Machine Guarding The Full-Rev Press



The OSHA standard states: “It shall be the responsibility of the employer to provide and insure the usage of “point of operation guards” or properly applied and adjusted point of operation devices on every operation performed on a mechanical power press.”

The OSHA standard states:

“It shall be the responsibility of the employer to provide and insure the usage of “point of operation guards” or properly applied and adjusted point of operation devices on every operation performed on a mechanical power press.” [29 CFR 1910.217 (c)(1)(i)].

Guards are mandatory and it’s the employer’s responsibility to provide them and ensure their usage. This is equally true in Canada.

Selecting the Right Guard

There are two types of mechanical power presses:

1. Full-revolution; and
2. Part-revolution

(Hydraulic presses are covered under different OSHA guidelines.)

The Full-Revolution Press

When cycled (tripped), a full-revolution (full-rev) press cannot be disengaged until the crankshaft makes a complete rotation and the press slide returns to the top. There is no stopping the cycle once tripped; so light curtains or E-Stops are useless. The press stops by mechanical means through the use of a pin (called a “dog”) on the flywheel shaft. Thus, when the press is tripped, the pin is pulled from a keyhole allowing the press flywheel to rotate 360 degrees until the pin drops back into the keyhole after one revolution, which mechanically stops the press.

The only types of guarding acceptable for full-revolution presses are:

- Full-barrier guarding (barrier guards surrounding the press point of operation (POO) area);

- Physical restraints; and
- Pullback devices, whereby the operator's hands are mechanically pulled back away from the POO when the press is cycled.

It is the employer's responsibility to furnish and ensure the use of point of operation guards of mechanical power presses. The OSHA standard covers two types of presses: full-revolution presses and part-revolution presses. (Hydraulic presses are covered under a different standard.) Last week, we looked at the guarding required for full-revolution presses.

Guarding of Part-Revolution Presses
Unlike a full-revolution (full-rev) press which cannot be stopped once it's tripped, a part-revolution (part-rev) press can stop at any point during the cycle. Motion is stopped through the use of friction brakes. When the control buttons are simultaneously depressed, the press cycles and runs according to:

- What is programmed into the selector switch (off, continuous, inch and single-stroke modes); and
- What the control box is programmed for (it has internal cams that are set to control items such as lubrication, light curtains, other mechanical devices, etc.).

Guarding part-rev presses can be an engineer's nightmare because of the complexity of some presses' tasks. Nevertheless, the press has to be guarded and guards must be foolproof to operators and other workers.

The Brake Monitor

When hands are in dies to place and remove parts, a brake monitor must be installed to monitor the stop-time of the press. The monitor has a manual alarm setting that's determined by maintenance (or die setup workers), so if the stopping of the press reaches a maximum stop time, it stops the press so the fault can be evaluated. This time is based upon the physical distance from the control buttons to the point of operation whereby a person can reach a distance of 36 inches in one second.

Distance Guarding

Distance may be used as a means of safeguarding workers. Safety distance timetables are set out in 29 CFR 1910.217 (c) (3) (vii) [c], which set out distances that must be exceeded based upon the press stop time.

If POO devices (light curtains) are used, that same distance must be used from the light curtain to the POO. In addition, one cannot reach over, under, around, or through a POO guard (light curtain) to access a pinch-point area, with permissible guard openings with sizes based upon distance from the guard to the POO.

Also keep in mind the risk that a worker might stand between a light curtain and the press while the press is operating. This is a violation of the standard and leaves the worker without protection from the POO.

Other Guarding Options

Other types of guards/devices include:

- A and B type gates;
- Adjustable and fixed barrier guards;
- Interlocks for barrier guards;
- Pull-out devices (pull-back); and
- Restraints.

There are many aspects to the safe operation of a mechanical power press and it all depends on the application of that press for the particular job. There are air and spring counter-balances, air filtering, hand-feeding tools, die set-up, guard fastening, scrap handling, control reliability, anti-repeated feature, brake monitoring, inspection requirements, plus others, again, depending on the application of the press.

Conclusion

The bottom line: If an operator can get at a point of operation with his fingers or hands without removing guards, then the point of operation is not properly guarded. If assistance is needed, contact the manufacturer or your local OSHA on-site consultation for assistance. Remember, it is impossible to have an accident without the presence of a hazard!