuries for a power press. Maintain a record of this report to verify compliance if POO power press injuries are noted in the OSHA 200 log.

The above paragraphs of this section do not represent an inclusive listing of press inspection discrepancies. They are items that are frequently cited by compliance officers. For a more complete inspection, the entire standard at 29 CFR 1910.217 should be reviewed to determine where there might be compliance shortfalls.

Training

The employer shall insure the original and continuing competence of personnel caring for, inspecting, and maintaining presses. Employers must provide adequate supervision and correct operating procedures. Employees shall be trained in safe work methods. The training in all phases of press operations, capabilities and limitations will cover:

- ☐ How to use press controls
- ☐ Safeguard features of the press and their correct function
- ☐ Use of tools to remove stuck work, and swabs, brushes and oil cans for lubrication
- ☐ Use of personal protective equipment
- ☐ Hazards (storage of items on dies and pinch points) and housekeeping
- ☐ Checking and testing of press prior to operations; reporting of any discrepancies
- ☐ Allowing at least eight hours of training under supervision for operators prior to being assigned to operate the press is suggested.

Summary

Some manufacturers may rush out to correct their power press discrepancies. This is certainly in line with the goals of the NEP. Whatever the level of effort, when the work is done, compliance with the OSHA standard at 29 CFR 1910.217 must be accomplished. Safeguarding may be instituted by in-house resources or by the original equipment manufacturer. If in-house resources provide modifications; unexpected operational modes must not be introduced, manufacturer safeguards need to remain intact, and equipment warranties must not be voided. Failure to attend to these concerns will exacerbate the liability of the employer.

The first state to have the NEP instituted on a random basis will be Massachusetts (775 companies have been notified). No further schedule information is available at this time, though all states will certainly be included shortly.

Though this is a NEP, OSHA's primary prioritization of tasks will remain. They will always investigate fatalities first, then catastrophes (three or more hospitalized over night), then signed complaints. Program inspections will be conducted at random and will take place only when the previous tasks are addressed.

Some OSHA compliance officers report that, due to present work loads and staffing, some OSHA offices may have limited time for this effort. Though this is a significant NEP, actual inspections will be accomplished within the previous prioritization directive on a time available basis. There is no sunset clause for the NEP. We can expect to see it administered for a number of years until satisfactory results are determined by OSHA.

References

1. United States Department of Labor, Occupational Safety and Health Administration. Directorate of Compliance Programs. OSHA Instruction CPL 2-1.24, February 27 1997; "National Emphasis on Mechanical Power Presses, 29 CFR 1910.217"
2. "OSHA Special Emphasis Program to Target Massachusetts Industries." *Workers' Compensation Report*; May 12, 1997
3. "Safeguarding Fabricating Equipment." (Catalog) Rockford Systems, Rockford, IL, 1996.
4. United States Department of Labor, Occupational Safety and Health Administration. 29 CFR 1910.217 Regulation, "Mechanical Power Presses"

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